Federal Energy Regulatory Commission

Office of Energy Projects

November 2024

DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR HYDROPOWER LICENSE

R.L. Harris Hydroelectric Project
Docket No. P-2628-066 – Alabama

Federal Energy Regulatory Commission
Office of Energy Projects
Division of Hydropower Licensing
888 First Street, NE
Washington, DC 20426

DRAFT ENVIRONMENTAL IMPACT STATEMENT

FOR HYDROPOWER LICENSE

R.L. Harris Hydroelectric Project—FERC Project No. 2628-066

Alabama

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FEDERAL ENERGY REGULATORY COMMISSION

WASHINGTON, D.C. 20426

OFFICE OF ENERGY PROJECTS

To the Agency or Individual Addressed:

Reference: Draft Environmental Impact Statement

Attached is the draft environmental impact statement (draft EIS) for the R.L. Harris Hydroelectric Project (FERC Project No. 2628-066), which is located on the Tallapoosa River near the City of Lineville in Randolph, Clay, and Cleburne Counties, Alabama. The Harris Project also includes land within the James D. Martin-Skyline Wildlife Management Area located approximately 110 miles north of Harris Lake in Jackson County, Alabama. The project consists of Harris Lake; a powerhouse; two transmission lines; and other associated facilities. The project occupies 4.9 acres of federal land administered by the Bureau of Land Management.

This draft EIS documents the view of governmental agencies, non-governmental organizations, affected Indian Tribes, the public, the license applicant, and Federal Energy Regulatory Commission (Commission) staff. It contains staff evaluations of the applicant's proposal and the alternatives for relicensing the R.L. Harris Hydroelectric Project.

Before the Commission makes a licensing decision, it will take into account all concerns relevant to the public interest. The draft EIS will be part of the record from which the Commission will make its decision. The draft EIS was sent to the U.S. Environmental Protection Agency and made available to the public on or about November 21, 2024.

The draft EIS may be viewed on the Internet at www.ferc.gov/docs-filing/elibrary.asp. Please call (202) 502-8222 for assistance.

Attachment: Draft EIS

COVER SHEET

a.	Title:	Environmental Impact Statement for Hydropower License, R.L. Harris Hydroelectric Project— FERC Project No. 2628-066
b.	Subject:	Draft Environmental Impact Statement
c.	Lead Agency:	Federal Energy Regulatory Commission
d.	Abstract:	The R.L. Harris Hydroelectric Project is located on the Tallapoosa River near the City of Lineville in Randolph, Clay, and Cleburne Counties, Alabama. The Harris Project also includes land within the James D. Martin-Skyline Wildlife Management Area located approximately 110 miles north of Harris Lake in Jackson County, Alabama. The 135-megawatt project consists of a powerhouse owned by Alabama Power Company, two 115-kilovolt transmission lines, which extend 1.5 miles from the dam to the Crooked Creek Transmission Substation; water storage, diversion, and conveyance facilities associated with the powerhouse, including a dam, spillway with six gates, and intake; and other associated facilities. The project occupies 4.9 acres of federal land administered by the Bureau of Land Management. The staff's recommendation is to relicense the project as proposed, with certain modifications and additional measures recommended by the agencies and staff.
e.	Contact:	Sarah Salazar Federal Energy Regulatory Commission Office of Energy Projects 888 First Street, N.E. Washington, D.C. 20426 (202) 502-6863
f.	Transmittal:	This draft environmental impact statement to relicense the R.L. Harris Hydroelectric Project is being made available to the public on or about November 21, 2024, as required by the National Environmental Policy Act of 1969[1] and the Commission's Regulations Implementing the National Environmental Policy Act (18 C.F.R., Part 380).

[1] National Environmental Policy Act of 1969, amended (Pub. L. 91-190. 42 U.S.C. §§ 4321–4347, as amended by Pub. L. 94-52, July 3, 1975, Pub. L. 94-83, August 9, 1975, Pub. L. 97-258, §4(b), September 13, 1982, Pub. L. 118-5, June 3, 2023). On May 20, 2024, CEQ issued updated regulations that went into effect for new NEPA processes begun after July 1, 2024. 40 C.F.R. § 1506.12 (2024). This action is subject to CEQ's previous regulations; thus, citations throughout this document will refer to the 2023 regulations.

FOREWORD

The Federal Energy Regulatory Commission (Commission), pursuant to the Federal Power Act (FPA)[2] and the U.S. Department of Energy Organization Act[3] is authorized to issue licenses for up to 50 years for the construction and operation of non-federal hydroelectric developments subject to its jurisdiction, on the necessary conditions:

"That the project adopted…shall be such as in the judgment of the Commission will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce, for the improvement and utilization of water-power development, for the adequate protection, mitigation, and enhancement of fish and wildlife (including related spawning grounds and habitat), and for other beneficial public uses, including irrigation, flood control, water supply, and recreational and other purposes referred to in section 4(e)…"[4]

The Commission may require other conditions consistent with the FPA and as may be found necessary to provide for the various public interests to be served by the project.[5] Compliance with such conditions during the licensing period is required. The Commission's Rules of Practice and Procedure allow any person objecting to a licensee's compliance or noncompliance with such conditions to file a complaint noting the basis for such objection for the Commission's consideration.[6]

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[2] 16 U.S.C. §791(a)-825r, as amended by the Electric Consumers Protection Act of 1986, Pub. L. 99-495 (1986), the Energy Policy Act of 1992, Pub. L. 102-486 (1992), and the Energy Policy Act of 2005, Pub. L. 109-58 (2005).

[3] Pub. L. 95-91, 91 Stat. 556 (1977).

[4] 16 U.S.C. § 803(a).

[5] 16 U.S.C. § 803(g).

[6] 18 C.F.R. §385.206 (2018).

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LIST OF APPENDICES

ACRONYMS AND ABBREVIATIONS

401 certification	Water quality certification under section 401 of the Clean Water Act
Alabama CAMP	Alabama Coastal Area Management Plan
Alabama CFWRU	Alabama Cooperative Fish and Wildlife Research Unit
ACT	Alabama-Coosa-Tallapoosa (River Basin)
ADA	Americans with Disabilities Act
Alabama DCNR	Alabama Department of Conservation and Natural Resources
Alabama DEM	Alabama Department of Environmental Management
Alabama DPH	Alabama Department of Public Health
ADROP	Alabama Drought Response Operation Plan
Alabama Power	Alabama Power Company
Alabama NHP	Alabama Natural Heritage Program
APE	area of potential effects
APLIC	Avian Power Line Interaction Committee
ATV	all-terrain vehicle
BCC	birds of conservation concern
BESS	Battery Energy Storage System
BLM	U.S. Bureau of Land Management
BMPs	Best Management Practices
B.P.	before present
ºC	degrees Celsius
certification	water quality certification
CEQ	Council on Environmental Quality
C.F.R.	Code of Federal Regulations
cfs	cubic feet per second
Commission	Federal Energy Regulatory Commission
Corps	U.S. Army Corps of Engineers
CRWG	Cultural Resources Workgroup
CWA	Clean Water Act
CY	cubic yards
CZMA	Coastal Zone Management Act
dbh	diameter at breast height
DO	dissolved oxygen
DIL	drought intensity level
DSF	day second feet
ECOS	Environmental Conservation Online System
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
EPRI	Electric Power Research Institute
ESA	Endangered Species Act
ºF	degrees Fahrenheit
FERC	Federal Energy Regulatory Commission
FLA	final license application

FPA	Federal Power Act
FWS	U.S. Department of the Interior, Fish and Wildlife Service
GIS	Geographic Information System
GWh	gigawatt hours
Harris Dam	R.L. Harris Dam
Harris Project	R.L. Harris Hydroelectric Project
HAT	Harris Action Team
HEC-RAS	Hydrologic Engineering Center's River Analysis System
HEC-ResSim	Hydrologic Engineering Center's Reservoir System Simulation
Heflin gage	USGS No. 02412000 Tallapoosa River near Heflin, Alabama
Horseshoe Bend	Horseshoe Bend National Military Park
HPMP	Historic Properties Management Plan
IBI	Index of Biological Integrity
IDP	Inadvertent Discovery Plan
ILP	Integrated Licensing Process
Interior	U.S. Department of the Interior
IPaC	Information for Planning and Conservation
Kleinschmidt	Kleinschmidt Associates
kV	kilovolt
kW	kilowatt
LiDAR	Light Detection and Ranging
mgd	million gallons per day
mg/L	milligrams per liter
µg/L	micrograms per liter
mL	Milliliters
mi^2	square miles
MW	megawatt
MWh	megawatt-hour
National Register	National Register of Historic Places
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
Newell gage	USGS No. 02413300 Little Tallapoosa River near Newell, Alabama
NGO	non-governmental organization
NGVD 29	National Geodetic Vertical Datum of 1929
NHPA	National Historic Preservation Act of 1966
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resource Conservation Service
NTU	nephelometric turbidity unit
NWI	National Wetlands Inventory
O&M	operation and maintenance
PA	Programmatic Agreement
PAD	pre-application document

Park Service	U.S. Department of the Interior, National Park Service
PLP	Preliminary Licensing Proposal
PM&E	protection, mitigation, and enhancement
PURPA	Public Utility Regulatory Policies Act
PVC	polyvinyl chloride
REA	ready for environmental analysis
RM	river mile
SD	Scoping Document
SERC	Southeast Electric Reliability Council
SHPO	State Historic Preservation Officer
Skyline WMA	James D. Martin-Skyline Wildlife Management Area
SMP	Shoreline Management Plan
TCP	traditional cultural property
TMDL	total maximum daily load
TVA	Tennessee Valley Authority
U.S.C.	United States Code
USGS	U.S. Geological Survey
Wadley gage	USGS No. 02414500 Tallapoosa River at Wadley, Alabama
WCM	Army Corps of Engineers' Water Control Manual
WMA	Wildlife Management Area
WMP	Wildlife Management Plan

EXECUTIVE SUMMARY

Proposed Action

On November 23, 2021, Alabama Power Company (Alabama Power) filed an application for a new license with the Federal Energy Regulatory Commission (Commission or FERC) to continue to operate and maintain the R.L. Harris Hydroelectric Project (Harris Project) (FERC No. 2628). Alabama Power supplemented the application on March 23, 2022, June 15, 2022, and December 27, 2022.

The project has an existing capacity of 135 megawatts (MW) and includes one development located on the Tallapoosa River near the City of Lineville in Randolph, Clay, and Cleburne Counties, Alabama. The Harris Project also includes land within the James D. Martin-Skyline Wildlife Management Area (Skyline WMA) located approximately 110 miles north of Harris Lake in Jackson County, Alabama. The project occupies 4.9 acres of federal land administered by the U.S. Bureau of Land Management (BLM).

Project Description

R.L. Harris Dam (Harris Dam) and powerhouse are located on the Tallapoosa River in Randolph County in east central Alabama. The project works include the powerhouse and its headworks, the spillway structure, two non-overflow gravity dam sections, and earth embankments at the east and west banks and in topographic saddles east and west of the river. The maximum concrete dam height is about 152 feet. The east non-overflow section is a 315.5-foot-long concrete gravity structure with a maximum height of about 150 feet. The west non-overflow section is a 331-foot-long concrete gravity structure with a maximum height of 112 feet. The crest elevation for both sections is 810 feet relative to the National Geodetic Vertical Datum of 1929 (NGVD 29).[7]

The spillway is a 310-foot-long concrete gravity structure with a maximum height of 163 feet. The top deck elevation is at 808 feet (2 feet lower than the embankments). The spillway has six bays, each with a radial gate 40 feet wide and 40.5 feet high. The spillway structure consists of six monoliths, with the crest at elevation 753 feet.

The intake structure consists of two 93-foot-wide concrete monoliths, each containing three 21-foot-wide conduits that transition to a single 22-foot-diameter steel penstock entering the spiral case. The powerhouse is a conventional concrete structure integral with its headworks. The powerhouse has two 67.5-MW generators manufactured by General Electric.

Harris Lake extends up the Tallapoosa and Little Tallapoosa Rivers approximately 29 miles and has about 367 miles of shoreline. Harris Lake's surface area is approximately 9,870 acres at the 793.0-foot normal pool elevation, with a maximum depth of 121 feet. The gross storage capacity of Harris Lake is approximately 425,700 acre-feet at the normal pool elevation, with a usable storage of about 207,300 acre-feet.

[7] All elevations in this document are referenced to the NGVD 29 vertical datum, unless otherwise noted.

Project Operation

The primary purpose of Harris Dam is to provide for peaking power generation by the associated hydroelectric plant. The dam also provides flood control for the basin, and the project reservoir offers recreational opportunities. The reservoir is operated in accordance with the U.S. Army Corps of Engineers (Corps) Mobile District's Alabama-Coosa-Tallapoosa River Basin Water Control Manual, and its operations are closely coordinated with those at Alabama Power's other facilities in the Tallapoosa basin. From May 1 through September 30, Harris Lake pool level is maintained at or near elevation 793 feet, depending on inflow conditions. Between October 1 and November 30, the pool level at Harris Lake is gradually dropped to elevation 785 feet. The pool level remains at elevation 785 feet through March 31, after which it is gradually raised back to full pool at elevation 793 feet. When the reservoir is at the level dictated by the Harris rule curve, all inflow is passed first through the powerplant units until their discharge capacity is exceeded, at which point spillway gate operations are initiated.

Proposed Facility Modifications

Alabama Power proposes to install a new continuous minimum flow generating unit at Harris Dam, adjacent to Unit 1 on the east side of the existing Harris Powerhouse. The unit would draw water from the Unit 1 penstock and discharge approximately 300 cubic feet per second (cfs) to the Tallapoosa River immediately downstream from the dam. Based on preliminary design, the unit would consist of a 2,500-kilowatt (kW) turbine with a generator rated at 3,600 kW. The capacity of the unit would be turbine-limited at 2,500 kW, and the authorized installed capacity of the project would increase by 2,500 kW (2.5 MW).

Proposed Project Boundary

Alabama Power proposes changes to the existing project boundary at Harris Lake that would: (1) include existing facilities and roads that are necessary for operation and maintenance (O&M) activities, and recreation development; and (2) remove land and roads currently within the boundary that are not required for project purposes. The licensing proposal does not include changes to the project boundary at Skyline WMA.[8]

The proposed boundary modifications around Harris Lake would add approximately 504 acres and remove approximately 286 acres, for a net addition of 218 acres. With these changes, the amount of federal land within the project boundary would remain the same.

Proposed Project Operation

- Operate the two main generating units at the Harris Powerhouse in a daily peaking mode, within the constraints of the existing Harris Lake operating curve, and continue to operate in accordance with Green Plan operations until the proposed minimum flow unit is installed and operating.

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[8] Recent changes in the project boundary at Skyline WMA have been approved and finalized in the revised project boundary drawings. *See* 179 FERC ¶ 62,134 (June 13, 2022) and 189 FERC ¶ 62,028 (October 16, 2024).

- Operate in accordance with Green Plan operations when the proposed minimum flow unit is shut down for maintenance or when flow to Unit 1 is interrupted.
- Continue to operate the project during high flow conditions in accordance with the Corps-approved flood control procedures in the Corps' Harris Water Control Manual (Corps, 2022).
- Continue to operate the project to maintain a navigation channel in the Alabama River.
- Continue to operate the project during drought conditions in accordance with ADROP procedures, as outlined in the Corps' Water Control Manual (Alabama Power, 2016 and 2022b), and develop drought operations procedures for the minimum flow unit.

Proposed Environmental Measures

Geology and Soils

- Develop and implement an erosion monitoring plan (Alabama Power, 2021c) for the Tallapoosa River downstream from Harris Dam.

Water and Aquatic Resources

- Release a continuous minimum flow of approximately 300 cfs through the proposed continuous minimum flow unit.
- Develop drought operations procedures for the minimum-flow unit that would be consistent with the Alabama-ACT Drought Response Operations Plan (ADROP).
- Develop and implement a project operation and flow monitoring plan (Alabama Power, 2021b) to monitor compliance with: (1) project operation and water level management; (2) flow releases from Harris Dam; (3) flood control operations; and (4) drought management.
- Continue to maintain the existing skimmer weir that is part of the existing intake's design at its highest elevation to allow the intake to draw from higher levels in the water column.[9]
- Continue to operate the existing aeration system that is part of the existing turbines.
- Include an aeration system in the proposed continuous minimum flow unit.
- Develop and implement a water quality monitoring plan (Alabama Power, 2022c) consistent with the water quality certification.
- Develop and implement an aquatic resources monitoring plan (Alabama Power, 2021d) following implementation of the continuous minimum flow.

[9] The skimmer weir is part of the existing intake's design to enable the intake to draft water from different elevations in the water column.

- When conditions permit, and upon request from Alabama Department of Conservation and Natural Resources (Alabama DCNR), continue to hold Harris Lake water levels constant or slightly increasing for a 14-day period for spring fish spawning.
- Improve fish habitat by adding fish attraction devices (e.g., brush piles and other woody debris [recycled Christmas trees, felled trees] and synthetic materials [spider blocks, concrete, and PVC structures]) to Harris Lake.
- Finalize and implement a nuisance aquatic vegetation and vector control program for Harris Lake (Alabama Power, 2021e).

Terrestrial Resources

- Continue to maintain the existing native plant plots at Little Fox Creek to provide habitat for pollinators.
- Protect a rare plant community by reclassifying a 57-acre area adjacent to Flat Rock Park at Harris Lake from “recreation” to “natural/undeveloped” in the Shoreline Management Plan (SMP)(filed June 15, 2022).
- Finalize and implement a Wildlife Management Plan (WMP)(filed November 23, 2021) that includes measures to protect and enhance wildlife habitat within the Harris Lake and Skyline WMA project boundaries.
- Implement the Alabama Power Company Avian Protection Plan (Alabama Power, 2022b) within the Harris Project boundary.

Threatened and Endangered Species

- Consult with the U.S. Department of the Interior, Fish and Wildlife Service (FWS) to develop measures to protect federally listed bats, including the Indiana, northern long-eared, and gray bats as part of the preparation of the final WMP.
- As part of the WMP, conduct surveys for Price’s potato-bean at the location of the extant population, and notify crews of the location of any Price’s potato-bean occurrences prior to conducting timber management activities that may affect the extant population.

Recreation Resources

- Implement the draft Recreation Plan as filed with the license application, which includes provisions to operate and maintain the existing recreation sites at Harris Lake and the following facility modifications and new recreation facilities:
    - Install a barrier-free access kayak/canoe access area and a barrier-free access trail to the launch from the existing Harris Dam tailrace fishing pier parking lot.
    - Remove the Wedowee Marine South recreation area on Harris Lake from the project’s licensed facilities to be replaced by a new recreation facility at another location (see next item).

- Install a new project recreation area on Harris Lake on licensee-owned land near the existing Alabama Power-owned and commercially operated, Wedowee Marine South facility. The new facility would be accessed from the existing Wedowee Marine South access road on Alabama State Route 48 (Highway 48). It would be a day use park with amenities including swimming, picnicking, boat launch and pier, fishing piers, and parking.

Land Use and Aesthetics

- Finalize and implement the SMP, filed November 23, 2021, and revised on June 15, 2022, that addresses all shorelines within the project boundary, and guides the use, occupancy, and management of shoreline resources, and future updates and revisions to the plan.
- Implement proposed land additions to, and removals from, the project boundary and incorporate these changes into Exhibit G.

Cultural Resources

- Finalize and implement a Historic Properties Management Plan (HPMP) to protect and preserve historic properties identified in the project area and conduct ongoing inventory and evaluation of cultural resources in the project area.

Public Involvement

Before filing its license application, Alabama Power conducted pre-filing consultation under the Integrated Licensing Process. The intent of the Commission's pre-filing process is to initiate public involvement early in the project planning process and to encourage citizens, governmental entities, Tribes, and other interested parties to identify and resolve issues prior to an application being formally filed with the Commission. As part of the pre-filing process, staff conducted scoping to identify issues and alternatives. Staff distributed a scoping document to stakeholders and other interested entities on July 31, 2018, and held scoping meetings in Lineville, Alabama, on August 28 and 29, 2018. Staff distributed a revised scoping document on November 16, 2018, that reflects public input. On November 23, 2021, Alabama Power filed its final license application. Alabama Power subsequently filed a supplement to the final license application on June 15, 2022, and December 27, 2022. On April 14, 2022, the Commission issued a public notice accepting the application and soliciting motions to intervene and protests. On January 17, 2023, the Commission issued a public notice stating that the application is ready for environmental analysis (REA notice), and requesting comments, terms and conditions, recommendations, and prescriptions.

Alternatives Considered

This draft environmental impact statement (draft EIS) analyzes the effects of continued project operation and recommends conditions for any license that may be issued for the project. In addition to Alabama Power's proposal, we consider three alternatives: (1) Alabama Power's proposal with staff modifications (staff alternative); (2) staff alternative with mandatory agency conditions; and (3) no action, meaning that Alabama Power would continue to operate the project with no changes.

Staff Alternative

Under the staff alternative, the project would include Alabama Power's proposed measures with the exception of: (1) releasing a continuous minimum flow of approximately 300 cfs through the proposed continuous minimum flow unit; (2) operating in accordance with the Green Plan operations until the minimum flow unit is installed and during periods when the minimum flow unit is offline or flow to existing unit #1 is interrupted; and (3) developing the proposed water quality and aquatic resources monitoring plans. The staff alternative also includes most measures recommended by relicensing participants, with the exception of: (1) installing battery storage to replace generation at the project; (2) a 2-hour delay between the second and first unit being taken offline; (3) maintaining stable water levels in the project tailrace for a 14-day period annually to enhance spawning; (4) monetary compensation or other measure to offset fish loss due to entrainment; (5) a specific license requirement for consulting with FWS and the Corps regarding potential methods to provide or enhance fish passage on the Tallapoosa River; and (6) an aquatic resources propagation program for the Tallapoosa River.

As noted below, we find that the most appropriate balance between utilization of flow for project generation and for downstream aquatic resource protection is best struck by providing, during certain seasons of the year, higher minimum flows than the year-round 300-cfs flow proposed by Alabama Power. Therefore, although we adopt Alabama Power's proposal for a minimum flow of 300 cfs for the months of July through November, we recommend between 350 and 450 cfs in the remaining months. We do not recommend Alabama Power's proposed water quality and aquatic resources monitoring plans, as the proposed plans lack sufficient detail for the Commission's administration of the license to ensure water quality and aquatic resources in the Tallapoosa River are protected.

We do not recommend installing battery storage to replace generation at the project because, as discussed in Appendix E, the cost is prohibitively expensive and would provide no water quality benefit. We do not recommend a 2-hour delay when transitioning from one to two turbine operation, because it would interfere with peaking operation and could lower lake levels unnecessarily (i.e., for no described benefit). We do not recommend requiring Alabama Power to maintain stable water levels in the project tailrace for a 14-day period annually because maintaining stable downstream flows for a 14-day period during the spring would be difficult, due to naturally high inflows and reservoir management obligations during that time. In addition, Alabama Power would be unable to operate the project in a peaking mode during that time. Finally, if Alabama Power were to operate the project as recommended by Alabama DCNR, lake levels would be held relatively constant, which could potentially result in excessive flow being spilled, which could negate any benefits gained with stable downstream flows. We do not recommend monetary compensation or other measure to offset fish loss due to entrainment because compensatory mitigation for lost fish would constitute a payment of damages, and the Commission lacks the authority under the Federal Power Act to either adjudicate claims, or require compensation, for damages. We do not recommend consulting with FWS and the Corps regarding fish passage because several dams downstream from Harris Dam block upstream passage. In addition, FWS and NMFS did not file comments or conditions related to fish passage, or reserve authority to require fish passage in response to the Commission's REA notice. We do not recommend requiring an aquatic resources propagation program for the Tallapoosa River because it is unclear which reaches of the Tallapoosa River are intended to be enhanced through such a program. Moreover, propagating fish and invertebrate species that are then used to enhance aquatic communities in the Tallapoosa River upstream of the project boundary or downstream of Lake Martin would not be commensurate with effects of the Harris Project and therefore would not be needed to fulfill a project-specific purpose. For all the above reasons, we do not recommend incorporating these measures as part of any license issued for the project.

In addition, the staff alternative includes the following modifications to Alabama Power's proposal, and additional staff-recommended measures:

- Continue to operate in accordance with Green Plan operations (a) until any minimum flow recommended by staff and required by the license is implemented, and (b) when any minimum flow required by the license is interrupted for maintenance.
- Release a continuous minimum flow from the Harris Project (dam and/or powerhouse) to the Tallapoosa River of 300 cfs July through November; 350 cfs May and June; 400 cfs in December; and 450 cfs from January through April.
- Limit annual reductions in minimum flows to down to 254 cfs, as necessary for project maintenance, in the months of October through January, and for no longer than 3 consecutive weeks at a time.
- Develop a minimum flow release plan, in consultation with Alabama Department of Environmental Management (Alabama DEM), Alabama DCNR, Alabama Rivers Alliance, and FWS, that includes: (1) a description of the source(s) of water releases for each seasonal period; (2) a description of any new facilities and/or modifications of existing facilities needed to release the required minimum flows, including an evaluation (with requisite conceptual design drawings) of fish-friendly turbine design options for any proposed minimum flow unit; (3) a provision for any deviation from normal operations; (4) provisions to monitor the efficacy of any proposed release mechanism(s) to provide the required flows and to modify the plan, with Commission approval, if necessary; and (5) an implementation schedule for the provisions of the plan.
- Include, within Alabama Power's proposed project operations and flow monitoring plan, a provision to sequentially start the existing project turbines for all controllable, non-emergency flow releases by allowing at least 30 minutes (consistent with existing Green Plan operations) to pass before starting a second turbine after the first turbine has been started.
- Develop a water temperature and DO monitoring plan to ensure that the staff-recommended Alabama DCNR thermal regime and staff-recommend Alabama DEM DO targets are achieved, and that includes: (1) the goals and objectives of the plan; (2) measurable response objectives and success criteria; (3) measures, including a narrative description and requisite conceptual design drawings, to destratify a portion of Harris Lake to meet the staff-recommended water temperature regime and DO targets[10] in the Tallapoosa River downstream from the project; (4) a monitoring

[10] *See* Alabama DCNR (10(j) #12) and the DO targets described in Alabama DEM's 401 certification Conditions 1 and 2.

program that, at a minimum, includes the elements of Alabama Power's proposed Water Quality Monitoring Plan (i.e., measures consistent with Alabama DEM's 401 certification) and Alabama DCNR 10(j) recommendations nos. 2 and 9 through 13; (5) a provision to file annual monitoring report(s) that include (a) the data collected, (b) a discussion of the effectiveness of the water temperature and DO enhancement measures implemented, and (c) any recommendations to the Commission, for approval, of any needed changes to project facilities and/or operations; and (6) an implementation schedule that includes monitoring after flows and water quality enhancement measures required by the license are implemented.

- Develop a Harris Lake aquatic habitat enhancement plan, in consultation with Alabama DCNR, that includes provisions to: (1) consult with Alabama DCNR regarding timing prior to annually holding Harris Lake water levels constant or slightly increasing for a 14-day period for spring fish spawning within Harris Lake; (2) identify candidate areas for littoral enhancement and establish native aquatic plants in the selected areas within Harris Lake; (3) file a proposed schedule for carrying out lake habitat enhancement activities; (4) continue to selectively cut and monitor felled trees for shoreline cover; (5) add fish attraction devices such as brush piles and other woody debris (e.g., recycled Christmas trees, felled trees) and synthetic materials (e.g., spider blocks, concrete, and PVC structures) in Harris Lake to provide cover for fish and to enhance angling opportunities; and (6) file a summary report with the Commission, within 3 months of completing any enhancement activity, that describes the area enhanced, the measures used, and any areas within Harris Lake recommended to the Commission for approval, for future enhancement.

- Develop a Tallapoosa River aquatic resources monitoring plan to measure the effectiveness of the minimum flows and water quality enhancement measures required by the license for the first 3 years after commencement of the minimum flow releases and water quality enhancement measures, and that includes the elements of Alabama Power's proposed Aquatic Resources Monitoring Plan, with the following additional provisions: (1) the goals and objectives (ecological and navigational) for the Tallapoosa River in project-affected waters downstream from Harris Dam; (2) criteria for measuring the effectiveness of the required minimum flow regime at achieving the environmental objectives in item 1 (to include developing degree day criteria for selected fish species in consultation with FWS, Alabama DCNR, and Alabama DEM); (3) the methodologies for (a) monitoring the project-related effects of the minimum flow regime required by the license on the environmental objectives identified in item 1, including monitoring (for the first 3 years after providing the required minimum flows and water quality enhancement measures) through monitoring aquatic organisms at the same locations as water temperature and DO, and (b) the methods that will be used to isolate the effects of the minimum flows from other, non-project-related effects; (4) the formation of a Tallapoosa River Flow Advisory Committee, consisting of Alabama Power, Alabama DCNR, and Alabama DEM, to the extent they are willing to participate; (5) annual monitoring reports and a 3-year monitoring report that includes (a) the monitoring methods used, (b) the data collected, (c) a discussion of the effectiveness of the minimum flow regime required by the license in achieving the environmental objectives identified in item 1, and

(d) any recommendations to the Commission, for approval, for changes to project facilities and/or operations, including changes to the minimum flow regime, and any changes to the monitoring schedule, including the need for additional monitoring after the third year of monitoring is completed; and (6) an implementation schedule.

- Develop an aquatic invasive species management plan that includes, at a minimum, provisions for: (1) educating the public regarding preventative actions that can be taken to help control invasive species on project land and waters; (2) consulting with agencies regarding appropriate signage to be provided on project land; (3) developing BMPs for specific activities that have the potential to introduce aquatic invasive species into Harris Lake; and (4) documenting incidental observations of aquatic invasive species on project land and waters and reporting such observations to Alabama DCNR.

- Finalize the WMP in consultation with FWS and Alabama DCNR, and include provisions to: (1) manage vegetation in the Pollinator Plots at Little Fox Creek and project transmission line right-of-way to protect the monarch butterfly; (2) prior to conducting ongoing timber management, constructing proposed recreation amenities, and removing land from the Harris Project boundary, use FWS's current guidance to conduct additional surveys for the: (a) red-cockaded woodpecker at Harris Lake, (b) gray, Indiana, northern long-eared, and tricolored bats, and their habitats (i.e., hibernacula (for all four species), summer roost caves (for gray bats), and summer/maternity roost trees (for Indiana, northern long-eared, and tricolored bats) on project land at Harris Lake and/or Skyline WMA, and (c) Georgia rockcress, white fringeless orchid, Price's potato bean, Morefield's leather-flower, and American hart's-tongue fern at Harris Lake and/or Skyline WMA, as appropriate; (3) report alligator snapping turtle sightings; (4) based on survey results and incidental species sightings, identify potential measures to protect the species listed in items 2 and 3 during timber harvests and other vegetation management activities, construction of the proposed recreation sites/amenities, and project operations, if necessary to avoid project-related effects; (5) file, for Commission approval, the survey results, recommended protection measures, and proposed forestry management plans for project land at Harris Lake and Skyline WMA; and (6) incorporate Commission-approved species protection measures into the final WMP.

- Incorporate in the SMP provisions to protect rare plants within the project's 57-acre rare plant area adjacent to Flat Rock Park including: (1) periodically monitor the area for evidence of unauthorized uses (e.g., tire track marks on vegetation and rock outcrops); (2) maintain the new signs and barrier (gate); and (3) consult with Alabama DCNR to develop and recommend additional protection measures, for Commission approval, if needed, to avoid effects associated with recreation activities.

- Develop a public education and outreach plan in consultation with Alabama DCNR that includes a detailed description of provisions to: (1) share information about (a) the project's recreation opportunities and upgrades, (b) water levels in Harris Lake and the Tallapoosa River downstream from Harris Dam, (c) the new Harris Lake shoreline classifications, changes to land parcels in the project boundary, and the allowable activities in each area, (d) BMPs to protect natural resources from construction and maintenance activities (e.g., boat dock construction, shoreline stabilization, and vegetation management), (e) the procedures for permits to lease or occupy project lands and waters for purposes permitted by any license issued for the project, (f) license requirements for the enhancement of aquatic habitat, and management of invasive species, historic properties, and recreation at the project, as applicable; (2) file a schedule for distribution of the project information described in item 1 to stakeholders; and (3) review and update the plan every 6 years.

- Revise the November 23, 2021, HPMP to include the following additional information regarding historic properties within the project Area of Potential Effects (APE): (1) the results of cultural resources surveys of the 17 tracts of land proposed for removal from the project boundary and measures to resolve adverse effects to eligible sites on these lands; (2) a plan to conduct National Register evaluations of all unevaluated sites proposed to be removed from the project boundary and 119 sites (8 sites at Lake Harris, 111 sites at Skyline WMA) within the APE that remain unevaluated but have been removed from consideration; (3) current, ongoing, project-related effects to National Register-eligible and unevaluated sites, including impacts of flow release alternatives; (4) documentation of all consultation efforts with the SHPO and applicable Tribes; (5) specific plans for cultural resources monitoring; (6) details regarding public interpretation and education; and (7) a schedule for completion of all HPMP actions.

Staff Alternative with Mandatory Conditions

The staff alternative with mandatory conditions includes the staff-recommended measures noted above along with the mandatory water quality certification conditions issued by Alabama DEM (*see* Appendix C).

No-action Alternative

Under the no-action alternative, the project would continue to operate under the terms and conditions of the existing license, and no new environmental protection, mitigation, or enhancement measures would be implemented.

Environmental Effects of the Staff Alternative

The primary issues associated with licensing the Harris Project are the effects of continued project operation on erosion and sedimentation along the Tallapoosa River, aquatic and terrestrial resources, threatened and endangered species, recreation, and cultural resources. Below, we briefly discuss the anticipated environmental effects of issuing a new license for the project under the staff alternative.

Geology and Soils

Current erosion sites on Harris Lake are located at or above full pool elevation and are attributable to anthropogenic and/or natural processes. Sedimentation in Harris Lake is a natural occurrence for impoundments where sediment from upstream tributaries settles out of the water column as water velocities decrease upon entering the lake. Neither erosion nor sedimentation on Harris Lake would be affected by continuation of peaking operations under the existing rule curve, ADROP, and flood control procedures. The recommended continuous minimum flows would not affect Harris Lake water levels, and so would not affect erosion or sedimentation there. The Wildlife Management Plan includes specific timber management actions and BMPs to reduce or prevent runoff, erosion, turbidity, and sedimentation that may affect Harris Lake and its tributaries by maintaining streamside management zones (forested riparian buffers), avoiding placement of roads, skid trails, or firebreaks across streams, when possible, and minimizing stream crossings and bank disturbances. The Shoreline Management Plan includes policies and measures to limit dredging and shoreline construction activities, maintain shoreline vegetation and vegetative buffers, and enhance bank stabilization, all of which would help to maintain shorelines and reduce shoreline erosion. The Recreation Plan includes provisions for soil erosion and sedimentation control BMPs to reduce or eliminate the temporary effects of construction of new recreational facilities.

Existing erosion sites on the Tallapoosa River downstream from Harris Dam are partially attributable to adjacent land use/clearing and riverine processes, but the process has likely been exacerbated by sediment trapping in the impoundment and water level fluctuations from project peaking flows and would be expected to continue with the continuing presence of the impoundment and under peaking operations. The addition, higher continuous minimum flow releases would tend to reduce river fluctuations, which would be expected to benefit areas of downstream erosion. The greatest benefit would occur nearer the dam, where fluctuations are greatest, with less benefit further downstream as fluctuations attenuate. The Erosion Monitoring Plan would provide a mechanism for ongoing review of riverbank erosion downstream. Although it does not include any measures to address erosion, developing the details of the plan in consultation with Alabama DCNR and other resource agencies would help to ensure that project-related effects are identified and that provisions to avoid or minimize these effects could be considered. Under the Recreation Plan, land clearing would be limited and provisions for erosion and sedimentation control BMPs would minimize the temporary effects of construction.

Timber management actions and BMPs in the Wildlife Management Plan would reduce or prevent runoff, erosion, and sedimentation that may affect streams and waterbodies within Skyline WMA. The inclusion of timber management guidelines and cave protection and maintenance components could also provide soils-related benefits that could further enhance the long-term health and sustainability of the forest, which could contribute to reducing or preventing runoff, erosion, and sedimentation.

Aquatic Resources

Impoundment fluctuations can lead to fish stranding, nest dewatering, unsuitable spawning depths, and lack of cover. Harris Lake is a multi-purpose storage impoundment with water levels that fluctuate seasonally. Minimum release scenarios of 450 cfs and less would have nearly identical effects on the average lake water surface elevation if implemented in lieu of the Green Plan.[11] However, the higher flow alternatives (i.e., 600 cfs and 800 cfs) would result in lower average elevations in Harris Lake compared to the Green Plan, or the 150 cfs, 300 cfs, 350 cfs, 400 cfs, and 450 cfs minimum flows, thus reducing the amount of littoral habitat for

[11] The Harris "Green Plan" outlines specific daily and hourly release schedules, including short (10- to 30-minute-long) pulses from Harris Dam based on the previous day's flow at the USGS gage near Heflin, to improve downstream ecological conditions, including fisheries.

juvenile fish and mollusks. Alabama Power's proposal to annually hold Harris Lake water levels constant or slightly increasing for a 14-day period for spring spawning would reduce the potential stranding of centrarchid nests in the shallow, shoreline areas. Developing a Harris Lake aquatic habitat enhancement plan, in consultation with Alabama DCNR would benefit the shoreline habitat, the aquatic community, and the lake's fishery.

Impoundment of the river results in stratification of temperature and dissolved oxygen (DO) within the impoundment and leads to releasing water that is cooler and lower in DO than typically support native warmwater communities of fish and other aquatic biota. Peaking operation further alters these conditions downstream from the dam by causing large fluctuations in water temperature and occasional low DO. Releasing minimum flows proposed by Alabama Power, and recommended by Alabama DCNR and Commission staff would reduce these temperature fluctuations and is expected to reduce the incidence of low DO but would still not provide a thermal regime supporting a warmwater aquatic community as seen in the current high abundance of darters and minnows in the fishery. However, the staff-recommended partial destratification system would result in a warmer thermal regime that would further reduce temperature fluctuations, eliminate occasional low DO, and support a warmwater aquatic community. Implementing the staff-recommended water temperature and DO monitoring plan would determine the effectiveness of the partial destratification system combined with new minimum flows at meeting water temperature and DO targets, identify any need for further modifications to meet these targets, and facilitate a process to select and implement any additional modifications needed with Commission approval.

Alabama Power's continuous minimum flow of 300 cfs would provide a greater reduction in flow fluctuation compared to the Green Plan (baseline) operation of releasing periodic pulse flows, which leads to fluctuations in the downstream wetted perimeter, and, in turn, can lead to erosion and dewatering of aquatic habitat. However, Alabama DCNR's higher continuous minimum flow regime would provide a greater and more seasonal baseline wetted perimeter downstream from the dam than Alabama Power's proposed year-round 300-cfs minimum flow. Releasing the staff alternative continuous minimum flow of 300 cfs July through November; 350 cfs May and June; 400 cfs in December; and 450 cfs from January through April would provide the greatest improvement to downstream resources that could be acquired without reducing lake levels in Harris Lake. Developing a minimum flow release plan, in consultation with Alabama DEM, Alabama DCNR, Alabama Rivers Alliance, and FWS would help guide the implementation of these seasonal minimum flows. Developing a Tallapoosa River aquatic resources monitoring plan in consultation with resource agencies would allow for monitoring for effects of the staff-recommended minimum flows and water quality enhancement measures on aquatic biota.

Sudden rapid increases and decreases in discharge associated with peaking operations can wash away spawning habitat, disrupt fish behavior in the tailrace, and lead to rapid dewatering of habitat and stranding of aquatic organisms. Staging the starting of the existing project turbines for all controllable, non-emergency flow releases by allowing at least 30 minutes (consistent with existing Green Plan operations) to pass before starting the second turbine after the first turbine has been started would help to mitigate the effects of sudden increases in downstream flow associated with peaking operations.

Terrestrial Resources

Alabama Power manages 7,371 acres of project land surrounding Harris Lake and 15,031 acres of project land within the Skyline WMA. Finalizing Alabama Power's SMP would protect and enhance native vegetation and wildlife, including a rare plant community in a 57-acre area adjacent to Flat Rock Park at Harris Lake that would be reclassified from "recreation" to "natural/undeveloped." The rare plant community would be further protected with staff's recommendations to periodically monitor the area for evidence of unauthorized uses, maintain Alabama Power's signs and barrier (gate), and consult with Alabama DCNR to develop and recommend additional protection measures, for Commission approval, if needed, to avoid effects to these communities associated with recreation activities. In addition, finalizing Alabama Power's WMP, including forestry management plans and other vegetation management activities, in consultation with FWS and Alabama DCNR, would enhance the value of project lands for wildlife habitat, benefitting game and non-game species. Continuing to maintain the existing native plant plots at Little Fox Creek would preserve this habitat for pollinators at Harris Lake. Implementing the Alabama Power Company Avian Protection Plan (APP) would benefit resident and migratory birds within the Harris Project boundary because it would require Alabama to follow guidelines set forth in peer-recognized industry and/or resource agency publications (e.g., Avian Power Line Interaction Committee [APLIC] guidance documents) during transmission line operation and maintenance activities (APLIC 2006; 2012).

Threatened and Endangered Species

The FWS's Information for Planning and Consultation website was used to generate an updated list of listed and proposed threatened and endangered species, designated, and proposed critical habitats, and candidate species in the project-affected area. There are 14 federally listed aquatic species (palezone shiner, spotfin chub, Alabama lampmussel, Cumberland bean, fine-rayed pigtoe, pale lilliput, rabbitsfoot, snuffbox, shiny pigtoe, slabside pearlymussel, finelined pocketbook, southern pigtoe, longsolid, and round hickorynut), 10 listed terrestrial species (red-cockaded woodpecker, gray bat, northern long-eared bat, Indiana bat, Georgia rockcress, Morefield's leather flower, white fingerless orchid, Prince's potato-bean, American hart's-tongue fern, and little amphianthus), 5 proposed species (Cumberland moccasinshell, Tennessee clubshell, and Tennessee pigtoe, tricolored bat, and alligator snapping turtle), 1 candidate species (monarch butterfly), 1 experimental population (whooping crane) and 9 of these species have designated critical habitat. The *Biological Assessment* (Appendix D) of this draft EIS includes a more detailed analysis of the effects of the proposed action on federally listed species and designated critical habitats known to occur within the project-affected area.

The only known extant populations of palezone shiner occur outside of the project boundary at Skyline Wildlife Management Area (Skyline WMA). No specimens were collected during Alabama Power's surveys at four locations on Little Coon Creek in June 2020. The spotfin chub's range extends to the western boundary of Skyline WMA, outside the project boundary. However, there are no published reports of occurrences of the species within the project boundary at Skyline WMA. The nearest critical habitat unit is southwest of Columbia, Tennessee and north of Florence, Alabama, which is over 110 miles from the project area. Due to the large role agricultural runoff plays in affecting water quality in Little Coon Creek and other streams in Skyline WMA, and because Alabama Power would continue to implement

Alabama’s BMPs for forestry, relicensing the proposed project, with Alabama Power’s proposed PME’s, would have “no effect” on these species or the spotfin chub critical habitat.

Nine of the federally listed mollusks (Alabama lampmussel, fine-rayed pigtoe, pale lilliput, rabbitsfoot, snuffbox, shiny pigtoe, slabside pearlymussel, longsolid, and round hickorynut) and the three proposed-listed mollusks occur in the Paint Rock River system which is beyond the western boundary of the Skyline WMA, and outside of the project boundary. Critical habitat for the rabbitsfoot, slabside pearlymussel, longsolid, and round hickorynut is also located on the Paint Rock River system. Because the Paint Rock River system is outside of the project boundary and is not hydrologically connected to the Skyline WMA, project operation and maintenance activities would not affect the aquatic habitat in the Paint Rock River system. The Cumberland bean’s habitat range is, outside the project boundary. However, there are no published reports of occurrences of the species within the project boundary at Skyline WMA, and the species is considered extirpated from the state. Therefore, relicensing the proposed project, with Alabama Power’s proposed protection measures, would have “no effect” on these species or their designated critical habitat.

The finelined pocketbook’s current range encompasses portions of the Harris Lake project boundary. The nearest critical habitat unit (Unit 6) for the species is located immediately upstream of Harris Lake, north of the Highway 431 Bridge, on the Tallapoosa River. No specimens were collected from surveys in the Tallapoosa River upstream of Harris Lake in November 2019 and during surveys in the summer of 2020 on the Tallapoosa River and four of its tributaries. Nonetheless, portions of the species’ habitat range encompass Harris Lake, and the species is currently being reintroduced into suitable historical habitats; thus, their potential presence cannot be ruled out. Therefore, Alabama Power’s proposed operations, including lake level management and a continuous minimum flow of 300 cfs, as well as alternative downstream releases up to 800 cfs “may affect, but would not likely adversely affect” finelined pocketbook mussels and its critical habitat. There are no published reports of occurrences of the southern pigtoe within the project boundary at Harris Lake. Moreover, no populations were identified during finelined pocketbook surveys in Carr Creek, which extends into the habitat range for the southern pigtoe. Given the unlikely presence of southern pigtoe in the project boundary, Alabama Power’s proposed operations, including lake level management and a continuous minimum flow of 300 cfs, as well as all alternative downstream releases, “may affect, but would not likely adversely affect” the southern pigtoe. The nearest critical habitat for southern pigtoe mussel is located on Cheaha Creek, in the Talladega National Park, about 12 miles west of the northern most portion of the Harris Lake project boundary. Therefore, Alabama Power’s proposed operations would have “no effect” on this species’ designated critical habitat.

Finalizing Alabama Power’s WMP, including forestry management plans and other vegetation management activities, in consultation with FWS and Alabama DCNR, would enhance the value of project lands for rare, threatened, and endangered vegetation and wildlife species on project land at Harris Lake and Skyline WMA. Continuing to maintain the existing native plant plots at Little Fox Creek, as part of the WMP, would provide habitat for the monarch butterfly at Harris Lake. Implementing the staff-recommended measures for the WMP would avoid adverse effects to the rare, threatened, and endangered terrestrial species that may occur in the project area(s). Specifically, coordinating vegetation management activities within and adjacent to the Pollinator Plots at Little Fox Creek and in the project transmission line right-of-way would preserve milkweeds and other forage plants to benefit monarch butterflies at Harris

Lake. In addition, conducting additional surveys for the red-cockaded woodpecker, gray bat, Indiana bat, northern long-eared bat, tricolored bat, Georgia rockcress, white fringeless orchid, Price's potato bean, Morefield's leather-flower, and American hart's-tongue fern would identify locations of occupied habitats within the project boundary where these threatened and endangered species could be affected by timber management activities, constructing the proposed recreation amenities at Harris Lake and adjacent to the project tailrace, and removing land from the Harris Project boundary. Reporting any alligator snapping turtle sightings within the project boundary at Harris Lake would also facilitate the identification of occupied habitats that could be affected by project operation, maintenance, construction, and project-related recreation. Consulting with FWS and Alabama DCNR regarding the survey results and any incidental species sightings would facilitate the development of potential protection measures that could be incorporated into the forestry management plans and other parts of the WMP and SMP to avoid adverse effects to these species during project operations, timber harvests and other vegetation management activities, construction of the proposed recreation sites/amenities, and project-related recreation. Incorporating any Commission-approved species protection measures into the final WMP would benefit these species during any new license term.

We conclude that relicensing the project, as proposed by Alabama Power with staff's additional recommendations, is "not likely to adversely affect" the red-cockaded woodpecker, the eastern migratory population of whooping crane, gray bat, Indiana bat, northern long-eared bat, Georgia rockcress, white fringeless orchid, Price's potato-bean, Morefield's leather-flower, and American hart's-tongue fern. We also conclude that relicensing the project, as proposed by Alabama Power with staff's additional recommendations, would have "no effect" on the little amphianthus or designated critical habitats for Indiana bat and Georgia rockcress. In addition, we conclude that relicensing the project, as proposed by Alabama Power, and with the staff recommended measures, would not be sufficient to preclude both the survival and recovery of (i.e., jeopardize) the tricolored bat or alligator snapping turtle. Therefore, we have determined that an informal conference is appropriate as the project may affect, but is not likely to adversely affect, the tricolored bat and alligator snapping turtle.

Recreation, Land Use, and Aesthetics

Any operations or changes in flows that would lower the reservoir elevation beyond existing operating conditions, specifically operations lowering the winter reservoir elevation below 785 feet, would negatively affect visitors recreating on the lake, specifically for boat launch access, and access to private facilities on the lake. Downstream, Alabama Power's proposal for adding continuous minimum flows is expected to decrease the size of these water level fluctuations and increase water depth in the Tallapoosa River downstream compared to existing conditions, which would allow for more predictable water levels and likely create a safer recreational experience.

Finalizing and implementation of Alabama Power's proposed Recreation Plan for the Harris Project would provide a framework for enhancing recreational facilities, coordinating management of recreational facilities within the project boundary, and monitoring recreational use and needs over the term of any new license. Implementing improvements and maintenance at the recreation sites, as detailed in the Recreation Plan, would help meet current user needs, including accessibility. Maintaining and updating signs at recreation sites would protect public safety and provide information to visitors to the recreation sites about BMPs, litter and waste management policies, areas of closure, allowable activities, and areas needing protection for natural or cultural resource values. Continued monitoring, reporting, consultation with agencies and stakeholders, and periodic updates would help to collaboratively address issues, changes in recreation use, needs, and allow for future upgrades, improvements, and modifications. This ongoing monitoring would also allow for assessing changes in use downstream from Harris Dam as recreationists adapt to altered flow releases at river access points and help to determine the need for future improvements.

Implementation of Alabama Power's proposed SMP would provide shoreline management guidelines, policies, and an overall framework for managing shorelines within the project boundary. The SMP would establish shoreline classifications and update Alabama Power's system for authorizing shoreline uses that help protect project shorelines, and associated recreational, scenic, and environmental values by encouraging the use of alternative bank stabilization techniques, such as rip-rap, bioengineering techniques, natural vegetation with rip-rap, and gabions. It also would restrict dredging and other activities near sensitive resources areas, permit allowable uses, and prohibit unauthorized uses of the shoreline. Implementing a Public Education and Outreach Program would inform residents and visitors of various methods to protect project resources and requirements for shoreline management at the project.

Incorporating the lands necessary for project purposes within the project boundary would provide allow for management and access to the lands as part of any new license.

Cultural Resources

Inclusion of staff's recommended measures in a revised HPMP would ensure that properties that are eligible for listing in the National Register within the Harris Project Area of Potential Effects are appropriately addressed in accordance with section 106 of the National Historic Preservation Act.

Environmental Justice

Within the study area, staff identified 10 census block groups in the Harris Lake and Tallapoosa River portion of the project and 6 census block groups in the Skyline WMA portion of the project in which the populations qualify as environmental justice communities with minority populations meaningfully greater than the minority population within their surrounding counties and/or where the low-income populations are greater than or equal to that of the county. With the exception of recreation enhancements proposed as part of the draft Recreation Plan and a proposed minimum flow unit, Alabama Power does not propose to modify project facilities or construct new facilities. Regarding the proposed recreation site enhancements, Alabama Power's proposed measures and staff and agency recommended measures would mitigate for adverse effects related to the construction activity on adjacent environmental justice communities. Although improvements to the recreational facilities may temporarily decrease access to recreation within those areas, including localized minor adverse effects to access to fishery resources, this new recreation site would have long-term benefits to recreation in the project area, such as improved access to Harris Lake and the Tallapoosa River downstream from Harris Dam for sport or subsistence fishing.

Construction of the new minimum flow unit could produce minimal short-term construction-related adverse effects to water quality, aquatic, and aesthetic resources. Implementing Alabama Power's proposed BMPs as part of standard sediment and erosion control plans during construction are expected to avoid or reduce the potential effects to water quality and aquatic resources. Additionally, Alabama Power's proposed project operation and proposed minimum flow unit, along with staff-recommended seasonal minimum flows and destratification of the water column in the forebay, would improve DO levels, provide a more stable thermal regime downstream from Harris Dam, benefitting fishery resources in the Tallapoosa River downstream from Harris Dam, and managing floods and droughts in the project vicinity, including in environmental justice communities.

Finalizing and implementing Alabama Power's WMP, SMP, and APP would provide a shoreline buffer against erosion, protect wildlife, and preserve their habitats, improve water resources and recreation access, and maintain environmental values in the surrounding environmental justice communities. These plans would also maintain existing permanent openings and access points on project land and include activities that promote biodiversity, scenic easements, and public health for adjacent environmental justice communities.

No-action Alternative

Under the no-action alternative, the project would continue to operate as it has in the past. None of Alabama Power's proposed measures or the resource agencies' recommendations and mandatory conditions would be required. None of the staff-recommended measures would be implemented, including measures to enhance environmental conditions for water quality, fish and wildlife within the project area, measures to improve flow conditions downstream from the project, and measures to expand and improve recreational opportunities, as presented in section 2.3 and Appendix I.

Draft License Articles

Staff recommendations for license articles for any new license for the project are based on the analysis presented in this draft EIS. Draft license articles are attached in Appendix J.

Conclusions

Based on our analysis, we recommend relicensing the project with the environmental, recreation, and cultural resources measures proposed by Alabama Power with staff modifications and additional measures.

In Appendix H of the EIS, we estimate the likely cost of alternative power for each of the three alternatives identified above. Our analysis shows that during the first year of operation under the no-action alternative, the project would cost $28,083,584 less than the likely alternative cost of power. Under the proposed action alternative, the project would cost $24,435,882 less than the likely alternative cost of power. Under the staff alternative, the project would cost $24,026,594 less than the likely alternative cost of power. Under the staff alternative with mandatory conditions, the project would cost $24,026,594 less than the likely alternative cost of power.

We chose the staff alternative as the preferred alternative because: (1) the project would provide a dependable source of electrical energy for the region (147,306 MWh annually); (2) the 135.0 MW of electric capacity comes from a renewable resource that does not contribute to atmospheric pollution, including greenhouse gases; and (3) the recommended environmental measures proposed by Alabama Power, as modified by staff, would adequately protect and enhance environmental resources affected by the project. The overall benefits of the staff alternative would be worth the cost of the proposed and recommended environmental measures.

DRAFT ENVIRONMENTAL IMPACT STATEMENT

Federal Energy Regulatory Commission
Office of Energy Projects
Division of Hydropower Licensing
Washington, D.C.

R.L. Harris Hydroelectric Project
FERC Project No. 2628—Alabama

1.0 INTRODUCTION

1.1 APPLICATION

On November 23, 2021, Alabama Power Company (Alabama Power or applicant) filed an application for a new license with the Federal Energy Regulatory Commission (Commission or FERC) to continue to operate and maintain the R.L. Harris Hydroelectric Project (Harris Project or project). On June 15, 2022, and December 27, 2022, Alabama Power supplemented the license application. The existing 135-megawatt (MW) project is located on the Tallapoosa River near the City of Lineville in Randolph, Clay, and Cleburne Counties, Alabama (figure 1-1). The total area within the existing project boundary at Harris Lake is about 17,241 acres. This includes 4.9 acres of federal land administered by U.S. Bureau of Land Management (BLM) and 7,371 acres of Alabama Power-owned land. The project generates an average of about 177,487 megawatt-hours (MWh) of energy annually.

The Harris Project boundary also includes 15,031 acres of land within the James D. Martin-Skyline Wildlife Management Area (Skyline WMA) located approximately 110 miles north of Harris Lake in Jackson County, Alabama, on which there are no hydropower generation facilities (figure 1-1; figures and tables are provided in Appendix G). Alabama Power acquired these lands as mitigation for the development of the Harris Project and leases these lands to the state of Alabama for wildlife management and public hunting as part of the Skyline WMA as outlined in the 1990 Skyline Wildlife Management Plan (WMP).[12]

1.2 PURPOSE OF ACTION AND NEED FOR POWER

1.2.1 Purpose of Action

The purpose of the Harris Project is to continue to provide a source of hydroelectric power. Therefore, under the provisions of the Federal Power Act (FPA), the Commission must decide whether to issue a license to Alabama Power for the Harris Project and what conditions should be placed on any license issued. In deciding whether to issue a license for a

[12] The Skyline WMP was approved by the Commission on June 29, 1990. *See* Accession No. 20181113-4002.

hydroelectric project, the Commission must determine that the project would be the best adapted comprehensive plan for improving or developing a waterway. In addition to the power and developmental purposes for which licenses are issued (such as flood control, irrigation, or water supply), the Commission must give equal consideration to the purposes of: (1) energy conservation; (2) the protection of, mitigation of damage to, and enhancement of fish and wildlife resources; (3) the protection of recreational opportunities; and (4) the preservation of other aspects of environmental quality.

Issuing a new license for the Harris Project would allow Alabama Power to generate electricity at the project for the term of a new license, making electrical power from a renewable resource available to its customers.

This draft environmental impact statement (draft EIS) assesses the effects associated with operation of the project and alternatives to the proposed project. It also includes recommendations to the Commission on whether to issue a new license, and if so, the terms and conditions recommended to become a part of any license issued.

In this draft EIS, we assess the environmental and economic effects of continuing to operate the project: (1) as proposed by Alabama Power; (2) with our recommended measures; and (3) with any mandatory conditions prescribed by state and federal agencies. We also consider the effects of the no-action alternative. Important issues that are addressed include the effects of continued project operation on reservoir levels, flows downstream from Harris Dam, shoreline erosion, water quality, fishery resources, terrestrial resources, threatened and endangered species, recreation and land use, and cultural resources.

1.2.2 Need for Power

To assess the need for project power, FERC staff reviewed Alabama Power's anticipated future use of project power. The Harris Project has an installed capacity of 135 MW and currently generates about 177,487 MWh annually. With the proposed minimum-flow unit (figure 1-2) installed, the project would have an installed capacity of 137.5 MW and generate about 175,177 MWh annually.

The North American Electric Reliability Corporation (NERC) annually forecasts electrical supply and demand nationally and regionally for a 10-year period. The Harris Project is located in the Southeast Electric Reliability Council (SERC)-Southeast subregion of the SERC Reliability Corporation region of the NERC. According to NERC's December 2023 forecast, net internal demand in the SERC-Southeast subregion is expected to increase from 46,354 MW in 2024 to 47,937 MW in 2033, an increase of 3.4% over a 10-year period (NERC, 2023). Capacity reserves are expected to decrease from 42.2% to 40.8% over the same 10-year period.

By producing hydroelectricity, the Harris Project would displace the need for non-renewable resources, thereby creating an environmental benefit. The future use of power from the Harris Project, its displacement of non-renewable, fossil-fueled generation, and contribution to a diversified generation mix support a finding that the power from the project would help meet both the short- and long-term need for power for the SERC-Southeast subregion.

1.2.3 Scoping

Before preparing this EIS, we conducted scoping to determine what issues and alternatives should be addressed. Scoping document (SD) 1 was distributed to interested agencies and others on July 31, 2018 (FERC, 2018a). It was noticed in the Federal Register on July 31, 2018, and August 6, 2018. Based on verbal comments that were received during two scoping meetings held on August 28 and 29, 2018, in Lineville, Alabama,[13] as well as written comments we received throughout the scoping process, SD2 was prepared and distributed to interested parties on November 16, 2018 (FERC, 2018b). In addition to comments provided at the scoping meetings, the following entities provided written comments:

Commenting Entity	Date Filed
Alabama Glade Conservation Coalition	September 3, 2018
Terry M. Hardig	September 18, 2018
Choctaw Nation of Oklahoma	September 18, 2018
U.S. Environmental Protection Agency (EPA)	September 25, 2018
Brad McLane	September 28, 2018
Alabama Power	September 28, 2018
Linda Sherk	September 28, 2018
Alabama Department of Environmental Management (Alabama DEM)	October 1, 2018
Alabama Rivers Alliance, Inc. and American Rivers, Inc. (Alabama Rivers Alliance and American Rivers)	October 1, 2018
U.S. Department of the Interior, National Park Service (Park Service)	October 1, 2018
Russell Lands, Inc. (Russell Lands)	October 1, 2018
Lake Martin Resource Association, Inc. (Lake Martin Resource Association)	October 1, 2018
Lake Martin Covey Rise Chapter of Quail Forever (Quail Forever)	October 2, 2018
Alabama Department of Conservation and Natural Resources (Alabama DCNR)	October 2, 2018
Kenneth M. Wills	October 2, 2018

[13] Transcripts of the public meetings are part of the Commission's public record for the project (*See* Accession Nos. 20181010-4002 and -4003).

1.3 STATUTORY AND REGULATORY REQUIREMENTS

Any new license for the Harris Project would be subject to numerous requirements under the FPA and other applicable statutes. The major regulatory and statutory requirements are described in Appendix B.

1.4 PUBLIC REVIEW AND COMMENT

The Commission's regulations (18 Code of Federal Regulations [C.F.R.], sections 5.1–5.16) require that licensees consult with appropriate resource agencies, Tribes, and other entities before filing an application for a license. This consultation is the first step in complying with the Fish and Wildlife Coordination Act, the Endangered Species Act (ESA), the National Historic Preservation Act (NHPA), and other federal statutes. Pre-filing consultation must be complete and documented according to the Commission's regulations.

1.4.1 Interventions

On December 7, 2021, the Commission issued a notice that Alabama Power had filed an application to relicense the Harris Project. On April 14, 2022, the Commission issued a notice that application was accepted for filing. This notice set June 13, 2022, as the deadline for filing protests and motions to intervene. The following entities filed motions to intervene:

Intervenor	Date Filed
Alabama Rivers Alliance	June 13, 2022
Mr. James T. Traylor	June 13, 2022
Mr. Barry Morris on behalf of Lake Wedowee Property Owners Association	June 21, 2022

1.4.2 Comments on the Application

On January 17, 2023, the Commission issued a notice that the application was ready for environmental analysis (REA notice) and solicited comments, recommendations, preliminary terms and conditions, and preliminary fishway prescriptions. The following entities commented:

Commenting Entity	Date Filed
George Diamond	March 8, 2023
Donna F. Matthews	March 14, 2023
EPA	March 15, 2023
Robin Crockett	March 15 2023
Laney Reese	March 16, 2023
V.M. Lashley	March 16, 2023
Carol Knight	March 17, 2023

Commenting Entity	Date Filed
Jonathan D. Belek	March 17, 2023
Donna F. Matthews	March 17, 2023
Alabama Rivers Alliance	March 17, 2023
James H. Allen	March 20, 2023
Alabama DCNR	March 20, 2023
Donna F. Matthews	March 20, 2023
Donna F. Matthews	March 21, 2023
EPA	May 10, 2023
Melanie Cole	July 5, 2023

Alabama Power filed reply comments on May 2, 2023.

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 NO-ACTION ALTERNATIVE

Under the no-action alternative, the Harris Project would continue to operate under the terms and conditions of the current project license, and no new environmental, mitigation, or enhancement (PM&E) measures would be implemented. We use this alternative to establish baseline environmental conditions for comparison with other alternatives, and to compare the benefits and costs of any measures that might be required under any new license issued.

2.1.1 Existing Project Facilities

The project is located on the Tallapoosa River near the City of Lineville in Randolph, Clay, and Cleburne Counties, Alabama. It consists of one development that contains one dam, two saddle dikes, a reservoir (Harris Lake), a powerhouse, several recreation sites, and associated facilities.

The Harris Project includes 9,870 acres inundated by Harris Lake at the full pool elevation of 793 feet relative to the National Geodetic Vertical Datum of 1929 (NGVD 29),[14] 7,371 acres surrounding the lake, and the 15,031 acres of land within the James D. Martin-Skyline Wildlife Management Area.

2.1.1.1 Harris Development

The Harris Development was completed in 1983. It includes Harris Dam, Harris Lake, and powerhouse.

Harris Dam and Reservoir

Harris Dam, located on the Tallapoosa River at river mile (RM) 139.1,[15] consists of six sections. From west to east, the dam sections include: (1) a 400-foot-long, 95-foot-high, west earth embankment section; (2) a 331-foot-long, 112-foot-high, concrete gravity west non-overflow section; (3) a 186-foot-long, 150-foot-high, concrete gravity intake structure section; (4) a 310-foot-long, 163-foot-high, concrete gravity spillway section; (5) a 315.5-foot-long, 150-foot-high, concrete gravity east non-overflow section; and (6) a 600-foot-long, 95-foot-high, east earth embankment section. There are also two saddle dikes located to the east of the dam: (1) an 800-foot-long, 40-foot-high, west saddle dike; and (2) a 300-foot-long, 30-foot-high, east saddle dike. The dam and saddle dikes impound Harris Lake, which extends approximately 29 miles upstream of the dam. The dam impounds portions of the Tallapoosa and Little Tallapoosa Rivers. Total gross storage is about 425,721 acre-feet at the May 1 through September 30 normal maximum water surface elevation of 793 feet. The usable storage of the reservoir during this period, from the 768-feet minimum lake elevation to the

[14] All elevations in this document are referenced to the NGVD 29 vertical datum, unless otherwise noted.

[15] River mile is a measure of distance in miles along a river with values beginning at zero at the mouth and increasing further upstream. For example, Harris Dam (RM 139.1) is located 139.1 miles upstream of the mouth of the Tallapoosa River.

793-feet normal maximum water surface elevation, is 207,317 acre-feet. The usable storage from elevation 768 feet to the January 1 through March 31 normal maximum water surface elevation of 785 feet, is 128,813 acre-feet. From Harris Lake, water is released through the powerhouse or over the spillway directly into the Tallapoosa River.

There are 12 project recreation sites located on lands associated with Harris Lake. Four of the sites are owned and managed by Alabama Power: (1) Crescent Crest Boat Ramp (boat launch and pier, and parking); (2) Flat Rock Park (parking, fishing pier, restrooms, and shelters); (3) Lee's Bridge Boat Ramp (boat launch and pier); and (4) Harris Tailwater Fishing Pier (parking, fishing pier, and restrooms). Seven of the sites are owned by Alabama Power and managed by Alabama Power and Alabama Department of Conservation and Natural Resources (Alabama DCNR): (1) Big Fox Creek Boat Ramp (boat launch and pier); (2) Foster's Bridge Boat Ramp (boat launch and pier); (3) Highway 48 Bridge Boat Ramp (boat launch and pier, parking, and restrooms); (4) Little Fox Creek Boat Ramp (boat launch and pier, and restrooms); (5) Lonnie White Boat Ramp (boat launch and pier); (6) Swagg Boat Ramp (boat launch and pier); and (7) R.L. Harris Wildlife Management Area (hunting shelters). One site, Wedowee Marine South, is owned by Alabama Power, but managed by Wedowee Marine, Inc. (parking, boat launch and pier, fishing pier, store, and bank fishing).

Harris Powerhouse

The Harris Powerhouse is a 186-foot-long by 95-foot-wide, concrete building located at the downstream face of the dam. The powerhouse contains two vertical Francis-type turbines that each have a rated output of 95,000 horsepower (hp) (71,250 kilowatts (kW)). Each turbine is connected to a generator rated at 71,740 kilovolt-amperes, with a 0.9409 power factor (67,500 kW). The current installed capacity, as authorized in a 1984 license amendment order,[16] is 142.5 MW. The 142.5 MW installed capacity was based on the nameplate capacities of the turbines. However, a project's installed capacity is currently defined as the lesser of the ratings of the generator or turbine units.[17] The project's generators are rated at a lesser capacity than the turbines, which results in an installed capacity of 67,500 kW for each generating unit, or a total authorized installed capacity of 135,000 kW (135 MW). The normal maximum gross head of Harris Powerhouse is 121 feet, generating about 177,487 MWh annually.

There are two 115 kilovolt (kV) transmission lines at the Harris Powerhouse, one 1.42 miles long (Harris 1) and the other 1.29 miles long (Harris 2). Both lines transfer power from the project switchyard to the Crooked Creek Transmission Substation, which is the point of interconnection with the electric grid. The substation is not a project facility.

2.1.2 Project Safety

The project has been operating since 1983 under the existing license that was issued in 1968. During this time, Commission staff has conducted operational inspections focusing on the continued safety of the structures, identification of unauthorized modifications, efficiency

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[16] *See* 28 FERC ¶ 62,017 (July 12, 1984), which authorizes an installed capacity of 190,000 hp or 142,500 kW.

[17] *See* 18 C.F.R. § 11.1(i) (2021).

and safety of operations, compliance with the terms of the license, and proper maintenance. In addition, the project has been inspected and evaluated every five years by an independent consultant, and consultant's safety reports have been submitted for Commission review. As part of the relicensing process, Commission staff evaluated the continued adequacy of the proposed project facilities should a new license be issued. Special articles may be included in any license issued, as appropriate. Commission staff would continue to inspect the project during the new license term to assure adherence to Commission-approved plans and specifications, special license articles relating to construction (if any), operations and maintenance (O&M), and accepted engineering practices and procedures.

2.1.3 Existing Project Operation

The Harris Project is a peaking facility and typically generates Monday through Friday to meet peak power demands. As licensed, the project serves multiple purposes, including hydropower generation, water supply, public recreation, flood control, and wildlife enhancement. Alabama Power operates the project to target lake surface elevations known as the project's operating curve. Table 2-1 and figure 2-1 show the target operating curve. In addition, the Corps' Water Control Manual, last updated in 2022, describes flood management regulations, drought management provisions, and navigation requirements for the Harris Project (Corps, 2022).

2.1.3.1 Normal Operation

The project has two identical turbines, with one turbine operated a majority of the time. Alabama Power states that two-turbine operation occurs less than 9% of the time. When the lake is at or near the operating curve, the Harris Project passes inflow up to about 13,000 cfs through the powerhouse. The releases are guided by the Harris "Green Plan" (figure 2-2), which was implemented in 2005 to improve downstream ecological conditions, including fisheries. The Green Plan specifies short (10- to 30-minute-long) 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 Lake. The plan outlines specific daily and hourly release schedules from Harris Dam based on the previous day's flow at the U.S. Geological Survey's (USGS) gage near Heflin (Station. No. 02412000). The daily volume releases are suspended during flood operations and guided by a drought plan (see below) during low inflow conditions. The project has two identical turbines, with one turbine operated a majority of the time. Alabama Power states that two-turbine operation occurs less than 9% of the time.

2.1.3.2 Flood Operation

The Corps Water Control Manual specifies a gate opening schedule to be followed during flood conditions. According to the manual, the Harris Project operates to pass the inflow up to approximately 16,000 cfs through the powerhouse to maintain the lake elevation near the operating curve. If the elevation rises above the operating curve (or is predicted to do so), but is below elevation 790 feet, the project discharges 13,000 cfs or an amount that would 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.[18] When the reservoir rises above elevation 790 feet, the powerhouse discharge is 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 are maintained at those settings until the 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 would be as directed by the induced surcharge curve operation plan outlined in the Corps' Water Control Manual.

2.1.3.3 Drought Operation

During low-flow (or adverse) conditions the drought contingency curve (see figure 2-1) is one of several factors used in evaluating drought reservoir operations. The drought contingency curve indicates when the reservoir is in drought condition and is used to calculate the composite storage (the sum of the amount of storage available for each storage reservoir in the Coosa and Tallapoosa River Basins). Composite storage is a component of the Alabama-ACT[19] Drought Response Operations Plan (ADROP).

The ADROP describes the management of Alabama Power's reservoirs within the ACT basin during drought conditions. It 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, Alabama Office of Water Resources, and other relevant state and federal agencies monitor specific precipitation and stream flow indicators within the ACT basin. Alabama Power evaluates the DIL using the ADROP Decision Tool that was developed by Alabama Power and the Corps to implement portions of the Corps' Water Control Manual in real-time operations. ADROP was incorporated into the Corps' Water Control Manual (Corps, 2022) and ACT River Basin Drought Contingency Plan (Corps, 2022, Appendix I, Exhibit D).

2.1.3.4 Navigation Operations

As outlined in the Corps' Water Control Manual, Alabama Power's Coosa River and Tallapoosa River projects are operated to provide a minimum 7-day average flow of 4,640 cfs to the Alabama River at Montgomery. The Corps' Water Control Manual also includes a template for increased Alabama River navigation support, subject to development of a navigational memorandum of understanding between Alabama Power and the Corps. This template provides for the use of specified amounts of storage from Alabama Power's reservoirs

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[18] The induced surcharge curves are a set of curves on a graph relating discharge to lake elevation and inflow. For a given combination of elevation and inflow they specify the necessary release.

[19] ACT refers to the Alabama-Coosa-Tallapoosa River Basin.

to support navigation during the June-December period under certain conditions, including adequate basin inflow. As discussed above, navigation is not supported during drought operations, as defined by the ACT Basin Drought Contingency Plan.

Figure 2-3 is a schematic overview diagram of the project. The flow of water through the project is shown in figure 2-4.

2.1.4 Existing Environmental Measures

Alabama Power operates the Harris Project in accordance with the environmental measures required by, or carried out voluntarily, under the current license, as discussed below.

- Per Article 13 of the existing license, (1) release water from the project to provide a minimum flow of 45 cfs, as measured at the downstream Wadley gage near Wadley, Alabama. The 45 cfs is not a continuous 45-cfs release from Harris Dam, but rather is met through Harris releases in addition to other intervening flows; (2) maintain Harris Lake elevation as much as reasonably possible at normal full pool elevation of 793 feet from May 1 to September 30 and elevations as high as is consistent with flood control and system power needs and in no event lower than elevations of 768 feet from October 1 to April 30; and (3) operate the reservoir for flood control in accordance with the 1972 agreement between the Corps and Alabama Power.
- Operate Harris Dam according to Green Plan release criteria since 2005.
- When conditions exist, and upon request from Alabama DCNR, hold Harris Lake water levels constant or slightly increasing for a 14-day period for spring spawning.
- Per revised Exhibit S and amended Article 63 of the existing license, operate the skimmer weir and turbine aeration system, as included in the original turbine design, to maintain state water quality standards.
- Per Article 63 of the existing license, implement the 1989 Wildlife Mitigation Plan on project lands at Harris Lake and the 1990 WMP on project land at Skyline WMA.
- Maintain the existing native plant plots at Little Fox Creek to provide habitat for pollinators.
- Per Article 18 of the existing license, operate and maintain project recreation sites.
- Per Article 19 of the existing license, implement the Harris Land Use Plan, which describes the land management of project lands at Harris Lake based on the current land use classifications: hunting, natural undeveloped, recreational use (public use areas), and prohibited access.
- Per the standard land use article, implement a shoreline compliance program, shoreline permitting program, dredge permit program, and water withdrawal policy.
- Prior to construction at the project, consult with the Alabama State Historic Preservation Officer (SHPO) about the need for any cultural resource survey and salvage work.

2.2 APPLICANT'S PROPOSAL

Alabama Power proposes to install a minimum flow turbine generator unit that would involve major construction and changes in power generation facilities. Alabama Power also proposes modifications to the Harris Dam and Powerhouse, recreation facilities, and the project boundary. The details of these changes are described below.

2.2.1 Proposed Facility Modifications

Alabama Power proposes to install a new continuous minimum flow generating unit at Harris Dam, adjacent to Unit 1 on the east side of the existing Harris Powerhouse. The unit would draw water from the Unit 1 penstock and discharge approximately 300 cfs to the Tallapoosa River immediately downstream from the dam. 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 preliminary design, the unit would consist of a 2,500-kW turbine with a generator rated at 3,600 kW. The capacity of the unit would be turbine-limited at 2,500 kW, and the authorized installed capacity of the project would increase by 2,500 kW (2.5 MW).

2.2.2 Proposed Project Boundary Changes

Recent changes in the project boundary at Skyline WMA were approved on October 16, 2024.[20] The total acreage within the project boundary at Skyline WMA after this approval is about 15,031 acres.[21] Alabama Power proposes additional changes to the project boundary at Harris Lake to include lands necessary for project O&M, and to exclude excess land and roads currently within the project boundary that are not required for project purposes. The proposed project boundary modifications around Harris Lake would add eight parcels of land totaling about 504 acres and remove eight parcels of land totaling about 286 acres, for a net addition of about 218 acres. The amount of federal land within the project boundary would remain the same. The revised acreage within the project boundary would include 9,870 acres inundated by Harris Lake, 7,589 acres surrounding Harris Lake, and 15,031 acres associated with the Skyline WMA, for a total acreage within the project boundary of 32,490 acres. The proposed modifications around Harris Lake are shown in Exhibit G of the final license application (FLA) (Alabama Power, 2021a), and are described in table 2-2.

2.2.3 Proposed Project Operation

The project would continue to operate as it has under the existing license as a peaking facility as described below. A more detailed description of the operational measures is provided in table 5-2 of the revised Exhibit E (Alabama Power, 2022a).

- Operate the two main generating units at the Harris Powerhouse in a daily peaking mode, within the constraints of the existing Harris Lake operating curve, and

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[20] *See* 189 FERC ¶ 62,028.

[21] On June 13, 2022, the Commission approved the addition of about 120.7 acres and removal of about 152.3 acres from the project boundary at Skyline WMA, resulting in a net reduction of about 31.6 acres. *See* 179 FERC ¶ 62,134.

continue to operate in accordance with Green Plan operations until the proposed minimum flow unit is installed and operating.

- Operate in accordance with Green Plan operations when the proposed minimum flow unit is shut down for maintenance or when flow to Unit 1 is interrupted.
- Continue to operate the project during high flow conditions in accordance with the Corps-approved flood control procedures in the Corps' Harris Water Control Manual (Corps, 2022).
- Continue to operate the project to maintain a navigation channel in the Alabama River.
- Continue to operate the project during drought conditions in accordance with ADROP procedures, as outlined in the Corps' Water Control Manual (Alabama Power, 2016 and 2022b), and develop drought operations procedures for the minimum flow unit.

2.2.4 Proposed Environmental Measures

The applicant proposes the following environmental measures:

Geology and Soils

- Develop and implement an erosion monitoring plan (Alabama Power, 2021c) for the Tallapoosa River downstream from Harris Dam.

Water and Aquatic Resources

- Release a continuous minimum flow of approximately 300 cfs through the proposed continuous minimum flow unit.
- Develop drought operations procedures for the minimum-flow unit that would be consistent with the Alabama-ACT Drought Response Operations Plan (ADROP).
- Develop and implement a project operation and flow monitoring plan (Alabama Power, 2021b) to monitor compliance with: (1) project operation and water level management; (2) flow releases from Harris Dam; (3) flood control operations; and (4) drought management.
- Continue to maintain the existing skimmer weir that is part of the existing intake's design at its highest elevation to allow the intake to draw from higher levels in the water column.[22]
- Continue to operate the existing aeration system that is part of the existing turbines.
- Include an aeration system in the proposed continuous minimum flow unit.

[22] The skimmer weir is part of the existing intake's design to enable the intake to draft water from different elevations in the water column.

- Develop and implement a water quality monitoring plan (Alabama Power, 2022c) consistent with the water quality certification.
- Develop and implement an aquatic resources monitoring plan (Alabama Power, 2021d) following implementation of the continuous minimum flow.
- When conditions permit, and upon request from Alabama Department of Conservation and Natural Resources (Alabama DCNR), continue to hold Harris Lake water levels constant or slightly increasing for a 14-day period for spring fish spawning.
- Improve fish habitat by adding fish attraction devices (e.g., brush piles and other woody debris [recycled Christmas trees, felled trees] and synthetic materials [spider blocks, concrete, and PVC structures]) to Harris Lake.
- Finalize and implement a nuisance aquatic vegetation and vector control program for Harris Lake (Alabama Power, 2021e).

Terrestrial Resources

- Continue to maintain the existing native plant plots at Little Fox Creek to provide habitat for pollinators.
- Protect a rare plant community by reclassifying a 57-acre area adjacent to Flat Rock Park at Harris Lake from “recreation” to “natural/undeveloped” in the Shoreline Management Plan (SMP)(filed June 15, 2022).
- Finalize and implement a Wildlife Management Plan (WMP)(filed November 23, 2021) that includes measures to protect and enhance wildlife habitat within the Harris Lake and Skyline WMA project boundaries.
- Implement the Alabama Power Company Avian Protection Plan (Alabama Power, 2022b) within the Harris Project boundary.

Threatened and Endangered Species

- Consult with the U.S. Department of the Interior, Fish and Wildlife Service (FWS) to develop measures to protect federally listed bats, including the Indiana, northern long-eared, and gray bats as part of the preparation of the final WMP.
- As part of the WMP, conduct surveys for Price’s potato-bean at the location of the extant population, and notify crews of the location of any Price’s potato-bean occurrences prior to conducting timber management activities that may affect the extant population.

Recreation Resources

- Implement the draft Recreation Plan as filed with the license application, which includes provisions to operate and maintain the existing recreation sites at Harris Lake and the following facility modifications and new recreation facilities:
    - Install a barrier-free access kayak/canoe access area and a barrier-free access trail to the launch from the existing Harris Dam tailrace fishing pier parking lot.

- Remove the Wedowee Marine South recreation area on Harris Lake from the project's licensed facilities to be replaced by a new recreation facility at another location (see next item).
- Install a new project recreation area on Harris Lake on licensee-owned land near the existing Alabama Power-owned and commercially operated, Wedowee Marine South facility. The new facility would be accessed from the existing Wedowee Marine South access road on Alabama State Route 48 (Highway 48). It would be a day use park with amenities including swimming, picnicking, boat launch and pier, fishing piers, and parking.

Land Use and Aesthetics

- Finalize and implement the SMP, filed November 23, 2021, and revised on June 15, 2022, that addresses all shorelines within the project boundary, and guides the use, occupancy, and management of shoreline resources, and future updates and revisions to the plan.
- Implement proposed land additions to, and removals from, the project boundary and incorporate these changes into Exhibit G.

Cultural Resources

- Finalize and implement a Historic Properties Management Plan (HPMP) to protect and preserve historic properties identified in the project area and conduct ongoing inventory and evaluation of cultural resources in the project area.

2.2.5 Modifications to Applicant's Proposal—Mandatory Conditions

The following mandatory conditions have been provided and are evaluated as part of the applicant's proposal.

Water Quality Certification Conditions

Alabama Power's request for certification under section 401 of the Clean Water Act was filed on March 3, 2023, which was received by the Alabama Department of Environmental Management (Alabama DEM) on the same day. Alabama DEM issued a 401 certification on November 29, 2023, which was filed on December 4, 2023. The 401 certification (Appendix C) includes the following conditions:

- Condition 1: Operate the project to maintain DO of no less than 5.0 mg/L in the tailrace waters downstream from R.L. Harris Dam.
- Condition 2: Adaptively implement structural and/or operational modifications throughout the duration of the FERC license to maintain DO of no less than 5.0 mg/L downstream from the project.
- Condition 3: Monitor DO and temperature at 15-minute intervals in the project's tailrace approximately 800 feet downstream from the dam on the west bank of the river at 33.255448° N and 85.615765° W for the period January 1 through December 31 to determine compliance with Conditions 1 and 2.

- Condition 4: Coordinate with USGS to conduct additional monitoring in the Tallapoosa River at Malone and Wadley (USGS Nos. 02414300 and 02414500, respectively) to document water quality conditions following proposed structural and operational changes as outlined in the November 2021 FLA.
- Condition 5: During the term of a new FERC license, Alabama Power and Alabama DEM may work together to modify the monitoring and reporting requirements.
- Condition 6: Conduct all monitoring according to applicable Alabama DEM and/or USGS Standard Operating Procedures, and conduct appropriate maintenance and calibration of monitoring equipment.
- Condition 7: Within 90 days following the end of each annual monitoring period, submit DO and temperature monitoring reports with appropriate certifications to Alabama DEM.[23]

2.3 STAFF ALTERNATIVE

Under the staff alternative, the project would include Alabama Power's proposed measures with the exception of: (1) releasing a continuous minimum flow of approximately 300 cfs through the proposed continuous minimum flow unit; (2) operating in accordance with the Green Plan operations until the minimum flow unit is installed and during periods when the minimum flow unit is offline or flow to existing unit #1 is interrupted; and (3) developing the proposed water quality and aquatic resources monitoring plans. The staff alternative also includes most measures recommended by relicensing participants, with the exception of: (1) installing battery storage to replace generation at the project; (2) a 2-hour delay between the second and first unit being taken offline; (3) maintaining stable water levels in the project tailrace for a 14-day period annually to enhance spawning; (4) monetary compensation or other measure to offset fish loss due to entrainment; (5) a specific license requirement for consulting with FWS and the Corps regarding potential methods to provide or enhance fish passage on the Tallapoosa River; and (6) an aquatic resources propagation program for the Tallapoosa River.

We recognize that the proposed 300-cfs continuous minimum flow unit would benefit environmental resources and capture generation; however, a higher continuous minimum flow in some seasons would further increase aquatic habitat and reduce the risk for stranding. Therefore, we do not recommend inclusion of this as a specific license condition, nor do we recommend operating in accordance with Green Plan operations until the minimum flow unit is installed and during periods when the minimum flow unit is offline or flow to the existing unit #1 is interrupted. We do not recommend Alabama Power's proposed water quality and aquatic resources monitoring plans, as the proposed plans lack sufficient detail for the Commission's administration of the license to ensure water quality and aquatic resources in the Tallapoosa River are protected.

We do not recommend installing battery storage to replace generation at the project because, as discussed in Appendix E, the cost is prohibitively expensive and would provide no

[23] Subsequent to implementation of Alabama Power's proposed structural and operational changes.

water quality benefit. We do not recommend a 2-hour delay when transitioning from one to two turbine operation, because it would interfere with peaking operation and could lower lake levels unnecessarily (i.e., for no described benefit). We do not recommend requiring Alabama Power to maintain stable water levels in the project tailrace for a 14-day period annually because maintaining stable downstream flows for a 14-day period during the spring would be difficult, due to naturally high inflows and reservoir management obligations during that time. In addition, Alabama Power would be unable to operate the project in a peaking mode during that time. Finally, if Alabama Power were to operate the project as recommended by Alabama DCNR, lake levels would be held relatively constant, which could potentially result in excessive flow being spilled, which could negate any benefits gained with stable downstream flows. We do not recommend monetary compensation or other measure to offset fish loss due to entrainment because compensatory mitigation for lost fish would constitute a payment of damages, and the Commission lacks the authority under the Federal Power Act to either adjudicate claims, or require compensation, for damages. We do not recommend consulting with FWS and the Corps regarding fish passage because several dams downstream from Harris Dam block upstream passage. In addition, FWS and NMFS did not file comments or conditions related to fish passage, or reserve authority to require fish passage in response to the Commission's REA notice. We do not recommend requiring an aquatic resources propagation program for the Tallapoosa River because it is unclear which reaches of the Tallapoosa River are intended to be enhanced through such a program. Moreover, propagating fish and invertebrate species that are then used to enhance aquatic communities in the Tallapoosa River upstream of the project boundary or downstream of Lake Martin would not be commensurate with effects of the Harris Project and therefore would not be needed to fulfill a project-specific purpose. For all the above reasons, we do not recommend incorporating these measures as part of any license issued for the project.

In addition, the staff alternative also includes the terms and conditions of Alabama DEM's 401 certification and the following recommended modifications to Alabama Power's proposal and additional measures.

- Continue to operate in accordance with Green Plan operations (a) until any minimum flow recommended by staff and required by the license is implemented, and (b) when any minimum flow required by the license is interrupted for maintenance.
- Release a continuous minimum flow from the Harris Project (dam and/or powerhouse) to the Tallapoosa River of 300 cfs July through November; 350 cfs May and June; 400 cfs in December; and 450 cfs from January through April.
- Limit annual reductions in minimum flows to down to 254 cfs, as necessary for project maintenance, in the months of October through January, and for no longer than 3 consecutive weeks at a time.
- Develop a minimum flow release plan, in consultation with Alabama Department of Environmental Management (Alabama DEM), Alabama DCNR, Alabama Rivers Alliance, and FWS, that includes: (1) a description of the source(s) of water releases for each seasonal period; (2) a description of any new facilities and/or modifications of existing facilities needed to release the required minimum flows, including an evaluation (with requisite conceptual design drawings) of fish-friendly

turbine design options for any proposed minimum flow unit; (3) a provision for any deviation from normal operations; (4) provisions to monitor the efficacy of any proposed release mechanism(s) to provide the required flows and to modify the plan, with Commission approval, if necessary; and (5) an implementation schedule for the provisions of the plan.

- Include, within Alabama Power's proposed project operations and flow monitoring plan, a provision to sequentially start the existing project turbines for all controllable, non-emergency flow releases by allowing at least 30 minutes (consistent with existing Green Plan operations) to pass before starting a second turbine after the first turbine has been started.

- Develop a water temperature and DO monitoring plan to ensure that the staff-recommended Alabama DCNR thermal regime and staff-recommend Alabama DEM DO targets are achieved, and that includes: (1) the goals and objectives of the plan; (2) measurable response objectives and success criteria; (3) measures, including a narrative description and requisite conceptual design drawings, to destratify a portion of Harris Lake to meet the staff-recommended water temperature regime and DO targets[24] in the Tallapoosa River downstream from the project; (4) a monitoring program that, at a minimum, includes the elements of Alabama Power's proposed Water Quality Monitoring Plan (i.e., measures consistent with Alabama DEM's 401 certification) and Alabama DCNR 10(j) recommendations nos. 2 and 9 through 13; (5) a provision to file annual monitoring report(s) that include (a) the data collected, (b) a discussion of the effectiveness of the water temperature and DO enhancement measures implemented, and (c) any recommendations to the Commission, for approval, of any needed changes to project facilities and/or operations; and (6) an implementation schedule that includes monitoring after flows and water quality enhancement measures required by the license are implemented.

- Develop a Harris Lake aquatic habitat enhancement plan, in consultation with Alabama DCNR, that includes provisions to: (1) consult with Alabama DCNR regarding timing prior to annually holding Harris Lake water levels constant or slightly increasing for a 14-day period for spring fish spawning within Harris Lake; (2) identify candidate areas for littoral enhancement and establish native aquatic plants in the selected areas within Harris Lake; (3) file a proposed schedule for carrying out lake habitat enhancement activities; (4) continue to selectively cut and monitor felled trees for shoreline cover; (5) add fish attraction devices such as brush piles and other woody debris (e.g., recycled Christmas trees, felled trees) and synthetic materials (e.g., spider blocks, concrete, and PVC structures) in Harris Lake to provide cover for fish and to enhance angling opportunities; and (6) file a summary report with the Commission, within 3 months of completing any enhancement activity, that describes the area enhanced, the measures used, and any

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[24] *See* Alabama DCNR (10(j) #12) and the DO targets described in Alabama DEM's 401 certification Conditions 1 and 2.

areas within Harris Lake recommended to the Commission for approval, for future enhancement.

- Develop a Tallapoosa River aquatic resources monitoring plan to measure the effectiveness of the minimum flows and water quality enhancement measures required by the license for the first 3 years after commencement of the minimum flow releases and water quality enhancement measures, and that includes the elements of Alabama Power's proposed Aquatic Resources Monitoring Plan, with the following additional provisions: (1) the goals and objectives (ecological and navigational) for the Tallapoosa River in project-affected waters downstream from Harris Dam; (2) criteria for measuring the effectiveness of the required minimum flow regime at achieving the environmental objectives in item 1 (to include developing degree day criteria for selected fish species in consultation with FWS, Alabama DCNR, and Alabama DEM); (3) the methodologies for (a) monitoring the project-related effects of the minimum flow regime required by the license on the environmental objectives identified in item 1, including monitoring (for the first 3 years after providing the required minimum flows and water quality enhancement measures) through monitoring aquatic organisms at the same locations as water temperature and DO, and (b) the methods that will be used to isolate the effects of the minimum flows from other, non-project-related effects; (4) the formation of a Tallapoosa River Flow Advisory Committee, consisting of Alabama Power, Alabama DCNR, and Alabama DEM, to the extent they are willing to participate; (5) annual monitoring reports and a 3-year monitoring report that includes (a) the monitoring methods used, (b) the data collected, (c) a discussion of the effectiveness of the minimum flow regime required by the license in achieving the environmental objectives identified in item 1, and (d) any recommendations to the Commission, for approval, for changes to project facilities and/or operations, including changes to the minimum flow regime, and any changes to the monitoring schedule, including the need for additional monitoring after the third year of monitoring is completed; and (6) an implementation schedule.
- Develop an aquatic invasive species management plan that includes, at a minimum, provisions for: (1) educating the public regarding preventative actions that can be taken to help control invasive species on project land and waters; (2) consulting with agencies regarding appropriate signage to be provided on project land; (3) developing BMPs for specific activities that have the potential to introduce aquatic invasive species into Harris Lake; and (4) documenting incidental observations of aquatic invasive species on project land and waters and reporting such observations to Alabama DCNR.
- Finalize the WMP in consultation with FWS and Alabama DCNR, and include provisions to: (1) manage vegetation in the Pollinator Plots at Little Fox Creek and project transmission line right-of-way to protect the monarch butterfly; (2) prior to conducting ongoing timber management, constructing proposed recreation amenities, and removing land from the Harris Project boundary, use FWS's current guidance to conduct additional surveys for the: (a) red-cockaded woodpecker at Harris Lake, (b) gray, Indiana, northern long-eared, and tricolored bats, and their habitats (i.e., hibernacula (for all four species), summer roost caves (for gray bats),

and summer/maternity roost trees (for Indiana, northern long-eared, and tricolored bats) on project land at Harris Lake and/or Skyline WMA, and (c) Georgia rockcress, white fringeless orchid, Price's potato bean, Morefield's leather-flower, and American hart's-tongue fern at Harris Lake and/or Skyline WMA, as appropriate; (3) report alligator snapping turtle sightings; (4) based on survey results and incidental species sightings, identify potential measures to protect the species listed in items 2 and 3 during timber harvests and other vegetation management activities, construction of the proposed recreation sites/amenities, and project operations, if necessary to avoid project-related effects; (5) file, for Commission approval, the survey results, recommended protection measures, and proposed forestry management plans for project land at Harris Lake and Skyline WMA; and (6) incorporate Commission-approved species protection measures into the final WMP.

- Incorporate in the SMP provisions to protect rare plants within the project's 57-acre rare plant area adjacent to Flat Rock Park including: (1) periodically monitor the area for evidence of unauthorized uses (e.g., tire track marks on vegetation and rock outcrops); (2) maintain the new signs and barrier (gate); and (3) consult with Alabama DCNR to develop and recommend additional protection measures, for Commission approval, if needed, to avoid effects associated with recreation activities.

- Develop a public education and outreach plan in consultation with Alabama DCNR that includes a detailed description of provisions to: (1) share information about (a) the project's recreation opportunities and upgrades, (b) water levels in Harris Lake and the Tallapoosa River downstream from Harris Dam, (c) the new Harris Lake shoreline classifications, changes to land parcels in the project boundary, and the allowable activities in each area, (d) BMPs to protect natural resources from construction and maintenance activities (e.g., boat dock construction, shoreline stabilization, and vegetation management), (e) the procedures for permits to lease or occupy project lands and waters for purposes permitted by any license issued for the project, (f) license requirements for the enhancement of aquatic habitat, and management of invasive species, historic properties, and recreation at the project, as applicable; (2) file a schedule for distribution of the project information described in item 1 to stakeholders; and (3) review and update the plan every 6 years.

- Revise the November 23, 2021, HPMP to include the following additional information regarding historic properties within the project Area of Potential Effects (APE): (1) the results of cultural resources surveys of the 17 tracts of land proposed for removal from the project boundary and measures to resolve adverse effects to eligible sites on these lands; (2) a plan to conduct National Register evaluations of all unevaluated sites proposed to be removed from the project boundary and 119 sites (8 sites at Lake Harris, 111 sites at Skyline WMA) within the APE that remain unevaluated but have been removed from consideration; (3) current, ongoing, project-related effects to National Register-eligible and unevaluated sites, including impacts of flow release alternatives; (4) documentation of all consultation efforts with the SHPO and applicable Tribes; (5) specific plans for cultural resources monitoring; (6) details regarding public interpretation and education; and (7) a schedule for completion of all HPMP actions.

2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY OR NOT CARRIED THROUGH DETAILED ANALYSIS

Certain alternatives to Alabama Power's proposal were considered but eliminated from further analysis because they are not reasonable in this case. Similarly, certain measures were considered but not carried through detailed analysis because they are not considered feasible. These alternatives are presented in Appendix E.

3.0 ENVIRONMENTAL ANALYSIS

In this section, we present (1) a general description of the project vicinity; (2) an explanation of the scope of our cumulative effects analysis; and (3) our analysis of the proposed action and other recommended environmental measures. Sections are organized by resource area. Appendix F describes historic and current conditions for each resource area. The existing condition is the baseline against which the environmental effects of the proposed action and alternatives are compared, including an assessment of the effects of proposed mitigation, protection, and enhancement measures, and any potential cumulative effects of the proposed action and alternatives. Staff conclusions and recommended measures are discussed in Appendix I, *Comprehensive Development and Recommended Alternative*.[25]

3.1 DESCRIPTION OF THE ENVIRONMENTAL CONTEXT

Tallapoosa River Basin

The 4,687 square-mile Tallapoosa River Basin is a sub-basin of the Mobile River Basin. Formed by the confluence of McClendon and Mud Creeks in Paulding County, Georgia, the Tallapoosa River flows 265 miles from the southern end of the Appalachian Mountains in Georgia, south and westward into Alabama. The principal tributary streams in the Tallapoosa River Basin are the Little Tallapoosa River, which has a drainage area of 464.7 square miles (mi^2) in Georgia and Alabama, and the Sougahatchee, South Sandy, Uphapee, and Hillabee Creeks in Alabama. The main stem of the Tallapoosa River begins in Randolph County, Alabama, where the Tallapoosa and Little Tallapoosa Rivers converge at Harris Lake. Other principal tributaries of Harris Lake include Wedowee Creek, and Ketchepedrakee Creek. About 138 miles downstream from the Harris Project, the Tallapoosa River joins the Coosa River to form the Alabama River (figure 3.1-1).

Major Land and Water Uses

Most of the land in the Tallapoosa River Basin is undeveloped. The upper, middle, and lower Tallapoosa River Basin areas are dominated by forest/woodland, at 83.8, 84.4, and 64.1%, respectively, and agriculture, at 13.1, 8.4, and 19.6%, respectively. Less than 1% of the Tallapoosa River Basin is urban. Although there are no large metropolitan centers within the Tallapoosa River Basin, Harris Lake is located approximately equidistant (65 miles) east of Birmingham, Alabama, and west of Atlanta, Georgia. The closest population centers to Harris Lake are Wedowee, Lineville, and Wadley, Alabama with populations of 794, 2,249, and 714, respectively.

Current water uses in the Tallapoosa River Basin include municipal, industrial, agricultural, hydropower, navigation (downstream flow augmentation for the Alabama River),[26] assimilative capacity (for wastewater discharges), flood control, fish and wildlife habitat, and

[25] Unless otherwise indicated, our information is taken from the application for license for this project (Alabama Power, 2021a) and supplemental information filed by the applicant (Alabama Power, 2023, 2022a, b, d, and e).

[26] The Alabama River, downstream from the Tallapoosa provides for navigation for commercial barge traffic. However, the Tallapoosa River does not contain any locks.

recreation. The four hydroelectric generating dams on the Tallapoosa River are owned and operated by Alabama Power, and include 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. The Newell and Heflin U.S. Geological Survey (USGS) gages measure the unregulated flows upstream of the Harris Project, and the Wadley and Horseshoe Bend USGS gages measure the regulated flows downstream from the Harris Project (figures 3.1-1 and 3.1-2).

Consumptive 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. Seasonal demands on surface water affect management of Alabama Power's hydroelectric operations in the basin. Nearly half of the surface water withdrawals are from reservoirs, with Martin Lake, downstream from Harris Lake, being the main source. Drinking water supplies for livestock, irrigation of crops and orchards, and aquaculture account for the agricultural water demand in the Tallapoosa River Basin.

Climate

The temperate climate in the Tallapoosa River Basin is conducive to agriculture, outdoor leisure and recreation activities, and industries that require year-round outdoor work. Average daily air temperatures are typically lowest in January ranging from 35 to 58 degrees Fahrenheit (°F) and highest in July ranging from 67°F to 92°F. The monthly average highs in June, July, and August exceed 90°F. Historically, freezing temperatures occur an average of 51 days per year and 90°F is exceeded an average of 87 days per year.

Precipitation is usually in the form of rain with rare snowfall. Rainfall is not evenly distributed throughout the Tallapoosa River Basin. Annual rainfall amounts typically range from 46 inches to 64 inches, with the higher amounts occurring in the upper and lower Tallapoosa River Basin segments, respectively.

Skyline Wildlife Management Area

The Skyline WMA is located in northeast Alabama just west of the Tennessee River and just south of the Tennessee state border. The Tennessee River Basin is a sub-unit of the Ohio River Basin. The Tennessee River flows 652 miles from the confluence of its two main tributaries, the French Broad and Holston Rivers, near Knoxville, Tennessee, enters Alabama in Jackson County northeast of Bridgeport, Alabama, passing to the east of Skyline WMA. The Tennessee River then meanders southwest to Guntersville, Alabama, northwest through Florence, Alabama, and then north back into Tennessee before meeting the Ohio River at Paducah, Kentucky.

While the Tennessee River is one of the major rivers in the eastern United States, its tributaries in the Skyline WMA are relatively small and short. Unlike the Tallapoosa River the Skyline WMA streams are not used to generate hydropower by Alabama Power. The Skyline WMA was established as, and continues to be maintained to provide, mitigation for the effects of the R.L. Harris Project.

Major Land and Water Uses

Land cover in the Skyline WMA is forest and wildland, which is used for wildlife habitat, hunting, hiking, wildlife observation, and timber management. Private rural residential and agricultural lands are interspersed around and between sections the Skyline WMA.

Waterways in the Skyline WMA are intermittent and first to third order perennial streams, crossing back and forth through and between lands of the Skyline WMA and private lands. The streams flow for only a few miles before entering the Tennessee River. In spite of their small size, the Skyline WMA waterways have carved dramatic topographic features through the karst (limestone) geology, including steep canyons, stepped waterfalls, and caves.

Climate

Like the Tallapoosa River Basin, the temperate climate in the Skyline WMA is conducive outdoor leisure and recreation activities. Average daily air temperatures are typically lowest in January ranging from 32°F to 47°F and highest in July ranging from 70°F to 86°F. The monthly average highs in June, July, and August exceed 85°F. Historically, freezing temperatures occur an average of 74 days per year and 90°F is exceeded an average of 38 days per year.

3.2 SCOPE OF CUMULATIVE EFFECTS ANALYSIS

According to the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act (40 C.F.R., section 1508.1(g)(3)), cumulative effects are effects on the environment that result from the incremental effects of the action when added to the effects of other past, present, and reasonably foreseeable actions, regardless of what agency (federal or non-federal) or person undertakes such actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time, including hydropower and other land and water development activities.

Based on our review of the license application and agency and public comments, we have identified geology and soils (erosion and sedimentation), water quantity, water quality, and fishery resources (fish movement) as resources that could be cumulatively affected by the proposed continued operation and maintenance (O&M) of the Harris Project, in combination with other hydroelectric projects and other activities in the Tallapoosa River Basin. Our analysis of cumulative effects is found in the corresponding resource sections.

3.2.1 Geographic Scope

The geographic scope of analysis defines the physical limits or boundaries of the proposed action's effects on the resources. Because the proposed action would affect the resources differently, the geographic scope for each resource may vary.

For geology and soils, we identified the geographic scope to include the Tallapoosa River Basin from its headwaters through Horseshoe Bend, including Horseshoe Bend National Military Park.[27] We chose this geographic scope because the collective O&M of the project, in combination with other developmental and non-developmental uses of the upper and middle Tallapoosa River Basin, may cumulatively affect erosion and sedimentation in the Tallapoosa River.

[27] Horseshoe Bend is about 44 river miles downstream from Harris Dam and 8 miles upstream of the headwaters of Lake Martin.

The geographic scope for water quantity (or river flow) is the Tallapoosa and Coosa River Basins. The Corps' flood control operations in the two river basins, as well as the Corps' navigation flow requirements for the Alabama River, have the potential to affect flow at Harris Lake and in the lower Tallapoosa River; operational changes at Harris Lake, including minimum flow releases, have the potential to affect the Corps' flood control operations and navigation flows, as well as Alabama Power's minimum flow requirements, in the Alabama-Coosa-Tallapoosa River Basin.

The geographic scope for water quality is the same as for geology and soils, extending from the headwaters down through Horseshoe Bend because the collective O&M of the project, in combination with other developmental and non-developmental uses of the upper and middle Tallapoosa River Basin, may cumulatively affect erosion and sedimentation, as well as water temperature, dissolved oxygen, and other water quality characteristics in the Tallapoosa River. The geographic scope for fishery resources includes the Tallapoosa River from the headwaters of Harris Lake downstream to the confluence with the Coosa River because the presence and operation of the Harris Project, along with the downstream Martin and Yates-Thurlow Projects, could affect the movements of fish and fish populations in the Tallapoosa River.

3.2.2 Temporal Scope

The temporal scope of analysis includes a discussion of the past, present, and reasonably foreseeable future actions and their effects. Based on the likely term of any new license that may be issued, we will look 30 to 50 years into the future, concentrating on the effects of reasonably foreseeable future actions. We identified the present resource conditions based on the license application, agency comments, and comprehensive plans.

3.3 PROPOSED ACTION AND ACTION ALTERNATIVES

Appendix F describes the affected environment for each resource area, which is the existing condition and baseline against which we measure potential effects. In this section, we discuss the effect of project alternatives on environmental resources. We then discuss and analyze the specific cumulative and site-specific environmental issues. We present our recommendations for each resource in Appendix I, *Comprehensive Development and Recommended Alternative.*

3.3.1 Geologic and Soil Resources

3.3.1.1 Affected Environment

The affected environment is provided in Appendix F to this EIS.

3.3.1.2 Environmental Effects

Harris Lake

<u>Project Operations</u>

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. Changes in water surface elevation over the course of the year have the potential to leave areas of shoreline exposed from a lack of vegetation and prone to erosion. There is also potential for sediment to be transported from upstream tributaries, causing turbidity, and then settling out of the water column as water velocities decrease upon entering Harris Lake.

One Harris Lake resident advocated in comments on the REA for maintaining higher Harris Lake water surface elevations in the winter.[28]

Our Analysis

Alabama Power erosion and sedimentation study (Alabama Power and Kleinschmidt, 2022b) evaluated the potential causes of erosion at 22 existing erosion sites (Sites E1-E21, and E24) identified by stakeholders on the shoreline of Harris Lake (figures 3.3.1-2 and 3.3.1-3). Of these 22 sites, 8 sites were confirmed to have no significant signs of active erosion. The remaining 14 sites showed signs of active erosion, but the erosion at these sites was occurring at or above normal full pool elevation.[29] Therefore, they were assessed to be 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 toward the reservoir. Natural processes observed included wind-generated wave action and bank scour due to channelized flows at the toes of banks. Fluctuations in water levels associated with project operations do not have a significant impact on erosion at Harris Lake. Changes in reservoir level appear to influence the elevation at which erosion may occur in the impoundment, but they have little impact on the frequency and magnitude of shoreline loss. Because there would be no change in reservoir levels or in the magnitude and frequency of water level fluctuations under Alabama Power's proposed operations, we anticipate no effect on erosion at Harris Lake. Also, as discussed below, the SMP includes policies and measures to limit dredging and shoreline construction activities, maintain shoreline vegetation and vegetative buffers, and enhance bank stabilization, all of which would help to maintain shorelines and reduce shoreline erosion.

The same study included an evaluation of nine existing sedimentation sites (Sites S1-S9) identified by stakeholders on the shoreline of Harris Lake (figures 3.3.1-1, 3.3.1-3, and 3.3.1-4). The evaluation was based on a comparison of Light Detection and Ranging (LiDAR) data collected during the 2007 and 2015 winter drawdowns to determine changes in sedimentation surface area between the 793-foot and 786-foot contours. Of these 9 sites, 8 sites showed an increase in surface area from 2007 to 2015, ranging from 2% to 172%; the remaining site showed a decrease of 4%. Land uses in the basin upstream of Harris Lake and adjacent to the river and tributaries contribute sediment load to the upper reaches of Harris Lake. Changes in water level according to the rule curve affect where sediment settles, but the settling itself is a natural occurrence for impoundments, and there would be no change in reservoir levels or in the magnitude and frequency of water level fluctuations under proposed operations. Therefore, sedimentation rates on the lake likely would remain consistent with rates under the existing operations, assuming upstream influences remain consistent.

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[28] *See* Accession No. 20220209-5031. This comment was similar to many other stakeholders' comments on the preliminary licensing proposal (PLP); Alabama Power did not change its proposed operating curve from the PLP to the FLA.

[29] Of these 14 sites, 13 were within the existing and proposed project boundary, and one (E4) was outside the existing and proposed project boundary by approximately 1.0 foot.

With regard to the higher winter water surface elevations advocated by lake residents, Alabama Power conducted an analysis of potential operating curve changes (Alabama Power and Kleinschmidt, 2022c) that evaluated increases from the current winter water surface elevation of 785 feet in 1-foot increments (786 feet, 787 feet, 788 feet, 789 feet). Soil and slope data were reviewed to evaluate the potential effects of each winter pool alternative on erosion and sedimentation areas. Recreation data were also used to determine the potential increase in recreation from higher winter operating curve elevations and their effect on erosion and sedimentation areas. Areas of sedimentation in the reservoir and near creek mouths were qualitatively assessed, and LiDAR data were used for Harris Lake to estimate the area that could be impacted at each site by each winter pool alternative.

LiDAR data at the 22 erosion sites discussed above (Sites E1-E21, and E24) indicate that none of the winter pool alternatives likely would affect existing erosion because even at the higher winter pool levels considered, water levels would still be lower than the elevations at which the erosion is occurring. Furthermore, most of these sites exhibited hard clay, bedrock, or increased amounts of larger rock substrates below the current summer pool elevation of 793 feet. Because the substrates below summer pool at the erosion sites are stable, there should be no increase in erosion resulting from a winter operating curve change.

With an increase in the winter operating curve, more structures (e.g., boardwalks, boathouses, floats, piers, and wet slips) around the lake would become available for use. This likely would result in increased boater recreation during the winter, which in turn may increase boat wave action, exposing the banks of Harris Lake to increased erosive forces. However, none of the identified erosion sites would be affected because the erosion at these sites occurs well above the winter pool alternative elevations.

While erosion rates around the reservoir would be relatively unchanged by a higher winter operative curve, changes to depositional patterns could result. LiDAR data at the nine sedimentation sites discussed above (Sites S1-S9) indicated an increase in sedimentation surface area relative to the current winter drawdown of: (1) 9% to 52% resulting from a 1-foot increase to 786 feet; (2) 21% to 79% resulting from a 2-foot increase to 787 feet; (3) 35% to 93% resulting from a 3-foot increase to 788 feet; and (4) 52% to 96% resulting from a 4-foot increase to 789 feet. Therefore, higher winter operating curve elevations could contribute to increased sedimentation over time.

Continuous Minimum Flow

Alabama Power is currently required to release water from the project to provide a minimum flow of 45 cfs, as measured at the downstream Wadley gage (USGS 02414500 - Tallapoosa River at Wadley, Alabama). This minimum flow is met through turbine releases—either as part of normal peaking operations or as pulses under Green Plan operations—and includes intervening flows. Given the flexible manner through which the existing minimum flow can be met, it is not a continuous 45 cfs release from the dam. Alabama Power proposes to install a minimum flow turbine to provide a continuous minimum release of about 300 cfs to the Tallapoosa River at Harris Dam in lieu of Green Plan pulsed releases.

Alabama DCNR recommends [10(j) #1] the following continuous minimum flows at the Wadley gage: (1) 760 cfs from January 1 through April 30; (2) 510 cfs from May 1 through June 30; (3) 390 cfs from July 1 through November 30; and (4) 510 cfs from December 1 through December 31.[30] Alabama Rivers Alliance recommends [10(a) #3] developing a means to release 100 to 150 cfs in addition to Alabama Power's proposed 300 cfs release from a continuous minimum flow turbine, for a total continuous minimum release of 400 to 450 cfs.

Our Analysis

Alabama Power used HEC-ResSim and HydroBudget[31] models to analyze the effects of downstream release alternatives on various operational parameters, including Harris Lake elevations (Alabama Power and Kleinschmidt, 2022a). For these models, 2001 was selected as an "average" year, since inflows to Harris Lake were closest to median values, and hourly flow data were available for that year. The study concluded that continuous minimum flow releases up to 450 cfs would have negligible effects on average reservoir elevations compared to releases under the Green Plan (see figure 3.3.1-6). Compared to existing conditions, a continuous minimum flow release of 600 cfs would result in the following changes in average reservoir elevations relative to the Green Plan, including a(n): (1) less than 0.5-foot decrease from May through August; (2) about 0.5-foot decrease during September; (3) about 0.7-foot decrease during October; and (4) little change from November through April. A continuous minimum flow release of 800 cfs would result in the following changes in average reservoir elevations relative to the Green Plan, including a(n): (1) about 0.6-foot decrease during May and June; (2) about 0.7-foot decrease during July; (3) about a 0.9-foot decrease during August; (4) about 1.4-foot decrease during September; (5) about 1.9-foot decrease during October; (6) about 1.2-feet decrease during November; and (7) less than 1 foot decrease from December through April.

Including Green Plan pulses on top of continuous minimum flows of 300 cfs would result in average reservoir elevations less than 0.5 foot below the Green Plan throughout the year, with the maximum difference (about 0.4-foot) in May (figure 3.3.1-7). Green Plan pulses on top of larger releases would result in more pronounced decreases in Harris Lake elevations. For example, a 600 cfs continuous minimum flow combined with Green Plan pulses would result in average reservoir elevations 1 to 1.1 feet lower than under the Green Plan alone for May through July with decreases of about 1.3 feet during August, 1.7 feet during September, 2.3 feet during October; 1.4 feet during November; and less than 1 foot from December through April. An 800 cfs continuous minimum flow combined with Green Plan pulses would result in average reservoir elevation decreases of about 1.8 feet in May, 1.9 feet in June, 2.3 feet in July, 2.8 feet in August, 4.0 feet in September, and 5.1 feet in October, 4.3 feet in November, 3.1 feet in December, and about 1.0 foot in March. Harris Lake elevations from May through November based on the Green Plan and various release alternatives are compared in table 3.3.1-1.

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[30] We assume Alabama DCNR inadvertently omitted December 31 from its recommended minimum flow schedule.

[31] HEC-ResSim is a Corps' computer program used to evaluate operational criteria for both flood control and conservation purposes (including hydropower) for a system of reservoirs. HydroBudget is a proprietary daily model that is used to evaluate the net economic gains or losses that could result from downstream flow alternatives at a hydroelectric project.

Continuous minimum flow releases that have a negligible effect on summer or winter pool elevations would also be expected to have a negligible effect on shoreline erosion, turbidity, and sedimentation in Harris Lake. Higher releases (e.g., 600–800 cfs) would be expected to increase erosion, turbidity, and sedimentation by exposing larger areas of unvegetated shoreline.

Timber Management in the Wildlife Management Plan

Alabama Power proposes to finalize and implement a WMP, including specific timber management actions and BMPs to reduce or prevent runoff, erosion, turbidity, and sedimentation that may affect Harris Lake and its tributaries and within Skyline WMA (discussed separately below under "Skyline WMA"). Specifically, Alabama Power would continue to incorporate Alabama's BMPs for forestry, as provided by the Alabama Forestry Commission.

Alabama DCNR recommends [10(a) no. 5] development of the plan, including FWS guidelines for timber management regarding federally and state-protected bats. Alabama DCNR also recommends [10(a) no. 5]: (1) adding cave protection and maintenance components to the WMP to conserve state-protected species and their habitats; and (2) consulting Alabama DCNR and FWS to develop any additional measures protective of wildlife resources within the project boundary.

Our Analysis

BMPs that would be incorporated into the Alabama Power's proposed WMP would include: (1) establishing streamside management zones; (2) avoiding stream crossings by roads, skid trails, or firebreaks when possible; (3) when stream crossings are unavoidable, minimizing their effects; and (4) properly siting roads. These management practices would benefit soil resources and limit erosion by reducing disturbance and runoff. Alabama DCNR's recommendations [10(a) no. 5] regarding bat and other wildlife protection measures, including cave protection, are discussed in section 3.3.3, *Terrestrial Resources*, and Appendix D, *Biological Assessment*.

Shoreline Management Plan

Alabama Power proposes to finalize and implement an SMP, which would include continuing to: (1) encourage the use of alternative bank stabilization techniques (other than seawalls); (2) implement the Dredge Permit Program; (3) implement the shoreline classification system to guide management and permitting activities; (4) enforce the scenic easement for the purpose of protecting scenic and environmental values; (5) implement the shoreline compliance program and shoreline permitting program; and (6) encourage the adoption of shoreline BMPs. In the SMP, the scenic easement is defined as lands located between the 795-feet contour and the 800-feet contour, or 50 horizontal feet from the 793-feet contour (whichever is less), but never less than 795-feet. Prohibited activities within Alabama Power's scenic easement lands include, but are not 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 three inches in diameter; and clearing any shrubbery measuring more than 4 feet tall.

Alabama DCNR recommends [10(a) no. 2] development and implementation of the SMP and continued consultation with the resource agencies. Alabama DCNR recommends

[10(a) no. 2] the use of riprap rather than seawalls to protect shorelines from erosion. Alabama DCNR states that: (1) proposed seawall projects should be evaluated case-by-case based on specific criteria before a new seawall is permitted; (2) if a seawall is deemed necessary over alternative shoreline erosion control measures, the Corps' bulkhead guidelines should be followed; and (3) Alabama Power should encourage alternative bank stabilization techniques other than seawalls, and reduce permissible seawall lengths or require mitigation for loss of shallow water aquatic species habitat. Alabama DCNR also recommends [10(a) no. 6] the development and implementation of a public education outreach plan to ensure that SMPs, as well as invasive species management plans, habitat restoration plans, and recreational opportunities are adequately distributed to stakeholders on a regular basis.

Our Analysis

Alternatives to seawalls for bank stabilization include riprap, bioengineered installations, natural vegetation with riprap, and gabions. As a condition of a permit, Alabama Power requires 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 would seawalls without riprap be permitted. Alternative bank stabilization techniques are preferred methods of erosion control because they minimize adverse effects of erosion while mimicking natural shoreline substrates and providing more habitat compared with seawalls. Alabama Power's proposed SMP, like Alabama DCNR's recommendation [10(a) no. 2], includes a provision to encourage the use of alternative bank stabilization techniques for erosion control. Implementing these techniques likely would help to minimize adverse effects of erosion at Harris Lake.

Alabama Power's Dredge Permit Program was developed in consultation with the Corps and other agencies.[32] It establishes the processes and procedures for permittees seeking to obtain authorization from Alabama Power for dredging activities of up to 500 cubic yards of material (below the full pool elevation) and does not cover applications for dredging on lands determined to be "sensitive."[33] The proposed location for disposing of dredged materials (i.e., spoils) must be included in the application and approved by Alabama Power. Spoils may not be placed in areas identified as potentially environmentally sensitive, adjacent waters,

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[32] Alabama Power met with resource agencies on September 28, 2010, to discuss the concept and background of the dredging program. Alabama Power submitted a draft for agency review and comment on November 17, 2010, and received comments from the Corps, FWS, and Alabama DCNR. On December 2, 2021, Alabama Power met with agencies to review their comments. Alabama Power addressed the comments in its Final Dredge Permit Program, filed on January 26, 2011. The Commission modified and approved the Dredge Permit Program on July 6, 2011.

[33] "Sensitive" is a designation for resources used in conjunction with the shoreline classifications as appropriate. For example, a portion of an area classified as "Recreation" may also be designated as "sensitive." This designation is used on project lands managed for the protection and enhancement of resources that are protected by state and/or federal law, executive order, or where other natural features are present that are considered important to the area or natural environment.

bottomland hardwoods, or wetlands. Spoils must be placed in a confined upland area in such a manner that sediment does not re-enter the waterway or interfere with natural drainage. Continued implementation of the existing Dredge Permit Program would have a beneficial effect on sedimentation in Harris Lake by restricting the location and manner in which dredge materials can be disposed, thereby limiting the re-introduction of spoil material to the lake.

Continuing to implement a shoreline classification system would provide a mechanism to manage and permit activities that are specific to the designated uses in those areas around the lake. For example, areas or shorelines designated as Natural/Undeveloped would be managed to prohibit or limit certain construction activities, and those shorelines would be less likely to need shoreline stabilization because naturally vegetated shorelines would be preserved.

Continuing to require "scenic easements" on Harris Lake would help protect currently vegetated areas that might otherwise 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 (e.g., seawalls or riprap).

Finally, continuing to implement the existing shoreline compliance and shoreline permitting programs would ensure that Alabama Power's permitting and compliance programs are carried out in a manner that is integrated and consistent. Providing homeowner education on shoreline BMPs, particularly those practices that preserve or establish a vegetative filter strip along the shoreline, would have a beneficial effect on the Harris Lake shoreline as homeowners would be encouraged to keep vegetated shorelines that stabilize soils and minimize erosion.

Recreation Plan

Alabama Power proposes to finalize and implement a Recreation Plan that would incorporate the continued O&M of 11 existing recreation sites on Harris Lake and the construction of an additional (i.e., 12th) recreation site on Harris Lake that would include a day use park (with swimming, picnicking, and a boat ramp). The plan would also include the installation and maintenance of a canoe/kayak access site downstream from Harris Dam, discussed separately below under "Tallapoosa River Downstream from Harris Dam."

Alabama DCNR recommends [10(a) no. 1] the plan development, with the additional recreation site on Harris Lake. Alabama DCNR recommends [10(a) no. 1] that Alabama Power provide additional bank fishing opportunities on Harris Lake and along the tailrace, such as fishing piers or wharf style access, with the sites selected in consultation with Alabama DCNR. Alabama DCNR also recommends [10(a) no. 6] the development and implementation of a public education outreach plan to ensure that recreational opportunities, as well as SMPs, invasive species management plans, and habitat restoration plans, are adequately distributed to stakeholders on a regular basis.

Our Analysis

Construction of new recreation access and facilities on Harris Lake, such as Alabama Power's proposed day use park or the bank fishing sites recommended by Alabama DCNR [10(a) no. 1], would require land clearing and land disturbing activity that could adversely affect soils and result in localized erosion and sedimentation. However, Alabama Power states that the Recreation Plan, as discussed below, would include provisions for soil erosion and sedimentation control BMPs to reduce or eliminate the temporary effects of construction.

These BMPs would include silt fencing, straw wattles, temporary grassing, disturbance minimization, and bioengineering techniques such as planting willow and wetland species. Alabama Power would also comply with the BMPs described in the SMP.

Adding boat ramps on Harris Lake might also result in an increase in recreational boating. If boat wave action were to increase, the banks of Harris Lake could be exposed to an increase in erosive forces. Implementation of the SMP shoreline stabilization techniques, along with the erosion and sedimentation BMPs used during construction, would help to mitigate these potential adverse effects.

Tallapoosa River Downstream from Harris Dam

Project Operations

As discussed above, in the context of Harris Lake, 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.

Over one hundred comments were submitted in response to the PLP and the FLA in support of maintaining higher Harris Lake water surface elevations in the winter by reducing the magnitude and/or duration of the winter drawdown. Over 20 commentors advocated for more consistent releases from Harris Lake and/or better communication from Alabama Power prior to changes in the release. The ongoing erosion along the Tallapoosa River downstream from the dam was a recurring topic in comments from residents. One resident with property along the river reported riverbank erosion in excess of 20 feet horizontally, with bank undercutting so severe that they consider it a safety issue. Another resident with significant river frontage downstream from the dam recalled that before the project's construction, he could stand on the shoreline and observe multiple islands in the river that over the years since construction and operation of the Harris Project have disappeared completely.

Our Analysis

Peaking Flows

When water enters a large impoundment, much of the sediment settles as the water velocity slows. Therefore, it carries less sediment out than it had flowing in. When the water leaves the impoundment, flowing in a river again, as it does in the Tallapoosa River downstream from Harris Dam, it has the energy to carry more sediment again. That extra energy is manifested as erosion. This phenomenon has almost certainly been a large factor in the erosion of islands and streambanks downstream from Harris Dam since the dam construction reported by observers over the years. It is supported by the fact that the survey of the channel downstream of Harris Dam revealed substantial sediment deposition only where unimpounded tributaries flowed into the Tallapoosa River.

This phenomenon has likely been exacerbated by peaking flows from dam operations as well as naturally erodible, loamy soils, and a fairly deep channel shape in the Tallapoosa River below Harris Dam. A deep, narrow channel is characteristic of river channels formed in loamy soils (of relatively small particle size).

No additional effects relative to current operations on erosion sites identified on the Tallapoosa River downstream from Harris Dam are expected to result from the proposed continuation of peaking operations. The erosive phenomena described above, however, are likely to continue with the ongoing presence of the dam and the other factors, both operational and natural. Land use practices (e.g., farming and mowing) are probably local erosion factors as well (discussed below).

With regard to the higher winter water surface elevations of Harris Lake advocated by some lake residents, Alabama Power conducted an analysis of the effects of changes from the current 785 feet to as high as 789 feet (Alabama Power and Kleinschmidt, 2022c). Soil, slope, and LiDAR data were used to determine the potential effects on erosion and sedimentation associated with a change in magnitude and frequency of flood events predicted with each winter pool alternative.

As stated above, much of the streambank along the Tallapoosa River between Harris Lake and Lake Martin is steep-sided, and able to contain higher flood flows without overtopping. Therefore, higher winter water surface elevations in Harris Lake, which would tend to increase releases downstream during storm events, would result in increased water velocities. Higher velocity downstream flow releases combined with the fact that many of these streambanks are constituted of erodible sand and loam, would subject the streambanks to more scour and erosion than occur under the current rule curve.

<u>Continuous Minimum Flow</u>

As discussed above, in the context of Harris Lake, Alabama Power is currently required to release water from the project to provide a minimum flow of 45 cfs, as measured at the downstream Wadley gage. This is met through turbine releases under normal peaking operations or as pulses under Green Plan operations, combined with intervening flows, and is not a continuous 45-cfs release. Alabama Power proposes to install a minimum flow turbine to provide a continuous minimum flow of about 300 cfs in the Tallapoosa River downstream from Harris Dam, in lieu of Green Plan releases.

Alabama DCNR recommends [10(j) no. 1] that Alabama Power make releases from Harris Dam sufficient to yield the following total flows (release plus intervening flow) at the Wadley gage: (1) 760 cfs from January 1 through April 30; (2) 510 cfs from May 1 through June 30; (3) 390 cfs from July 1 through November 30; and (4) 510 cfs from December 1 through December 31. Alabama Rivers Alliance recommends [10(a) no. 3] a means for releasing an additional 100-150 cfs beyond Alabama Power's proposed release of 300 cfs through the continuous minimum flow turbine, for a total, continuous minimum release of 400-450 cfs.

Our Analysis

Alabama Power conducted an erosion and sedimentation study (Alabama Power and Kleinschmidt, 2022b) that documented the condition of the entire length of the study reach on both sides of the river using a video survey. Streambank condition point data were averaged into 0.1-mile segments and characterized as fully functional, functional, slightly impaired, impaired, or non-functional. Of the 875 segments downstream from Harris Dam, Alabama Power's study found that only 15 segments were slightly impaired or worse (sites A1–A15, table 3.3.1-2, figures 3.3.1-8, 3.3.1-9, 3.3.1-10, and 3.3.1-11), and only one of these segments (site A7, figure 3.3.1-9) was characterized as impaired.

The downstream survey results were also used to assess conditions for two specific erosion sites identified by stakeholders (E22 and E23, figure 3.3.1-5), using the same criteria as the erosion sites located within Harris Lake. Both sites were confirmed to have areas of erosion potentially caused by adjacent land use/clearing and riverine[34] processes, and were characterized as slightly impaired.

Alabama Power also used the results of the erosion and sedimentation study and outputs from the HEC-RAS model to assess the effects of downstream release alternatives on erosion in the Tallapoosa River downstream from Harris Dam (Alabama Power and Kleinschmidt, 2022a). The HEC-RAS model results were used to evaluate daily average water surface fluctuations for the study area under a range of continuous minimum flow releases. The results showed that river fluctuations generally decrease with increasing continuous minimum flows (table 3.3.1-3). For example, 0.2 miles downstream from the dam, the daily average water surface elevation fluctuation would be expected to decrease from 4.62 feet under baseline Green Plan operations to 3.59 feet with a 300-cfs release, 3.29 feet with a 400-cfs release, 2.84 feet with a 600-cfs release, and 2.50 feet with an 800-cfs release. Although the erosion and sedimentation study found that existing erosion sites in the Tallapoosa River downstream from Harris Dam were primarily attributed to adjacent land use/clearing and riverine processes rather than the direct result of Harris Project operations, the addition of higher continuous minimum flow releases downstream from Harris Dam would tend to reduce river fluctuations, which is expected to benefit areas of downstream erosion. The greatest benefit in terms of decreased fluctuations caused by project operations would be seen in the first 7 miles downstream from Harris Dam, where fluctuations are greatest due to proximity to the project; fluctuations tend to dissipate as flows attenuate downstream. For example, with a release of 300 cfs, the daily average water surface elevation fluctuation would be expected to decrease from 3.59 feet 0.2 miles downstream from the dam to 3.44 feet 2 miles downstream, 2.34 feet 10 miles downstream, and 1.99 feet 23 miles downstream (table 3.3.1-3).[35]

The model results were also used to estimate water surface elevation fluctuations at each of the 15 sites characterized as slightly impaired or worse in Alabama Power's erosion and sedimentation study (sites A1–A15, table 3.3.1-2, figures 3.3.1-8, 3.3.1-9, 3.3.1-10, and 3.3.1-11). Daily average fluctuations at these 15 segments ranged from less than 1 foot to more than 3 feet, depending on the downstream release alternative (table 3.3.1-4). As discussed above, fluctuations generally decrease farther downstream and tend to decrease for alternatives with increased continuous minimum flows.

Six of the 15 impaired segments (sites A3–A8, figure 3.3.1-9) occur on a portion of the river (about 16 miles downstream from Harris Dam) that consists of adjacent agricultural lands, where banks have been cleared of vegetation that would otherwise naturally inhibit erosion. Two of the 17 sites suggest for further investigation by another stakeholder are also located in this area (sites B16–B17, figure 3.3.1-9).

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[34] "Riverine" means relating to or found on a river or rivers, or the banks of a river; in other words, related to moving water in a river, as opposed to still water in a lake.

[35] Note that there are exceptions to this general trend due to hydraulic conditions at specific locations (e.g., the increase with a 300 cfs release from 3.44 feet 2 miles downstream to 3.72 feet 4 miles downstream).

With respect to the proposed minimum flow turbine or a different minimum flow turbine, installation of the unit would not be expected to affect erosion since there would be no ground-disturbing activities or modification of the existing powerhouse intake structure. Some sedimentation could result from concrete debris being accidentally introduced to the tailrace area during installation.

Erosion Monitoring Plan

Alabama Power proposes to develop, in consultation with resource agencies, an erosion monitoring plan for the Tallapoosa River downstream from Harris Dam. The plan would employ the same methods as their previous erosion and sedimentation study (Alabama Power and Kleinschmidt, 2022b), and would characterize and document the condition of the entire length of the reach on both sides of the river using a video survey. The erosion monitoring plan would begin 1 year after the proposed minimum flow commences, with two subsequent events occurring at 5-year intervals, to evaluate any change in downstream erosion following implementation of the continuous minimum flow.

Alabama DCNR supports Alabama Power's proposal to develop and implement the erosion monitoring plan and recommends [10(a) no. 3] continued consultation with resource agencies. Alabama DCNR recommends [10(a) no. 3] that Alabama Power: (1) evaluate any changes in downstream erosion following implementation of operational changes; (2) revise the plan to include lake monitoring of erosion and sedimentation that corresponds to, or works in conjunction with, the SMP; (3) conduct annual surveys to identify areas of erosion at Harris Lake, and use the results to prepare a remediation plan with erosion control response measures for areas determined to be problematic on Harris Lake shorelines and along the Tallapoosa River downstream; and (4) consider initiating a landowner assistance program which would include providing expertise and potential Alabama Power cost-share for improvements to high erosion areas. Alabama DCNR also supports Alabama Power's proposal to develop and implement the SMP [10(a) no. 2] and invasive species management plan [10(a) no. 4] and recommends continued consultation with resource agencies to determine the best measures to protect the shorelines from erosion and invasive species introduction and establishment.

Our Analysis

A continuous minimum flow equal to or above 300 cfs would tend to dampen the effects of peaking operations on the Tallapoosa River downstream from the dam. By reducing the daily hydrologic variability, a continuous minimum flow would help stabilize the banks by reducing erosion. The increase in wetted perimeter associated with a continuous minimum flow would increase habitat diversity, and improve the availability of slow-velocity, shallow habitats critical for fish in the early stages of their life. The erosion monitoring plan and SMP would provide a mechanism for ongoing review of streambank erosion downstream, and potentially verify the anticipated benefit of the continuous minimum flow with respect to downstream streambank erosion. Surveying for erosion three times with five years between each survey would more efficiently identify trends than surveying every year, because it is typically more difficult to detect trends from year to year than when comparing data sets collected at longer intervals. The invasive species management plan would provide a means for evaluation and response to the potential introduction or establishment of invasive fish, mollusks, and plants resulting from increased wetted perimeter and a more stable shoreline.

Alabama Power's proposed erosion monitoring plan filed with the license application on November 21, 2022, is conceptual in nature. Although it does include provisions for some surveys to document erosion that may occur with future changes in project operation, it includes fewer surveys than Alabama DCNR recommends, and it does not include any measures to address erosion that may be identified during the surveys. Developing the details of the plan in consultation with Alabama DCNR and other resource agencies would help to ensure that project-related effects on soil stability are identified in a timely manner and that provisions to avoid or minimize these effects would be developed as part of the plan, as appropriate. Alabama DCNR's recommendation to consider initiating a landowner assistance program, including providing expertise and potential Alabama Power cost-share for improvements to high erosion areas, is vague and unclear and therefore it is not addressed further at this time.

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 downstream from Harris Dam. Alabama Power proposes that the Recreation Plan would include provisions for soil erosion and sedimentation control BMPs, such as silt fences. The plan would also incorporate the continued O&M of 11 existing recreation sites on Harris Lake and the construction of an additional recreation site on Harris Lake, discussed previously at the beginning of this subsection.

Alabama DCNR recommends [10(a) no. 1] the development of a recreation plan, as well as the construction and maintenance of canoe/kayak access downstream from Harris Dam and additional bank fishing opportunities on Harris Lake and tailrace, such as fishing piers or wharf style access, with sites selected in consultation with Alabama DCNR. Alabama DCNR also recommends [10(a) no. 6] that Alabama Power develop and implement a public education outreach plan to ensure that recreational opportunities, as well as SMPs, invasive species management plans, and habitat restoration plans, are adequately distributed to stakeholders on a regular basis.

Our Analysis

The construction of canoe/kayak access downstream from Harris Dam, as proposed by Alabama Power and recommended by Alabama DCNR [10(a) no. 1], would require land clearing and land disturbing activity that could adversely affect soils and may result in localized erosion and sedimentation. However, land clearing would be limited in area and provisions in the Recreation Plan for applying soil erosion and sedimentation control BMPs would minimize the temporary effects of construction.

Increased foot traffic resulting from additional recreation access could also adversely affect erosion in the canoe/kayak recreation area, but implementation of BMPs and shoreline stabilization would mitigate these effects.

A public education outreach plan, such as the one recommended by Alabama DCNR [10(a) no. 6], could further enhance efforts to reduce erosion and sedimentation by including information regarding the function and importance of riparian buffers and best practices for establishing and maintaining them.

Skyline Wildlife Management Area

Timber Management in the Wildlife 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 affect streams and waterbodies within Skyline WMA (and at Harris Lake, discussed separately above under "Harris Lake"). Specifically, Alabama Power would continue to implement Alabama's BMPs for forestry as provided by the Alabama Forestry Commission.

Alabama DCNR recommends [10(a) no. 5] Alabama Power developing the plan and including FWS guidelines for timber management that could affect federal and state-protected bats. Alabama DCNR also recommends [10(a) no. 5] that: (1) the WMP include cave protection and maintenance components for conservation of state-protected species; and (2) Alabama Power consult with Alabama DCNR and FWS to develop any additional measures that might be necessary to protect wildlife resources within the project boundary (e.g., if unforeseen conditions suggest that approved measures are not providing adequate protection).

Our Analysis

Alabama Power would incorporate the following Alabama Forestry Commission's BMPs in the WMP: (1) establishing streamside management zones; (2) avoiding crossing of streams by roads, skid trails, or firebreaks when possible; (3) where stream crossings are unavoidable, minimizing them and locating them where the bank and streamside management zone would be least disturbed; and (4) proper planning and location of roads. These management practices would benefit soil resources and erosion by reducing disturbance and runoff.

Alabama DCNR's recommendations [10(a) no. 5] to include FWS timber management guidelines and cave protection and maintenance components, although focused on bats and other special status species, could also provide soils-related benefits compared to Alabama Power's proposal. They would further enhance the long-term health and sustainability of the forest, which contributes to reducing or preventing runoff, erosion, and sedimentation that affect streams and wetlands, as well as caves and other karst features.

3.3.1.3 Cumulative Effects

The current operating rule curve for the Harris Project, which Alabama Power proposes to continue, maintains a summer high water surface elevation of 793 feet from May through September and a winter low water surface elevation of 785 feet from December through March, with transitions of one month from low to high in the spring (April) and two months from high to low in the fall (October–November). This frequent change in water surface elevation has the potential to limit growth of vegetation in the 8-foot range of shoreline that is repeatedly inundated and dried, thereby making this range of shoreline potentially less stable and more prone to erosion. However, Alabama Power's erosion and sedimentation study (Alabama Power and Kleinschmidt, 2022b) indicated that the shoreline below the summer high water surface elevation of 793 feet generally consisted of hard clay, bedrock, or stable substrates of larger rock, and all of the currently active erosion sites were located above the summer high water surface elevation. This erosion is believed to be caused predominantly by boat- or wind-driven waves, rather than by reservoir operations.

Alabama Power evaluated alternative rule curves that would raise the winter low water surface elevation from 785 feet to as high as 789 feet, which would reduce the amount of shoreline that is repeatedly inundated and dried. However, since even at the higher winter pool levels considered, water levels would still be lower than the elevations at which the erosion is occurring, it is anticipated that none of the winter pool alternatives would significantly affect erosion. There is some concern that increased recreational use resulting from higher winter elevations might adversely affect the shoreline due to erosion from boat-driven waves, but the shoreline exposed at these elevations is generally stable, as discussed above.

Any shoreline erosion, even erosion that occurs above the summer high water surface elevation, also exposes Harris Lake to sedimentation. Furthermore, sediment transported from tributary watersheds settles out when the water velocity decreases upon entering the lake. This is a natural occurrence at reservoirs, and is essentially independent of reservoir operations. The proposed operations would maintain current conditions, and the alternative rule curves would be expected to change the elevations/areas at which sedimentation would occur, not the rate of sedimentation.

The Harris Project has likely contributed to erosion and sedimentation downstream in the middle Tallapoosa River Basin due to shoreline destabilization caused by relatively large and frequent water level fluctuations associated with peaking operations. Alabama Power proposes to continue peaking operations, but the proposed increased continuous minimum releases from the project would be expected to decrease erosion and sedimentation by reducing the magnitude of these fluctuations. The improvement in riverbank stability would be most apparent close to the dam and would attenuate further downstream. There would also be a greater improvement with continuous minimum flow releases that are larger than those proposed by Alabama Power. The higher winter water surface elevation in Harris Lake associated with the alternative rule curves would have the effect of reducing the amount of storage available in the reservoir to store high inflows. This would be expected increase the magnitude and frequency of unusually high project outflows from storm events, which could increase erosion downstream in the middle Tallapoosa River Basin.

The timber management actions and best management practices associated with Alabama Power's proposed WMP would be expected to reduce or prevent runoff, erosion, turbidity, and sedimentation that may affect Harris Lake and its tributaries in the upper Tallapoosa River Basin. The proposed SMP should also reduce erosion and sedimentation in Harris Lake by improving shoreline stabilization. The erosion monitoring plan would provide information regarding the effectiveness of the increased continuous minimum flow releases in reducing erosion and sedimentation in the middle Tallapoosa River Basin.

The recreational enhancements included in the proposed Recreation Plan could adversely affect soils and result in localized erosion and sedimentation both on Harris Lake and on the Tallapoosa River downstream from Harris Dam. Land clearing and land disturbing activities would be required during construction of new facilities, although implementation of erosion and sedimentation BMPs should help to minimize these temporary effects. Increased recreational boating on Harris Lake would likely increase erosive forces due to boat-driven waves, although these potential adverse effects should be at least partially mitigated by shoreline stabilization techniques implemented in the SMP. There would likely be increased onshore foot traffic associated with the downstream canoe/kayak access, but implementation of BMPs and shoreline stabilization should help to mitigate these effects.

In summary, Alabama Power's proposal to continue operating under the current rule curve would be expected to have no cumulative effects on erosion or sedimentation over the geographic scope considered. The proposal for increased continuous minimum releases from the project would be expected to decrease erosion and sedimentation in the middle Tallapoosa River Basin due to the reduced magnitude water level fluctuations downstream from the dam. The alternative rule curves with a higher winter water surface elevation would likely not affect erosion upstream of the dam and would only be expected to affect the location of sedimentation, not the rate at which it occurs. However, these alternatives could increase erosion downstream in the middle Tallapoosa River Basin due to higher flood flows resulting from reduced availability of storage in the reservoir. The proposed Recreation Plan could adversely affect erosion and sedimentation on Harris Lake and in the middle Tallapoosa River Basin, but the proposed WMP, SMP, and erosion monitoring plan would help to mitigate these effects, as well as existing erosion and sedimentation in the upper and middle Tallapoosa River Basin.

3.3.2 Water and Aquatic Resources

3.3.2.1 Affected Environment

The affected environment is provided in Appendix F to this EIS.

3.3.2.2 Environmental Effects

Water Quantity

<u>Operating Curve Alternatives</u>

In addition to providing flood control, the operating curve at Harris Lake affects or constrains lake levels, hydropower generation, navigation, drought operations, and downstream flow releases. Alabama Power proposes to continue operating the Harris Project during daily peak-load periods according to the existing operating curve as described in section 2.1.3, *Existing Project Operation*.

Several local stakeholders requested that Alabama Power investigate increasing the winter operating curve (e.g., dropping the winter pool by 6 feet rather than 8 feet under the existing operating curve) to enhance recreational opportunities. To address this request, Alabama Power as part of the Operating Curve Change Feasibility Analysis Study, evaluated, in increments of 1 foot from 786 feet to 789 feet (i.e., 786, 787, 788, and 789 feet; collectively "winter pool alternatives" or "alternatives"), Alabama Power's ability to increase the winter pool elevation and continue to meet project purposes.

Based on the results from this study, Alabama Power concluded any increase in the winter operating curve would result in an increase in downstream flooding, including an increase in acres inundated and flood depth. Alabama Power determined from the modeled 100-year design flood that the magnitude of potential increases in downstream flooding that would be caused by raising the winter pool elevation were not reasonable; therefore, it proposed to eliminate these operating alternatives from further consideration.

Our Analysis

Alabama Power used the HEC-RAS, HEC-ResSim, and HydroBudget models to analyze the effects of Harris Lake operating curve alternatives on various operational parameters and downstream releases, as well as water levels in the Tallapoosa River downstream from Harris Dam. Based upon study results, Alabama Power found that raising the winter operating curve would have little effect on sedimentation, but would result in increased outflows and downstream water levels during flood events, which would affect additional downstream structures (including single-family homes). Simulations of a 100-year flood predicted that increasing the winter pool levels by 4 feet would inundate 88 structures compared to 79 under the existing operating curve.

Although raising the winter pool level could provide minor benefits for winter recreation, the adverse effects related to increased downstream flooding would be substantial. Spill occurs at Harris 0.2% of the time under baseline operations. Winter operating curves of 786, 787, and 788 feet increases the frequency of spill to 0.3% of the time. A winter pool of 789 feet is estimated to increase the frequency of spill to 0.4%. Any increase in the winter pool level would decrease the ability of Harris Lake to accommodate high-flow events. Modifying the existing operating curve, as stakeholders suggest, would benefit a portion of upstream stakeholders while negatively affecting landowners and other stakeholders downstream. Alabama Power's proposal to continue to use the existing rule curve at Harris Lake would maintain the existing level of spill effects within, and downstream from, Harris Lake.

Flood Management

The objective of flood control at Harris Dam is to minimize effects downstream from Harris Dam by ensuring that sufficient storage capacity is available in Harris Lake to reduce outflows during high-flow events. As described in section 2.1.3, *Existing Project Operation*, the Corps' Harris Water Control Manual includes procedures used by Alabama Power to manage Harris Lake releases during floods.

Alabama Power proposes to continue operating the Harris Project according to the existing operating curve, including the Harris Water Control Manual flood procedures, as described in section 2.2.3, *Proposed Project Operation*. Alabama Power also proposes to develop a project operations and flow monitoring plan to monitor compliance with license requirements related to: (1) water levels in Harris Lake; (2) flood control operations; (3) drought management; and (4) flow releases from Harris Dam.

Alabama DCNR recommends [10(j) no. 8] that Alabama Power implement a project operations and flow monitoring plan that includes provisions for: (1) monitoring project operations at the existing USGS gage at Wadley and the existing discharge gage downstream from the Harris Powerhouse; (2) providing flow data to the public via the Internet or other means, with updates every two hours; (3) contracting with the USGS to operate and maintain the Wadley gage for the first 10 years after license issuance; and (4) preparing an annual report by March 31 of the year following the reporting period. Alabama DCNR also recommends that compliance with minimum flows for the Harris Project be measured at the powerhouse gage.

EPA recommends the use of adaptive management approaches for the Tallapoosa River downstream from Harris Dam due to the adverse effects caused by low flows and sometimes dangerous high-flow regimes of the project that continue to affect aquatic health and public use of the Tallapoosa River.

Our Analysis

During floods, the Harris Project operates to pass inflow up to about 13,000 cfs by releasing water through the powerhouse to maintain Harris Lake near the operating curve. Downstream from Harris Dam, floods have the potential to result in adverse effects to downstream areas through inundation of land, infrastructure, and residences.

Alabama DCNR's recommended project operations and flow monitoring plan provides guidelines and performance criteria that Alabama Power should incorporate into its proposed plan. Because the existing turbines at Harris Dam are not designed to operate at discharges less than about 6,000 cfs each, Alabama Power meets the current 45-cfs minimum flow requirement (as measured at the USGS Wadley gage) by operating one unit intermittently, with the attenuated flow pulses plus the intervening flow between the dam and the gage providing the required flow. This eliminates the need for gate openings, Dedekind (or cone) valves, siphons, or other means of releasing low flows. Alabama Power's proposed minimum flow unit would be designed to operate at 300 cfs, which would provide a portion of Alabama DCNR's recommended minimum flows, which vary from 390 to 760 cfs depending on the time of year. According to Alabama Power, space restrictions limit the capacity of the proposed minimum flow unit to 300 cfs or less. Alabama DCNR's recommendation that compliance be measured at the powerhouse gage would make it difficult for Alabama Power to provide the additional required flow by pulsing, and would likely require spillway gate openings, or the installation of mini-gates, Dedekind valves, or other upgrades.

EPA's recommendation to use adaptive flow management approaches overlaps with Alabama Power's proposed project operations and flow monitoring plan. Goals of the proposed monitoring plan include establishing a framework to periodically confirm that the project is operated in compliance with the new license and monitor various variables of project operations including, but not limited to, lake levels, tailrace elevation, wicket gate settings, generation data, unit discharge, and spillway gate operation. In addition, Alabama Power's proposal to develop the plan after consultation with appropriate agencies, and to provide EPA an opportunity to comment on the draft monitoring plan, would help to ensure that appropriate adaptive flow management approaches are incorporated into the project operations and flow monitoring plan.

Drought Management Plan

Droughts are difficult to predict and manage, because they vary in duration, magnitude, severity, and geographical extent. As described in section 2.1.3, *Existing Project Operation*, the ADROP describes the management of Alabama Power's impoundments within the ACT basin during drought conditions. Alabama Power proposes to continue to operate the project during low-flow periods in accordance with the ADROP, which has been incorporated into the Harris Water Control Manual. Alabama DCNR recommends [10(j) no. 7] Alabama Power's proposal to continue operating in accordance with ADROP to address drought management, with appropriate agency input, and to incorporate flow operations during drought and unit outages in the proposed project operations and flow monitoring plan.

Our Analysis

Alabama Power's proposal to continue to operate the project during low-flow periods in accordance with ADROP would help manage and reduce potential adverse effects related to drought in Harris Lake and in the Tallapoosa River downstream from Harris Dam. Alabama Power's proposal to incorporate drought operations and unit outages in its monitoring plan is also consistent with Alabama DCNR's recommendation.

Project Minimum Flow Release Plan

Hydropower projects meet required minimum flows through various strategies, including pulse releases through turbines; small turbine units; flow release through spillways, weirs, bottom outlets, and siphons that bypass turbines (International Hydropower Association, 2020). Currently, the project meets its minimum flow requirement is primarily met through short-duration pulses through one of the units. This strategy would not be practical for meeting a new requirement for a minimum flow immediately downstream of the dam. Therefore, another strategy would be needed to meet any new minimum flow requirement for immediately downstream of the dam that exceeds leakage from the project.

Alabama Power proposes to install, operate, and maintain a minimum flow unit to provide a continuous minimum flow of about 300 cfs in the Tallapoosa River downstream from Harris Dam. Operation of the turbine would replace the existing "Green Plan" releases except when the minimum flow unit is taken offline. In these cases, Alabama Power would operate in accordance with the current Green Plan, providing pulses through Unit 1 or Unit 2, depending on availability.

Alabama DCNR recommends [10(j) no. 1] that Alabama Power implement the following seasonal continuous minimum flow regime within five years of any license issued for the project: 760 cfs from January 1 through April 30; 510 cfs from May 1 through June 30; 390 cfs from July 1 through November 30; and 510 cfs from December 1 through December 31. Alabama DCNR also recommends [10(j) no. 4] the following ramping restrictions for the project: (1) that the up-ramp time of each turbine at the project would be no less than 30 minutes from off-line to full gate; and (2) for down-ramp time, after the first operating unit is taken off-line, the second operating unit would not be taken off-line for at least 2 hours after the first operating unit was taken off-line. Finally, Alabama DCNR recommends [10(j) no. 6] that with the exception of drought periods, the new minimum flow regime should be allowed to vary down to 254 cfs for short periods of time annually from October through January if turbine maintenance is needed.

Alabama Rivers Alliance recommends a flow regime for the Tallapoosa River downstream from Harris Dam that mimics the natural hydrograph to the fullest extent possible, provides seasonal variability, restores aquatic habitat, reduces river level and water temperature fluctuations to mitigate the detrimental effects of hydropeaking, and is adaptively managed for the benefit of aquatic species. Alabama Rivers Alliance also recommends, [10(a) no. 3] that a combined 400–450 cfs flow be passed from the warmer epilimnion of the lake when stratified, and that the flow have a DO concentration of at least 5.0 mg/L at all times.

Our Analysis

The project currently provides its required minimum flow of 45 cfs at the Wadley gage, 14 miles downstream from Harris Dam, through short-duration pulse flows through the existing turbines. Under Alabama Power's proposal the minimum flow would be increased to about 300 cfs immediately below the dam and would be provided through a new minimum flow unit. Providing minimum flows significantly higher than the proposed 300-cfs minimum would require releases from locations other than the proposed minimum flow unit. This could be accomplished through a variety of means including a new minimum flow unit with a larger hydraulic capacity, the proposed new minimum flow unit along with other new facilities to provide the difference between the new required minimum flow and the hydraulic capacity of the new minimum flow unit, or a release mechanism without a new minimum flow unit. The depth at which water is released could have substantial effects on the water temperature and DO and therefore aquatic habitat downstream of the dam. Therefore, it would be beneficial to identify the means in which Alabama Power would meet any new minimum flow requirement that set for immediately downstream of the dam.

Development of a minimum flow release plan could provide insight into the likely efficiency of meeting minimum flows and the corresponding water temperature and DO regimes likely occur. Alabama Power could accomplish this by developing a minimum flow release plan, in consultation with Alabama DEM, Alabama DCNR, Alabama Rivers Alliance, and FWS, that includes: (1) a description of the source(s) of water releases for each seasonal period; (2) a description of any new facilities and/or modifications of existing facilities needed to release the required minimum flows, including an evaluation (with requisite conceptual design drawings) of fish-friendly turbine design options for any proposed minimum flow unit; (3) a provision for any deviation from normal operations; (4) a provision to monitor the efficiency of any proposed release mechanism(s) to provide the required flows and modifying the plan, with Commission approval, if necessary; and (5) an implementation schedule for the provisions of the plan.

Water Quality

Water Temperature and Dissolved Oxygen Management

The dam and regulation of flows affect water temperature and DO levels in Harris Lake and downstream in the Tallapoosa River, which in turn affect aquatic organisms. As mentioned above, dams can affect water temperature and DO by increasing the residence time of water in an impoundment and exposing the expanded surface area to warming from the sun. The level at which water is withdrawn from the impoundment can influence stratification of water temperature and DO within the impoundment, as well as the temperature and DO levels in water released to the river downstream from the dam. Variations in flow releases associated with peaking operations can also affect temperature and DO conditions downstream from the release point.

Alabama Power proposes to:

- operate the two existing main generating units at the Harris Powerhouse in a peaking mode and continue to operate in accordance with Green Plan operations until the proposed minimum flow unit is installed and operating and during periods when flow to Unit 1 is interrupted;
- continue to maintain the existing skimmer weir and operate it at its highest elevation;

- continue to operate the existing turbine aeration system; and
- install a new minimum flow unit, with an aeration system, adjacent to Unit 1 on the east side of the powerhouse, which would draw water from the Unit 1 penstock and discharge about 300 cfs to the Tallapoosa River immediately downstream from the dam.[36]

In addition, Alabama Power proposes to develop a water quality monitoring plan, in consultation with appropriate agencies. In its Water Quality Monitoring Conceptual Plan, Alabama Power states that the plan's goal would be to ensure compliance with applicable water quality standards and conditions of the water quality certification (401 certification) to be issued by Alabama DEM (Alabama Power, 2022c). Under the proposed plan, and following installation of the minimum flow unit, Alabama Power would monitor water temperature and DO year-round during periods of generation or minimum flow releases at three locations in the Tallapoosa River: (1) in the tailrace about 800 feet downstream from Harris Dam on the west bank of the river; (2) at Malone (USGS Gage No. 02414300) located 6.9 RM downstream from Harris Dam; and (3) at Wadley (USGS Gage No. 02414500) located 13.8 RM downstream from Harris Dam. Alabama Power would provide the resulting monitoring data for all three sites to Alabama DEM and file it with the Commission by February 28 for the preceding monitoring year for the first three years under a new license. Alabama Power would provide a water quality assessment to Alabama DEM for determination if the conditions of the 401 certification are being met.

The assessment and record of consultation with Alabama DEM would be filed with the Commission. If, after the initial three years of monitoring, Alabama DEM determines that 401 certification conditions are not being met, Alabama Power would determine, in consultation with Alabama DEM, additional ways to increase DO, and file a plan with the Commission for approval.

Alabama DEM, in its 401 certification, specifies that Alabama Power operate the project to maintain DO of no less than 5.0 mg/L in the Harris Dam tailrace (condition 1); adaptively implement structural and/or operational modifications to meet this DO criteria (condition 2); monitor DO and temperature in the project's tailrace (condition 3); coordinate with USGS to conduct additional monitoring in the Tallapoosa River at the Malone and Wadley gages (condition 4); conduct all monitoring according to applicable Alabama DEM and/or USGS Standard Operating Procedures, and conduct appropriate maintenance and calibration of monitoring equipment (condition 6); and submit DO and temperature annual monitoring reports with appropriate certifications to Alabama DEM (condition 7). The 401 certification also includes a provision for Alabama Power and Alabama DEM to work together to modify the monitoring and reporting requirements (condition 5).

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[36] Under Alabama Power's proposal, the final continuous minimum flow would be based on peak unit efficiency with an aeration system in operation, which would be determined following unit installation and performance testing. Alabama Power anticipates it would take about 48 months to complete design, permitting, and construction of its proposed continuous minimum flow system.

Alabama DCNR recommends [10(j) no. 1], a seasonal minimum flow schedule, ramping factors and downstream spawning stabilization periods. Recommended continuous minimum flows, as measured at the Wadley gage, are 390 cfs from July 1 through November 30, 510 cfs from May 1 through June 30 and December 1 through December 31, and 760 cfs from January 1 through April 30 to ensure that sufficient quality and quantity of water is provided to resemble the natural, historical riverine flow regime.[37]

Alabama DCNR supports Alabama Power's proposal to design, install, operate, and maintain a minimum flow unit to provide a continuous minimum flow, as well as the proposed project operations and flow monitoring plan. However, Alabama DCNR recommends [10(j) no. 2] that the minimum flow unit be designed to accommodate adjustable flow releases that mimic the natural flow and water temperature regime of the system. Alabama Power would provide an analysis to ensure that all viable options regarding turbine design, type, hydraulic capacity (range), aeration capabilities and environmental effects are fully assessed. Alabama DCNR further recommends [10(j) no. 10 and no. 12] that state water quality standards be met at all times, including seasonal maximum and minimum temperature limits (in addition to hourly and daily temperature change limits). Finally, Alabama DCNR recommends [10(j) no. 4] that if Alabama Power continues daily peak-load operations, the units used during peak-load generation have restricted start and stop times to minimize drastic flow, temperature, and DO changes.

Alabama DCNR also supports Alabama Power's proposal to develop a water quality monitoring plan, but recommends [10(j) no. 9] that the plan include temperature regulation and DO improvement components, both of which include well-defined endpoints, measurable response objectives, and a rigid timeline for completing any needed upgrades. The temperature component would include strategies to provide temperatures that mimic an unregulated thermal regime, and the DO component would address strategies to increase DO to meet the state DO standard. Until the plan's strategies are implemented, Alabama Power would provide flows to adequately oxygenate water released into the tailrace.

Alabama Rivers Alliance recommends a flow regime downstream from Harris Dam that mimics the natural hydrograph and, to the fullest extent possible, provides seasonal variability, restores aquatic habitat, reduces river level and temperature fluctuations, and is adaptively managed for the benefit of aquatic species. Alabama Rivers Alliance recommends [10(a) no. 3] that a combined 400–450 cfs flow be passed from the warm epilimnion of the lake when it is stratified and that this flow always have a DO of at least 5.0 mg/L. Alabama Rivers Alliance also recommends [10(a) no. 2.B] that the powerhouse intake structure be modified to provide warmer water through enhancing the ability to raise the skimmer weir, destratification of a portion of the reservoir at the current intake level, or installation of a multi-level intake structure.

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[37] Alabama DCNR recommends at least 30 minutes of time to up-ramp each turbine from off-line to full gate and at least 2 hours between ceasing on-line operation of the two units. Further details on recommended ramping rates and spawning stabilization are provided in *Fishery Resources, Minimum Instream Flows*, later in this section.

Alabama Rivers Alliance also recommends [10(a) no. 2.A] retrofitting, upgrading, or replacing the current aeration system to achieve at least a 2.0 mg/L increase in DO.[38] Alternatively, Alabama Rivers Alliance recommends that Alabama Power modify the intake to selectively withdraw water from additional levels of the lake, or destratify portions of the lake so water with higher levels of DO are passed through the turbines.

EPA encourages Alabama Power to follow recommendations by others to monitor temperature and DO in the tailrace of Harris Dam during both generation and non-generation periods to document compliance with standards and operation of the new continuous minimum flow unit. EPA also encourages use of new information on riverine health and scientific advances in generation technology as they become available to continue efforts in improving the chemical, physical, and biological conditions in the Tallapoosa River. V.M. Lashley requests consideration of a minimum flow of 1,000 cfs.

Our Analysis

The flow, temperature, and DO regime of the Tallapoosa River downstream from Harris Dam is affected by the project's design and operation. The project was designed as a peaking facility with a mid-to-surface-level intake for two units, each of which can discharge up to 8,000 cfs. Because the turbines are most efficient at 6,500 cfs, the project typically operates at either 6,500 cfs or 13,000 cfs. Historically,[39] the project has resulted in: (1) lower high flows; (2) lower and more frequent low flows; (3) seasonal shifts in flow magnitude; and (4) temperature decreases of as much as 10°C (18°F) during spring and summer generation periods (Irwin and Freeman, 2002, as cited by Irwin, 2019). Release of water from the reservoir results in warmer water downstream of the dam than upstream of the reservoir in fall and at times in winter (figure 3.3.2-8). Moreover, vertical profiles taken during intensive water quality surveys in 2000 and 2018 documented DO of less than 5 mg/L in about 2/3 of the forebay's water column and anoxic conditions at depths of more than 30 feet (9 meters) in the months of August–October (Alabama DEM, 2003, 2022b).

Since 2005, the project has been operated according to the Green Plan, which was developed to address concerns about adverse effects of the project's peaking operations and minimum flows on aquatic resources. Generally, the Green Plan specifies short (10- to 30-minute-long) pulses from Harris Dam, with the pulse duration determined by conditions in an unregulated section of the Tallapoosa River upstream of Harris Lake at the Heflin gage. In addition, Article 13 of the existing FERC license requires a minimum flow of 45 cfs at the Wadley gage, about 14 river miles downstream from Harris Dam.

Measurements in the forebay indicate that DO typically remains greater than the 5-mg/L criterion at a depth of 5 feet, but is frequently less than 4 mg/L at depths of 20 feet and more in the summer, with DO being less than 1.0 mg/L in seven of the eight years reported by Alabama

[38] Alabama Rivers Alliance states that testing of the existing draft tube aeration devices, which were designed to provide up to a 2 mg/L increase in DO, show an average increase of 1.37 mg/L in 1983 and an average increase of 1.1 mg/L in 2016.

[39] Compared to without project conditions.

Power and Alabama DEM (2011, 2013a, 2022b).[40] Both of the project's existing units are equipped with an aeration system that is used when DO monitored about 800 feet downstream from Harris Dam approach 5.5 mg/L and ceasing when they are consistently above 6.0 mg/L (typically from sometime in June into September). However, even with turbine aeration, DO concentrations less than the 4-mg/L criterion are occasionally discharged from the existing turbines. DO concentrations less than the 5-mg/L criterion historically occur 0.5 miles downstream from Harris Dam in May through October (table 3.3.2-7).[41]

Alabama Power used a model on the HEC-RAS platform with the hydraulic and water quality modules to simulate flow, water surface elevations, and water temperature in the Tallapoosa River at selected points downstream from Harris Dam. The HEC-RAS model development, calibration, and use are documented in the Downstream Release Alternatives Phase 1 and 2 reports (Alabama Power and Kleinschmidt, 2020c, 2022a). The model includes 306 one-dimensional cross sections and 6 storage areas for backwaters during flood conditions. The model geometry is based on bathymetric surveys conducted in 1999 to 2019, LiDAR conducted in 2018, and Alabama Department of Transportation engineering drawings for the four highway bridges. The model includes uniform lateral inflow hydrographs for the river from RM 136.6–122.7 and from RM 122.7–93.7 that are based on differences between flows at Harris Dam and the Wadley gage and between the Wadley gage and Horseshoe Bend, respectively. The model hydraulics were calibrated by adjusting Manning's roughness values to match the historical data for stream gages at Wadley and Horseshoe Bend as closely as possible over the range of flows modeled. The model was calibrated for water temperature using data collected in the tailrace, 1 mile and 7 miles downstream from Harris Dam in 2019–2020 as part of the Downstream Aquatic Habitat Study.

Simulations were run for each downstream release alternative for 2-week periods in spring (April), summer (July), and fall (September). The 2-week periods were selected based on the availability of continuous *in-situ* data from all three water temperature monitoring locations. Alabama Power did not simulate a winter period because the forebay water temperatures are typically uniform throughout the water column then.

All simulations were computed using the unsteady flow analysis in the HEC-RAS model with the output provided as hourly time series for each cross section. The simulated temperature values represent average conditions for the entire wetted channel and do not indicate how temperatures along the river's margin would differ from in the main flow of the channel. Assumptions applied in the model include: (1) the two storage areas represented by a two-dimensional grid mesh do not have any storage volume initially; (2) the same lateral inflow hydrographs are applied for each scenario; and (3) the same date/time-dependent thermal regime for Harris Dam releases is applied to all Alabama Power scenarios. This last assumption limits the effects analysis to just the effects from varying outflows and does not provide insight into potential effects from releasing water with a different temperature. Later in this section, we discuss modifications that Commission staff made to the model's boundary

[40] At a depth of 20 feet, DO measurements dropped to 1 mg/L or less in 2005, 2010, 2015, 2017, 2018, 2019, and 2021, but not in 2020.

[41] Refer to table 3.3.2-3 for details on applicability of the 4-mg/L and 5-mg/L criteria.

conditions to enable a quantitative evaluation of releasing water through an existing spillway gate or partially destratification of the water column in the forebay.

Under existing conditions (Green Plan operations), the magnitude of discharges from the project vary substantially over short periods each day for peaking operations and 10- to 30-minute pulses. HEC-RAS simulated hourly flow releases for Green Plan operations range from 70 to about 6,000 cfs in both July and September of 2019 and range from 70 to about 12,500 cfs in April 2020. As can be seen in figure 3.3.2-19, the transit time from the dam to Wadley is about 4–6 hours and about 17–24 hours from the dam to Horseshoe Bend at releases of about 6,000 cfs. As the flow releases decrease, the transit time from the dam becomes longer. For example, it takes about twice as long at flow releases of about 3,000 cfs than with 6,000 cfs. As water flows downstream, the peak flows attenuate (i.e., become distributed resulting in lower high flows and higher low flows). Simulated minimum flows at the Wadley gage are 395 cfs in July 2019, 300 cfs in September 2019, and 666 cfs in April 2020.

Proposed Operation

Comparison of simulation results under Alabama Power's proposed 300-cfs continuous minimum flow to existing conditions indicates that the proposed operation would:

- Increase the minimum flow from about 70 cfs to 300 cfs just downstream from the dam, but would have little effect on flows downstream from Wadley (figures 3.3.2-20 to 3.3.2-22).
- Eliminate the short-duration pulse releases in September that are provided under the Green Plan (figure 3.3.2-21).
- Reduce daily temperature fluctuations primarily through reduction of daily maximum temperatures and increases of daily minimum temperatures in September and April (figures 3.3.2-23 to 3.3.2-25).[42]
- Result in the largest changes in temperature just downstream from the dam, which would be reduced by inflows and attenuation as water flows downstream resulting in negligible changes in the thermal regime at, and downstream from, Wadley.

Alabama Power's preliminary design for the proposed minimum flow unit includes a conventional draft-tube aeration system,[43] which would passively add air to the water as it passes through the new unit's draft tube. To evaluate potential effects on DO discharged from the minimum flow unit, a discrete bubble analysis model (DBM) (McGinnis and Ruane, 2007) was used to simulate the exchange of oxygen in the proposed minimum flow unit draft tube at various air and turbine discharge rates. The DBM assumes: (1) the bubbles are produced at a constant rate and remain uniformly distributed in the draft tube; (2) the bubbles remain separate from one another; (3) all bubbles have a single size specified as a boundary condition; and (4) a constant draft tube temperature and tailrace elevation that are specified as boundary conditions.

[42] These model scenarios simulate all powerhouse flows, including the proposed 300-cfs minimum flow, which are withdrawn through the existing powerhouse intake structure with the skimmer weir at its uppermost limit of 764.0 feet.

[43] *See* Alabama Power's June 15, 2022, Filing.

The DBM was run for the preliminary design of the draft tube with air piping geometry, the air flow rate set to 10% of the water flow rate,[44] water flow rate that varied between runs, inflowing water temperature of 24.95°C (76.9°F) and DO concentration of 1.0 mg/L,[45] the minimum tailwater elevation of 661.4 feet, and a 2.5-mm bubble radius. The DBM results for the preliminary design of the minimum flow unit show a tailrace DO range from 7.0 mg/L at 100-cfs discharge to 5.0 mg/L at a 300-cfs discharge.

The results of the DBM model indicate a significant increase in the frequency that project discharges would meet applicable DO criteria. The discharge from the minimum flow unit would have higher DO levels than the existing units, but this is expected to result in minimal effect on the overall DO when peaking occurs because the proposed 300-cfs continuous minimum flow would typically be less than 5% of the total discharge. Therefore, it is unlikely that releases from Alabama Power's proposed minimum flow turbine combined with the discharge from the peaking turbines would consistently meet the 5-mg/L minimum DO criterion.

The following analysis of flow regimes and the source of water withdrawals from the forebay was conducted to evaluate potential river temperature and DO conditions resulting from: (1) continuous minimum flows greater than 300 cfs; (2) the Green Plan in combination with the proposed 300-cfs continuous minimum flow; and (3) drafting warmer water from the forebay. HEC-RAS simulations indicate that providing a continuous minimum flow above 300 cfs would increase base flows immediately downstream from the dam from about 70 cfs to the designated continuous minimum flow (figures 3.3.2-26 to 3.3.2-28). The change in flow would attenuate with distance downstream from the dam. Simulated temperatures indicate that continuous minimum flows higher than 300 cfs would further buffer temperatures and result in smaller temperature fluctuations (figures 3.3.2-29 to 3.3.2-31).

<u>Green Plan Peaking</u>

Simulations of operating the project with the Green Plan in combination with the proposed 300-cfs continuous minimum flow result in the same flows and temperatures as the 300-cfs continuous minimum flow throughout the July and April model periods. In contrast, simulated flow releases for the low-flow period in September maintain the short-term pulses that currently occur under the Green Plan and do not shift water released during those periods to periods of peaking power as occurs for the 300-cfs continuous minimum flow without the Green Plan (figure 3.3.2-27). The Green Plan peaking results in nearly the same simulated temperature as the 300-cfs continuous minimum flow without the Green Plan throughout the river (figure 3.3.2-29).

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[44] The air flow rate is based on a one-dimensional air flow model that computes air flow rate primarily as a function of draft tube geometry.

[45] To represent near worst-case DO conditions, water temperature and DO were set to values based on the forebay vertical profile with the lowest overall DO concentration (i.e., August 17, 2017). Temperature was set at the average withdrawal temperature, and DO was set to 1.0 mg/L, which is lower than the range of minimum withdrawal DO of 1.1 to 1.5 mg/L for flow rates of 100 to 300 cfs.

Withdrawal of Warmer Water

As discussed above, Alabama Power's proposal would reduce fluctuations in flow and temperature especially between Harris Dam and Wadley but have little effect on the river's general thermal regime. Continuous minimum flows greater than 300 cfs would further reduce these fluctuations. Continuing the Green Plan with the proposed 300-cfs continuous minimum flow would only differ from the proposed 300-cfs continuous minimum flow during low-flow periods. Thus, the differences in flow and water temperature and any continued short-term pulses would have minimal incremental effects on flow and temperature.

Alabama Power's evaluation of the potential to construct a high-level intake dedicated to the proposed minimum flow unit[46] identifies serious structural integrity and safety concerns with coring through the dam, adverse effects on lake levels and flood control procedures during construction, and a reduction in the amount of flow the minimum flow unit would be able to release. Alabama Power states that passing water to the minimum flow unit from a higher intake elevation than the existing units would result in an increase in the average and maximum daily and hourly temperature fluctuations downstream from Harris Dam. Thus, Alabama Power concludes that creating a separate minimum flow unit intake is neither feasible nor reasonable.

Various approaches have been evaluated and implemented to address coldwater releases from dams (Chaaya and Miller, 2022; Sherman, 2000; Reclamation, 2020; Gray et al., 2019; Price and Meyer, 1992; Burton, 2000). Management options include withdrawal of water at the desired temperature or artificially breaking up the thermal stratification. Approaches to withdraw warm water from the epilimnion and metalimnion include use of a skimmer weir, spillway gates, a thermal curtain blocking deep cold water, a siphon or pump system to transfer water from near the surface over or around the dam, and selective withdrawal structures. Approaches to break up thermal stratification include bubble plumes and surface mixers. Assuming modification of the existing spillway gates to release water from near the water surface, each of these options would result in higher DO in water withdrawn from the forebay. Advances in technologies to address coldwater releases continue to be developed and tested. In separate AIR filings,[47] Alabama Power provides project-specific information on a number of these approaches, which we briefly discuss below.

- Skimmer Weir – The project already uses its skimmer weir on the powerhouse intake operated at its uppermost level of 764 feet to limit withdrawal of cold water.
- Existing Spillway Gates – The existing spillway gates are 40-foot wide and open at an elevation of 753 feet (i.e., 11 feet lower than the invert of the powerhouse intake); therefore, use of an existing spillway gate would release deeper, cooler, less oxygenated water than the powerhouse intake. Alabama Power concludes that it is likely that an existing spillway gate can be operated at flows less than 500 cfs, but that it is highly unlikely that an existing 40-foot-wide spillway gate could be reliably adjusted to maintain a flow release of 50–150 cfs. Alabama Power states

[46] *See* Alabama Power's December 27, 2022 Filing.

[47] *See* Alabama Power's June 15, 2022, and December 27, 2022, filings.

that it may be possible for a spillway gate to provide a continuous minimum flow, but it does not consider this option reasonable due to the unknown effects to the stability of the dam and gate itself, and significant effects to generation and revenue from the minimum flow being passed by a non-generation mechanism.

- Modified Spillway Gates – One or more spillway gates could be modified by installing mini-gate(s), which would be used to supplement minimum flows provided by the proposed minimum flow unit.[48] Alabama Power states that to release water from higher in the lake through the existing spillway, one of the existing spillway gates would need to be replaced and redesigned to release from the top of the gate.

- Thermal Curtain – Sherman (2000) identified the potential to use a submerged thermal curtain to restrict flow to the warmer level above the curtain. Operation of such a curtain at Burrendong Dam in southeast Australia resulted in warmer river temperatures downstream from the dam (Gray et al., 2019). However, use of the Burrendong Dam curtain was terminated within seven years of its deployment because of frequent failures that resulted in coldwater releases (Thackray, 2020; Herron and Thackray, 2021).

- Siphon – Although siphons can draft near surface water in some cases, they are incapable of delivering water over a rise of about 33 feet (10 meters) which would produce a pure vacuum stopping any flow (Sherman, 2000). Alabama Power, based on its review, concludes that a siphon with a capacity of 50–150 cfs is not a reasonable alternative.[49]

- Pumps –Alabama Power provides a conceptual plan for a pump system that utilizes a high-level intake to pass 150 cfs and 300 cfs downstream from the dam.[50] Alabama Power states that this system would require a major infrastructure addition that includes a large concrete pump station constructed at the edge of the lake on the east embankment, a 64-inch-diameter intake with a pump of at least 48-inch diameter for 150 cfs. A 300-cfs system with no redundancy would require two pumps and two pipelines. To avoid prolonged outages caused by pump outages and maintenance events, a redundant pump would be needed for each pump in the system. Alabama Power concludes that the use of pumps is not a reasonable

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[48] For example, mini-gates were installed on the lower 2 feet of existing 12-foot-high Tainter gates at Santeetlah Dam, a component of the Smoky Mountain Hydroelectric Project (FERC No. 2169), formerly known as the Tapoco Project, in North Carolina (Alcoa, 2009).

[49] Alabama Power came to this conclusion due to high capital costs, potential dam safety concerns, maintenance and reliability issues that would result in interrupted minimum flow, effects to generation and revenue from flow being passed by a non-generation mechanism, little incremental benefit to downstream environmental and recreational resources, and unknown effects to DO and temperature from passing water from a different intake elevation.

[50] *See* Alabama Power's December 27, 2022, filing.

alternative to provide a continuous minimum flow partially because passing water from a higher intake elevation would result in an increase in the average and maximum daily and hourly temperature fluctuations.[51]

- Multi-level intakes – Multi-level intakes enable withdrawal of water from selected locations within the water column, which makes them effective at meeting downstream temperature targets. However, installing this type of structure at an existing dam: (1) needs to take into account the specific configuration of the dam and intake structure and debris management; (2) can adversely affect the structural integrity of project facilities; and (3) is very costly compared to other technologies.
- Bubble Plume –Bubble-plume systems for partial or full destratification involve pumping compressed air through a pipe network to diffusers that release plumes of buoyant bubbles which rise through the water column to the surface (figure 3.3.2-32). As a plume rises through the water column, it transports cold dense water upward to the warmer near-surface layer. Then, the cold water sinks back to a depth of neutral buoyancy and propagates away from the center of the plume, causing mixing in the vicinity of the bubble plume.
- Surface mixers – Large diameter (i.e., about 5 to 16 feet) impellers can be used to improve release water quality by forcing warm water from near the surface downward into the area adjacent to the powerhouse intake (figure 3.3.2-33). Including a draft tube on an impeller can increase its efficiency by reducing mixing of the warm water as it is forced downward. To limit the need for maintenance events, it is important to take measures to prevent the passage of debris through the impeller blades.
- Advances in technologies – Technologies to address coldwater pollution continue to advance (Hamilton and Patil, 2022; Smith et al., 2018) and may become feasible to address coldwater releases under a new FERC license.

Key insights gained from the analysis above includes:

1. Existing project operations result in lower spring and summer temperatures in the river between Harris Dam and Horseshoe Bend, as well as relatively large temperature fluctuations.
2. Proposed operations, including a 300-cfs continuous minimum flow provided through the existing powerhouse intake with the existing skimmer weir at its uppermost elevation, is expected to reduce temperature fluctuations, but still result in lower spring and summer river temperatures between Harris Dam and Horseshoe Bend.

[51] Other reasons Alabama Power concludes a pump station is not a reasonable alternative are: (1) its cost would be on par with the installation of the proposed minimum flow turbine (i.e., tens of millions of dollars); (2) its operation would significantly reduce generation and revenue from water being passed by a non-generation mechanism; and (3) the pumps would require an extreme amount of energy to operate.

3. Constructing a separate intake for the proposed minimum flow unit, given the limitations on potential locations and available space, could necessitate the use of a smaller unit with reduced capacity, and would likely increase risks to dam safety.
4. Drafting a continuous minimum flow greater than 300 cfs through one of the existing spillway gates would likely reduce river temperatures and increase temperature fluctuations compared to existing conditions under Green Plan operations combined with passing flow through the proposed 300-cfs continuous minimum flow unit.
5. Partial destratification of the forebay could increase temperatures and DO concentrations and reduce temperature fluctuations from peaking operations in the river downstream from Harris Dam. The extent of these increases would be dependent on the extent of mixing throughout the water column and whether additional flow is released from the partially destratified area or a location that is warmer than existing releases.
6. Drafting a continuous minimum flow greater than 300 cfs through a zone of partial destratification would likely incrementally increase DO, reduce temperature fluctuations from peaking operations, and increase temperatures farther downstream compared to the proposed 300-cfs continuous minimum flow drafted through a zone of partial destratification.

To gain a better understanding of the potential effects of Alabama Rivers Alliance's recommended flow release of 400–450 cfs, we modified the HEC-RAS boundary conditions and ran the model for the following scenarios:

- 450-cfs continuous minimum flow assuming the proposed 300-cfs continuous minimum flow and existing powerhouse flows are through the existing intake structure and the additional 150 cfs is released from an existing spillway gate. The spillway release temperatures are set for the spillway crest based on temperature measured in vertical profiles during the July, September, and April simulated periods (i.e., 18.6°C, 16.5°C, and 16.4°C; 65.5°F, 61.7°F, and 61.5°F, respectively).
- 450-cfs continuous minimum flow assuming partial forebay destratification for all releases. The release temperatures are set at the average temperature of the top 30 feet of vertical profiles measured during the July, September, and April simulated periods (i.e.,26.2°, 27.0°C, and 18.1°C; 79.2°F, 80.6°F, and 64.6°F, respectively).

To evaluate changes in the regimes for flow and average temperature across the river channel under these conditions and proposed operation, we present frequency analyses for simulated flows (figures 3.3.2-34 to 3.3.2-37), water temperatures (figures 3.3.2-38 to 3.3.2-41), and hourly change in flows (figures 3.3.2-42 to 3.3.2-45) and water temperatures (figures 3.3.2-46 to 3.3.2-49).[52] Simulated flows for the 450-cfs continuous minimum flow indicate base flows immediately downstream from the dam would incrementally increase by 150 cfs compared to proposed operation, although attenuation and inflows would reduce the incremental increase in base flows at Horseshoe Bend by an average of about 135 cfs in September, 120 cfs in July, and 95 cfs in April (figures 3.3.2-34 to 3.3.2-37).

The simulation results indicate that water temperature under a 450-cfs continuous minimum flow would be highly dependent on the source of the water released from the dam (figures 3.3.2-38 to 3.3.2-41). Compared to proposed operation, releasing 150 cfs of a 450-cfs continuous minimum flow through an existing spillway gate and the remaining 300 cfs through the existing powerhouse intake would result in substantially cooler temperatures in July and September between the dam and Wadley, but have much smaller cooling effect at Horseshoe Bend. During the April high-flow period, release of 150-cfs through an existing spillway gate would have minimal effect on temperature releases from the dam and these effects would be negligible once water reached Malone. In contrast, providing a 450-cfs continuous minimum flow from a partially destratified forebay could provide warmer conditions. Assuming average water temperatures for the top 30 feet of the forebay, tailrace temperatures could be increased by about 3°C (5.4°F) in July, 1.5°C (2.7°F) in September, and 1°C (1.8°F) in April (figure 3.3.2-38). These temperature increases would attenuate with distance downstream from the dam generally resulting in less than 1°C (1.8°F) at Wadley and likely negligible increases at Horseshoe Bend (figures 3.3.2-38 to 3.3.2-41). Partial destratification of the forebay may also result in occasional reduction in hourly temperature fluctuations immediately downstream from the dam but likely would not have measurable effects on hourly temperature fluctuations at or downstream from Malone.

Alabama Power's proposed new minimum flow unit and operations would increase the base flow, reduce flow fluctuations, reduce daily maximum and average water temperature, and may increase DO concentrations in the river downstream from Harris Dam. However, water temperatures would still frequently remain cooler than natural conditions and DO may not meet the water quality standards set to protect aquatic life. Development of a water temperature and DO monitoring plan could determine whether the new minimum flow and modifications to the project facilities and operations effectively result in more suitable aquatic habitat conditions for native aquatic organisms. Development of the plan in consultation with Alabama DEM, Alabama DCNR, Alabama Rivers Alliance, and FWS would provide an approach to address their concerns. The benefits of a water quality monitoring plan could be maximized by including design, implementation, monitoring, and reporting provisions for both water temperature and DO enhancement measures at the project consistent with Alabama DCNR's recommendation [10(j)-nos. 11 and 13] for: (1) well-defined endpoints; (2) strategies to provide temperatures that more closely resemble an unregulated thermal regime and increase DO to meet applicable DO requirements to better support warmwater aquatic communities;

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[52] The one-dimensional model simulates the average water temperature for the entire wetted channel cross-section and does not simulate temperature variations across the channel that would result from inflows of tributaries and/or springs, hyporheic flows, braided channels, deep pools, slow shallow water, or shade.

(3) measurable response objectives; and (4) a schedule for implementing any needed changes to the plan.

Since it is not evident that the design and operation of new project facilities would meet the water temperature and DO goals, it would be important that the monitoring plan include reporting requirements to address the need for (a) additional monitoring, or (b) shortfalls in meeting identified goals. Continuous monitoring at the three locations proposed by Alabama Power and included in the 401 certification (i.e., in the project's tailrace, and at the USGS gages at Malone and Wadley) would provide sufficient data to determine the extent to which water temperature and DO goals are met and whether further monitoring or other remedial measures may be necessary. Initiating monitoring once a new minimum flow is established, providing the data to Alabama DCNR annually, and preparing a report, in consultation with Alabama DCNR and Alabama DEM, following the third full year of monitoring would provide adequate information to determine whether the water temperature and DO goals are being met, or if additional monitoring or other remedial actions that may require Commission approval are necessary. However, initiating water temperature and DO monitoring within 1 year of license issuance and providing annual reports, as specified in the 401 certification, would avoid an unnecessary delay in understanding temperature and DO conditions in the tailrace during periods of non-generation. Subsequently, this could lead to more timely adaptations to the project that increase the suitability of the thermal regime downstream from the dam for native fish. Once the monitoring demonstrates that the project consistently meets the water temperature and DO targets there would be little value in continuing monitoring for the remainder of the license, as the 401 certification specifies.

We address monitoring of water temperature and DO as it pertains to aquatic resources in section 3.3.2.2, *Environmental Effects* in the *Minimum Instream Flow Releases* and *Aquatic Resources Monitoring Plan* subsections.

Fishery Resources

Effects of Reservoir Fluctuations on Aquatic Resources

Impoundment fluctuations can lead to fish stranding, nest dewatering, unsuitable spawning depths, and lack of cover. Harris Lake is a multi-purpose storage impoundment with water levels that fluctuate seasonally. Alabama Power operates the project to seasonally target lake surface elevations, following the project’s operating curve. From May 1 through October 1, Harris Lake is maintained at or below elevation 793.0 feet, depending on inflow conditions. Between October 1 and December 1, the operating curve elevation drops to elevation 785.0 feet. The pool level remains at or below elevation 785.0 feet until April 1. From April 1 to May 1, the operating curve elevation rises to full pool at elevation 793.0 feet. Alabama Power proposes to continue managing the lake elevations in accordance the current Harris Lake operating curve along with providing a continuous minimum instream flow of about 300 cfs into the tailrace. Alabama Power also proposes to continue its current practice of holding Harris Lake water levels constant or slightly increasing for a 14-day period for spring spawning upon request from Alabama DCNR. Finally, Alabama Power proposes to improve habitat by adding structures to enhance fish habitat (e.g., brush piles and other woody debris [recycled Christmas trees, felled trees] and synthetic materials [spider blocks, concrete, and PVC structures]) to Harris Lake.

Alabama DCNR [10(j) no. 3] recommends holding Harris Lake water levels constant or slightly increasing for a 14-day period to provide improved conditions for fish spawning and hatching success, with timing determined after consultation with Alabama DCNR. In addition, Alabama DCNR [10(j) no. 18] recommends fish habitat improvement by adding habitat enhancements and developing a plan, schedule, and monitoring program. Specifically, Alabama DCNR recommends: (1) identifying and establishing candidate areas with native aquatic plants; (2) continuing to selectively cut and monitor felled trees for shoreline cover; and (3) adding fish attraction devices such as brush piles and other woody debris (e.g., recycled Christmas trees, felled trees) and synthetic materials (e.g., spider blocks, concrete, and PVC structures) in Harris Lake to provide cover for fish and to enhance angling opportunities in Harris Project waters.

Our Analysis

Alabama Power evaluated the effect of its proposed operating scenario, as well as several alternative scenarios (table 3.3.2-24) on the water surface elevation in Harris Lake as part of its Downstream Release Alternatives Report (Alabama Power and Kleinschmidt, 2022a). Figures 3.3.2-50 through 3.3.2-55 show the average, minimum, and low-inflow water year (2006 through 2008) water surface elevations in Harris Lake based on HEC-ResSim modeling of alternative downstream release scenarios. Release scenarios of 450 cfs and less would have nearly identical effects on the average lake water surface elevation if implemented in lieu of the Green Plan. However, all release scenarios of 300 cfs or higher, with continued Green Plan releases, would lower the June through July minimum lake water surface elevation by 1 to 10 feet compared to existing conditions. When the pulsing of flow as described in the Green Plan is combined with the higher considered minimum flow releases, the estimated effects on minimum lake water surface elevation are as much as about 20 feet lower than existing conditions (e.g., 800 cfs + Green Plan scenario in July relative to Green Plan scenario as shown in figure 3.3.2-53). The higher flow alternatives (i.e., 600 cfs and 800 cfs) result in lower average elevations in Harris Lake compared to Green Plan, or the 150 cfs, 300 cfs, 350 cfs, 400 cfs, and 450 cfs minimum flows, thus reducing the amount of littoral habitat for juvenile fish and mollusks.

In addition to reducing the amount of littoral habitat, fluctuating lake levels can lead to shoreline erosion and sedimentation of aquatic habitat, which in turn can reduce the quality of habitat available to aquatic organisms. As part of the erosion and sedimentation study (Alabama Power and Kleinschmidt, 2022b), Alabama Power evaluated potential causes of erosion at existing erosion sites identified by stakeholders around Harris Lake. Of the 22 erosion sites identified, 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 appeared to be the result of anthropogenic and/or natural processes/factors independent of Harris Project operations. Anthropogenic factors include wave action due to boating activity, land clearing and landscaping, and other construction activities affecting runoff toward the reservoir. 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 Harris Project operations.

Sedimentation in Harris Lake 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 lake. Land uses in the basin upstream of Harris Lake and adjacent to the river contribute sediment load to the upper reaches of Harris Lake. This is illustrated in the growth of all but one of the sedimentation areas identified on Harris Lake. 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 greater depths, reducing the overall areas of sedimentation. This winter exposure and early spring flushing of accumulated sediment into deeper habitats reduces the risk to spring spawning fish like centrarchids (basses and sunfishes) to having their nests buried in late spring sediment.

Alabama Power's proposal to annually hold Harris Lake water levels constant or slightly increasing for a 14-day period for spring spawning would reduce the potential stranding of centrarchid nests in the shallow, shoreline areas. Consulting with Alabama DCNR to determine an ideal 2-week period would improve the effectiveness of the stabilization effort. Alabama Power has been using recycled Christmas trees to enhance aquatic habitat in the lake since 1993, and more recently has used artificial structures. These habitat structures would provide cover from predators, increased habitat complexity, and act as anchor points for fish eggs. Continuing these enhancement efforts, as proposed by Alabama Power, would continue to enhance the aquatic habitat in Harris Lake. Alabama DCNR's recommended development of a formal plan, schedule, and monitoring program for such lake enhancement actions would help guide implementation and effectiveness of these measures over the course of any new license issued for the project.

Minimum Instream Flows

Operation of dams and diversions that alter a river's natural flow regime can disrupt ecosystem-sustaining processes, adversely affecting fish and other aquatic biota (NRC, 1996; Richter et al., 1996). High flows shape the character of the river channel (creating pools, riffles, and other aquatic habitat types), maintain habitat complexity, deposit spawning gravel, flush fine sediments, and prevent the encroachment of riparian vegetation. Low and intermediate flows determine how much habitat space is available for fish and other aquatic biota and can affect water quality and the ability of fish to move freely between critical rearing and spawning areas (Postel and Richter, 2003).

Alabama Power proposes to continue operating the Harris Project during daily peak-load periods while maintaining lake levels according to the existing operating curve. Alabama Power also proposes to install, operate, and maintain a minimum flow unit to provide a continuous minimum flow of about 300 cfs in the Tallapoosa River downstream from Harris Dam. Operation of the turbine would replace the existing "Green Plan" releases except when the minimum flow unit is taken offline. In these cases, Alabama Power would operate in accordance with the current Green Plan, providing pulses through Unit 1 or Unit 2, depending on availability.

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 from Harris Dam and at a reference site upstream. Results would be used to compare the effects, if any, of the proposed continuous minimum flow release compared to Green Plan sampling.

Alabama DCNR recommends [10(j) no. 1] that Alabama Power implement the following seasonal continuous minimum flow regime within five years of any license issued for the project: 760 cfs from January 1 through April 30; 510 cfs from May 1 through June 30; 390 cfs from July 1 through November 30; and 510 cfs from December 1 through December 31. Alabama DCNR also recommends [10(j) no. 4] the following ramping restrictions for the project: (1) that the up-ramp time of each turbine at the project would be no less than 30 minutes from off-line to full gate; and (2) for down-ramp time, after the first operating unit is taken off-line, the second operating unit would not be taken off-line for at least 2 hours after the first operating unit was taken off-line. Finally, Alabama DCNR recommends [10(j) no. 6] that with the exception of drought periods, the new minimum flow regime should be allowed to vary down to 254 cfs for short periods of time annually from October through January if turbine maintenance is needed.

Alabama Rivers Alliance recommends a flow regime for the Tallapoosa River downstream from Harris Dam that mimics the natural hydrograph to the fullest extent possible, provides seasonal variability, restores aquatic habitat, reduces river level and water temperature fluctuations to mitigate the detrimental effects of hydropeaking, and is adaptively managed for the benefit of aquatic species. Alabama Rivers Alliance also recommends, [10(a) no. 3] that a combined 400–450 cfs flow be passed from the warmer epilimnion of the lake when stratified, and that the flow have a DO concentration of at least 5.0 mg/L at all times.

Our Analysis

Studies have demonstrated the effects of hydraulic regulation on the Tallapoosa River fish community (Irwin and Hornsby, 1997; Bowen et al. 1998; Freeman et al., 2005; and Irwin, 2019). Construction of Harris Dam and its appurtenant hydroelectric system features began in 1974 and was completed in 1983. Bowen et al. (1998) examined the availability and persistence of key habitats and fish assemblages at regulated and unregulated sites on the river and concluded that hydropeaking dam operations decreased both the average duration of shallow water habitats and year-to-year variation in persistence of these habitats when compared to unregulated sites. Freeman et al. (2005) found an increase in the proportion of darters and minnows in regulated reaches of the Tallapoosa River when compared to unregulated reaches of the Coosa River. Irwin (2019) found fish species richness and fish persistence and colonization rates being greatest in unregulated reaches of the river compared to regulated reaches.

The Green Plan (10 to 30-minute-long pulses, with the pulse duration determined by conditions at a gage on the Tallapoosa River upstream of Harris Lake) 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). Alabama Power’s continuous minimum flow of 300 cfs would provide a greater benefit compared to the Green Plan (baseline) operation of releasing periodic pulse flows downstream, which leads to fluctuations in the downstream shoreline wetted perimeter which in turn can lead to erosion and stranding of aquatic habitat. Alabama Power evaluated the effects of multiple downstream release alternative flows (table 3.3.2-24) on the downstream wetted perimeter as part of its Downstream Release Alternatives Report (Alabama Power and Kleinschmidt, 2022a). All downstream release alternatives would provide more wetter perimeter than the current Green Plan or the pre-Green Plan release alternatives (table 3.3.2-25). The larger flow releases resulted in larger increases in wetter perimeter relative to the existing conditions. However, at sites closer to the dam (i.e., RMs 0.2 to 7 downstream) the higher and lower flows were estimated to have relatively similar increases, while at sites between RM 7 and 43, the larger flow releases were estimated to provide larger increases in wetter perimeter. The addition of the Green Plan pulses to scenarios resulted in very little additional wetter perimeter, especially at the higher continuous minimum flow releases of 600 and 800 cfs.

Alabama Power also compared the average daily fluctuation of wetted perimeter associated with each downstream release alternative to evaluate aquatic habitat stability downstream from Harris Dam (Alabama Power and Kleinschmidt, 2022a). The fluctuations in wetted perimeter generally decreased with increasing river miles downstream from the dam (table 3.3.2-26).

Alabama DCNR[53] states that the continuous minimum flow alternatives of 300 cfs or greater increase average wetted perimeter habitat 5% or more from existing Green Plan conditions beginning 0.4 miles downstream from Harris Dam and should create additional shallow water habitat conditions that more closely align with historic average low flows and duration of daily flows. Alabama DCNR also states that while a 300 cfs continuous, minimum flow would improve aquatic resource abundance and species richness in the tailrace during low-flow periods, these flows do not address the increased habitat availability needs throughout various seasonal periods, when many aquatic species require additional habitat for successful reproduction. Alabama DCNR's recommended seasonal continuous minimum flow regime ranges from 760 to 390 cfs, which would be intended to ensure sufficient quantity and quality of water is provided in a manner that would resemble the historic, natural flow regime. As shown in tables 3.3.2-25 and 3.3.2-26, Alabama DCNR's higher continuous minimum flow regime would provide more wetted perimeter and less fluctuation in wetted perimeter downstream from the dam than Alabama Power's proposed 300-cfs minimum flow.

Sudden rapid increases in discharge associated with peaking operations can wash away spawning habitat and disrupt fish behavior in the tailrace. Alabama DCNR recommends that, if daily peak-load operations are continued under a new project license, unit ramping rates be put in place. For transitions to and from both one unit and two units to peak-load generation adequate start times and stop times could help to minimize drastic flow, DO, and temperature changes. Ramping would potentially benefit aquatic resources by reducing the rate of change of discharge and increasing habitat stability; however, as Alabama Power points out, the project's turbines are not designed to operate at flows less than best/full gate and would be vulnerable to mechanical damage if ramping constraints were imposed. Therefore, incrementally opening or closing the existing turbine wicket gates to gradually increase or decrease discharge would not be feasible. When transitioning from spinning mode to generating mode, the wicket gates are opened over a period of about 45 seconds (Alabama Power, 2023). Sequential start-up of the project's two units, however, would reduce the sudden increases in flow velocities and water levels in the tailrace relative to current operations where both units are simultaneously brought online to full or best capacity very quickly. To provide some control over sudden increases in flow, this could involve bringing one turbine online and then waiting at least 30 minutes before bringing the other turbine online. However, Martin (2008) found that even one turbine release altered the nesting behavior of redbreast sunfish, leading to nest abandonment and disrupted spawning activity. Some species may use flow refugia along the shore in response to discharge associated with the peaking operations.

[53] *See* Alabama DCNR's March 20, 2023, filing.

Sammons et al. (2013) tracked Alabama bass and redeye bass movement and habitat use in the tailrace in response to peaking operations and found that Alabama bass moved toward the shore during high spring and summer flows and into deeper water during winter high flows. Redeye bass shifted less in response to flow changes than Alabama bass. Limiting up- and down-ramping rates could restrict Alabama Power's ability to manage lake levels and littoral habitat, as well as effect on-peak energy production.

Increasing daily average flows and decreasing daily flow fluctuations downstream could partially reduce or counter some negative effects of rapid start up and shut down of the peaking turbines. These changes potentially could be achieved through several project design alternatives, including: (1) modifying or replacing either or both of the existing turbines so they can operate over a wider range of flows; (2) identifying and using a new location that could accommodate a larger capacity continuous minimum flow turbine that can operate over a wider range of flows; (3) siphoning or pumping extra flow releases from the epilimnion of the reservoir, in addition to Alabama Power's proposed continuous minimum flow unit; (4) providing extra flow releases from the existing gate with its current configuration (from the bottom); (5) providing extra flow releases from the existing gate in a new configuration (from the top); and (6) modifying an existing gate with addition of mini-gate to make an extra release (in addition to proposed continuous minimum flow turbine) from the top. While all of these alternative designs would allow for increased daily average flows and decreased daily flow fluctuations, and in turn benefit downstream aquatic habitat, some would also improve water quality downstream for aquatic resources (i.e., provide warmer water temperature during the spring and summer and higher DO concentrations). Design alternatives 2, 3, 5, and 6 above would all improve water quality for aquatic resources downstream from the dam, which generally has large variations in temperature, often is too cold during the spring and summer, and has low DO concentrations.

Table 3.3.2-27 shows water temperature ranges for key fish species in the Tallapoosa River downstream from Harris Dam. Alabama Power's Final Aquatic Resources Study Report indicates that optimal ranges were based on a variety of metrics (e.g., digestion/growth), and that some sources did not specify what metric was being considered. We consider the spawning and hatching water temperature values to be the most important. The centrarchid species (sunfish and basses) are early spring spawners, channel catfish are May to late summer spawners, Tallapoosa shiner spawn from April through June, Tallapoosa darter spawn in the early spring, and muscadine darter spawn from March through June.

Figures 3.3.2-23 to 3.3.2-25 show that, relative to existing conditions, Alabama Power's proposed 300 cfs continuous minimum flow would reduce daily temperature fluctuations immediately downstream from Harris Dam. This would occur primarily through reduction of daily maximum temperatures in all three periods simulated, and increases in daily minimum temperatures for September and April. Figures 3.3.2-29 to 3.3.2-31 show that minimum flows greater than 300 cfs would further buffer temperatures and result in smaller temperature fluctuations. However, once the proposed flows reach Wadley, the thermal regime would remain nearly unchanged. Overall, modeled river temperatures under proposed operation and under higher alternative minimum flow releases are on the low side of the spawning and hatching temperature range for warmwater fishes during April, and for channel catfish immediately downstream from the dam during the summer. However, the simulated temperature values represent average conditions for the entire wetted channel and do not indicate how temperatures along the river's margin would differ from in the main flow of the channel. Several studies of various river systems have shown that local conditions (e.g., inflows from tributaries and springs, hyporheic flows, braided channels, deep pools, slow shallow water, and shade) result in stream temperatures varying laterally across the channel (Buxton et al., 2022; Ferencz, et al., 2021; Mejia et al., 2020; Steel et al., 2017; Sullivan et al., 2021). During non-peaking periods, water temperature along the tailrace shorelines, especially in shallower habitats, would likely be warmer than in the main channel where minimum flow discharge from the dam keeps the water from stagnating. Therefore, channel catfish and sunfish species may find more suitable habitat (warmer) along the margins during these periods. However, during peaking periods, all water throughout the width of the tailrace is moving and any warmer habitat would be lost. Therefore, being able to release warmer water would likely be more beneficial to downstream fish than the release of higher minimum flows alone.

As discussed above in section 3.3.2.2, *Environmental Effects, Water Temperature and Dissolved Oxygen*, there are several options for addressing coldwater releases. These options generally consist of either withdrawing water from a specific elevation where the water is at the desired temperature or artificially breaking up the thermal stratification. We assess the potential applicability of these options, at the Harris Project, in section 3.3.2.2. Drafting a continuous minimum flow greater than 300 cfs through the zone of partial destratification would likely incrementally reduce temperature fluctuations from peaking operations and increase downstream temperatures compared to the proposed 300 cfs continuous minimum flow drafted through a zone of partial destratification.

As part of its Aquatic Resources Study Report, Alabama Power compared recorded water temperature data from 20 data loggers installed downstream from Harris Dam to Irwin Shoals from May 2019 through April 2020 to water temperature data recorded upstream at the unregulated USGS Heflin and Newell gages over the same period. Mean daily water temperature at the unregulated reaches were higher than temperatures from the regulated reaches during the spring and summer, and cooler than the regulated reaches during the fall and winter. Therefore, operation of any thermal destratification methods during the spring and summer would be the most beneficial in terms of supporting a warmwater fish assemblage.

Figures 3.3.2-23 to 3.3.2-25 and figures 3.3.2-29 to 3.3.2-31 show that the proposed 300-cfs minimum flow, as well as higher minimum flow releases, would often result in downstream water temperatures that are in the lower spawning and hatching range for the spring spawning species (table 3.3.2-27), but would be slightly more appropriate for summer spawners. Because water temperatures downstream from hydropeaking facilities are known to fluctuate in response to peaking operations, analysis of water temperature based solely on the range may not be appropriate. Rather, attainment of the minimum number of days needed that a specific temperature threshold is met for a species lifestage, known as degree days, is often considered more important for assessing the effects of temperature on fish populations than daily mean values (Phelps et al., 2007; Pawiroredjo et al., 2008; Irwin 2019; and Bickley, 2023). Pawiroredjo et al. (2008) identified 57 days and 21°C (69.8°F) as the minimum duration and temperature threshold for channel catfish spawning, and Irwin (2019) used 63 days and 17°C (62.6°F) for redbreast sunfish egg development to swim-up fry. Given the daily fluctuations in downstream water temperatures due to peaking operations, incorporating the use of degree days into assessments of suitable continuous minimum flow quantities for downstream aquatic resources would be appropriate. Alabama Power could collect water temperature data with water temperature loggers deployed at the same sites proposed for fish sampling in the aquatic resources monitoring plan.

Alabama DCNR's recommendation for decreasing minimum flows down to 254 cfs for short periods during the months of October through January for turbine maintenance would allow for necessary repairs during a time when environmental effects should be minimal. Limiting these short periods to no more than 3 weeks would further minimize the environmental effects of the reduced flows.

Effects of Water Quality Measures on Aquatic Resources

Alabama Power also proposes to develop a water quality monitoring plan to ensure compliance with applicable water quality standards and conditions of the 401 certification to be issued by Alabama DEM. Alabama Power would monitor water temperature and DO year-round in the Harris Project tailrace during periods of discharge associated with peaking generation or minimum flow releases and at two downstream USGS gages. If, after the initial three years of year-round monitoring, Alabama DEM determines that the state water quality standards are not being met, Alabama Power would evaluate, in consultation with Alabama DEM, additional ways to increase DO, and file a plan with FERC for approval.

Alabama Power also proposes to continue to maintain the skimmer weir[54] and operate it at its highest setting possible which would provide the warmest and highest DO possible with the existing project facilities. Alabama Power also proposes to continue operating its existing aeration system within the existing turbine units, and incorporate an aeration system in the design of the proposed minimum-flow unit.

Our Analysis

Alabama Power's proposed water quality monitoring plan would ensure that project operations support water quality that meets the use classifications for project waters, which include fish and wildlife, swimming, and other whole-body water contact sports (i.e., "water sports"), public water supply, and Outstanding Alabama Waters. The fish and wildlife use applies to the entire geographic scope of this environmental analysis, within Alabama (specifically, the Tallapoosa River, Little Tallapoosa River, Wedowee Creek and Ketchepedrakee Creek). The proposed continued use of the existing aeration systems and incorporation of a new aeration system into the proposed minimum flow unit could help increase DO in water discharged downstream from the project. However, the existing aeration system alone has been shown to increase DO concentrations by only about 1 mg/L and sub-standard DO concentrations are still occasionally released downstream (table 3.3.2-7).

Downstream Habitat Enhancement

Apart from their proposed flow and water quality measures discussed above, Alabama Power does not propose any other measures to enhance downstream aquatic habitat. Alabama DCNR recommends [10(j) no. 3b] a 14-day water level spawning stabilization period be

[54] The skimmer weir was incorporated into the original project design to allow the intake to draft water from different elevations in the water column.

implemented each year in the tailrace, with the specific timing to be determined in consultation with resource agencies. Alabama Power would also consult with resource agencies and FERC to determine expected flow and hydrologic conditions and to schedule flow adjustment periods for upcoming spawning seasons. Following establishment of an adjusted flow period, Alabama Power would inform resource agencies of its daily generation/flow release schedule for the flow adjustment period at least one week prior to the start of the flow adjustment period. If unexpected conditions occur during any flow adjustment period, Alabama Power would inform resource agencies of any necessary changes in its daily generation/flow release schedule for the remainder of the flow adjustment period. Alabama DCNR also recommends [10(j) no. 18] in addition to the reservoir habitat enhancement measure proposed by Alabama Power and discussed above, tailrace fish habitat improvement and enhancement options should be evaluated.

Our Analysis

The most abundant fish species downstream of Harris Dam are spring spawners (shiners, catfish, and centrarchids) and having to maintain a stable downstream water level for a 14-day period during the spring would be difficult for Alabama Power due to high inflows during the spring and reservoir management obligations. Maintaining a stable downstream water level would prevent Alabama Power from performing its traditional peaking operations. If Alabama Power were to continually operate a single unit for 14 consecutive days to provide stable downstream levels, reservoir water surface elevations would fluctuate. Alternatively, excessive inflows would have to be spilled downstream and in turn negate the continuous generated releases. In addition, the flow and water quality measures proposed by Alabama Power and recommended by resource agencies and discussed above would provide a greater benefit to downstream aquatic resource and would be more manageable by Alabama Power. Regarding tailrace fish habitat improvement and enhancement options, given that Alabama DCNR's recommendation is not specific, we are unable to evaluate the merits of the recommendation. Nonetheless, downstream flow releases can change rapidly due to project operations and in response to emergency operations (providing flood control for the basin) and any downstream enhancement such as large woody debris and brush piles and synthetic materials would need to be properly anchored to the streambank to avoid being washed downstream during high-flow events and potentially becoming a public safety hazard. Even so, they could cause unexpected local hydraulic and erosional effects.

Effects of Project Operation on Fish Entrainment and Fish Passage

Fish entrained through powerhouses may be subjected to injury or death during turbine passage, or may be redistributed into downstream systems, and this entrainment may affect the species composition and recruitment of fish to the reaches both upstream of, and downstream from, the hydropower facility. Entrainment at the Harris Project can occur through the existing powerhouse that contains two vertical Francis-type turbines that each have a rated output of 71,250 kW, and could occur through the proposed continuous minimum flow unit that would draw water from the unit 1 penstock and consist of a 2,500-kW turbine. Prior to being entrained, fish in an impoundment can be vulnerable to impingement on a project's trashrack(s) if the fish is too big to fit through the trashrack bars and unable to outswim the approach velocity at the trashrack. The Harris Project has 30 trashracks with vertical bars spaced 6 inches on center from one another and approach velocities of 2.41 feet per second at best gate and 2.97 feet per second at full gate (*see* table 3.3.2-12). Alabama Power does not propose any specific mitigation or enhancement measures related to fish entrainment, but does propose to: (1) continue to maintain lake levels at a stable, or slightly rising, elevation for a period of 14 days in the spring; and (2) install aquatic habitat enhancement measures in Harris Lake.

EPA states that while the mortality rates estimated in Alabama Power's entrainment reports (Kleinschmidt, 2018a, 2022) may appear low, when these numbers are added to those resulting from the operation of many other facilities along the waterways, the effect is no longer minimal.[55] EPA also states that neither the existing nor the proposed turbines are "fish friendly," and that throughout the relicensing process, EPA has encouraged Alabama Power to analyze ways to mitigate this effect. EPA recommends considering the use of fish-friendly turbines. Alabama DCNR recommends [10(j) no. 14], without elaboration, that Alabama Power pursue and provide methods to eliminate, minimize, or mitigate for entrainment losses. Alabama DCNR also recommends [10(j) no. 15] the Commission reserve authority to require fishways, as may be prescribed by the Department of Commerce or Interior under section 18 of the FPA. Finally, Alabama Power should participate in discussions with FWS and the Corps regarding potential methods to provide or enhance fish passage on the Tallapoosa River [10(j) no. 16].

Our Analysis

Alabama Power conducted a desktop study of fish entrainment and turbine mortality for the Harris Project (Kleinschmidt, 2018a; 2022). Estimates of the number and species of fish potentially entrained through the proposed minimum flow unit were extrapolated from the estimates for the existing units (Kleinschmidt, 2022).[56] Fish entrainment through the two existing turbine units was estimated to be 294,427 annually; with the highest rate during the winter (262,847 fish) and lowest during the summer (3,714 fish) (*see* table 3.3.2-13). Based on the results from Kleinschmidt (2018a), the proposed minimum flow unit could potentially entrain 37,353 fish annually (Kleinschmidt, 2022; table 3.3.2-14). The majority of fish would be entrained during the winter months and would be dominated by species in the family Clupeidae (shads and herring) (tables 3.3.2-13 and 3.3.2-14). Estimated losses due to turbine mortality associated with the existing turbines and the proposed minimum flow unit are shown in tables 3.3.2-17 and 3.3.2-18. Clupeids (gizzard shad and threadfin shad) comprise most of the estimated fish losses associated with entrainment at the Harris Project, while sport fish represented about 20% of the fish lost due to entrainment at the project.

Gizzard shad often account for the majority of entrained species at a hydropower project because individuals become lethargic when water temperatures are cold for prolonged periods and no longer capable of swimming away. Gizzard shad are an important forage species for various other fish that could be affected if entrainment rates are too high. However,

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[55] *See* EPA's March 15, 2023, filing.

[56] For example, in Kleinschmidt (2018a), the monthly flow rate for December was 6,361 million cubic feet, which resulted in an entrainment estimate of 6,998 fish for the existing units. For the same period, the minimum flow unit is expected to pass 804 million cubic feet of water, or 12.6% of the volume the existing units would pass. The estimate of entrainment for the proposed minimum flow unit would be 12.6% of 6,998, or 884 fish.

gizzard shad are highly fecund species; a single female gizzard shad can lay approximately 300,000 eggs (Fuller et al., 2021) and entrainment often has minimal effect on the species. Regarding the effects of entrainment and turbine mortality of sport fish in Harris Lake, several bass fishing tournaments occur on the lake annually. The percentage of largemouth bass in Harris Lake that are greater than 20 inches (12%) exceeds the state average (7%) for Alabama impoundments. Growth rates for largemouth bass in their first four years of life are similar to growth rates for largemouth bass found in other impoundments throughout the state (Alabama DCNR, 2015). In 2015, black crappie 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 Harris Lake and exhibited much better growth and size distribution than crappie in the Tallapoosa River near Foster's Bridge.[57] Hartline et al. (2018) attributed this to more abundant habitat and forage availability in the lake. The size and abundance of these game species relative to other lakes indicate that the effects of entrainment and mortality are likely minimal, and do not appear to be appreciably affecting populations of game species in the lake.

Fish entrainment and turbine mortality is a concern at most hydroelectric projects. Engineers are designing new, more fish-friendly turbines that allow for 100% survival of entrained species, in certain cases. For example, Natel Energy designed its FishSafe Restoration Hydro Turbines that can be used at projects with 130 feet of head or less. These turbines have thin, curved runner blades that reduce the likelihood and severity of a blade strike compared to conventional thin, straight blade turbine designs. Survival rate studies have shown 98 to 100% survival for eels, juvenile alewife, and channel catfish using Natel's design (Natel Energy, 2024). Other design features that can make a turbine more fish-friendly include maximizing the openings between runner blades (or using fewer runner blades), minimizing the gap between the runner blade tip and the turbine outer cylinder, using long runner blades, and designing turbines to rotate more slowly. Alabama Power's proposed design for its minimum flow unit would include 15 runner blades and a rotational speed of 360 revolutions per minute (table 3.3.2-15). Consideration of a more fish-friendly design option for the proposed minimum flow unit, as recommended by EPA, could reduce the mortality rate of the proposed unit.

Alabama DCNR recommends [10(j) no. 14] that Alabama Power provide methods to eliminate, minimize, or mitigate for entrainment losses. Given that Alabama DCNR's recommendation is not specific, we are unable to evaluate the merits of the recommendation. Nonetheless, Alabama Power proposes to: (1) continue to maintain lake levels at a stable or slightly rising elevation for a period of 14 days in the spring; and (2) enhance aquatic habitat in Harris Lake with artificial habitat structures. These measures are expected to enhance littoral habitat, which would help maintain the heathy fish populations that exist in the lake.

Alabama DCNR discusses the use of American Fisheries Society's publication "Investigation and Monetary Values of Fish and Freshwater Mussel Kills" in calculating replacement costs values for public trust resource losses. However, compensatory mitigation for lost fish would constitute a payment of damages. The Commission lacks the authority

[57] Foster's Bridge is about 11 miles upstream of the Tallapoosa and Little Tallapoosa River confluence.

under the FPA to either adjudicate claims, or require compensation, for damages.[58] In certain situations, developing a fish stocking plan can be an appropriate measure to offset fish loss due to entrainment. However as discussed above, the fishery, in particular the sport fishery, in Harris Lake appears to be healthy and not in need of support through a stocking program. Regarding EPA's concern for the cumulative effects of watershed entrainment on fishes, we discuss these cumulative effects below in section 3.3.2.3, *Cumulative Effects, Aquatic Resources*.

Regarding fish passage concerns, neither FWS nor NMFS filed passage-related comments or conditions in response to the Commission's REA notice, including a reservation for authority to prescribe fishways under section 18 of the FPA. There are several dams downstream of the project that lack any type of passage facility, and multiple lock and dams owned by Corps that only provide limited opportunities for upstream passage. These downstream barriers have minimized the potential for migratory species to reach the Harris Project tailrace. Consequently, evaluating passage options at the Harris Project does not appear necessary at this time.

Aquatic Resources Monitoring Plan

Alabama Power proposes to develop an aquatic resources monitoring plan, which would be implemented following initiation of the proposed continuous minimum flow, to quantify the fish community at three sites downstream from Harris Dam and at a reference site upstream of Harris Lake. Alabama Power would use the results to compare the potential effects, if any, of the proposed continuous minimum flow release to the baseline sampling conducted during relicensing. Fish assemblages would be monitored at the tailrace, Wadley, Horseshoe Bend, and about 4 miles upstream of Lee's Bridge (above Harris Lake) using methods similar to those used in the relicensing study (bi-monthly samples of six, 10-minute transects at each site using boat and barge electrofishing). All four sites would be sampled for a total of three sampling events (12 bi-monthly samples over 2 years for each sample event). Alabama Power would conduct the first sampling event 1 year after the minimum flow system is fully operational, with each subsequent event conducted on a five-year interval. Field collections and subsequent analysis would be summarized in a report that would be made available to resource agencies for review and discussed in a meeting/conference call the year following each full collection cycle. Reports and meeting summaries would be filed with the Commission. Alabama Power does not propose to adaptively manage the minimum flow.

Alabama DCNR recommends [10(j) no. 17] the development and implementation of an aquatic resources monitoring plan, with the following modifications: (1) implement the plan at determined intervals throughout the license term with standardized sampling protocols for all aquatic species (macroinvertebrates, mollusks, crayfish, fish); (2) require both pre- and post-aquatic resource monitoring; (3) consider sportfish, state and federally protected species, and species of greatest conservation need during development of the plan; and (4) consider and prioritize the research, surveys, and monitoring needs outlined in Alabama DCNR's 2015 Alabama's Wildlife Action Plan 2015-2025. Alabama DCNR also recommends [10(j) no. 16]

[58] *See* City of Jackson, Ohio, and Certain Ohio Municipalities, 105 FERC ¶ 61,136, P 11 (2003).

that Alabama Power should establish a Memorandum of Agreement with an approved and licensed hatchery/facility to develop and implement a freshwater fish, mollusk and crayfish propagation program for the Tallapoosa River in consultation with resource agencies and FERC approval. The goals of this program would be to: (1) stabilize existing populations of select rare, state listed, species of greatest conservation need, and federally listed species; (2) reintroduce extirpated species; and (3) establish select faunal representative species into restored habitats. Initial propagation work would focus on the monitoring of select species in existing habitats to prevent their extirpation. Reintroductions and reestablishment of species into restored habitat would rely on population and habitat assessments to determine when and where conditions are favorable for the release of juveniles. Activities of this program would include but are not limited to: (1) collection and maintenance of brood stock and fish hosts; (2) developing propagation and rearing techniques; (3) artificial culture and rearing of fish, mollusks or crayfish; (4) testing of proposed release sites to determine habitat suitability; and (5) monitoring of release sites to determine success of releases and population status of target species. This propagation program would be carried out until monitoring data indicate that self-sustaining populations are established. The most cost-effective way to implement such a propagation program is to use nearby state or federal facilities although NGO or private alternatives should be explored. Upon agreement, Alabama Power would reimburse selected propagation programs for capital improvements and operational costs at facility, not to exceed replacement costs outlined in the American Fisheries Society, Investigation and Monetary Values of Fish and Freshwater Mussel Kills (Bowen and O'Hearn, 2017). Alabama Rivers Alliance recommends [10(a) no. 3.D] that Alabama Power consider 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.[59]

Our Analysis

As outlined above, Alabama Power would use the fish community monitoring results to compare the potential effects, if any, of the proposed continuous minimum flow releases to those associated with the baseline sampling conducted during relicensing. As discussed above, several studies have demonstrated the effects of hydraulic regulation on the Tallapoosa River fish community. In addition to the downstream fish community, upstream and downstream benthic macroinvertebrate data indicate that the downstream macroinvertebrate communities have overall lower diversity, greater density driven by increased abundances of flow disturbance tolerant taxa, and the exclusion of some flow sensitive species from regulated reaches (Irwin, 2019). Benthic macroinvertebrates are often the base of aquatic food webs and are also one of the first groups of organisms to show responses to environmental variability. Therefore, any aquatic resources monitoring plan should include monitoring for benthic macroinvertebrates, as well as mollusks and crayfish in addition to fish species. Alabama DCNR recommended its plan, including monitoring, be implemented through the term of any new license issued. However, if monitoring objectives are met earlier during a license term, the

[59] Alabama Rivers Alliance states that Alabama Power's proposed plan lacks a mechanism for change or iteration based on monitoring results, and stresses the importance of flexibility and the ability to respond to changing environmental conditions over the next multi-decade license term, which necessitates adaptive management.

value of subsequent monitoring would be questionable and could incur unnecessary costs. Monitoring for a period of three years with the option for additional monitoring if agreed upon between the licensee and resource agencies would ensure that unnecessary monitoring does not occur.

Given that aquatic organisms are affected by variables other than project operation (i.e., flow releases) and the consensus among stakeholders is that restoring the thermal regime to a more natural condition would benefit the native fish community, monitoring water temperature in conjunction with measures designed to address effects on water temperature would provide better information than monitoring biotic populations alone. Therefore, monitoring water temperatures at the same sites that the aquatic organisms are monitored, would enable Alabama Power to conduct a more thorough assessment of the combined effects of any new minimum flows and water quality enhancement measures than monitoring fish community composition alone. Additionally, as discussed in section 3.3.2.2, *Environmental Effects, Minimum Instream Flows*, given the daily fluctuations in downstream water temperatures due to peaking operations, incorporating the use of degree days into assessments of suitable continuous minimum flow quantities on downstream fish communities such as proposed in Alabama Power's aquatic resources monitoring plan would be appropriate. The application of degree days should be for selected fish species that are important to resource managers and recreationists and determined in consultation with Alabama DCNR, Alabama Rivers Alliance, and FWS.

As Alabama Rivers Alliance notes, the proposed aquatic resources monitoring plan lacks a mechanism for change or iteration based on monitoring results. In the absence of an adaptive management mechanism, the value of the monitoring data is unclear. Developing monitoring targets for groups of aquatic organisms (i.e., abundance and diversity of cyprinids or centrarchid species, composition of a macroinvertebrate community) and for individual species (i.e., abundance and relative condition factor of a particular game species) in consultation with resource agencies would help inform the monitoring plan if new project management conditions required by any new license issued (i.e., minimum flow releases and water quality measures) are effective or need to be adjusted. Additionally, developing routine reports in consultation with resource agencies that summarize the data collected, a discussion of the effectiveness of any minimum flow regime required in achieving established monitoring targets, and any recommendations to the Commission for approval, for changes to project facilities and/or operations, including changes to a minimum flow regime, and any changes to the monitoring schedule, including the need for additional monitoring after the third year of monitoring is completed, and filing these reports with the Commission would give value to the monitoring data and facilitate the Commission's ability to determine compliance with any future license.

Alabama DCNR recommended the development of a propagation program for aquatic resources in the Tallapoosa River. However, it is unclear which reaches of the Tallapoosa River are intended to be enhanced through such a program. Propagating fish and invertebrate species that are then used to enhance aquatic communities in the Tallapoosa River upstream of the project boundary or downstream of Lake Martin would not be commensurate with effects of the Harris Project. Additionally, we question the value of any type of propagation program that is developed immediately following issuance of any license compared to a program developed after operational changes of a new license are implemented and after any necessary biological monitoring has collected sufficient data to evaluate the effects of new operational changes. Should biological monitoring data indicate that any future flow releases and operational measures are not allowing aquatic resource targets to be met, a propagation program could be an appropriate consideration.

Aquatic Invasive Species Management

Aquatic invasive species, such as New Zealand mudsnails, quagga mussels, zebra mussels, and Asian clams can compete for habitat resources with native species and have the potential to affect aquatic communities and infrastructure. Asian clams can clog facility pipes and cause structural damage, weakening dams and related structures. With the abundance of boat docks and associated launching of small boats, landscaping and access by people who also frequent other areas, there is an increased risk of invasive species being introduced into Harris Lake and the Tallapoosa River. Alabama Power does not propose any measures to control aquatic invasive animals. However, Alabama Power proposes to revise and implement a Nuisance Aquatic Vegetation and Vector Control Program (Alabama Power, 2021e), which would include: (1) a description of the nuisance aquatic vegetation (i.e., non-indigenous aquatic vegetation species) and vectors (i.e., mosquitos) covered under this program; (2) frequency (i.e., annual), timing, and locations (i.e., lake-wide) of surveys to identify and monitor where nuisance aquatic vegetation and mosquitos could create a public health hazard, affect power generation facilities, restrict recreational use, and/or pose a threat to the ecological balance of Harris Lake; (3) methods for monitoring for increases in nuisance aquatic vegetation (i.e., annual survey and property owner reporting of nuisance aquatic vegetation to Alabama Power, and mosquito monitoring through adult resting stations and larval sampling; (4) methods for controlling nuisance aquatic vegetation and mosquitos (i) all aquatic plant control measures would be directed by Alabama Power staff biologists certified as commercial aquatic pesticide applicators by the state of Alabama, Department of Agriculture and Industries; and (ii) only EPA-approved aquatic herbicides and algaecides would be used to manage invasive aquatic plants; and (5) schedules for monitoring (i.e., surveys would occur in the late summer/early fall when vegetation biomass reaches its peak) and for finalizing and implementing the program (i.e., within three months of license issuance, Alabama Power would revise or update the existing program, as needed, and file with FERC for approval).

Alabama DCNR recommends [10(a) no. 4] that Alabama Power develop an invasive species management plan in consultation with resource agencies. The goal of the plan would be to prevent introductions and establishment of invasive species, in addition to managing nuisance aquatic vegetation to best suit the many uses in Harris Lake and the project tailrace. Alabama DCNR recommends that the plan include criteria for evaluating and responding to invasive fish, mollusk, plant, and crayfish introductions.

Our Analysis

Alabama Power's Nuisance Aquatic Vegetation and Vector Control Program is a maintenance control plan in which measures are initiated before noxious weeds reach a problematic stage. This program is intended to minimize chemical applications and promote natural plant diversity. All aquatic plant control measures are directed by staff biologists certified as commercial aquatic applicators by the Alabama Department of Agriculture and Industries. The strict use of only EPA-approved aquatic herbicides and pesticides would minimize the potential for water quality impacts during implementation of the program.

In general, Alabama Power would leave aquatic vegetation in its natural state in areas where the above criteria are not met (as deemed appropriate by Alabama Power Company biologists and staff). Such a measure would enhance fishery habitat and reservoir aesthetics by allowing natural aquatic vegetation to exist at healthy levels and treating areas that become a nuisance. The program includes monitoring protocols and would facilitate the control of nuisance aquatic plants in the project. Over the last few years, Alabama Power has implemented aquatic vegetation control applications a couple of times but generally there have not been many aquatic vegetation management challenges at the project. Implementing the proposed Nuisance Aquatic Vegetation and Vector Control Program would benefit biological resources by promoting a healthy aquatic ecosystem.

Alabama Power's existing Vector Control Program implements a multi-faceted approach that focuses on all mosquito life stages. Alabama Power receives less than three calls annually from Harris Lake shoreline homeowners and lake users regarding mosquitos. The program appears to have effectively controlled mosquito populations in the past, and there is no indication that changes in project operations would affect the success of these measures. Continuation of this program would control mosquito populations and help prevent the spread of mosquito-related disease.

The only aquatic invasive animal that has been documented in the project area is Asian clam. This species has been documented in the Tallapoosa River Basin since at least the early 1990s (Johnson and DeVries, 1997). Alabama DCNR's 2021 Alabama Aquatic Nuisance Species Management Plan (Alabama DCNR, 2021) lists objectives for invasive species including: (1) coordination of activities and programs; (2) prevention, control, and manage through education; (3) active control and management; and (4) prevention through legislation, regulation, and enforcement. For Asian clam, each objective is ranked as "low." Taking a proactive approach by establishing an aquatic invasive species management plan for aquatic animal would ensure that reasonable measures are in place to prevent colonization in Lake Harris, and if colonization should occur, procedures are in place to control the spread of invasive species. However, based on information in the record and Alabama DCNR's 2021 management plan, which indicates that the Alabama Aquatic Nuisance Species Task Force's recommendations for approaching management of the Asian clam in the state for the next 10 years is considered low priority, there appears to be no basis for an active monitoring program as part of a plan. Instead, provisions for: (1) public education regarding preventive measures; (2) consultation with agencies regarding appropriate signage; (3) development of BMPs for specific activities that have the potential to introduce aquatic invasive species into a project reservoir; and (4) documenting incidental observations of aquatic invasive species and reporting such observations to Alabama DCNR should provide an appropriate level of protection against the potential spread of Asian clams and the establishment of other aquatic invasive species in project waters.

3.3.2.3 Cumulative Effects

Water and aquatic resources have the potential to be cumulatively affected by the continued operation of the Harris Project, in combination with other activities in the Tallapoosa River Basin (Corps, 2014).

Water Quality

The presence of Harris Dam has created a slackwater impoundment that captures nutrients and leads to vertical stratification of temperature. The combination of thermal stratification leading to an isolated hypolimnion and decomposition of organic matter that sinks into the hypolimnion results in DO of less than 5 mg/L in the impoundment's deep water in March through October. The powerhouse drafts water from depths extending down to 30 feet below the surface, which results in cool water, and occasional low DO concentrations, being discharged from the powerhouse. As part of Alabama Power's proposal, water temperature and DO would be monitored, and Alabama Power would develop a plan to increase DO levels if standards are not met under new license conditions. As a result, there would likely be slight improvement in DO in the Tallapoosa River downstream from the dam. River temperature in the first 7 to 14 miles downstream from the dam would continue to be cooler than natural conditions in spring and summer under proposed operation. Construction and operation of a forebay destratification system or another method to release warmer water from the dam would reduce the ongoing cooling effect of the project in spring and summer. Monitoring water temperature and DO after Alabama Power modifies project facilities and/or operations to release warmer water from the dam would enable determination of the effectiveness of the modifications and any need for further project modifications to meet the water temperature and DO targets.

The 1988 Harris Project Wildlife Mitigation Plan was prepared in consultation with the FWS and the Alabama DCNR. Much of the 779.5 acres of land acquired for wildlife management drains to Harris Lake. Protecting these parcels from development also reduces contaminated runoff entering the reservoir. Many of the management techniques developed to improve wildlife habitat also help protect water quality in and around the lake. For example, a buffer strip of undisturbed timber adjacent to the shoreline for the protection of ospreys also reduces the inflow of nutrients. Similarly, the SMP's scenic easement at the water's edge between elevations 795 and 800 feet protects trees over three inches in diameter and shrubs over four and one-half feet high. By reducing erosion and sedimentation, the roots of these trees and shrubs reduce turbidity, thereby improving water quality.

Aquatic Resources

<u>Effects of Erosion and Sedimentation on Skyline WMA Aquatic Habitat</u>

Alabama Power has a Forestry Management Program that, through tree clear cutting, could cause erosion and sedimentation issues for Skyline aquatic habitat. 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 affect streams and waterbodies within the Skyline WMA. Specifically, Alabama Power would continue to incorporate Alabama's BMP for forestry as provided by the Alabama Forestry Commission. These practices include: establishing streamside management zones; avoiding crossing of streams by roads, skid trails, or firebreaks when possible; when unavoidable, using the fewest possible steam crossings located where the bank and streamside management zones would be least disturbed; and properly planning and locating roads (Alabama Forestry Commission, 2023). These management activities would benefit soil resources and erosion, as well as reduce turbidity by reducing runoff and disturbance which may indirectly improve aquatic habitats of the rivers and streams within the Skyline WMA. Implementation of the WMP also may have a beneficial effect on aquatic resources in the Skyline WMA. However, agricultural runoff plays a major role in affecting water quality in this area; therefore, sediment and erosion caused by forestry management practices may be minimal compared to the effects of agricultural runoff on aquatic habitat.

Entrainment

EPA states that fish loss due to turbine mortality is a known direct effect from hydroelectric facilities.[60] EPA further states that there are hydroelectric facilities around the United States operating with fish-friendly turbines. EPA goes on to say that, throughout the process, it has encouraged Alabama Power to analyze ways to mitigate this ongoing effect. Finally, EPA notes that the fish mortality numbers from Alabama Power's hydroelectric turbines may appear low but when these mortality numbers are added to those resulting from the operation of many other facilities along the water ways, the effect is no longer minimal (i.e., millions of fish fatalities). EPA recommends that Alabama Power consider the use of fish-friendly turbines at the Harris Project, as well as develop a table that shows side-by-side the types of turbines being evaluated, and any additional studies and their results.

Turbine-related injuries and mortality associated with proposed project operation could contribute to cumulative effects on fishery resources. While some fish entrainment would occur, most fish entrained would be juvenile or smaller fish of the most common species that occur in the Tallapoosa River Basin. Alabama Power conducted a desktop study of fish entrainment and turbine mortality for the Harris Project (Kleinschmidt, 2018a; 2022). Fish entrainment through the two existing turbine units was estimated to be 294,427 annually (*see* table 3.3.2-13), and potential fish entrainment associated with the new minimum flow unit was estimated to be 37,353 fish annually (Kleinschmidt, 2022; table 3.3.2-14). Estimated losses due to turbine mortality associated with the existing turbines and the proposed minimum flow unit are shown in tables 3.3.2-17 and 3.3.2-18, with gizzard shad and threadfin shad comprising most of the estimated fish losses. Sport fish represented about 20% of the fish lost due to entrainment at the project. We also reviewed the EPRI (1997) summary of fish entrainment studies, which reviewed the results of 43 fish entrainment studies conducted at hydroelectric projects located primarily in the northeast, southeast, and Midwest United States in the early to mid-1990s. The results of this review indicate that many of the warmwater species occurring in the Tallapoosa River are common species entrained at other hydroelectric projects; however, the extent of entrainment varies among species and from project to project. What is consistent across the studies, though, is that most of the fish entrained are typically less than 100 mm (4 inches) long; often being juvenile fish or species such as minnows that do not typically exceed a length of 3 or 4 inches. EPRI (1997) found that overall, 90% of the fish entrained across the 43 studies reviewed are less than 4 inches long.

If we assume a similar distribution for fish entrained at hydroelectric projects on the Tallapoosa River, the fish experiencing mortality would be young-of-year or juvenile life stages, gizzard and threadfin shad, and smaller species such as minnows. The high fecundities of most of the warmwater fish species in Harris Lake, as well as gizzard and threadfin shad,

[60] *See* EPA's March 15, 2023, filing.

that would be subject to entrainment would compensate for any mortality and buffer population-level effects on resident species. The loss of these species and life stages to the lake fishery, which typically experience high natural mortality in fish populations unaffected by hydro operations, would be unlikely to affect the overall fish populations in Harris Lake. The lake supports a healthy, robust recreational fishery, and does not appear to be substantially affected by any turbine-related mortality.

In addition to operational effects, fish and fish populations from the headwaters of Harris Lake downstream to the confluence with the Coosa River could also be affected because of the presence of the Harris Dam, along with the downstream Martin and Yates-Thurlow Projects. These dams, which act as a physical barrier, hinder the movements of aquatic species in the Tallapoosa River. Fish entrainment, mortality, and hinderance of species movement throughout the river system are expected to continue, and, thus, effects to the lake and river fisheries would continue. However, the effects, while adverse, are expected to be small. Moreover, fish that survive turbine passage likely contribute to the downstream Tallapoosa River fishery.

As discussed in section 3.3.2.2, *Fishery Resources, Effects of Project Operations on Fish Entrainment and Fish Passage*, there are several turbine design alternatives that are considered fish-friendly and more conducive to turbine survival than conventional designs. Consideration by Alabama Power of a more fish-friendly design option for the proposed minimum flow unit, as recommended by EPA, could reduce the mortality rate of the proposed unit.

3.3.3 Terrestrial Resources

3.3.3.1 Affected Environment

The affected environment is provided in Appendix F to this EIS.

3.3.3.2 Environmental Effects

Vegetation and Wildlife

<u>Effects of Project Operation (Normal, Flood, Drought) on Vegetation and Wildlife at Harris Lake</u>

Changes to the operating regime at Harris Lake could affect vegetation and wildlife if they modify the current frequency and duration of water elevations as well as the seasonal wetted area on the shoreline. Alabama Power proposes to install, operate, and maintain a Francis-type minimum flow unit and release 300 cfs continuously from it, and would continue to operate the Harris Project during daily peak-load periods according to the existing operating curve, flood control procedures, and ADROP (drought procedures) as described in section 2.1.3, *Existing Project Operation*. Alabama Power would maintain the existing winter pool elevation of Harris Lake at 785 feet.

Alabama DCNR and Alabama Rivers Alliance recommend that Alabama Power increase the continuous minimum flow to mitigate effects of project operation on downstream natural resources, and other stakeholders (e.g., lake residents) recommend that Alabama Power increase the winter operating curve elevation to enhance recreational opportunities. As described in section 3.3.2.2, *Water and Aquatic Resources, Environmental Effects,* Alabama Power evaluated increases in the minimum flows (i.e., 150, 300, 350, 400, 450, 600, and 800 cfs; collectively "downstream release alternatives") and winter pool elevation (i.e., 786, 787, 788, and 789 feet; collectively "winter pool alternatives") and the effects on project resources.

In its May 2, 2023 reply comments, Alabama Power states that the downstream release alternatives other than their proposed 300 cfs continuous minimum flow are not feasible (see our discussion in section 3.3.2.2, *Water and Aquatic Resources*, *Environmental*).

Our Analysis

Alabama Power's proposal to continue operating the Harris Project in peaking mode would maintain the same seasonal normal full pool elevations as it has historically (i.e., at or below 793 feet from May 1 to October 1; dropping to 785 feet between October 1 and December 1; at or below 785 feet from December 1 to April 1; and rising back to 793 feet between April 1 and May 1). Continuing the existing reservoir operating regime would maintain the existing hydroperiod and therefore no changes in the composition or extent of wetland, riparian, and littoral habitat along the Harris Lake shoreline are expected. Maintaining the existing winter pool elevation would continue to provide both unwetted shoreline and littoral habitat for foraging species. The 8-foot winter drawdown zone would remain essentially unvegetated, providing marginal wildlife habitat value as a corridor for movement when the reservoir is drawn down.

In its final Operating Curve Change Feasibility Study (Phase 2), Alabama Power found that increasing the winter operating curve by one to four feet would increase the availability of shallow littoral habitats in coves and sloughs on Harris Lake, which may increase availability of cover and feeding sites for overwintering resident and migratory waterfowl. Higher winter operating curve elevations could similarly increase winter foraging habitat for wading birds. The increased wetted area in coves and sloughs during the winter months may result in marginal increases in the availability of shallow breeding sites for early spring breeding amphibians, such as southern leopard frog, bullfrog, and spotted salamander. However, Alabama Power proposes eliminating the higher winter pool alternatives from further consideration based on their modeling results, which demonstrated that the change would increase the area and depth of flooding downstream from the project. For example, under 100-year design flood conditions, higher winter pools could result in inundation of agricultural fields, homes, cabins, and other structures in the Tallapoosa River downstream from Harris Dam. This flooding could lead to indirect effects to vegetation and wildlife (e.g., inadvertent flood water contact with chemicals in homes and vehicles and spread of these chemicals into surrounding land as flood water recedes). Although a greater number of flood days are expected with a one-to-four-foot increase in winter pool, no long-term effects to wildlife downstream are expected (Alabama Power and Kleinschmidt, 2022c).

Alabama Power's Downstream Release Alternative Study (Phase 2) found that releasing continuous minimum flows of 150 cfs, 300 cfs, 350 cfs, 400 cfs, and 450 cfs would not cause significant water surface elevation fluctuations or changes in the wetted perimeter at Harris Lake. Alabama Power's proposal to develop drought operations procedures specifically for the minimum flow unit would ensure that reservoir elevations would not be lower than would occur under current (baseline) operating conditions (Alabama Power and Kleinschmidt, 2022c).

Given that minimum flow releases of 150 to 450 cfs would not affect the frequency or duration of inundation of wetlands, riparian, littoral, and other shoreline habitats, these continuous minimum flow alternatives are not expected to affect terrestrial resources at Harris Lake.

In contrast, Alabama Power's modeling results showed that releasing a continuous minimum flow of 600 cfs or higher would result in lower average lake elevations compared to existing project operations. Continuous minimum flows of 600 cfs or higher would change the existing hydroperiod, leaving some areas dryer for longer periods, and could therefore reduce the net amount of wetland, riparian, and littoral habitat for amphibians, mussels, and other invertebrates that only persist in shallow water along the shoreline of Harris Lake. In the short term, de-wetted areas would be dominated by mud flats, which may increase foraging sites for wading birds and small mammals. Over the long term permanently exposed mud flats could shift in habitat type (e.g., wetlands to uplands) and would be susceptible to colonization by non-native invasive plants. As they are colonized by upland plants, they would increase habitat for terrestrial species (Alabama Power and Kleinschmidt, 2022c).

Alabama Power's Downstream Release Alternative Study (Phase 2) stated that modifying downstream releases would not impact project operation during flood conditions, which follow Corps flood control procedures. With higher winter operating pools, there would be less space available within the normal operating range of Harris Lake to accommodate high-flow events. This could result in an increase in the frequency of spillway operation and/or operating the project at full capacity (i.e., 16,000 cfs downstream release or greater), which would increase the magnitude of downstream flooding during some high-flow events. Such high flows could scour the riverbanks and damage riparian vegetation and existing wildlife habitats in the Tallapoosa River downstream from Harris Dam.

Under all winter pool and downstream release alternatives, the shoreline between the maximum reservoir operating elevation (793 feet) and the scenic easement[61] is expected to remain mostly undeveloped and vegetated. This area would continue to serve as a vegetated buffer zone around the reservoir, protecting shoreline habitat from erosion and providing relatively stable wildlife habitat upslope of the reservoir fluctuation zone. Maintaining the shoreline within the existing scenic buffer zone in an undeveloped state would preserve vegetation and the habitat value it provides to wildlife.

<u>Effects of Project Operation (Normal, Flood, Drought) on Vegetation and Wildlife in the Tallapoosa River Downstream from Harris Dam</u>

Changes to volumes and frequency of flows released during project operation could affect riparian vegetation and wildlife if the duration of inundation/drying, and the extent of seasonally wetted areas change on the banks of the Tallapoosa River downstream from Harris Dam. 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 addition, Alabama Power proposes to develop low-inflow and drought

[61] The scenic easement goes from 793 feet up to 800 feet or 50 horizontal feet, whichever is less, but never less than 795 feet.

operations procedures for the minimum flow unit in consultation with resource agencies following unit installation and performance testing.

As described in section 3.3.2.2, Alabama DCNR recommends that Alabama Power implement a higher seasonal continuous minimum flow regime [10(j)-1], and turbine ramping restrictions for the project [10(j) 4] to minimize the effects of peaking operations in the Tallapoosa River downstream from Harris Dam. In addition, Alabama Rivers Alliance recommends that Alabama Power implement a flow regime for the Tallapoosa River downstream from Harris Dam that mimics the natural hydrograph to the fullest extent possible, including a release of 400 to 450 cfs when Harris Lake is stratified [10(a)-3].

In reply comments filed on May 2, 2023, Alabama Power states that its proposed 300 cfs continuous minimum flow would increase the average time that the Alabama DCNR's recommended seasonal minimum flow alternative is met from 60% under existing operations, to 79% of the time, with the highest percent increase from May through November. Alabama Power also states that Alabama DCNR's recommended turbine ramping restrictions are infeasible due to the existing turbine operating limitations.

Our Analysis

Modifying the quantity of flow releases from Harris Dam would affect the total wetted area and the water fluctuations on the banks of the Tallapoosa River between Harris Dam and Horseshoe Bend. Compared with existing operations, all of the downstream continuous minimum flow alternatives (except the pre-Green Plan alternative) would increase the amount of littoral habitat and decrease water level fluctuations between Harris Dam and Horseshoe Bend. Generally, as downstream flows increase, the percent wetted perimeter would also increase, and water level fluctuations would decrease. Thus, the downstream release alternatives with continuous minimum flows of 150 cfs and 800 cfs would produce the least, and the greatest percent wetted perimeter increases, respectively. Similarly, 800 cfs continuous minimum flow would provide the greatest decrease in water level fluctuations in the Tallapoosa River downstream from Harris Dam, compared with existing operations and all of the other downstream release alternatives. The downstream minimum flow alternatives with Green Plan pulses would not result in substantial increases to wetted perimeter or reductions of water level fluctuations in the Tallapoosa River downstream from Harris Dam.

All of the continuous minimum flow alternatives would provide some benefits to wildlife and terrestrial resources in the Tallapoosa River below Harris Dam compared with existing project operation. These benefits would be augmented incrementally with increases in the volume of minimum flow that reduce the effects of peaking operations. For example, a continuous minimum flow of 150 cfs would provide the least net increase in littoral habitat, while a continuous minimum flow of 800 cfs would provide the most net increase in littoral habitat. As wetted area in the riverbed would increase and water level fluctuations would decrease, the total littoral area and its habitat viability would increase. Larger, more stable littoral areas would increase the availability of shallow water sites that are suitable for early spring breeders, such as amphibians, to lay their eggs. These areas could also increase suitable habitat for macroinvertebrates, which could improve foraging conditions for birds, amphibians, and reptiles along the Tallapoosa River downstream from Harris Dam.

Although upland habitats along the Tallapoosa River downstream from Harris Dam are not expected to be significantly affected by any of the downstream release alternatives, operational changes that reduce scouring and erosion could benefit upland sites immediately adjacent to the Tallapoosa River downstream from Harris Dam. Increasing the stability of flows in shallow water and along riverbanks would facilitate growth of littoral and riparian plants, which could help anchor sediments and stabilize soils. As littoral and riparian vegetation become established, they would provide additional cover and breeding sites (e.g., dens, nests, roosts), forage, and broader migration corridors for local wildlife. Realizing such benefits to terrestrial resources along the Tallapoosa River downstream from Harris Dam through Horseshoe Bend would require that landowners maintain riparian buffers with adequate widths to preserve soil/riverbank stability over the course of any new license. In addition, as described in section 3.3.1.2, the proposed erosion monitoring plan would allow Alabama Power to identify and address any areas of streambank erosion downstream from Harris Dam after any operational changes (e.g., minimum flow releases) are implemented.

As described above, Alabama Power's flood control procedures would remain the same under all proposed operating alternatives. During high-flow events under any of the higher winter pool alternatives, there would be less space available within the normal operating range of Harris Lake. This would increase the need to release water that exceeds the normal full pool elevation by operating the spillway and/or both turbines at full capacity, which could increase the magnitude of downstream flooding. Such high flows could adversely affect terrestrial resources (e.g., increase riverbank scouring, damage riparian vegetation and existing wildlife habitats) in the Tallapoosa River downstream from Harris Dam.

Effects of Land Management Activities on Vegetation and Wildlife

Land management activities can affect vegetation and wildlife, including native, special status, and non-native invasive species, if they would disturb plants, soils, and wildlife, or their habitats. To enhance and protect terrestrial resources within the project boundary, Alabama Power proposes to consult with resource agencies to finalize and implement land management activities described in its draft WMP for both the Harris Lake and Skyline WMA portions of the project, as well as its draft SMP for Harris Lake. In addition, to protect birds within the transmission line corridor at Harris Lake, Alabama Power also proposes to implement its company Avian Protection Plan (APP) (2022d).

Alabama DCNR recommends the proposed WMP and SMP. To protect special status bat species, Alabama DCNR recommends that the final WMP include FWS's guidelines for timber management and provisions for cave protection and maintenance. In addition, to protect Harris Lake shorelines from erosion and maintain shoreline habitat, Alabama DCNR recommends that the SMP include specific criteria to limit the use of seawalls and ensure the use of riprap and other alternative bank stabilization techniques, and that the Corps' bulkhead guidelines (Alabama General Permit Shoreline and Bank Stabilization and Protection) should be followed if seawalls are deemed necessary.

Our Analysis

Wildlife Management Plan

Alabama Power's management activities for project lands at Harris Lake and Skyline WMA would be consolidated in the WMP, and would include provisions to: (1) finalize timber management methods that avoid or minimize effects to terrestrial resources; (2) consult with FWS to develop measures protective of federally listed bats; (3) conduct surveys for Price's potato-bean prior to timber harvests near an extant population at Skyline WMA; (4) manage about 357 acres of permanent openings to enhance wildlife habitat and hunting opportunities; (5) maintain property boundaries, gates, and roads; and (6) continue to maintain two pollinator plots at Little Fox Creek Recreation Area on Harris Lake. The proposed WMP would continue many of the existing timber management methods, which would maintain the existing forest types at Harris Lake and Skyline WMA, as described in Appendix F, *Terrestrial Resources*, and the draft WMP. In addition, continued use of Alabama's forestry BMPs would minimize disturbances to soils and riparian vegetation, which would ensure the long-term health and sustainability of the forests, while also protecting riparian habitat for wildlife species, such as bats that inhabit or forage in these areas, as well as water quality. Special status bat species would benefit from Alabama Power's proposal to consult with FWS to develop additional measures to minimize the effects of timber management on suitable summer and winter habitats within the project boundary. Such measures may include pre-harvest bat surveys, retaining trees with potential roost tree characteristics (e.g., exfoliating bark, cracks, crevices, or hollows), maintaining forested buffers around known hibernacula, summer roosting caves, and maternity roost trees, and seasonal restrictions for tree harvests/removal to protect bats during the pup season and winter torpor (state of lower body temperature and metabolic activity). WMP provisions to protect federally listed and proposed species are discussed further in Appendix D, *Biological Assessment*.

Alabama Power's WMP would maintain the existing permanent openings and access points on project land at Harris Lake and Skyline WMA. The openings at Harris Lake include 10 acres of food plots planted annually with a wildlife mix (e.g., cool season grains), and 95 acres that are mowed once annually to maintain early-successional habitats. On about 42 acres at Skyline WMA, Alabama DCNR generally plants cool season grains and/or perennial legumes, or disks annually to maintain openings/food plots for wildlife. Another 210 acres native grass stands, early-successional fields, and other openings at Skyline WMA are maintained by mowing, disking, or prescribed burns. In expansive forested landscapes, managed openings and edge habitats can foster diversity by providing early-successional plant communities that often serve as a valuable source of food and cover for wildlife, including browse for deer and wild turkey and brood habitat for forest birds. Maintaining property boundaries, gates, and roads would indirectly protect vegetation and wildlife from disturbances by controlling access to, and deterring unauthorized uses of, project land at Harris Lake and Skyline WMA.

The draft WMP does not include provisions to maintain the wildlife nesting boxes that Alabama Power installed at Harris Lake under the existing WMP. These structures were used by wood ducks after they were installed as a mitigative measure for lost habitat associated with the initial impoundment of Harris Lake. Since that time, wood ducks inhabiting the area have had time to adapt to conditions at the project, including existing human presence, activities, and project facilities at Harris Lake.

Maintaining the two pollinator plots at Little Fox Creek with native herbaceous plants, including milkweed species would provide forage and cover habitats for the monarch butterfly and other pollinators such as bees, moths, and beetles. Alabama Power's proposed Nuisance Aquatic Vegetation and Vector Control Program (Alabama Power 2021e), discussed in section 3.3.2.2., *Water and Aquatic Resources*, *Environmental Effects*, contains provisions to use herbicides, algaecides, and larvicides to treat nuisance aquatic vegetation and mosquitos if they create a public health hazard, affect power generation facilities, restrict recreational use, and/or pose a threat to the ecological balance of Harris Lake. The effects of these treatments would be limited to small areas and targeted on nuisance aquatic plants and/or mosquitos because there are typically only a few locations that are treated each year; only EPA-approved aquatic herbicides and algaecides are applied by Alabama Power's certified commercial aquatic applicators; and the proposed larvicides are granular/briquette in form, applied by hand into the water in mosquito breeding areas documented through Alabama Power's monitoring. However, Alabama Power applies the aquatic herbicide and algaecide via boat- and truck-mounted equipment, or hand equipment. Also, although three of the four proposed larvicides are bacterial insecticide that are safe for pollinators (Chandler, 2018), methoprene is a hormone that can prevent normal growth and development of insects, including some pollinators (Wick et al., 2012). As a precaution, to protect the native wildflowers as well as native pollinators, the WMP could include a provision to ensure that herbicides and larvicides used to control nuisance aquatic vegetation and mosquitos would not be applied near the pollinator plots. The monarch butterfly is discussed further in Appendix D of this document.

Shoreline Management Plan

Alabama Power's draft SMP also contains management practices that would protect and enhance terrestrial resources on the 367 miles of shoreline within the project boundary at Harris Lake. The SMP includes provisions to: (1) continue implementing a shoreline classification system to guide management and permitting activities (Appendices C and D of the SMP); (2) incorporate Alabama Power's proposed changes in land use classifications, including reclassifying the botanical area at Flat Rock Park from Recreation to Natural/Undeveloped; (3) maintain a scenic easement to protect scenic and environmental values; (4) designate "sensitive resources" in conjunction with shoreline classifications at Harris Lake to protect and enhance wetlands, threatened and endangered species, and cultural resources; (5) encourage the use of alternative bank stabilization techniques other than seawalls; (6) continue to implement shoreline compliance and permitting programs, and the Dredge Permit Program (Appendix A of the SMP); and (7) promote shoreline BMPs, such as methods to maintain vegetated shorelines (Appendix E of the SMP).

In the draft SMP, Alabama Power proposes to modify the existing definition for the Natural/Undeveloped classification so that it would include project lands that would remain undeveloped to: (1) protect environmentally sensitive areas; (2) preserve natural aesthetic qualities; (3) provide buffer zones around public recreation areas; and (4) prevent overcrowding of partially developed shorelines. This classification, under the new definition, would assist Alabama Power in protecting environmentally sensitive areas and preserving vegetative buffer zones at Harris Lake. Limiting development on natural, undeveloped lands would protect terrestrial resources along the shoreline, enhance food and cover availability for wildlife species, and provide travel corridors to adjacent habitats. These nearshore environments also provide important breeding and nursery areas for amphibians, as well as foraging and cover for river otters, beavers, and waterfowl.

Alabama Power's proposal to reclassify 57-acres[62] of project land (Blake's Ferry Pluton) adjacent to Flat Rock Park from "Recreational" to "Natural/Undeveloped" would provide the rare plant community at this location protection from development. However, as indicated in the consultation record, stakeholders notified Alabama Power in March 2020 of trespassing vehicles and all-terrain vehicles (ATV) over the rare plant communities in this area. During the pre-filing phase of the relicensing process, Alabama Power installed signage and a barrier to prevent ATV traffic (figure 3.3.3-36). To ensure long-term protection of the rare plant community, the SMP could include provisions to periodically monitor the area for evidence of unauthorized uses (e.g., tire track marks on vegetation and rock outcrops), maintain the new signs and barrier, and consult with Alabama DCNR to develop and recommend additional measures for Commission approval, if needed, to protect the rare plants from project-related recreation activities.

Under the SMP, Alabama Power would also continue to maintain a scenic easement to protect scenic and environmental values along the shorelines of Harris Lake. This classification includes lands located between the 795-feet contour and the 800-feet contour. No construction and/or related activity may take place within Alabama Power's scenic easement lands without prior written authorization. Certain activities are not permitted within Alabama Power's scenic easement lands, including (but not limited to) changing the contour of the land; laying/seeding any sod, grass, and/or garden; constructing habitable structures, fences, or wells; 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 that is more than 4 feet tall. Continuing to maintain this scenic easement would protect terrestrial resources on the shorelines of Harris Lake.

The SMP would facilitate Alabama Power's efforts to encourage landowners to implement BMPs to maintain and preserve naturally vegetated shorelines at Harris Lake. For example, the SMP encourages landowners to plant native trees, shrubs, and herbaceous species in landscaped areas and gardens and to preserve or establish a vegetated riparian buffer of at least 15 feet measured horizontally from the full pool elevation. Native vegetation would increase the habitat value for native wildlife by providing additional cover and forage. Also, promoting the use of riprap, bioengineering techniques, natural vegetation with riprap, and gabions (i.e., instead of seawalls) would benefit terrestrial resources by maintaining stable shorelines while also providing niches for native plants and wildlife and minimizing adverse effects on water quality in Harris Lake.

Alabama Power's Dredge Permit Program, developed in consultation with the Corps and other agencies, establishes the procedures dredging activities up to 500 cubic yards of material (below the full pool elevation). This program includes requirements that spoil sites: (1) are approved by Alabama Power; (2) are located in a confined upland area so that sediment does not re-enter the waterway or interfere with natural drainage; and (3) are not located in areas identified as potentially environmentally sensitive, adjacent waters, bottomland

[62] The 57 acres described in this section includes the two areas surveyed for rare plants (20-acre and 35-acre parcels) and the area within the project boundary below 800 ft.

hardwoods, or wetlands. Continuing to implement these provisions of the Dredge Permit Program would help protect terrestrial resources at Harris Lake.

Avian Protection Plan

Powerline interactions can cause bird injuries/mortalities that can result in power outages and fires. Alabama Power proposes to implement its company-wide APP to manage and minimize potentially harmful or fatal avian interactions with power lines, transmission towers, or other Alabama Power structures. Implementing the APP at the Harris Project would benefit resident and migratory birds because it would require Alabama to follow guidelines set forth in peer-recognized industry and/or resource agency publications (e.g., Avian Power Line Interaction Committee [APLIC] guidance documents) during transmission line O&M activities (APLIC 2006; 2012). Alabama Power's APP includes provisions to: (1) comply with avian protection laws; (2) use avian-friendly alternatives for construction standards and procedures, as applicable; (3) provide training for Alabama Power employees; (4) report avian encounters and nest management activities; (5) incorporate revisions of BMPs to enhance avian protection, where appropriate; and (6) facilitate cooperative protection efforts with resource agencies and other stakeholders.

Effects of Recreation on Vegetation and Wildlife

Construction, maintenance, and use of recreation sites can cause disturbances to vegetation and wildlife. Alabama Power proposes to finalize and implement a Recreation Plan at Harris Lake, with provisions to: (1) continue to operate and maintain 11 existing project recreation sites; (2) construct and maintain a new recreation site to include a day use park for swimming, picnicking, and boating; (3) construct and maintain a canoe/kayak access area at the existing Harris Tailrace Fishing Pier downstream from Harris Dam within the project boundary; and (4) implement BMPs to minimize soil erosion and sedimentation during recreation site construction. In addition, Alabama Power's proposed WMP includes provisions to continue to maintain two existing campsites, as well as hunting opportunities project land at Skyline WMA.

Alabama DCNR recommends the construction and maintenance of a new day use park at Harris Lake that would accommodate 100 or more truck/trailers, a canoe/kayak access downstream from Harris Dam, and additional fishing opportunities (i.e., fishing piers or wharf style piers) on Harris Lake and in the tailrace. Alabama DCNR also recommends that Alabama Power develop and implement a public education outreach plan to ensure that recreational opportunities, as well as SMPs, invasive species management plans, and habitat restoration plans, are distributed to stakeholders on a regular basis. Alabama Rivers Alliance also recommends the proposed new recreation sites.

Our Analysis

Harris Lake and the Tallapoosa River Downstream from Harris Dam

Construction of a new day use park on Harris Lake and a canoe/kayak access downstream from Harris Dam would require clearing of vegetation and other land disturbing activities that could adversely affect terrestrial resources. Based on the description and figure showing the conceptual design of the proposed Highway 48 Day Use Park in the draft Recreation Plan, construction of one parking area for 60 single vehicles and another parking area for 100 trailers would require the permanent removal of about 0.5 acres and 1.6 acres, respectively, of currently forested habitat. Another 1.6 acres would be permanently removed to install about 0.4-miles of new road segments to provide access to these parking areas, as well as a proposed boat launch and launching pier. An additional 2.4 acres of forested area would be temporarily disturbed during the construction of amenities associated with the proposed picnic and swimming areas.[63] Construction of a canoe/kayak access downstream from Harris Dam would involve very little vegetation removal because it overlaps with the existing access point for tailrace fishing, where only small areas of mowed grass and other herbaceous vegetation currently occur.

Although vegetation clearing would be limited in area and provisions in the Recreation Plan for applying soil erosion and sedimentation control BMPs would minimize the temporary effects of construction, the Recreation Plan does not include provisions to address the temporary disturbance or permanent loss of forested habitat and wildlife, including special status species. To avoid or minimize adverse effects of construction on vegetation and wildlife, the WMP and Recreation Plan, as appropriate, could include provisions to: (1) conduct preconstruction surveys for rare, threatened, and endangered species and other sensitive resources; (2) consult with FWS and Alabama DCNR regarding preconstruction survey results and develop and recommend measures, for Commission approval, if needed to minimize effects to terrestrial resources; (3) implement seasonal restrictions on tree removal/trimming activities to protect special status bat species; (4) avoid disturbances to wetlands, riparian buffer areas, streams and stream crossings during construction; and (5) develop and post recreation signage to identify authorized uses of the sites and to protect any sensitive resources.

Increased foot traffic resulting from additional access could also cause disturbances to vegetation and wildlife. However, disturbances to terrestrial resources associated with some recreation activities (e.g., swimming, picnicking) would be temporary (i.e., mostly during the daytime and warmest months), and limited to a small area on and adjacent to the shoreline and an existing recreation area adjacent to the project tailrace. Posting signage, as described above would deter unauthorized uses of the new project recreation sites/amenities which would help prevent damage to plants and wildlife, including special status species. A public education outreach plan, as recommended by Alabama DCNR, could further enhance efforts to increase public awareness of PM&E measures to protect terrestrial resources.

Skyline WMA

Under Alabama Power's WMP, Alabama DCNR would continue to manage lands to enhance and protect wildlife, provide hunting opportunities, and maintain the two existing campsites on project lands at Skyline WMA. Implementing the WMP would maintain the existing recreation areas and activities which provide many benefits to vegetation and wildlife, as described above. Disturbances to terrestrial resources associated with ongoing recreation use at Skyline WMA are expected to be minor, contained to small areas, and temporary,

[63] Commission staff estimated the areas of disturbance using Alabama Power's concept design for the day use park in the draft Recreation Plan and geographic information system (GIS) data that Alabama Power filed on June 15, 2024. Staff assumes roughly a 30-foot-wide road right-of-way to accommodate car and boat/trailer traffic.

consistent with the existing camping and hunting seasons. Potential effects of project recreation on federally listed species at Skyline WMA is discussed further in Appendix D.

3.3.4 Threatened and Endangered Species

A *Biological Assessment* of the effects of project operation, maintenance, construction, and project-related recreation on federally listed threatened and endangered species is presented as Appendix D of this EIS.

3.3.5 Recreation Resources

3.3.5.1 Affected Environment

The affected environment is provided in Appendix F to this EIS.

3.3.5.2 Environmental Effects

The following section describes the effects of Alabama Power's proposed measures, agency preliminary terms and conditions, and recommendations from agencies and other entities that are intended to address recreation-related project effects. We also analyze the effects of measures that are intended to address project effects on other resources, but that also may affect recreation resources.

Recreation Plan

Alabama Power proposes to finalize a Recreation Plan that includes measures to address existing and future recreation resource needs within the project boundary, including final schedule for improvement implementation. The draft Recreation Plan was developed in consultation with state and federal agency staff and interested stakeholders. The draft plan, as filed with the license application, includes:

- A description and as-built drawings of all existing project recreation facilities (all amenities and associated infrastructure).
- A description of, and conceptual drawings and specifications for, a new day use park on Harris Lake and a canoe/kayak put-in at the Harris tailrace, as discussed below in *Recreation Facility Improvements and Maintenance*.
- A provision to operate and maintain the existing project recreation sites that includes: (a) the hours of operation; (b) signs at each project recreation site, as specified in 18 C.F.R. section 8.2 of the Commission's regulations; and (c) trash removal.
- A description of soil erosion and sediment control measures to be used where ground-disturbing activities are proposed, including bioengineering techniques to stabilize the shoreline.
- A discussion of how the needs of the disabled would be considered in the planning and design of the recreation facilities; and
- A proposed process for updating the Recreation Plan, including provisions for reporting recommendations to FERC.

Alabama Power also proposes to assess the viability of existing sites for site decommissioning, or for site enhancement, to meet the future recreation use and needs within the project area and minimize adverse, recreation-related project effects. If decommissioning is needed, it would be done in compliance with license requirements, include stakeholder consultation, and allow for Commission prior approval.

Alabama Power proposes to monitor use of project recreation sites every 10 years after Commission approval of the final Recreation Plan. Monitoring would include conducting use counts at the project recreation sites using an appropriate methodology, such as trail cameras, spot counts, drone/aerial counts, or other readily available, cost-effective technology. Monitoring information, along with any proposed revisions to the Recreation Plan, would be distributed to consulting stakeholders for review and filed for Commission approval by January 31 every 10 years over the term of the new license.

Alabama Power proposes to remove Wedowee Marine South as a project recreation site and reclassify the shoreline at Wedowee Marine South from Recreation to Commercial Recreation, as described in section 3.3.6, *Land Use and Aesthetics.*

Alabama DCNR recommends development of a public education outreach plan in consultation with resource agencies and with Commission approval, to ensure that important information from the shoreline management, invasive species management, and habitat restoration plans, as well as information about recreational opportunities, is adequately distributed to stakeholders on a regular basis.

Our Analysis

Alabama Power's proposed Recreation Plan for the Harris Project would provide a framework for enhancing recreational facilities, coordinating management of recreational facilities within the project boundary and monitoring recreational use and needs over the term of any new license. Alabama Power proposes to remove Wedowee Marine South as a project recreation site, but the site would remain available for recreation use by visitors as it has in the past. Therefore, recreation capacity would not be affected by the change. The site is owned by Alabama Power and commercially managed and would be permitted and managed consistent with other non-project uses on project lands, including other commercial marinas on Harris Lake, as described in the SMP.

Implementation of public education and outreach activities, as recommended by Alabama DCNR, as discussed further in section 3.3.6.2, *Land Use and Aesthetics*, would help to inform the public about the project, current issues, BMPs, recreational opportunities and upgrades, water level information, and serve as a means of communication with surrounding landowners and other interest stakeholders. BMPs may include practices to preserve cultural and natural resources, and can encourage preservation of naturally vegetated shorelines to improve water quality and control soil erosion and sedimentation.

Recreation Facility Improvements and Maintenance

Alabama Power proposes, as part of the Recreation Plan to: (1) check public safety signs at project recreation sites monthly and maintain or replace as needed, (2) construct new facilities and amenities to comply with current Americans with Disabilities Act (ADA) standards, (3) obtain proper permits and employ BMPs during land disturbing activities as part of recreation facility improvements and maintenance; (4) collaboratively with Alabama DCNR, continue to implement a "Carry in Carry out" policy at most access sites, including the message on signs, and (5) maintain project recreation sites according to Alabama Power's General Guidelines for Operations & Maintenance of Developed Project Recreation Sites[64] as may be periodically updated. In addition to assessing Commission-required signage, monthly site inspections would include addressing maintenance issues, site vandalism, litter, and vegetation management.

Alabama Power also proposes to construct the following new project recreation facilities over the next license term to meet projected recreation demand:

- **Harris Tailrace Fishing Area**: Alabama Power proposes to improve the Harris Tailrace Fishing Area to include a barrier-free canoe/kayak put-in, including a barrier-free path from the existing parking area to the canoe/kayak put-in. Alabama Power proposes to complete this improvement within two years following installation and performance testing of the proposed minimum flow unit. Figure 3.3.5-3 provides the conceptual design for this fishing area.
- **Highway 48 Day Use Park**: Alabama Power proposes to design and construct a barrier-free day use area that would include a parking area for approximately 100 trailers, boat launch, and launching pier. In addition, the site would include a separate parking area for approximately 60 single car parking spaces, a restroom, picnic area, bank fishing, and swim area. Alabama Power proposes to complete the day use park within five years of Commission approval of the Recreation Plan. Figure 3.3.5-4 provides the conceptual design for this park.

Alabama DCNR supports Alabama Power's proposal to provide canoe/kayak access downstream from Harris Dam and designate Highway 48 Day Use Park for additional recreation uses like swimming, picnicking, and boating. Alabama DCNR states that a larger, more modern boating access facility that can accommodate 100 or more truck/trailer rigs is needed on Harris Lake. In addition, Alabama DCNR recommends that Alabama Power provide additional bank fishing opportunities on Harris Lake and in the tailrace. Alabama Power states that building fishing or wharf style piers, particularly in areas near fish habitat improvement projects, would increase angling opportunities.

Alabama DCNR continues to recommend that Alabama Power pursue strategies to provide public access on the Tallapoosa River near the towns of Malone and Wadley. Alabama DCNR anticipates that public access at these sites would greatly improve recreation activities, including fishing opportunities. Alabama DCNR states that if continuous minimum flows are implemented at Harris Dam, recreational use at these locations has the potential to increase, and further recommends consultation regarding site selection and design of future public access sites.

Alabama Rivers Alliance supports Alabama Power's proposal to add a canoe/kayak launch below Harris Dam and improve recreation on Harris Lake. Alabama Rivers Alliance also encourages Alabama Power to pursue ways to create additional public access points in the

[64] See Appendix A of Alabama Power's proposed Recreation Plan filed on June 15, 2022.

reach from Harris Dam to Horseshoe Bend and acknowledges support of any efforts by licensee including off-license efforts.

Park Service supports the proposal for tailrace access, however, recommends that the licensee include provisions for the development of additional river access, in partnership with willing landowners and government entities, to improve safe recreational access on the entire reach downstream from Harris Dam. Park Service also notes the 10-mile gap without public river access between Horseshoe Bend and Germany's Ferry and encourages collaboration and partnerships to improve river access below Harris Dam.

In addition, at least ten other stakeholders including the Randolph County sheriff, the mayor of Waverly, a representative of the Randolph County Commission, and additional members of the public filed comments regarding the need for additional public access downstream from Harris Dam.

Our Analysis

Alabama Power's proposed improvements and maintenance would help ensure current user needs, including accessibility, are addressed. Maintaining and updating signs at recreation sites would help ensure public safety and provide information to visitors to the recreation site about BMPs, litter and waste management policies, areas of closure, allowable activities, and areas needing protection for natural or cultural resource values. As discussed in section 3.3.3, *Terrestrial Resources*, signs and barriers were installed to prohibit access to an area with rare plants near Flat Rock Park. Including provisions to routinely monitor this area for evidence of unauthorized use, maintain signs and barriers to strictly prohibit ATV and mountain bike use in protected areas, and consultation with Alabama DCNR to develop additional plant protection measures, if needed, as discussed in section 3.3.3, *Terrestrial Resources*, would further preserve these protected plant communities, while continuing to allow nearby recreation.

As described in table 3.3.5-2, recreation use capacity increased at several of the sites between 2014 and 2019. Alabama Power further estimates that future recreation use changes would depend on population increases or decreases in the counties from which most recreation users originate. By 2040, the Highway 48 Bridge is estimated to be near or over capacity (table 3.3.5-3). Alabama Power's proposal to develop a day use site at Highway 48 Bridge would increase parking from 30 spaces to about 150 spaces and provide new recreational features including a swimming area, boat launch, boat launch pier, and fishing piers. These additions, consistent with Alabama DCNR recommendations, would be completed within five years of Recreation Plan approval. Providing recreation facilities with sufficient capacity for future recreational use is necessary to ensure adequate and safe access to project land and water. Alabama Power's proposal to improve barrier-free access at recreation sites including the Harris Tailrace Fishing Area with a barrier-free canoe/kayak launch would also expand accessibility to additional visitors and is supported by Alabama DCNR.

Alabama Power's proposals to improve recreation sites has been supported by many agency and stakeholder comments. However, most of the interested stakeholders (e.g., Alabama DCNR, Alabama Rivers Alliance, Park Service, and members of the public) have commented recommending additional public access downstream from Harris Dam.

Consistent with the Commission's policy on recreation facilities at licensed projects[65], Alabama Power is required to make project lands and water available for public recreation, however these access points are located outside the project boundary on privately owned lands, therefore Alabama Power would not be required to create or maintain access points along the river on private property, unless there is clear project nexus. Currently it is unclear how the project and changes in operation would affect recreation, specifically river access downstream. However, Commission regulations also require licensees to develop suitable recreation facilities, provide adequate public access, and determine public recreation needs in cooperation with appropriate local, state, and federal agencies and other interested entities. Therefore, while, Alabama Power has not currently proposed any additional public access downstream, continued monitoring, reporting, consultation with agencies and stakeholders, and periodic updates would help to collaboratively address issues, changes in recreation use, needs, and allow for future upgrades, improvements, and modifications. This would also allow for assessing changes in use downstream from Harris Dam as recreationists adapt to altered flow releases and the effects on recreation use and capacity at river access points are observed. Alabama Power's proposal to monitor recreation use every 10 years would identify whether use exceeds capacity at any recreation sites and would trigger updating the Recreation Plan to accommodate such changes.

Effects of Project Operations on Recreation

Harris Lake

Changes in project operation and reservoir elevation could affect boating and shoreline recreational access to the reservoirs and reduce the quality of the experience. 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 described in section 2.1.3, *Existing Project Operation*. Alabama Power also proposes to install a minimum flow turbine to provide a continuous release of approximately 300 cfs to the Tallapoosa River downstream from Harris Dam in lieu of Green Plan pulsed releases.

No state or federal agencies recommend a change to the operations at Harris Lake. Several local stakeholders, however, request that Alabama Power increase the winter reservoir levels to enhance recreational opportunities.

Several stakeholders, including Alabama DCNR and Alabama Rivers Alliance, recommended increased minimum flow releases or requested the evaluation of multiple downstream release alternatives which could result in lower winter reservoir levels. Alabama DCNR specifically recommends aquatic habitat continuous minimum flow of (1) 760 cfs from January-April; (2) 510 cfs May-June; (3) 390 cfs from July-November; and (4) 510 cfs in December. Alabama Rivers Alliance recommends developing a means to release an additional 100 – 150 cfs in addition to Alabama Power's proposed 300 cfs release from a continuous minimum flow turbine, for a total continuous minimum release of 400–450 cfs.

[65] See 18 CFR §2.7

Our Analysis

Alabama Power proposes to continue operating the Harris Project during daily peak-load periods according to the existing operating curve as described in section 2.1.3, *Existing Project Operation*. To address stakeholder recommendations for an increased winter pool elevation, Alabama Power found in the Operating Curve Change Feasibility Analysis Study that modifying the existing operating curve to increase reservoir levels during winter would increase water depths at boat ramps, and private facilities around the lake. However, this change would also increase the potential for downstream flooding and negatively affect other stakeholders downstream, as discussed in section 3.3.2, *Water and Aquatic Resources, Water Quantity, Tallapoosa River Downstream from Harris Dam*. According to modeling performed by Alabama Power (Alabama Power and Kleinschmidt, 2022c), while an increase in the winter pool elevation by 1 foot, to an elevation of 786 feet, would not inundate additional downstream structures, each 1-foot increase in the winter pool elevation above 786 feet would increase flooding downstream. An increased winter reservoir level also decreases the ability of Harris Lake to moderate high-flow events. Alabama Power concluded that any operations that increase the reservoir elevation beyond 786 feet, may improve winter use of public boat ramps and private facilities on Harris Lake, but the increase would adversely affect landowners and increase flooding downstream on the Tallapoosa River below Harris Dam.

In the June 2022 Downstream Release Alternatives Phase 2 Report, Alabama Power addressed stakeholder recommendations for evaluation of alternative downstream releases. Alabama Power found that the pre-Green Plan; 150 cfs, 300 cfs, 350 cfs, 400 cfs, or 450 cfs continuous minimum flow; or the 150 cfs continuous minimum flow+Green Plan downstream release alternatives would have minimal effects on recreation compared to existing conditions at Harris Lake. For this reason, continuous minimum flow releases of 450 cfs or less, as recommended by Alabama Rivers Alliance, would also be expected to have a minimal effect on recreation resources on Harris Lake. However, per study results, implementation of the higher continuous minimum flows of 600 cfs, 800 cfs, as recommended by Alabama DCNR or operation alternatives that include 300 cfs+Green Plan, 600 cfs+ Green Plan, 800 cfs+Green Plan would decrease lake levels which would negatively affect boat ramp access as well as access to private facilities on Harris Lake.

Any operations or changes in flows that would lower the reservoir elevation beyond existing operating conditions, specifically operations lowering the winter reservoir elevation below 785 feet, would be noticeable and negatively affect visitors recreating on the lake, specifically for boat launch access, and access to private facilities on the lake. Four public boat ramps are considered accessible at the current winter reservoir elevation of 785 feet. A decrease in the winter pool elevation of just 6 inches would put the reservoir elevation at a level at which all of the public boat ramps would have less than 4.5 feet of water at the bottom edge of the ramp and be considered unusable, which would negatively affect visitors trying to launch boats in the winter season. Some boats and visitors may still be able to use certain boat ramps depending on the size and type of boat however launching would become more difficult as water levels decrease. A lower winter pool elevation would also limit usability of private facilities on the lake. As detailed in the Downstream Release Alternatives Report (Alabama Power and Kleinschmidt, 2022a) about 94% of private facilities (boathouses, floats, piers, wet slips, and boardwalks) are usable at 792 feet reservoir elevation, about 74% of are usable at an elevation of 790 feet but at 788 feet nearly 50% of all private facilities on Harris Lake are unusable. Specifically, only 449 structures total are usable at the current winter elevation of 785 feet, 311 are usable at 784 feet and the numbers of usable private structures continues to decrease with decreased reservoir elevation.

Based on study results and HEC-RAS modeling (figures 3.3.2-50 to 3.3.2-55), it is expected Alabama DCNR's proposed seasonal continuous minimum flows at Wadley gage would lower Harris Lake below elevations under the current operating curve, however the extent of the decrease in elevation is dependent on which operating regime and which continuous minimum flow release alternative is analyzed. Generally, as continuous minimum flow amounts increase, the reservoir elevation decreases. Given highest use of the reservoir occurs in warmer months, it would be expected that lower reservoir levels would negatively affect more visitors to the reservoir, however depending on the extent of the change in reservoir elevation, lower reservoir elevations in winter months would also negatively affect visitors to the lake and private facilities on the lake. These low winter elevations would make the reservoir difficult to navigate or access overall which would create additional public safety concerns.

Tallapoosa River Downstream from Harris Dam

Alabama Power proposes to continue operating the Harris Project during daily peak-load periods to maintain reservoir levels and proposes to provide a continuous minimum flow of 300 cfs in the Tallapoosa River immediately downstream from Harris Dam.

Alabama DCNR recommends that Alabama Power provide public access downstream on the Tallapoosa River near Malone and Wadley, and states that continuous minimum flows have the potential to increase recreational use at these locations, and further recommends continued consultation regarding site selection and design of future public access sites. Alabama DCNR also recommends seasonal continuous minimum flows at the Wadley gage including: (1) 760 cfs from January 1 through April 30; (2) 510 cfs from May 1 through June 30; (3) 390 cfs from July 1 through November 30; and (4) 510 cfs from December 1 through December 31 for the benefit of aquatic habitat.

Alabama Rivers Alliance recommends releasing an additional 100–150 cfs beyond the Alabama Power's proposed 300 cfs release from a continuous minimum flow turbine, for a total continuous minimum release of 400–450 cfs.

Several stakeholders request evaluation of multiple downstream release alternatives, as described in section 3.3.2.2, *Water Quantity*.

Our Analysis

Alabama Power's proposal to continue regular peaking operations would continue to cause water level fluctuations, which is discussed in *Public Safety Downstream* below, however Alabama Power's proposal for adding continuous minimum flows would be expected to decrease the size of these fluctuations compared to existing conditions. The HEC-RAS model evaluated daily average water surface fluctuations for a range of continuous minimum flow releases and showed that river fluctuations decrease with increasing continuous minimum flows (table 3.3.1-3) compared to existing conditions. For example, 0.2 miles downstream from the dam, the daily average water surface elevation fluctuation would be expected to decrease from 4.62 feet under baseline Green Plan operations to 3.59 feet with a 300-cfs release, 3.29 feet with a 400-cfs release, 2.84 feet with a 600-cfs release, and 2.50 feet with an 800-cfs release. The improvement would be most noticeable close to the dam and lessening as the release flows downstream.

Continuous minimum flow releases would have a beneficial effect on downstream recreation by increasing water depth in the Tallapoosa River downstream from Harris Dam, which improves navigability and increases the number of boatable days (table 3.3.5-4). Alabama Power conducted a Downstream Release Alternatives Report (Alabama Power and Kleinschmidt, 2022a) that examined the effects of continuous minimum flows, and alternative downstream releases. In the report, boatable days were defined as any day when flows measured at the Wadley gage were between 450 cfs and 2,000 cfs between sunrise and sunset. Any days with flows less than 450 cfs or above 2,000 cfs were not considered boatable based on Alabama DCNR personnel angling diaries, however, in surveys most recreation users found all water levels acceptable (river flows ranging from 499 to 6,110 cfs), and recreation did not appear to be affected by flow.

Alabama Power found that all alternatives for operation with the addition of continuous minimum flows including the proposed 300 cfs up to a continuous minimum flow of 800 cfs, added depth to the river which would be expected to continue benefiting recreation downstream by increasing the number of boatable days annually. Alabama Power also found that spring and fall have the most variation in number of boatable days with the most annual boatable days occurring with the 300 cfs continuous minimum flow+Green Plan alternative. The pulses of water associated with the Green Plan alone, does not increase river depth enough to improve boating, however these water fluctuations can be unpredictable below the dam. Alabama Power's proposal to continue regular peaking operations plus the continuous minimum flow of 300 cfs, without the Green Plan pulses, would lessen the fluctuations in the river compared to existing operations. This would allow for more predictable water levels downstream, which would likely create a safer recreational experience, as discussed below in *Public Safety Downstream*.

Alabama DCNR comments that increased flows would improve navigability and could increase recreation, therefore recreation use studies may be needed after the introduction of these continuous minimum flows. Future consultation between Alabama Power and the agencies on any new minimum flow releases, as part of the recreation plan, would allow for a coordinated review of such changes in recreation use, as well as implementation of future improvements to recreation sites as necessary.

Public Safety Downstream

Fluctuating flows, associated with peaking operations, and increased flows in the Tallapoosa River downstream from Harris Dam have historically affected visitor safety and could continue to affect the safety of recreational visitors in this area. To address safety concerns related to downstream releases expressed by many stakeholders, Alabama Power proposes to continue peaking operations with the addition of a continuous minimum flow release, and provide real-time flow gaging information for the Tallapoosa River downstream from Harris Dam.

Alabama Rivers Alliance argues for improving the Public Safety Plan by having Alabama Power notify people of releases by as many methods as possible. Alabama Rivers Alliance recommends updates to the Alabama Power's SmartLakes application so that users can opt-in to receive push notifications or email/text alerts about real-time generation releases and flood control procedures. Alabama Rivers Alliance also recommends that while upgrading the Harris Tailrace Fishing Area, Alabama Power add a digital sign near the new canoe/kayak launch to give real-time release notifications for any hearing-disabled recreationists who may not be alerted by the existing sirens.

Stakeholders have submitted public safety-related comments in the relicensing docket including recommendations for: (1) run-of-river operation or reduced peaking to protect recreationists using or standing in the river, (2) new access points to the river downstream, in part, for rescue purposes, and (3) improvements to the licensee's website and other public notification systems that provide flow-related information.

Our Analysis

Peaking operations cause water fluctuations in the river downstream from Harris Dam which make the river flows less predictable, increasing potential public safety issues that would negatively affect boaters and other visitors in the river. As shown in table 3.3.1-3 the daily average water surface elevation fluctuation would decrease from 4.62 feet under baseline Green Plan operations (existing conditions) to 3.59 feet with a 300-cfs release at a location about 0.2 miles downstream from the dam, thereby lessening the flow fluctuation as present under existing conditions. Also, as these continuous minimum flow releases increase in volume, the fluctuations appear to decrease, therefore, the increased continuous minimum flows in the Tallapoosa River downstream, alone would not add to public safety concerns given that the proposed releases are designed to stabilize the river and provide less drastic fluctuations.

Stakeholders have expressed concerns regarding peaking related water level fluctuations on public safety for water-based recreation downstream from Harris Dam. However, the most recent Public Safety Plan was submitted on January 13, 2023, and remains acceptable. Installed safety measures include:

- Five LED warning lights on the upstream side of the dam,
- Four warning signs on the upstream side of the dam,
- Six warning signs on the downstream side of the dam,
- One audible siren to alert people of powerhouse or spillway discharges, and
- Multiple security devices.

The public safety measures described above and observed during the most recent dam safety inspection were in satisfactory condition and were located in accordance with the licensee's approved Public Safety Plan. All signage was well maintained and easily visible on the reservoir near the dam. Signage upstream and downstream near the project was clean, cleared of surrounding vegetation, and highly visible. The siren sounds 30 seconds before the units are loaded and begin discharging. The licensee briefly operated a unit during the inspection and the siren sounded before the unit started.

While public safety is typically handled by the Commission's Division of Dam Safety and Inspections (D2SI) independent of relicensing, there have been no public safety incidents at this project on record that warrant an immediate review of the above recommendations.[66] Because of this, and because some recommendations (e.g., run-of-river) could significantly affect a relicensing decision, we see no need to address the above recommendations at this time. Because public safety matters are typically handled by D2SI, these recommendations can be addressed in the relicensing docket with D2SI input. D2SI can always reconsider this matter, and review the recommendations immediately, should circumstances change.

Alabama Power's proposal to provide real-time flow gaging information for the Tallapoosa River downstream from Harris Dam would also minimize the effects of river fluctuations by giving residents and visitors the ability to see real-time data. Alabama Rivers Alliance's recommendation for providing accurate notifications via "as many methods as possible" would maximize the likelihood that residents and visitors are notified of flow changes or variations. However, the effectiveness, practicality, and complementary nature of the communication methods need to be considered. Multiple methods for visitors to gain real-time information would help if one communication system or another fails or provides inaccurate readings. Given the proposed upgrades to Harris Tailrace Fishing Area, it would also be beneficial to ensure the needs of the disabled are considered in the design and construction of this site and related safety measures.

Effects of Wildlife and Shoreline Management Plans

Alabama Power proposes, as part of the SMP, shoreline reclassifications and changes to the project boundary that could affect recreation resources.

Alabama Power proposes to finalize and implement a WMP, as described in greater detail in section 3.3.3, *Terrestrial Resources*, and includes specific timber and wildlife management actions and BMP's for management of Skyline WMA and lands around Harris Lake.

Our Analysis

Changes to the SMP classification would alter the type of recreation allowed in certain areas, however changes to the project boundary would add or remove lands to the project. These changes appear to be consistent with existing land uses, as described and examined further in section 3.3.6, *Land Use and Aesthetics*, below.

Alabama Power's proposed WMP would consolidate management activities into a single document to continue to promote ecological diversity, improve wildlife habitat, and provide hunting opportunities at Skyline WMA and around Harris Lake. The proposed WMP would improve hunting opportunities for disabled persons at Harris Lake by ensuring the maintenance of wildlife openings, providing accessible shooting houses, and maintaining roads to the shooting houses for accessibility. Although Alabama Power does not propose any specific measures to improve recreation downstream from Harris Dam as part of the WMP, Alabama Power would continue to incorporate Alabama Forestry Commission's BMPs for forestry which would limit erosion and sedimentation on the Tallapoosa River below the dam.

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[66] A flow-related downing occurred in early 2021 in the project's tailrace. However, the circumstances of this incident distinguish it from the above recommendations for run-of-river operation to protect recreationists many miles downstream.

Alabama Power's proposal for Alabama DCNR to continue to issue permits and determine regulations at Skyline WMA, as part of the WMP, would ensure hunting opportunities are operated and maintained for the long term of the license. Recreational opportunities like hiking, backpacking, primitive camping, wildlife viewing, and bank fishing would also be available at areas that are part of the WMP and are classified with SMP-associated hunting shoreline classification.

3.3.6 Land Use and Aesthetics

3.3.6.1 Affected Environment

The affected environment is provided in Appendix F to this EIS.

3.3.6.2 Environmental Effects

Shoreline Management Plan

Alabama Power proposes to finalize and implement the SMP (filed June 15, 2022) that addresses all shorelines within the project boundary, and guides the use, occupancy, and management of shoreline resources, and mechanisms for future updates and revisions to the plan. The SMP includes: (1) long-term shoreline management goals to provide guidance for existing and future management actions within the project boundary; (2) policies relative to activities that may affect shoreline management (e.g., dredging, bank stabilization, and channelization); (3) a shoreline classification system to protect natural resources and guide future shoreline management actions; (4) shoreline permitting guidelines; (5) BMPs; and (6) measures for an implementation plan and review cycle for the SMP.

The general goals of the SMP are to provide for reasonable public access, protect fish and wildlife habitat, protect cultural resources, protect operational needs, facilitate compliance with license articles, minimize adverse effects on water quality, minimize erosion, minimize adverse scenic effects, and guide shoreline development. Specific components of Alabama Power's proposed SMP are described in the following sections.

Shoreline Management Policies

The proposed SMP includes the following shoreline management policies:

Bank Stabilization – Alabama Power encourages the use of alternative bank stabilization techniques other than seawalls, including riprap, bioengineering techniques, natural vegetation with riprap, and gabions. Alabama Power proposes to require, as a condition of a permit, that any future seawall proposals include the placement of riprap for fish habitat and increased stability in front of the seawall. Only in very limited cases where Alabama Power determines that riprap would not be an effective source of bank stabilization, or would be not economically feasible, would seawalls without riprap be permitted.

Dredging – Alabama Power would allow dredging, consistent with the Corps' guidelines for navigable waters, except that dredging would be restricted in and around shoreline designated as sensitive resources to protect those sensitive resources. Requests for dredging would be considered on a case-by-case basis and must be approved by Alabama Power prior to the initiation of any dredging operations.

Channelization – Alabama Power would prohibit channelization on the reservoir, including channelization proposals by both private and commercial interests.

Water Withdrawals – Alabama Power would evaluate each water withdrawal application and seek Commission authorization to permit water withdrawals at Harris Lake if the water withdrawal is more than 1 mgd. In accordance with the provisions of its license, Alabama Power would charge reasonable compensation for water withdrawals based on the replacement cost of energy lost as a result of the withdrawal and the replacement cost of the storage in the reservoir allocated to the withdrawer and the withdrawer also must obtain property rights for its intake facility, if it is located on project lands that Alabama Power owns in fee. Adjacent single-family home uses, such as lawn/garden watering or other similar non-commercial uses would be excluded from this policy.

Causeways – Alabama Power would prohibit the creation of causeways on its reservoirs to connect islands to the mainland or to other islands to protect the integrity of the existing project features and shoreline, as well as fish habitat, navigation, and project operations. When Alabama Power receives an inquiry concerning the construction of a causeway, it would work with the property owner to investigate potential alternatives that may be acceptable to Alabama Power and the Commission.

Shoreline Classifications

As part of the development of the SMP, Alabama Power in consultation with stakeholders, developed a proposed shoreline classification system to guide future shoreline management and permitting activities within the project boundary. The proposed shoreline classifications include the following categories:

Project Operations – These are Alabama Power-owned project lands that are reserved for current and potential future operational activities such as hydroelectric generation, switchyards, transmission facilities, right-of-way areas, security lands, and other operational uses.

Recreation – These are project lands managed by Alabama Power for existing and/or potential future concentrated recreational activities. This includes land that is developed for commercial recreation with provisions for adequate public access, public recreation, open space, water access, and future recreational development. These lands typically are owned by Alabama Power but may be operated under a lease agreement with Alabama Power.

Commercial Recreation – These are project lands managed by Alabama Power for concessionaire-operated marinas and recreational areas that provide a wide variety of recreational services to the public on a fee basis. These uses are generally subject to approval by the Commission and would be permitted through Alabama Power’s permitting program.

Flood Storage – These lands are managed by Alabama Power to accommodate reasonable demands for public and private uses, while being reserved for flood storage as needed.

Scenic Buffer Zone/Easement – These are project lands located between the 795 feet contour and the 800 feet contour or 50 horizontal feet from 793 feet (full pool), whichever is less, but never less than to the 795 feet elevation and designated for the protection of scenic and environmental values. This classification restricts certain activities and requires permission from Alabama Power for any allowable activities.

Hunting – This classification includes lands that are managed to provide hunting opportunities in accordance with the WMP, however public access is allowed from May 1 until September 30 of each year for activities such as hiking, backpacking, camping, wildlife viewing, and bank fishing.

Natural/Undeveloped – These are project lands to remain in an undeveloped state for specific project purposes including to: protect environmentally sensitive areas, maintain natural aesthetic qualities, serve as buffer zones around public recreational areas, and provide a means for preventing overcrowding of partially developed shoreline areas. This classification allows for public hiking trails, nature studies, primitive camping, wildlife management (excluding hunting), and normal forestry management practices as defined in the WMP. These project lands are typically owned by Alabama Power and would continue to be managed for effective protection of associated resource values.

Alabama Power also designates some shoreline areas as "sensitive resources," which defines project lands that 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; wetlands; federally listed threatened and endangered species habitat protection areas; significant scenic areas; and other sensitive ecological areas. Table 3.3.6-2 summarizes Alabama Power's shoreline classifications by acres, shoreline miles, and miles designated as sensitive within each shoreline classification.

Shoreline Compliance and Permitting and BMPs

Alabama Power developed a permitting program, shoreline compliance plan, monitoring programs, education programs, preservation initiatives, and guidelines as part of managing the shoreline of Harris Lake. Alabama Power requires that permittees maintain a minimum of 15 feet of unmanaged vegetation that would serve as a shoreline buffer zone on Alabama Power-owned lands. Alabama Power also encourages the use of BMPs through a combination of public education and outreach efforts, as well as lake shore use permits. Alabama Power further encourages the use of alternative shoreline stabilization methods other than seawalls.

SMP Review and Update

Alabama Power proposes to review the SMP every 10 years, with input from interested parties. Alabama Power states that the review process would provide the means for the permitting program to change, if necessary, or for additional BMPs to be adopted or replaced as their effectiveness is tested. Alabama Power proposes to issue a report through various media outlets (e.g., the SMP website, the Shorelines newsletter) stating the number of permits it has processed on each shoreline classification type at Harris Lake. A public workshop would be advertised in various media formats (e.g., the SMP website, the Shorelines newsletter, and contact with homeowner associations) one month before it begins. In addition, Alabama Power proposes to host annual public education workshops to address SMP questions that come up outside of the 10-year review and update cycle.

Alabama DCNR supports development and implementation of the SMP, and recommends continued consultation with resource agencies during development of the SMP. Alabama DCNR also recommends: (1)(a) the use of riprap rather than seawalls, (b) that specific criteria be met before a new seawall is permitted, and (c) if seawalls are deemed necessary, the Corps' bulkhead guidelines be followed; (2) alternative bank stabilization techniques, other than seawalls, and reduction of seawall lengths or requiring mitigation for loss of shallow water aquatic species habitat; and (3) that proposed seawall projects should be evaluated on a case-by-case basis and permitted accordingly. Alabama DCNR also recommends the development and implementation of a public education and outreach plan to ensure that SMPs, as well as other plans are adequately distributed to stakeholders on a regular basis.

Our Analysis

Implementation of Alabama Power's proposed SMP would provide shoreline management guidelines, policies, and an overall framework for managing shorelines within the project boundary over the term of any new license. The SMP would help protect project shorelines, and associated recreational, scenic, and environmental values by encouraging the use of alternative bank stabilization techniques, such as riprap, bioengineering techniques, natural vegetation with riprap, and gabions; restricting dredging and other activities near sensitive resources areas; permitting allowable uses; and prohibiting channelization and the creation of causeways. The SMP shoreline classifications would provide a framework for specific shoreline management activities, permitting, and protection measures within designated areas around the reservoir. Special status species, as further discussed in section 3.3.3, *Terrestrial Resources*, and section 3.3.4, *Threatened and Endangered Species*, would be protected by the "sensitive resources" lands designation, as would archaeological resources, as discussed in section 3.3.7, *Cultural Resources.* The classification of Natural/Undeveloped lands would provide buffer zones around public recreation areas, preserve natural and aesthetic qualities of the shoreline, and protect environmental areas. The classification of Scenic Easement would further protect the vegetation on lands that previously would have been subject to future development. Both Natural/Undeveloped and Scenic Easement classifications would preserve the natural shoreline and maintain existing undeveloped land uses as well as the natural aesthetics.

Alabama Power's proposed changes to the existing shoreline permitting program would affect land use, management, and visual aesthetics in ways that would benefit the environment and help ensure that the natural resources are protected for the term of any new license. The shoreline permitting program would continue to provide consistency in facility development and methods for future shoreline management at the project. The shoreline compliance plan, incorporated as part of the SMP, would address encroachments and other related permit compliance issues on the lake, and be consistent with prior efforts to address compliance related matters. Alabama Power's proposal for permit requirements for shoreline stabilization appears to be consistent with Alabama DCNR's recommendation.

Alabama Power's proposed SMP review and update would provide the means to monitor shoreline use and management policies, as well as permitting and compliance. Consultation with interested parties, including federal agencies, such as the Corps and FWS, state regulators, interested non-governmental organizations, and concerned residents during this update and review process would help ensure that a wide range of perspectives are considered when addressing shoreline management issues over the term of any new license.

Alabama Power's SMP lacks detail about potential public education and outreach efforts. Developing a public education and outreach plan would help protect natural resources at Harris Lake by making the public aware of rules and opportunities for shoreline protection. Such a plan could include Alabama Power's existing educational brochures and public website, updated as needed, and the proposed regular educational opportunities (e.g., 10-year workshop to review and update the SMP, annual public education workshops) to share information about events and resource issues. The plan could also include provisions to: (1) share information about (a) the project's recreation opportunities and upgrades, including when the new proposed recreation sites/amenities become available (b) water levels in Harris Lake and the Tallapoosa River downstream from Harris Dam, (c) the new shoreline classifications, changes to land parcels in the project boundary, and the allowable activities in each area, (d) BMPs to protect natural resources from construction and maintenance activities (e.g., boat dock construction, shoreline stabilization, and vegetation management), (e) the procedures for permits to lease or occupy project lands and waters for purposes permitted by any license issued for the project, (f) license requirements for the enhancement of aquatic habitat, and management of invasive species, historic properties, and recreation at the project, as applicable; (2) file a schedule for distribution of the project information described in item 1 to stakeholders; and (3) review and update the plan every six years. An organized education and outreach effort with the provisions described above would also comport with Alabama DCNR's recommendation.

Project Boundary Revisions

Commission regulations require including within the project boundary only those lands necessary to operate and maintain the project and for other project purposes, such as recreation, or for the protection of environmental resources (18 C.F.R. 4.41[h][2]). Alabama Power proposes project boundary changes around Harris Lake to: (1) add land necessary for current and future O&M and recreation development; (2) remove land not required for O&M or any other project purpose; and (3) reduce the shoreline buffer where project infrastructure and recreation facilities are not located along the shoreline. Overall, Alabama Power's proposed changes would result in the removal of 286 acres and the addition of 504 acres to the Harris Lake portion of the project boundary for a net, total addition to the boundary of 218 acres. Further, a number of acres, as described in table 3.3.6-3 would be reclassified. Alabama Power is not proposing any changes to the project boundary or to land use classification at Skyline.[67]

Our Analysis

Alabama Power proposes to modify the project boundary to include only lands necessary for the operation or maintenance of the project. Areas that would be removed from the project boundary include land that Alabama Power states is: (1) not necessary for existing or proposed recreation features; (2) is not used to mitigate project effects; and (3) is not required for the operation or maintenance of the project. Land adjacent to the reservoir shorelines would be reduced to the 800 feet contour, unless additional land above the 800 feet contour is needed to enclose adjacent project features. Other reductions in the project boundary

[67] Except for modifications to the project boundary at Skyline as detailed and approved through other FERC filings. (*See* Accession No. 20241016-3075, Accession No. 20231211-5060, and Accession No. 20201223-5431).

would occur in upland areas away from the reservoir that are not being used for project facilities or recreation sites, but where timber harvests may occur as part of the existing 1989 Wildlife Mitigation Plan.

According to county parcel data, areas that would be added to the project boundary are owned by Alabama Power, and include lands needed to fully encompass recreation sites; including trails, campground facilities, roads, and O&M facilities within the project boundary to ensure that Alabama Power would be able to protect resources and maintain these sites as defined in the license. Alabama Power also proposes shoreline reclassifications with these additions from the existing classifications of flood storage or scenic easement to natural undeveloped or commercial recreation (table 3.3.6-3). However, the proposed reclassification of these additions may be incorrect since Alabama Power states that all portions of land additions or removals below 800 feet would still be considered project lands and would remain within the project boundary. All lands between 793 feet and 795 feet reclassified to flood storage and lands between 795 feet and 800 feet reclassified to scenic easement. Therefore, Alabama Power's proposal to change from flood storage or scenic easement to another classification seems inconsistent with that statement.

Alabama Power also proposes to remove about 286 acres of lands from the project boundary at Harris Lake, but also proposes to retain the narrow strip of shoreline closest to the lake or river for project purposes such as flood storage and scenic easement. As shown (table 3.3.6-3), the lands proposed for removal do not appear to be part of original mitigation lands to be preserved and managed as part of the existing WMP, and removal of the excess lands would ensure the project boundary only encompasses what is necessary for project purposes. The scenic easement designation would allow for protection of the shoreline and any natural resources. Reclassification of the shoreline to flood storage and scenic easement for both land removals and additions to the project boundary would allow for continued maintenance and protection of the shoreline for project purposes.

About 400 acres within the project boundary are also proposed to be reclassified from Recreation to Natural/Undeveloped. Most of these lands were originally classified as recreation for use as future recreation;[68] however, reclassifying most of these lands would be consistent with existing (forestry/timber management), adjacent land use, and would continue to protect natural resources. While the Recreation classification would allow for public access and day and evening recreational use, and may allow facilities/structures, the Natural/Undeveloped classification would be more restrictive to promote preservation of environmentally sensitive areas, protect natural aesthetic qualities, and serve as a buffer around public recreation areas. This reclassification would still allow for public uses like hiking, nature studies, primitive camping, wildlife management (excluding hunting), and forestry management practices (as outlined in the WMP). This change is expected to have minimal effects on recreation resources since shoreline is being preserved and recreation is allowable.

As discussed in 3.3.3, *Terrestrial Resources*, Alabama Power's proposal to reclassify two parcels with rare plant communities near Flat Rock Park totaling 57 acres from "Recreation" to "Natural/Undeveloped" would provide protection from development. In

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[68] *See* Accession No. 20080708-5128, 1995 Land Use Plan.

addition, the signs and barriers that Alabama Power installed in March 2020 after stakeholders commented regarding ATV damage to the rare plants would help prevent unauthorized access to this area (figure 3.3.3-36). However, over the term of a new license, unauthorized use related to nearby recreation at Flat Rock Park could still occur if compliance with the Natural/Undeveloped shoreline classification is not monitored and enforced. Including provisions in the SMP to periodically monitor this area for evidence of unauthorized uses (e.g., tire tracks, broken barriers, etc.), maintain the signs and barriers, and consult with Alabama DCNR to develop additional measures, if needed, would further preserve these rare plant communities.

Alabama Power also proposes to remove about 43 acres of road corridors (16 road segments) from within the project boundary due to a lack of project purpose (figure 3.3.5-5). Most of these roads are public access roads (table 3.3.6-4), maintained by the state, county, or another entity; are not solely project related, and provide access to both project and non-project features or locations. The remaining roads are privately maintained access routes to non-project parcels that are land locked by Alabama Power project lands. According to Alabama Power, removal of these roads from the project boundary removes land that is: (1) not affected by the project; (2) is not part of a project recreation feature; (3) is not used for the mitigation of project effects; and (4) is not required for O&M of the project.

Alabama Power's proposal appears to remove lands that are not project related except for two road segments (R.L. Harris Dam Road & Crescent Creek Ridge Road), which appear to be necessary for project purposes (table 3.3.6-4). R.L. Harris Dam Road is a public road on Alabama Power lands providing access to and through designated hunting lands at R.L. Harris WMA. While this is a public road, it appears this section extends across Alabama Power lands designated as prohibited access area lands solely affiliated with the hydroelectric project. This road also appears to end at or near the Harris Tailrace Fishing Area, which is proposed to be upgraded and reclassified to Recreation as part of this license. Crescent Creek Ridge Road is a public road crossing Alabama Power-owned lands designated for recreation use and leading directly to Crescent Crest Boat Launch. Retaining both these sections of roads along R.L. Harris Road and Crescent Creek Ridge Road, within the project boundary would ensure the access roads to project recreation sites be maintained into the future as part of a new license.

Effects of Project Operations

Alabama Power is proposing changes in operations that would affect Harris Lake and the Tallapoosa River downstream from Harris Dam. Implementation of the WMP at Skyline WMA is discussed below under *Effects of Wildlife and Shoreline Management Plans*.

Harris Lake

Alabama Power proposes to continue to operate the Harris Project during daily peak-load periods according to the existing operating curve, flood control procedures, and ADROP as described in section 2.1.3, *Existing Project Operation*.

Our Analysis

Alabama Power's proposal to continue operating the Harris Project during daily peak-load periods according to the existing operating curve, flood control procedures, and ADROP would have no effect on land use or aesthetics since there would be no significant change to the seasonal reservoir levels.

Similarly, operations including those that add continuous minimum flow releases that would minimally affect summer or winter pool elevations would not be expected to have any changes in land use, and no noticeable changes to aesthetics on Harris Lake. Operations that cause a decrease in lake levels would be expected to have a greater effect on aesthetic resources since the timing or duration of exposed shoreline may change with changing reservoir levels however land use would remain the same.

Tallapoosa Downstream from Harris Dam

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 described in section 2.1.3, *Existing Project Operation*. High-flow events downstream would continue to inundate the same lands as under current operations.

Alabama Power proposes to provide a continuous minimum flow of approximately 300 cfs in the Tallapoosa River downstream from Harris Dam.

Our Analysis

Operations, including proposed continuous minimum flows, are not expected to affect land use along the river downstream from Harris Dam. The increased flows would reduce river fluctuations would partially stabilize the riverine environment, lessen the frequency and degree of riverbank exposure, and potentially moderately improve the aesthetics and visual character of the river.

Effects of Wildlife Management and Recreation Plans

Alabama Power proposes to finalize its WMP, as described in greater detail in section 3.3.3, *Terrestrial Resources*, and includes specific management actions and BMP's for management of Skyline WMA and applicable lands around Harris Lake.

Alabama Power also proposes to finalize and implement a Recreation Plan with provisions to construct an additional day use park on Harris Lake and a canoe/kayak launch downstream from the dam.

Our Analysis

Alabama Power's proposal to continue management actions as part of the WMP is further analyzed in section 3.3.3, *Terrestrial Resources*, and 3.3.5, *Recreation Resources*; however, the WMP supports the shoreline management classification related to hunting. The hunting shoreline classification also allows for recreational opportunities like hiking, backpacking, primitive camping, wildlife viewing, and bank fishing thereby benefiting recreation and land use resources.

Alabama Power's proposal to improve, manage, and maintain recreation sites as defined in the Recreation Plan would alter the lands from an undeveloped state to a developed day use recreation site with amenities for swimming, boating, and picnicking. Changes to developed recreation would be consistent with intended land use purposes, and shoreline management classifications. Aesthetics would be considered and incorporated in the design of the park.

3.3.7 Cultural Resources

3.3.7.1 Affected Environment

The affected environment is provided in Appendix F to this EIS.

3.3.7.2 Environmental Effects

Under 36 C.F.R. Part 800, an effect on a historic property occurs when an undertaking alters the characteristics that qualify the property for inclusion in the National Register (800.16[i]). Ongoing hydropower project operations and maintenance and recreation have the potential to adversely affect cultural resources as a result of soil disturbance, vegetation management, erosion, and/or reservoir fluctuation. Trampling and looting that are sometimes associated with recreation access also have the potential to damage cultural resources. Additionally, the transfer, lease, or sale of historic properties out of federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation is considered to be an adverse effect (36 C.F.R. 800.5[a][2][vii]).

In its application, Alabama Power does not identify any specific project-related effects on archaeological resources within the APE and instead states that effects would be determined in consultation with the Alabama SHPO and applicable Tribes. However, the application identifies various existing conditions, operations, and PM&E measures that could affect cultural resources. These include but are not limited to continued and proposed operational changes (including but not limited to the implementation of downstream release alternatives), implementation of a proposed Harris Lake SMP, and implementation of a proposed Recreation Plan.

Alabama Power states that while continued operation of the project could result in adverse effects to historic properties (e.g., wind erosion, recreation, and vandalism), continued operation would not result in any changes that would amplify or increase these existing effects. Alabama Power also states that the proposed continuous minimum flow following installation of a Francis-type unit would not affect cultural resources because the flows would have negligible effects on reservoir elevations. Alabama Power states that implementation of a SMP would follow best management practices (BMPs) that would help to minimize erosion. These BMPs would include establishing or maintaining vegetation to minimize soil erosion and placing permit restrictions or prohibiting particular activities within sensitive areas. Alabama Power's proposed Recreation Plan would also be finalized and implemented with consideration of potential effects on cultural resources.

In its June 2022 Downstream Release Alternatives Phase 2 Report, Alabama Power used flow stage data to determine the potential effects of the alternative releases on identified cultural resources, both within Harris Lake and downstream. The report concluded that the inundated sites at the reservoir would not be affected by implementation of the pre-Green Plan; 150 cfs, 300 cfs, 350 cfs, 400 cfs, or 450 cfs continuous minimum flow; or the 150 cfs continuous minimum flow+Green Plan downstream release alternatives. However, implementation of the remaining release alternatives (continuous minimum flows of 600 cfs, 800 cfs, 300 cfs+Green Plan, 600 cfs+ Green Plan, 800 cfs+ Green Plan) would impact Harris Lake elevations and potentially expose the 96 inundated sites present at the lake. These effects could result in erosion and vandalism. However, Alabama Power suggests that these flows would negatively affect recreational use of the reservoir thereby minimizing recreational impacts to cultural resources. The report also analyzed the potential effects on cultural resources of the various flow alternatives in the Tallapoosa River downstream from Harris Dam and concluded that under existing conditions, the 19 downstream sites are inundated 49.4% of the time. Under the pre-Green Plan, 150 cfs, 300 cfs, 350 cfs, 400 cfs, and 450 cfs continuous minimum flow alternatives, inundation would be similar to the existing condition. However, eight sites would experience inundation for different amounts of time than with the existing condition under these scenarios. Additionally, the 600 cfs and 800 cfs continuous minimum flow alternatives would inundate all 19 sites for a greater amount of time than currently documented. Increased inundation could result in increased scouring and depletion of protective sediments and vegetation.

On October 22, 2021, Commission staff, Alabama Power, and representatives of the Muscogee (Creek) Nation met to discuss various activities with the potential to affect archaeological resources and TCPs. Potential effects that were discussed included recreation use (including hunting activities) and improvements, Alabama Power's proposal to install a new flow unit, project-related ground disturbance, and the issuance of permits to private parties for the installation of structures on the Lake Harris shoreline within the project boundary.

Management of Historic Properties

On June 29, 2021, Alabama Power filed a draft HPMP for the Commission's consideration. An updated HPMP was subsequently filed on November 23, 2021 (Alabama Power and Kleinschmidt Associates, 2021b). The updated HPMP provides a summary of Alabama Power's preservation goals for the Harris Project, including the appointment of an HPMP Coordinator and measures for the treatment of cultural resources over any new license term. These measures include, but are not limited to, the following: (a) the evaluation of actions that may affect historic properties; (b) public involvement and interpretation; (c) the treatment of human remains and unanticipated discoveries of cultural materials; (d) a plan for periodic reporting to agencies and Tribes regarding HPMP actions; (e) a plan for review and revision of HPMP every six years; (f) dispute resolution; (g) activities that would be exempt for section 106 consultation; and (h) a requirement to evaluate the Harris Project hydroelectric facilities for inclusion in the National Register when they reach the 50-year threshold for potential eligibility in 2033.

As shown in tables 3.3.7-1 through 3.3.7-3, there are a total of 512 documented archaeological sites within the APE for the Harris Project. Of these, 49 are eligible for listing on the National Register, 175 sites are ineligible, and 288 archaeological sites remain undetermined. There are also two properties within the APE that are traditionally important to the Muscogee (Creek) Nation. The R.L. Harris Project facilities do not yet meet the age requirements for National Register consideration. However, the Miller Bridge, piers and abutments contribute to the eligibility of the Horseshoe Bend National Military Park. While Alabama Power's updated HPMP does not provide specific management measures for eligible or unevaluated archaeological properties (ineligible resources need not be further considered under section 106 of the NHPA), the updated site table filed on December 27, 2022, provides additional details related to assessing project effects and determining appropriate treatment. These measures are summarized in table 3.3.7-4.

Alabama Power proposes to evaluate project effects and determine appropriate treatment in consultation with the Alabama SHPO, participating Tribes, and other appropriate parties for the 47 sites within the APE that are eligible for listing in the National Register. Twenty-four of these sites are at Harris Lake, 4 are on the Tallapoosa River downstream from Harris Dam, and 19 are at Skyline WMA. Additionally, Alabama Power proposes to develop detailed mitigation contracts with private landowners, as necessary, for project-related effects on historic properties on private lands, including two eligible resources downstream from Harris Dam. However, where landowners deny appropriate access to historic properties, Alabama Power would not be responsible for addressing effects on these properties.

Alabama Power also proposes to consult with the Alabama SHPO regarding potential project effects and treatment measures for eleven unevaluated sites at Harris Lake and one site on the Tallapoosa River (a historic Creek village site). The eleven sites at Harris Lake include four locations of concern to the Muscogee (Creek) Nation, four sites that had been previously selected for assessment, and three sites identified during the tract survey. On the Tallapoosa River downstream from the Harris Dam, Alabama Power's updated site table indicates there are 8 unevaluated sites located on private lands that the company would "develop detailed mitigation contracts with private landowners, as necessary" if project-related effects are identified. Finally, there are 132 sites at Harris Lake that are currently inundated but remain potentially eligible for listing on the National Register. Should these sites become exposed during any new license term, Alabama Power proposes evaluate them for listing on the National Register, assess the effects of inundation, and identify ways to avoid, minimize, or mitigate adverse effects and implement appropriate treatment in accordance with section 106.

No specific treatment is proposed or required for 175 sites within the project APE that have been evaluated as ineligible for listing on the National Register. Alabama Power also does not propose any treatment of 139 sites (28 sites at Harris Lake and 111 sites at Skyline WMA) that have not been formally evaluated. In its updated site table, Alabama Power states that these sites were "removed from consideration through appropriate consultation." According to the Alabama SHPO's October 28, 2022 letter (filed on December 27, 2022), the reasons that these sites were removed from consideration include that the sites were: (a) originally misplotted, (b) deflated beyond the potential to retain intact deposits, or (c) were subjected to alteration that had negated their potential to contain intact deposits. These reasons appear to imply that these sites either cannot be relocated (misplotted) or that they are not eligible for listing on the National Register (deflated, altered). The site table provides some indication regarding why 17 sites at Harris Lake were removed from consideration (4 sites contain limited data potential, no cultural materials were observed at 2 sites, and the integrity of 11 sites appears to have been compromised) but no specific reasons were provided regarding 119 sites that were removed from consideration (8 sites at Harris Lake and 111 sites at Skyline WMA).

Appendix E (*Traditional Cultural Property Identification Plan*) of the draft HPMP provides a process that would be followed by Alabama Power to consult with participating Tribes regarding the identification of TCPs. When Alabama Power consulted with the Muscogee (Creek) Nation, the Tribe identified two potential TCPs within the project APE. Alabama Power has not proposed any specific treatment for TCPs at the Harris Project. However, in its draft HPMP, Alabama Power states that it would continue to pursue a memorandum of understanding or another form of written agreement regarding a TCP Consultation Protocol and would use the procedures established in the TCP Identification Plan to work with other applicable Tribes to identify TCPs in the project APE. Further, in its

HPMP, Alabama Power states that it would also consult with the Tribes regarding any undertakings that may affect TCPs and would develop plans to manage, or to reduce or mitigate harm to such properties. On July 11, 2023, Alabama Power filed an agreement reached with the Muscogee (Creek) Nation regarding the TCP Consultation Protocol. In the cover letter, Alabama Power states that both parties acknowledged the protocol as final and that it would be implemented upon issuance of a new license for the Harris Project.

The R.L. Harris hydroelectric system features were completed in 1983 and do not yet meet the 50-year threshold for National Register consideration or assessment of effects. However, Alabama Power's HPMP calls for evaluation of the project when it reaches 50 years old.

Our Analysis

Alabama Power's updated draft HPMP includes a number of the measures identified in the Commission and Advisory Council's joint document, *Guidelines for the Development of Historic Properties Management Plans for FERC Hydroelectric Projects* (FERC and Advisory Council, 2002). However, revision of the HPMP, to include additional information related to cultural resources within the APE and future management of project-related effects to historic properties and unevaluated cultural resources, would ensure that the document contains all necessary information. Specific details regarding these revisions are provided below.

Section 2.5 (*Surveys and Inventories*) of the draft HPMP does not address the Alabama SHPO's October 28, 2022, determinations of eligibility for 224 sites (47 eligible sites, 173 ineligible sites) within the project APE at Harris Lake, downstream from Harris Dam, and at Skyline WMA. Alabama Power acknowledges this omission in its December 27, 2022, response to the Commission's request for additional information and states that this information would be included in the "next version of the HPMP." The draft HPMP also does not include a discussion of Alabama Power's cultural resources investigations of lands proposed for removal from the project boundary, and the National Register determinations provided for 9 sites (2 previously recorded sites, 7 new sites) located on these lands (Watkins, 2022). Inclusion in the HPMP of the updated cultural resources information, including an appendix that contains the site table filed on December 27, 2022, that has been updated to include the sites that were documented during the tract survey, and the SHPO's determinations of eligibility, would ensure that the document contains the most recent information about each resource within the APE.

The draft HPMP also does not adequately address the 119 sites within the APE that remain unevaluated yet have been removed from consideration. In the site table, Alabama Power states that these sites were "removed from consideration through appropriate consultation," but unlike 17 sites at Harris Lake, no specific reasoning for exclusion has been provided for these sites. Inclusion in the HPMP of an updated site table that includes the site-specific reasons why each of the 119 resources do not require further section 106 consideration and specific reference to any agreement with the SHPO in this regard would provide clarification for future cultural resources management purposes over the license term. Additionally, while the site table indicates that 111 of these sites at Skyline WMA may have been previously evaluated, the Alabama State Site Files indicate that they remain unevaluated. Until the Alabama SHPO makes formal determinations of eligibility for all sites, they remain potentially eligible for listing under section 106 of the NHPA and this should be reflected in the updated HPMP with appropriate treatment measures provided (e.g., avoidance or further consultation to determine eligibility).

Section 4.1 (*Evaluation Procedures*) of the draft HPMP states that "consultation with the SHPO and applicable Tribes may be required when certain actions or activities proposed by Alabama Power (or an individual or entity requesting and/or requiring a permit from Alabama Power) have the potential to affect a historic property." This section describes measures that may be implemented to determine whether proposed (future) project activities may affect historic properties. These activities would include, but not be limited to, shoreline construction, ground disturbance within the APE, issuance of permits to shoreline property owners, and other project-related activities. We also understand that this measure would also apply to any sites that are eligible for listing on the National Register or are unevaluated that could be affected by Alabama Power's implementation of any of the downstream release alternatives. However, the HPMP does not specifically address current, ongoing, project-related impacts. The site table filed on December 27, 2022, states that project-related effects and any necessary management measures would be determined "through appropriate consultations" for 35 eligible sites within the project APE at Harris Lake (24 eligible sites, 11 undetermined sites), 5 sites downstream from Harris Dam,[69] and 19 sites at the Skyline WMA. However, the HPMP and the site table do not describe the known impacts at a number of sites that are eligible for listing on the National Register and that were identified in the Harris Lake and tract reports (Watkins, 2021; Watkins, 2022). Many of the sites at Harris Lake were identified during "low pool conditions" and it is clear from the text and photographs contained in the assessment report that fluctuating water levels are indeed present at many of the eligible sites at the reservoir. For example, the description of site 1Ra381 states that erosion is occurring at the site (confirmed by photographs). It is further noted that the site retains "significant subsurface deposits of cultural material/features" including potential human burials. Other sites are also identified as experiencing erosion, and two (10Ra50, 10Ra280) are described as having features eroding out of site sediments. Other potential site impacts identified in the report include ATV use, vandalism, development, roads, and other impacts. Identification in the updated site table and in the HPMP of these and any other ongoing effects to all eligible and unevaluated (but not inundated) sites that were identified during the fieldwork at Harris Lake, the Tallapoosa River downstream from Harris Dam, and at Skyline WMA, would aid in the analysis of these impacts and in the development of appropriate treatment and/or mitigation measures for specific resources that should be included in the HPMP in accordance with section 106.

Section 4.7.3 (*Unanticipated Discoveries, Removal of Project Lands*) of the HPMP discusses the removal of lands from the project boundary and mentions Alabama Power's cultural resources report regarding its current proposal to remove 17 tracts of land from the boundary (Watkins, 2022). In this section, Alabama Power states that during the term of the new license, it would consult with the SHPO regarding any assessment that may be required on the respective lands. However, the HPMP does not include the results of consultation with the

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[69] Additionally, as needed, Alabama Power proposes to develop mitigation contracts with private landowners for an additional 10 downstream sites (2 eligible sites, 8 unevaluated sites).

SHPO that has already taken place regarding Alabama Power's proposed removal of the 17 tracts and the SHPO's determinations of eligibility for 9 potentially affected sites. As mentioned above, four of the sites are not eligible for listing on the National Register, but two eligible sites and three unevaluated sites would be removed from federal protection under this proposal. Absent adequate and legally enforceable restrictions or conditions to ensure long-term preservation of each of the five property's historic significance, this action would constitute an adverse effect under section 106 and its implementing regulations found at 36 C.F.R. 800.5(a)(2)(vii). Identification in the HPMP and site table of measures to ensure protection of these five sites or to mitigate the effects of their removal from federal oversight would ensure compliance with section 106. Additionally, the discussion of removal of project lands would be better addressed in section 4.2 (*Evaluation and Mitigation for Actions that May Adversely Affect Historic Properties*) of the HPMP than in section 4.7 (*Unanticipated Discoveries Procedures*) of the HPMP, because it does not pertain to discoveries of cultural materials during project activities. We also recommend moving section 4.7.2 (*Unscheduled Ground Disturbance*) to section 4.2, because this section also does not pertain to unanticipated discoveries but rather to an activity that would require consultation with the Alabama SHPO prior to implementation.

In its site table, Alabama Power proposes to assess 132 sites that are currently inundated and proceed with appropriate treatment measures if and when these sites are exposed. This plan is consistent with plans for inundated resources identified at other projects operating under FERC licenses. However, in Appendix F (*List of Activities That Do Not Require Consultation*) of the HPMP, Alabama Power provides a list of project-related activities that it proposes to be exempt from section 106 consultation. This list includes "fluctuation of reservoir levels associated with routine operation of the Project" and "standard seasonal drawdowns based on the respective Operating Curve," provided that no known historic properties would be affected. As mentioned above, many of the eligible sites at Harris Lake were documented during periods of low reservoir conditions and erosion and/or deflation was observed at many of these locations. As reservoir fluctuation and drawdowns are associated with project operations, the potential effects associated with these operations require consideration under section 106. Inclusion in the HPMP of an exemption from consultation for reservoir fluctuation and drawdowns would not acknowledge the impacts of these activities on historic properties and would be inconsistent with Alabama Power's proposal to assess the 132 inundated sites should they become exposed. Deletion of the exemption in Appendix F from consultation regarding reservoir fluctuations and drawdowns, and the inclusion in the section 4.1 (*Evaluation Procedures*) of requirements and specific protocols to assess inundated sites when they are exposed and also to formally assess the effects of known erosion/deflation that was observed on eligible or unevaluated sites would ensure that affected sites that are eligible or potentially eligible for listing on the National Register are appropriately addressed in accordance with section 106.

The draft HPMP discusses Alabama Power's efforts to consult with the Muscogee (Creek) Nation regarding TCPs located within the project APE and the resulting TCP report (OAR, 2021). This study was conducted in accordance with the "*Traditional Cultural Properties Identification Plan"* provided in Appendix E of the HPMP. As mentioned above, due to confidentiality concerns, the report has not been filed and details regarding the two potential TCPs identified within the APE and specific project-related impacts to these properties are not discussed in the draft HPMP. Inclusion in the HPMP of the results of further consultation between Alabama Power and the Muscogee (Creek) Nation to manage identified TCPs and also Alabama Power's plans to consult with other applicable Tribes to identify TCPs would ensure that the Tribes concerns are appropriately addressed.

Section 4.4 (*Management Protocols*) of the HPMP discusses cultural resources monitoring protocols that would be established by the HPMP Coordinator. In this section, Alabama Power states "the HPMP Coordinator establishes and coordinates a monitoring program with Alabama Power personnel, Alabama Power contractors, or others managing lands in the project boundary to monitor project shorelines and lands managed to provide hunting opportunities (either through hunting leases or individual permits) for any vandalism or looting activities of historic properties within the project APE." No specific cultural resources monitoring plan, protocols, or schedule for monitoring are described. Inclusion in the HPMP of more specific information regarding what the goals of the monitoring plan would be (e.g., identification of site vandalism, looting, and ongoing erosion), how monitoring would be conducted and reported (and by whom). The monitor should be a qualified archaeologist or cultural resources specialist. The HPMP also should define a schedule for monitoring and reporting to ensure that the program is successful and appropriate actions are taken to rectify identified issues in a timely manner.

Section 4.6 (*Public Involvement and Interpretation Provisions*) of the HPMP states that Alabama Power would conduct public education programs regarding historic properties protection on an "as-needed basis." A brochure containing BMPs would also be developed. Inclusion in this section of the HPMP of the circumstances under which public interpretation and education measures would be implemented would provide clarification of Alabama Power's public education goals. Additionally, inclusion in the HPMP of other methods of disseminating information to the public would also be helpful. As suggested by the Muscogee (Creek) Nation during the October 22, 2021, conference call, these methods could include, but not be limited to, restrictive, interpretive and educational signage posted at project recreation areas that describes the importance of preserving and protecting cultural resources in the vicinity of the project.

Finally, inclusion in the HPMP of a detailed schedule for the completion of all actions required in the HPMP (e.g., assessment of effects to historic properties, identification and implementation of management/mitigation measures, etc.) would also ensure that the HPMP complies with the Commission and Advisory Council's (2002) guidance.

These recommended updates to the HPMP would benefit cultural resources by providing a comprehensive approach to protecting and managing historic properties. To meet section 106 requirements, the Commission intends to execute a PA with the Alabama SHPO for the project to protect historic properties that are, or would be, affected by continued project O&M. The terms of the PA would require Alabama Power to update the HPMP as recommended in consultation with the Alabama SHPO, Park Service, participating Tribes, and other parties as appropriate.

3.3.8 Environmental Justice

In conducting NEPA reviews of hydroelectric projects, the Commission follows Executive Orders 12898 and 14096, which direct federal agencies to identify, analyze, and address disproportionate and adverse human health or environmental effects of their actions on environmental justice communities.[70] Executive Order 14008 also directs agencies to develop programs, policies, and activities to address the disproportionate and adverse "human health, environmental, climate-related and other cumulative impacts on disadvantaged communities, as well as the accompanying economic challenges of such impacts."[71] Environmental justice is "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies."[72] The term "environmental justice community" includes communities that have been historically marginalized and overburdened by pollution.[73]

Commission staff used *Promising Practices for EJ Methodologies in NEPA Reviews* (*Promising Practices*),[74] which provides methodologies for conducting environmental justice analyses throughout the NEPA process for this project. Additionally, consistent with EPA recommendations, Commission staff used EPA's Environmental Justice Screening and Mapping Tool (EJScreen) as an initial screening tool to better understand locations that require further review or additional information regarding minority and/or low-income populations; potential environmental quality issues; environmental and demographic indicators; and other important factors.[75]

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[70] Exec. Order No. 12,898, 59 Fed. Reg. 7629 (Feb. 11, 1994); Exec. Order No. 14,096, 88 Fed. Reg. 25251 (Apr. 21, 2023).

[71] Exec. Order No. 14,008, 86 Fed. Reg. 7619, 7629 (January 27, 2021).

[72] *See* EPA, EJ 2020 Glossary (February 2024), https://www.epa.gov/system/files/documents/2024-02/ej-2020-glossary.pdf. Fair treatment means that no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental, and commercial operations or policies. *Id.* Meaningful involvement of potentially affected environmental justice community residents means: (1) people have an appropriate opportunity to participate in decisions about a proposed activity that may affect their environment and/or health; (2) the public's contributions can influence the regulatory agency's decision; (3) community concerns will be considered in the decision-making process; and (4) decision makers will seek out and facilitate the involvement of those potentially affected. *Id.*

[73] Environmental justice communities include, but may not be limited to minority populations, low-income populations, or indigenous peoples. *See* EPA, EJ 2020 Glossary (Feb. 2024), https://www.epa.gov/system/files/documents/2024-02/ej-2020-glossary.pdf.

[74] Federal Interagency Working Group on Environmental Justice & NEPA Committee, *Promising Practices for EJ Methodologies in NEPA Reviews* (March 2016) (*Promising Practices*), https://www.epa.gov/sites/default/-files /2016-08/documents/nepa_promising_practices_document_2016.pdf.

[75] EPA, *Purposes and Uses of EJScreen* (January 9, 2024), https://www.epa.gov/ejscreen/purposes-and-uses-ejscreen ("Screening tools should be used for

Consistent with *Promising Practices*, and Executive Orders 12898 and 14096, we reviewed the project to determine whether its resulting impacts would be disproportionate and adverse on minority and low-income populations and also whether impacts would be significant.[76] *Promising Practices* provides that agencies can consider any of a number of conditions in this determination and the presence of any of these factors could indicate a potential disproportionate and adverse impact.[77] For this project, a disproportionate and adverse effect on an environmental justice community means the adverse effect is predominantly borne by such population. Relevant considerations include the location of project facilities and the project's human health and environmental impacts on identified environmental justice communities, including direct, indirect, and cumulative impacts.

3.3.8.1 Affected Environment

The affected environment is provided in Appendix F to this EIS.

3.3.8.2 Environmental Effects

<u>Harris Lake and Tallapoosa River Downstream from Harris Dam</u>

As described in section 2.2.3, *Proposed Project Operation*, Alabama Power proposes to operate the project as it has in the past in a peaking mode with the addition of a new continuous minimum flow. The proposed continuous minimum flow unit would be installed adjacent to Unit 1 on the east side of the existing Harris Powerhouse, and would be used to discharge the minimum flow of approximately 300 cfs. As discussed in section 3.3.5, *Recreation*, Alabama Power proposes to construct a canoe/kayak launch downstream from Harris Dam, construct an additional recreation site on Harris Lake, and implement improvements to existing recreational sites. Construction and changes to project operation could affect fishery and recreation resources that may be used by environmental justice communities for supplemental food sources or income. As discussed in sections 2.2.3, *Proposed Project Operation*, 3.3.2, *Aquatic Resources*, and 3.3.5, *Recreation Resources*, proposed measures that could affect fish habitat and fish populations and/or recreation resources include: (1) construction and operation of a new continuous minimum flow unit, and (2) construction of a new recreation site and amenities.

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a 'screening-level' look. Screening is a useful first step in understanding or highlighting locations that may be candidates for further review.").

[76] An agency may determine that impacts are disproportionate and adverse, but not significant within the meaning of NEPA and in other circumstances an agency may determine that an impact is *both* disproportionate and adverse and significant within the meaning of NEPA. *See Promising Practices* at 33.

[77] There are various approaches for determining whether an impact will cause a disproportionate and adverse impact, and one recommended approach is to consider whether an impact would be "predominantly borne by minority populations or low-income populations." *See id.* at 44-46.

No entity provided comments or recommendations regarding the effects of the project on environmental justice communities in response to the Commission's REA notice.

Our Analysis

Other than the proposed 300-cfs minimum flow, which would provide long-term benefits to water quality, aquatic resources, and geology and soils downstream from Harris Dam, Alabama Power proposes no change to project operation. As such, some of the effects to environmental resources, including water quantity, water quality, geology and soils, and fisheries would largely continue as under the current conditions. As discussed in section 3.3.2, *Water and Aquatic Resources*, operations include some adverse effects to the recreational opportunities within environmental justice communities. Due to the prolonged residence time of water in an impoundment, dams can reduce the concentration of DO and increase water temperatures, each of which can result in biologically unhealthy water for swimming and fishing conditions. However, the staff-recommended measures to release higher minimum flows ranging seasonally from 300 cfs to 450 cfs, and to implement a destratification system within the forebay would provide greater long-term benefits to water quality, water quantity, geology and soils, and fisheries. Staff also recommended maintaining Harris Lake water levels constant or slightly increasing for a 14-day period to improve fish spawning and hatching conditions. Such measures would also minimize adverse effects on recreational resources. Construction of the new minimum flow unit could produce minimal short-term construction-related adverse effects to water quality and aquatic resources. Construction of the new minimum flow unit is expected to result in minimal effects on water quantity, water quality, and fishery resources partially because the unit's use of the existing intake would prevent the need to construct a new intake. Any potential adverse effects to water quality and aquatic resources from the unit's construction are expected to be avoided or minimized through the implementation of BMPs as part of standard sediment and erosion control plans. As noted in section 3.3.2, *Water and Aquatic Resources*, the proposed ongoing peaking operation would adequately benefit management of floods and droughts, and the proposed operation of a new minimum flow unit, along with staff-recommended seasonal minimum flows and destratification of the water column in the forebay, would improve DO levels and provide a more stable thermal regime downstream from Harris Dam. Therefore, construction and operation of the new minimum flow unit is expected to produce long-term, beneficial effects on water quality localized to the Tallapoosa River downstream from Harris Dam, including adjacent to identified environmental justice communities located in Tract 300, Block Group 2; Tract 600, Block Group 2; Tract 953800, Block Group 2; and Tract 962501, Block Group 1 (figure 3.3.8-1).

Construction and improvements of recreational facilities may temporarily decrease access to recreation and produce localized minor adverse effects to fishery resources, with long-term benefits to recreation in the project area. Construction of the new recreation facilities would be of a short duration, and construction effects are expected to be mitigated by Alabama Power's proposed measures and agency recommendations. Access to Harris Lake for sport or subsistence fishing would be improved with the construction of an additional recreation site and with pier improvements and public outreach, as recommended by Alabama DCNR. Fishing opportunities in the Tallapoosa River downstream from Harris Dam would also be improved by the proposed canoe/kayak access site. Vegetation clearing and noise associated with construction of the Highway 48 Day Use Park may produce temporary localized adverse effects to shoreline habitat and fishery resources, as detailed in section 3.3.2. However, the overall availability and quality of fish stocks in Harris Lake would not be affected by construction activities, and nearby alternative fishing sites at Harris Lake would experience less than significant adverse effects from construction. The proposed facility modifications have the potential to affect nearby residences due to construction noise, dust, and traffic. The nearest residences to the project are approximately 0.75 miles east of the project, in Tract 300, Block Group 2, considered an environmental justice community on the minority basis (figure 3.3.8-1). These adverse effects would not be disproportionate nor significant due to the short duration of construction.

As discussed in section 3.3.1, *Geologic and Soil Resources*, the project is not expected to result in any additional shoreline erosion that would cause flooding or bank stabilization concerns for any adjacent environmental justice community. Terrestrial impacts to these communities would also be negligible. Proposed activities affecting geologic and soil resources would therefore not result in disproportionate and adverse effects on environmental justice communities.

As discussed in section 3.3.3, *Terrestrial Resources*, project operations would continue to buffer the shoreline from erosion and preserve wildlife habitat in environmental justice communities. Some management activities may adversely affect these features. To mitigate these effects, Alabama Power has drafted a WMP, SMP, and APP to protect biodiversity, the physical environment, and public health in these block groups. The WMP would maintain existing permanent openings and access points on project land and include food for wildlife; land set aside for native grass, forestland, prescribed fire, and other activities that promote biodiversity; pollinator maintenance; and provisions for the careful use of herbicide, algicide, and other measures should public health be endangered. The draft SMP includes provisions including the implementation of a shoreline classification system which, as discussed in section 3.3.6, *Land Use and Aesthetics*, would benefit the resilience of the shoreline in the Commission's opinion. Scenic easements along the shorelines of Harris Lake, which is surrounded by environmental justice communities, would continue to protect the scenic and environmental values here. The draft SMP also proposes the reclassification of the environmentally sensitive project land at Blake's Ferry Pluton, adjacent to Flat Rock Park, from "Recreational" to "Natural/Undeveloped," adding a layer of protection to the rare plants here from development. This area is located primarily in the environmental justice community of Tract 958900, Block Group 2. Finally, the draft SMP encourages landowners to implement BMPs to bolster shoreline preservation. Alabama Power's company-wide APP would manage and minimize harmful or fatal avian interactions with manmade features such as power lines and transmission towers. Due to the lack of impact to terrestrial resources from operations, along with the wealth of measures Alabama Power would take to preserve these resources in management operations, terrestrial resources activities would not result in disproportionate and adverse effects on environmental justice communities.

As discussed in section 3.3.5, *Recreation Resources*, as well as throughout this document, the project emphasizes recreational benefits. Alabama Power's Recreation Plan includes the development of the Highway 48 Day Use Park and Harris Tailrace Fishing Area, which would allow environmental justice communities to enjoy swimming, picnicking, boating, and fishing amenities. Many stakeholders recommend additional access downstream from Harris Dam, and staff recommends continued monitoring, reporting, and agency and stakeholder consultation to advance additional recreational opportunities. Section 3.5.5 also discusses public safety for communities downstream from Harris Dam. Of these communities, Tract 600, Block Group 2; Tract 953800, Block Group 2; and Tract 962501, Block Group 1 are all considered environmental justice communities. In these areas, fluctuating flows associated with peaking operations and increased downstream flows have historically affected safety here. To address this, Alabama Power proposes to add a continuous minimum flow release to existing peaking operations, in addition to providing real-time flow gaging information. Additionally, Alabama Power has drafted a Public Safety Plan (PSP) for areas downstream which includes various signalization and security measures detailed in the PSP having been installed and in high-quality condition. Recreation resources activities would therefore not result in disproportionate and adverse effects on environmental justice communities.

As discussed in section 3.3.6, *Land Use and Aesthetics*, staff determines that land use impacts from proposed shoreline management activities detailed in the SMP would benefit the environment and natural resources along the shore. These shoreline communities include the environmental justice communities (from north to south) of Tract 959700, Block Group 2; Tract 100, Block Group 2, Tract 958900, Block Group 2; Tract 958900, Block Group 3; Tract 300, Block Group 2; Tract 60, Block Group 2; Tract 953800, Block Group 2; and Tract 962501, Block Group 1 (figure 3.3.8-1). Project operations, meanwhile, would not affect land use or aesthetics. The project would thus not result in land use or aesthetic effects disproportionate to environmental justice communities.

As discussed in section 3.3.7, *Cultural Resources*, Alabama Power's HPMP provides measures that include public involvement, an agency and Tribe reporting plan, and an HPMP review and revision plan. Meanwhile, the Commission intends to execute a programmatic agreement with the Alabama SHPO for the project to protect any historic properties that are, or would be, affected by project operations and maintenance, including those properties within environmental justice communities. Cultural resources activities would therefore not result in disproportionate and adverse effects on environmental justice communities.

Continued operations, as proposed with the staff-recommended measures, would not result in adverse effects on the identified environmental justice communities. Environmental justice communities near the project area may benefit from increased fishing and recreational opportunities in Harris Lake and the Tallapoosa River. Construction of recreation sites may produce short-term adverse effects localized to the area surrounding the proposed site locations. These impacts may disproportionately affect nearby environmental justice communities in Census Tract 100, Block Group 2; Census Tract 600, Block Group 2; Census Tract 958900, Block Group 2; and Census Tract 958900, Block Group 3. However, these effects would be limited to the short duration of site construction, and the magnitude of adverse effects would be minimal compared to the long-term benefits provided by the recreation sites.

Skyline WMA

As described in section 2.2.3, *Proposed Project Operation*, Alabama Power proposes to continue to manage the Skyline WMA through the lease agreement with the Alabama DCNR.

No entity provided comments or recommendations regarding the effects of the project on environmental justice communities in response to the Commission's REA notice.

Our Analysis

The applicant proposes to continue to manage project land at Skyline WMA, including timber harvests, as described in the draft WMP. Ongoing effects to aquatic and terrestrial resources on project land at Skyline WMA are discussed in sections 3.3.2.2, *Water and Aquatic Resources*, and 3.3.3.2, *Terrestrial Resources*. Alabama Power's ongoing management of project land at Skyline WMA is not expected to impact adjacent environmental justice communities because it would continue to allow for access to hunting and recreation, as under the current license. Alabama Power's proposed WMP, with the additional staff-recommended measures to protect rare, threatened, and endangered wildlife that would avoid or minimize adverse effects on environmental resources, including water supply, water quality, fisheries, vegetation, and wildlife.

3.4 NO-ACTION ALTERNATIVE

Under the no-action alternative, the project would continue to operate as it has in the past. None of Alabama Power's proposed measures or the resource agencies' recommendations and mandatory conditions would be required. In addition, none of the measures Alabama Power is currently implementing on a voluntary basis would be required (e.g., implementing the modified Green Plan, holding Harris Lake water levels constant or slightly increasing for a 14-day period for spring spawning, maintaining native plants in the pollinator plots at Little Fox Creek, etc.). Lastly, none of the staff-recommended measures would be implemented, including measures to enhance environmental conditions for fish and wildlife within the project-affected areas.

4.0 DEVELOPMENTAL ANALYSIS

In this section, we look at the Harris Project's use of the Tallapoosa River for hydropower purposes to analyze what effect various environmental measures would have on project costs and power generation. Under the Commission's approach to evaluating the economics of hydropower projects, as articulated in *Mead Corp.*,[78] the Commission compares the current project cost to an estimate of the cost of obtaining the same amount of energy and capacity[79] using the likely alternative source of power for the region (cost of alternative power). In keeping with Commission policy as described in *Mead Corp.*, our economic analysis is based on current electric power cost conditions and does not consider future escalation of fuel prices in valuing the hydropower project's power benefits.

For each of the licensing alternatives, our analysis includes an estimate of: (1) the cost of individual measures considered in the EIS for the protection, mitigation, and enhancement of environmental resources affected by the project; (2) the cost of alternative power; (3) the total project cost (i.e., for construction, operation, maintenance, and environmental measures); and (4) the difference between the cost of alternative power and total project cost. If the difference between the cost of alternative power and total project cost is positive, the project produces power for less than the cost of alternative power. If the difference between the cost of alternative power and total project cost is negative, the project produces power for more than the cost of alternative power. This estimate helps to support an informed decision concerning what is in the public interest with respect to a proposed license. However, project economics is only one of many public interest factors the Commission considers in determining whether, and under what conditions, to issue a license.

4.1 POWER AND DEVELOPMENTAL BENEFITS OF THE PROJECT

Table 4-1 (Appendix H) summarizes the assumptions and economic information we use in our analysis for the project. This information was provided by the licensee in the license application or estimated by Commission staff. We find that most values provided by the licensee are reasonable for the purposes of our analysis; if they are not, this is noted in the table. Cost items common to all alternatives include: taxes and insurance costs, net investment, estimated future capital investment required to maintain and extend the life of facilities, relicensing costs, normal O&M costs, and Commission fees. All costs are represented in 2023 dollars.

In addition to overall changes in energy generation, Commission staff estimated the proportion of on-peak and off-peak generation under each alternative based on other

[78] See *Mead Corporation, Publishing Paper Division*, 72 FERC ¶ 61,027 (July 13, 1995). In most cases, electricity from hydropower would displace some form of fossil-fueled generation, in which fuel cost is the largest component of the cost of electricity production.

[79] We use the term "capacity benefit" to describe the benefit a project receives for providing capacity to the grid, which may be in the form of a dependable capacity credit or credit for monthly capacity provided.

information provided by Alabama Power. The FLA provides on-peak, off-peak, and composite energy values (Exhibit D, section 10.0, table 10-1), and the Downstream Release Alternatives – Phase 2 Report provides modeled changes in average annual generation and revenue for various alternatives (section 3.1.2, figures 3-11 and 3-12). Commission staff first assumed that generation under pre-Green Plan operations would be entirely on-peak and calculated the associated revenue. For each alternative we then calculated the combination of on-peak and off-peak generation that would yield the stated changes in generation and revenue relative to pre-Green Plan operations.

This step of the analysis was intended only to yield the quantities of on-peak and off-peak generation under each alternative. To assign values to this generation, we first adjusted our standard composite energy value by the same proportions as used above to determine corresponding on-peak and off-peak values. We than assigned these values to on-peak and off-peak generation to determine the cost of alternative power for each alternative.

Table 4-2 (Appendix H) summarizes the costs of environmental mitigation and enhancement measures.

4.2 COMPARISON OF ALTERNATIVES

Table 4.3 (Appendix H) summarizes the installed capacity, annual generation, capacity benefit, alternative source of power's cost, estimated total project cost, and difference between the alternative source of power's cost and total project cost for each of the alternatives considered in this EIS: no-action, the applicant's proposal, the staff alternative, and staff alternative with mandatory conditions.

4.2.1 No-action Alternative

Under the no-action alternative, the project has an installed capacity of 135.0 MW, a capacity benefit of 132.0 MW, and an average annual generation of 177,487 MWh.[80] The alternative source of power's current annual cost to produce the same amount of energy and provide the same capacity benefit is $34,790,647. The total annual levelized project cost is $6,707,063. Subtracting the total annual levelized project cost from the alternative source of power's current annual cost, the project's cost to produce power and capacity is $28,083,584 less than the alternative source of power's cost.

4.2.2 Applicant's Proposal

Under the applicant's proposal, the project would have a total installed capacity of 137.5 MW, a capacity benefit of 132.0 MW, and an average annual generation of

[80] The project is currently required to release water to provide, in combination with intervening flows, a minimum flow of 45 cfs as measured at the downstream Wadley gage; however, these releases are provided through the turbines combined with intervening flows and do not result in reduced generation.

175,177 MWh.[81] The alternative source of power's cost to produce the same amount of energy and provide the same capacity benefit would be $34,329,137. The total annual levelized project cost would be $9,893,255.[82] Subtracting the total annual levelized project cost from the alternative source of power's current cost, the project's cost to produce power and capacity would be $24,435,882 less than the alternative source of power's cost.

4.2.3 Staff Alternative

Under the staff-recommended alternative, the project would have a total installed capacity of 135.0 MW, a capacity benefit of 132.0 MW, and an average annual generation of 147,306 MWh.[83] The alternative source of power's cost to produce the same amount of energy and provide the same capacity benefit would be $33,057,783.[84] The total annual levelized project cost would be $9,031,189.[85] [86] Subtracting the total annual levelized project cost from the alternative source of power's current cost, the project's cost to produce power and capacity would be $24,026,594 less than the alternative source of power's cost.

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[81] The applicant's proposal included installation of a minimum flow turbine which would pass a 300 cfs minimum flow. The applicant's proposal would reduce generation by 2,310 MWh per year, which is equivalent to the average annual generation of 220 U.S. households.

[82] The total annual levelized project cost does not include the cost of potential reductions in generation resulting from environmental measures. Reductions in generation are accounted for in the average annual generation for each alternative.

[83] The staff alternative does not include the 300 cfs minimum flow turbine proposed by the applicant. As noted in Appendix H, Table 4-2, the Staff Alternative includes measure (AR-12), for a seasonal continuous minimum flow between 300 and 450 cfs. This minimum flow would result in 30,181 MWh/yr of reduced generation, which is equivalent to the average annual generation of 2,874 U.S. households. Part of this energy could be recovered with a minimum flow turbine.

[84] As noted in Appendix H, Table 4-2, the Staff Alternative includes measure (AR-16) for up-ramping and down-ramping of main turbine operations that would have losses associated with moving generation from on-peak to off-peak. As noted in Appendix H, Table 4-2, measure (AR-16), staff determined the cost of this measure to be negligible.

[85] The total annual levelized project cost does not include the cost of potential reductions in generation resulting from environmental measures. Reductions in generation are accounted for in the average annual generation for each alternative.

[86] The Staff Alternative includes measure (AR-14) for developing a plan which includes a mechanism for providing the minimum flow. A cost is included for developing this plan; however, we do not have sufficient information to estimate costs to construct any structure or mechanism for passing the flow, which may be developed as part of the plan. Staff estimated a worst-case scenario for this cost, as noted in Appendix H, Table 4-2, measure (AR-14). Staff estimates the additional construction cost for this measure could be as high as $310,050 per year.

4.2.4 Staff Alternative with Mandatory Conditions

The section 401 certification (Appendix C) describes the mandatory conditions for the Harris Project. Staff recommends all the measures required by the section 401 certification; therefore, the generation, cost of this alternative, and total annual project cost are the same as the staff alternative.

4.3 COST OF ENVIRONMENTAL MEASURES

Table 4-2 (Appendix H) presents the costs of the environmental enhancement measures considered in our analysis. Unless otherwise noted, all capital and annual costs are based on Alabama Power's June 15, 2022 Revised FLA (Exhibit D, Table 5-1), escalated to 2023 dollars. We convert all costs to equal annual (levelized) values over a 30-year period of analysis to provide a uniform basis for comparing the benefits of each measure to its cost.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations of this EIS are presented in Appendix I.

6.0 LITERATURE CITED

The literature cited in this EIS is presented as Appendix K.

7.0 LIST OF RECIPIENTS

The list of recipients of this EIS is presented as Appendix M.

APPENDIX A
DEFINITIONS

Biological Oxygen Demand (BOD) – Biological oxygen demand represents the amount of oxygen consumed by microorganisms while they decompose organic matter.

Capacity Benefit – The benefit a project receives for providing capacity to the grid, which may be in the form of a dependable capacity credit or credit for monthly capacity provided.

Census Block Groups – Statistical divisions of census tracts that generally contain between 600 and 3,000 people (U.S. Census Bureau, 2021).

Drawdown Zone – The area of the reservoir within the operating range of project turbines.

Foliar Herbicide Applications – This refers to applying herbicides on the leaves of plants.

Hibernaculum (pl. "hibernacula") – a thermally-stable roost used by bats for extended periods of torpor during winter. A cave, natural cave-like feature (e.g., sinkhole, fissure, talus opening), or anthropogenic structure (e.g., mine, tunnel, bridge).

Hydric soil – Soil that is permanently or seasonally saturated, flooded, or ponding long enough during the growing season to develop anaerobic conditions.

Hydrophytic Vegetation – Hydrophytic, or water-loving vegetation, are plants which have adapted to growing in the low-oxygen (anaerobic) conditions associated with prolonged saturation or flooding. These plants have adapted to anaerobic soil conditions by evolving alternative methods of collecting oxygen.

Karst – An irregular limestone region with sinkholes, underground streams, and caves (natural chamber or series of chambers in the earth or in the side of a hill or cliff).

Lacustrine – Relating to or associated with lakes.

Littoral – Relating to or situated on the shore of the sea or a lake.

Lotic – Relating to or associated with moving water.

Minority– Individuals who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic (CEQ, 1997 at 25).

Minority Population– Block groups within the area of study where: (1) the aggregate minority population of the block group in the affected area exceeds 50%; or (2) the aggregate minority population in the block group affected is 10% higher than the aggregate minority population percentage in the county.

Most probable Number (MPN) – An estimate of a viable (i.e., living) microbe; in this case, *E. coli*. This estimate is determined by making serial dilutions of a sample and measuring the resulting concentration of microbes after growth in an inoculated medium.

Pluton – An intrusive type of igneous rock that forms when magma is forced into other layers of rock, usually in cracks, and cools underground, but can, over time, be exposed through erosion.

Ramping – Refers to variable flow operation of the turbines.

Recreation Day– Each visit by a person to a facility for recreational purposes during any portion of a 24-hour period.

Rule curve – A common method for managing water levels in storage reservoirs that sets time-dependent limits (often seasonally based) on reservoir elevations.

Slough – A swamp or shallow area of a lake, often a backwater to a larger body of water. Sloughs can be filled with deep mud or mire and have stagnant or slow-moving water on a seasonal basis.

Stratified – Layered.

Submaturely Dissected Plateau – A dissected plateau is a plateau area that has been severely eroded such that the relief is sharp. A submaturely dissected plateau is one in which the dissection occurred prior to complete differentiation.

Undertaking – A project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a federal agency, including those carried out by or on behalf of a federal agency; those carried out with Federal financial assistance; and those requiring a federal permit, license, or approval (36 C.F.R. § 800.16. For purposes of this NEPA document, the undertaking is the potential issuance of a new license for the Harris Project.

APPENDIX B
STATUTORY AND REGULATORY REQUIREMENTS

Federal Power Act[1]

Section 18 Fishway Prescriptions

Section 18 of the FPA states that the Commission is to require construction, operation, and maintenance by a licensee of such fishways as may be prescribed by the Secretaries of Commerce or the U.S. Department of the Interior (Interior). No section 18 fishway prescriptions or reservations of authority to prescribe fishways were filed.

Section 4(e) Conditions

Section 4(e) of the FPA provides that any license issued by the Commission for a project within a federal reservation will be subject to and contain such conditions as the Secretary of the responsible federal land management agency deems necessary for the adequate protection and use of the reservation. There are 4.9 acres of federal land administered by BLM within the project boundary at Harris Lake. No section 4(e) conditions were filed.

Section 10(j) Recommendations

Under section 10(j) of the FPA, 16 U.S.C. § 803(j)(1), each hydroelectric license issued by the Commission must include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, or enhancement of fish and wildlife resources affected by the project. The Commission is required to include these conditions in any new license, unless it determines that they are inconsistent with the purposes and requirements of the FPA or other applicable law. Before rejecting or modifying an agency recommendation, the Commission is required to attempt to resolve any such inconsistency with the agency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agency.

In response to the Commission's January 17, 2023, Ready for Environmental Analysis notice, on March 20, 2023, the Alabama Department of Conservation and Natural Resources (Alabama DCNR) filed recommendations under section 10(j). Alabama DCNR's recommendations are summarized in table 5-1 in the *Fish and Wildlife Agency Recommendations* section of Appendix I, *Conclusions and Recommendations*. In the *Comprehensive Development and Recommended Alternative* section of Appendix I, we discuss Alabama DCNR's recommendations.

Clean Water Act

Under section 401 of the Clean Water Act, the Commission may not issue a license for a hydroelectric project unless a license applicant obtains certification from the appropriate state pollution control agency verifying compliance with the act, or the state agency waives certification by either acting on the request or failing to act on the request within a reasonable time, not to exceed one year.

On March 3, 2023, Alabama Power applied to the Alabama Department of Environmental Management (Alabama DEM) for section 401 water quality certification (certification) for the R.L. Harris Hydroelectric Project, which Alabama DEM received the

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[1] References cited in Appendix B are found in Appendix K, *Literature Cited*.

same day. On December 4, 2023, Alabama Power filed a copy of Alabama DEM's preliminary certification conditions, dated November 29, 2023. These conditions are described in section 2.3, *Staff Alternative* and included in Appendix C.

Endangered Species Act

Section 7 of the Endangered Species Act (ESA) requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of the critical habitat of such species. On November 1, 2024, Commission staff accessed the U.S. Fish and Wildlife Service's (FWS) Information for Planning and Consultation (IPaC) database to determine whether any federally listed species could occur within the project boundary at Harris Lake and Skyline Wildlife Management Area (WMA)(FWS, 2024a).

For the Harris Lake portion of the project area, review of the IPaC database identified the following federally listed species that may occur within the project boundary, in the vicinity of Harris Lake, or be affected by the project: the endangered southern pigtoe, red-cockaded woodpecker, Indiana bat, and northern long-eared bat; the threatened finelined pocketbook, Georgia rockcress, white fringeless orchid, and little amphianthus; the proposed endangered tri-colored bat; the proposed threatened alligator snapping turtle; whooping crane (i.e., experimental, non-essential, population);[2] and the candidate monarch butterfly.

For the Skyline WMA portion of the project area, review of the IPaC database identified the following federally listed species that may occur within the project boundary, in the vicinity of Skyline WMA, or be affected by the project: the endangered palezone shiner, Alabama lampmussel, Cumberland bean, fine-rayed pigtoe, pale lilliput, snuffbox, shiny pigtoe, slabside pearlymussel, gray bat, Indiana bat, northern long-eared bat, and Morefield's leather flower; the threatened spotfin chub, rabbitsfoot, longsolid, round hickorynut, Price's potato-bean, white fringeless orchid, and American hart's-tongue fern; the proposed endangered Cumberland moccasinshell, Tennessee clubshell, Tennessee pigtoe, and tri-colored bat; a non-essential experimental population of whooping crane; and the candidate monarch butterfly.

The only known extant populations of palezone shiner occur in the Paint Rock River system, and the Little South Fork of the Cumberland River, both of which are outside the project boundary at Skyline Wildlife Management Area (Skyline WMA). No specimens were collected during Alabama Power's surveys at four locations on Little Coon Creek in June 2020. The spotfin chub's range extends to the western boundary of Skyline WMA, outside the project boundary. However, there are no published reports of occurrences of the species within the project boundary at Skyline WMA. The nearest critical habitat unit is southwest of Columbia, Tennessee and north of Florence, Alabama, which is over 110 miles from the project area. Due to the large role agricultural runoff plays in affecting water quality in Little Coon Creek and other streams in Skyline WMA, any sedimentation and erosion effects on water quality due to

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[2] For the purposes of ESA consultation, non-essential experimental populations are treated as threatened species on National Wildlife Refuge and National Park land (i.e., they require consultation under 7(a)(2) of the ESA), and as a proposed species on private land (i.e., no section 7(a)(2) requirements), but federal agencies must not jeopardize their existence (section 7(a)(4))) (FWS, no date).

Alabama Power's forestry management program would likely be minimal by comparison. In addition, Alabama Power would continue to implement Alabama's BMPs for forestry, as provided by the Alabama Forestry Commission. Therefore, relicensing the proposed project, with Alabama Power's proposed PME's, including implementing Alabama Power's proposed forestry management program, with the Forestry Commission's BMPs, would have "no effect" on these species or the spotfin chub critical habitat.

Nine of the federally listed mollusks (Alabama lampmussel, fine-rayed pigtoe, pale lilliput, rabbitsfoot, snuffbox, shiny pigtoe, slabside pearlymussel, longsolid, and round hickorynut) and the three proposed-listed mollusks occur in the Paint Rock River system which is beyond the western boundary of the Skyline WMA, and outside the project boundary. Critical habitat for the rabbitsfoot, slabside pearlymussel, longsolid, and round hickorynut is also located on the Paint Rock River system. Because the Paint Rock River system is outside the project boundary and is not hydrologically connected to the Skyline WMA, project operation and maintenance activities would not affect the aquatic habitat in the Paint Rock River system. The Cumberland bean's habitat range also extends to the western boundary of Skyline WMA, outside the project boundary. However, there are no published reports of occurrences of the species within the project boundary at Skyline WMA, and the species is considered extirpated from the state. Therefore, relicensing the proposed project, with Alabama Power's proposed protection measures, including implementing Alabama Power's proposed forestry management program, with the Forestry Commission's BMPs, would have "no effect" on these species or their designated critical habitat.

The finelined pocketbook's current range encompasses portions of the Harris Lake project boundary, primarily the Tallapoosa River arm of the lake. The nearest critical habitat unit (Unit 6) for the species is located immediately upstream of Harris Lake, north of the Highway 431 Bridge, on the Tallapoosa River. No specimens were collected from surveys in the Tallapoosa River upstream of Harris Lake in November 2019 and during surveys in the summer of 2020 on the Tallapoosa River and four of its tributaries. Nonetheless, portions of the species' habitat range encompass Harris Lake, and the species is currently being reintroduced into suitable historical habitats; thus, their potential presence cannot be ruled out. Therefore, Alabama Power's proposed operations, including lake level management and a continuous minimum flow of 300 cfs, as well as alternative downstream releases up to 800 cfs "may affect, but would not likely adversely affect" finelined pocketbook mussels and its critical habitat. The southern pigtoe is considered endemic to the Coosa River system. While southern pigtoe's habitat range overlaps with a portion of the Harris Lake project boundary, there are no published reports of occurrences of the species within the project boundary at Harris Lake. Moreover, no populations were identified during finelined pocketbook surveys in Carr Creek, which extends into the habitat range for the southern pigtoe. Given the unlikely presence of southern pigtoe in the project boundary, Alabama Power's proposed operations, including lake level management and a continuous minimum flow of 300 cfs, as well as all alternative downstream releases, "may affect, but would not likely adversely affect" the southern pigtoe. The nearest critical habitat for southern pigtoe mussel is located on Cheaha Creek, in the Talladega National Park, about 12 miles west of the northern most portion of the Harris Lake project boundary. Therefore, Alabama Power's proposed operations would have "no effect" on this species' designated critical habitat.

Red-cockaded woodpeckers historically occurred throughout Alabama and have been sighted recently in the Talladega National Forest, the Coosa Wildlife Management Area (WMA), and along a northeast-to-southwest strip between Alabama Routes 9 and 21, including an area at the northwest corner of Randolph County that is within the project boundary. Although Alabama Power's 2020 red cockaded woodpecker survey did not detect suitable or occupied red cockaded woodpecker habitat, only about 18% of the coniferous habitat in the project boundary at Harris Lake was surveyed and it did not include areas within dispersal range of known red cockaded woodpecker populations along the southwestern shoreline of Harris Lake, where Alabama Power proposes to continue to remove mature pine trees as part of its timber management activities, conduct prescribed burns on 160 acres of mostly natural pine forest, remove 3.7 acres of mixed pine forest during construction of a new recreation site, or the parcels proposed for removal from the project boundary. Therefore, this species' presence cannot be ruled out. Staff's recommended additional red cockaded woodpecker surveys and consultation with FWS and Alabama DCNR regarding the survey results prior to timber harvesting, prescribed burns, construction of the new recreation site, and removal of land at Harris Lake would allow Alabama Power to identify occupied habitats, recommend (for Commission approval) appropriate measures to protect this species, and incorporate Commission-approved protection measures into the WMP. We conclude that relicensing the project, with Alabama Power's proposed WMP and APP, and staff's additional recommendations, is "not likely to adversely affect" the red-cockaded woodpecker.

There have been no reported sightings of whooping cranes within the project boundary at Skyline WMA, Harris Lake, or along the Tallapoosa and Little Tallapoosa Rivers. However, the whooping crane was not evaluated during relicensing studies, and there are documented occurrences of this species in northern Alabama and southern Tennessee, as well as central Alabama during migrations between their primary wintering areas in west-central Florida and their core breeding/summering area in central Wisconsin. Potentially suitable foraging and/or roosting habitat for whooping cranes, including wetlands, marshy areas, sloughs and along lake margins, and upland grain fields occur on project land at Harris Lake. Given that any whooping cranes occurring at the project would be transient, and potential effects to this species could be avoided or minimized through implementation of Alabama Power's proposed project operation, WMP, SMP, Recreation Plan, APP, and Nuisance Aquatic Vegetation and Vector Control Program, as well as Alabama DCNR's recommended aquatic invasive species plan, with additional staff downstream flow recommendations, we find that relicensing the Harris Project is "not likely to adversely affect" the eastern migratory population of whooping crane.

The current range of the gray bat overlaps with project land at Skyline WMA, but Harris Lake is outside this species' range. There are no known occurrences of overwintering or summer roosting gray bats within the project boundary at Skyline WMA. However, Alabama Power did not conduct formal bat surveys as part of relicensing studies. Only 8 of the 236 caves within the project boundary at Skyline WMA were surveyed in 2020 for cultural resources and incidental observations of other bat species were documented at 3 of those caves. Therefore, whether gray bats are present within the project boundary at Skyline WMA is unknown. Other than implementing Alabama Forestry Commission's forestry BMPs, Alabama Power's draft WMP does not contain specific measures to protect gray bats that may use caves at Skyline WMA for winter or summer-roosting, from timber harvests and other forest management activities, or recreation activities, such as spelunking (exploring caves), hunting, and camping near caves. Staff's recommendation to conduct targeted gray bat surveys using FWS's protocols would identify any caves that may require protection from disturbances associated with timber harvesting and project-related recreation activities. Consultation with FWS and Alabama DCNR regarding the survey results prior to timber harvesting and other forest management activities would allow Alabama Power to identify occupied habitats, recommend (for Commission approval) appropriate measures to protect gray bats and their habitats, and incorporate Commission-approved protection measures into the WMP. Implementing protection measures at caves occupied by gray bats would avoid adverse effects to this species. We conclude that relicensing the project, with Alabama Power's proposed WMP, and the staff recommended measures described above, is "not likely to adversely affect" the gray bat.

Both Lake Harris and Skyline WMA are within the current ranges of the Indiana bat, northern long-eared bat, and tricolored bat. Although there are no known occurrences of Indiana or northern long-eared bats within the project boundary at Harris Lake or Skyline WMA, and no Indiana or northern long-eared bats were observed during Alabama Power's 2020 cultural resource surveys, Alabama Power assumes that these species are present. In addition, as mentioned above, Alabama Power did not conduct formal bat surveys as part of relicensing studies, but the 2020 cultural resources study that evaluated 8 caves on project land at Skyline WMA documented incidental observations of 45 tricolored bats in 3 of the caves including: 16 in Ginormous Sink Cave, 27 in Tate Cave, and 2 in Cane Cave. Additionally, one dead tricolored bat was observed in the water below a small waterfall within Ginormous Sink Cave and surveyors noted that it most likely washed out of a low passage during a flood surge. Alabama Power's draft WMP includes some measures protective of the Indiana and northern long-eared bats that would also likely benefit the tricolored bat such as: (a) consulting with resource agencies to identify any known locations of maternity roost trees and hibernacula for these species and following current FWS guidance regarding timber management in/near these habitats; (b) retaining snags and live trees with potential roost tree characteristics, and (c) avoiding damage to potential roost trees during harvests, especially high-quality snags during the pup season. However, the draft WMP does not include provisions to survey timber management units for Indiana, northern long-eared, and tricolored bats prior to harvests on project land at Skyline WMA and Harris Lake. Similarly, the draft Recreation Plan and SMP do not include provisions for surveying for these species prior to tree removal associated with the proposed Highway 48 Day Use Park, or the removal of parcels of Natural/Undeveloped land from the project boundary at Harris Lake. Without surveys prior to timber harvests and construction, existing roost trees, including maternity roosts, could be removed and existing hibernacula for these species could be disturbed. Federally listed bats on land removed from the project boundary would lose federal protection. Conducting Indiana, northern long-eared, and tricolored bat surveys using FWS's current survey guidelines would help Alabama Power to identify any caves and summer roost trees that may require protection from disturbances associated with timber harvesting activities, project recreation, construction of the day use park, and removal from the project boundary. Implementing any Commission-approved protection measures at caves and summer roosts occupied by Indiana, northern long-eared, and tricolored would avoid adverse effects to this species. We conclude that relicensing the project, with Alabama Power's proposed WMP, and the staff recommended measures described above, is "not likely to adversely affect" the Indiana bat or the northern long-eared bat. There is no critical habitat for Indiana bats in Alabama and relicensing the project would have "no effect" on the Indiana bat's critical habitat units, which are all located in other states. In addition, we conclude that relicensing the project, with Alabama Power's proposed WMP, and the staff recommended measures described above, would not be sufficient to preclude both the survival and recovery of (i.e., jeopardize) the tricolored bat. Therefore, we do not believe a formal conference is required. However, we have determined an informal conference is appropriate as the project may affect, but is not likely to adversely affect, the tricolored bat.

The alligator snapping turtle range overlaps with project land at Harris Lake and its tributary streams. Project operation would not change the existing shoreline, littoral, and lake bottom habitat available to alligator snapping turtles at Harris Lake and the proposed and recommended increase in minimum flows downstream from Harris Dam would increase riverine/littoral habitat and improve conditions for alligator snapping turtle prey species in the Tallapoosa River downstream from Harris Dam compared with existing project operation. Provisions in the SMP to preserve natural shorelines would also benefit this species. However, alligator snapping turtles could be inadvertently injured due to project-related recreation on Harris Lake (e.g., by boat propellers or entanglement in fishing gear). In addition, constructing the proposed recreation amenities at Harris Lake and in the project tailrace, maintenance at boat ramps, dredging and seawalls that may be permitted along the shoreline could affect this species. Staff's recommendation to report alligator snapping turtle sightings to FWS and Alabama DCNR, and subsequent consultation with these agencies regarding the sighting would facilitate a review of potential project-related effects to observed individuals and the development of protection measures, for approval by the Commission. We conclude that relicensing the project, as proposed by Alabama Power, and with the staff recommended measures, would not be sufficient to preclude both the survival and recovery of (i.e., jeopardize) the alligator snapping turtle. Therefore, we do not believe a formal conference is required. However, we have determined an informal conference is appropriate as the project may affect, but is not likely to adversely affect, the alligator snapping turtle.

The monarch butterfly's current habitat range covers both the Harris Lake and Skyline project boundaries and monarchs have been observed incidentally at the project. Alabama Power's pollinator plots at Little Fox Creek (i.e., within the project boundary at Harris Lake) preserve habitat for monarchs and other pollinators. However, monarchs could be adversely affected by vegetation management practices that affect milkweeds and other native plants that provide forage for this species, as well as by the use of pesticides. With the staff-recommended measures to protect monarchs and their habitats in the final WMP, potential effects to monarchs would likely be incidental and minor. We conclude that relicensing the project, with Alabama Power's proposed WMP, and the staff recommended measures, is unlikely to have a significant effect of the monarch butterfly. No further action under the ESA is necessary.

The range of Georgia rockcress overlaps with project land at Harris Lake, the ranges of Price's potato-bean, Morefield's leather flower, and American hart's-tongue fern overlap with project land at Skyline WMA, and the range of white fringeless orchid overlaps with both Harris Lake and Skyline WMA. Generally, these species could be affected by timber harvesting, road construction, and recreation activities that disturb the soil, eliminate tree canopy, and/or facilitate the spread of non-native, invasive plants. Although Alabama Power conducted surveys for white fringeless orchid at both Harris Lake and Skyline WMA and Price's potato bean at Skyline WMA, these species are difficult to detect so they could have been missed during Alabama Power's surveys, and there is additional suitable habitat that could be affected by timber harvesting. In addition, there is no survey data available for Georgia rockcress, Morefield's leather-flower, and American hart's-tongue fern because these species did not appear on the initial IPaC species list for the project and so they were not evaluated during relicensing studies. Staff's recommendation to include in the final WMP, provisions to conduct additional species-specific surveys for these plants (i.e., within their respective ranges) prior to conducting soil disturbing activities and removing land from the project boundary would help identify undocumented occurrences of these species. Consulting with FWS and Alabama DCNR regarding the survey results would facilitate the development of measures, for Commission review and approval, if necessary, to protect any identified occurrences of this species from project-related effects. In addition, the nearest Georgia rockcress critical habitat unit on the Coosa River in Fort Toulouse State Park is over 60 miles southwest of the Harris Lake project boundary. Due to the distance and hydrologic setting, this population of Georgia rockcress is not directly affected by water fluctuations in the Tallapoosa River downstream from Harris Dam. We conclude that that relicensing the project, as proposed by Alabama Power, and with the staff recommended measures described above, is "not likely to adversely affect" the Georgia rockcress, white fringeless orchid, Price's potato-bean, Morefield's leather-flower, and American hart's-tongue fern, and would have "no effect" on Georgia rockcress critical habitat.

The range for the little amphianthus previously included project land at Harris Lake; however, project land at both Harris Lake and Skyline WMA is currently outside this species' range. Little amphianthus was evaluated during Alabama Power's relicensing studies, but was not observed at the project. This species has not been observed at Harris Lake since March 1995 and is assumed to be extirpated. We conclude that relicensing the project, as proposed by Alabama Power, and with the staff recommended measures described above, would have "no effect" on the little amphianthus.

Our analyses of project effects on threatened and endangered species are presented in Appendix D, *Biological Assessment*, and our recommendations are provided in Appendix I, under *Comprehensive Development and Recommended Alternative*.

Coastal Zone Management Act

Under section 307(c)(3)(A) of the Coastal Zone Management Act (CZMA), 16 U.S.C. § 1456(3)(A), the Commission cannot issue a license for a project within or affecting a state's coastal zone unless the state CZMA agency concurs with the license applicant's certification of consistency with the state's CZMA program, or the agency's concurrence is conclusively presumed by its failure to act within 180 days of its receipt of the applicant's certification request.

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.[3] Implementation of the ACAMP is shared by the Alabama Department of Conservation and Natural Resources (Alabama DCNR) and the Alabama Department of

[3] A map of Alabama's Alabama Coastal Area Management Program Coastal Area Boundary is available on the Alabama DEM's Coastal Programs webpage at https://adem.alabama.gov/programs/coastal/default.cnt.

Environmental Management (Alabama DEM). In a letter dated June 2, 2021, which was appended to the final license application, Alabama DEM noted that, due to the geographic location and nature of the Harris Project, there would be no reasonably foreseeable effects on uses or resources in Alabama's coastal zone resulting from the proposed action.

National Historic Preservation Act

In its NOI (July 31, 2018), the Commission designated Alabama Power as the non-federal representative for carrying out informal consultation pursuant to section 106 of the National Historic Preservation Act (NHPA). Section 106 requires that every federal agency "take into account" how each of its undertakings could affect historic properties. Historic properties are districts, sites, buildings, structures, traditional cultural properties, and objects significant in American history, architecture, engineering, and culture that are eligible for inclusion in the National Register of Historic Places (National Register).

To meet the requirements of section 106, the Commission will execute a Programmatic Agreement (PA) for the protection of historic properties from the effects of the operation of the Harris Project. The terms of the PA would ensure that Alabama Power addresses and treats all historic properties identified within the project's area of potential effects (APE) through the implementation of a final Historic Properties Management Plan (HPMP). Alabama Power filed a draft HPMP with the Commission on November 23, 2021 (Alabama Power and Kleinschmidt Associates, 2021b).

APPENDIX C
FINAL WATER QUALITY CERTIFICATION CONDITIONS FOR THE R.L. HARRIS HYDROELECTRIC PROJECT ISSUED BY THE ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT ISSUED ON NOVEMBER 29, 2023

LANCE R. LEFLEUR
DIRECTOR

KAY IVEY
GOVERNOR

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November 29, 2023

Mr. Mike Godfrey
Environmental Affairs Manager
Alabama Power Company
600 North 18th Street
P.O. Box 2641
Birmingham, AL 35291

RE: Water Quality Certification
R.L. Harris Hydroelectric Project
FERC Project No. 2628

Dear Mr. Godfrey:

Because action pertinent to water quality certification is required by Section 401(a)(1) of the Clean Water Act, 33 U.S.C. Section 1251, et seq., the Alabama Department of Environmental Management (ADEM) hereby issues certification that there is reasonable assurance that the proposed project, as outlined in the licensee's November 2021 Final License Application to the Federal Energy Regulatory Commission (FERC), will not violate applicable water quality standards established under Section 303 of the Clean Water Act and Title 22, Section 22-22-9(g), Code of Alabama, 1975, provided the applicant acts in accordance with the following conditions as specified for the hydroelectric development included in FERC project number 2628.

LIMITATIONS

1. The operation of the R.L. Harris Hydroelectric Project, including but not limited to, the operation of the existing turbines, the turbine aeration systems, the skimmer weir, and the proposed continuous minimum flow, shall be managed such that no less than 5.0 mg/L of dissolved oxygen (DO) shall be maintained at all times in the tailrace waters below R.L. Harris Dam.

COMPLIANCE SCHEDULE

2. Alabama Power Company (APC) shall implement measures to maintain the DO downstream of R.L. Harris Hydroelectric Project to comply with the limitations herein through structural and/or operational modifications throughout the duration of the FERC license. If monitoring results do not demonstrate compliance with state

Birmingham Branch
110 Vulcan Road
Birmingham, AL 35209-4702
(205) 942-6168
(205) 941-1603 (FAX)

Decatur Branch
2715 Sandlin Road, S.W.
Decatur, AL 35603-1333
(256) 353-1713
(256) 340-9359 (FAX)

Mobile Branch
2204 Perimeter Road
Mobile, AL 36615-1131
(251) 450-3400
(251) 479-2593 (FAX)

Mobile-Coastal
4171 Commanders Drive
Mobile, AL 36615-1421
(251) 432-6533
(251) 432-6598 (FAX)

water quality standards after structural and/or operational modifications have been implemented, as outlined in the Final License Application, Alabama Power Company shall develop and implement additional measures to ensure compliance with limitations described in Paragraph 1.

MONITORING AND REPORTING

3. APC shall conduct monitoring in the R.L. Harris Dam tailrace to determine compliance with Paragraphs 1 and 2. The monitor shall be located approximately 800 feet downstream of the dam on the west bank of the river at 33.255448° N and 85.615765° W. The tailrace monitor shall record dissolved oxygen and temperature at 15-minute intervals for the period January 1 through December 31. Monitoring shall be at a depth of 5 feet below the water surface if the total depth is 10 feet or greater, or at mid-depth if the total depth is less than 10 feet. Monitoring shall begin no later than 1 year after issuance of the Final FERC License and continue for the duration of the License as outlined in Paragraph 2.

4. APC shall coordinate with USGS to conduct additional monitoring of the Tallapoosa River to document water quality conditions following APC's proposed structural and operational changes as outlined in the Final November 2021 License Application. River monitoring shall begin no later than one year after issuance of the Final FERC License and continue for the duration of the License. All river monitoring data shall be collected, stored, and maintained by USGS and made available to the public via the National Water Information System (NWIS). The river monitoring locations and additional requirements are as follows:

   A. Tallapoosa River at Malone, AL (USGS Station 02414300). The approximate location is at 33.197062° N and 85.577177° W. APC shall contract with USGS to operate and maintain this gaging station and collect river stage (ft), river flow (cfs), water temperature (°F) and dissolved oxygen (mg/L) on a continuous basis (15-minute interval at minimum) for the period January 1 to December 31. Monitoring shall be at a depth of 5 feet below the water surface if the total depth is 10 feet or greater, or at mid-depth if the total depth is less than 10 feet.

   B. Tallapoosa River at Wadley, AL (USGS Station 02414500). The approximate location is at 33.116787° N and 85.560788° W. APC shall contract with USGS to operate and maintain this gaging station and collect river stage (ft), river flow (cfs), water temperature (°F) and dissolved oxygen (mg/L) on a continuous basis (15-minute interval at minimum) for the period January 1 to December 31. Monitoring shall be at a depth of 5 feet below the water surface if the total depth is 10 feet or greater, or at mid-depth if the total depth is less than 10 feet.

5. During the term of the new FERC license, APC and ADEM may work together to modify the monitoring and reporting requirements.

6. All monitoring shall be conducted according to applicable ADEM and/or USGS Standard Operating Procedures (SOPs). All monitoring equipment shall receive appropriate maintenance and calibration utilizing the manufacturer's recommended procedures or other equivalent methods.

7. Subsequent to implementation of APC's proposed structural and operational changes, dissolved oxygen and temperature monitoring reports shall be submitted with appropriate certifications to ADEM within 90 days following the end of the annual monitoring period. In addition to dissolved oxygen and temperature data, the monitoring reports shall specify whether turbines were in operation at the time of the Harris tailrace dissolved oxygen and temperature measurements and the discharge rate of water flow passing through each turbine at the time of the measurements. The annual reports shall also include an assessment of the effects of the operation of the R.L. Harris Hydroelectric Project on the State of Alabama's water quality standards using the results of the monitoring as described in the previous paragraphs. Annual monitoring reports shall be submitted in an electronic form compatible with the Microsoft™ Excel and Word software.

The Department also certifies that there are no applicable effluent limitations nor other limitations imposed under Sections 301(b) or 302 or other standards imposed under Sections 306 or 307 of the Clean Water Act. This certification does not, however, exempt Alabama Power Company from requirements imposed under the National Pollutant Discharge Elimination System for other discharges at these facilities regulated by the Department.

Should you have any questions, please contact me at (334) 271-7823 or Mr. Chris Johnson, Chief, Water Quality Branch at (334) 271-7827.

Sincerely,

Jeffery W. Kitchens

Jeffery W. Kitchens, Chief
Water Division

JWK/CLJ/djm

APPENDIX D
BIOLOGICAL ASSESSMENT

APPENDIX D – BIOLOGICAL ASSESSMENT

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BIOLOGICAL ASSESSMENT

Introduction

As described in Appendix B, under the *Endangered Species Act* (ESA), the federally listed species that potentially occur within the project boundary, in the vicinity of Harris Lake, or could be affected by the project, include: the endangered southern pigtoe, red-cockaded woodpecker, Indiana bat, and northern long-eared bat; the threatened finelined pocketbook, Georgia rockcress, white fringeless orchid, and little amphianthus;[4] the proposed endangered tri-colored bat;[5] the proposed threatened alligator snapping turtle; whooping crane (i.e., experimental, non-essential, population);[6] and the candidate monarch butterfly (table D-1) (FWS, 2018a; 2021h; 2023; and 2024kk).

In addition, the federally listed species that potentially occur in Skyline WMA portion of the project area, or could be affected by the project, include: the endangered palezone shiner, Alabama lampmussel, fine-rayed pigtoe, pale lilliput, Cumberland bean, snuffbox,[7] shiny pigtoe, slabside pearlymussel, gray bat, Indiana bat, northern long-eared bat, and Morefield's leather flower; the threatened spotfin chub,[8] longsolid, rabbitsfoot, round hickorynut, Price's potato-bean, white fringeless orchid, and American hart's-tongue fern; the

[4] Little amphianthus was evaluated as part of the relicensing studies and was included in the IPaC species lists for Harris Lake filed on July 30, 2018, and September 28, 2021 (FWS, 2018a; 2021h). However, little amphianthus was not included in the January 30, 2023, or the November 1, 2024, lists (FWS, 2023; 2024kk).

[5] Tri-colored bat was evaluated as part of the relicensing studies. This species was not included in the IPaC species lists for Harris Lake and Skyline WMA on July 30, 2018, and September 28, 2021 (FWS 2018a; 2021h). However, staff included it in its IPaC memo filed on January 30, 2023, given that FWS proposed to list the tricolored bat as an endangered species under the ESA on September 14, 2022, and the range of the tricolored bat includes all of Alabama (FWS, 2023). *See* 87 Fed. Reg. 56,381-56,393 (September 14, 2022). The tricolored bat appears on the November 1, 2024 IPaC list (FWS, 2024kk).

[6] For the purposes of ESA consultation, non-essential experimental populations are treated as threatened species on National Wildlife Refuge and National Park land (i.e., they require consultation under 7(a)(2) of the ESA), and as a proposed species on private land (i.e., no section 7(a)(2) requirements), but federal agencies must not jeopardize their existence (section 7(a)(4) requirements) (FWS, no date).

[7] Cumberland bean and snuffbox were included in the IPaC species list for the Skyline WMA portion of the Harris Project boundary filed on July 30, 2018, and September 28, 2021 (FWS, 2018a; 2021h). However, it was not included in the January 30, 2023, or the November 1, 2024 lists (FWS, 2023; 2024kk).

[8] Spotfin chub was included in the IPaC species list for the Skyline WMA portion of the Harris Project boundary filed on July 30, 2018, and September 28, 2021 (FWS, 2018a; 2021h). However, it was not included in the January 30, 2023, or the November 1, 2024 lists (FWS, 2023; 2024kk).

proposed endangered Cumberland moccasinshell, Tennessee clubshell, Tennessee pigtoe, and tri-colored bat; a non-essential experimental population of whooping crane; and the candidate monarch butterfly (table 1).

This section describes the status, habitat requirements, and likelihood of occurrence for each of these species.

Table D-1. Federally listed threatened and endangered species with potential to occur in the R.L. Harris Project area (Source: Kleinschmidt, 2021; Alabama NHP, 2020; FWS, 2018a; 2021h; 2023; and 2024kk).

Common Name (*Scientific Name*)	**Federal Status**[1]	**State Status**[2]	**Critical Habitat (Y/N)**	**Current Range in Alabama**	**Recent (1995-2020) Project Occurrence(s)**
		Aquatic Species			
Palezone Shiner (*Notropis albizonatus*)	E	SP	N	Paint Rock River	No
Spotfin Chub (*Erimonax monachus*)	T	SP	Y	Tennessee River system	No
Alabama Lampmussel (*Lampsilis virescens*)	E	SP	N	Tennessee River system above Muscle Shoals	No
Cumberland Bean (*Villosa trabalis*)	E	SP	N	Tennessee River system above Muscle Shoals	No
Fine-rayed Pigtoe (*Fusconaia cuneolus*)	E	SP	N	Tennessee River system above Muscle Shoals	No
Pale Lilliput (*Toxolasma cylindrellus*)	E	SP	N	Paint Rock River; Tennessee River system	No
Rabbitsfoot (*Quadrula cylindrica cylindrica*)	T	SP	Y	Elk and Paint Rock Rivers; Bear Creek; Tennessee River system	No
Snuffbox (*Epioblasma triquetra*)	E	PSM	N	Paint Rock River; Tennessee River system	No
Shiny Pigtoe (*Fusconaia cor*)	E	SP	N	Paint Rock River; Tennessee River near Muscle Shoals	No
Slabside Pearlymussel (*Pleuronaia dolabelloides*)	E	SP	Y	Paint Rock River, Shoal Creek, Pickwick Lake; Tennessee River system	No
Finelined Pocketbook (*Hamiota altilis*)	T	SP	Y	Coosa, Tallapoosa, and Cahaba River systems; Blackburn Fork, Little Warrior River, Big Willis Creek	No

Common Name (*Scientific Name*)	**Federal Status[1]**	**State Status[2]**	**Critical Habitat (Y/N)**	**Current Range in Alabama**	**Recent (1995-2020) Project Occurrence(s)**
Southern Pigtoe (*Pleurobema georgianum*)	E	SP	Y	Coosa River system; Talladega and Hatchet Creeks	No
Cumberland Moccasinshell (*Medionidus conradicus*)	PE	SP	N	Tennessee River system	No
Longsolid (*Fusconaia subrotunda*)	T	SP	Y	Tennessee River system	No
Round Hickorynut (*Obovaria subrotunda*)	T	SP	Y	Tennessee River system	No
Tennessee Clubshell (*Pleurobema oviforme*)	PE	PSM	N	Tennessee River system	No
Tennessee Pigtoe (*Pleuronaia barnesiana*)	PE	SP	N	Tennessee River system	No
Terrestrial Species					
Red-cockaded Woodpecker (*Picoides borealis*)	E	SP	N	Cleburne, Calhoun, Clay Counties; Talladega National Forest, Coosa Wildlife Management Area	No
Whooping Crane (*Grus americana*)	EXPN	SP	N	Limestone, Madison, and Morgan Counties; Wheeler National Wildlife Refuge	No
Gray Bat (*Myotis grisescens*)	E	SP	N	North of Bankhead National Forest; Northeast of Talladega National Forest	Yes[9]
Indiana Bat (*Myotis sodalis*)	E	SP	Y	Northern half of the state	Yes
Northern Long-eared Bat (*Myotis septentrionalis*)	E	SP	N	Paint Rock River, Bankhead National Forest, Pickwick Lake, Cedar Creek	Yes
Tricolored Bat (*Perimyotis subflavus*)	PE	-	N	Statewide in appropriate habitat	Yes (Skyline); Unknown—not evaluated during relicensing studies (Harris Lake).

[9] See 2020 Skyline Cave Assessment (Alabama Power, 2021a).

Common Name (*Scientific Name*)	**Federal Status[1]**	**State Status[2]**	**Critical Habitat (Y/N)**	**Current Range in Alabama**	**Recent (1995-2020) Project Occurrence(s)**
Alligator Snapping Turtle (*Macrochelys temminckii*)	PT	SP	N	South of Bankhead National Forest; Southwest of Gadsden	No (Skyline outside of range); Unknown—not evaluated during relicensing studies (Harris Lake).
Monarch Butterfly (*Danaus plexippus*)	C	-	N	Statewide	Assumed Present
Georgia Rockcress (*Arabis georgiana*)	T	-	Y	Southeast of Tuscaloosa and Gadsden; North of Dothan and Montgomery	Unknown—not evaluated during relicensing studies.
Morefield's Leather Flower (*Clematis morefieldii*)	E	-	N	Jackson, Marshall and Madison Counties	No
White Fringeless Orchid (*Platanthera integrilabia*)	T	-	N	Tallapoosa River, Paint Rock River, Cedar Creek and Hatchet Creek drainages	No
Price's Potato-bean (*Apios priceana*)	T	-	N	North of Tennessee River, NE of Huntsville; Bankhead National Forest; Alabama River between Montgomery and Selma	Yes
American Hart's-tongue Fern (*Asplenium scolopendrium var. americanum*)	T	-	N	Jackson County, North of Tennessee River, NE of Huntsville; Morgan County South of Rte. 36	No
Little Amphianthus (*Amphianthus pusillus*)	T	-	N	SE and SW corners of Randolph County, NW Chambers County	Yes

1 E = endangered; T = threatened; PE = proposed endangered; PT = proposed threatened; EXPN = Experimental population, Non-essential; C = candidate species

2 SP = State-Protected; PSM = Partial Status Mussels (Alabama NHP, 2020)

Affected Environment

Aquatic Species

Palezone Shiner

The U.S. Fish and Wildlife Service (FWS) listed the palezone shiner as an endangered species under the ESA in 1993.[10] It is also listed as an Alabama state protected species (Alabama NHP, 2020). No critical habitat has been designated for the species (FWS, 2024a).

The palezone shiner is a small, slender minnow species with a pointed snout and large eyes (FWS, 2014). 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. The species is found in runs and pools of large creeks and small rivers with clean bedrock, cobble, gravel, and sand (FWS, 2014). Spawning likely occurs between May and July, peaking in June. Historically, the species was found in the Tennessee and Cumberland River systems (FWS, 2014). Currently, 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 the project boundary at Skyline WMA (FWS, 2014; figure D-1).

Current threats to the species include: (1) water quality degradation from coal mining activities; (2) reservoir construction and loss of free-flowing stream habitat; (3) removal of riparian vegetation and increases in stream temperatures; (4) stream channelization; (5) increased siltation associated with poor agricultural and mining practices; and (6) deforestation of watersheds (FWS, 2014). In addition, climate change has the potential to increase the vulnerability of the palezone shiner to random detrimental events and limited distribution makes this species vulnerable to extinction (FWS, 2014).

At the request of FWS, and due to the potential presence of the species in tributaries with Skyline WMA, Alabama Power conducted surveys for palezone shiner at four locations on Little Coon Creek in June 2020 (figure D-2). Alabama Power and Alabama DEM surveyors performed fish IBI (Index of Biotic Integrity) 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, 2021).

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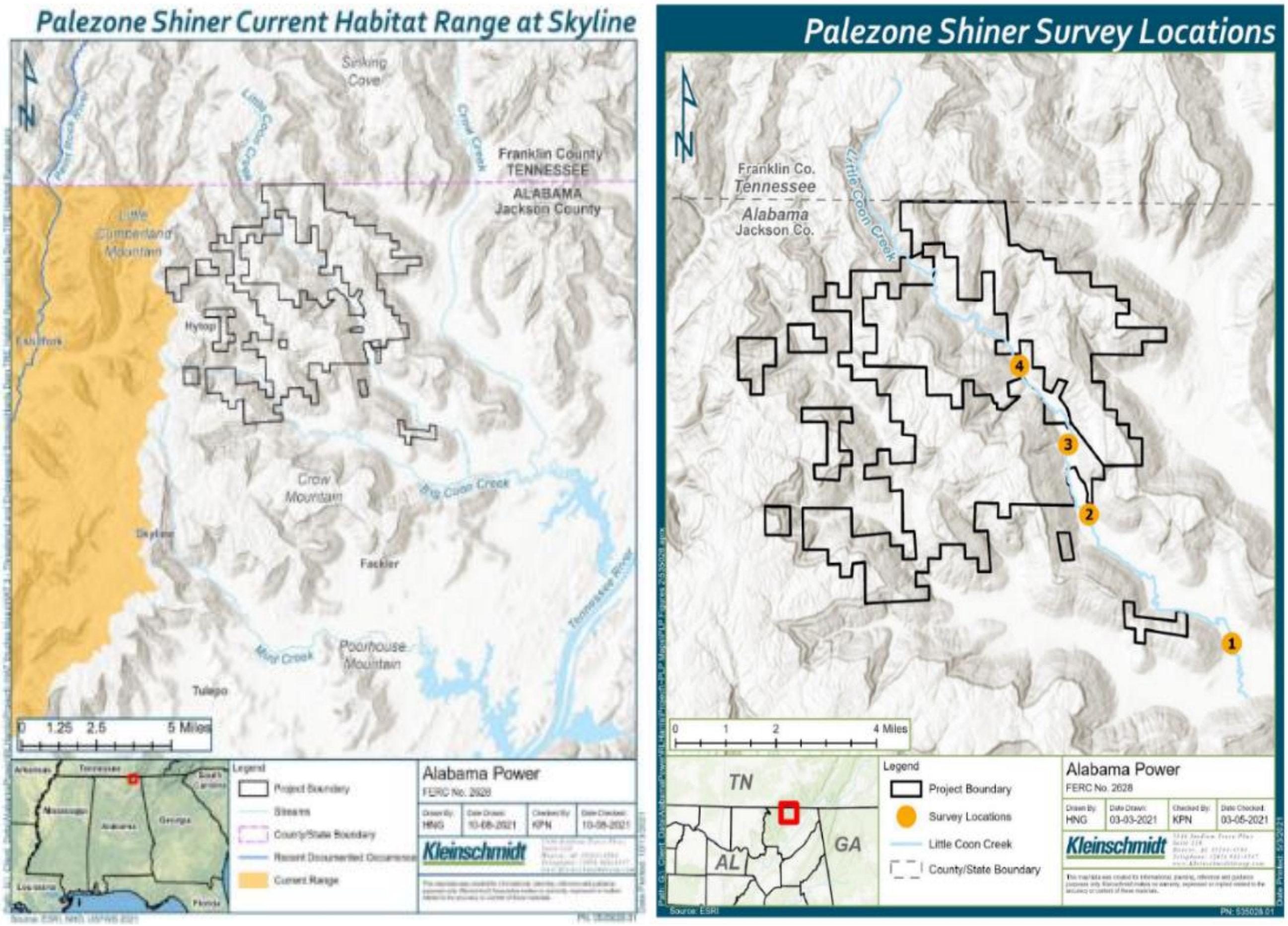
[10] 58 Fed. Reg. 25758-225763 (April 27, 1993).



Figures D-1 and D-2. Palezone Shiner Current Range in Relation to the Project Boundary Near Skyline WMA and Survey Location (Source: Kleinschmidt, 2021).

Spotfin Chub

FWS listed the spotfin chub as threatened under the ESA, and designated critical habitat for the species, in 1977.[11] It is also listed as an Alabama state protected species (Alabama NHP, 2020).

Spotfin chubs are elongate minnows with dusky green coloration above the lateral line and silver below (FWS, 2019a). Breeding males develop a metallic blue coloration and white fin margins. Spawning probably occurs between May and August. The species is found in clear, large creeks and medium-sized rivers with moderate current over bedrock and gravel substrates (FWS, 2019a).

Historically, the species was endemic to upland habitats in the Tennessee River drainage, including parts of Alabama (FWS, 2019a). However, it is presumed to be extirpated

[11] 42 Fed. Reg. 45526-45530 (September 9, 1977); critical habitat corrected and augmented in 42 Fed. Reg. 47840-47845 (September 22, 1977).

in Alabama and Georgia. Ongoing threats to the species include habitat loss and degradation, habitat fragmentation and population isolation, cold water temperatures, pollution, water withdrawals, and climate change (FWS, 2019a).

The spotfin chub's range extends to the western boundary of Skyline WMA, outside the project boundary (figure D-3). However, there are no published reports of occurrences of the species within the project boundary at Skyline WMA. The nearest critical habitat unit is southwest of Columbia, Tennessee and north of Florence, Alabama, which is over 110 miles from the project area.

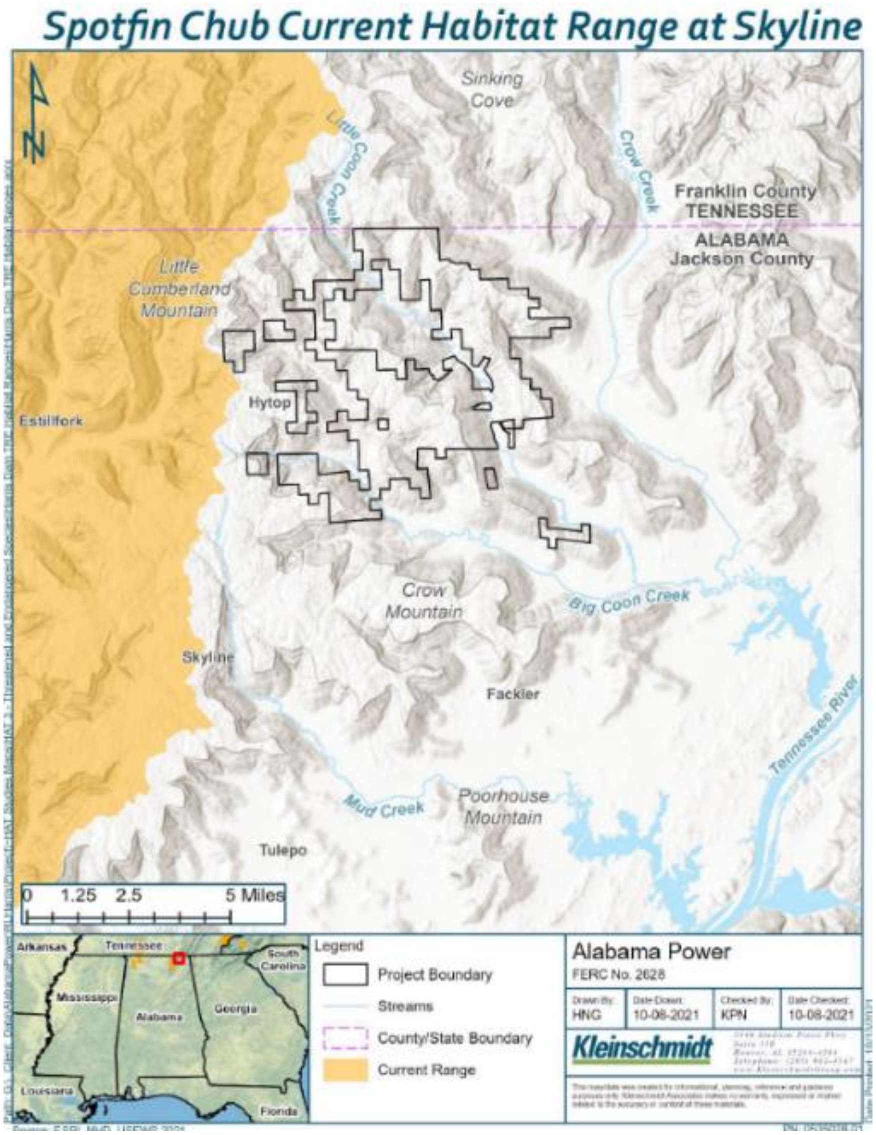


Figure D-3. Spotfin Chub Current Range in Relation to the Project Boundary Near Skyline WMA (Source: Kleinschmidt, 2021).

Finelined Pocketbook

FWS listed the finelined pocketbook as threatened under the ESA in 1993,[12] and designated critical habitat for the species in 2004.[13] It is also listed as an Alabama state protected species (Alabama NHP, 2020).

The finelined pocketbook is a sub-oval shaped mussel that has a maximum length of about 3⅜ inches (Mirarchi et al., 2004). The finelined pocketbook releases glochidia from March through June. Confirmed host species include the blackspotted topminnow, redeye bass,[14] spotted bass,[15] largemouth bass, and green sunfish (Mirarchi et al., 2004). The finelined pocketbook 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, the species existed in the Alabama, Tombigbee, Black Warrior, Cahaba, Tallapoosa, and Coosa Rivers, and their tributaries (FWS, 2004). Alabama DCNR and FWS are currently reintroducing the finelined pocketbook into suitable historical habitats within the state (FWS, 2019b).

The historic construction of dams and impoundments is the primary cause of the decline in finelined pocketbook's distribution and population size and continues to be a major threat to the species' persistence. In addition, the species continues to be imperiled due to a range of threats, including: (1) water withdrawal; (2) water quality degradation, including sedimentation released from dams and agricultural runoff; (3) downstream flow alterations caused by hydropeaking dams; and (4) climate change (FWS, 2019b).

The finelined pocketbook's current range encompasses portions of the Harris Lake project boundary, primarily the Tallapoosa River arm of the lake (figure D-4). There are no critical habitat units, as identified by FWS, within the Harris Lake project boundary. The nearest critical habitat unit (Unit 6) for the species, though, is located immediately upstream of Harris Lake, north of the Highway 431 Bridge, on the Tallapoosa River (FWS, 2004) (figure D-5).

FWS recommended surveys for finelined pocketbook due to the proximity of critical habitat to the Harris Lake project boundary. On November 21, 2019, Alabama Power, Kleinschmidt, and FWS biologists surveyed the Tallapoosa River upstream of Harris Lake for finelined pocketbook (table D-2). Additional surveys were conducted in the summer of 2020 by Alabama Power and Alabama DCNR biologists on the Tallapoosa River and four of its tributaries (i.e., Carr Creek, Ketchepedrakee Creek, Little Ketchepedrakee Creek, and Mad Indian Creek (figures D-6 and D-7) and the Little Tallapoosa and one of its tributaries (Pineywood Creek) (figure D-8). During the surveys, critical habitat within the Tallapoosa River was observed to be degraded by siltation. The secondary tributaries had a similar lack of good habitat (Kleinschmidt, 2021). Overall mussel diversity and density was low across sites (Kleinschmidt, 2021). To date, no finelined pocketbook mussels have been observed at any of the survey sites and no populations of the mussel species have been found to exist within the

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[12] 58 Fed. Reg. 14330-14340 (March 17, 1993).

[13] 69 Fed. Reg. 40084-40171 (July 1, 2004).

[14] Identified as Tallapoosa bass in the Tallapoosa River Basin.

[15] Identified as Alabama bass in the Tallapoosa River Basin.

Harris Lake project boundary, or in reaches of the Tallapoosa River affected by project operation (Kleinschmidt, 2021).

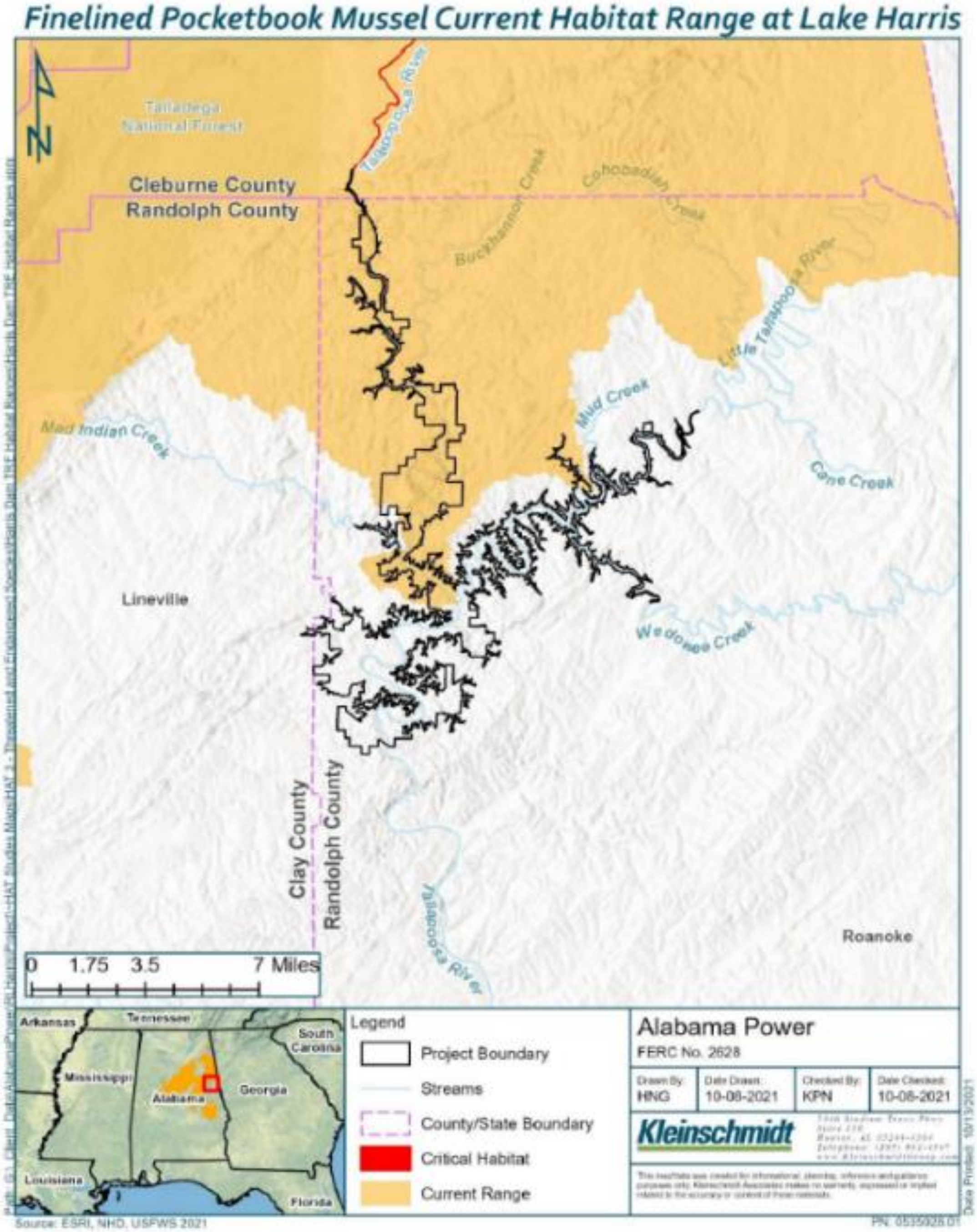
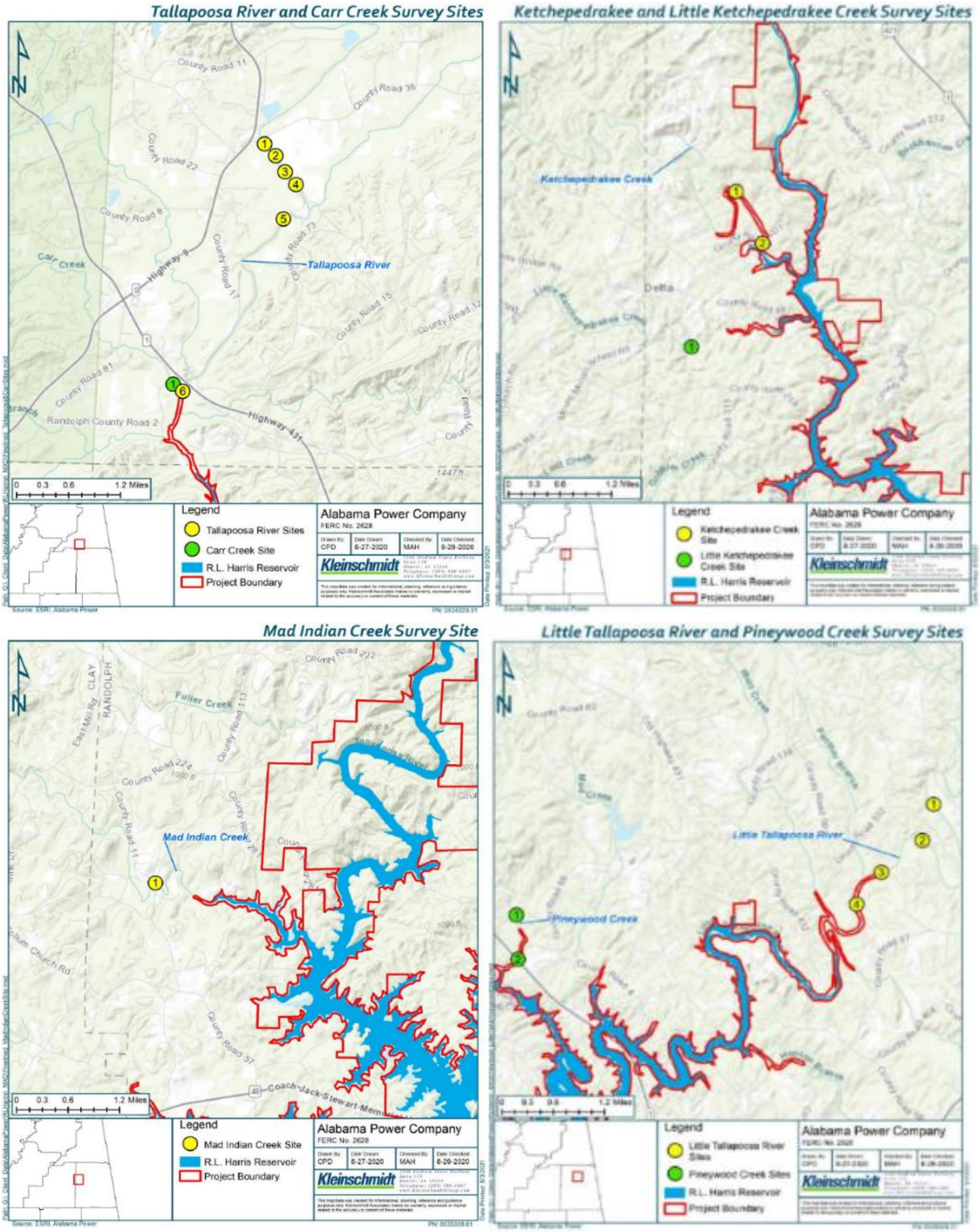


Figure D-4. Finelined Pocketbook's Current Range and Critical Habitat in the Harris Lake Project Area (Source: Kleinschmidt, 2021).

Table D-2. Finelined Pocketbook Survey Locations, 2019–2020 (Source: Kleinschmidt, 2021).

Tributary	Site Number	Miles Upstream of Confluence[1]	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	

[1] The confluence of the tributaries with the Tallapoosa River, and the Tallapoosa River and Little Tallapoosa River in this table are where the Harris Lake begins, at an elevation of 793 feet.



Figures 5, 6, 7, and 8. Finelined Pocketbook Survey Sites - (top left) Tallapoosa River and Carr Creek, (top right) on Ketchepedrakee Creek and Little Ketchepedrakee Creek, (bottom left) on Mad Indian Creek, and (bottom right) and on the Little Tallapoosa River and Pineywood Creek (Source: Kleinschmidt, 2021).

Southern Pigtoe

FWS listed the southern pigtoe as endangered under the ESA in 1993,[16] and designated critical habitat for the species in 2004.[17] It is also listed as an Alabama state protected species (Alabama NHP, 2020).

The southern pigtoe is a mussel found in Clay, Cleburne, and Randolph Counties, Alabama. It is an elliptical to oval shaped mussel that has a maximum length of approximately 2.5 inches (FWS, 2019b). The southern pigtoe releases glochidia during spring and early summer. The confirmed host species for the species include the Alabama shiner, blacktail shiner, and tricolor shiner (FWS, 2019b). The southern pigtoe lives in medium streams to large rivers, in habitats having sand/gravel substrates and moderate to swift currents. Historically, it was found in Alabama, Georgia, and Tennessee; it is endemic to the Coosa River system (FWS, 2019b; 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 southern pigtoe's distribution and population size, and continues to be a major threat to this species' persistence (FWS, 2019b). In addition, the species continues to be imperiled due to: (1) water withdrawals; (2) water quality degradation, including sedimentation released from dams and agricultural runoff; (3) downstream flow alterations caused by hydropeaking dams; and (4) climate change (FWS, 2019b).

The southern pigtoe's current habitat range extends to, and overlaps with, the far northern portion of the Harris Lake project boundary (figure D-9). However, there are no published reports of occurrences of the species within the project boundary at Harris Lake. Moreover, no populations were identified during finelined pocketbook surveys in Carr Creek, where habitat range was noted for the southern pigtoe (*see* figure D-5). The critical habitat designated for the species includes 973 miles of stream channel in Alabama, Mississippi, Tennessee, and Virginia. The nearest critical habitat unit (Unit 22) for the species is located on Cheaha Creek, in Talladega National Park, about 12 miles west of the northern most portion of the Harris Lake project area.

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[16] 58 Fed. Reg. 14330-14340 (March 17, 1993).

[17] 69 Fed. Reg. 40084-40171 (July 1, 2004).

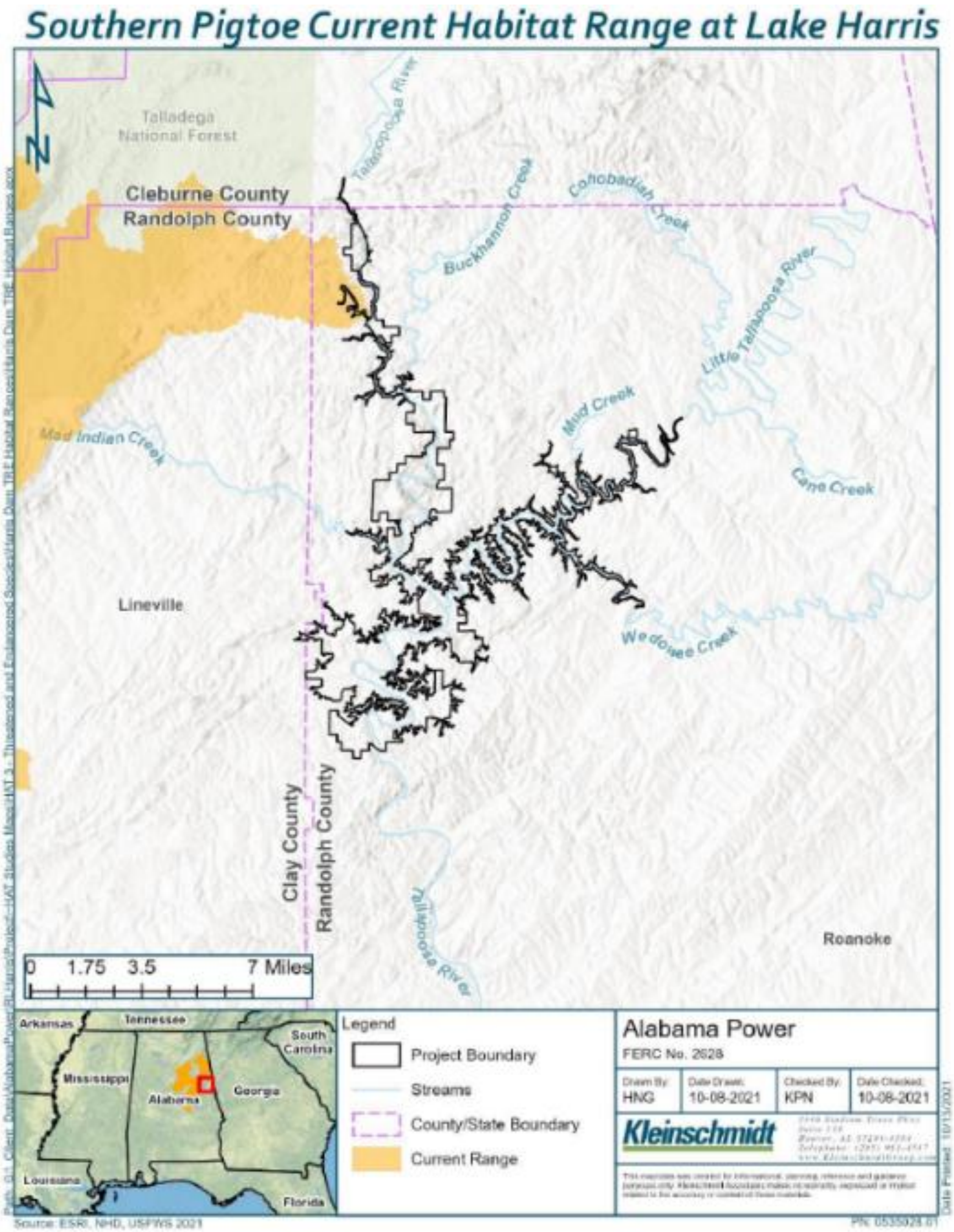

Figure D-9. Southern Pigtoe Current Range in the Harris Lake Project Area (Source: Kleinschmidt, 2021).

Alabama Lampmussel

FWS listed the Alabama lampmussel as endangered under the ESA in 1976.[18] It is also listed as an Alabama state protected species (Alabama NHP, 2020). No critical habitat has been designated for the species (FWS, 2024b).

Alabama lampmussels have a moderately thin shell with a maximum length of 2¾ 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 use rock bass, green sunfish, bluegill, smallmouth bass, spotted bass, largemouth bass, and redeye bass as host fish; banded sculpin appeared to be a marginal host (Williams et al., 2008).

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). The species is found in shoals, in small to medium rivers (Parmalee and Bogan, 1998). However, it is currently only known to occur in upper reaches of the Paint Rock River system, Jackson County, Alabama (Ahlstedt, 1995). Alabama DCNR and FWS are currently reintroducing Alabama lampmussels into suitable historical habitats within the state (FWS, 2012; 2020a).

The Alabama lampmussel is imperiled due to water quality degradation primarily caused by agricultural runoff, severely restricted distribution, rarity, and vulnerability to habitat degradation (FWS, 2012; 2020a). Habitat degradation is the leading cause of the decline for this species (FWS, 2012; 2020a). Unauthorized removal of gravel from the Paint Rock River drainage basin results in degradation of Alabama lampmussel habitat (FWS, 2012). Factors that have the potential to affect the species' persistence include droughts, toxic spills, fish barriers which restrict freshwater mussel distribution, and climate change (FWS, 2012; 2020a).

The Alabama lampmussel's habitat range extends to the western boundary of Skyline WMA, outside the project boundary (figure D-10). However, there are no published reports of occurrences of the species within the project boundary at Skyline WMA.

[18] 41 Fed. Reg. 24062-24067 (June 14, 1976).

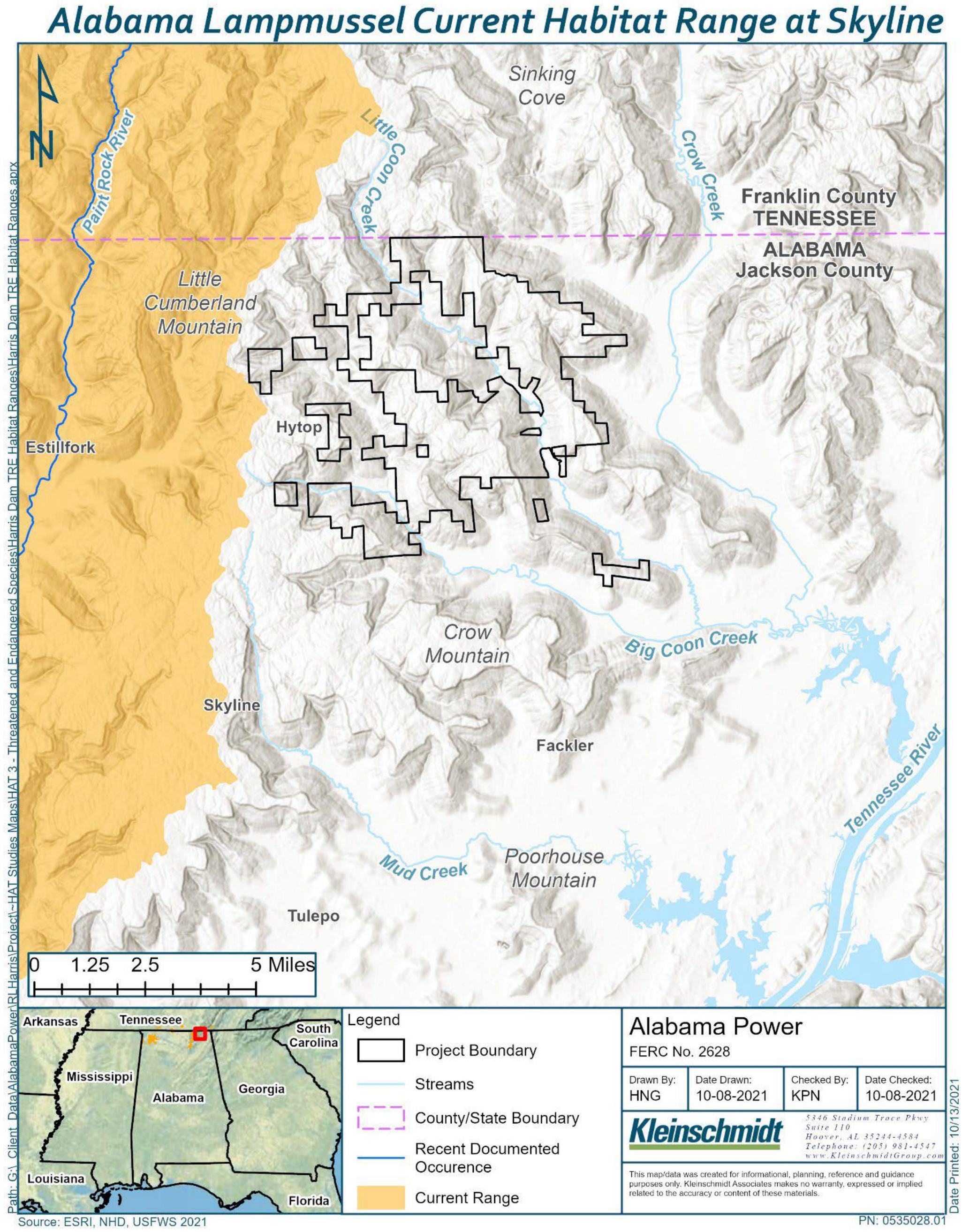

Figure D-10. Alabama Lampmussel Current Range in Relation to the Project Boundary Near Skyline WMA (Source: Kleinschmidt, 2021).

Cumberland Bean

FWS listed the Cumberland bean as endangered under the ESA in 1976.[19] It is also listed as an Alabama state protected species (Alabama NHP, 2020). No critical habitat has been designated for the species (FWS, 2024c).

Cumberland beans have a solid, elongated shell with a maximum length of 2⅛ inches. Females grow slightly larger than males (Mirarchi et al., 2004). Host fish for the Cumberland bean glochidia include the barcheek, fantail, Johnny, rainbow, snubnose, dirty, striped, and stripetail darters (Parmalee and Bogan, 1998).

Cumberland bean is endemic to the upper Cumberland River system in Kentucky and the Tennessee River system from headwaters downstream to Muscle Shoals, Alabama. 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). However, it has not been reported in Alabama since impoundment of the Tennessee River, and is considered extirpated from the state (Parmalee and Bogan, 1998; Mirarchi et al., 2004). Alabama DCNR and FWS are currently reintroducing the Cumberland Bean into suitable historical habitats within the state (FWS, 2020b). Factors contributing to the decline of the Cumberland bean include impoundments, siltation, as well as pollution, and limited distribution and rarity make it vulnerable to extinction (FWS, 2020b). Changes in land use, pollution, contaminant spills, resource extraction, and siltation have the potential to affect the species' persistence within its current range (FWS, 2010; 2020b).

Cumberland bean habitat range extends to the western boundary of Skyline WMA, outside the project boundary (figure D-11). However, there are no published reports of occurrences of the species within the project boundary at Skyline WMA.

[19] 41 Fed. Reg. 24062-24067 (June 14, 1976).

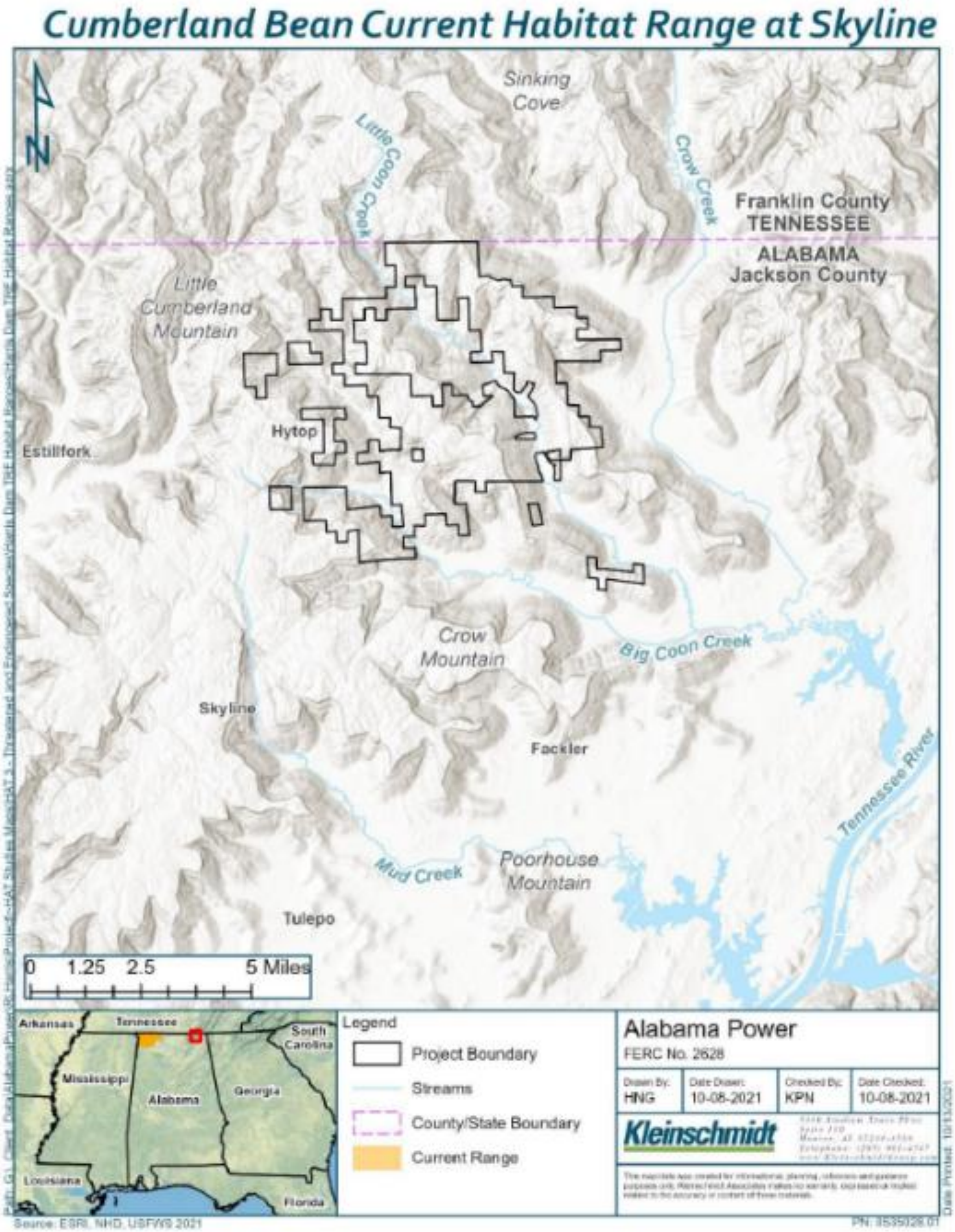

Figure D-11. Cumberland Bean Current Range in Relation to the Project Boundary Near Skyline WMA (Source: Kleinschmidt, 2021).

Fine-Rayed Pigtoe

FWS listed the fine-rayed pigtoe mussel as endangered under the ESA in 1976.[20] It is also listed as an Alabama state protected species (Alabama NHP, 2020). No critical habitat has been designated for the species (FWS, 2024d).

The fine-rayed pigtoe mussel shell is solid, somewhat inflated, with a maximum length of 3⅛ inches, subtriangular to rhomboidal in outline (Mirarchi et al., 2004). The species is a short-term brooder, spawning in May, with females gravid until late July (Ortmann, 1925; Bruenderman and Neves 1993). Host fish for fine-rayed pigtoe's glochidia include river chub, central stoneroller, fathead minnow, mottled sculpin, as well as the whitetail, white, telescope, and Tennessee shiners (Bruenderman and Neves, 1993).

Fine-rayed pigtoe mussel is endemic to the Tennessee River system, historically occurring from the Virginia headwaters, downstream to Muscle Shoals, Alabama, and in some tributaries (Parmalee and Bogan, 1998). The species occurs in shoal habitat of medium to large rivers, and it typically lives in stable, mixed substrate, with particle sizes ranging from sand to cobble (Neves, 1991). However, it has been extirpated from the Tennessee River proper (Garner and McGregor, 2001). Paint Rock River, Jackson County, Alabama may contain the only extant population in Alabama (Ahlstedt, 1995).

Factors contributing to the decline of the fine-rayed pigtoe include impoundment, siltation, and pollution (FWS, 2013a). The species' small population size and limited geographic distribution make it vulnerable to stochastic disturbances and decreased fitness from reduced genetic diversity (FWS, 2013a). On-going factors that have the potential to affect this species' persistence include accidental chemical releases and spills, as well as other human-induced changes and climate change (FWS, 2013a; 2022a).

The fine-rayed pigtoe's habitat range extends to the western boundary of Skyline WMA, outside the project boundary (figure D-12). However, there are no published reports of occurrences of the species within the project boundary at Skyline WMA.

[20] 41 Fed. Reg. 24062-24067 (June 14, 1976).

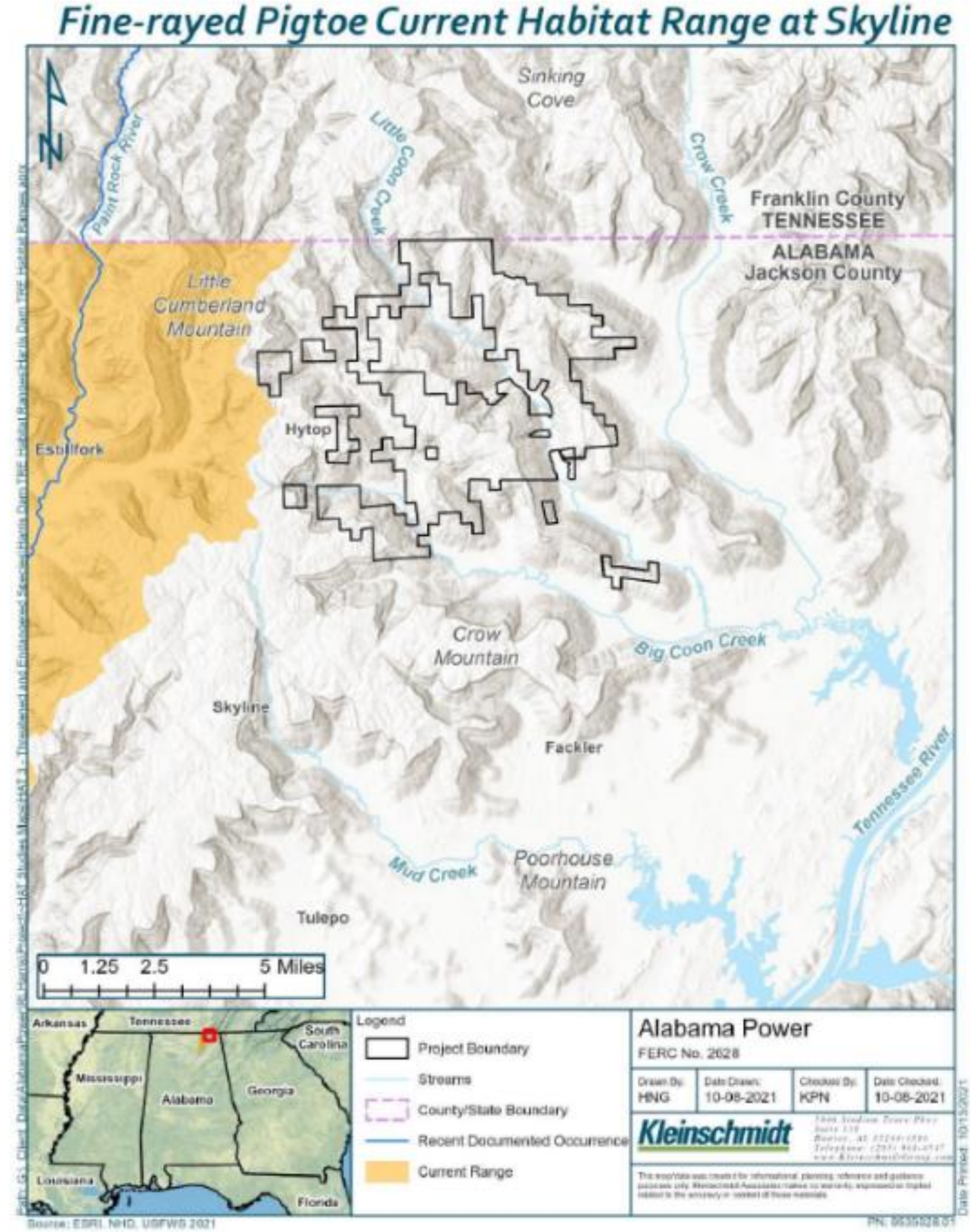

Figure D-12. Fine-rayed Pigtoe Current Range in Relation to the Project Boundary Near Skyline WMA (Source: Kleinschmidt, 2021).

Pale Lilliput

FWS listed the pale lilliput as endangered under the ESA in 1976.[21] It is also listed as an Alabama state protected species (Alabama NHP, 2020). No critical habitat has been designated for the species (FWS, 2024e).

Pale lilliput's shell is moderately solid with a maximum length of 1⅜ inches, elongate and elliptical in outline, and inflated in some older individuals (Mirarchi et al., 2004). This species is thought to be a long-term brooder. In laboratory trials by Alabama DCNR, pale lilliput glochidia have been found to use northern studfish, blackspotted topminnow, and blackstripe topminnow as primary hosts (Fobian et al., 2015). The pale lilliput is found in large creeks and small rivers, typically in gravel and in moderate current (Parmalee and Bogan, 1998). It is thought to be extirpated, except in the Paint Rock River system, Jackson County, Alabama, where it is rare (Ahlstedt, 1995) and the Lick Creek drainage, a tributary to Duck River in Tennessee (FWS, 2021a). Alabama DCNR and FWS are currently reintroducing the pale lilliput into suitable historical habitats within the state (FWS, 2011a; 2021a).

The Paint Rock River system and the Lick Creek drainage, where the only extant populations of the pale lilliput persists, are strained by human-related activities and development (FWS, 2011a; 2021a). The species is vulnerable to extinction due to extremely limited distribution, rarity, and susceptibility to habitat degradation (FWS, 2011a; 2021a), and unauthorized removal of gravel from the Paint Rock River drainage basin results in degradation of pale lilliput habitat (FWS, 2011a). Factors that have the potential to affect the species' persistence include droughts, toxic spills, fish barriers which restrict freshwater mussel distribution, and climate change (FWS, 2011a; 2021a).

The pale lilliput's range extends to the western boundary of Skyline WMA, outside the project boundary (figure D-13). However, there are no published reports of occurrences of the species within the project boundary at Skyline WMA.

[21] 41 Fed. Reg. 24062-24067 (June 14, 1976).

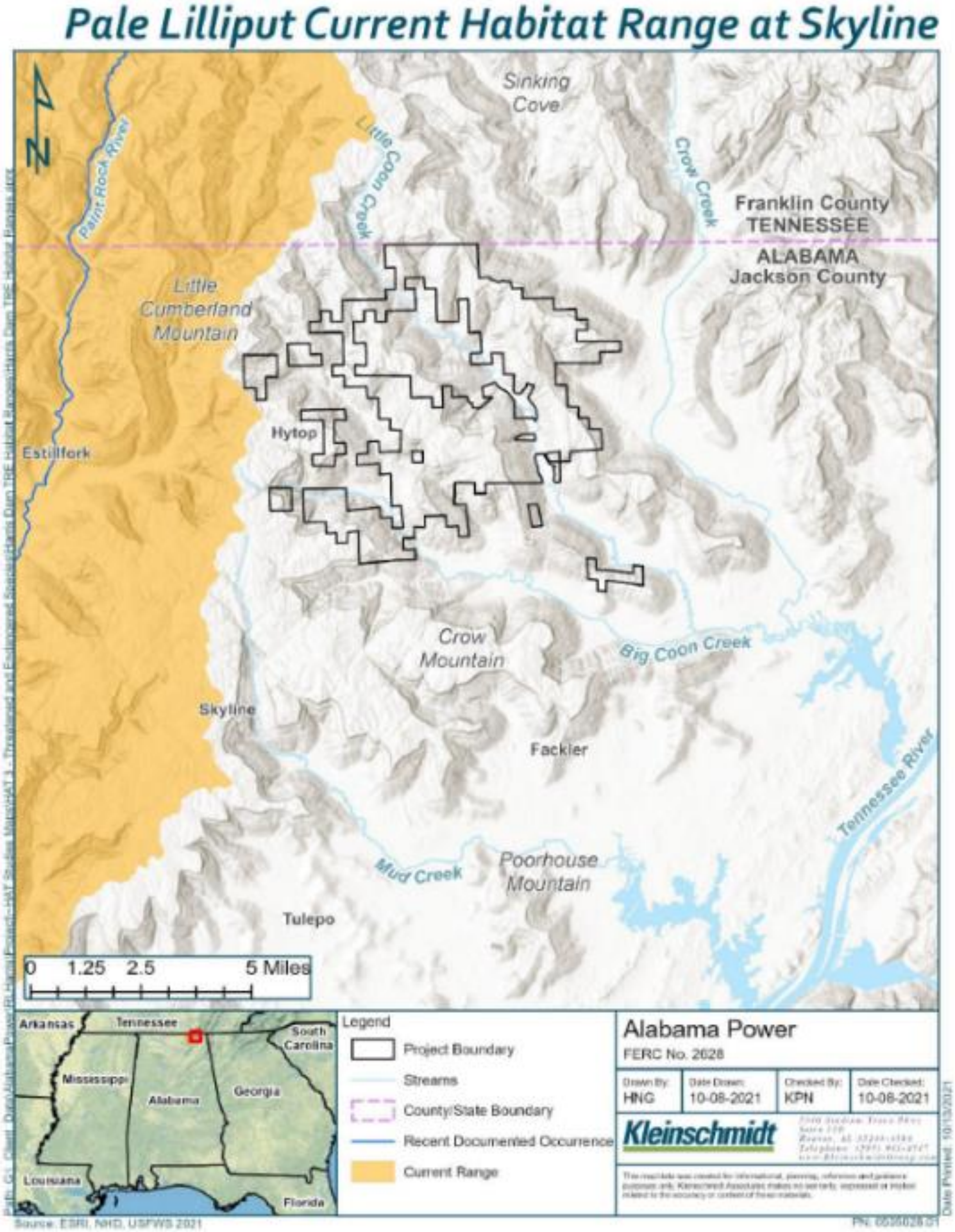

Figure D-13. Pale Lilliput Current Range in Relation to the Project Boundary Near Skyline WMA (Source: Kleinschmidt, 2021).

Rabbitsfoot

FWS listed the rabbitsfoot mussel as threatened under the ESA in 2013,[22] and designated critical habitat for the species in 2015.[23] It is also listed as an Alabama state protected species (Alabama NHP, 2020).

Rabbitsfoot mussels have a solid shell with a maximum length of 4¾ inches, elongated and rhomboidal to rectangular in outline. This species is a short-term brooder. Suitable fish hosts for rabbitsfoot populations west of the Mississippi River include blacktail shiner from the Black and Little Rivers; and cardinal, red, spotfin, and bluntface shiners from the Spring River. However, host suitability information is lacking for most of the eastern range (Fobian, 2007). A host study conducted by Alabama DCNR in 2011 found the scarlet, whitetail, and striped shiners to be sympatric hosts with rabbitsfoot from Paint Rock River, Alabama. Marginal minnow hosts from studies include central stoneroller, emerald shiner, rosyface shiner, bullhead minnow, and rainbow darter, but not in all stream populations tested (Fobian, 2007; Watters et al., 2009).

The rabbitsfoot 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 19¾ 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 (Ahlstedt, 1995), and a short reach of Bear Creek, Colbert County (Mirarchi et al., 2004). Widespread distribution reductions, rarity, and declining population trends make it vulnerable to extirpation (Mirarchi et al., 2004). Alabama DCNR and FWS are currently reintroducing the rabbitsfoot into suitable historical habitats statewide (Alabama DCNR, 2020).

The rabbitsfoot's habitat range extends to the western boundary of Skyline WMA, outside the project boundary (figure D-14). However, there are no published reports of occurrences of the species within the project boundary at Skyline WMA. The nearest critical habitat unit (RF17) is located on the Paint Rock River, about 10 miles southwest of Skyline WMA and the project area.

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[22] 78 Fed. Reg. 57076-57097 (September 17, 2013).

[23] 80 Fed. Reg. 24692-24774 (April 30, 2015).

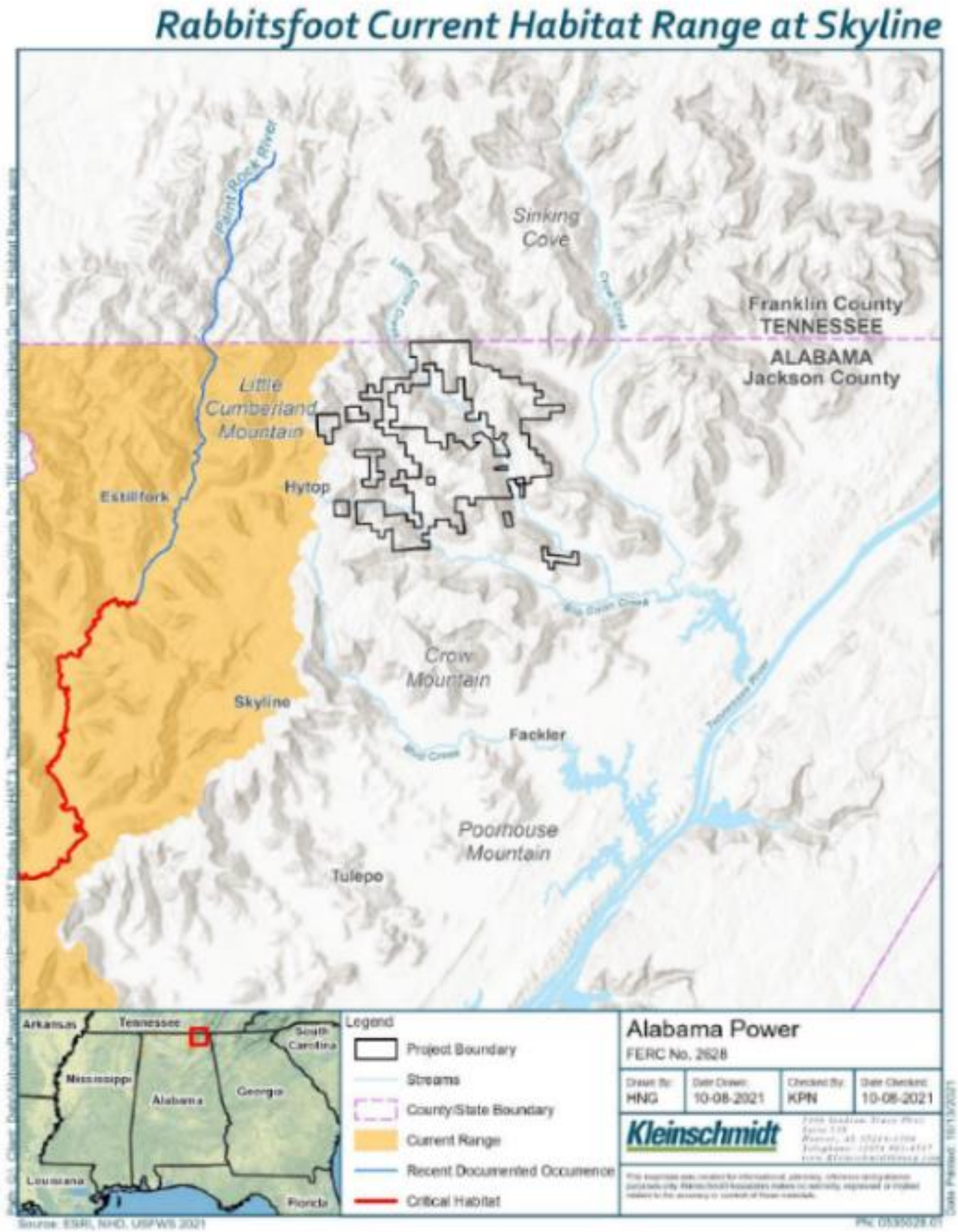

Figure D-14. Rabbitsfoot Current Range and Designated Critical Habitat in Relation to the Project Boundary Near Skyline WMA (Source: Kleinschmidt, 2021).

Shiny Pigtoe

FWS listed the shiny pigtoe mussel as endangered under the ESA in 1976.[24] It is also listed as an Alabama state protected species (Alabama NHP, 2020). No critical habitat has been designated for the species (FWS, 2024f).

The species has a solid and somewhat inflated shell with a maximum length of 3⅛ inches, subtriangular in outline, with anterior margin broadly rounded and somewhat obliquely truncate above, and posterior margin nearly straight but obliquely angled; dorsal and ventral margins nearly straight (Mirarchi et al., 2004). It 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, including the telescope, warpaint, and common shiners, as hosts (Kitchel, 1985).

The shiny pigtoe lives in shoal and riffle habitat of medium to large rivers. Endemic to the Tennessee River system, this species historically occurred from the headwaters downstream to Muscle Shoals, Alabama, and in some of its large tributaries (Parmalee and Bogan, 1998). It has been extirpated from the Tennessee River proper (Garner and McGregor, 2001), but still occurs in several tributaries, including the Paint Rock River, in Jackson County, Alabama (Ahlstedt, 1995). The shiny pigtoe is imperiled due to impoundments, siltation, and pollution caused by coal mining, urbanization, agriculture, and toxic chemical spills (FWS, 2013b; 2021b). In addition, the small population size and limited geographic distribution make it vulnerable to stochastic disturbances and decreased fitness from reduced genetic diversity (FWS, 2013b; 2021b).

The shiny pigtoe's habitat range extends to the western boundary of Skyline WMA, outside the project boundary (figure D-15). However, there are no published reports of occurrences of the species within the project boundary at Skyline WMA.

[24] 41 Fed. Reg. 24062-24067 (June 14, 1976).

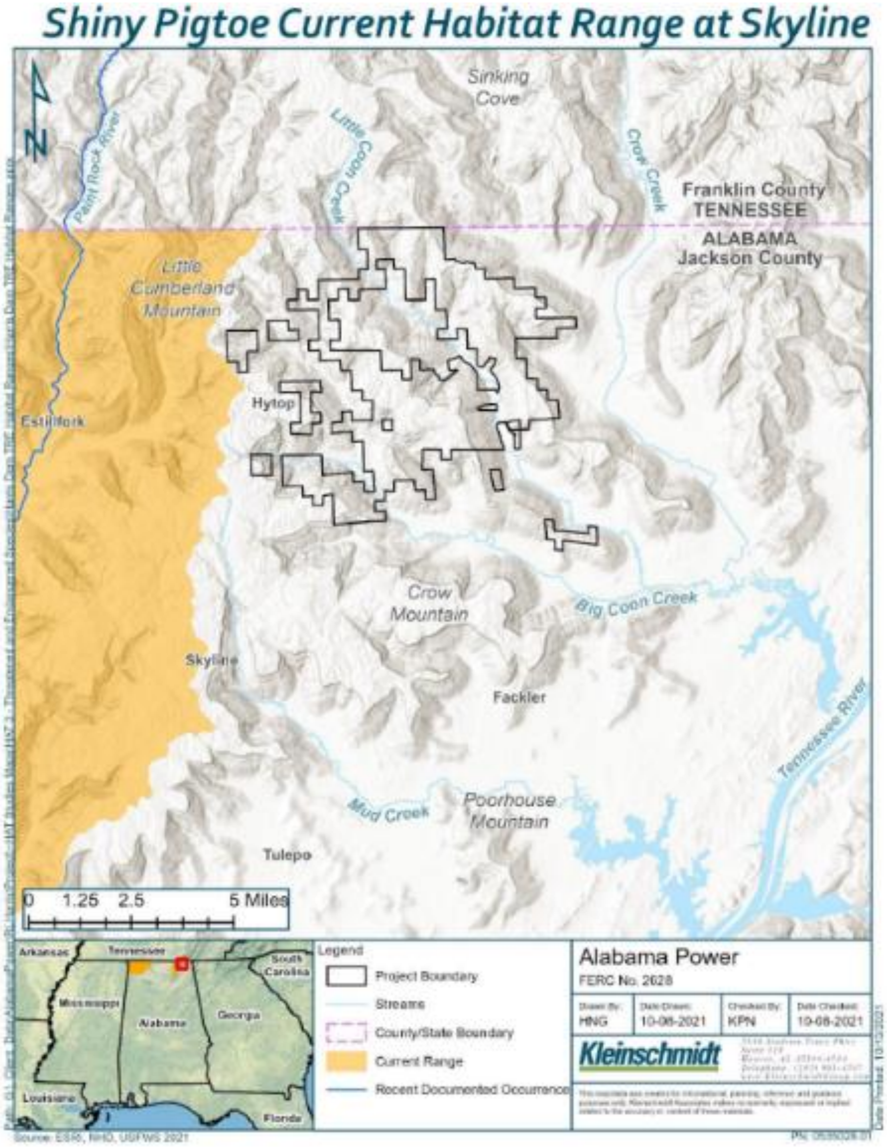

Figure D-15. Shiny Pigtoe Current Range in Relation to the Project Boundary Near Skyline WMA (Source: Kleinschmidt, 2021).

Snuffbox Mussel

FWS listed the snuffbox mussel as endangered under the ESA in 2012.[25] It is listed as an Alabama Partial Protected Mussel (Alabama NHP, 2020). No critical habitat has been designated for the species (FWS, 2024g).

Snuffbox mussels are small- to medium-sized, with males reaching up to 2.8 inches in length and females reaching up to about 1.8 inches in length (Parmalee and Bogan, 1998). The shape of the shell is somewhat triangular (females), oblong, or ovate (males), with the valves solid, thick, and very inflated. The color of the nacre is white, often with a silvery luster, and a gray-blue or gray-green tinge in the beak cavity. The species is a long-term brooder, with gravid females observed from September to May and glochidia being discharged in late May (Ortmann, 1919). Fish hosts include the common logperch, Roanoke darter, as well as banded and black sculpins (Yeager and Saylor, 1995).

The snuffbox 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 once occurred in the Tennessee River and several of its tributaries. However, the species is assumed to persist only in the Paint Rock River system, Jackson County (Mirarchi et al., 2004).

The snuffbox's initial and current imperilment is caused by adverse effects from constructing impoundments, including destruction, modification, and curtailment of the species' habitat range (FWS, 2018b). Since its listing, five dams have been removed on streams inhabited by the snuffbox, but status improvements have not been documented in restored reaches of inhabited streams (FWS, 2018b). Other factors that continue to effect snuffbox populations and their habitat range include: (1) exotic species (e.g., zebra mussel, Asian clam, round goby, and black carp); (2) water quality degradation caused by agricultural runoff, municipal effluents, industrial sources, and spills; (3) dredging and channelization, oil and gas production, and development; and (4) climate change (e.g., changes in stream temperature regimes and precipitation levels) (FWS, 2018b).

The snuffbox's habitat range extends up the Paint Rock River system to a point that is located west and southwest of Skyline WMA and the project area (figure D-16). There are no published reports of occurrences of the species within the project boundary at Skyline WMA.

[25] 77 Fed. Reg. 8632-8665 (February 14, 2012).

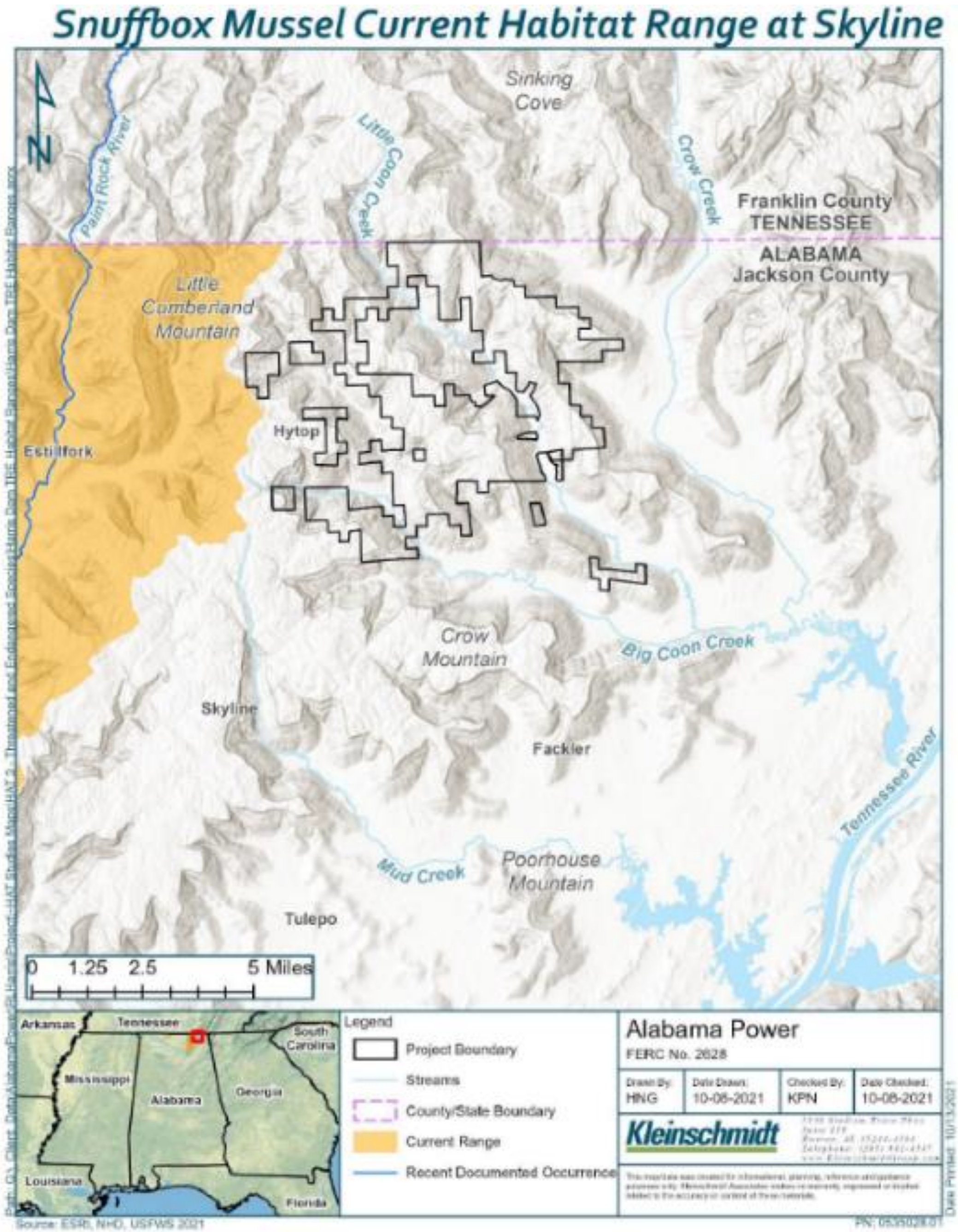

Figure D-16. Snuffbox Mussel Current Range in Relation to the Project Boundary Near Skyline WMA (Source: Kleinschmidt, 2021).

Slabside Pearlymussel

FWS listed the slabside pearlymussel as endangered under the ESA,[26] and designated critical habitat for the species, in 2013.[27] The slabside pearlymussel is also listed as an Alabama state protected species (Alabama NHP, 2020).

Slabside pearlymussels are subtriangular in shape, reach an average length of 3.5 inches, and have dense, moderately inflated valves and a white nacre. The species is a short-term, summer brooder that is known to use several species in the minnow family as glochidial hosts (FWS, 2013c). They typically inhabit large creeks and rivers in shallow riffles comprised of sand, gravel, and cobble substrates with moderate current.

The slabside pearlymussel historically occurred in Alabama in the Tennessee River and several of its tributaries. FWS designated 13 critical habitat units for the slabside pearlymussel, which encompasses about 970 miles of stream channel in Alabama, Mississippi, Tennessee, and Virginia. In Jackson County, Alabama, the designated critical habitat includes the Paint Rock River, Larkin Fork, Estill Fork, and Hurricane Creek. Decline of the slabside pearlymussel is attributed primarily to habitat loss and degradation associated with impoundments, gravel and coal mining, sedimentation, water pollution, and stream channel alterations (FWS, 2013c). Climate change is also considered a potential threat to the species (FWS, 2021c).

The slabside pearlymussel's habitat range extends to the western boundary of Skyline WMA, outside the project boundary (figure D-17). However, there are no published reports of occurrences of the species within the project boundary at Skyline WMA. The nearest critical habitat unit (SP9) is located on Hurricane Creek, a tributary of the Paint Rock River, less than 2 miles from the project area.

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[26] 78 Fed. Reg. 59269-59287 (September 26, 2013).

[27] 78 Fed. Reg. 59556-59620 (September 26, 2013).

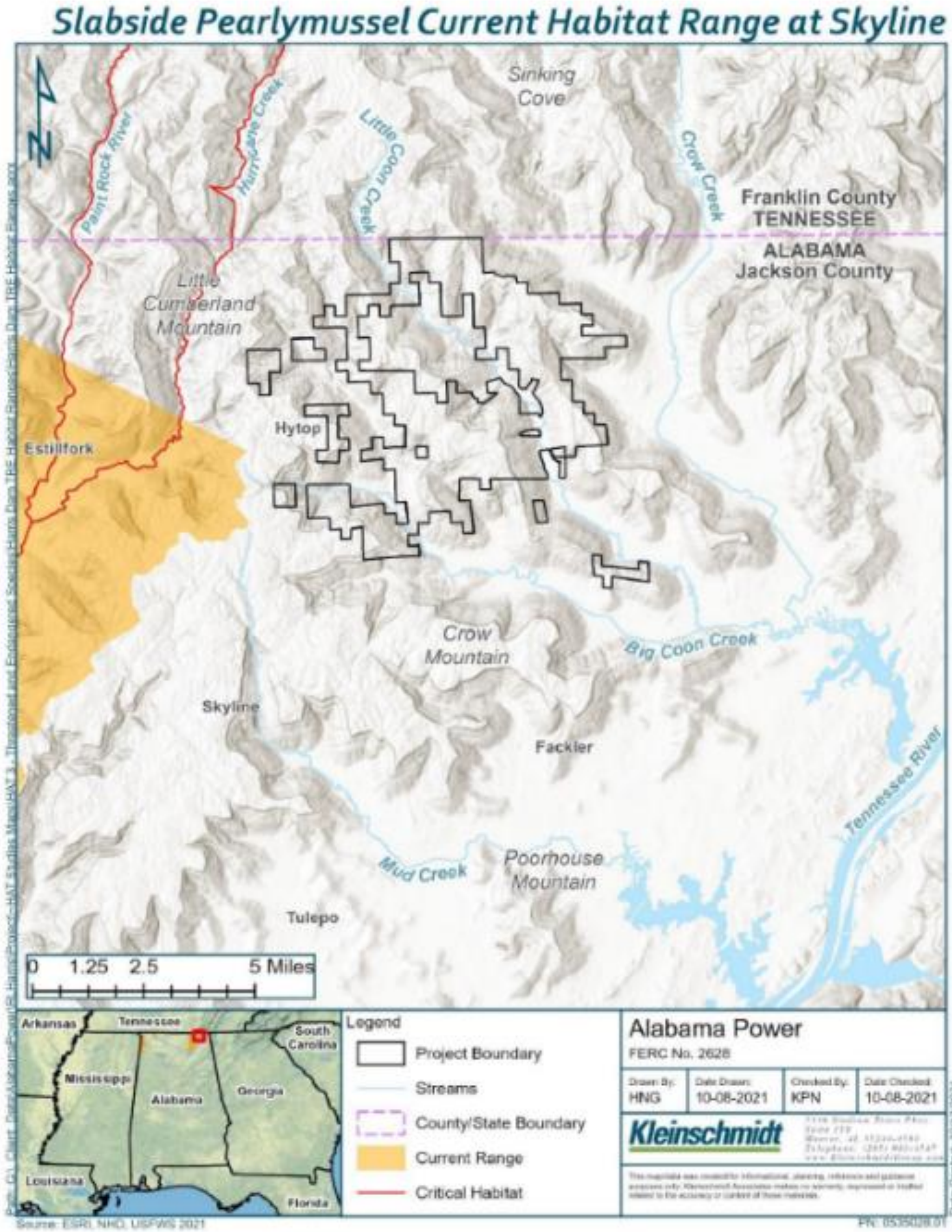

Figure D-17. Slabside Pearlymussel Current Range and Designated Critical Habitat in Relation to the Project Boundary Near Skyline WMA (Source: Kleinschmidt, 2021).

Cumberland Moccasinshell

FWS issued its proposed rule to list the Cumberland moccasinshell as endangered under the ESA in 2023.[28] It is also listed as an Alabama state protected species (Alabama NHP, 2020). No critical habitat has been proposed for the species (FWS, 2024h).

Cumberland moccasinshell have a maximum length of 2.4 inches, and shell colors range from golden brown to yellow-green with vertical, green streaks (FWS, 2020c). Cumberland moccasinshell spawn in late August to early October and use a range of darter species (*Etheostoma spp.*) as fish hosts for their glochidia (FWS, 2020c). This species is endemic to the Tennessee River system in Alabama, and the upper Paint Rock River population is classified as low resiliency (FWS, 2020c).

The Cumberland moccasinshell is imperiled due to flow alterations caused by large impoundments and diminishment of water and substrate quality caused by various land development activities.[29] Cumberland moccasinshell habitat includes riffles and high gradient areas in small streams and creeks to medium sized rivers less than 3 feet deep with gravel to boulder substrate and occasionally sand (FWS, 2020c). Current range extends to the western boundary of Skyline WMA, outside the project boundary (figure D-18).

[28] 88 Fed. Reg. 57,060-57,077 (August 22, 2023).

[29] *Id.*

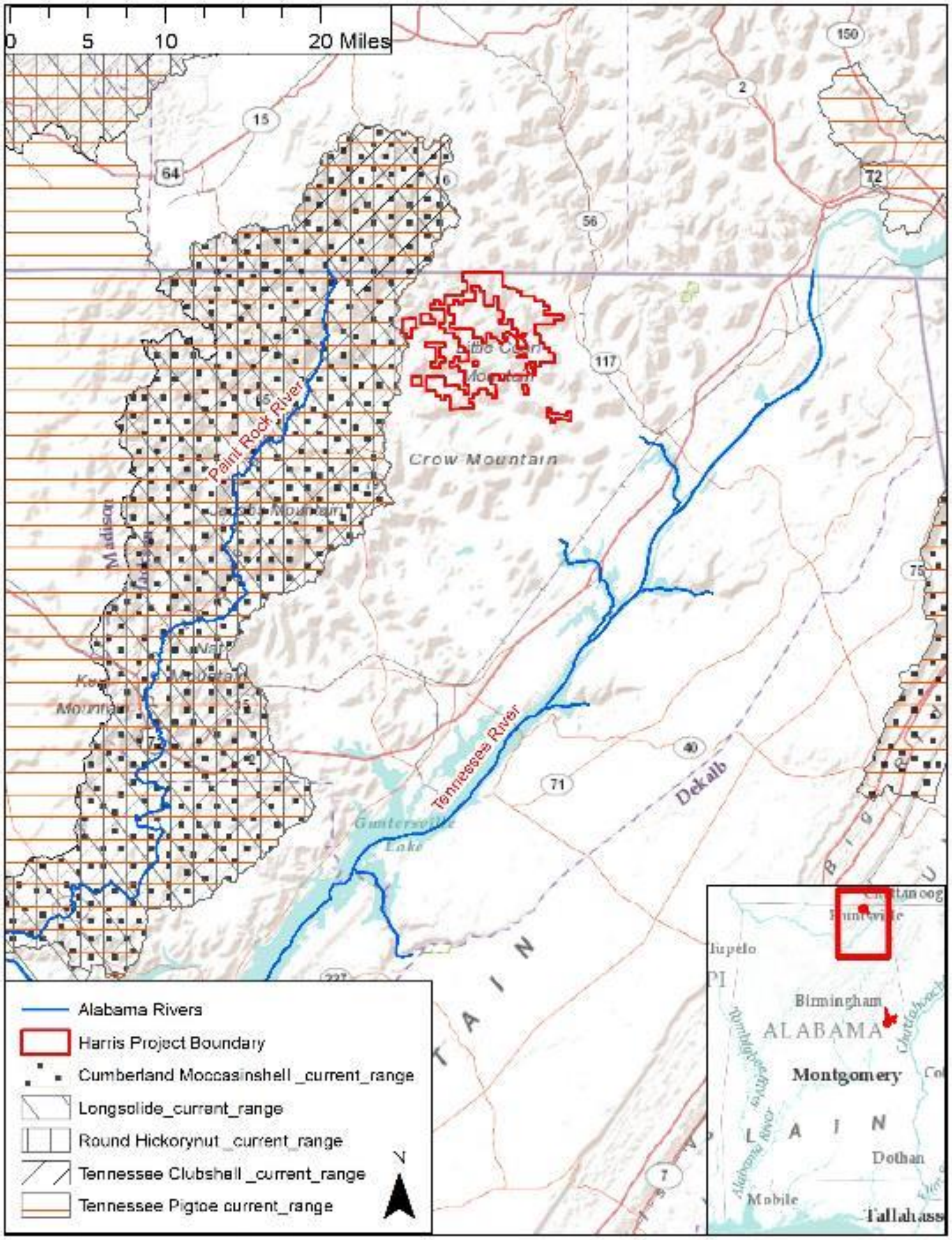

Figure D-18. Current Range of Cumberland Moccasinshell, Longsolid, Round Hickorynut, Tennessee Clubshell, and Tennessee Pigtoe Mussels in the Vicinity of the Harris Project Boundary Near Skyline WMA (FWS, 2024h, i, j; Alabama DCNR, 2024a,b, as modified by staff). Note: All species have habitat within the Paint Rock River system.

Longsolid

Longsolid was listed by FWS as threatened under the ESA, and designated critical habitat in 2023.[30] It is also listed as an Alabama state protected species (Alabama NHP, 2020).

The longsolid has a thick to medium-sized shell, up to about 5 inches long, with a dull sheen .[31] Longsolid spawn in spring to early summer and based on fish host usage by conspecifics, longsolid likely use minnows and sculpin species (Cyprinids and Cottids) as hosts for their glochidia (FWS, 2022b). In Alabama, this species is endemic to the Tennessee River system with remnant populations found in the tailwaters of the Wilson and Guntersville Dams (Alabama DCNR, 2024b). The Paint Rock River population is considered to be of medium condition.[32]

Current threats to longsolid mussel include: (1) habitat degradation or loss via development/urbanization, transportation, contaminants, agricultural activities, dams and barriers, climate change, resource extraction, and forest conservation; (2) invasive and non-native species; and (3) small populations.[33] Longsolid habitat includes sand and gravel in streams and small rivers, but also coarse gravel and cobble in larger rivers (Gordon and Layzer, 1989; as cited in FWS, 2022b). This species current range extends to the western boundary of Skyline WMA, outside the project boundary (figure D-18). Critical habitat includes the lower 58 miles of Paint Rock River from its mouth at the Tennessee River upstream to the confluence with Hurricane Creek (figure D-19).[34]

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[30] 88 Fed. Reg. 14,794-14,869 (March 9, 2023).

[31] *Id.*

[32] FWS (2022b) define "high" condition populations have resilient populations generally distributed over a significant and more or less contiguous length of stream (greater than or equal to 30 river miles), with evidence of recruitment and multiple age classes represented; "medium" condition populations have spatially restricted populations with limited levels of recruitment or age class structure. Resiliency is less than under high conditions; "low" condition populations have small and highly restricted populations, with no evidence of recent recruitment or age class structure, and limited detectability. These populations have low resiliency, are not likely to withstand stochastic events.

[33] 88 Fed. Reg. 14,794-14,869 (March 9, 2023).

[34] *Id.*

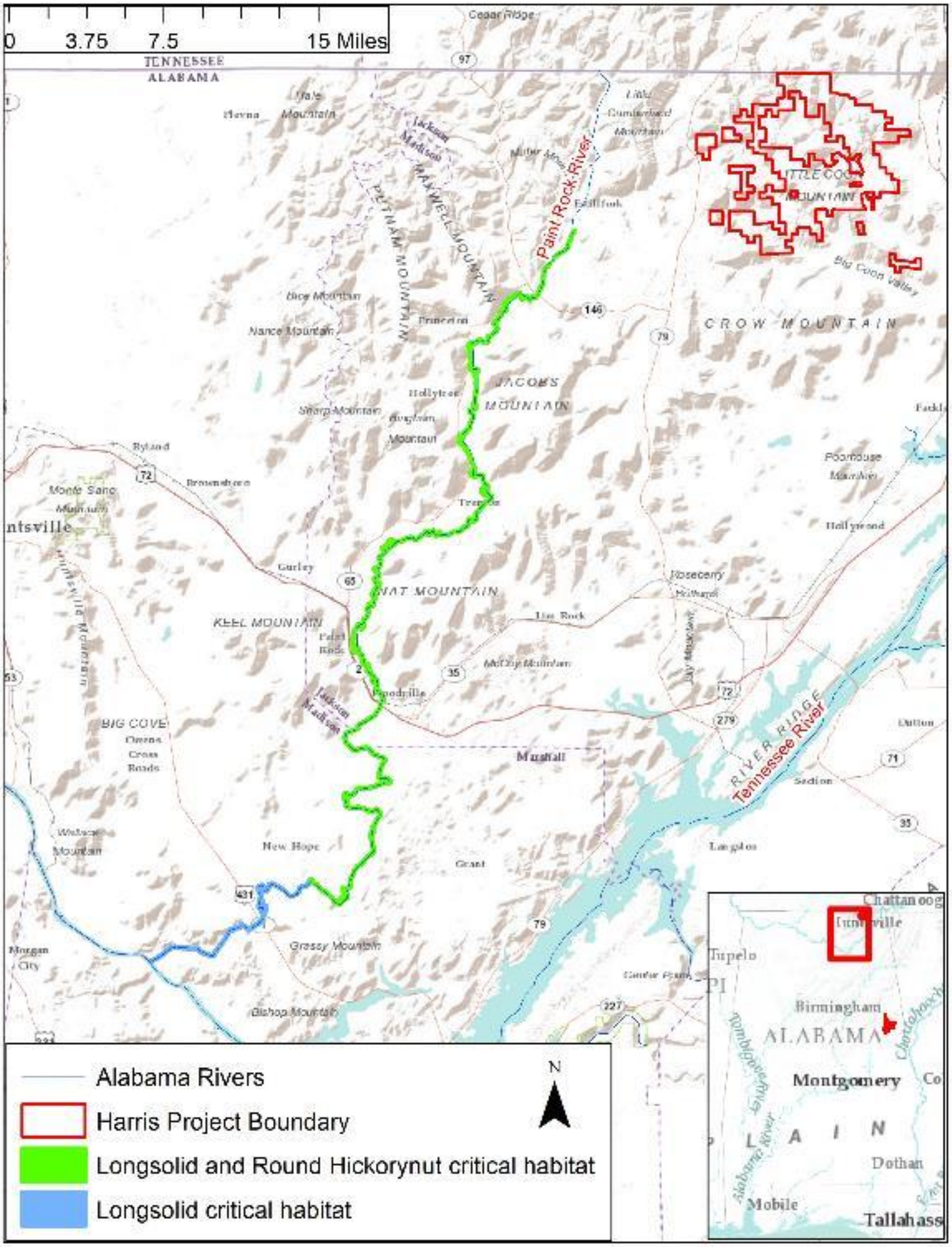

Figure D-19. Critical Habitat Range of Longsolid and Round Hickorynut in the Vicinity of the Harris Project Boundary near the Skyline WMA (Alabama DCNR, 2024a,b, as modified by staff).

Round Hickorynut

Round hickorynut was listed by FWS as threatened under the ESA, and designated critical habitat in 2023.[35] This species is also listed as an Alabama state protected species (Alabama NHP, 2020).

Round hickorynut mussels have a small- to medium-sized, greenish-olive to dark or chestnut brown shell up to 3 inches long.[36] They use darter species as hosts for their glochidia and primarily spawn from late spring to early summer, but some southern populations extend spawning to August (FWS, 2022c). In Alabama, this species is endemic to the Tennessee River system, with remnant populations found in Paint Rock River and the Tennessee River downstream from Guntersville and Wilson Dams (Williams et al., 2008 ;Alabama DCNR, 2024a). FWS considers the Paint Rock River population to be of medium condition (FWS, 2022c).

Current threats to round hickorynut include: (1) habitat degradation or loss via development/urbanization, transportation, contaminants, agricultural activities, dams and barriers, climate change, resource extraction, and forest conservation; (2) invasive and non-native species; and (3) small populations.[37] Round hickorynut habitat includes small streams to large rivers, with a mixture of sand, gravel, and cobble substrates (FWS, 2022c). The current range extends to the western boundary of Skyline WMA, outside the project boundary (figure D-18). Critical habitat includes the lower 48 miles of Paint Rock River from its confluence with Cedar Creek upstream to the confluence with Hurricane Creek (figure D-19).[38]

Tennessee Clubshell

FWS issued its proposed rule to list the Tennessee clubshell as endangered under the ESA in 2023.[39] It is also listed as an Alabama state protected species (Alabama NHP, 2020). FWS has not proposed critical habitat for this species (FWS, 2024i).

Tennessee clubshells have an oval to triangular shaped, brownish shell usually with wide, broken green rays and a maximum length of 3.5 inches.[40] They spawn in March to early August and use a range of minnow and shiner species (*Notropis* and *Luxilus spp.*) as fish hosts for their glochidia (FWS, 2020c). The species is considered extirpated from the Big Coon Creek-Crow Creek hydrologic unit (i.e., hydrologic unit [HU] 0603000103), which covers the project boundary at Skyline WMA, and is classified as low resiliency in the upper Paint Rock River (FWS, 2020c).

The Tennessee clubshell is imperiled due flow alterations caused by large impoundments, as well as diminishment of water and substrate quality caused by various land

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[35] *Id.*

[36] *Id.*

[37] *Id.*

[38] *Id.*

[39] 88 Fed. Reg. 57,060-57,077 (August 22, 2023).

[40] *Id.*

development activities.[41] Suitable habitat for this species includes moderately swift currents, riffles and shoals of small streams to large rivers, in a mixture of sand, gravel, and cobble substrate (FWS, 2020c). The current range extends to the western boundary of Skyline WMA, outside the project boundary (figure D-18).

Tennessee Pigtoe

FWS issued its proposed rule to list the Tennessee pigtoe as endangered under the ESA in 2023.[42] It is also listed as an Alabama state protected species (Alabama NHP, 2020). FWS has not proposed critical habitat for this species (FWS, 2024j).

The Tennessee pigtoe has yellow to brown colored shell with dark green rays that can be either oval, subtriangular or subquadrate and a maximum length of 3.7 inches.[43] Tennessee pigtoe spawn in late March to June, and likely use minnow and shiner species (*Notropis* and *Luxilus spp.*) as fish hosts for their glochidia, similar to Tennessee clubshell (FWS, 2020c). The species is considered endemic to the Tennessee River system, but extirpated from the main channel of the river (Alabama DCNR, 2024b). In addition, this species is extirpated from adjacent watersheds to the Big Coon Creek-Crow Creek hydrologic unit, and is classified as low resiliency in the upper Paint Rock River (FWS, 2020c).

The Tennessee pigtoe is imperiled due flow alterations caused by large impoundments, as well as diminishment of water and substrate quality caused by various land development activities.[44] Tennessee pigtoe habitat includes moderately swift currents, riffles and shoals of small streams to large rivers, in a mixture of sand, gravel, and cobble substrate (FWS, 2020c). The current range extends to the western boundary of Skyline WMA, outside the project boundary (figure D-18), as well as the Lookout Creek system southwest of Skyline WMA and the Tennessee River.

<u>Terrestrial Species</u>

Red-Cockaded Woodpecker

FWS listed the red-cockaded woodpecker as endangered under the ESA in 1970.[45] It is also listed as an Alabama state protected species (Alabama NHP, 2020). In 2020 and 2022, FWS proposed downlisting this species from endangered to threatened.[46] No critical habitat has been designated for the species (FWS, 2024k).

These non-migratory woodpeckers are small, averaging less than 8 inches in length, with a black-and-white ladder-striped back, white cheeks, and an underside that is mostly white

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[41] *Id.*

[42] *Id.*

[43] *Id.*

[44] *Id.*

[45] 35 Fed. Reg. 16,047-16,048 (October 13, 1970).

[46] 85 Fed. Reg. 63,499 (October 8, 2020) and 87 Fed. Reg. 6,130 (February 3, 2022).

(FWS, 2024l). Males have a small red mark on the side of the head (FWS, 2020d). Red-cockaded woodpeckers are highly social. They live in clans consisting of the male, the female, and one or more “helper” birds, which are typically males from the previous year’s brood or earlier. Helpers assist with incubation, feeding, rearing the young, territory and nest defense, and cavity excavation. Although currently most clans have only a breeding pair with 0, 1, or 2 helpers, clans with more than 2 helpers are increasing in frequency as habitat improves (FWS, 2020d).

Red-cockaded woodpeckers use large, old pine trees (preferably longleaf pines that are near the end of their lifecycle) as cavity trees. They pick at live trees in search of prey (e.g., ants, roaches, beetles, spiders, centipedes, crickets, and moths), and to make the sticky pine resin flow in the vicinity of their nest to provide protection from climbing snakes and other predators. This species also requires an abundant supply of native bunchgrass and groundcovers within their foraging habitat (FWS, 2020d). The typical territory of a clan ranges from 125 to 200 acres, but territories from 60 to 600 acres have been observed. Dispersing juveniles have been observed moving from about 2 miles to 6 miles from their natal territory to establish themselves in other territories (FWS, 2024l).

Historically, red-cockaded woodpeckers occurred in open pine forest from New Jersey, Maryland, and Virginia to Florida. Their range also extended west to Texas and north to parts of Oklahoma, Missouri, Tennessee, Kentucky (Alabama DCNR, 2024d), and Alabama in the Talladega National Forest, the Coosa Wildlife Management Area (WMA), and along a northeast-to-southwest strip between Alabama Routes 9 and 21 (FWS, 2024k). Currently in Alabama, the majority of red-cockaded woodpeckers are found on the Oakmulgee, Talladega, and Conecuh National Forests (Alabama DCNR, 2024d). Figure D-20 shows the current range of the species near the Harris Lake Project boundary.

Decline of the red-cockaded woodpecker is attributed primarily to habitat loss and degradation, and specifically the loss of old growth pine trees that would be suitable for nest cavities, associated with timber harvesting. In the 1990s researchers learned that the species often occupies artificial cavities constructed in live trees and this discovery has helped reverse their decline (FWS, 2003). The species has also historically relied on periodic wildfires to clear out understory from the longleaf pine forests they inhabit. The reduction in wildfires associated with modern timber management resulted in an increase in hardwoods and other detrimental species throughout their range (FWS 2003; 2020d).

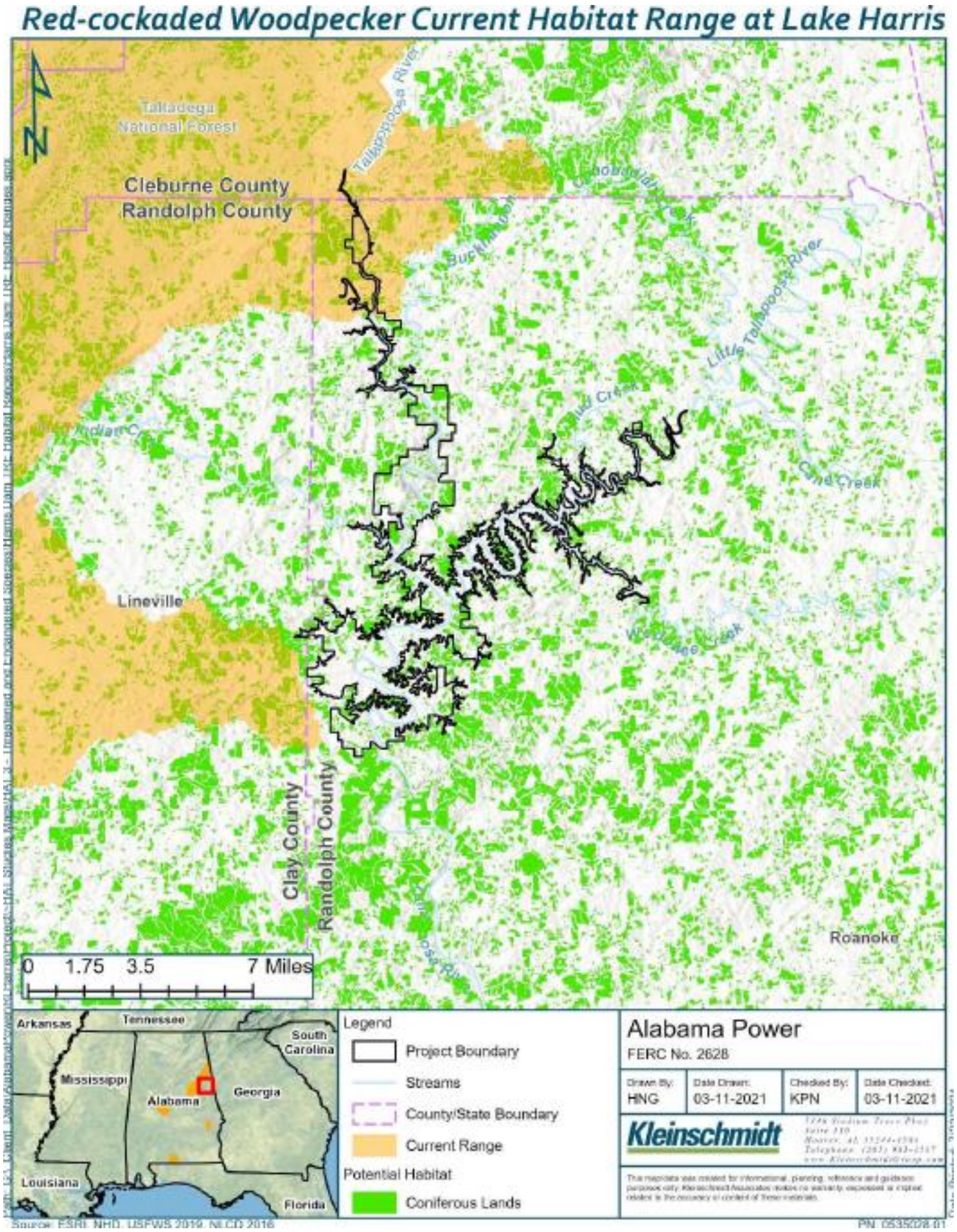

Figure D-20. Red-cockaded Woodpecker Current Range in Relation to the Project Boundary near Harris Lake (Source: Kleinschmidt, 2021).

Whooping Crane

Although the whooping crane is listed as endangered in Kansas, Louisiana, Montana, Nebraska, North Dakota, Oklahoma, South Dakota, Texas, it is an experimental, non-essential population in Alabama (FWS, 2024m).[47] This species is also listed as an Alabama state protected species (Alabama NHP, 2020). FWS designated critical habitat for the whooping crane at the: (1) National Wildlife Refuges in Kansas and Texas; (2) Cheyenne Bottoms State Waterfowl Management Area in Kansas; and (3) Platte River Bottoms in Nebraska.[48]

Whooping cranes are one of the largest birds in North America, with an average height of 5 feet, and a wingspan of 7 feet. The species is long-lived – up to 30 years for individuals in the wild, but as long as 35 to 40 years in captivity (FWS, 2007). Whooping cranes typically nest once per year, laying two eggs in late April to mid-May. Hatching typically occurs one month later, though survival is often limited to one nestling (FWS, 2023). The long-term growth rate in the whooping crane population has averaged about 4.6% (FWS, 2011b).

Habitat requirements for whooping cranes include marshy areas, sloughs, and along lake margins for nesting amongst bulrushes, cattails, and sedges, as well as in upland grain fields and wetlands for foraging. They do not use trees for nesting or roosting. Whooping cranes are opportunistic feeders and often consumes insects, minnows, mollusks, crustaceans, frogs, rodents, small birds, and berries (FWS, 2007). Every three years they molt, which renders them flightless, making them particularly susceptible to predators. Whooping cranes often roost on submerged sandbars in wide unobstructed channels that are isolated from human activity (FWS, 2023).

Whooping cranes are endemic to North America, with a historic population of about 10,000 individuals and a distribution that ranged from the Rocky Mountains to the East Coast and extended from Canada to Mexico. The population was reduced to 1,400 by the mid-1800s due to shooting and habitat destruction in the prairies for agricultural development (FWS, 2011b). By 1941 only fifteen whooping cranes remained worldwide (FWS, 2011b). In 1966, biologists at the Patuxent Wildlife Research Center in Maryland began a captive breeding program with 12 eggs collected from the wild, in addition to a young male bird named Canus who had been rescued 2 years earlier with a fractured wing. By July 2010, the total population of wild and captive whooping cranes had increased to 535 (FWS, 2023), with many of these descendants of Canus. The Aransas-Wood Buffalo National Park population is the only non-experimental population[49] in the wild, and it migrates from the Wood Buffalo National Park in northern Canada to the Aransas National Wildlife Refuge on the Texas coast. There are also two experimental populations: one that migrates between Wisconsin and Florida, and a non-migratory population in Louisiana.[50] Harris Lake and Skyline WMA are

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[47] Any nonessential experimental population located outside a National Park or National Wildlife Refuge System unit is treated as a proposed species (conference may be conducted)(FWS and NMFS, 1998).

[48] 43 Fed. Reg. 20,938-20,942 (May 15, 1978).

[49] FWS estimates this population at 543 individuals.

[50] There are also populations of whooping cranes in captivity at 12 sites.

located within the migration corridor for the eastern (Wisconsin to Florida) non-essential, experimental population, which was reintroduced from 2001 to 2010 (FWS, 2024m). Ongoing threats to the species include human disturbance, loss and degradation of breeding and wintering grounds, human-caused mortality, loss of genetic diversity, disease, predation, and collisions with fences and power lines (FWS, 2011b).

Gray Bat

FWS listed the gray bat as endangered under the ESA in 1976.[51] This species is also listed as an Alabama state protected species (Alabama NHP, 2020). No critical habitat has been designated for this species (FWS, 2024n).

Gray bats are a migratory species with long, glossy, light-brown to reddish-brown fur, except after the summer molt when their fur is gray. They are approximately 3.5 inches long, with a wingspan of 10 to 11 inches. Gray bats feed on mayflies, caddisflies and stoneflies, but they also eat moths, beetles, and Asiatic oak weevils. Adults forage almost exclusively over water along river or reservoir/lake edges with forested riparian zones. Sexual maturity occurs around 2 years of age. Although fewer than half live to maturity, gray bats can live up to 17 years.

Caves provide habitat for gray bats year-round—for roosting and rearing young in the summer and hibernation in the winter. It is estimated that 95% of their range-wide population hibernate in fewer than 20 caves (Kentucky DFW, 2024). Gray bats swarm and breed in the fall upon arrival at the winter caves (September through early November), with one pup born late in May or early in June. Summer roosting caves are almost always located within about a half a mile of a river or reservoir/lake, but this species becomes territorial when insect numbers decrease (NatureServe, 2024a) and has been documented foraging up to 26 miles from their colony (Kentucky DFW, 2024).

The current range of gray bats includes Alabama, Arkansas, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Mississippi, Missouri, North Carolina, Ohio, Oklahoma, South Carolina, Tennessee, Virginia, and West Virginia (FWS, 2024n). In Alabama, gray bats historically occurred in the limestone karst areas north of the Bankhead National Forest and northeast of the Talladega National Forest. In addition, FWS's Fern Cave and Sauta Cave National Wildlife Refuges (NWRs) protect two large gray bat hibernacula located about 20 miles southeast and south of Skyline WMA, respectively. Fern Cave provides habitat for an estimated one million bats, including the largest wintering colony of gray bats in the United States. Sauta Cave provides a summer roosting site for about 200,000 to 400,000 gray bats and serves as a hibernaculum for both the gray and Indiana bats during the winter (FWS, 2024o; and 2024p). In addition, Nickajack Cave is located about 20 miles northeast of Skyline WMA in South Pittsburg, Tennessee. Like Sauta Cave, Nickajack Cave is listed as a Priority 1 cave[52] with a maternity colony in the Gray Bat Recovery Plan, but the status of its population is

[51] 41 Fed. Reg. 17,736-17,740 (April 28, 1976).

[52] FWS assigned priority numbers to gray bat caves based on biological significance, location, vulnerability, and a consensus of expert opinions. Priority 1 caves are major hibernacula and their most important maternity colonies (FWS, 2009).

unknown (FWS, 2009). Skyline WMA is within the current gray bat range and contains about 10,782 acres of karst geology (figure D-21).

Decline of the gray bat is attributed primarily to human disturbances to roosting bats, environmental contamination, and impoundment of waterways. Unlike other bats that roost high up in large dead trees, gray bats roost in caves where they are much more accessible to humans. Given their strong fidelity to particular caves, gray bats are very susceptible to disturbance (NatureServe, 2024a). However, recent surveys indicate that gray bats are less susceptible to white-nose syndrome[53] than other bat species.

[53] White-nose syndrome is a disease caused by a white fungus (i.e., *Pseudogymnoascus destructans*), which infects the muzzle and other parts of many bat species, and is associated with high mortality rates of 12 cave-hibernating bat species (FWS, 2019c).

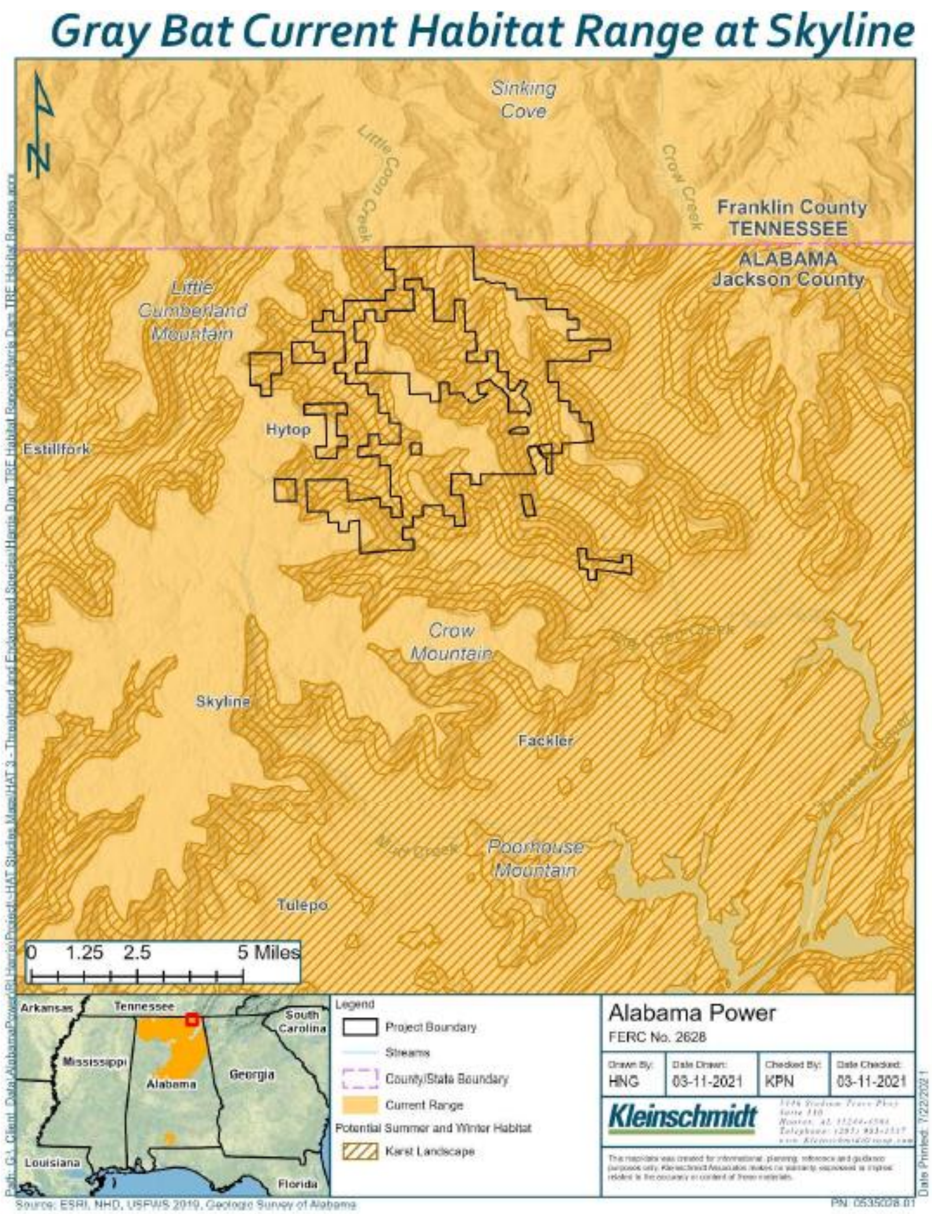

Figure D-21. Gray Bat Current Range in Relation to the Project Boundary near Skyline WMA and Karst Geology (Source: Kleinschmidt, 2021).

Indiana Bat

FWS listed the Indiana bat as endangered under the ESA in March 1967.[54] It is also listed as an Alabama state protected species (Alabama NHP, 2020). In 1977, FWS designated critical habitat for Indiana bats in 11 caves and 2 mines in 6 states, including Missouri, Illinois, Indiana, Kentucky, Tennessee, and West Virginia.[55] There are no critical habitat units in Alabama (FWS, 2024q).

Similar in size to gray bats, Indiana bats have fine, fluffy chestnut brown to dark gray fur, with the underside lighter than the back. Indiana bats forage on flies, caddisflies, moths, beetles, ants, spiders, and mites, which they catch on the fly in riparian areas along rivers and lakes, in upland and floodplain forest canopies, and over ponds and fields (FWS, 2007; 2024r). An Indiana bat can eat up to half its body weight in insects in one night (FWS, 2024r).

Indiana bats hibernate in the winter, and are active in the spring, summer, and fall. Suitable hibernacula include underground limestone caves and cave-like structures (e.g., abandoned mines and railroad tunnels), with a wide range of vertical structures, and cool, stable temperatures below 50ºF but infrequently below freezing (FWS, 2015a). Suitable summer habitat includes a variety of forested/wooded areas where the bats roost, forage, and travel (FWS, 2015a), like forested blocks and corridors with variable amounts of canopy closure, such as fencerows and riparian forests. Isolated live or dead trees may provide summer roosting habitat if they are 5 inches diameter at breast height (dbh) or greater with exfoliating bark, crevices, or cracks. Dead or dying trees of 16 inches dbh or greater are considered optimal for maternity colony roosts. Although female Indiana bats exhibit fidelity to summer roosting trees, a tree may only provide suitable habitat for a few years. Successful maternity colonies may form in different suitable trees in subsequent years, if available (FWS, 2007).

Indiana bats breed in late summer or early fall, hibernate, and then one pup is born between mid-June and early July. Maternity colonies have an average of 50 to 80 adults, roosting in hollow trees, under loose bark, or in cracks or holes in mature oaks, hickories, elms, and maples, as well as ash, cottonwood, pine, and hemlocks in riparian or upland forests (FWS, 2007). The pups are weaned and begin flying 25 to 37 days after birth. This species' mean lifespan is estimated to be about 6 years, but they can live over 20 years (FWS, 2024r).

In Alabama, Indiana bats have historically occurred in the northern half of the state. Karst geology is common in the state and there are 10 caves, including two Priority 3 and eight Priority 4 caves,[56] that are known, or believed, to harbor Indiana bat winter populations in Blount, Colbert, DeKalb, Jackson, Lauderdale, Lawrence, Limestone, Marshall, Morgan, and Shelby Counties, Alabama (FWS, 2024s). Of the 27 FWS-designated Priority 1 Indiana bat hibernacula, the nearest to project land at Harris Lake is the White Oak Blowhole in Blount

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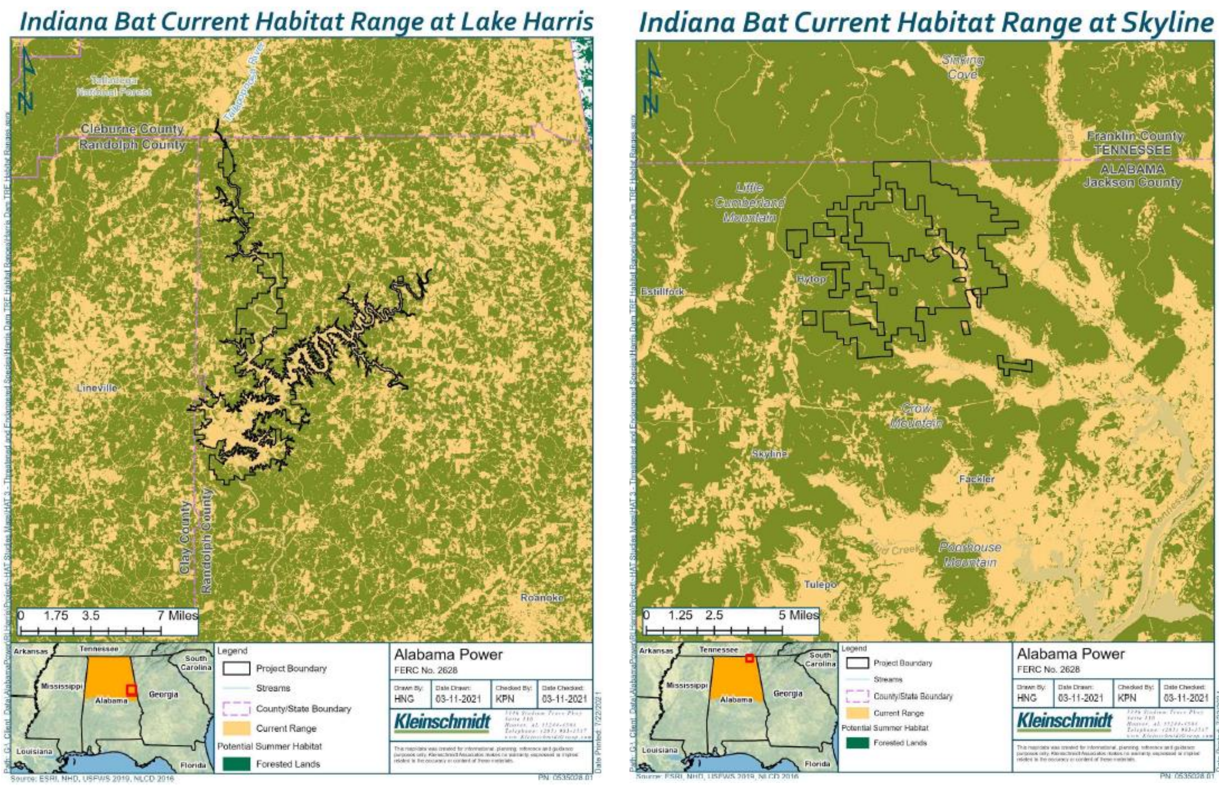
[54] 32 Fed. Reg. 4,001 (March 11, 1967).

[55] 42 Fed. Reg. 47,840-47,841 (September 22, 1977).

[56] FWS assigns priority numbers to hibernacula based on the number of Indiana bats that use them. Priority 3 and 4 hibernacula have current or observed historic populations of 50 to 1,000 bats, and less than 50 bats, respectively (FWS, 2019).

County, Tennessee, approximately 130 miles northeast of Skyline WMA. Nickajack Cave in Marion County, Tennessee, is classified a Priority 2 hibernacula for Indiana bats and it is located just 19 miles east of Skyline WMA (FWS, 2019d). Nickajack Cave is federally owned, has a gate to protect bats from human disturbances. There is also known summer Indiana bat habitat in Jackson County, Alabama, but there are currently no records of summer or winter habitat at Harris Lake or downstream from Harris Dam on the Tallapoosa River (FWS, 2007). In addition, there were no incidental observations of Indiana bats during Alabama Power's 2020 Skyline Cave Assessment associated with the cultural resource surveys. However, FWS assumes that suitable summer habitat occurs throughout the state, including forests/woodlots, loose aggregates of trees, riparian forests, individual trees near forested areas and may also include some adjacent, non-forested habitats such as emergent wetlands, agricultural edge fields, old fields and pastures (FWS, 2024s). Figures 22 and 23 show the current range of the Indiana bat and forested land at Harris Lake and Skyline WMA, respectively.

Habitat loss and degradation, forest fragmentation, winter disturbance, and environmental contaminants are among the most significant range-wide threats to Indiana bats. More recently, white-nose syndrome, non-native invasive species, climate change, and wind turbines have been identified as significant threats to the recovery of this species (FWS, 2019d). In addition, the concentration of 72% of the Indiana bat population in just 4 hibernacula in Missouri, Indiana, and Illinois (FWS, 2024r), makes this species extremely vulnerable to adverse impacts during the winter (FWS, 2007).



Figures D-22 and D-23. Indiana Bat Current Range and Forested Lands in Relation to the Project Boundary at Harris Lake and Skyline WMA (Source: Kleinschmidt, 2021).

Northern Long-Eared Bat

FWS listed the northern long-eared bat as endangered under the ESA in 2023.[57] It is also listed as an Alabama state protected species (Alabama NHP, 2020). No critical habitat has been designated for this species (FWS, 2024t).

Northern long-eared bats are approximately 3.5 inches long, with a wingspan of 9 to 10 inches, and are easily distinguished by their large ears (FWS, 2024t). Their fur is medium to dark brown on the back, with a somewhat paler brown on the underside. They hunt moths, beetles, spiders, flies, and leafhoppers primarily between the understory and canopy in forested areas, but also in more open areas, such as forest clearings, over water bodies, and along roads starting at dusk (FWS, 2015b).

Northern long-eared bats roost under bark, in cavities, or in crevices of large live, dead, or dying trees in the summer and hibernate in caves or abandoned mines in the winter (FWS, 2015b). Every two to three days during the summer, individuals or colonies switch roosts, which can include a wide variety of species and sizes of trees, typically with 3 inches dbh or greater, as well as the nooks and crannies in human-made structures (FWS, 2016). Northern long-eared bats breed from late July to October, females store sperm during hibernation, delaying fertilization (of a single egg) until ovulation during the spring. Typically born between late May and July, pups are raised in maternity colonies of 30 to 60 individuals, and are most vulnerable to disturbances at maternal roosts before they learn to fly, from 18 to 21 days after birth. Under the right conditions, northern long-eared bats can live up to about 19 years (FWS, 2024t).

In Alabama, the northern long-eared bat has historically occurred statewide, including along the Tallapoosa River downstream from Harris Dam. There were no incidental observations of northern long-eared bats during Alabama Power's 2020 Skyline Cave Assessment associated with the cultural resource surveys.[58] However, there are two known northern long-eared bat hibernacula in Jackson County, Alabama, and at least three documented maternity roost trees in Cleburne County, Alabama (FWS, 2016; NatureServe, 2024b). In addition, Alabama DCNR and FWS have documented a breeding population in coastal Alabama (i.e., Perdido River Wildlife Management Area in eastern Baldwin County) that appears to live in forests and be active year-round and does not hibernate in caves during the winter. Therefore, this population likely avoids potential exposure to white-nose syndrome (Pillion, 2023). Figures 24 and 25 show the current range of the northern long-eared bat, and forested land at Harris Lake and Skyline WMA, respectively.

Decline of the northern long-eared bat is attributed primarily to white-nose syndrome, which has eliminated more than 99% of the bats in some areas (FWS, 2024t; 2015b). Habitat loss from timber harvesting, surface mining, road and bridge construction, and forest management activities intended to prevent wildfires have also contributed to their decline. Mortality of a small number of this species from wind turbine operation has also been documented (FWS, 2015b).

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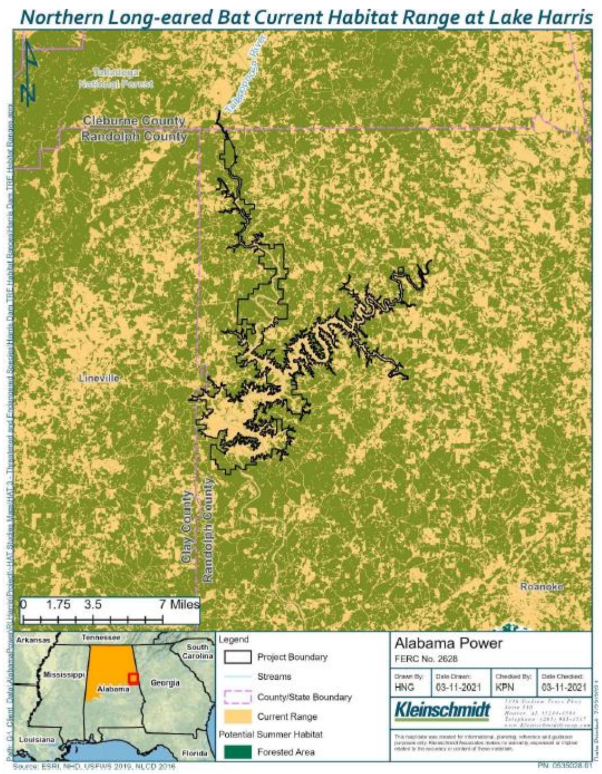
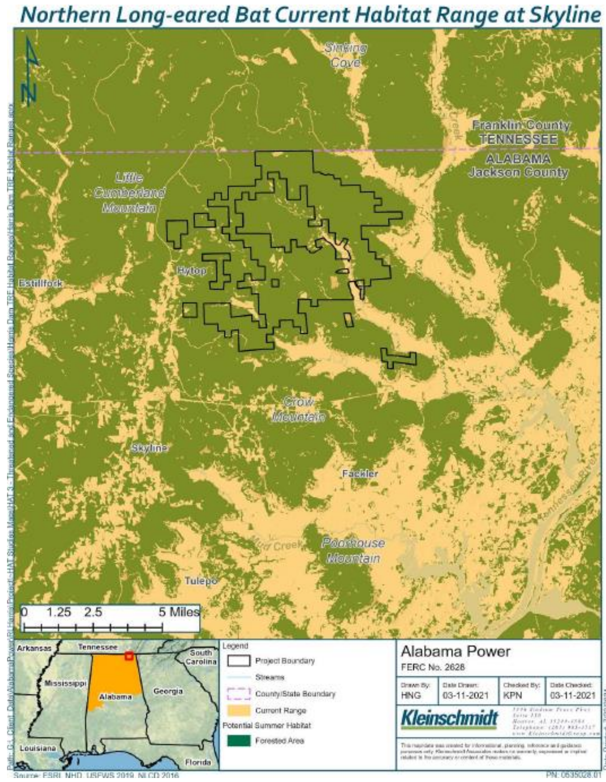
[57] 88 Fed. Reg. 4908-4,910 (January 26, 2023).

[58] Accession No 20211123-5079, Appendix D, Part 6





Figures D-24 and D-25. Northern Long-eared Bat Current Range and Forested Lands in Relation to the Project Boundary at Harris Lake and Skyline WMA (Source: Kleinschmidt, 2021).

Tri-colored Bat

In September 2022, FWS proposed to list the tri-colored bat as endangered under the ESA.[59] It is not currently listed as an Alabama state protected species (Alabama NHP, 2020). No critical habitat has been designated for this species (FWS, 2024u).

Tricolored bats are 3 to 3.5-inches-long, with a wingspan of 8 to 10 inches. Their fur is tri-colored, appearing yellowish to nearly orange and dark at the base and tips, while lighter in the middle (FWS, 2024u; 2024v). Tri-colored bats have a slow, erratic, fluttery flight, while foraging on flies and caddisflies, moths, beetles, flying ants, and wasps. They most commonly hunt over waterways and forest edges (FWS, 2024v).

In the winter, tri-colored bats hibernate in caves and abandoned mines and wells. However, in the southern United States, where caves are sparse, tricolored bats often roost in roadway culverts, and they exhibit shorter torpor bouts and forage during warm nights. They often hibernate in the same location year after year. During the spring, summer, and fall, tricolored bats occur in forested habitats where they roost in leaf clusters of large live, dead, or dying deciduous hardwood trees, in Spanish moss, or clusters of needles in pine trees. They occasionally roost in human structures such as barns, sheds, or under porch roofs. They breed between mid-August and mid-October, with two pups born between May and July. The pups

[59] 87 Fed. Reg. 56,381- (September 14, 2022).

begin flying 3 weeks after they are born, and begin foraging when they are 4 weeks old. At 5 weeks, they are fully independent. Female tricolored bats exhibit high site fidelity, returning year after year to the same summer roosting locations. Female tricolored bats form maternity colonies and switch roost trees regularly while males roost singly. The oldest tricolored bat on record is over 14 years old (FWS, 2024v).

The range of tricolored bats includes southeastern Canada, most of Central America, and all, or portions of, 39 states and the District of Columbia, including all of Georgia. In Alabama, the tri-colored bat has historically occurred throughout the state, including a portion of the Tallapoosa River downstream from Harris Dam. During Alabama Power's 2020 Skyline Cave Assessment associated with the cultural resource surveys, the majority (45) of the 48 bats that were observed were tri-colored bats.[60]

Decline of the tri-colored bat is attributed primarily to the spread of white-nose syndrome, which has reduced their numbers by more than 90% in some areas (FWS, 2024u). Forest removal or conversion and the disturbance or destruction of caves can result in the loss of suitable summer roosting and foraging habitat, as well as winter hibernacula. The loss or disturbance of habitat may compound the effects of white-nose syndrome.[61]

Alligator Snapping Turtle

In 2021, FWS proposed to list the alligator snapping turtle as a threatened species with a 4(d) rule.[62] It is currently listed as an Alabama state protected species (Alabama NHP, 2020). No critical habitat has been designated for this species (FWS, 2024w).

This species has a long tail, large triangular head, curved beak, and a rough brown shell. The largest freshwater turtle in North America, alligator snapping turtles can reach 29 inches long and their weight can exceed 250 pounds. Their diet includes fish, mollusks, snakes, worms, crayfish, aquatic birds, and mammals (FWS, 2024x). They are aquatic creatures, often burying themselves in the mud at the bottom of sloughs, oxbows, canals, swamps, and ponds near rivers, and they are most active during the night (Alabama DCNR, 2024c). Females venturing onto land to build nests and lay their eggs (FWS, 2024x).

Most alligator snapping turtles live to be 20 to 70 years old; however, some are believed to live as long as 200 years. They become sexually mature at about 12 years of age, mate in the spring, and nest about two months later. The female digs a nest about 90 to 210 feet from the shoreline, and lays a clutch of 20 to 50 eggs, which incubate for 100 to 140 days (Alabama DCNR, 2024c). An incubation temperature range of 77 to 81°F produces male hatchlings, while a range of 84 to 86°F incubation temperature produces female hatchlings.

In Alabama, alligator snapping turtles occur in a large area of the state south of the Bankhead National Forest and southwest of Gadsden. The range-wide alligator snapping turtle population is estimated to be between 68,154 and 1,436,825 individuals. This enormous range illustrates the high degree of uncertainty that exists in local populations and in turn, the limited

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[60] Accession No 20211123-5079, Appendix D, Part 6

[61] *Id.*

[62] 86 Fed. Reg. 62434 (November 9, 2021).

ability to extrapolate local abundance estimates to a broader spatial scale. Within the estimated population bounds, the most likely estimate of range-wide alligator snapping turtle abundance is 361,213 turtles, with 55% of these (198,667 turtles) occurring in the Alabama Analysis Unit (i.e., central and southwestern Alabama and eastern Mississippi) (FWS, 2021g).

Alligator snapping turtles face a predicted 95% decline in 50 years and possible extinction sooner (Center for Biological Diversity, 2021). Threats to this species include habitat degradation, overhunting for their meat, illegal trapping, entanglement in fishing gear, life-threatening injuries from boat propeller strike, and nest predation by raccoons and other species (FWS, 2024x). This species' decline is also attributed to the facts that the length of time to reach sexual maturity is long, females only produce one clutch of eggs per year, and survival for hatchlings is low (Center for Biological Diversity, 2021).

Monarch Butterfly

The monarch butterfly is a candidate for listing as a threatened or endangered species under the ESA.[63] It is not currently listed as an Alabama state protected species (Alabama NHP, 2020). No critical habitat has been designated for this species (FWS, 2024y).

Adult monarch butterflies have bright orange wings with black veins and a black border with a double row of white spots. Their wingspan is typically 3 to 4 inches, and the bright coloring is a warning to predators that this species is toxic. During the breeding season, monarchs lay their eggs on milkweed plants (primarily *Asclepias* spp.),[64] and the larvae (i.e., caterpillars) emerge after two to five days. Caterpillars are initially green with black heads, and then gradually develop vivid black, yellow, and white bands as they grow by feeding on milkweed leaves and molting over a period of 9 to 18 days before pupating into a chrysalis.[65] Adult monarch butterflies emerge from their chrysalises in 6 to 14 days. Monarchs breed year-round in many regions where they are present, and multiple generations are produced during the breeding season. Most adult butterflies live approximately two to five weeks; however, adults that migrate to overwintering sites enter into reproductive diapause (suspended reproduction) and live from six to nine months (FWS, 2024y).

During the fall, both the eastern and western North American monarch populations begin migrating to their overwintering sites in Mexico and California, respectively. More specifically, the eastern population overwinters in the mountains of central Mexico, where they roost in oyamel fir trees at elevations between 7,800 and 9,800 feet. Migration can last for over two months, during which monarchs may travel over 1,800 miles. In early spring (February-March), surviving monarchs break diapause and mate at the overwintering sites before dispersing. The same individuals that undertook the initial southward migration begin flying

[63] 85 Fed. Reg. 81,813 (2020).

[64] Monarch butterfly larvae are obligate milkweed feeders. Individuals always lay their eggs on a milkweed plant, and the larvae only develop on various milkweed species.

[65] Pupating into a chrysalis is the process of transforming between the larval and adult life stages for butterflies.

back through the breeding grounds and their offspring start the cycle of generational migration over again (FWS, 2024y).

In Alabama, monarchs occur statewide wherever milkweed and flowering plants are abundant. Both the Harris Lake/Tallapoosa River downstream from Harris Dam and Skyline WMA portions of the Harris Project are within the breeding range of the eastern North American migratory monarch population. Summer habitat requirements include the existence of milkweed plants for egg laying and larval feeding and development, and a variety of flowering plants for adults to feed on nectar.

The decline of the monarch butterfly is also attributed to loss of habitat with milkweeds and other nectar-rich plants due to urban development, use of insecticides and herbicides, logging operations at their overwintering sites in Mexico, and climate change (Fallon C. et al., no date; FWS, 2020e). The probability of the monarch population east of the Rocky Mountains reaching the point at which extinction is inevitable (given their current abundance and growth rate) over the next 60 years is 48 to 69% (FWS, 2020e). Their declining numbers increase their vulnerability to catastrophic events such as extreme storms at their overwintering sites in Mexico.

Georgia Rockcress

In 2014, FWS listed Georgia rockcress as threatened under the ESA.[66] It is not listed as an Alabama state protected species. FWS designated critical habitat for this species on September 12, 2014 (FWS, 2024z).

Georgia rockcress is a perennial herb belonging to the mustard family. It has a taproot, lance-shaped leaves 2 to 3 inches in length, and unbranched stems that grow up to 3 feet tall. The life stages of Georgia rockcress include the dispersing and germinating seed, basal rosette, vegetative plant, and reproductive plant. The plants are capable of reproducing within six months of germination. Blooming occurs from March to April and each flower features four white petals in a cluster at the tip of a short stem. Fruits are produced from May until early July. The fruits are long and slender, typically 2.5 inches long by 0.04-inch diameter. Although this species has a thick rootstock that could live for many years, but it is reported to be a relatively short-lived perennial. Experts indicate that under cultivation, plants seem able to survive for three to four years (FWS, 2021d).

Georgia rockcress grows well on river bluffs with steep slopes with exposed mineral soil, and they are often found along rivers with rocky outcrops or eroding banks. They prefer sunny locations with partial shade from a mature canopy. In Alabama, they occur in the south-central part of the state, in an area bounded on the north by Tuscaloosa, Birmingham and Gadsden, and on the south by Thomasville, Montgomery and Eufaula. Twelve of the 17 critical habitat units are located in Alabama, including units in Sumter, Monroe, Wilcox, Elmore, Bibb, and Dallas Counties. Unit 12 is the closest critical habitat to the Harris Project,

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[66] 79 Fed. Reg. 54,627-54,635 (September 12, 2014).

it occurs near the confluence of the Coosa and Tallapoosa Rivers, outside the Harris Project's area of potential effect.[67]

The decline of the Georgia rockcress is primarily due to habitat disturbances and destruction and subsequent competition with non-native, invasive plant species. Specifically, residential development, timber harvesting, quarrying, road construction, and recreation can disturb the soil and/or eliminate the tree canopy, creating conditions that facilitate the introduction or spread of non-native, invasive plants such as Japanese honeysuckle, Chinese privet, Nepalese browntop/Japanese stiltgrass. Climate change is also believed to be a factor in the decline of this species.[68]

White Fringeless Orchid

FWS listed the white fringeless orchid as threatened under the ESA in September 2016.[69] It is not listed as an Alabama state protected species. No critical habitat has been designated for this species (FWS, 2024aa).

White fringeless orchid is a perennial herb that sprouts each spring from an underground tuber. It has a light green stem approximately 24 inches high, with lower leaves that are 8 inches long and 1 inch wide. This species prefers partially-shaded wet areas with sandy, acidic soils. They are sometimes found in wetlands featuring white oak, blackgum, red maple, climbing hydrangea, smooth alder, winterberry, chokecherry, and possumhaw (FWS, 2021e). In Alabama, the species current range includes portions of the northern half of the state (figures D-26 and D-27). This species is known to occur in the Paint Rock River, Tallapoosa River, Hatchet Creek, and Cedar Creek drainages.

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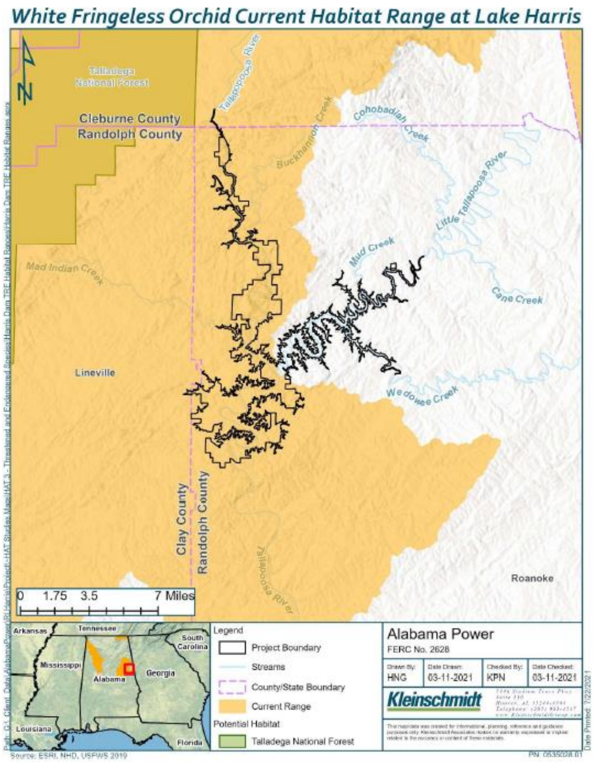
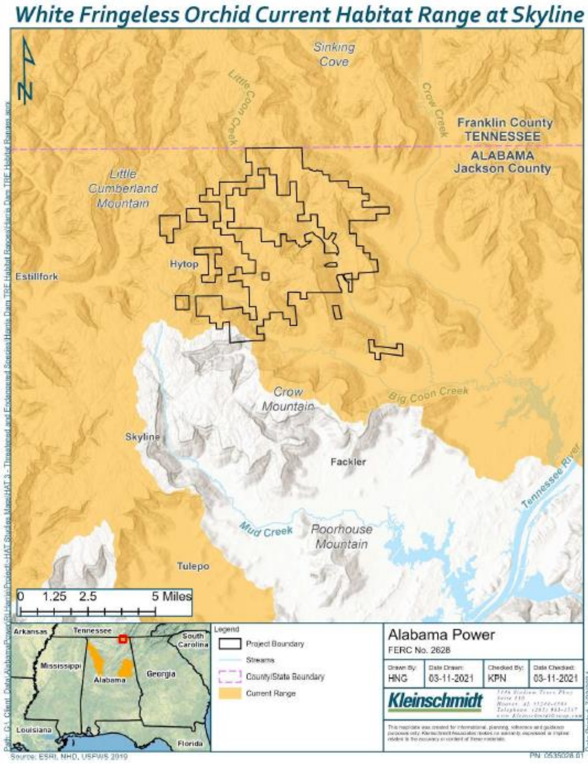
[67] 79 Fed. Reg. 54,635-54,667 (September 12, 2014).

[68] 79 Fed. Reg. 54,627-54,635 (September 12, 2014).

[69] 81 Fed. Reg. 62,826 (September 13, 2016).





Figures D-26 and D-27. White Fringeless Orchid Current Range in Relation to the Project Boundary at Harris Lake and Skyline WMA (Source: Kleinschmidt, 2021).

White fringeless orchids typically flower from late July through September, with the fruiting capsules maturing in October. A single plant can produce over 10,000 seeds; however, the survival rate of individual seeds is around 1%. The seeds are dust-like, and require an external source to provide carbon for germination. Like most orchids, this species relies on a symbiotic relationship[70] with a mycorrhizal fungus (i.e., *Epulorhiza inquilina*) for its seeds to germinate and its seedlings to grow (FWS, 2021e).

Among the threats to white fringeless orchids are timber harvests, including the conversion of native forests to intensively managed loblolly pine plantations. Non-native, invasive plants, particularly Nepalese browntop/Japanese stiltgrass, Chinese privet, and beefsteak plant also pose a threat. In September 2020, Alabama Power surveyed 12 sites around Harris Lake and 9 sites in or adjacent to Skyline WMA to determine if there are any extant populations of white fringeless orchids in or near the Harris Project boundary (see figures D-28 and D-29). However, no white fringeless orchids were observed.

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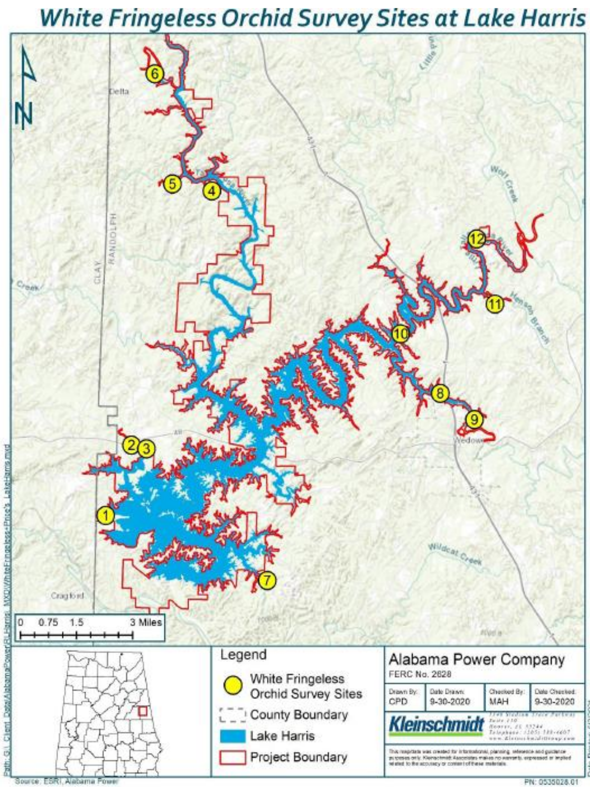
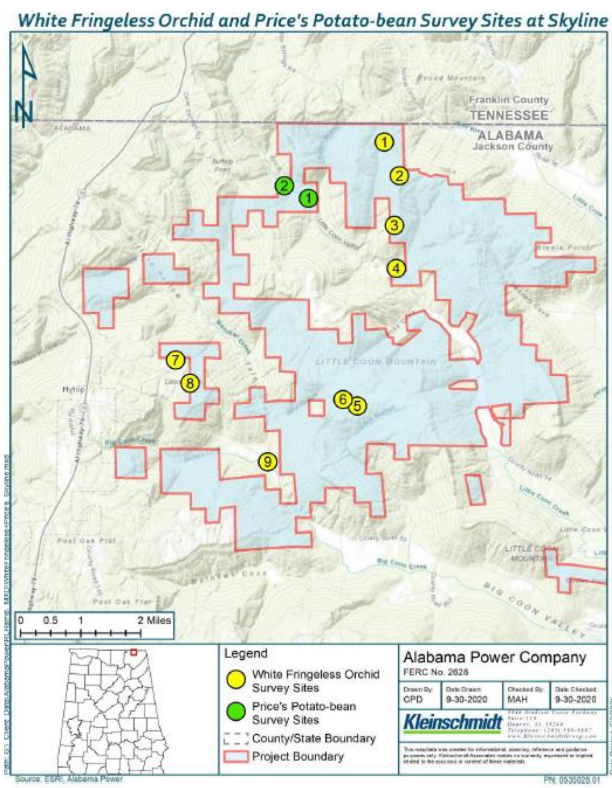
[70] A symbiotic relationship is mutually beneficial association between two or more species. In this case, a fungus colonizes the host orchid's root tissues, allowing it to increase the surface area of its root system, and obtain phosphate and other minerals in the soil, while the fungus obtains sugars from the roots of the orchid.





Figures D-28 and D-29. White Fringeless Orchid and Price's Potato-bean Survey Sites in Relation to the Project Boundary at Harris Lake and Skyline WMA (Source: Kleinschmidt, 2021).

Price's Potato-bean

In February 1990, FWS listed Price's potato-bean as threatened under the ESA.[71] It is not listed as an Alabama state protected species. No critical habitat has been designated for this species (FWS, 2024bb).

Price's potato-bean, also known as traveler's delight, is a perennial vine that grows up to 15 feet long from a thickened tuber up to 7 inches in diameter. This tuber is edible and is believed to have been a food source for Native Americans and early settlers. The species produces clusters of greenish-white or brownish-pink flowers from mid-June through August. These flowers develop into pods from late August through October. The pods vary from 5 to 6 inches in length, with 4 to 10 seeds per pod.

As of September 2022, there were 57 extant populations of Price's potato-bean in the southeastern United States, with 20 of these in Alabama (FWS, 2022d). In Alabama they occur in an area north of the Tennessee River and northeast of Huntsville; an area along the Alabama River between Montgomery and Selma; and in the Bankhead National Forest. Unable to tolerate deep shade, their habitat includes open woods and wooded edges in limestone areas, and along roadsides and powerline rights-of-way. This species prefers well-drained, loam soil

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[71] 55 Fed. Reg. 429 (January 5, 1990).

underlain by old alluvium or limestone. Figure D-30 shows the range of Price's potato-bean in the project area at Skyline WMA. In September 2020, Alabama Power surveyed 2 sites in or adjacent to Skyline WMA to determine if there were any extant populations of Price's potato-bean. No Price's potato-bean specimens were found (figure D-29).

The decline of Price's potato-bean is primarily due to timber harvesting, excessive shading by canopy trees, right-of-way maintenance for roads and utilities, and competition with non-native, invasive plants (FWS, 2022d). In the Bankhead National Forest, feral hogs pose a threat to the species as their numbers increase.

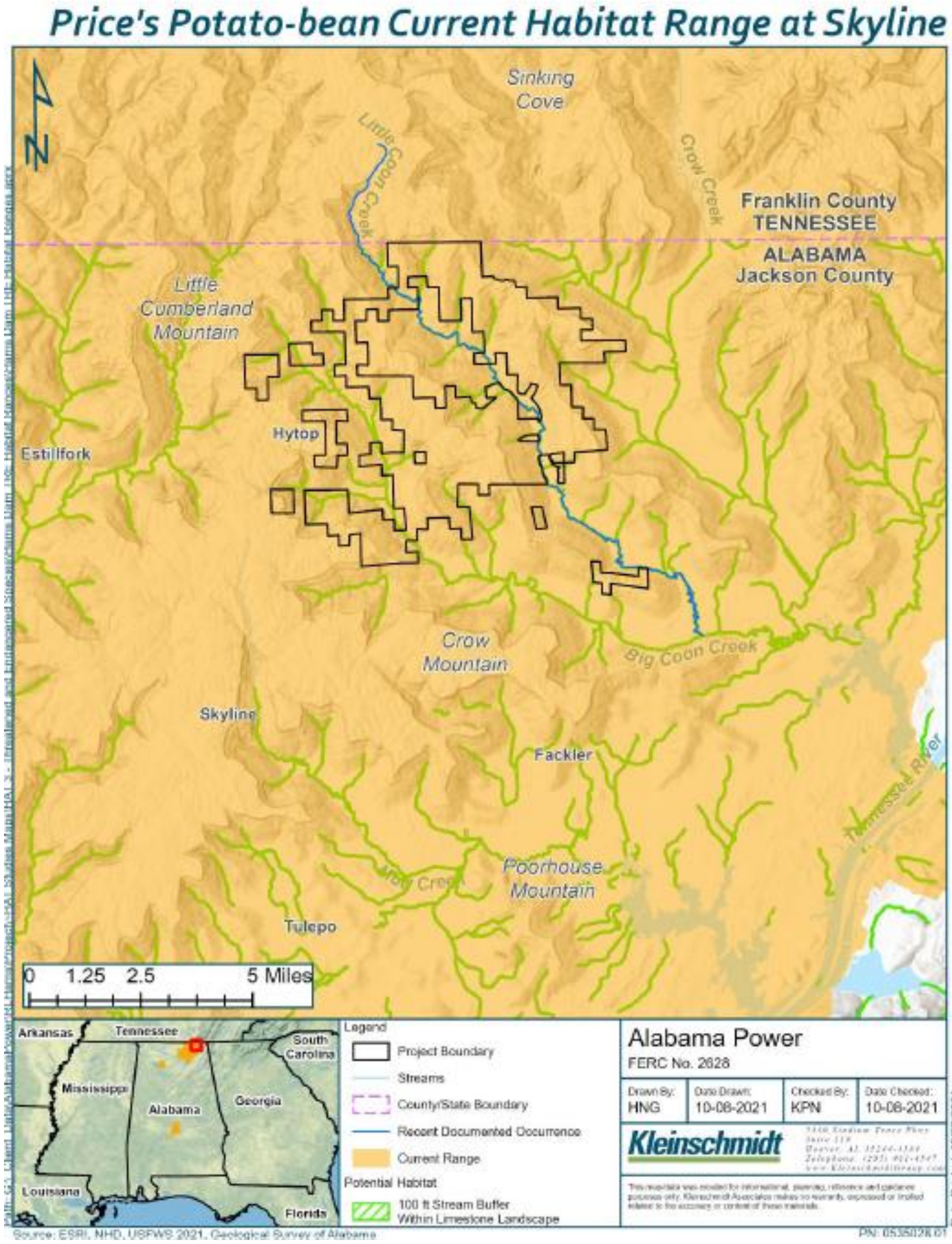

Figure D-30. Price's Potato-Bean Range and 100-foot Stream Buffers Within Limestone Landscape at Skyline WMA (Source: Alabama Power, 2021d).

Morefield's Leather Flower

FWS listed Morefield's leather flower as endangered under the ESA in May 1992.[72] It is not listed as an Alabama state protected species. No critical habitat has been designated for this species (FWS, 2024cc).

This species was first recorded by James D. Morefield on Round Top Mountain just east of Huntsville, Alabama, in 1982 (Encyclopedia of Alabama.org, 2024a). It is a rare perennial flowering vine related to the buttercup. It has urn-shaped flowers about 1-inch-long, with a pinkish color. Its vines are up to 16-feet-long, flower in May and June, and produce fruit in June and July. If precipitation is low during the spring, fruit production will decrease, and the plant may go dormant during periods of drought. The vine dies back in the fall and re-emerges in the spring. The seeds of this species typically lie dormant for a year before germinating.

Morefield's leather-flower prefers limestone outcrops on south- or southwest-facing mountainsides at elevations between 800 and 1,100 feet (FWS, 1994). This species' range includes portions of Alabama, Tennessee, and Georgia. In Alabama, the species occurs in the northeast corner of the state, north of Gadsden and east of Huntsville. Figure D-31 shows the current range of this species in Alabama and specifically near Skyline WMA, as well as potentially suitable habitat on the south- and southwest-facing slopes in the project area at Skyline WMA. Monitoring data indicates that most populations of Morefield's leather flower are small, with as many as 25 populations (over 69% of extant populations) consisting of fewer than 100 plants. Of the 36 extant populations, 22 are ranked by their respective state natural heritage programs as being in fair to poor condition, with the remaining 14 populations considered to be in good to excellent condition (FWS, 2024dd).

The decline of Morefield's leather-flower is largely due to the loss and fragmentation of habitat due to human development, timber management, roadside maintenance, and other activities that disturb its habitat. Invasive species such as climbing euonymus, English ivy, Chinese privet, heavenly bamboo, (FWS, 2024dd), and two non-native honeysuckle vine species are also a threat. Given that Morefield's leather-flower relies on pollination by animals and insects, any decline in pollinator numbers has an adverse effect on this species (Encyclopedia of Alabama.org, 2024a).

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[72] 57 Fed. Reg. 21,564 (May 20, 1992).

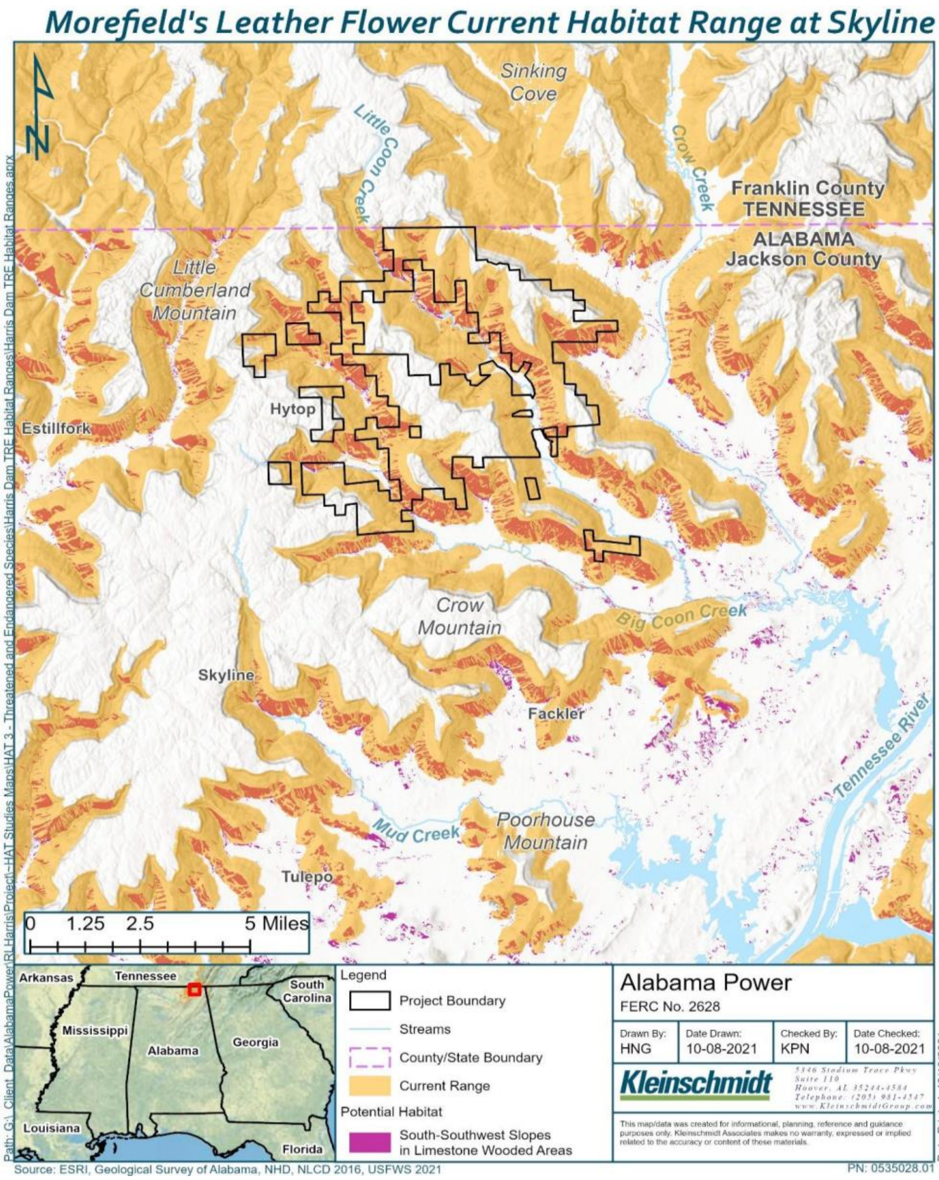

Figure D-31. Morefield's Leather Flower Range with South- and Southwest-Facing Slopes at Skyline WMA (Source: Alabama Power, 2021d).

American Hart's-Tongue Fern

FWS listed American hart's-tongue fern as threatened under the ESA in July 1989.[73] It is not listed as an Alabama state protected species. No critical habitat has been designated for this species (FWS, 2024ee).

American hart's-tongue fern is an evergreen leafy fern with smooth fronds that vary from 5 to 17 inches in length, and ¾ to 1¾ inches in width. The sporangia (spore-producing structures) are located on the underside of the frond.

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[73] 54 Fed. Reg. 29,726 (July 14, 1989).

American hart's-tongue fern is found at entrances to limestone caves and near limestone sinks that provide the high humidity, cool temperatures, and deep shade necessary for its growth (Encyclopedia of Alabama.org, 2024b). Only dolomitic limestone, which is high in magnesium will support this species' growth. The presence or absence of snowpack, which provides additional moisture, also appears to be a factor in their survival. In Alabama, American hart's-tongue fern was first recorded in Jackson County in 1979. Today, the species occurs in the northeast corner of the state, north of Gadsden and east of Huntsville (figure D-32).

Never plentiful in Alabama, American hart's-tongue fern is threatened by quarrying, timber harvesting, and other human activities that eliminate the shade it requires and/or facilitate the spread or growth of non-native invasive plants. Reductions in snowpack due to climate change also pose a threat.

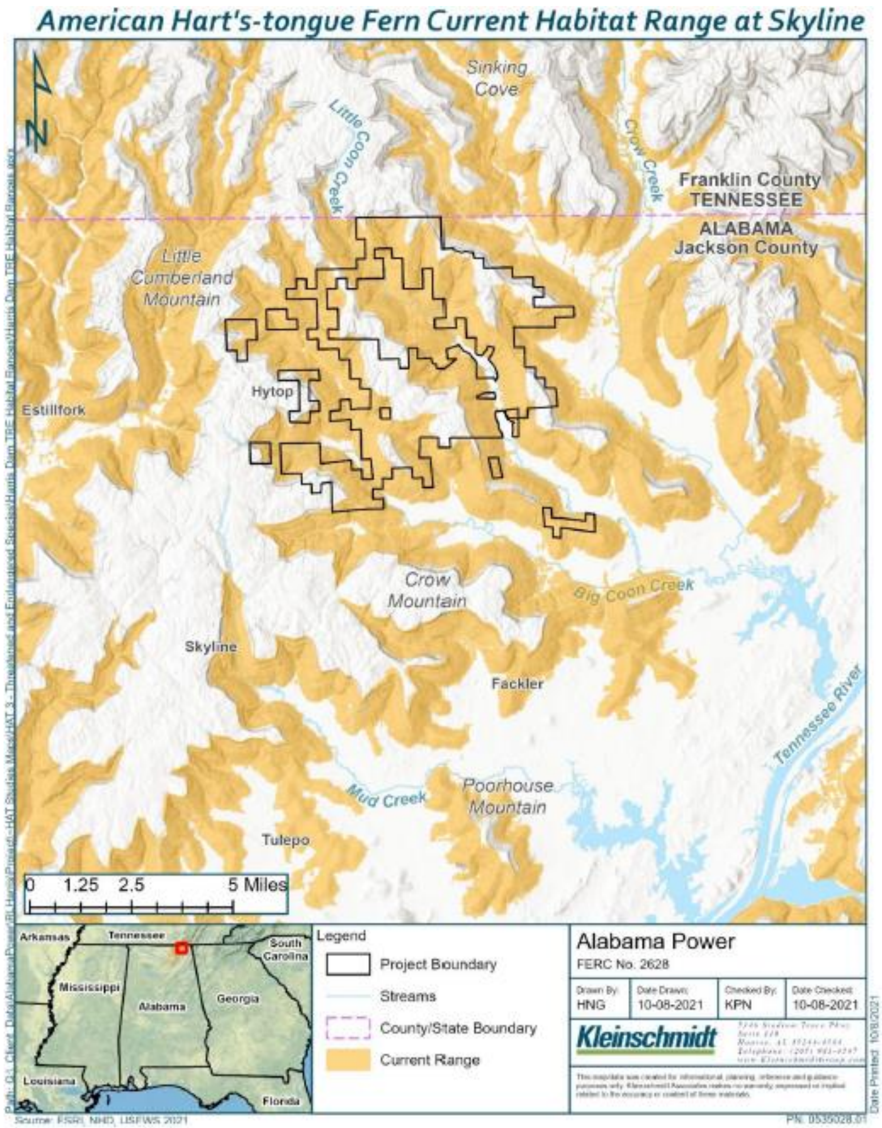

Figure D-32. American Hart's-tongue Fern Current Range at Skyline WMA (Source: Alabama Power, 2021d).

Little Amphianthus

FWS listed the little amphianthus, also known as granite pool sprite, among other names, as threatened under the ESA in February 1988.[74] It is not listed as an Alabama state protected species. No critical habitat has been designated for this species (FWS, 2024ff).

A member of the plantain family, little amphianthus is a diminutive, aquatic, annual plant with both floating and submerged leaves less than ½ inch in length. They prefer seasonal pools on granite outcrops with a sandy or silty bottom, surrounded by a rock rim (FWS, 1988). Because the small pools they inhabit disappear by early to mid-summer, the life cycle of little amphianthus is short, averaging 3 to 4 weeks (Alabama Forestry Commission, 2022). The floating flowers typically bloom in March or April, and produce a tiny seed capsule. The seeds germinate in the late winter and early spring if moisture and light are adequate. If the year is dry and no suitable habitat is available, the seeds may lie dormant.

In Alabama, their historical range was limited to 3 small areas, in the southwest and southeast corners of Randolph County, and between Sandy and Allen Creeks in the northwest corner of Chambers County. The Natural Heritage Section of the Alabama DCNR recently observed additional populations in Tallapoosa County (Alabama Forestry Commission, 2022). Eight miles south of Harris Lake, between Wadley and Almond, three small pools in an outcrop of bare rock have supported a population of little amphianthus that varied from 1,300 to 1,600 plants between 2012 and 2016, with a smaller number observed in 2018. There are also populations in: (1) two pools near the rim of an abandoned quarry in Randolph County, Alabama, 21 miles southeast of the Harris Lake project boundary; and (2) three pools in a granite gneiss outcrop in Chambers County, Alabama, 17 miles southeast of Harris Lake. Figure D-33 shows the range of little amphianthus in 2021 as well as areas with granite outcrops at Harris Lake.

Loss of habitat due to rock and mineral quarrying, trash dumping, and all-terrain vehicle (ATV) traffic are the primary causes of the little amphianthus ongoing decline (FWS, 2019f). All three of the sites in Alabama where little amphianthus is documented to occur are privately-owned. As such, the unique habitat necessary for its survival is subject to loss or degradation, further jeopardizing the viability of the species.

[74] *See* 53 Fed. Reg. 3,560 (February 5, 1988).

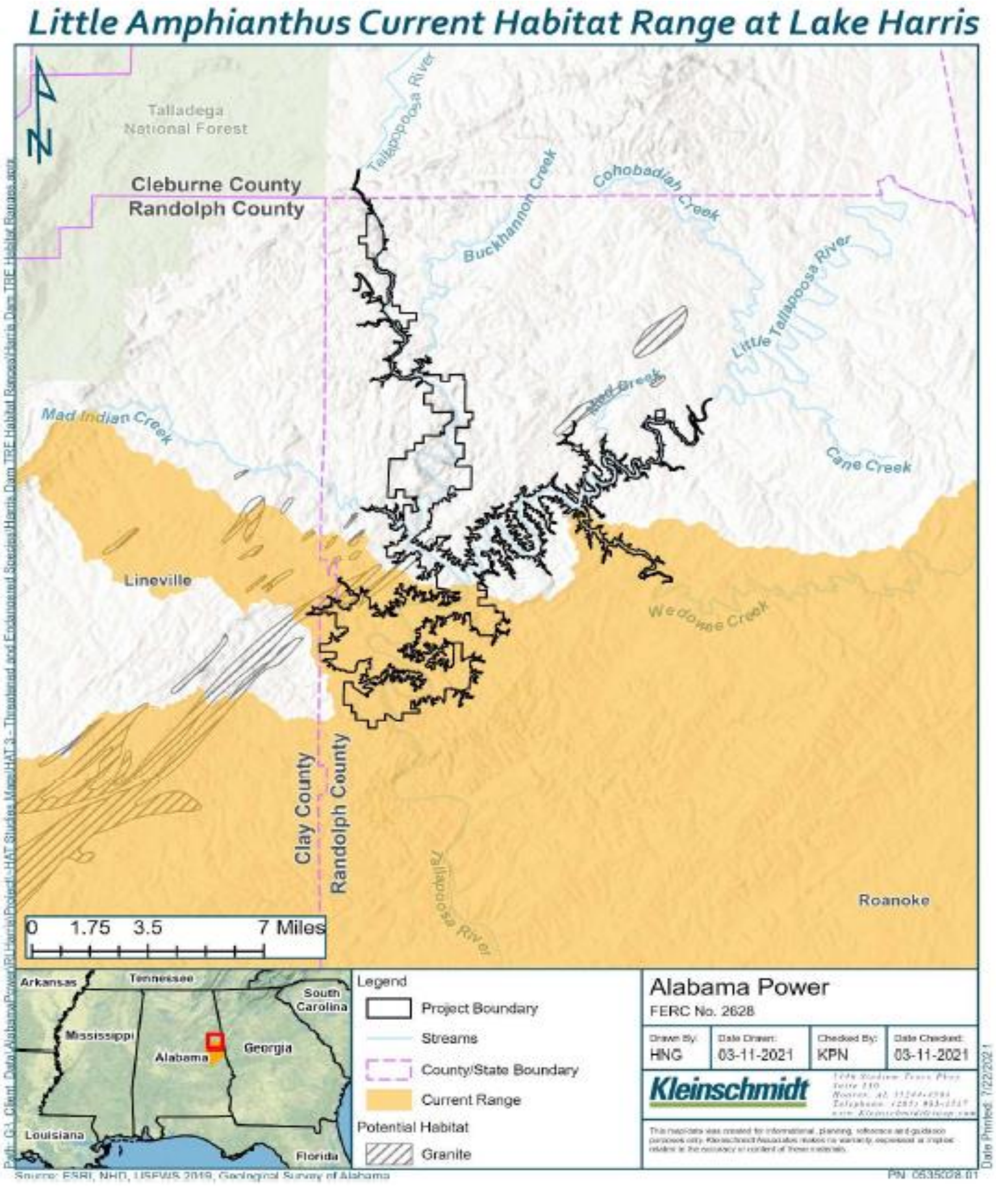

Figure D-33. Little Amphianthus Range in 2021 and Granite Outcrops in Relation to the Project Boundary at Harris Lake and Skyline WMA. (Source: Kleinschmidt, 2021).

Environmental Effects

Reservoir fluctuations can lead to fish stranding, nest dewatering, unsuitable spawning depths, and lack of cover. Harris Lake is a multi-purpose storage reservoir with water levels that fluctuate seasonally. Alabama Power operates the project to target lake surface elevations known as the project's operating curve. Alabama Power proposes to continue managing the reservoir elevations in accordance the current Harris Lake operating curve along with providing a continuous minimum instream flow of 300 cfs into the tailrace. Several stakeholders requested Alabama Power evaluate multiple alternative downstream release scenarios including continuous minimum flows ranging from 150 cfs to 800 cfs (*see* table 3.3.2-24).

Alabama Power’s relicensing proposal includes provisions to finalize its draft Wildlife Management Plan (WMP) for both Harris Lake and Skyline WMA, draft Shoreline Management Plan (SMP) for Harris Lake, and draft Recreation Plan for Harris Lake, as well as implement an Avian Protection Plan. These plans include measures to enhance and protect fish, wildlife, and their habitats. They also include provisions to mitigate the effects of proposed timber harvesting, shoreline development/management, and construction of recreation amenities that could lead to adverse environmental effects.

For example, as part of the WMP, Alabama Power would: (1) manage shoreline areas at Harris Lake to promote communities of native vegetation; (2) continue to implement Alabama’s BMPs for forestry at Harris Lake and Skyline WMA including: (a) establishing streamside management zones; (b) avoiding placement of roads, skid trails, or firebreaks across streams, when possible; (c) when stream crossings are unavoidable, using the fewest possible crossings located where the bank and streamside management zone would be least disturbed; and (d) proper planning and location of roads; (3) implement additional timber management measures to protect federally listed bat species and Price’s potato bean; (4) manage permanent openings (e.g., food plots) through mowing, disking, or prescribed fire, to benefit both game and non-game species; (5) continue to maintain two pollinator plots at Little Fox Creek Recreation Area on Harris Lake; and (6) manage public hunting areas at Harris Lake and Skyline WMA.

Alabama Power’s proposed SMP includes provisions to: (1) continue implementing a shoreline classification system to guide management and permitting activities (Appendices C and D of the SMP); (2) incorporate Alabama Power’s proposed changes in land use classifications, including reclassifying the botanical area at Flat Rock Park from recreation to natural/undeveloped (Appendix F, table 3.3.6-3); (3) maintain a scenic easement to protect scenic and environmental values; (4) designate “sensitive resources” in conjunction with shoreline classifications at Harris Lake to protect and enhance wetlands, threatened and endangered species, and cultural resources; (5) encourage the use of alternative bank stabilization techniques other than seawalls; (6) continue to implement shoreline compliance and permitting programs, and the Dredge Permit Program (Appendix A to the SMP); and (7) promote shoreline BMPs, such as methods to maintain vegetated shorelines (Appendix E of the SMP).

As part of the Recreation Plan, Alabama Power would: (1) continue to operate and maintain 11 existing project recreation sites at Harris Lake; (2) construct and maintain a new recreation site to include a day use park for swimming, picnicking, fishing, and boating at Harris Lake; (3) construct and maintain a canoe/kayak access area at the existing Harris Tailrace Fishing Pier downstream from Harris Dam within the project boundary; and (4) implement BMPs to minimize soil erosion and sedimentation during recreation site construction. In addition, Alabama Power’s proposed WMP includes provisions to continue to maintain two existing campsites, as well as hunting opportunities project land at Skyline WMA.

Alabama Power’s proposed Avian Protection Plan includes provisions to: (1) comply with avian protection laws; (2) use avian-friendly alternatives for construction standards and procedures, as applicable; (3) provide training for Alabama Power employees; (4) report avian encounters and nest management activities; (5) incorporate revisions of BMPs to enhance avian protection, where appropriate; and (6) facilitate cooperative protection efforts with resource agencies and other stakeholders.

In addition, as described in section 3.3.6.2, *Land Use and Aesthetics, Environmental Effects,* Alabama Power proposes project boundary changes around Harris Lake to: (1) add land necessary for current and future O&M and recreation development; (2) remove land not required for O&M or other project purpose; and (3) reduce the shoreline buffer where project infrastructure and recreation facilities are not located along the shoreline. Alabama Power's proposed changes would result in the removal of 286 acres and the addition of 504 acres to the Harris Lake portion of the project boundary for a net, total addition to the boundary of 218 acres. Alabama Power is not proposing any changes to the project boundary or to land use classification at Skyline.

Alabama DCNR recommends (10(j) nos. 15 and 16) that if Alabama DCNR-WFF fishway recommendations are addressed to improve aquatic habitats upstream and downstream of Harris Dam, Alabama Power should establish a Memorandum of Agreement with an approved and licensed hatchery/facility to develop and implement a freshwater fish, mollusk and crayfish propagation program for the Tallapoosa River in consultation with resource agencies and Commission approval. The goals of this program would be to: (1) stabilize existing populations of select rare, state listed, species of greatest conservation need and federally listed species; (2) reintroduce extirpated species; and (3) reestablish select faunal representative species into restored habitats. Initial propagation work would focus on the monitoring of select species in existing habitats to prevent their extirpation. Reintroductions and reestablishment of species into restored habitat would rely on population and habitat assessments to determine when and where conditions are favorable for the release of juveniles. Activities of this program would include but not be limited to: (1) collection and maintenance of brood stock and fish hosts; (2) developing propagation and rearing techniques; (3) artificial culture and rearing of fish, mollusks or crayfish; (4) testing of proposed release sites to determine habitat suitability; and (5) monitoring of release sites to determine success of releases and population status of target species. This propagation program would be carried out until monitoring data indicate that self-sustaining populations are established. Alabama DCNR recommends using nearby state or federal facilities or exploring non-governmental organizations (NGOs) or private alternatives as cost-effective ways to implement such a propagation program. Upon agreement, Alabama DCNR recommends that Alabama Power reimburse selected propagation program for capital improvements and operational costs at facility, not to exceed replacement costs outlined in the American Fisheries Society, Investigation and Monetary Values of Fish and Freshwater Mussel Kills (Bowen and O'Hearn 2017).

<u>Aquatic Species</u>

Palezone Shiner

Given the current proximity of known extant populations of palezone shiners in the Paint Rock River watershed and the Little South Fork of the Cumberland River, any previously unknown populations within the project boundary at Skyline WMA could be affected by current project operations, namely the forestry management program and wildlife habitat management.

Our Analysis

Little Coon Creek flows through Skyline WMA before joining with Big Coon Creek and ultimately the Tennessee River, and it is listed as impaired on the 303(d) list of impaired water due to siltation. The source of the impairment includes non-irrigated crop production and pasture grazing on adjacent land resulting in sedimentation of the creek bottom. No palezone shiners were collected in surveys at four locations on Little Coon Creek conducted by Alabama Power and Alabama Department of Environmental Management (Alabama DEM) in June 2020 (Figure D-2; Kleinschmidt, 2021). The entire Skyline WMA is approximately 60,000 acres, and Alabama DCNR manages about 15,031 acres of that land on behalf of Alabama Power. As part of its proposed timber management program, Alabama Power would typically harvest timber once or twice a year, and based on harvests from 2016 through 2020, average annual harvests were 164 acres. Due to the large role agricultural runoff plays in affecting water quality in Little Coon Creek and other streams in Skyline WMA, any sedimentation and erosion effects on water quality due to Alabama Power's forestry management program would likely be minimal by comparison. In addition, Alabama Power would continue to implement Alabama's BMPs for forestry, as provided by the Alabama Forestry Commission. Therefore, we conclude that relicensing the project, with Alabama Power's proposed PME's, including implementing the Alabama Power's forestry management program, with provisions for implementing Forestry Commission's BMPs, "may affect, but is not likely to adversely affect" the palezone shiner.

Spotfin Chub

FWS did not recommend field surveys for spotfin chub during the August 27, 2019 meeting with the Harris Action Team because the species is presumed to be extirpated from Alabama (FWS, 2019a).

Our Analysis

Potential project related effects to spotfin chub would be the same as those discussed for palezone shiner above (i.e., degraded habitat from sedimentation from Alabama Power's forestry management program in Skyline WMA). However, there are no published records of this species occurring within the project boundary at Skyline WMA and it is considered extirpated from Alabama. Therefore, the absence of the species coupled with Alabama Power's proposal to implement BMPs as part of its forestry management program, we conclude that relicensing the project, with Alabama Power's proposed PME's would have "no effect" on the spotfin chub. In addition, Alabama Power's proposed PME's, including implementing the Alabama Power's forestry management program, with provisions for implementing Forestry Commission's BMPs, would occur over 110 miles from the nearest critical habitat unit southwest of Columbia, Tennessee, and north of Florence, Alabama, which is also not hydrologically connected to Skyline WMA. Therefore, we conclude that relicensing the project, with Alabama Power's proposed PME's, including implementing Alabama Power's forestry management program, with provisions for implementing the Forestry Commission's BMPs, would have "no effect" on spotfin chub critical habitat.

Finelined Pocketbook Mussel

FWS recommended surveys for finelined pocketbook due to the proximity of critical habitat to the Harris Lake Project boundary. Because portions of the species' habitat range encompass Harris Lake (*see* figure D-4), the various proposed downstream release alternatives could cause reservoir fluctuations that could strand individuals and lead to shoreline erosion and sedimentation of aquatic habitat. Finelined pocketbook mussels could also be affected indirectly if their host fish species (blackspotted topminnow, and centrarchids like redeye bass, spotted bass, largemouth bass, and green sunfish) or nests experience stranding or sedimentation.

Our Analysis

As discussed in section 3.3.2.2, *Environmental Effects – Effects of Reservoir Fluctuations on Aquatic Resources,* current and proposed alternative project operations have, and would have, different effects on reservoir water surface elevation (stranding potential), as well as erosion and sedimentation (water quality/habitat quality effects). Specifically, release scenarios of 450 cfs and less would have nearly identical effects on the annual average reservoir water surface elevation as current project operation (Green Plan). However, all release scenarios of 300 cfs or greater would lower the June through July minimum reservoir water surface elevation between 1 and 10 feet compared to existing conditions. Downstream release scenarios of 600 cfs and 800 cfs would lower the summer minimum water surface elevation in Harris Lake by 7 to 10 feet, respectively, while releases between 300 cfs and 450 cfs would lower the summer minimum water surface elevation by 1 to 4 feet. Regarding erosion potential, of the 14 existing erosion sites in Harris Lake identified by stakeholders, erosion is occurring at or above normal full pool elevation and appeared to be the result of anthropogenic and/or natural processes/factors independent of Harris Project operations (Alabama Power and Kleinschmidt, 2022). Sedimentation in Harris Lake is most pronounced in the Little Tallapoosa River arm, where sediment transported from upstream[75] settles out of the water column as water velocities decrease upon entering the reservoir. Sedimentation rates for the reservoir would likely remain consistent with rates under the existing operation, assuming upstream influences remain consistent (Alabama Power and Kleinschmidt, 2022). 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. This winter exposure and early spring flushing of accumulated sediment into deeper habitats reduces the potential for spring spawning fish like centrarchids (a finelined pocketbook host species) to have their nests buried in late spring sediment. Higher reproductive success of the fish host species in turn promotes the long-term survival of the finelined pocketbook mussel.

To date, no finelined pocketbook mussels have been observed at any of the survey sites and no populations of the mussel species have been found to exist within the Harris Lake project boundary, or in reaches of the Tallapoosa River affected by project operation

[75] Land uses in the basin upstream of Harris Lake and adjacent to the river contribute sediment load to the upper reaches of Harris Lake. This is illustrated in the growth of all but one of the sedimentation areas identified on Harris Lake.

(Kleinschmidt, 2021). Nonetheless, portions of the species' habitat range encompass Harris Lake, and the species is currently being reintroduced by Alabama DCNR and FWS into suitable historical habitats; thus, their potential presence cannot be ruled out. Therefore, we conclude that Alabama Power's proposed operations, including lake level management and a continuous minimum flow of 300 cfs, as well as alternative downstream releases up to 800 cfs "may affect, but would not likely adversely affect" finelined pocketbook mussels.

Critical habitat for finelined pocketbook mussel is located on the Tallapoosa River immediately upstream of the Harris Lake project boundary. During the 2019 and 2020 surveys, critical habitat within the Tallapoosa River was observed to be degraded by siltation, and secondary tributaries that may or may not be within the project boundary exhibited similar conditions and a lack of habitat (Kleinschmidt, 2021). Because critical habitat is located upstream of Harris Lake project boundary and non-project related activities currently contribute to siltation of this habitat, we conclude that Alabama Power's proposed operation, including lake level management and a continuous minimum flow of 300 cfs, as well as alternative downstream releases up to 450 cfs would have "no effect" on critical habitat for finelined pocketbook mussels. Due to the magnitude of fluctuations in Harris Lake water surface elevation associated with downstream releases of 600 to 800 cfs, project operation under these high flow releases "may affect, but would not likely adversely affect" critical habitat for finelined pocketbook mussels.

Southern Pigtoe

The southern pigtoe's habitat range extends to, and overlaps with, the far northern portion of the Harris Lake Project boundary (*see* figure D-9).

Our Analysis

Southern pigtoe is considered endemic to the Coosa River system. While southern pigtoe's habitat range overlaps with a portion of the Harris Lake project boundary, there are no published reports of occurrences of the species within the project boundary at Harris Lake. Moreover, no populations were identified during finelined pocketbook surveys in Carr Creek, which extends into the habitat range for the southern pigtoe. Therefore, it is unlikely that the species is present within the project boundary. Because the habitat range for southern pigtoe overlaps with the finelined pocketbook mussel surveyed area on the Tallapoosa River arm of the lake, the same analysis regarding water level fluctuations and sedimentation discussed above for finelined pocketbook mussel is applicable to southern pigtoe. Given the unlikely presence of southern pigtoe in the project boundary, we conclude that Alabama Power's proposed operations, including lake level management and a continuous minimum flow of 300 cfs, as well as all alternative downstream releases, "may affect, but would not likely adversely affect" the southern pigtoe.

The nearest critical habitat for southern pigtoe mussel is located on Cheaha Creek, in the Talladega National Park, about 12 miles west of the northern most portion of the Harris Lake Project boundary. Because critical habitat is located outside both the project boundary and the Tallapoosa River Basin, we conclude that Alabama Power's proposed operations, including lake level management and a continuous minimum flow of 300 cfs, as well as all alternative downstream releases, would have "no effect" on critical habitat for southern pigtoe mussel.

Alabama Lampmussel

The Alabama lampmussel's habitat range extends to the western boundary of Skyline WMA, outside the project boundary (*see* figure D-10). However, there are no published reports of occurrences of the species within the project boundary at Skyline WMA. Currently, it is only known to occur in upper reaches of the Paint Rock River system, in Jackson County, Alabama (Ahlstedt, 1995).

Our Analysis

The most recent collections of Alabama lampmussel from Paint Rock River are from 2008, when individuals were collected from the mainstem and the Estill Fork (FWS, 2020a). However, the Paint Rock River system is outside the project boundary at, and is not hydrologically connected to, the Skyline WMA, thus, project operation and maintenance activities would not affect the aquatic habitat in the Paint Rock River system. Moreover, the species is not known to occur within the project boundary associated with Skyline WMA. Therefore, we conclude that relicensing the project, with Alabama Power's proposed PME's, including implementing Alabama Power's forestry management program, with provisions for implementing the Forestry Commission's BMPs, would have "no effect" on the Alabama lampmussel.

Cumberland Bean (Pearlymussel)

The Cumberland bean's habitat range extends to the western boundary of Skyline WMA, outside the project boundary (*see* figure D-11). However, there are no published reports of occurrences of the species within the project boundary at Skyline WMA, and the species is considered extirpated from the state (Parmalee and Bogan, 1998; Mirarchi et al., 2004).

Our Analysis

Alabama DCNR and FWS are currently reintroducing the Cumberland bean into suitable historical habitats within the state (FWS, 2020b). Reintroductions began in the Paint Rock River system in 2012, and again in 2015 and 2019 (FWS, 2020b). However, the Paint Rock River system is outside the project boundary at, and is not hydrologically connected to, the Skyline WMA, thus, project operation and maintenance activities would not affect the aquatic habitat in the Paint Rock River system. Moreover, the species is not known to occur within the project boundary associated with Skyline WMA. Therefore, we conclude that relicensing the project, with Alabama Power's proposed PME's, including implementing Alabama Power's forestry management program, with provisions for implementing the Forestry Commission's BMPs , would have "no effect" on the Cumberland bean mussel.

Fine-Rayed Pigtoe

The fine-rayed pigtoe's habitat range extends to the western boundary of Skyline WMA, outside the project boundary (*see* figure D-12). However, there are no published reports of occurrences of the species within the project boundary at Skyline WMA. The Paint Rock River population is likely an extant population in Alabama (Ahlstedt, 1995).

Our Analysis

Based on collections from Paint Rock River since the 1980s, the species has declined to almost undetectable levels in this watershed (FWS, 2022a). No individuals were collected over a series of collections from 2002 to 2013, and only a single individual was collected in 2018. Notwithstanding its current status, the Paint Rock River system is outside the project boundary at, and is not hydrologically connected to, the Skyline WMA, thus, project operation and maintenance activities would not affect the aquatic habitat in the Paint Rock River system. Moreover, the species is not known to occur within the project boundary at Skyline WMA. Therefore, we conclude that relicensing the project, with Alabama Power's proposed PME's, including implementing Alabama Power's forestry management program, with provisions for implementing the Forestry Commission's BMPs, would have "no effect" on the fine-rayed pigtoe.

Pale Lilliput (Pearlymussel)

The pale lilliput's habitat range extends to the western boundary of Skyline WMA, outside the project boundary (*see* figure D-13). However, there are no published reports of occurrences of the species within the project boundary at Skyline WMA. The Paint Rock River population is the only extant population in Alabama (Ahlstedt, 1995), with the exception of reintroductions into suitable habitats by Alabama DCNR and FWS.

Our Analysis

Pale lilliput have recently been collected from tributary streams to Paint Rock River, including the Estill Fork in 2013 and Larkin Fork in 2021 (FWS, 2021a). However, the Paint Rock River system is outside the project boundary at, and is not hydrologically connected to, the Skyline WMA, thus, project operation and maintenance activities would not affect the aquatic habitat in the Paint Rock River system. Moreover, the species is not known to occur within the project boundary at Skyline WMA. Therefore, we conclude that relicensing the project, with Alabama Power's proposed PME's, including implementing Alabama Power's forestry management program, including implementing the Forestry Commission's BMPs, would have "no effect" on the pale lilliput.

Rabbitsfoot

The rabbitsfoot's habitat range extends to the western boundary of Skyline WMA, outside the project boundary (*see* figure D-14). However, there are no published reports of occurrences of the species within the project boundary at Skyline WMA. In Alabama, extant populations are known to exist only in the Paint Rock River system, in Jackson County, Alabama (Ahlstedt, 1995), and a short reach of Bear Creek, in Colbert County, Alabama (Mirarchi et al., 2004). Alabama DCNR and FWS are currently reintroducing rabbitsfoot mussels into suitable historical habitats statewide (Alabama DCNR, 2020).

Our Analysis

Recent surveys from Paint Rock River in 2008, 2013, and 2018 suggest that the rabbitsfoot population in this river is increasing (FWS, 2020f). However, the Paint Rock River system is outside the project boundary at, and is not hydrologically connected to, the Skyline

WMA, thus, project operation and maintenance activities would not affect the aquatic habitat in the Paint Rock River system. Moreover, the species is not known to occur within the project boundary at Skyline WMA. Therefore, we conclude that relicensing the proposed project, with Alabama Power's proposed PMEs, including implementing Alabama Power's forestry management program, including implementing the Forestry Commission's BMPs, would have "no effect" on the rabbitsfoot.

The nearest critical habitat unit (RF17) is located on the Paint Rock River, about 10 miles southwest of Skyline WMA and the project area. Because the nearest critical habitat is located in the Paint Rock River and its tributaries, and is outside the project boundary at, and not hydrologically connected to, the Skyline WMA, and Alabama Power would continue to implement Alabama's BMPs for forestry as part of its forestry management program, which would minimize effects to water quality in local streams, we conclude that relicensing the proposed project, with Alabama Power's proposed PME's, including implementing Alabama Power's proposed forestry management program, including implementing the Forestry Commission's BMPs, would have "no effect" on critical habitat for rabbitsfoot.

Shiny Pigtoe

The shiny pigtoe's habitat range extends to the western boundary of Skyline WMA, outside the project boundary (*see* figure D-15). However, there are no published reports of occurrences of the species within the project boundary at Skyline WMA. The species has been extirpated from the mainstem Tennessee River (Garner and McGregor, 2001), but still occurs in several tributaries, including the Paint Rock River, in Jackson County, Alabama (Ahlstedt, 1995).

Our Analysis

Based on updated abundance data in FWS's most recent 5-year review (FWS, 2021b) the Paint Rock River populations continue to be viable, but the species has declined over the past two decades. However, the Paint Rock River system is outside the project boundary at, and is not hydrologically connected to, the Skyline WMA, thus, project operation and maintenance activities would not affect the aquatic habitat in the Paint Rock River system. Moreover, the species is not known to occur within the project boundary associated with Skyline WMA. Therefore, we conclude that relicensing the project, with Alabama Power's proposed PME's, including implementing Alabama Power's forestry management program, with provisions for implementing the Forestry Commission's BMPs, would have "no effect" on the shiny pigtoe.

Snuffbox Mussel

In Alabama, the snuffbox once occurred in the Tennessee River and several of its tributaries. However, the species is assumed to persist only in the Paint Rock River system. The snuffbox's habitat range extends up the Paint Rock River system to a point that is located west and southwest of Skyline WMA and the project area (*see* figure D-16). However, there are no published reports of occurrences of the species within the project boundary at Skyline WMA.

Our Analysis

The snuffbox occurs in the Paint Rock River between river miles 13.1 (river km 21.1) and 46.7 (river km 75.1), in Jackson, Madison, and Marshall Counties, Alabama (Ford, 2016, personal communication; as cited in FWS, 2018b). At one location, the Jones Property site in Jackson County, Alabama, there were an estimated 500 snuffbox (Johnson, 2017, personal communication; as cited in FWS, 2018b). At the Butler Mill site in Madison County, Alabama, there were an estimated 200 snuffbox (Johnson, 2017, personal communication; as cited in FWS, 2018b). These snuffbox populations are the most robust of the Alabama populations and are recruiting viable individuals, and have improved since 1980 (FWS, 2018b). However, the Paint Rock River system is outside the project boundary at, and is not hydrologically connected to, the Skyline WMA, thus, project operation and maintenance activities would not affect the aquatic habitat in the Paint Rock River system. Moreover, the species is not known to occur within the project boundary at Skyline WMA. Therefore, we conclude that relicensing the proposed project, with Alabama Power's proposed PME's, including implementing Alabama Power's proposed forestry management program, including implementing the Alabama Forestry Commission's BMPs, would have "no effect" on the snuffbox mussel.

Slabside Pearlymussel

The slabside pearlymussel's habitat range extends to the western boundary of Skyline WMA, outside the project boundary (*see* figure D-17). However, there are no published reports of occurrences of the species within the project boundary at Skyline WMA.

Our Analysis

The population of slabside pearlymussel in the Paint Rock River is characterized by good recruitment and numerous individuals in multiple age classes. Overall, the Paint Rock River population is thought to have a high level of resiliency, capable of withstanding random events, and represents one of the most important areas for the species (FWS, 2021c). Because the Paint Rock River system is outside the project boundary at Skyline WMA and not hydrologically connected, project operation and maintenance activities would not affect the aquatic habitat in the Paint Rock River system. Moreover, the species is not known to occur within the project boundary at Skyline WMA. Therefore, we conclude that relicensing the proposed project, with Alabama Power's proposed PME's, including implementing Alabama Power's proposed forestry management program, including implementing the Forestry Commission's BMPs, would have "no effect" on the slabside pearlymussel.

The nearest critical habitat unit (SP9) is located on Hurricane Creek, a tributary of the Paint Rock River, less than 2 miles from the project area. Because the nearest critical habitat is located on a tributary to the Paint Rock River, which is outside the project boundary at Skyline WMA, and Alabama Power would continue to implement Alabama's BMPs for forestry as part of its forestry management program, which would minimize effects to water quality in local streams, we conclude that relicensing the proposed project, with Alabama Power's proposed PME's, including implementing Alabama Power's proposed forestry management program, including implementing the Forestry Commission's BMPs, would have "no effect" on critical habitat for the slabside pearlymussel.

Cumberland Moccasinshell

The Cumberland moccasinshell's habitat range extends to the western boundary of Skyline WMA, outside the project boundary. Based on FWS's 2020 Species Assessment Report (FWS, 2020c), this species is (a) extirpated from adjacent watersheds to the Big Coon Creek-Crow Creek Hydrologic Unit (HU) which covers Skyline, and (b) classified as "low resiliency" on the Upper Paint Rock River HU. Fobian et al. (2014) documented the species in the upper Paint Rock River system.

Our Analysis

The most recent collections of Cumberland moccasinshell from Paint Rock River are from 2008 when individuals were collected from the Estill Fork (Fobian et al., 2014). Nonetheless, the Paint Rock River system is outside the project boundary at, and is not hydrologically connected to, the Skyline WMA, thus, project operation and maintenance activities would not affect the aquatic habitat in the Paint Rock River system. Moreover, the species is not known to occur within the project boundary at Skyline WMA (*see* figure D-18). Therefore, we conclude that relicensing the proposed project, with Alabama Power's proposed PME's, including implementing Alabama Power's proposed forestry management program, including implementing the Forestry Commission's BMPs, would have "no effect" on the Cumberland moccasinshell.

Longsolid

The longsolid's habitat range extends to the western boundary of Skyline WMA, outside the project boundary. In Alabama, this species is endemic to the Tennessee River system with remnant populations found in the tailwaters of Wilson and Guntersville Dams (Alabama DCNR, 2024b). The Paint Rock River population is considered to be of medium[76] condition.

Our Analysis

The most recent collections of longsolid from Paint Rock River are from 2008 when individuals were collected from the mainstem of the river (Fobian et al., 2014). However, the Paint Rock River system is outside the project boundary at, and is not hydrologically connected to, the Skyline WMA, thus, project operation and maintenance activities would not affect the aquatic habitat in the Paint Rock River system. Moreover, the species is not known to occur within the project boundary at Skyline WMA (*see* figure D-18). Therefore, we conclude that relicensing the proposed project, with Alabama Power's proposed PME's, including implementing Alabama Power's proposed forestry management program, including implementing the Forestry Commission's BMPs, would have "no effect" on the longsolid.

The nearest critical habitat unit is located on the lower 58 miles of Paint Rock River from its mouth at the Tennessee River upstream to the confluence with Hurricane Creek, about 4 miles from the project area. Because the nearest critical habitat is located on Paint Rock River, which is outside the project boundary at Skyline WMA and not hydrologically

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[76] *See* n. 29, *supra*.

connected to Skyline WMA, and Alabama Power would continue to implement Alabama's BMPs for forestry as part of its forestry management program, which would minimize effects to water quality in local streams, we conclude that relicensing the project, with Alabama Power's proposed PME's, including implementing Alabama Power's forestry management program, with provisions for implementing the Forestry Commission's BMPs, would have "no effect" on critical habitat for the longsolid.

Round Hickorynut

The round hickorynut's habitat range extends to the western boundary of Skyline WMA, outside the project boundary. In Alabama, this species is endemic to the Tennessee River system with remnant populations found in Paint Rock River and the Tennessee River downstream from Guntersville and Wilson Dams.

Our Analysis

During the 2008 collections of round hickorynut from the Paint Rock River, only dead specimens were collected (Fobian et al., 2014). Nonetheless, the Paint Rock River system is outside the project boundary at, and is not hydrologically connected to, the Skyline WMA, thus, project operation and maintenance activities would not affect the aquatic habitat in the Paint Rock River system. Moreover, the species is not known to occur within the project boundary at Skyline WMA (*see* figure D-18). Therefore, we conclude that relicensing the proposed project, with Alabama Power's proposed PME's, including implementing Alabama Power's proposed forestry management program, with the Forestry Commission's BMPs, would have "no effect" on the round hickorynut.

The nearest critical habitat for round hickorynut is located on the lower 48 miles of Paint Rock River from its confluence with Cedar Creek upstream to the confluence with Hurricane Creek, about 4 miles from the project area. Because the nearest critical habitat is located on a tributary to the Paint Rock River, which is outside the project boundary at Skyline WMA and not hydrologically connected to Skyline WMA, and Alabama Power would continue to implement the Forestry Commission's BMPs for forestry as part of its forestry management program, which would minimize effects to water quality in local streams, we conclude that relicensing the project, with Alabama Power's proposed PME's, including implementing Alabama Power's forestry management program, with provisions for implementing the Forestry Commission's BMPs, would have "no effect" on critical habitat for the round hickorynut.

Tennessee Clubshell

The Tennessee clubshell's habitat range extends to the western boundary of Skyline WMA, outside the project boundary. Based on FWS's 2020 Species Assessment Report (FWS, 2020c), this species is extirpated from the Big Coon Creek-Crow Creek HU 0603000103 which covers Skyline, and is considered "low resiliency" on the Upper Paint Rock River HU 0603000201. Fobian et al. (2014) documented the species in the upper Paint Rock River system.

Our Analysis

The most recent collections of Tennessee clubshell from Paint Rock River are from 2008 when individuals were collected from the mainstem (Fobian et al., 2014). However, the Paint Rock River system is outside the project boundary at, and is not hydrologically connected to, the Skyline WMA, thus, project operation and maintenance activities would not affect the aquatic habitat in the Paint Rock River system. Moreover, the species is not known to occur within the project boundary at Skyline WMA (*see* figure D-18). Therefore, we conclude that relicensing the project, with Alabama Power's proposed PME's, including implementing Alabama Power's forestry management program, with provisions for implementing the Forestry Commission's BMPs, would have "no effect" on the Tennessee clubshell.

Tennessee Pigtoe

The Tennessee pigtoe's habitat range extends to the western boundary of Skyline WMA, outside the project boundary, as well as the Lookout Creek system southwest of Skyline WMA and the Tennessee River. Based on FWS's 2020 Species Assessment Report (FWS, 2020c), this species is extirpated from adjacent watersheds to the Big Coon Creek-Crow Creek HU, which covers Skyline, and is classified as "low resiliency" on the Upper Paint Rock River HU. Fobian et al. (2014) documented the species throughout the Paint Rock River system.

Our Analysis

The most recent collections of Tennessee pigtoe from Paint Rock River are from 2008 when individuals were collected from the mainstem of the Paint Rock River and the Estill Fork portion (Fobian et al., 2014). However, the Paint Rock River system is outside the project boundary at, and is not hydrologically connected to, the Skyline WMA, thus, project operation and maintenance activities would not affect the aquatic habitat in the Paint Rock River system. Moreover, the species is not known to occur within the project boundary at Skyline WMA (*see* figure D-18). Therefore, we conclude that relicensing the proposed project, with Alabama Power's proposed PME's, including implementing Alabama Power's proposed forestry management program with provisions for implementing the Forestry Commission's BMPs, would have "no effect" on the Tennessee pigtoe.

<u>Terrestrial Species</u>

Red-Cockaded Woodpecker

Red-cockaded woodpeckers historically occurred in throughout Alabama and have been sighted recently in the Talladega National Forest, the Coosa Wildlife Management Area (WMA), and along a northeast-to-southwest strip between Alabama Routes 9 and 21, including an area at the northwest corner of Randolph County that is within the project boundary.[77] This

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[77] In April 2024, 5 red-cockaded woodpeckers were observed in the Choccolocco WMA, at the Coleman Lake Pinhoti trailhead 10 miles north of Heflin, and 3 individuals in the Coosa WMA, at the Forever Wild Trailhead. Other sightings include individuals in the Talladega National Forest within 9 miles of the project boundary in 2015 and 2016 (eBird.org., 2024a).

species could be affected by activities that result in the loss or disturbance of suitable open old growth pine savannah habitats. Alabama Power's proposed construction of new recreation amenities and continued timber management activities would involve the removal of trees and disturbances to existing forested habitat overlapping with the red-cockaded woodpecker's current range at Harris Lake (figure D-20).

Our Analysis

Alabama Power's proposed WMP would involve ongoing, periodic timber harvests and prescribed burns at Harris Lake. The draft WMP states that at Harris Lake only live, standing pine trees measuring 15 inches at dbh and greater would be harvested on a 20-year cycle. Generally, hardwoods would not be harvested at Harris Lake. Although timber harvests are not conducted every year at Harris Lake, Alabama Power estimates that an average of 128.5 acres would be harvested annually, for a total of 5,140 acres over the course of a new 40-year license.[78] The project boundary at Harris Lake contains 3,068 acres of coniferous forest. Therefore, some areas with pine trees would likely be harvested twice within a license term. Also, every two years, Alabama Power conducts a prescribed burn on 160 acres of mostly natural pine forest (i.e., with a narrow strip of mixed pine-hardwood forest) at Harris Lake, on a peninsula northeast of Flat Rock Park (see figures D-34 and D-35).

[78] Overall harvest estimates do not include future salvage operations because their size and frequency are unknown.

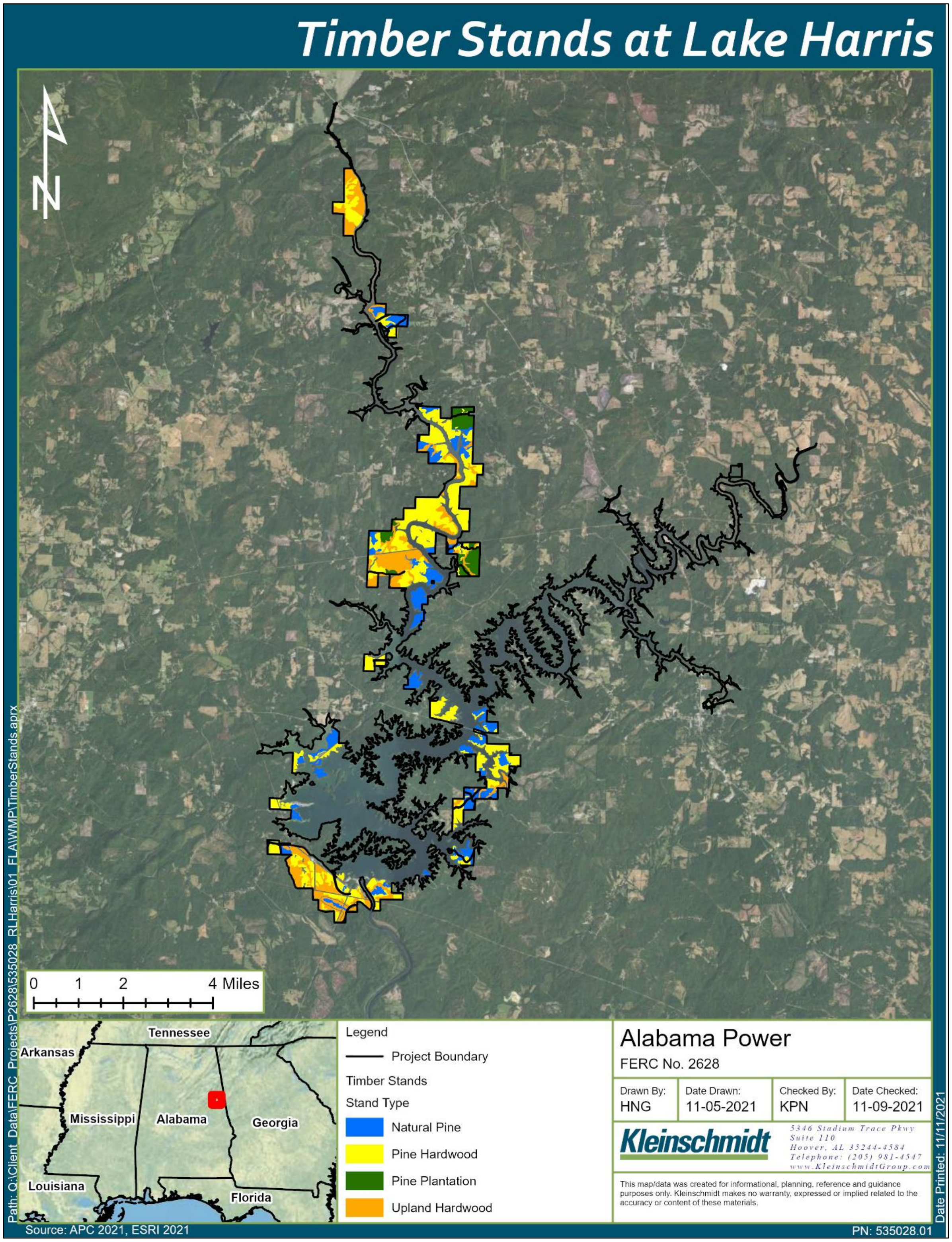

Figure D-34. Location of timber stands and types at Harris Lake within Alabama Power's proposed project boundary (Source: Alabama Power, 2022c).

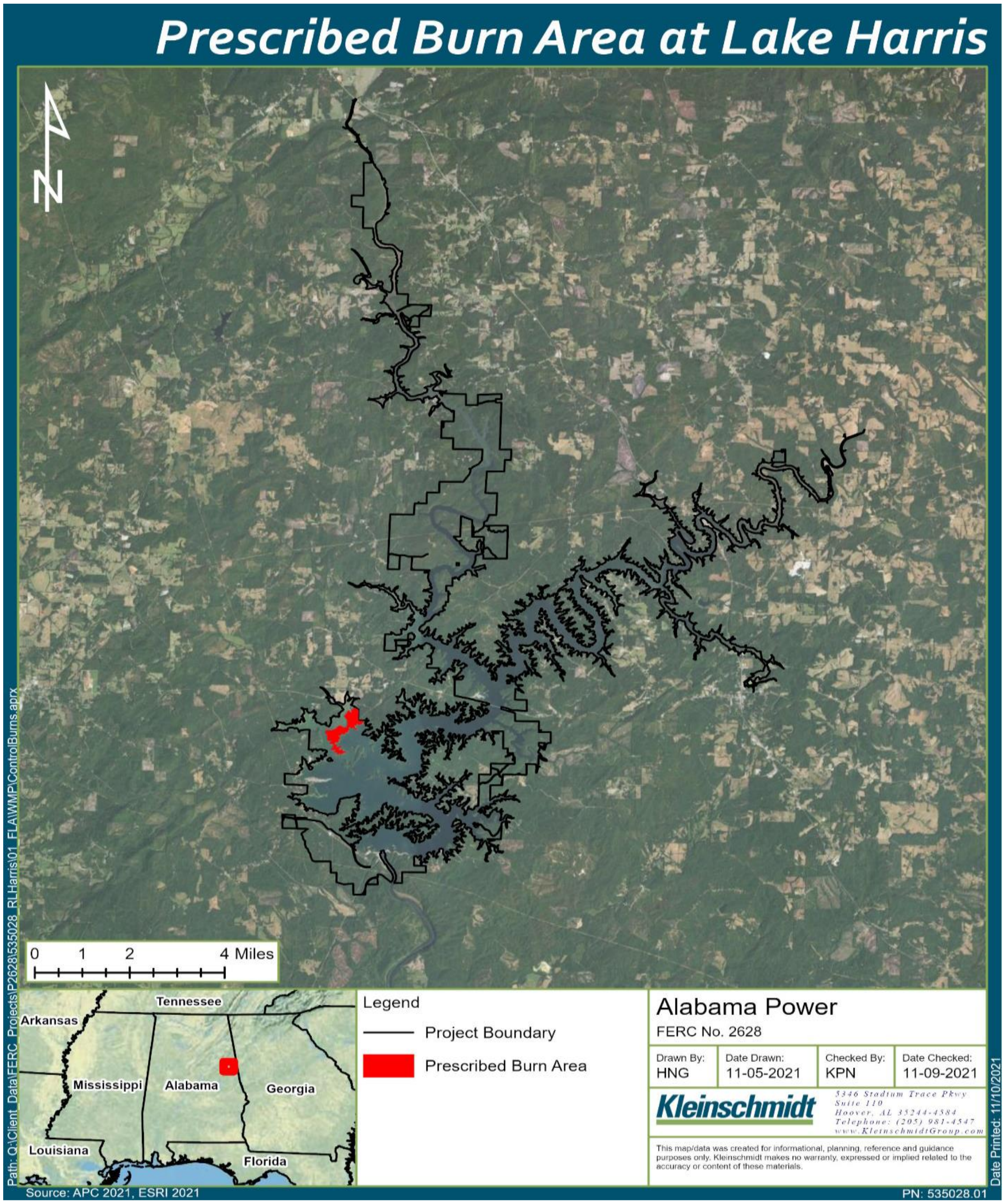

Figure D-35. Location of prescribed burn area (160 acres) at Harris Lake (Source: Alabama Power, 2022c).

As described in section 3.3.3.2, *Terrestrial Resources, Environmental Effects*, the construction of the proposed Hwy 48 Day Use Park at Harris Lake would involve the permanent removal of about 3.7 acres of forested land to build two parking areas for cars and trailers, a boat launch, launching pier, and 0.4-miles of new access road right-of-way. An additional 2.4 acres of forested land would be temporarily disturbed during the construction of amenities associated with the proposed picnic and swimming areas. Most of the area that would be permanently removed is identified as coniferous forest in the geographic information system (GIS) data provided by Alabama Power on June 15, 2022.[79] However, figure D-34 identifies the areas of disturbance and adjacent land as a mixed pine-hardwood forest.

Permanent loss and disturbance of coniferous forests associated with the construction of the proposed timber management and Hwy 48 Day Use Park at Harris Lake could affect red-cockaded woodpeckers if they are present. Alabama Power's harvesting methods are not designed to preserve or create potentially suitable habitat for red-cockaded woodpeckers at the project. Most of the existing coniferous forest at Harris Lake appears to be a mix of pines and hardwood species with a closed canopy and dense understory, and not the open savannahs with large old growth pine trees that red-cockaded woodpeckers need to establish cavities for their nests. The prescribed burn area in the natural pine timber stand appears to be the only site that may provide an open pine savannah. Alabama Power states that this area is managed to enhance recreation and it is not clear if old growth pines or bunchgrass and groundcovers occur.

In 2020, per FWS and Alabama DCNR recommendations, Alabama Power surveyed 6 mature pine forest sites, including 556 acres within the project boundary, to determine if they provided suitable habitat for red-cockaded woodpeckers and document any signs of use by this species. One survey site of about 84 acres is among Alabama Power's timber stands in the northernmost portion of the Harris Lake project boundary along the Tallapoosa River arm of the reservoir, within the species current range and within about 10 miles of the recent red-cockaded woodpecker sightings (eBird.org., 2024a). The 160-acre natural pine area where Alabama Power conducts prescribed burns was not among the survey sites even though it is located just one mile from the current range of red-cockaded woodpeckers to the west of the project. In general, Alabama Power's surveys found that the foraging habitat was marginal at best, in part due to dense vegetation in the understory. Although surveyors viewed mature pines from all angles, they did not observe any starter cavities or resin wells in the mature pine trees that were evaluated. Alabama Power's surveyors found that Harris Lake is unlikely to contain red-cockaded woodpeckers.

Although no red-cockaded woodpeckers have been observed at the project and no suitable or occupied red-cockaded woodpecker habitat was found during Alabama Power's survey, the survey was not comprehensive. Only about 18% of the coniferous habitat in the project boundary at Harris Lake was surveyed. No survey sites were selected along the southwestern shoreline of Harris Lake that are within one to two miles of the current red-cockaded range, including within the open pine habitat maintained by Alabama Power's prescribed burns for recreation to determine if it contains suitable habitat for this species. In addition, none of the parcels proposed for removal were surveyed for red-cockaded woodpeckers. As described above, mature red-cockaded woodpeckers are known to disperse between 2 to 6 miles from their native clans. Over the course of the next 30 to 50 years, individuals from red-cockaded woodpecker clans to the north and/or west may disperse into the

[79] Alabama Power also provided GIS data layers with more detailed polygons of forest types in the timber stands at Harris Lake and Skyline MWA. However, the descriptions of Alabama Power's forest type codes for timber stands were not provided (i.e., neither in the attribute tables nor as narrative descriptions) with the LakeHarris_TimberStands or Skyline_TimberStands data layers and therefore cannot be interpreted by Commission staff.

project area, as competition for habitat/forage may necessitate the use of adjacent habitats for foraging. Depending on the ages of the pines and overall conditions in the 160-acre open natural pine area over the term of the license, it might attract dispersing red-cockaded woodpeckers looking for suitable trees for cavity nests. Removal of lands from the project boundary that are occupied by red-cockaded woodpeckers would also remove federal protection of this species on those lands.

As part of the finalization of the WMP, to avoid adverse effects on red-cockaded woodpeckers that may disperse into and use habitat within the project boundary during a new license term, Alabama Power could consult with FWS and Alabama DCNR to identify the timing and locations of additional red-cockaded woodpeckers surveys. Additional red-cockaded woodpecker surveys could take place within: (1) land parcels proposed for removal from the project boundary; (2) the 160-acre natural pine and other timber management sites on the southwestern side of Harris Lake prior to prescribed burns and timber harvests; (3) mature/over mature pine stands at Harris Lake prior to harvesting; (4) the area proposed for the Hwy 48 Day Use Park prior to removing mature pines; and (5) any pine forests where future recreation sites or amenities are proposed at Harris Lake (i.e., prior to clearing trees for construction). The WMP could also include provisions for Alabama Power to document and submit the survey results to FWS and Alabama DCNR, and consult with these agencies regarding other potential measures that may be needed to protect any identified red-cockaded woodpeckers or suitable/occupied habitat, such as timing prescribed burns based on red-cockaded woodpecker use/activity in the area.

In addition, Alabama Power's proposed Avian Protection Plan (APP) includes measures to avoid adverse project-related avian interactions and generally protect birds, including federally listed species such as the red-cockaded woodpecker. The proposed APP measures include training staff on proper procedures if federally listed birds are observed at the project, documenting and reporting bird injuries or fatalities to FWS, identifying any areas of higher risk for birds, and installing devices that reduce the potential for collisions and electrocutions on project transmission facilities, if needed.

Conducting a more comprehensive set of surveys and consulting with FWS and Alabama DCNR regarding the results and the need to develop red-cockaded woodpecker protection measures, as well as implementing the proposed APP would allow Alabama Power to document any signs of red-cockaded woodpecker use of the project area and avoid any adverse effects during a new license term. We conclude that relicensing the project, with Alabama Power's proposed WMP and APP, and staff's additional recommendations, is "not likely to adversely affect" the red-cockaded woodpecker.

Whooping Crane

Whooping cranes historically occurred in northern and eastern Alabama. The current migration corridor for the eastern migratory population overlaps with the project boundaries at Harris Lake and Skyline WMA. On their migrations between their primary wintering areas in west-central Florida and their core breeding/summering area in central Wisconsin, the eastern migratory population of whooping cranes have been observed in northern Alabama and southern Tennessee,[80] as well as central Alabama.[81]

Our Analysis

There have been no reported sightings of whooping cranes within the project boundary at Skyline WMA, Harris Lake, or along the Tallapoosa and Little Tallapoosa Rivers. At Skyline, this is most likely due to the lack of large waterbodies within the project boundary. In the vicinity of Harris Lake, this may be due to human activity, fluctuating water levels, and the relatively small wetland areas. However, this species was not evaluated during relicensing studies and continued project operation, maintenance, and construction activities that affect the availability of wetlands and shoreline habitats during the winter could affect migrating whooping cranes.

The Harris Project contains potentially suitable foraging and/or roosting habitat for whooping cranes, including wetlands, marshy areas, sloughs and along lake margins, and upland grain fields. During migration, whooping cranes use cropland for feeding and large palustrine wetlands. As described in section 3.3.3.2, *Terrestrial Resources, Environmental Effects*, Alabama Power's proposal to continue the existing reservoir operating regime would maintain the existing hydroperiod and therefore no changes in the composition or extent of wetland, riparian, and littoral habitat along the Harris Lake shoreline are expected. Maintaining the existing winter pool elevation would continue to provide both unwetted shoreline and littoral habitat for foraging species. The 8-foot winter drawdown zone would remain essentially unvegetated, providing marginal wildlife habitat value as a corridor for movement when the reservoir is drawn down.

The various alternatives to Alabama Power's operating proposal could increase or decrease wetlands and riparian habitat at Harris Lake and along the Tallapoosa River downstream from Harris Dam compared with the existing conditions. In its final Operating Curve Change Feasibility Study (Phase 2), Alabama Power found that increasing the winter operating curve by one to four feet would increase the availability of shallow littoral habitats in coves and sloughs on Harris Lake, which may increase availability of cover and feeding sites for overwintering resident and migratory waterfowl. However, higher winter operating pools, would also reduce space available within the normal operating range of Harris Lake to accommodate high flow events. This could result in an increase in the frequency of spillway operation and/or operating the project at full capacity (i.e., 16,000 cfs downstream release or greater), which would increase the magnitude of downstream flooding and could scour the

[80] Recent whooping crane observations near Skyline WMA were all in December or January and include: 2 individuals in 2023, and 32 individuals winter 2017-2018, at the Stevenson, Alabama City Park 5.5 miles east of Skyline; 1 individual in 2019 in Huntsville, 33 miles southwest of Skyline; and 1 individual in 2017 at the Winfred Thomas Agricultural Research Station 28 miles west of Skyline (eBird.org. 2024b).

[81] The nearest whooping crane observations to the project boundary at Harris Lake were at Weiss Lake (47 miles north) in December 2010, and in Birmingham (71 miles west) in January 2019 (eBird.org. 2024b).

riverbanks and damage riparian vegetation and existing riparian wildlife habitats in the Tallapoosa River downstream from Harris Dam.

In its Downstream Release Alternative Study (Phase 2) Alabama Power found that releasing continuous minimum flows of 150 cfs, 300 cfs, 350 cfs, 400 cfs, and 450 cfs would not cause significant water surface elevation fluctuations or changes in the wetted perimeter around Harris Lake. However, a continuous minimum flow of 600 cfs or higher would change the existing hydroperiod, leaving some areas dryer for longer periods, and could therefore reduce the net amount of wetland, riparian, and littoral habitat at Harris Lake. That said, all of the downstream release alternatives with continuous minimum flows (i.e., 150 cfs, 300 cfs, 350 cfs, 400 cfs, 450 cfs, 600 cfs, and 800 cfs) would improve riparian habitat downstream from Harris Dam compared with the existing conditions. Each of these continuous minimum flow alternatives would increase the wetted perimeter and decrease water level fluctuations associated with project peaking operations, which would increase the total littoral area along portions of the banks of the Tallapoosa River downstream from the project. Larger, more stable littoral areas would increase the availability of shallow water sites that are suitable for macroinvertebrates, minnows, and other littoral species. This in turn, could improve foraging conditions for whooping cranes and other wildlife, along the Tallapoosa River downstream from Harris Dam, compared with existing conditions.

Vegetation removal and/or disturbance would be mostly limited to upland areas where Alabama Power manages timber and at the new proposed recreation sites on Harris Lake (Highway 48 Day Use Park) and downstream from Harris Dam (a canoe/kayak access). Through implementation of its proposed WMP, SMP, and Recreation Plan, Alabama Power would implement BMPs to avoid or minimize disturbances to soils and riparian vegetation, which would help ensure the long-term health and sustainability of the forests, while also protecting shoreline and riparian habitat that may be suitable for migrating whooping cranes at Harris Lake and along the Tallapoosa River downstream from Harris Dam. Alabama Power's proposed Nuisance Aquatic Vegetation and Vector Control Program and Alabama DCNR's recommendation [10(a)-4] that Alabama Power develop an invasive species management plan would also cause some disturbance of aquatic/littoral vegetation. Under Alabama Power's proposed plan, nuisance aquatic vegetation and mosquitos would be treated (i.e., with herbicides, algaecides, and larvicides if they create a public health hazard, affect power generation facilities, restrict recreational use, and/or pose a threat to the ecological balance of Harris Lake (Alabama Power 2021c). The goal of Alabama DCNR's invasive species management plan would be to prevent introductions and establishment of invasive species, in addition to managing nuisance aquatic vegetation to best suit the many uses in Harris Lake and the project tailrace. Alabama DCNR recommends that the plan include criteria for evaluating and responding to introduction of invasive fish, mollusks, plants, and crayfish. Controlling nuisance vegetation and developing a plan to control invasive aquatic species within project waters would help protect aquatic and terrestrial habitats for native species, including foraging habitat for migratory species like the whooping crane.

As described above, Alabama Power's proposed Avian Protection Plan (APP) includes measures to avoid adverse project-related avian interactions and protect federally listed species, including large-bodied birds such as the whooping crane. APP measures include training staff on proper procedures if federally listed birds are observed at the project, documenting and reporting bird injuries or fatalities to FWS, identifying any areas of higher risk for birds, and installing devices such as marker balls, spiral vibration dampers, and bird flight diverters, that would reduce the potential for collisions and electrocutions, and increase the visibility of power lines to reduce collisions, where needed.

Given that any whooping cranes occurring at the project would be transient, and potential effects to this species could be avoided or minimized through implementation of Alabama Power's proposed project operation, WMP, SMP, Recreation Plan, APP, and Nuisance Aquatic Vegetation and Vector Control Program, as well as Alabama DCNR's recommended aquatic invasive species plan, with additional staff downstream flow recommendations, we find that relicensing the Harris Project is "not likely to adversely affect" the eastern migratory population of whooping crane.

Bats

Gray, Indiana, northern long-eared, and tricolored bats could be affected by activities resulting in the loss or disturbance of their summer or winter habitats. Alabama Power's proposed construction of new recreation amenities at Harris Lake and continued timber management activities at Harris Lake and Skyline WMA would involve tree removal and disturbances to existing forested habitat that could affect bats occurring in these areas. Specifically, construction of the proposed Hwy 48 Day Use Park at Harris Lake would involve the permanent removal of about 3.7 acres of mixed pine-hardwood forest and temporary disturbance of another 2.4 acres of mixed pine-hardwood forest to build the proposed recreation amenities (e.g., parking areas, access roads, boat launch, picnic area). No trees would be removed or disturbed during construction of the proposed canoe/kayak access downstream from Harris Dam where only small areas of mowed grass and other herbaceous vegetation currently occur at the existing access point for tailrace fishing.

In addition, as described above, Alabama Power conducts annual timber harvests on one or two units on project land at Skyline WMA, and periodic timber harvests at Harris Lake. In the draft WMP, Alabama Power estimates that over the course of a new 40-year license, it would harvest a total of 5,140 acres at Harris Lake and 13,120 acres at Skyline WMA. This would be equivalent to an average annual timber harvest of 128.5 acres at Harris Lake and 328 acres at Skyline WMA.[82] Alabama Power also conducts a prescribed burn every 2 years on 160 acres of mostly natural pine forest (i.e., with a narrow strip of mixed pine-hardwood forest) at Harris Lake, on a peninsula northeast of Flat Rock Park (see figures D-34 and D-35).

Alabama Power's draft WMP includes provisions to avoid and minimize the effects of timber management activities on geology and soils, water quality, and vegetation and wildlife, including special status bats and their habitats. For example, at both Harris Lake and Skyline WMA timber management areas, Alabama Power would continue to implement the Alabama Forestry Commission's BMPs described above (e.g., establish streamside management zones, avoid stream crossings). Alabama Power's draft WMP also includes preliminary bat protection measures for both Harris Lake and Skyline WMA, and a provision to develop additional

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[82] Actual annual acreage harvested would vary from year to year. In addition, the overall harvest estimates do not include future salvage operations because their size and frequency are unknown.

forestry management plans that are protective of special status bat species in consultation with the FWS, based on current bat avoidance guidance, as described further below.

Harris Lake—To avoid effects on Indiana and northern long-eared bats on project land at Harris Lake, Alabama Power would: (1) continue consulting the Alabama Natural Heritage Program (NHP) and FWS's Alabama Ecological Services Field Office regarding locations of any known maternity roost trees and hibernacula; (2) if northern long-eared bat or Indiana bat hibernacula or maternity roost trees are identified in areas within the project boundary, follow current FWS guidance regarding timber management near known hibernacula and maternity roost trees (e.g., based on the former 4(d) rule for northern long-eared bats, which includes limiting the cutting, trimming, or destruction of trees on project land within 0.25 miles of known hibernacula during any time of the year, and prohibits removing trees within 150 feet of known maternity roosts from June 1 through July 31, except for hazardous or fallen trees for the protection of human life[83]); (3) harvest only live, standing pine trees measuring 15 inches at dbh and greater on a 20-year cycle; (4) not harvest/retain hardwood species outside the streamside management zones, and retain all trees within these zones; (5) retain trees with potential roost tree characteristics (e.g., exfoliating bark, cracks, crevices, or hollows); (6) avoid inadvertently damaging potential roost trees during harvests, especially during the pup season for Indiana and northern long-eared bats (i.e., May 1 through July 15 in Alabama);[84] (7) if a high-quality potential roost tree[85] is inadvertently damaged during harvest and outside the approved clearing season (i.e., October 15 through March 31), consult with the FWS's Daphne Field Office; and (8) if a specific timber harvest plan does not adhere to the published avoidance guidelines or harvest prescriptions change, consult with FWS, as may be required, prior to commencing harvesting activities.

Skyline WMA—As described in Appendix F, *Terrestrial Resources*, Alabama Power's objective for timber management on project land at Skyline WMA is to ensure long-term health and sustainability of the forest, while enhancing wildlife management through ecological diversity and habitat improvement, with a primary goal of increasing the oak component of the forest through selective harvesting and natural regeneration. More specifically, Alabama Power proposes to continue to harvest using a shelterwood regeneration method,[86] in which less

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[83] 81 Fed. Reg. 1900-1922 (January 14, 2016).

[84] For the southeast U.S., the nonvolant period for the Indiana and northern long-eared bats occurs earlier than other regions, likely from May 1 through July 15 (A. Edelman, J. Stober, pers. comm. 2016 as cited in FWS, 2024hh; South Carolina DNR, 2019).

[85] In the WMP Alabama Power defined high-quality roost tree as a live tree or snag greater than 9 inches at dbh with exfoliating bark, a crevice, crack, or hollow (Missouri eFOTG, 2017; FWS, 2015c).

[86] The shelterwood regeneration method involves two or three-step harvest process designed to improve the vigor and seed production potential of older, stronger residual trees, that provide suitable conditions for seedling establishment (i.e., shelter and protect younger trees on the forest floor until they stand, grow, and thrive on their own). Generally, the shelterwood cutting method is used to create an even-aged or two-aged stand over a period of about 20 years.

desirable species (e.g., maples and tulip trees) across all size classes and over-mature oak trees (i.e., 19 inches or greater at dbh) are harvested within a 60-year cycle (minimum), leaving a residual stand of two or more age classes, with 30 to 100 or more trees per acre. Alabama Power also proposes that about every 5 years, all timber would be harvested within areas averaging 15 acres in size to create wildlife openings on mountain tops. Exceptions to these methods would be to allow for salvage operations after wind, fire, or insect damage, or to facilitate natural regeneration of oak species.

To avoid effects on Indiana and northern long-eared bats on project land at Skyline WMA, Alabama Power would: (1) continue consulting the Alabama NHP and FWS's Alabama Ecological Services Field Office regarding locations of any known maternity roost trees and hibernacula; (2) if northern long-eared bat or Indiana bat hibernacula or maternity roost trees are identified in areas within the project boundary, follow current FWS guidance regarding timber management near known hibernacula and maternity roost trees (e.g., based on the former 4(d) rule for northern long-eared bats, which includes limiting the cutting, trimming, or destruction of trees on project land within 0.25 miles of known hibernacula during any time of the year, and prohibits removing trees within 150 feet of known maternity roosts from June 1 through July 31, except for hazardous or fallen trees for the protection of human life); (3) retain snags and live trees exhibiting damage, basal openings, or hollowing of the hole; (4) retain shagbark hickory (*Carya ovata*) in most stands; (5) avoid inadvertently damaging potential roost trees during harvests, especially high quality snags during the pup season for Indiana and northern long-eared bats (i.e., May 1 through July 15 in Alabama); and (6) continue working with FWS to develop forestry management plans that are protective of listed species that may be present within the project boundary.

Alabama DCNR recommends that Alabama Power's proposed WMP include provisions to implement FWS's guidelines for timber management regarding federally and state protected bats, add cave protection and maintenance components in the WMP for conservation of state protected species, and consult with Alabama DCNR and FWS to develop additional measures protective of wildlife resources within the project boundary.

Our Analysis

Gray Bat—The current range of the gray bat overlaps with project land at Skyline WMA, but Harris Lake is outside this species' range. There are no known occurrences of overwintering or summer roosting gray bats within the project boundary at Skyline WMA. However, Alabama Power did not conduct formal bat surveys as part of relicensing studies. Therefore, whether gray bats are present within the project boundary at Skyline WMA is unknown. Alabama Power's 2020 cultural resources study included a visual inspection and documentation of any bats that were observed incidentally in caves during the survey.[87] Eight caves were surveyed within the project boundary at Skyline WMA in February 2020. A total of 48 bats were documented in 3 of the caves (i.e., Ginormous Sink Cave, Tate Cave, and Cane Cave), none of which were gray bats (Alabama Power, 2021a).[88]

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[87] During the cave surveys, three biologists were present and documented any bats, including species, numbers, and any symptoms of white-nose syndrome.

[88] Surveyors were unable to determine the species of one bat observed in Cane Cave.

There are about 10,782 acres of karst geology (figure D-21) and at least 236 caves on project land at Skyline WMA (Alabama Power, 2021a). Alabama Power's 2020 cultural resources study included a survey of roughly 3% of the caves on project land at Skyline WMA. The incidental bat observations reported only represent a single point in time during the winter season and are insufficient to establish the absence of gray bats beyond the eight caves that were surveyed at the time they were surveyed. It is not known whether bats, including gray bats, use any of the other 228 caves on project land that were not surveyed.

As discussed above, there are three large gray bat winter and/or summer colonies roosting in caves within 21 miles of the project boundary at Skyline WMA (i.e., Fern Cave, Sauta Cave, and Nickajack Cave). Although only about 5% of available caves are thought to be suitable for occupancy by most gray bats because of their highly specific roost and habitat requirements, males and yearling females are less restricted to specific cave and roost types during all seasons (FWS, 2009). Based on current migration data, gray bats can migrate as many as 500 miles from summer and winter caves (FWS, 2024gg). More commonly "regional migrants" travel 10 to 270 miles between summer and winter caves. During the active season, gray bats use multiple caves and the distances among their summer roosting caves can be substantial (e.g., 31 miles for maternity colonies and 43 miles for males)(NatureServe, 2024a). Also, gray bats have been documented foraging up to 26 miles from their summer colony (Kentucky DFW, 2024). Given the proximity of large gray bat colonies, known seasonal migration and foraging distances for this species, and the availability of caves and forested streams, gray bats likely forage and roost (i.e., in summer and/or winter in caves) on project land at Skyline WMA.

Although gray bats are less susceptible to loss of roosting habitat from timber harvesting because they roost in caves (not trees) year-round, timber harvesting activities could disturb cave habitat and forested corridors between caves and foraging areas. Heavy equipment used to cut and remove trees near cave entrances and other karst features could damage the structural integrity of caverns and/or cause changes abiotic conditions such as the air flow, temperature (via shading/sun exposure), and moisture levels or patterns of water flow within caves. Gray bats have been known to abandon roosting sites due to flooding or other environmental disturbances, such as changes in air flow (FWS, 2009). Disturbances during the sensitive maternity period and pup season can result in bats moving to less preferred roost sites within caves, cave abandonment, and pup mortality because non-volant young can become dislodged from cave walls and fall (Chipman, 2021). Also, the loss of tree cover surrounding cave entrances and from caves to foraging areas could expose gray bats, especially newly volant juveniles, to predators such as screech owls (FWS, 2009).

Alabama Power's draft WMP does not include protection, mitigation, or enhancement measures specifically designed for the gray bat. However, the WMP contains some tree harvesting methods and measures that would be protective of gray bats. For example, consulting the Alabama NHP and FWS's Alabama Ecological Services Field Office prior to timber harvests regarding locations of any known maternity roost caves and hibernacula for gray bats would help Alabama Power to identify methods to avoid disturbing this species. At Skyline WMA, harvesting timber units on a 60-year cycle (minimum) and leaving a residual stand of 30 to 100 or more trees of various age classes per acre would preserve some tree cover for gray bats, providing protection during migration and while traveling among summer caves and foraging areas. Nevertheless, it is not clear what density of vegetation is optimal or adequate for gray bat movement corridors. The proposed clear cuts on mountain tops to create wildlife openings and harvests associated with salvage operations after wind, fire, or insect damage, or to facilitate natural regeneration of oak species would result in some gaps in the forest, but these openings are expected to be relatively small. Gray bats would likely be able to avoid small forest gaps unless they are created at entrances of gray bat caves or around preferred foraging areas. Alabama Power's proposal to create and maintain forested (i.e., not harvest within) streamside management zones would preserve potential gray bat foraging habitat and maintain forested corridors to provide cover for gray bats at Skyline WMA. Continuing to implement Alabama Forestry Commission's other forestry BMPs would minimize potential soil disturbances, erosion, and associated adverse effects to water quality and habitat for gray bat prey species by avoiding stream crossings for roads, skid trails, or firebreaks. In addition, prohibiting the cutting, trimming, or destruction of trees on project land within 0.25 miles of known northern long-eared bat hibernacula during any time of the year could also benefit gray bats if they use the same caves for summer or winter roosting.

The draft WMP does not contain measures to protect bats from human disturbances, such as spelunking (exploring caves), hunting, primitive camping, and other recreation activities near caves. Although gray bats appear to be less susceptible to white-nose syndrome, they are more vulnerable to human disturbances than other bat species because they occupy caves year-round, caves tend to be accessible to humans, and some caves are popular recreation destinations (NatureServe, 2024a). There are two designated campsites on project land at Skyline WMA. One of the campsites is within about 1.5 miles of Ginormous Sink Cave, and the other campsite is within about 2 miles of Cane and Tate Caves. There do not appear to be formal trails to these caves, but there are WMA roads that pass near all three of the caves.[89] There is no information in the record regarding the status of the 236 caves on project land at Skyline WMA, including documentation of any existing gates, fences, or signs to protect bats, potential recreation use(s), evidence of vandalism, or other signs of human disturbance. There is also insufficient information regarding current bat use of these caves.

To further avoid or minimize the effects of timber management and recreation on gray bats at Skyline WMA, Alabama Power could consult with the FWS and Alabama DCNR regarding revising the draft WMP to include the following provisions: (1) identify FWS's current protocols for surveying gray bats, including potential passive techniques (e.g., acoustic detectors, infrared video surveillance) that could be conducted at summer and winter caves without disturbing bats; (2) within 1 year after Commission approval of the final WMP and prior to conducting timber harvests at Skyline WMA, survey caves that are accessible to recreationists, prioritizing caves near the two designated campsites, popular hunting areas, WMA roads and trails, and other WMA features that may facilitate access; (3) prior to conducting each annual timber harvest, survey caves within the management unit for use by gray bats; and (4) if gray bats are observed during surveys described in item 2 or 3, or evidence

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[89] Commission staff estimated distances between these caves and Alabama Power's two designated campsites by comparing figure 2-2 of Alabama Power's 2020 Skyline Cave Assessment, showing the locations of the eight caves that were surveyed during the cultural resource study, with figure 9-1 of the draft WMP, showing a map of Skyline WMA with roads and campsites inside the project boundary.

of bat use is present, consult with the FWS and Alabama DCNR to develop appropriate protection, mitigation, or enhancement measures to avoid adverse effects to bats. Gray bat protection, mitigation, and enhancement measures might include: (1) installing gates, fences, and/or signs at cave entrances to deter recreation or unauthorized activities at occupied caves, (2) limiting timber harvest activities to occur at times outside the gray bat pup season and active season near occupied caves; (3) maintaining forested buffers at entrances, sinkholes, and other karst features connected to caves occupied by gray bats, similar to streamside management zones, where no timber is harvested, and heavy equipment does not enter/traverse to prevent inadvertently causing a collapse of caves, changing abiotic factors (e.g., air flow patterns, sun exposure, humidity, groundwater flow), and/or increasing public access to caves; and (4) maintaining forested corridors from caves occupied by gray bats to streamside management zones and other riparian areas that provide foraging habitat (FWS, 2024gg; 1982).

Conducting gray bat surveys using FWS's protocols would identify any caves that may require protection from disturbances associated with project-related recreation and timber harvesting activities. Implementing protection measures at caves occupied by gray bats and their foraging areas would avoid adverse effects to this species. We conclude that relicensing the project, with Alabama Power's proposed WMP, and the staff recommended measures described above, is "not likely to adversely affect" the gray bat.

Indiana Bat, Northern Long-Eared Bat, and Tricolored Bat—Both Harris Lake and Skyline WMA are within the current ranges of the Indiana bat, northern long-eared bat, and tricolored bat. As mentioned above, Alabama Power did not conduct formal bat surveys as part of relicensing studies, but the cultural resources study included a visual inspection and documentation of incidental bat observations in eight caves that were surveyed on project land at Skyline WMA in February of 2020. A total of 45 tricolored bats were observed in 3 of the caves including: 16 in Ginormous Sink Cave, 27 in Tate Cave, and 2 in Cane Cave. Additionally, one dead tricolored bat was observed in the water below a small waterfall within Ginormous Sink Cave and surveyors noted that it most likely washed out of a low passage during a flood surge (Alabama Power, 2021a). Although there are no known occurrences of Indiana or northern long-eared bats within the project boundary at Harris Lake or Skyline WMA, and no Indiana or northern long-eared bats were observed during Alabama Power's cultural resource surveys, Alabama Power assumes that these species are present.

Based on FWS's methods to estimate Indiana and northern long-eared bat populations and habitat use in certain National Refuges and National Forests, Alabama Power calculated estimates for Indiana and northern long-eared bats (i.e., occupied acres, number of colonies, and number of individuals) on project land at Harris Lake and Skyline WMA (table D-3) (Alabama Power, 2021b). However, the assumptions used in these estimates may not be appropriate for the project area. Tricolored bat populations were not estimated.

Table D-3. Indiana and Northern Long-Eared Bat Population Estimates on Project Land at Harris Lake and Skyline WMA (Source: Alabama Power, 2021b, as modified by staff).

Species	**Location**	**Acres of Forested/ Managed Timber Stands**	**Estimated Occupied Acres [a]**	**Estimated # of Colonies [b]**	**# of individuals [c]**
Indiana bat	Harris Lake	6,269	81.50	0.0065	1.167
	Skyline WMA	15,063*	195	0.0156	2.8
Northern long-eared bat	Harris Lake	6,269	1,824.28	1.82	246.28
	Skyline WMA	15,063*	4,383.3	4.38	591.75

[a] The assumed occupancy rate was 0.013 for Indiana bats and 0.291 for northern long-eared bats.
[b] The assumed number of acres per colony was 12,566 acres for Indiana bats and 1,000 acres for northern long-eared bats.
[c] The assumed number of individuals per colony includes the number adult females, adult males, and pups, and was 180 for Indiana bats and 135 for northern long-eared bats.
* The total acreage of project land at Skyline WMA prior to the Commission's June 13, 2022, order amending the project boundary (*see* 179 FERC ¶ 62,134).

FWS's Current Survey Guidelines—In April 2024, FWS published new *Range-Wide Indiana Bat & Northern Long-Eared Bat Survey Guidance* that also applies to the tricolored bat (FWS, 2024ii). Figure D-36 shows the northern long-eared bat hibernating range and year-round active range. Figure D-37 and table D-4 include the activity periods for Indiana, northern long-eared, and tricolored bats for each state. FWS identifies three zones of bat activity for Alabama, including the hibernating range, year-round active zone 1, and year-round active zone 2. Project land at Skyline WMA falls wholly within the hibernating range for Indiana, northern long-eared, and tricolored bats. Project land at Harris Lake and the Tallapoosa River downstream from Harris Dam is also currently within the hibernating range, but it is located near the boundary for the year-round active zone 1. There are no project lands near the year-round active zone 2, which is located along the Gulf of Mexico and Atlantic coasts, including southern Alabama, Texas, Louisiana, Mississippi, Georgia, and Florida.

As shown in table D-4, Indiana, northern long-eared, and tricolored bats in the hibernating range of Alabama are inactive (hibernate) from November 16 through March 14 and are active from March 15 through November 15. Within their active period, is spring staging (March 15 through April 30), summer habitat occupancy (March 15 through September 30), the pup season (May 15 through July 31), and fall swarming (September 1 through November 15). In contrast, within Alabama's year-round active range (Zone 1), Indiana, northern long-eared, and tricolored bats do not hibernate and instead are roosting in trees in torpor (or a state of lowered body temperature and metabolic activity) from December 15 through February 15. In addition, the pup season in Alabama's year-round active range (Zone 1) starts and ends about two weeks earlier for these species (May 1 through July 15). FWS's guidance indicates that if a project falls within suitable summer Indiana bat habitat and Indiana bats are assumed or confirmed present within the year-round active range (Zone 1), then project proponents should default to using the more protective activity periods (e.g., Alabama: hibernating range) (FWS, 2024ii). However, FWS's guidance does not specify whether using the hibernating range activity periods would be more protective of Indiana, northern long-eared, and tricolored bats that are active year-round in the case of tree removal activities.

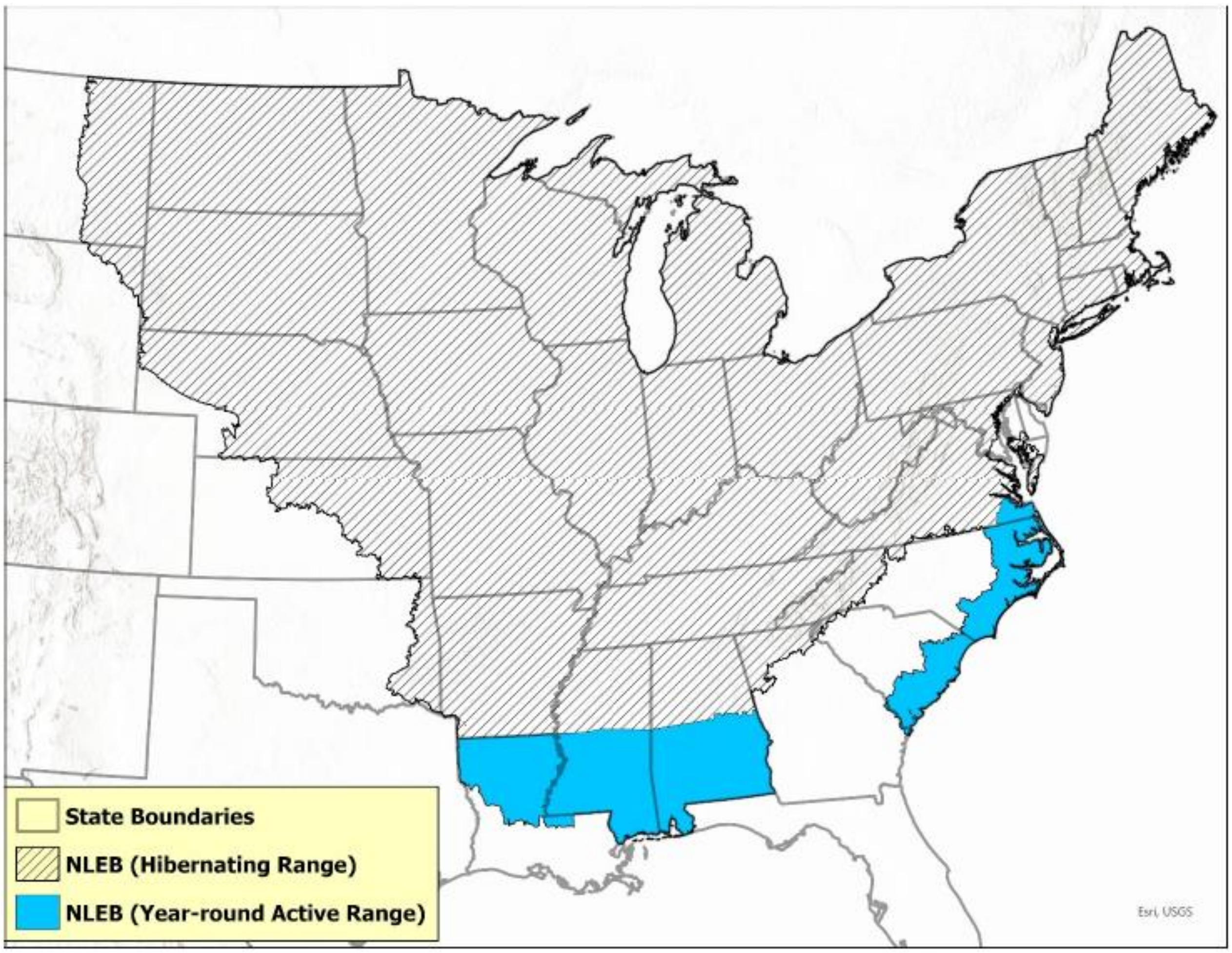

Figure D-36. Hibernating and Year-Round Active Range of the Northern Long-Eared Bat (Source: FWS, 2024ii).

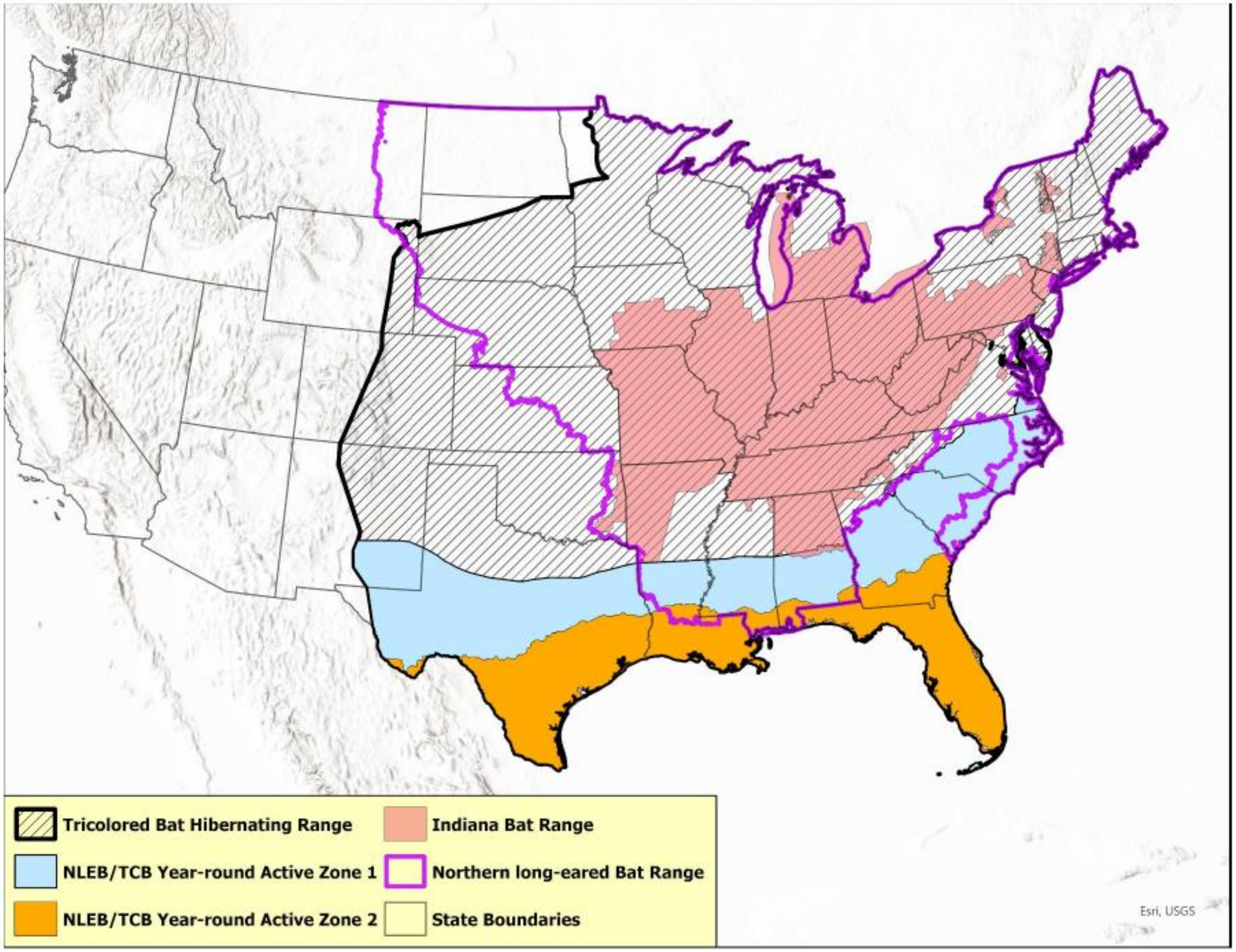

Figure D-37. Hibernating and/or Year-Round Active Ranges of the Indiana Bat, Northern Long-Eared Bat, and Tricolored Bat (Source: FWS, 2024ii).

Table D-4. Bat Activity Periods in Alabama for Indiana Bat, Northern Long-Eared Bat, and Tricolored Bat (Source: FWS, 2024ii, as modified by staff [i.e., excerpt of table showing Alabama only, reformatted for this document]).

State	Hibernation	Winter Torpor[90]	Spring Staging[91]	Summer Occupancy	Pup Season	Fall Swarming[92]
(See figures 36 & 37)	Timeframe when most bats are hibernating (i.e., inactive[93] season)	Timeframe when mean winter temperatures fall below 40° F and bats roosting in trees are in torpor[94]	Timeframe when most bats are emerging from hibernation, roosting near hibernacula, & preparing for migration to summer home range	Timeframe when bats are present on their summer home range and/or roosting in colonies[95]	Timeframe during late pregnancy and when most young are born until they can fly & forage independently	Period of increased activity near hibernacula (including foraging, roosting in trees, & mating) prior to hibernation
Alabama: Hibernating Range	November 16 – March 14	**N/A**	March 15 – April 30	March 15 – September 30	May 15 – July 31	September 1 – November 15

[90] Only applies in Zone 1 of the year-round active range (see figure D-37).

[91] FWS currently has no information to inform spring staging timeframe near winter roosts within the year-round active portion of the northern long-eared bat or tricolored bat range.

[92] FWS currently has no information to inform fall swarming timeframe near winter roosts within the year-round active portion of the northern long-eared bat or tricolored bat range.

[93] The "active season" is the inverse of the hibernation period. If no hibernation period is listed, bats in this area are active year-round.

[94] Torpor is a state of lowered body temperature and metabolic activity.

[95] Indiana bat (range-wide) and northern long-eared bat (hibernating range) often remain in colonies until the end of Summer Occupancy. Tricolored bat (range-wide) and northern long-eared bat (year-round active range) roost singly once young can fly and forage independently (i.e., the end of the Pup Season).

State	Hibernation	Winter Torpor[90]	Spring Staging[91]	Summer Occupancy	Pup Season	Fall Swarming[92]
(See figures 36 & 37)	Timeframe when most bats are hibernating (i.e., inactive[93] season)	Timeframe when mean winter temperatures fall below 40° F and bats roosting in trees are in torpor[94]	Timeframe when most bats are emerging from hibernation, roosting near hibernacula, & preparing for migration to summer home range	Timeframe when bats are present on their summer home range and/or roosting in colonies[95]	Timeframe during late pregnancy and when most young are born until they can fly & forage independently	Period of increased activity near hibernacula (including foraging, roosting in trees, & mating) prior to hibernation
Alabama: Year-round Active Range (Zone 1)[96]	**N/A**	December 15 – February 15	**N/A**	March 15 – July 15	May 1 – July 15	**N/A**
Alabama: Year-round Active Range (Zone 2)	**N/A**	**N/A**	**N/A**	March 15 – July 15	May 1 – July 15	**N/A**

[96] If a project falls within suitable summer Indiana bat habitat and Indiana bats are assumed or confirmed present, then default to using the more protective activity periods (e.g., Alabama: hibernating range).

WMP Bat Protection Measures

Alabama Power's draft WMP includes some protection, mitigation, or enhancement measures specifically designed for the Indiana and northern long-eared bats that would also likely benefit the tricolored bat at Harris Lake and Skyline WMA. For example, consulting the Alabama NHP and FWS's Alabama Ecological Services Field Office prior to timber harvests regarding locations of any known maternity roost trees and hibernacula for Indiana and northern long-eared bats and following current FWS guidance regarding timber management near known hibernacula and maternity roost trees would help Alabama Power to avoid adverse effects to these species during these activities. Retaining snags and live trees with potential roost tree characteristics such as shagbark hickories and other trees with exfoliating bark, cracks, crevices, or hollows, and avoiding damage to potential roost trees during harvests, especially high-quality snags during the pup season for Indiana and northern long-eared bats would preserve potential summer roosting habitat for these species. Alabama Power noted that the pup season for Indiana and northern long-eared bats is May 1 through July 15 in Alabama, but based on FWS's new guidance, that is the pup season for the year-round active range (Zones 1 and 2) (table D-4).[97] Skyline WMA and Harris Lake are currently within the hibernating range for Indiana, northern long-eared, and tricolored bats, and the pup season in those areas is listed as May 15 through July 31 (table D-4). Alabama Power's proposed, ongoing consulting with the FWS would help avoid adverse effects to Indiana, northern long-eared, and tricolored bats.

In addition, continuing to implement Alabama Forestry Commission's forestry BMPs would minimize potential soil disturbances, erosion, and associated adverse effects to water quality and habitat for these bats and their prey species by avoiding stream crossings for roads, skid trails, or firebreaks. Creating and maintaining forested (i.e., not harvesting within) streamside management zones would preserve potential foraging habitat and maintain forested corridors to provide cover for bats at Harris Lake and Skyline WMA. The draft WMP does not specify the width of the streamside management zones, but the Alabama Forestry Commission's BMPs for Forestry state that the minimum width on each side of a perennial or intermittent stream is 35 feet from a definable bank (Alabama Forestry Commission, 1992). However, if wildlife protection is a major objective, a minimum of 50 feet is recommended for streamside management zones. Wider streamside management zones and more stringent control of forestry operations within the streamside management zone may be appropriate depending on land management objectives, stream sensitivity, erodibility of soil, steepness of slopes, and activities planned outside the streamside management zone. Streamside management zones must always be wide enough to maintain water quality standards (Alabama Forestry Commission, 1992).

[97] FWS previously stated (generally) that for the southeast, the nonvolant period for the Indiana bat occurs earlier than other regions, likely from May 1 through July 15 (A. Edelman, J. Stober, pers. Comm. 2016 as cited in FWS, 2016c). Also, recent surveys by the South Carolina Department of Natural Resources (South Carolina DNR) observed an early pup season for northern long-eared bats in forests near the Atlantic Coast (South Carolina DNR, 2019), an area that is currently within FWS's year-round active range (Zone 1)(FWS, 2024ii).

Potential Effects of Tree Removal Activities

The draft WMP also includes some proposed timber management practices for project land at Skyline WMA that could adversely affect Indiana, northern long-eared, and tricolored bats. Harvesting timber units on a 60-year cycle (minimum), leaving a residual stand of 30 to 100 or more trees of various age classes per acre, and retaining all trees within the streamside management zones would preserve some potential summer roost trees and provide traveling and foraging areas. However, annual harvests of maples, tulip trees, and other "less desirable" tree species, well as over mature oaks, could result in the harvest of potential summer roost trees, including maternity roosts. Indiana bat maternity roosts have been observed on a variety of hardwood trees including maple, ash, elm, cottonwood and other poplars, black locust, red and white oak trees, as well as coniferous trees (e.g., white, shortleaf, and pitch pines) (FWS, 2007). Northern long-eared bats are also flexible in selecting roosts, choosing a variety of tree species that retain bark or provide cavities or crevices (FWS, 2022e). Tricolored bats are similarly opportunistic, roosting in live and dead leaf clusters of live or recently dead deciduous hardwood trees, Eastern red cedar, pines, and Spanish moss hanging from trees (FWS, 2021f). Without pre-harvest surveys, undocumented maternity roosts, other summer roost trees, and hibernacula for these species might be affected during timber harvests. It is also not clear that residual stands of 30 to 100 trees would provide adequate densities of vegetation for Indiana, northern long-eared, and tricolored bat roosting (e.g., buffers around maternity roosts), foraging, movement corridors, and/or spring staging/fall swarming areas near hibernacula. In addition, the proposed (a) clear cuts on mountain tops for wildlife openings, (b) salvage operation harvests after wind, fire, or insect damage, and (c) harvests to facilitate natural regeneration of oak species would result in some gaps in the forest, potential removal of summer roosting habitat, and potential exposure of hibernacula entrances.

Similarly, there are certain elements of Alabama Power's draft WMP proposal for timber management units at Harris Lake that may adversely affect Indiana, northern long-eared, and tricolored bats. Not harvesting any hardwood species and retaining all trees within the streamside management zones would preserve some potential roosting, foraging, and traveling habitat for these bats. However, harvesting an annual average of 128.5 acres of only live, standing pine trees measuring 15 inches at dbh and greater on a 20-year cycle could result in the harvest of some summer roost trees, including maternity roosts. Depending on the time of year, Alabama Power's prescribed burns within 160 acres of mostly natural pine forest on a peninsula northeast of Flat Rock Park on Harris Lake could also affect tree-roosting bats (see figures 34 and 35). Northern long-eared bats and Indiana bats have been observed roosting on pine tree trunks and tricolored bats may roost among pine needles (South Carolina DNR, 2019; FWS, 2007; 2021f).

Alabama Power did not propose measures to protect special status bat species during tree removal and disturbance associated with the construction of the proposed Highway 48 Day Use Park or the removal of undeveloped forested land from the project boundary at Harris Lake. There are no bat survey data on the record for these areas and therefore the occurrence of bats in these areas is unknown. The permanent removal of about 3.7 acres of mixed pine-hardwood forest and temporary disturbance of another 2.4 acres of mixed pine-hardwood forest to build the proposed recreation amenities (e.g., parking areas, access roads, boat launch, picnic area) could remove and/or disturb summer roosting habitat Indiana, northern long-eared, and tricolored bats. In addition, removal of undeveloped forested land from the project boundary would remove these areas from federal protection and potentially expose Indiana, northern long-eared, and tricolored bats to unmitigated effects.

Limiting timber harvests and other planned tree removal activities to the inactive/hibernating period (i.e., November 16 through March 14 in the hibernating range) would allow Alabama Power to avoid direct impacts to any summer roosting habitat while it is occupied by Indiana, northern long-eared, and tricolored bats. This timber management strategy may be effective on project land at Harris Lake, which does not have karst topography. However, given the large number of caves (i.e., 236) on project land at Skyline WMA and the lack of information about bat use within them, there is potential for timber harvests during the winter to adversely affect hibernating Indiana, northern long-eared, and tricolored bats.

Potential Effects of Recreation Activities

As mentioned in the gray bat discussion above, the draft WMP does not contain measures to protect hibernating bats from human disturbances and the inadvertent spread of the fungus that causes white-nose syndrome through recreation activities such as spelunking, hunting, primitive camping, and other recreation activities in or near caves located on project land. Indiana, northern long-eared, and tricolored bats are susceptible to white-nose syndrome as well as being vulnerable to human disturbances during hibernation, both of which can interrupt torpor and cause a depletion of fat reserves that are needed to survive the winter (FWS, 2007; 2022e; 2024jj; 2021f). Cavers and other recreationists can inadvertently transmit the fungus that causes white-nose syndrome from one cave to another on their clothing. The 45 tricolored bats observed in three caves surveyed during Alabama Power's cultural resource study did not show signs of white-nose syndrome. However, given the presence of the fungus that causes white-nose syndrome in Jackson County since 2012 (FWS, 2019c), some of the caves on project land at Skyline WMA could be infected. One of the two designated campsites on project land at Skyline WMA is within about 1.5 miles of Ginormous Sink Cave, and the other campsite is within about 2 miles of Cane and Tate Caves. Although there do not appear to be formal trails to these caves, these caves could be generally accessible to people given that there are WMA roads that pass near all three of them. There is no information in the record regarding the locations or status of the 236 caves on project land at Skyline WMA, potential recreation use(s), evidence of vandalism, or other signs of human disturbance, or documentation of any existing gates, fences, or signs installed to protect bats. There is also little information regarding current use of these caves by bats.

Finalizing the Draft WMP

Alabama Power proposes to finalize the WMP, including a provision to develop additional forestry management plans that are protective of special status bat species in consultation with the FWS, based on current bat avoidance guidance. Without existing bat survey data, FWS and Alabama DCNR could not advise Alabama Power regarding the locations of any existing hibernacula, or summer roosts, including maternity roosts for Indiana, northern long-eared, and tricolored bats. As a result, take[98] of these species could occur. To

[98] Under the ESA, "take" is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Section 9 of the ESA prohibits the unauthorized "take" of listed species.

avoid or minimize the effects of forest management, recreation site development, and recreation activities on Indiana, northern long-eared, and tricolored bats, Alabama Power could use FWS's current range-wide survey guidance for Indiana, northern long-eared, and tricolored bats (FWS, 2024ii) to develop a survey strategy, in consultation with the FWS and Alabama DCNR, to identify hibernacula and roost trees, including maternity roosts, within the project boundaries at Skyline WMA and Harris Lake.

A bat survey strategy could include provisions for: (1) prioritizing presence/absence surveys among the 236 caves on project land at Skyline WMA, and evaluating whether they are subject to adverse effects associated with timber harvests, recreation, or other human disturbances;[99] (2) pre-harvest surveys within and immediately adjacent to timber management units to identify hibernacula and summer roosts, including maternity roosts; and (3) surveys prior to removing undeveloped forested land from the project boundary at Harris Lake to determine whether any existing roost trees for Indiana, northern long-eared, and tricolored bats would be affected by the loss of federal protection. FWS could provide guidance regarding preferred site-specific survey methods[100] and the timeframe for which the bat surveys would remain valid.[101]

Using initial winter and summer habitat survey results, Alabama Power could consult with Alabama DCNR and FWS to modify existing forestry management plans and incorporate them into the final WMP to ensure the protection of known hibernacula, and roost trees, including maternity roosts within the project boundaries at Skyline WMA and Harris Lake. Depending on each set of survey results (as they become available), additional Indiana, northern long-eared, and tricolored bat protection, mitigation, and enhancement measures may be appropriate to include in regular updates to the WMP. Such measures might include: (1) installing FWS-approved gates, fences, and/or signs at cave entrances to deter recreation or unauthorized activities at occupied caves (e.g., at Ginormous Sink Cave, Cane Cave, and Tate Caves where tricolored bats were observed), (2) limiting timber harvest activities to occur only outside the active season; (3) prohibit timber harvests during the inactive season near known cave hibernacula; (4) maintain a forested buffer around documented roost trees, including maternity roosts; (5) maintaining a forested buffer at cave entrances, sinkholes, and other karst features connected to caves occupied by these bats, similar to streamside management zones, where no timber is harvested, and heavy equipment does not enter/traverse to prevent

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[99] The caves nearest to the two designated campsites on project land at Skyline WMA, popular hunting areas, WMA roads and trails, and other WMA features could be surveyed first considering that they could be the most easily accessible and/or are likely known by recreationists.

[100] For example, FWS may recommend potential passive bat detection techniques (e.g., acoustic detectors, infrared video surveillance) to minimize any disturbance to bats during the surveys.

[101] Based on FWS's current survey guidance for Indiana, northern long-eared, and tricolored bats, Alabama Power's surveys would be valid for 5 years from their completion. This timeframe may be reduced if significant habitat changes have occurred in the area, or increased based on new local information (e.g., other nearby surveys) (FWS, 2024ii).

inadvertently: (a) causing a collapse of caves; (b) changes to abiotic factors such as air flow patterns, sun exposure, humidity, groundwater flow; and (c) increasing public access to caves; (6) maintaining forested corridors from caves occupied by these bats to known roost trees, streamside management zones and other riparian areas that provide foraging habitat; and (7) consulting with FWS and Alabama DCNR regarding the appropriate width of all forested buffers (i.e., around occupied hibernacula, occupied roost trees, and streamside management zones). Conducting Indiana, northern long-eared, and tricolored bat surveys using FWS's current survey guidelines would help Alabama Power to identify any caves and summer roost trees that may require protection from disturbances associated with timber harvesting activities and project-related recreation. Implementing any Commission-approved protection measures at caves and summer roosts occupied by Indiana, northern long-eared, and tricolored would avoid adverse effects to this species while allowing for forest management to benefit a wide variety of wildlife species.

We conclude that relicensing the project, with Alabama Power's proposed WMP, and the staff recommended measures described above, is "not likely to adversely affect" the Indiana bat or the northern long-eared bat. There is no critical habitat for Indiana bats in Alabama and relicensing the project would have "no effect" on the Indiana bat's critical habitat units in other states. In addition, we conclude that relicensing the project, with Alabama Power's proposed WMP, and the staff recommended measures described above, would not be sufficient to preclude both the survival and recovery of (i.e., jeopardize) the tricolored bat. Therefore, we do not believe a formal conference is required. However, we have determined an informal conference is appropriate as the project may affect, but is not likely to adversely affect, the tricolored bat.

Alligator Snapping Turtle

The alligator snapping turtle range does not include northwestern Alabama, and so this species would not occur at Skyline WMA, but it may occur in Harris Lake and its tributary streams (FWS, 2024w). This species could be affected by project operations that affect their prey species, activities that affect their nests, and some recreation activities (e.g., boating, fishing, hunting). Construction of the proposed Highway 48 Day Use Park and tailrace fishing pier and canoe/kayak put-in could disturb potential shoreline habitat for this species.

Our Analysis

Alabama Power's proposal to continue implementing the current reservoir operating curve would maintain the existing hydroperiod and shoreline conditions at the project. Project operation would not change the existing shoreline, littoral, and lake bottom habitat available to alligator snapping turtles at Harris Lake. Continuing existing reservoir operations would also not be expected to affect the alligator snapping turtle's prey base. Alabama Power's proposal and Commission staff's recommendation to increase minimum flows downstream from Harris Dam would increase riverine/littoral habitat and improve conditions for alligator snapping turtle prey species. Therefore, proposed downstream releases are expected to benefit alligator snapping turtles in the Tallapoosa River downstream from Harris Dam compared with existing project operation.

Existing recreation activities such as boating and fishing are expected to continue or increase with the proposed construction of Highway 48 Day Use Park and tailrace fishing pier and canoe/kayak put-in. Alligator snapping turtles could be injured if struck by a boat propeller or entangled by fishing gear. Boat ramp maintenance during the summer months may necessitate the movement of heavy machinery into shoreline areas, which has the potential to disturb or destroy alligator snapping turtle nests. In addition, construction of the proposed recreation amenities on Harris Lake and in the tailrace downstream of Harris Dam would involve some permanent and temporary disturbances to small areas of shoreline and project land. However, alligator snapping turtles have a broad geographic distribution and low population density. Although it is unlikely the alligator snapping turtle occurs at the Harris Project in abundance, suitable habitat for this species is likely readily available within Harris Lake, and suitable nesting habitat is likely readily available in the undeveloped areas around the lake. Given the secretive nature of the species, it is unlikely that alligator snapping turtles would select heavily-trafficked sites near docks, boat ramps, or within commercial and residential areas in the project area for nesting or foraging when more favorable, undisturbed sites are available within the project boundary at Harris Lake.

Additionally, implementing the measures in Alabama Power's proposed SMP would preserve and potentially improve some areas of shoreline, and/or minimize potential effects of shoreline activities in terms of nesting habitat suitability for alligator snapping turtles. For example, the SMP includes provisions for: (1) protecting wetlands and other "sensitive resources" in natural/undeveloped shoreline classification; (2) preserving an undeveloped scenic easement; (3) promoting a vegetated buffer along the shoreline beyond the scenic easement; (4) encouraging the use of vegetation and other alternative bank stabilization techniques instead of seawalls; and (5) implementing environmental protection measures associated with the Dredge Permit Program.

The proposed 4(d) rule for the alligator snapping turtle states that the incidental take associated with the following actions would be excepted: (1) construction, operation, and maintenance activities near and in a stream, operation and maintenance of existing flood control features, and directional boring, when implemented with industry and/or state-approved BMPs; (2) pesticide application that follows appropriate application rates; (3) silviculture and forestry management activities following state-approved BMPs; and (4) maintenance dredging activities that remain in the previously disturbed portion of a maintained channel.[102] Although the proposed 4(d) rule does not provide further information to determine if an action qualifies for an exception to the take prohibition, staff assumes that the following Alabama Power-proposed measures would meet the rule's BMPs requirements: (1) as described above, BMPs in the SMP to minimize the effects of shoreline uses; (2) only staff biologists certified as commercial applicators by the State of Alabama, Department of Agriculture and Industries would continue to apply EPA-approved aquatic herbicides, algaecides, and larvicides within small areas at the project in conjunction with the proposed Nuisance Aquatic Vegetation and Vector Control Management Program (Alabama Power, 2021e); (3) ongoing implementation of the Alabama Forestry Commission's BMPs during timber management activities; and (4) ongoing conformity with U.S. Corps of Engineers (Corps) general permits for dredging at Harris Lake, as described in Alabama Power's Dredge Permit Program (Appendix A of the proposed SMP).

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[102] 86 Fed. Reg. 62,434 – 62,463 (November 9, 2021).

It is unclear whether the alligator snapping turtle will be listed, and if listed, what a final 4(d) rule would include. To facilitate avoidance of potential project-related adverse effects to this species, the final WMP could a provision for Alabama Power to report any alligator snapping turtle sightings at the Harris Project to the FWS and Alabama DCNR. The final WMP could also include a provision to consult with FWS and Alabama DCNR if alligator snapping turtles are observed, develop protection measures based on the final listing decision and 4(d) rule (e.g., any prohibitions on/or exceptions to incidental take prohibitions), and file them for Commission approval.

We conclude that relicensing the project, as proposed by Alabama Power, and with the staff recommended measures, would not be sufficient to preclude both the survival and recovery of (i.e., jeopardize) the alligator snapping turtle. Therefore, we do not believe a formal conference is required. However, we have determined an informal conference is appropriate as the project may affect, but is not likely to adversely affect, the alligator snapping turtle.

Monarch Butterfly

Due to its migratory nature, the monarch butterfly's current habitat range covers the entirety of both the Harris Lake and Skyline project boundaries. Occurrences within the project boundary are most likely during fall and spring migration and during the spring breeding period (FWS, 2020e). Monarchs could be affected by vegetation management activities that affect milkweeds and other native plants that provide forage for this species, as well as by the use of insecticides.

As part of the WMP, Alabama Power proposes to continue to maintain the pollinator plots at Little Fox Creek to benefit the monarch and other pollinators.

Our Analysis

At present the monarch butterfly is not listed as threatened or endangered, and is not currently listed as an Alabama state protected species. Although candidate species have no protection under the ESA, we include this analysis of potential project effects on the monarch butterfly because the species could become listed in the future. Monarch surveys have not been conducted at the Harris Project. However, Alabama Power staff have observed adult monarch butterflies at the pollinator plots. No monarch eggs, larvae, or pupa were observed at the pollinator plots. Additionally, Alabama Power staff have observed adult monarch butterflies at the nearby Flat Rock Park (Alabama Power, 2022b).

The pollinator plots on project lands at Little Fox Creek (arm of Harris Lake) are approximately two acres in size (figure D-36) and are part of a larger program called "The Preserves," which are a collection of recreation sites at Alabama Power's reservoirs in Alabama that were developed to foster appreciation for nature and provide educational opportunities to learn about native plants and animals (Alabama Power, 2021b; 2024). Alabama Power planted these plots with a native seed blend that was selected for compatibility with the soil and habitat type and to attract pollinators such as bees, butterflies, moths, and beetles. Specifically, the seed mix includes many species of native wildflowers, including common milkweeds and butterfly milkweeds, blazing stars, beach blanket flowers (*Gaillardia pulchella*), false sunflowers (*Heliopsis helianthoides*), ironweeds, goldenrods, blackeyed Susans, mint species (*Monarda* spp.) (Alabama Power, 2022b). These are among the types of herbaceous species that are recommended to support monarchs during their active life stages (Xerces Society, 2022).

Although not specified in the draft WMP, prior to planting the current seed mix in the pollinator plots, and over the course of a year, Alabama Power performed three rounds of herbicidal foliar applications to minimize nutrient competition for the native seed mix (Alabama Power, 2022b). Once established, Alabama Power anticipates that the native seed mix would maintain itself up to 5 years with no management. If the native seed mix becomes overwhelmed by undesirable vegetation species, and after each 5-year period, Alabama Power proposes to continue to replicate the initial methods (i.e., applying three rounds of herbicide treatment over the course of a year and then replanting the current seed mix) (Alabama Power, 2022b).

Adjacent to the pollinator plots, Alabama Power manages three permanent openings as brushy (early successional) areas (identified in figures 38 and 39 using blue arrows), by mechanical means (i.e., annual mowing)(Alabama Power, 2021d). Alabama Power also uses integrated vegetation management (i.e., a combination of mechanical, chemical, and biological treatments) within the adjacent transmission line right-of-way (identified in figure D-38 with yellow arrows) (Alabama Power, 2022b). Additionally, every 2 years, both during the dormant and growing season, Alabama Power conducts prescribed burns of 160 acres, including the entire peninsula with the pollinator plots, the three managed openings, and a (non-project) transmission line right-of-way (see figure D-35)(Alabama Power, 2021d).

Continuing to maintain the pollinator plots at Little Fox Creek would benefit monarchs and other native pollinators at Harris Lake; however, Alabama Power's additional vegetation management techniques adjacent to, and/or overlapping with, the pollinator plots could benefit and/or adversely affect these species. The draft WMP does not specify what if any coordination occurs to ensure the compatibility of the regular vegetation management techniques with the goals of the "The Preserves" and specifically the 5-year management cycle for the pollinator plots at Harris Lake. It is not clear from the draft WMP and figures whether the pollinator plots are excluded from prescribed burns that are conducted during the growing season, when monarchs are likely to be present. Given that there are multiple vegetation management techniques occurring immediately adjacent to, and potentially also overlapping with, the pollinator plots, the final WMP could include additional descriptions, maps, figures, and schedules to ensure that prescribed burns, use of herbicides, and other vegetation management methods are coordinated such that they minimize potential adverse effects to the monarch butterfly.

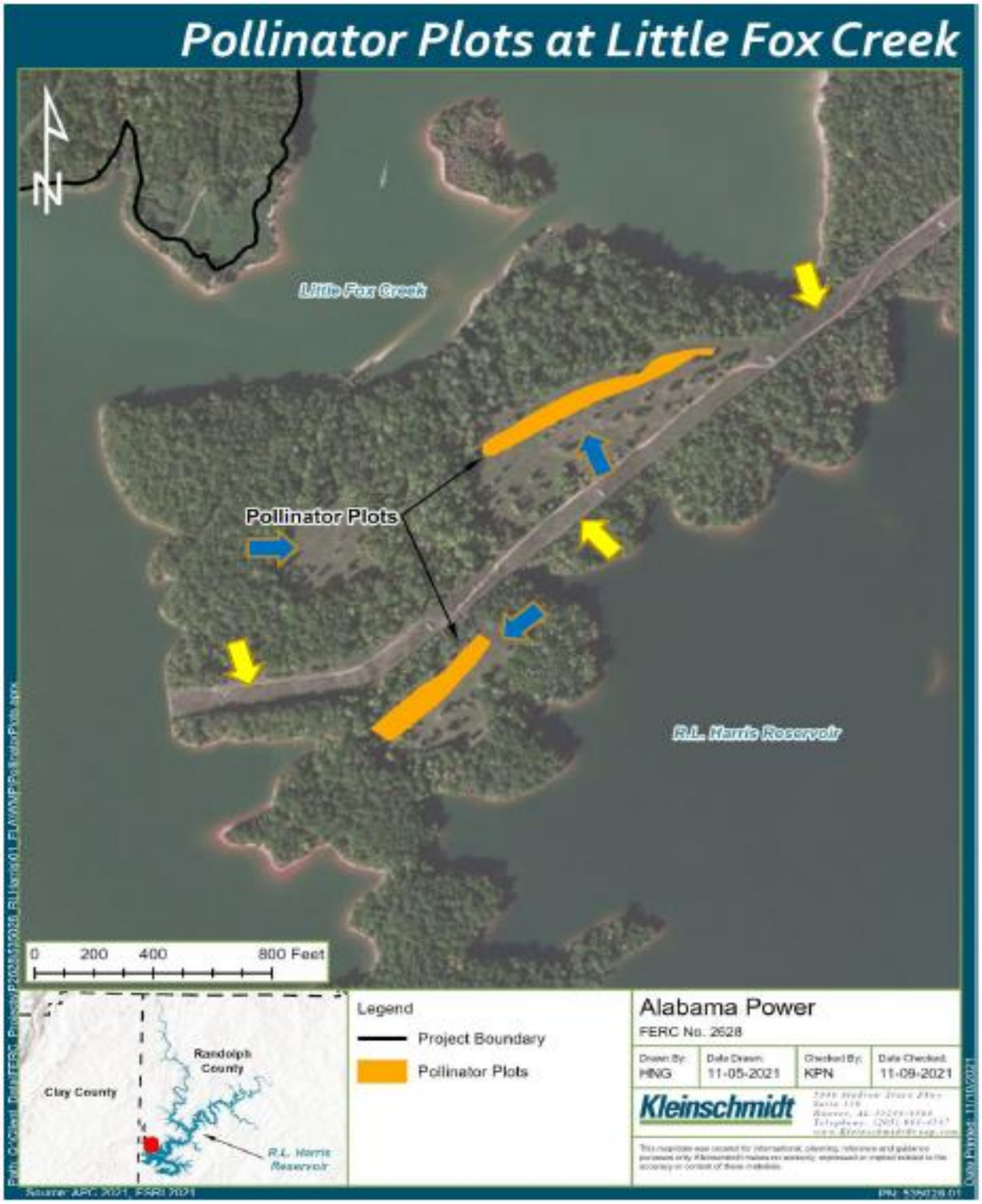

Figure D-38. Alabama Power's Pollinator Plots at Little Fox Creek (Source: Alabama Power, 2022b).

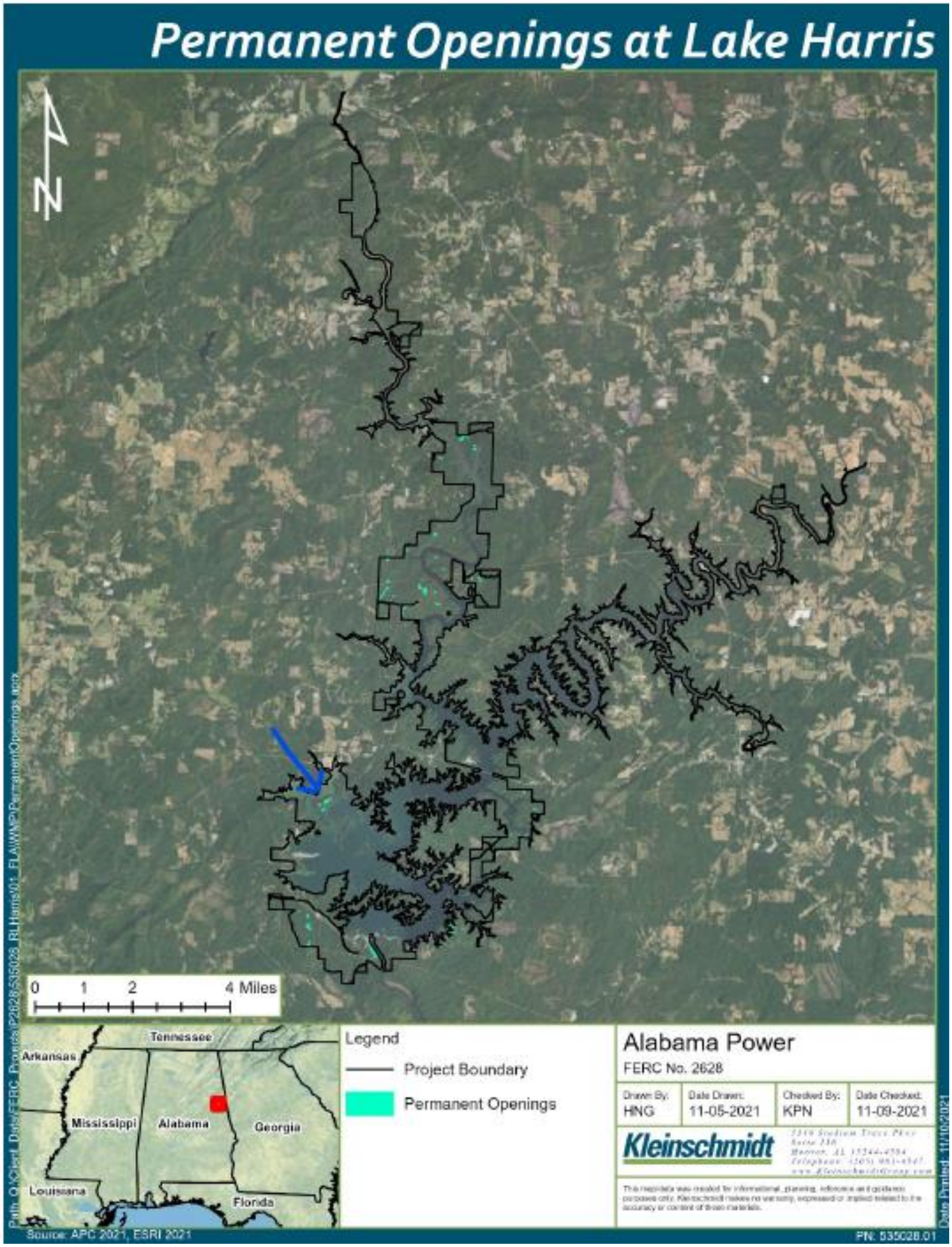

Figure D-39. Alabama Power's Managed Permanent Openings Near the Pollinator Plots at Little Fox Creek (Source: Alabama Power, 2021d).

Similarly, Alabama Power's ongoing maintenance of the Harris Project's primary transmission line right-of-way could provide benefits to and/or adversely affect monarchs. Continued use of mechanical, chemical, and biological treatments would maintain low-growing vegetation and may promote the growth of some milkweed species and other nectar-rich species known to benefit monarchs. Depending on the timing and types of treatments, use of herbicides and mechanical vegetation control methods could also adversely affect foraging monarch caterpillars or butterflies and monarchs in the process of metamorphosis. The final WMP could include measures for managing vegetation in the project transmission line that would minimize adverse effects to monarchs, such as: (1) preserving any milkweed and other low-growing, nectar rich plants for monarchs; (2) targeting only non-native plants and woody vegetation that exceeds right-of-way height limits via mechanical methods; and (3) using herbicides only sparingly, if necessary, when mechanical methods are ineffective.

Alabama Power's proposal to install new recreation amenities at a proposed Highway 48 Day Use Park and tailrace fishing pier and canoe/kayak put-in would involve disturbance to terrestrial and riparian areas, as described above. However, proposed area for the day use park is a mixed pine/hardwood forest and the canoe/kayak put-in tailrace area is surrounded by maintained lawn. These areas are not known to be a source of monarch butterfly forage such as milkweed or nectar-producing plants.

As part of its proposed Nuisance Aquatic Vegetation and Vector Control Management Program, Alabama Power would continue to apply aquatic herbicides by sub-surface injection into the water column, or by hand-operated sprayers directed at marginal emergent or floating vegetation. Drift control agents are added to spray solutions as required, to contain herbicide applications to the targeted species. Also, for the control of mosquitos, Alabama Power would continue to use larvicides that are highly selective and only target mosquitos while in the larval and pupal stages. These larvicides are applied directly to aquatic environments, sink to the bottom, and dissolve slowly to provide extended control of mosquito species. There is only one routine mosquito larvicide treatment site within the project boundary that is treated, at most, once annually, but treatment is not necessary every year.[103] However, as described in section 3.3.3.2, *Terrestrial Resources*, *Environmental Effects*, while three of the four proposed larvicides are bacterial insecticide are safe for pollinators (Chandler, 2018), methoprene is a hormone that can prevent normal growth and development of insects, including some pollinators (Wick et al., 2012). As a precaution, to protect the native wildflowers as well as the monarch and other native pollinators, the WMP could include a provision to ensure that herbicides and larvicides used to control nuisance aquatic vegetation and mosquitos would not be applied near the pollinator plots or other known locations of milkweeds.

Upland habitats in the project-affected area that may be used by the monarch butterfly represent a small fraction of the total available habitat within the eastern portion of the species' home range. With the staff-recommended measures for the final WMP described above, potential effects to monarchs would likely be incidental and minor. We conclude that relicensing the project, with Alabama Power's proposed WMP, and the staff recommended

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[103] *See* Accession No 20220615-5192.

measures described above, is unlikely to have a significant effect of the monarch butterfly. No further action under the ESA is necessary.

Georgia Rockcress

The Georgia rockcress range overlaps with project land at Harris Lake. Project land at Skyline WMA is outside this species' range (FWS, 2024z). Georgia rockcress could be affected by timber harvesting, road construction, and recreation activities that disturb the soil, eliminate tree canopy, and/or facilitate the spread of non-native, invasive plants.

Our Analysis

Potential habitat for Georgia rockcress, including a variety of dry mesic to mesic soils, including shallow soil accumulations on bedrock, sloping rock outcrops, and sandy loam along eroding riverbanks, occurs at Harris Lake and in the Tallapoosa River downstream from Harris Dam (FWS, 2021d). The project land at Harris Lake was not surveyed specifically for Georgia rockcress during relicensing studies because it did not appear on the initial July 27, 2018, or updated September 27, 2021, IPaC lists for the Harris Project. Georgia rockcress was included on the January 30, 2023, IPaC species list for project land at Harris Lake, but this was after relicensing studies were complete and Alabama Power had filed its final license application and supplemental information. Botanical inventories were conducted on two parcels which contain rock outcrops near Flat Rock Park. However, these botanical inventories did not detect any Georgia rockcress within the 57-acre study area (Blake's Ferry Pluton).

There is no information in the record regarding Georgia rockcress within the project boundary at Harris Lake. As part of the finalization of its WMP, Alabama Power could consult with FWS regarding the need for surveys for this species prior to conducting soil disturbing activities near the project shoreline and riverbank, such as timber harvesting, construction of the proposed Highway 48 Day Use Park, and construction of the proposed tailrace fishing pier and canoe/kayak put-in. If Georgia rockcress is observed at the project, Alabama Power could consult with FWS to develop measures to avoid adverse effects to this species during timber management, recreation site (including access roads) construction, and other soil disturbing activities on Harris Lake shorelines and along the Tallapoosa River in the tailrace area downstream from Harris Dam. Surveying areas of potentially suitable habitat for Georgia rockcress prior to conducting these activities would help Alabama Power identify any undocumented locations and develop measures to avoid any adverse project-related effects to this species.

In Alabama, the nearest critical habitat is Unit No. 12 on the Coosa River in Fort Toulouse State Park. This area is over 60 miles southwest of the Harris Lake project boundary. Due to the distance and hydrologic setting, this population of Georgia rockcress is not directly affected by water fluctuations in the Tallapoosa River downstream from Harris Dam.

We conclude that relicensing the project, with Alabama Power's proposed WMP, and the staff recommended measures described above, is "not likely to adversely affect" the Georgia rockcress and would have "no effect" on Georgia rockcress critical habitat.

White Fringeless Orchid

The white fringeless orchid range overlaps with project land at both Harris Lake and Skyline WMA (figures 26 and 27) (FWS, 2022f). White fringeless orchid could be affected by timber harvesting and other activities that facilitate the spread or promote the growth of non-native, invasive plants.

Our Analysis

Small populations of white fringeless orchid exist near Harris Lake, including at Ivory Mountain in the Talladega National Forest (6 miles northwest of the Harris Lake project boundary), and near Good Hope Delta Road (8 miles west of the project boundary) (FWS, 2022f). In addition, 343 white fringeless orchids were observed in February 2022 at the Mountain Longleaf National Wildlife Refuge, located 18 miles northwest of the project boundary at Harris Lake (FWS 2022g). A flowering population of 100 to 500 white fringeless orchids was observed at Skyline WMA in 2020 (FWS, 2021e). As of August 2022, there were 3 documented populations of white fringeless orchids near Skyline WMA in a 21-square-mile area along Alabama Highway 79 north of Alabama Highway 146 (NatureServe, 2024c). Just north of the state line in Winchester, Tennessee, in August 2023 a population of white fringeless orchids was documented in a 49-square-mile area bounded on the southwest by Tennessee Highway 16 and on the north by U.S. Highway 64 (NatureServe, 2024c).

In September 2020, surveyors from Kleinschmidt Associates and Alabama Power visited 12 sites around Harris Lake and 9 sites in or adjacent to Skyline WMA to determine if there were any extant populations of white fringeless orchids in or near the Harris Project boundary. No white fringeless orchid specimens were found at any of the 21 sites surveyed. Of the nine sites at Skyline WMA, only Sites 7 and 8 are near the populations documented in August 2022 (NatureServe, 2024c). The project transmission line was not surveyed for white fringeless orchids.

Timber harvesting and other vegetation management practices can both benefit and threaten the current and future viability of the white fringeless orchid. In some instances, the species responds positively to timber harvests, (possibly due to the increase in light), only to decline five to ten years after the harvest due to accelerated growth of the understory (FWS, 2021e). White fringeless orchids can also benefit from other vegetation management practices that periodically reduce shading, such as prescribed burns, mowing, and herbicide applications, if they are targeted to control non-native, invasive plants, and prevent advanced succession of woody vegetation, and do not affect white fringeless orchid's mycorrhizal fungi symbionts (FWS, 2021e).

Populations of white fringeless orchid can expand or decline rapidly, but FWS does not fully understand what drives these dynamics and does not have reliable estimates of population growth rates to use to estimate population sizes into the future (FWS, 2021e). There are no data regarding seed dispersal distances for white fringeless orchid, but seed dispersal distances for orchids with similar seed size have been up to hundreds of kilometers. Successful dispersal and establishment of white fringeless orchid could be limited due to its unique habitat needs and poor (1%) survival rate of seeds. The species likely relies on a single fungal species, *Epulorhiza inquilina*, to complete its life cycle. Also, it is not known whether white fringeless orchids form seed banks or how long seeds can remain viable (FWS, 2021e). Given the uncertainties regarding certain aspects of this species life history and the difficulty in detecting this species, it is possible that it occurs within the project boundary at Harris Lake or Skyline WMA and was missed during Alabama Power's surveys.

To avoid potential adverse effects associated with future timber harvests and vegetation management, Alabama Power could conduct additional surveys for white fringeless orchid, concurrent with pre-harvest surveys for other federally listed species, such as Price's potato bean (i.e., discussed in the next section). If white fringeless orchids are detected in a forest management unit or the project transmission line corridor, Alabama Power could consult with the FWS to tailor timber harvests and other vegetation management to benefit the species and avoid any adverse effects. White fringeless orchid protection measures might include routing timber harvest equipment around identified plants, removing any non-native invasive plants near identified plants, and consulting with FWS and Alabama DCNR regarding the optimal density of residual trees to benefit this species.

We conclude that that relicensing the project, as proposed by Alabama Power, and with the staff recommended measures described above, is "not likely to adversely affect" the white fringeless orchid.

Price's Potato-bean

Price's potato-bean range overlaps with project land at Skyline WMA (FWS, 2024bb; figure D-30). Project land at Harris Lake is outside this species' range (figure D-30). Price's potato-bean could be affected by timber harvesting, road construction, and recreation activities that disturb the soil, eliminate tree canopy, and/or facilitate the spread of non-native, invasive plants.

In the draft WMP, Alabama Power proposes to conduct additional surveys in the area of the known population of Price's potato-bean prior to any timber management activities to ensure that this population is not impacted if it is still present (Alabama Power, 2021d).

Our Analysis

In Alabama, Price's potato-bean has historically occurred in three areas: (1) in the northeast corner of the state, north of the Tennessee River and northeast of Huntsville; (2) in the central part of the state, along the Alabama River between Montgomery and Selma; and (3) in the Bankhead National Forest. In 2012, five Price's potato-bean vines were reported along Little Coon Creek in Skyline WMA, with no subsequent reports (FWS, 2022d). At Sauta Cave in Jackson County (20 miles southwest of the project boundary at Skyline WMA), 152 vines were reported in 2011 and this population increased to 172 vines by 2017. Just north of Skyline WMA, in Bear Hollow Mountain WMA in Franklin County, Tennessee, over 100 vines were reported in 2012 and a subsequent survey in 2015 reported that this population had increased to 376 vines.

During Alabama Power's white fringeless orchid survey in September 2020, surveyors passively searched for Price's potato-bean as a secondary objective. Surveyors visited two sites near the northwest corner of Skyline WMA to determine if there were any extant populations of Price's potato-bean. Both sites were sloping areas that graded into the bottom of Little Coon Creek. Most of the survey effort was concentrated in relatively open areas where some light filtered through the canopy to the forest floor. Some suitable habitat was available at these sites, but no specimens were found. In addition, surveyors checked the location of the known population Price's potato-bean outside the project boundary, as well as two locations with suitable habitat near the known population, but did not find any specimens. Surveyors speculated that the canopy cover may have been too dense in some of the surveyed locations to support Price's potato-bean. However, surveyors concluded that Price's potato-bean may have been present at the surveyed locations and just not detected, and that this species could be present at other potentially suitable habitats on project land at Skyline WMA that were not surveyed.

The decline of Price's potato-bean is primarily due to timber harvesting, excessive shading by canopy trees, right-of-way maintenance for roads and utilities, and competition with non-native, invasive plants (FWS, 2022d). Unable to tolerate deep shade, their habitat includes open woods and wooded edges in limestone areas, and along roadsides and powerline rights-of-way. Therefore, although timber harvesting at Skyline WMA poses a threat to the Price's potato-bean population, particularly in the vicinity of Little Coon Creek, reduction of the canopy in low-lying areas near limestone cliffs may also create favorable habitat in areas that otherwise would not support the species. The existing and proposed timber management on project land at Skyline WMA, as described in Alabama Power's proposed WMP, would involve continued selective harvesting to facilitate that natural regeneration of oaks and other desirable tree species for wildlife habitat and timber production. Ongoing thinning of the canopy to the proposed densities of 30 to 100 trees per acre would create gaps in the canopy, reducing heavy shade and allowing more sunlight to filter down to the forest floor.

Alabama Power's proposal to conduct additional surveys in the area of the previously documented population of Price's potato-bean prior to any timber management activities would help to verify the locations of extant vines in this population if they have not been extirpated. The draft WMP does not include provisions to survey other potentially suitable habitat for Price's potato bean prior to timber harvests or specific measures to protect Price's potato-bean if vines are found. To ensure that any extant populations of Price's potato-bean on project land at Skyline WMA are not impacted by Alabama Power's forest management practices, potentially suitable habitat at each timber management unit could be surveyed prior to timber harvests. If Price's potato-bean plants are found, Alabama Power could consult with the FWS regarding the appropriate measures to benefit this species while protecting it from the potential adverse effects of timber harvests. Price's potato-bean protection measures might include routing timber harvest equipment around identified plants, removing any non-native invasive plants near identified plants, and consulting with FWS and Alabama DCNR regarding the optimal density of residual trees to benefit this species.

We conclude that relicensing the project, with the forestry management BMPs and Price's potato-bean surveys in Alabama Power's proposed WMP, and the staff recommended measures described above, is "not likely to adversely affect" the Price's potato-bean.

Morefield's Leather Flower

The Morefield's leather flower range overlaps with project land at Skyline WMA (FWS, 2024cc). Project land at Harris Lake is outside this species' range. Morefield's leather flower could be affected by timber harvesting, road maintenance, and other activities that disturb this species' habitat and/or facilitate the spread of non-native, invasive plants.

Our Analysis

Although there are no documented occurrences of Morefield's leather-flower in Skyline WMA, no surveys have been conducted there to date. Morefield's leather-flower was not evaluated during Alabama Power's relicensing studies because it did not appear on the initial, July 27, 2018, IPaC list for the Harris Project. This species was included on the updated September 27, 2021, and January 30, 2023, IPaC species lists for project land at Skyline WMA, but this was after relicensing studies were complete.

Of the 36 known, extant populations of Morefield's leather-flower, there are two in Jackson County, Alabama, one of which is protected (FWS, 2024dd). In neighboring Madison County, Alabama, there are nine extant populations, with four of them protected, including: (1) the largest population of the species in Alabama, located 26 miles southwest of the Skyline project boundary, at Keel Mountain Preserve, a 300-acre area that is protected under The Nature Conservancy's management; and (2) a significant population at Monte Sano State Park, located 28 miles west of Skyline (FWS, 2024dd). The largest concentration of the species (21 extant populations) in Tennessee is located just north of Skyline WMA, in Franklin County. There are also two extant populations each in Grundy County, Tennessee, and Walker County, Georgia. To the extent that these areas are geologically (limestone bedrock), topographically (slope aspect), and hydrologically similar to habitat at Skyline WMA, it is likely that one or more populations of Morefield's leather-flower occur on, and immediately adjacent to, project land at Skyline WMA (figure D-31).

These areas could be affected by ongoing forest management activities. Timber harvesting in on south- or southwest-facing slopes on project land at Skyline WMA could lead to trampling or other damage to undocumented populations of this species. However, Alabama Power's proposed harvesting methods of leaving residual stands of 30 to 100 trees per acre could also create favorable habitat for Morefield's leather-flower by creating gaps the canopy while maintaining sufficient shade for this species. Morefield's leather-flower would also benefit if Alabama Power's forest management efforts included control of non-native invasive plants that may compete with this species for light, water, and nutrients (2024dd).

To ensure Morefield's leather-flower is avoided during, and benefits from, Alabama Power's ongoing forest management on project land at Skyline WMA, potentially suitable habitat would need to be surveyed and any extant populations would need to be documented and avoided during timber harvests. The draft WMP could be modified to include provisions to consult with FWS and Alabama DCNR on species-specific survey protocols. Pre-harvest surveys for Morefield's leather-flower could be targeted to areas with potentially suitable habitat, including any timber management units located on south- or southwest-facing slopes, and could be conducted concurrently with other pre-harvest survey efforts at Skyline WMA, as appropriate. If any previously unknown Morefield's leather-flower individuals or populations are found, Alabama Power could consult with the FWS and Alabama DCNR regarding the appropriate measures to benefit this species while protecting it from potential adverse effects of timber harvests. Morefield leather-flower protection measures might include routing timber harvest equipment around identified plants, removing any non-native invasive plants near identified plants, and consulting with FWS and Alabama DCNR regarding the optimal density of residual trees to benefit this species.

We conclude that relicensing the project, with Alabama Power's proposed WMP, and the staff recommended measures described above, is "not likely to adversely affect" the Morefield's leather-flower.

American Hart's-Tongue Fern

The American hart's-tongue fern range overlaps with project land at Skyline WMA (FWS, 2024ee). Project land at Harris Lake is outside this species' range. American hart's-tongue fern could be affected by timber harvesting and other activities that eliminate the shade that this species requires and/or facilitate the spread or growth of non-native invasive plants.

Our Analysis

Although there are no documented occurrences of American hart's-tongue fern on project land at Skyline WMA, this species was not evaluated during Alabama Power's relicensing studies because it did not appear on the initial July 27, 2018, IPaC list for the Harris Project. American hart's-tongue fern was included on the updated September 27, 2021, and January 30, 2023, IPaC species lists for project land at Skyline WMA, but this was after relicensing studies were complete.

Nearly all of the known American hart's-tongue fern populations and individuals are located in the Upper Peninsula of Michigan, south-central Ontario, and central New York State, with disjunct southern populations in eastern Tennessee and northeastern Alabama (FWS, 2019d). Since American hart's-tongue fern was originally listed, the number of known extant populations increased in published reports from 16 populations in the U.S., consisting of a few thousand individuals, to 144 extant populations, of which 32 are located in the U.S. (i.e., 12 in Michigan, 18 in New York, 1 in Tennessee, and 1 in Alabama), and 112 are located in Canada (FWS, 2020g).

The American hart's-tongue fern has likely never been abundant in Alabama. The historical range of this species includes the northeast corner of Alabama, north of Gadsden and east of Huntsville. American hart's-tongue fern was known to occur in the Fern Cave National Wildlife Refuge, located 21 miles southwest of the project boundary at Skyline WMA; however, this species was later determined to be extirpated from the site. FWS is currently working on reintroducing American hart's-tongue fern at Fern Cave and other potential locations in Alabama and Tennessee (FWS, 2020g). As of 2016, there were 33 American hart's-tongue ferns on 2 private parcels including 30 in Morgan County, Alabama, 46 miles southwest Skyline WMA, and 3 in Marion County, Tennessee, 14 miles northeast of Skyline (FWS, 2019e). There are agreements with the local landowners in Alabama and Tennessee that informally limit some recreation activities and development at the extant populations. Additionally, the American hart's-tongue fern population in Alabama is protected under the Alabama Cave Protection Law of 1988, which prohibits impacts to plants in caves in the state (FWS, 2020g).

Skyline WMA most likely provides some habitat favorable to the species, possibly near cave entrances or other karst features. Although is relatively scarce in the counties adjacent to Skyline and it has such narrow habitat requirements, the prevalence of caves at increases the chances of an extant population on project land at Skyline WMA. As discussed above, there are 236 caves on project land at Skyline WMA, and these or other karst features such as sink holes, may provide suitable habitat for American hart's-tongue fern at the project. If American hart's-tongue fern occurs in karst features at Skyline, any partially subterranean locations could maintain optimal microclimatic conditions that could allow the species persist (FWS, 2020g).

To ensure that any extant populations of American hart's-tongue fern on project land at Skyline WMA are not impacted by Alabama Power's forest management practices, potentially suitable habitat at each timber management unit could be surveyed prior to timber harvests. If American hart's-tongue fern plants are found, Alabama Power could consult with the FWS and Alabama DCNR regarding the appropriate measures to benefit this species while protecting it from the potential adverse effects of timber harvests. American hart's-tongue fern protection measures might include creating no-harvest buffers around identified plants and removing non-native invasive plants if present.

We conclude that relicensing the project, with Alabama Power's proposed WMP, and the staff recommended measures described above, is "not likely to adversely affect" the American hart's-tongue fern.

Little Amphianthus

The little amphianthus range previously overlapped with project land at Harris Lake (figure D-33). However, project land at both Harris Lake and Skyline WMA is currently outside this species' range (FWS, 2024ff). Little amphianthus could be affected by construction, operation, maintenance, and recreation activities that disturb their granite rock outcrop habitat, such as ATV use and camping/campfires.

Alabama Power proposes to protect a 57-acre area with a diverse assemblage of rare plants, some of which occur on rock outcrops, adjacent to Flat Rock Park, by changing its shoreline/land use classification from "Recreational" to "Natural/Undeveloped." Alabama Power also installed a gate and signs to prohibit ATV use in this area in order to protect these plants from trampling/damage.

Our Analysis

Little amphianthus was evaluated during Alabama Power's relicensing studies. This species was included on the initial July 27, 2018, IPaC species list for the Harris Project (Harris Lake area). However, it was not included on the updated September 27, 2021, and January 30, 2023, IPaC species lists for the project. FWS's current range for this species has shifted to smaller areas south of the range shown in figure D-33. One patch of the current little amphianthus range overlaps with the Tallapoosa River downstream from Harris Dam just north of Wadley, Alabama (FWS, 2024ff; NatureServe, 2024d).

Only 3 of the 57 extant populations occur in Alabama, while 51 occur in Georgia, and the remaining 3 occur in South Carolina (FWS, 2019f). At Flat Rock Park, a population of little amphianthus was documented from the 1930s until shortly after the completion of Harris Dam in 1983 (FWS, 2019f). This species has not been observed at Harris Lake since March 1995 and is assumed to be extirpated. Three subsequent surveys conducted in 2018 and 2019 have failed to document the species (Diggs et al., 2020), and the current habitat range identified by FWS no longer intersects the project boundary (FWS, 2024ff).

We conclude that relicensing the project, as proposed by Alabama, and with the staff recommended measures described above, would have "no effect" on the little amphianthus.

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APPENDIX E
ALTERNATIVES AND MEASURES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

Issuing a Nonpower License

A non-power license is a temporary license that the Commission will terminate when it determines that another governmental agency will assume regulatory authority and supervision over the land and facilities covered by the non-power license. At this point, no agency has suggested a willingness or ability to do so. No party has sought a non-power license and we have no basis for concluding that the project should no longer be used to produce power. Thus, we do not consider issuing a non-power license a realistic alternative to relicensing in this circumstance.

Federal Government Takeover of the Project

We do not consider federal takeover to be a reasonable alternative. Federal takeover and operation of the project would require Congressional approval. While that fact alone would not preclude further consideration of this alternative, there is currently no evidence to indicate that federal takeover should be recommended to Congress. No party has suggested federal takeover would be appropriate, and no federal agency has expressed an interest in operating the project.

Decommissioning the Project

As the Commission has previously held, decommissioning is not a reasonable alternative to relicensing a project in most cases, when appropriate protection, mitigation, and enhancement measures are available.[104] The Commission does not speculate about possible decommissioning measures at the time of relicensing, but rather waits until an applicant actually proposes to decommission a project, or there are serious resource concerns that cannot be addressed with appropriate license measures, making decommissioning a reasonable alternative to relicensing.[105] This is consistent with NEPA and the Commission's obligation under section 10(a) of the FPA to issue licenses that balance developmental and environmental interests.

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[104] *See,* e.g., *Eagle Crest Energy Co.*, 153 FERC ¶ 61,058, at P 67 (2015); *Public Utility District No. 1 of Pend Oreille County*, 112 FERC ¶ 61,055, at P 82 (2005); *Midwest Hydro, Inc.*, 111 FERC ¶ 61,327, at PP 35-38 (2005).

[105] *See generally Project Decommissioning at Relicensing; Policy Statement*, FERC Stats. & Regs., Regulations Preambles (1991-1996), ¶ 31,011 (1994); *see also City of Tacoma, Washington*, 110 FERC ¶ 61,140 (2005) (finding that unless and until the Commission has a specific decommissioning proposal, any further environmental analysis of the effects of project decommissioning would be both premature and speculative).

Project decommissioning could be accomplished with or without dam removal.[106] Either alternative would involve denial of the relicense application and surrender or termination of the existing license with appropriate conditions. No participant has recommended decommissioning, and we have no basis for recommending it.

Battery Storage

Alabama Rivers Alliance recommended pairing existing hydropower with battery storage to make the project more flexible to address the negative effects of peaking discharges on resources in, and adjacent to, the Tallapoosa River downstream from Harris Dam (e.g., fluctuations in volume of aquatic habitat and related riverbank erosion). Battery storage systems up to 409 MW[107] have been installed in the United States; however, the technology is still considered relatively new, and installations in conjunction with a hydropower project have been rare and relatively small. No installations, near the size necessary at the Harris Project, have been evaluated for a hydropower project, thus Alabama Power conducted a preliminary study to evaluate the feasibility of battery storage at the project.

Alabama Power evaluated two battery storage scenarios differing in battery charging and discharging rates, each designed to replace one of the two 60 MW turbines at the Harris Project. Alabama Power evaluated a 60-MW battery with 240 MWh of storage, capable of providing the equivalent generation of one 60-MW generating unit at best gate (67.5 MW) for 4 hours per day. For this option, the same daily volume of flow would be released, but the amount of flow that would have been released from one unit over 4 hours would now be dispersed throughout the day. This option could significantly reduce downstream fluctuations in water levels. The National Renewable Energy Lab estimates an installation cost of $96,600,000 for this battery storage unit. Including O&M this option could have a levelized cost of $3.7 million per year. In addition, this option would require replacement or major modification of one turbine. A turbine large enough to charge the battery bank sufficient to provide 4 hours of peak energy may not be feasible when considering availability of sufficient flow to charge the batteries. At minimum, a replacement/modification of the turbine would have a cost exceeding $20,000,000, or about $790,000 per year.

Alabama Power also evaluated a smaller battery storage option, based on a 20-MW battery with 80 MWh of storage, capable of providing the equivalent generation of one-third of one 60-MW unit at best gate (22.5 MW) for 4 hours per day. This 20-MW option would require a new 40-MW variable speed turbine to provide the equivalent of one 60-MW generating unit. For this option, a peak release would still occur, because the 40-MW unit would still operate during peak demand periods. This option would slightly reduce but not eliminate downstream fluctuations in water levels. The National Renewable Energy Lab

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[106] In the event that the Commission denies relicensing, or a licensee decides to surrender an existing project, the Commission must approve a surrender "upon such conditions with respect to the disposition of such works as may be determined by the Commission." 18 C.F.R. § 6.2 (2018). This can include simply shutting down the power operations, removing all or parts of the project (including the dam), or restoring the site to its pre-project condition.

[107] Florida Power and Light Manatee Energy Storage Center, 409-MW battery energy storage system located in Parrish Florida.

estimates an installation cost of $41,000,00 for this battery storage option. Including O&M and an additional turbine, this option could have a levelized cost of $4.5 million per year.

When compared to other alternatives for reducing downstream fluctuations, neither battery storage option would improve water quality (temperature and DO) because nothing about the incoming water or its source would change. Both options would require a large tract of land, 2 acres or more, which would need to be available within the project boundary. Both options would require major modifications to at least one project turbine. Transmission lines would be needed to connect the storage site to the Harris Powerhouse. Both options would require additional costs for replacement batteries, as often as every 20 years, which is not included in the estimated costs. While the cost of replacement batteries in 20 years cannot be determined, replacement costs similar to above could be expected.

Both options have a cost that would be prohibitively expensive relative to the net benefits for the Harris Project (approximately $24,000,000/year). Given the high costs and limited benefits to aquatic habitat, battery storage would not provide benefits that justify the cost; therefore, we do not evaluate this measure in further detail.

Modifying or Replacing Either or Both of the Existing Turbines to Operate over a Wider Range of Flows

Alabama DCNR recommends gradual turbine ramping from off-line to best gate or full gate for the existing units. This was considered as a means for decreasing flow fluctuations downstream. This would require major modifications or replacing the existing turbine(s) which would be prohibitively expensive and much of the same benefit could be provided with increased minimum flow releases.

A New High-Level Intake for the Existing Turbines and/or the Proposed CMF Turbine

Alabama DCNR expresses concern over the low temperature of releases from the lake's hypolimnion, and recommends an assessment of the design, feasibility, and cost to raise or modify turbine unit intakes. Alabama Rivers Alliance expresses concern over the low DO levels of releases from the lake's hypolimnion, and recommends a multi-level intake structure be installed, as well as lake destratification, as potential options for releasing higher-DO water while also providing water temperature control. We considered a high-level intake as a means for releasing water from the epilimnion in order to increase temperature and DO downstream. However, a new high-level intake would be prohibitively expensive, and would not be necessary with localized destratification of the forebay.

APPENDIX F
AFFECTED ENVIRONMENT

AFFECTED ENVIRONMENT

Geology

Harris Lake

Harris Lake and the surrounding lands are located in the Northern Piedmont Uplands District of the Piedmont Upland physiographic section. The Brevard Fault Zone, a narrow zone of intensely sheared rocks, separates the Northern and Southern Piedmont Uplands section. The Northern Piedmont District is characterized by well-dissected uplands developed over metamorphic and igneous rock of Precambrian to Paleozoic age.

Soil types within the project boundary surrounding Harris Lake consist primarily of loam with sand, gravel, clay, slate, and stone. Most of the soil types are moderately well to well-drained, with some types being somewhat poorly to poorly drained, and one type excessively drained. Details of these soil types are provided in Appendix C of the license application.

Alabama Power conducted an erosion and sedimentation study (Alabama Power and Kleinschmidt, 2022b) that included 22 individual erosion sites and 9 individual sedimentation sites on the shoreline of Harris Lake (figures 3.3.1-1, 3.3.1-2, 3.3.1-3, and 3.3.1-4). The sites were all located in Randolph County, in soil types with a substantial loam component. The results of the study are discussed in section 3.3.1.2, *Environmental Effects* of the EIS.

Tallapoosa River Downstream from Harris Dam

The 44-mile-long reach of the Tallapoosa River from Harris Dam to Horseshoe Bend includes the potential zone of downstream effects of the Harris Project to the upstream limit of effects from the Martin Project. This reach of the river is located mostly in the Northern Piedmont District, with the most downstream end of the reach located within the Inner Piedmont subdistrict of the Southern Piedmont District.

Soil types within the study reach, which extend 200 feet inland of the river, consist primarily of loam with sand, gravel, clay, slate, and stone. Most of the soil types are moderately well to well-drained, with some types being somewhat poorly to poorly drained, and one excessively drained. Details of these soil types are provided in Appendix C of the license application.

The reach includes lands in Randolph (35%), Chambers (26%), and Tallapoosa (39%) Counties, Alabama (from upstream to downstream). Soils in Randolph County, which include those closest to Harris Dam, include Madison soils, which are well-drained loam with some units classified as severely eroded gravelly clay loam and moderately eroded gravelly fine sandy loam. Soils in Chambers County, in the mid-section of the reach, include Cecil soils, which are well-drained loam characterized as: (1) eroded, severely eroded, or very severely eroded sloping gravelly clay loam; (2) moderately steep gravelly sandy loam; or (3) moderately eroded sandy loam. Also present are Madison soils (well-drained loam) characterized severely eroded gravelly clay loam, especially on steep banks, gravelly fine sandy loam, and eroded strongly sloping graphitic soils. Soils in Tallapoosa County, farthest from Harris Dam, include Pacolet-Rion complex soils that are stony, moderately eroded loam/clay.

Alabama Power surveyed the condition of the entire length of the 44-mile study reach (on both sides of the river) by video. The study characterized the condition of segments of the riverbanks as fully functional, functional, slightly impaired, impaired, or non-functional. The study did not identify any sedimentation areas downstream from Harris Dam. However, subsequent agency and stakeholder consultation identified sedimentation at the confluences of Cornhouse Creek and No Business Creek with the Tallapoosa River. Sandbar or delta sediment accumulation is a common natural process found at stream confluences, and because these creeks are free flowing, they likely carry a considerably higher sediment load than the impounded Tallapoosa River.

Among the 15 slightly impaired or impaired streambank sections identified during the study, the most impaired sections are located between 16 and 17 miles downstream from Harris Dam. Two specific erosion sites (Sites E22 and 23), located approximately 8-9 miles downstream from Harris Dam within Randolph County (figure 3.3.1-5), were also identified by stakeholders for further investigation as part of the study mentioned above for Harris Lake (Alabama Power and Kleinschmidt, 2022b). The soils at both sites are Ochlockonee fine sandy loam. Another stakeholder[108] suggested an additional 17 sites for further investigation (sites B1–B17, figures 3.3.1-8 and 3.3.1-9): 15 sites over a range of approximately 5 to 11 miles downstream from Harris Dam (sites B1–B15, figure 3.3.1-8) and another 2 sites approximately 16 miles downstream from the dam (sites B16–B17, figure 3.3.1-9).

Skyline WMA

The Skyline WMA currently includes approximately 60,000 acres of land. Approximately 15,000 acres of Harris Project lands were acquired and incorporated into the project boundary as part of the FERC-approved 1988 Harris Project Wildlife Mitigation Plan as mitigation for the original construction of the project. 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 WMP. The Skyline WMP also incorporates Alabama Forestry Commission's best management practices (BMPs) to benefit soil resources and limit erosion.

The project lands associated with the Skyline WMA are located in the Jackson County Mountains District within the Cumberland Plateau physiographic region (also referred to as the Appalachian Plateau). This physiographic region is characterized by a highly irregular surface consisting of isolated flat-topped remnants of former plateau cut by steep-sided valleys (Neilson, 2013). The region is a dissected plateau characterized by mesa-like sandstone remnants above limestone lowlands.

Soil types on project lands at Skyline WMA include mostly (greater than 70%) limestone rockland and stony soils. Most of the soils are well-drained, with areas of moderately or poorly drained soils. Details of these soil types are provided in Appendix C of the license application.

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[108] *See* Accession No. 20200612-5020.

Water and Aquatic Resources

Water Quantity

Harris Lake and Tallapoosa River Downstream from Harris Dam

The project impounds the Tallapoosa River to form Harris Lake. Harris Lake has a surface area of 9,870 acres, a gross storage volume of 425,721 acre-feet, and usable storage capacity of 207,317 acre-feet at the normal full pool level of 793 feet. At the top of the summer power pool, the lake extends up the Tallapoosa River and Little Tallapoosa River approximately 29 miles and has about 367 miles of shoreline. Harris Lake has a maximum depth of 121 feet, a mean depth of 110 feet, and average flushing rate (i.e., residence time) of 109 days.

The Tallapoosa River basin drains approximately 4,687 square miles, including 1,454 square miles upstream of Harris Lake (figure 3.3.2-1). Precipitation in the Tallapoosa River Basin typically ranges from 46 to 64 inches annually. March is generally the wettest month, and October is usually the driest. About half of the water that falls as precipitation is returned to the atmosphere as evapotranspiration (CH2MHILL, 2005). Approximately 80% of the flood-producing storms occur in the winter and spring months, of which approximately 27% occur in March. The principal tributaries to Harris Lake are the Tallapoosa and Little Tallapoosa Rivers, which make up 96% of the drainage area (USGS, 2022), with smaller contributions from tributaries to the southeast and southwest.

On the north side of the lake, the Tallapoosa River drains a 795-square-mile area that extends northeast through Cleburne County into Haralson County, Georgia. Approximately 45.5 miles upstream of the dam, USGS Gage 02412000 Tallapoosa River near Heflin, Alabama (i.e., Heflin gage) has a drainage area of 448 square miles and a record of daily discharges from July 1952 to the present. For the Tallapoosa River at this gage, the 100-year discharge estimate is 33,100 cfs (73.9 cfs/mi^2), with a 500-year estimate of 49,000 cfs. Near the point where the river enters the lake, USGS Gage 02412500 Tallapoosa River near Ofelia, Alabama, has a drainage area of 792 square miles, a record of daily discharges from January 1939 through December 1951, and of annual peak discharges from 1939 through 1970. According to USGS, the 100-year discharge for the Tallapoosa River at this gage is 45,800 cfs (57.8 cfs/mi^2), with a 500-year discharge of 58,500 cfs.

On the northeast side of the lake, the Little Tallapoosa River drains a 600-square-mile area that extends northeast into Carroll County, Georgia. Just upstream of the lake, USGS Gage 02413500 Little Tallapoosa River near Wedowee, Alabama, has a drainage area of 591 square miles, and a record of daily discharges from October 1939 through December 1951. For the Little Tallapoosa River at this gage, the 100-year discharge estimate is 39,500 cfs (66.8 cfs/mi^2), with a 500-year discharge of 49,400 cfs. Approximately 28.5 miles upstream of the Wedowee gage, USGS Gage 02413300 Little Tallapoosa River near Newell, Alabama (i.e., Newell gage) has a drainage area of 406 square miles, and a record of daily discharges from October 1975 to the present. For the Little Tallapoosa River at this gage, the 100-year discharge estimate is 24,900 cfs (61.3 cfs/mi^2), with a 500-year discharge of 33,200 cfs. These gage locations are shown in figures 3.3.2-1 and 3.3.2-2.

There are numerous subbasins draining to the Tallapoosa and Little Tallapoosa Rivers. These subbasins vary in size from 1.1 square miles for the Knight Branch to more than 72 square miles for Indian Creek. Using the USGS StreamStats application, the 100-year discharge was estimated for each subbasin at its confluence with the Tallapoosa or Little Tallapoosa River. These subbasins are shown in figures 3.3.2-3 and 3.3.2-4, respectively.

Reservoir Operations

Harris Lake is a multi-purpose storage impoundment with water levels that fluctuate seasonally as described in section **Error! Reference source not found.** *Existing Project Operation*. The existing license requires Alabama Power to operate the project for flood control, navigation, and drought conditions in accordance with the Corps' Master Water Control Manual (Water Control Manual). Appendix I of the Water Control Manual (issued May 2015 and revised April 2022) describes the flood management regulations and includes navigation support plans and drought contingency operations for the project (Corps, 2022). Under normal inflow conditions, Alabama Power operates the project during daily peak-load periods to maintain reservoir levels according to the operating curve (figure 3.3.2-5). For flood management, Harris Lake has a mandatory drawdown of 8 feet (793 feet to 785 feet) in the winter and spring months (December to April). Figure 3.3.2-6 presents actual Harris Lake surface elevations from 2017 to 2021, compared to Alabama Power's operating curve.

Harris Lake Inflow and Outflow Hydrology

USGS maintains streamflow gages capturing outflow, as well as inflow data for the project (figure 3.3.2-2). Table 3.3.2-1 provides monthly inflow and outflow statistics for each USGS gage. Releases from Harris Lake flow into the Tallapoosa River about 78 miles upstream of Martin Dam (FERC Project No. P-349). Monthly median inflows to Harris Lake via the USGS Heflin and Newell gages, and monthly median outflows via the USGS Wadley gage are compared in figure 3.3.2-7. Water surface elevations in the Tallapoosa River fluctuate daily due to existing project operations. Table 3.3.2-2 provides daily mean water surface elevation fluctuations downstream from Harris Dam.

To address stakeholder concerns related to the project's historical peaking operation and support downstream aquatic resources, Alabama Power, in coordination with the resource agencies and other stakeholders, established a flow release plan (Green Plan) that outlines specific daily and hourly release schedules from Harris Dam (Alabama Power and Kleinschmidt, 2022a, and c). Alabama Power's operation of the project under the Green Plan (since 2005) specifies short (10 to 30 minute long) pulses from Harris Dam, with the pulse duration determined by the previous day's flow at a streamflow gage (USGS gage No. 02412000 near Heflin) on an unregulated section of the Tallapoosa River upstream of Harris Lake. Green Plan calculations do not reflect inflow from the Newell gage. Alabama Power suspends Green Plan releases during flood operations and specific drought conditions.

Article 13 of the existing project license also requires Alabama Power to release water from Harris Dam in such a way to maintain a minimum flow of 45 cfs as measured at the downstream USGS gage near Wadley (USGS gage No. 02414500). This is not a continuous 45-cfs minimum release from the Harris Dam, but instead is a flow measured at the downstream gage that is met through a combination of project generation releases, Green Plan pulses, and other downstream intervening flows.

Water Quality

As discussed in section 3.1 of the EIS, the current project boundary includes two geographic areas: the Skyline WMA and Harris Lake. The geographic scope for water quality analyses, including the effects of the project waters within and outside the project boundary, includes the Tallapoosa River Basin from its headwaters in Georgia, downstream through Harris Lake, and ending after Horseshoe Bend National Military Park.

Background

Water Quality Standards, Impairments and Advisories

The Tallapoosa River Basin Management Plan states that the Tallapoosa River Basin has some of the best water quality in Alabama and the river's impoundments provide quality drinking water and bring millions of tourist dollars to the state.[109] However, the Tallapoosa River Basin Management Plan also notes impaired streams in need of restoration. The plan indicates that the primary causes of degradation in most of the waterbodies in the Tallapoosa River Basin are pathogens, contamination, nutrient enrichment, siltation, and illegal dumping (CH2MHILL, 2005).

The Clean Water Act (CWA) establishes regulations for maintaining water quality in waterbodies of the United States, including those within the Tallapoosa River Basin, by setting and applying water quality standards, which consist of designated uses, water quality criteria, antidegradation requirements, and general policies affecting the application and implementation of the water quality standards (EPA, 2014). Individual states develop water quality standards and submit them to EPA for approval; once approved by EPA, the standards are applicable to federal actions, including issuing FERC hydropower licenses. The CWA requires that each state report the health of its waters every 2 years in a section 305(b) report with a section 303(d) list of pollutant-impaired waters, and develop a total maximum daily load (TMDL) for any 303(d) listed impairments.[110]

The Alabama water quality standards specify water quality criteria to support use classifications designated for waterbodies within the state. A list of selected Alabama water quality criteria applicable to Harris Lake is provided in table 3.3.2-3. Use classifications designated for waterbody segments within the geographic scope of this environmental analysis include fish and wildlife, swimming and other whole-body water contact sports (i.e., "water sports"), public water supply, and outstanding Alabama water. The fish and wildlife use applies to the entire geographic scope of this environmental analysis, within Alabama (specifically, the Tallapoosa River, Little Tallapoosa River, Wedowee Creek and Ketchepedrakee Creek). The Little Tallapoosa River is also designated for water sports and fish and wildlife use from the Alabama-Georgia border to its confluence with Harris Lake. Harris Lake is designated for public water supply,[111] water sports, and fish and wildlife use. Table 3.3.2-4 summarizes the use

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[109] *See Recreation Resources*, below, for more information regarding tourism.

[110] TMDLs must allocate the total pollutant load among contributing point sources (i.e., waste load allocations) and nonpoint sources (i.e., load allocations).

[111] The portion of the reservoir within the Little Tallapoosa River, from Wolf creek to US Highway 431, specifically.

classification,[112] use classification status, known impairments, and current 303(d) list status for each waterbody segment within the Alabama portion of the geographic scope for the Tallapoosa River Basin.

The waters within the geographic scope of water quality analyses vary in terms of use classifications being met. The most recent EPA-approved section 303(d) list of impaired waters in need of a TMDL under the CWA (i.e., category 5 listings under the 305(b) report) for Alabama (Alabama DEM, 2022a) includes: (1) a 31-mile segment of the Tallapoosa River, from the Alabama-Georgia state line to Cane Creek, approximately 16 river miles upstream of Harris Lake for *Escherichia coli* (*E. coli*);[113] and (2) Harris Lake from the Little Tallapoosa River confluence to Harris Dam for mercury.[114] In addition, an approximately 14-mile-long segment of the Tallapoosa River that extends from Harris Dam to Alabama Highway 77 is impaired, but no TMDL is required for fish and wildlife use because of abnormal flows, including changes in depth and flow velocity.[115] The remaining portion of the Tallapoosa River from Alabama Highway 77 through Horseshoe Bend National Military Park to Irwin Shoals (slightly beyond the scope of this draft EIS) is supportive of fish and wildlife use, with no impairments (*see* table 3.3.2-4).

The Alabama Department of Public Health (Alabama DPH) issued a fish consumption advisory for Harris Lake, which includes spotted bass, blue catfish, and channel catfish based on high mercury accumulation in fish tissue (Alabama DPH *et al.*, 2022). No other fish consumption advisory is in effect near the Harris Project in Alabama.

Impaired Waters - Skyline WMA

The land owned by the licensee within Skyline WMA is within the Coon Creek and Crow Creek watersheds, both within the Tennessee River Basin and tributaries of Guntersville Lake. The water quality standards assign use classifications for Coon Creek from Guntersville Lake upstream to its source as swimming, and fish and wildlife (Alabama DEM, 2017). Little Coon Creek is currently on Alabama's 303(d) impaired-waters list because of siltation, for which the sources are primarily non-irrigated crop production and pasture grazing (Alabama DEM, 2020). Crow Creek is also included in the section 303(d) list for organic enrichment, per biological

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[112] According to Alabama DEM Administrative Code Ch. 335-6-11, with the exception of segments in the "Public Water Supply" classification, every segment, in addition to being considered acceptable for its designated use, is also considered acceptable for any other use with a less stringent associated criteria.

[113] *E. coli* are bacteria used to identify potential risks to human health. Alabama DEM identifies the sources for these high *E. coli* concentrations as pasture grazing and sources outside Alabama.

[114] Alabama DEM states that the source of the high mercury concentrations is atmospheric deposition.

[115] Alabama DEM considers this portion of the Tallapoosa River not to be impaired by a "pollutant," with pollution defined as "the man-made or man-induced alteration of the chemical, physical, or radiological integrity of a waterbody" (Alabama DEM, 2022a).

oxygen demand, from an unknown source. None of the identified sources is related to Alabama Power's management of its lands, including forests, within the Skyline WMA.

Crow Creek from Guntersville Lake to the Alabama-Tennessee state line has a designated use classification of fish and wildlife. There are no waterbodies within the Crow Creek basin on Alabama's 303(d) list (Alabama DEM, 2020).

Water Temperature and Dissolved Oxygen

Alabama Power collected water temperature and dissolved oxygen (DO) concentration data in the Harris forebay near the dam, about 800-feet downstream from Harris Dam at the "generation" site, [116] and about 0.5 mile downstream from Harris Dam at the "downstream continuous" site as part of a relicensing study. Alabama Power collected vertical profile data in the Harris Dam forebay for temperature and DO once or twice a month, between March and October of 2017 through 2021.[117] The generation monitor collected data at 15-minute intervals when the powerhouse was generating electricity between June 1 and October 31 in 2017 to 2020 and from June 1 to June 30 in 2021. The downstream continuous monitor collected data at 15-minute intervals for various months in 2019 to 2021. Data were collected during various flows and weather conditions; therefore, we consider them to be representative of project conditions.

Water temperature and DO are influenced by a variety of factors, including, but not limited to, season, time of day, weather, depth of the water column, and turbulence. DO is also influenced by photosynthesis and respiration of algae and aquatic plants and decomposition of organic material. The depth at which water is drafted from the forebay influences the thermal regime and quality of water both within the impoundment and discharged to the river downstream. Together, water quality data for forebay vertical profiles and downstream can be used to analyze project effects.

Water Temperature. The temperature of water varies as it flows down the Tallapoosa River and Little Tallapoosa River, is impounded in Harris Lake, is released from the Harris Project, and continues down the Tallapoosa River (figure 3.3.2-8). Harris Lake and forebay undergo seasonal thermal stratification, which is common for large impoundments, as a result of water warming and becoming less dense near the surface in the spring and summer, which causes a distinct 'separation' of water based on density. Based on vertical profiles of temperature, Harris Lake and the forebay exhibit seasonal thermal stratification (spring to fall) with three thermal layers as follows: (1) the well-mixed, warm, upper layer referred to as the epilimnion; (2) the middle layer, with a steep thermal gradient referred to as the metalimnion; and (3) the coolest layer with little to no thermal gradient which is referred to as the hypolimnion (figures 3.3.2-9 through 3.3.2-12).

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[116] Alabama Power states, "When the measurements of dissolved oxygen at the [generation monitor site] approach 5.5 milligrams per liter (mg/L) (typically in June of each year), plant operators open the valves to the intake pipes to provide aeration to turbine discharges and leave them open until dissolved oxygen readings consistently are above 6.0 mg/L (typically in September of each year)" (Exhibit B of the license application).

[117] Unless otherwise noted, *see* figures 3.3.2-9 to 3.3.2-12.

The lake's epilimnion begins to form in May or June when surface water temperatures are typically about 20 to 28°C (68 to 82.4°F). The epilimnion becomes well established by the time the surface water reaches an average temperature of about 25.3°C (77.5°F) in the summer. The depth of the epilimnion increases as the warm season progresses until fall when the epilimnion becomes deepest and the surface waters begin to cool. The water column mixes at greater depths while the surface continues to cool until fall turnover when the density of water is nearly the same throughout the water column and mixing of the layers occurs.[118]

The Harris powerhouse intake extends 29 feet, 8.8 meters, from the top of the skimmer weir at an elevation of 764 feet to the water surface, at an elevation of 793 feet normal full pool. Table 3.3.2-5 summarizes temperatures measured in the forebay's water column within the intake's depth. However, comparison of temperatures at the generation site to forebay vertical profiles indicates that the powerhouse likely drafts most of its water from relatively near the depth of the skimmer weir and little, if any, water from the epilimnion (figure 3.3.2-13). Water temperature data collected in 15-minute intervals indicate that the generation and downstream sites are typically warmest in August. The highest temperature overall was 35.6°C (96.1°F)[119] at the downstream site (table 3.3.2-6). The project's generation cycle disrupts the natural diel (i.e., 24-hour) cycle of warming and cooling in the river downstream from the Harris powerhouse and, based on Ferencz et al. (2021), likely influence temperature gains and losses, with shallow groundwater flows in the stream bed referred to as hyporheic flows. During non-generation periods, temperatures recorded at the downstream site tend to approach the natural diel cycle (figures 3.3.2-14 and 3.3.2-15).[120] The largest effects from project operation occur upon generation start-up and generation shutdown in the late morning to early afternoon when the volume of cool water discharge from the powerhouse changes substantially (i.e., increasing upon start-up and decreasing upon shutdown). A much smaller effect occurs at generation start-up and generation shutdown in the evening and early morning when air temperatures are much cooler. At the downstream site, generation tends to result in a rapid decrease in water temperature by as much as about 11°C (21.2°F) in May and about 8°C (14.4°F) in June–October followed by relatively steady temperatures until generation is terminated.

Figure 3.3.2-8 displays the general trends in the temperature of water as it flows from upstream of the project down to Wadley. The project tends to reduce the seasonal variability in temperatures as can be seen by the project tailrace being cooler than upstream in May through mid-September and warmer than upstream in October through December.[121] As water flows

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[118] The month water temperature reach equilibrium is likely to be between November and March based on data available.

[119] There were a total of 31 occurrences above the 32.2°C (90°F) criterion, 23 15-minute periods (i.e., 5.75 hours) of which happened on August 14, 2019, while the Harris Project was not generating.

[120] Although temperature data were not collected at the generation site during non-generation periods, we believe that temperatures at this site tend to approach the natural cycle, but to a lesser degree than at the generation site which is farther downstream.

[121] These trends are evident through comparison of the Harris Tailrace to the Tallapoosa River at Heflin and Little Tallapoosa River at Newell in figure 3.3.2-8.

downstream from the project's tailrace, it warms in May–September, but changes little between the tailrace and Wadley in October–April. Figure 3.3.2-16, which displays water temperatures at 16 sites as a function of distance downstream from Harris Dam, also supports this conclusion regarding the general seasonal trends in the main flow of the river. However, studies of various river systems have shown that local conditions (e.g., inflows from tributaries and springs, hyporheic flows, braided channels, deep pools, slow shallow water, and shade) result in stream temperatures varying laterally across the channel (Buxton et al., 2022; Ferencz, et al, 2021; Mejia et al., 2020; Steel et al., 2017; Sullivan et al., 2021).

Dissolved Oxygen. DO concentrations in Harris Lake, and many deep temperate impoundments (Thornton *et al*., 1990), are highly influenced by seasonal warming and reduced mixing caused by thermal stratification in summer and early fall. This results in relatively high DO concentrations in the epilimnion and low DO concentrations in the metalimnion and hypolimnion between spring and fall. Harris Lake's near-surface DO concentrations generally remain above 8 mg/L in March-August but decrease slightly in September and October. In contrast, DO concentrations in the hypolimnion and metalimnion are frequently less than 5 mg/L and reach anoxic levels (i.e., less than 0.5 mg/L) especially in the deepest water during the months of May through October (figures 3.3.2-9 to 3.3.2-12). However, DO in the forebay remains well above the 5 mg/L criterion applicable to a depth of 5 feet.

Historically, Harris Lake's summer pool elevation has rarely been met and trends about 0.5 foot to 4 feet lower than the operating curve (Alabama Power and Kleinschmidt, 2020a [figures 5-1 to 5-3]). Despite this, the lake surface elevations generally remained close to the operating curve (within about 1 foot) between 2017 and 2021 (figure 3.3.2-6), apart from July–October 2019 when elevations were just over 2 feet less than operating curve guidelines. Table 3.3.2-5 summarizes DO concentrations measured in the forebay's water column within the powerhouse intake's depth. Although, temperature data indicate that the powerhouse likely drafts most of its water from relatively near the depth of the skimmer weir, DO of less than 5 mg/L at this elevation is slightly increased by the existing aeration system (figure 3.3.2-17).

Alabama Power's water quality study data indicate that both water temperature and DO decrease immediately upon generation start-up downstream from the dam, then stabilize and maintain a steady state within 15 to 45 minutes in warmer times of the year. The largest disruption of the natural diel cycle for DO coincides with the start-up and shutdown of generation in the late morning to early afternoon when the rate of photosynthesis is highest (figures 3.3.2-14 and 3.3.2-15). The effect of generation on DO is smaller between late afternoon and early morning (figure 3.3.2-14). Generation start-up tends to result in a temporary, rapid decrease of at least 2 mg/L in DO downstream from the dam from May through October. DO levels then remain relatively steady until generation stops.[122]

Table 3.3.2-7 shows DO lower than the 5-mg/L criterion in June–October at both the generation and continuous stations. The frequency and overall duration of events with a DO of less than 5 mg/L varies substantially between years at both sites. At the generation station, less than 0.2 mile downstream from the dam, the overall duration of DO lower than 5 mg/L in a year

[122] Immediately following generation start-up, DO decreases rapidly by about 2 to 5 mg/L in May, about 3 to 4 mg/L in June-September, and about 2 to 3 mg/L in October.

was as high as 450 hours in 2017. Alabama Power states that these low DO events were likely caused by the combination of: (1) low inflows caused by a severe drought in the summer–fall of 2016; (2) the lake being filled 2 feet above the normal rule curve earlier in the year; and (3) high inflows in the summer of 2017 associated with higher than average precipitation (Kleinschmidt, 2021a). Our evaluation of the vertical profiles for the forebay show lower DO concentrations earlier than usual in 2017 within the intake layer of water (i.e., surface to a depth of about 30 feet or 9.1 meters) compared with the other years monitored, especially for the months of April, May, and June. Moreover, Alabama DCNR similarly concludes that higher spring and summer rainfall increases discharge, leading to poorer water quality below the thermocline in Harris Lake, similarly to what has been observed in Martin Lake (Kleinschmidt, 2021a).[123]

During 2019–2021 when both stations were monitored in the same months, but the generation station was not monitored during non-generation periods, the downstream station's more frequent and longer duration events with DO less than 5 mg/L indicates that low DO also occurs during non-generation periods.

Recreation Monitoring: Chlorophyll-a and *E. coli*

Alabama Water Watch (AWW) and Alabama DEM have monitored chlorophyll-a and *E. coli* at several locations upstream of, and downstream from the Harris Project. Most locations have been monitored for almost 10 years.

Average chlorophyll-a concentrations met the 12-µg/L maximum criterion upstream of the Tallapoosa River and Little Tallapoosa River confluence and met the 10-µg/L maximum criterion in the Harris forebay (table 3.3.2-8).[124] A total of 59 samples collected downstream from Harris Dam, at a Harris tailrace station, and a Wadley station, were also below the chlorophyll-a criterion[125] (National Water Quality Monitoring Council, 2022).

E. coli concentrations were generally well within the 235 most probable number (MPN)/100mL criterion, but occasionally (9 out of 130 samples, 7%) exceeded 235 MPN/100mL (table 3.3.2-9).[126] The five *E. coli* measurements taken near Foster's Bridge in the Tallapoosa River upstream of Harris Dam, between October 2021 and September 2022 had concentrations of 0 to 767 MPN/100 mL, with one sample exceeding the 235 MPN/100 mL criterion (AWW, 2022; Kleinschmidt, 2021a).

[123] *See* Alabama DCNR Final Study Report comments (Appendix C) for more information.

[124] *See* table 3.3.2-3 for applicable water quality criteria.

[125] There were 20 samples at the Harris Tailrace station (i.e., MARE-12) between June 2015 and July 2020 and 39 samples at Wadley (i.e., TA-1) between April 2010 and February 2019 equaling less than 10 µg/L.

[126] Table 3.3.2-8 does not include *E. coli* data for all locations monitored by AWW within Harris Lake.

Other Water Quality Parameters

Primary productivity, represented by Carlson's trophic state index (TSI)[127] (Carlson, 1977), varies substantially in Harris Lake depending on the month, year, and the location within the lake. Harris Lake is generally mesotrophic (i.e., has moderate plant life productivity) to eutrophic (i.e., high plant life productivity) during the growing season,[128] but has been found to be less productive at other times throughout the year (Alabama DEM, 2011, 2013a, 2022b). Tributary inflows to Harris Lake, as measured at the Wedowee Creek, Little Tallapoosa River, and Mad Indian Creek stations, indicate similar trends in productivity (Alabama DEM, 2022b [figures 16 and 17] for years 2015 and 2018). Table 3.3.2-10 provides a summary of nutrient-related parameter results for samples collected at the Harris tailrace in 2018 and 2020.

There are no sanitary sewer overflows into, or upstream of, Harris Lake (Alabama DEM, n.d.a). Wedowee Lagoon is the only facility reported by Alabama DEM (n.d.b) to discharge surface water (in this case, treated domestic wastewater released into Wedowee Creek) upstream of the Harris Project (NPDES[129] No. AL0024171). Top pollutants by pounds per year (lb./yr) released from Wedowee Lagoon for 2022 include total suspended solids at 18,369 lb./yr, biological oxygen demand (BOD) at 7,082 lb./yr, total Kjeldahl nitrogen (which includes organic nitrogen, ammonia, and ammonium) at 4,716 lb./yr, and ammonia at 4,669 lb./yr (EPA, 2022a,b).[130]

Harris Action Team (HAT) 2[131] participants expressed specific concern about water quality, namely due to potentially high nutrient concentrations in the Tallapoosa River at Foster's Bridge (Randolph County Highway 82 bridge[132]) during the 2017 Issue Identification Workshop. Table 3.3.2-8 summarizes 2018 and 2020 data for Foster's Bridge (RLHR-3), as well as other

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[127] TSIs are based on chlorophyll-a concentrations in this case, as chlorophyll a can represent productivity. This is because the presence of algae is indicated by the concentration of chlorophyll a present in a waterbody. Algae tend to grow more when their environment is more productive.

[128] In this case, the growing season is considered to be April to October. Alabama DEM currently considers Harris Lake to be mesotrophic based on chlorophyll-a samples collected from 1997 to 2020 (Alabama DEM, 2022a).

[129] National Pollutant Discharge Elimination System.

[130] The Town of Wedowee has proposed a project to improve Wedowee Lagoon (Alabama DEM, 2020) and Alabama DEM determined that the project qualified for a Categorical Exclusion from further environmental study under the guidelines specified by the State Environmental Review Process. However, this decision may be reconsidered if significant adverse information concerning the potential environmental effects of the project is discovered. Wedowee Lagoon incurred significant compliance violations 10 of 12 quarters between October, 2019 and September, 2022 (EPA, 2022b).

[131] HAT 2 is a team of resource-specific participants that provided technical expertise related to water quality and water use for relicensing the Harris Project.

[132] Foster's Bridge is about 11 miles upstream of the Tallapoosa and Little Tallapoosa River confluence.

locations within Harris Lake. DO was found to be below the 5-mg/L criterion in 21% of 160 surface grab samples collected in 2018 and 2020 at Foster's Bridge (National Water Quality Monitoring Council, 2022). Based on measurements made in 2000, the primary productivity in Harris Lake ranged from moderate to excessive (referred as mesotrophic to hypereutrophic), depending on location (Alabama DEM, 2003). The lake's upper end was eutrophic to hypereutrophic, the Little Tallapoosa arm was eutrophic, and the middle to lower end were generally mesotrophic.

Fish and Aquatic Resources

Harris Lake

Fish Community

Harris Lake supports sport fisheries for black bass (i.e., largemouth bass and Alabama bass), black crappie, channel catfish, white bass, and sunfish species (e.g., bluegill). Anglers frequently target largemouth bass, with several bass fishing tournaments occurring on Harris Lake annually. The percentage of largemouth bass in Harris Lake that are greater than 20 inches (12%) exceeds the state average (7%) for Alabama impoundments.[133] 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 (Alabama DCNR, 2015). Annual largemouth bass mortality is relatively low and Alabama bass mortality appears to be high in Harris Lake, when compared to other impoundments in the state, as indicated by age distributions of sampled fish (Alabama DCNR, 2015). Relative weight of black bass in the lake is low (Alabama DCNR, 2016).

In 2015, black crappie 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 Harris Lake and exhibited much better growth and size structure than crappie in the Tallapoosa River near Foster's Bridge. Hartline et al. (2018) attributed this to more abundant habitat and forage availability in the lake.

Alabama DCNR historically stocked sport fish in Harris Lake. During 1983 and 1984, Alabama DCNR stocked white bass x striped bass hybrids, largemouth bass, channel catfish and bluegill in Harris Lake (Alabama DCNR, 1983; 1984). While the lake provides a fishery for black bass, crappie, catfish, white bass, and sunfish, striped bass and hybrids are not commonly observed in the lake. There are fish consumption advisories for blue catfish and channel catfish (2 meals per month) and Alabama bass (1 meal per month) associated with mercury contamination in the lake (Alabama DPH, 2020; 2024).

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[133] In 1993, Alabama DCNR implemented a 13- to 16-inch slot limit for black bass species on Harris Lake (meaning that all fish 13 to 16 inches must be released) (Andress and Catchings 2005). This slot limit was removed for Alabama bass in 2006 (Andress and Catchings, 2007). As of 2018, maintaining the slot limit on largemouth bass and removing the slot limit on Alabama bass has had a positive effect on black bass populations in Harris Lake (Holley et al., 2012), as indicated by a greater relative density of slot-sized or larger bass (Hartline et al., 2018).

A list of fish species documented in Harris Lake, as well as in the reaches upstream of, and downstream from, the lake, is presented in table 3.3.2-11. There is no existing information on benthic macroinvertebrates in Harris Lake.

Fish Entrainment and Turbine Mortality

Alabama Power conducted a desktop study of fish entrainment and turbine mortality for the Harris Project.[134] The study used a volume-based rate approach to estimate the number of fish entrained. For the study, the rate of fish entrainment for the two existing turbine units at Harris Dam was estimated for current operations using an Electric Power Research Institute (EPRI) database of fish entrainment (Kleinschmidt, 2018a). Information used for the desktop study was derived from specific studies at projects with available entrainment data, and that were similar to Harris Lake with regard to geographic location, station hydraulic capacity, station operation, number and dimensions of trash racks (including the bar spacing), intake approach velocity and through-rack velocity, as well as biological information (fish species assemblage and water quality). Applicable trash rack specifications for the Harris Project are provided in table 3.3.2-12.

Fish entrainment through the two existing turbine units is estimated to be 294,427 annually, with the highest rate during the winter (263,847 fish) and lowest during the summer (3,714 fish) (table 3.3.2-13). Based on the results from Kleinschmidt (2018a), the proposed minimum flow unit could potentially entrain 37,353 fish annually (Kleinschmidt, 2022; table 3.3.2-14). The majority of fish would be entrained during the winter months and would be dominated by species in the family Clupeidae (shads and herring) (tables 3.3.2-13 and 3.3.2-14).

Turbine mortality was estimated by reviewing data from EPRI (1997), as cited in Kleinschmidt (2018a), and aggregating data from studies with turbine characteristics similar to those of the existing turbines at the Harris Project, as well as the proposed minimum flow unit. Data from five sites with similar turbine characteristics to the existing turbines were used, while data from three sites with turbine characteristics similar to those of the proposed minimum flow unit were used to develop mortality estimates at the Harris Project (table 3.3.2-15). Studies at these sites included members of the catostomid (suckers), centrarchid (sunfish), clupeid (shad and herring), cyprinids (minnows and carps), and ictalurid (catfish) families. Mortality data for suckers were used as a surrogate for catfish. Data from each study was grouped and averaged to determine percent mortality for each family/genus group and size class (table 3.3.2-16). The mortality rates were then applied to the fish entrainment estimates to determine estimated potential losses due to turbine mortality.

Water Temperature

As described above, Alabama Power collected monthly vertical DO and water temperature profiles in Harris Lake at the forebay (i.e., just upstream of Harris Dam) from March through October each year from 2017 to 2020 (figure 3.3.2-18). Average surface water

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[134] Details about the fish entrainment and mortality studies at the project are included in the *Desktop Fish Entrainment and Turbine Mortality Report* (Kleinschmidt, 2018a) and the *Desktop Fish Entrainment and Turbine Mortality Assessment for Proposed Minimum Flow Unit* (Kleinschmidt, 2022).

temperatures ranged from a low of 14.8°C (58.6°F) in March to a high of 30.4°C (86.2°F) in August. Average water temperatures at a depth of 30 feet (approximate depth of the Harris intake with skimmer weir fully raised) ranged from a low of 12.5°C (54.5°F) in March to a high of 23.8°C (74.8°F) in September (Kleinschmidt, 2021b).

Aquatic Special Status Species

Alabama state special status or protected fish species known to occur within the Harris Project boundary, or its vicinity, include the lined chub, lipstick darter, bronze darter, and bandfin darter. State special status or protected mussels include the finelined pocketbook and southern pigtoe. The two mussel species are federally listed and described further in Appendix D. In addition, state-designated special status or protected benthic macroinvertebrates include a variety of caddisfly species. A full listing of the Alabama state special status or protected species that occur in the counties surrounding the project and the Tallapoosa River downstream from Harris Dam can be found in Appendix E of Exhibit E, filed December 27, 2022, and on the Alabama Natural Heritage Program website.[135]

Tallapoosa River Downstream from Harris Dam

Fish Community

Alabama Power and Alabama DCNR funded research to assess the effects of Green Plan operations on the fishery in the Tallapoosa River downstream from Harris Dam. As part of that assessment, the Alabama Cooperative Fish and Wildlife Research Unit (Alabama Fish & Wildlife Unit) 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, 2018b).

Alabama Fish & Wildlife Unit conducted fishery surveys at six sites (*see* figure 9-2 on page E-139 of Exhibit E filed December 27, 2022) one to two times per year, typically in the late spring or early summer and/or late summer or fall. The methods used focused on collecting 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). 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.

Forty-five fish species were collected 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, lipstick darter, and bronze darter. Combined, these three species composed about 50% of all fish collected (table 3.3.2-19). The most abundant species collected during the study were generally abundant both upstream of, and downstream from, Harris Dam. However, threadfin shad were only observed downstream from Harris Dam. Sport fish species collected downstream from Harris Dam included channel catfish,

[135] *See* Alabama Natural Heritage Program at [Rare Species Lists - Data - Alabama Natural Heritage Program (auburn.edu)](), accessed January 25, 2023.

bluegill, redbreast sunfish, flathead catfish, and largemouth bass. Catfish collected during the study include speckled madtom, black madtom, 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 (darters and other members of the perch family) as the most abundant species collected across years and sites.

Alabama Power sampled fish communities in 2017 and 2018 using standardized methods developed by the Geological Survey of Alabama and Alabama DCNR known as the "30+2" method (Geological Survey of Alabama, 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. The surveys included 10 riffle samples, 10 run samples, 10 pool samples (or proportionally for a total of 30 samples), and 2 shoreline samples. Thirty-one species were collected at the Middle Tallapoosa sites during the spring and fall of 2017 and 2018, combined, compared with 33 species collected at the Upper Tallapoosa site. The most common species collected in the Middle Tallapoosa were the lipstick darter, bronze darter, and redbreast sunfish. The most common species collected at the upstream site were speckled darter, Tallapoosa shiner, muscadine darter, redbreast sunfish, and lipstick darter. Index of Biotic Integrity (IBI) scores for the Middle Tallapoosa sites ranged from 30 (Poor) to 40 (Fair), while scores at the upstream site were 32 (Poor) to 42 (Fair).

Auburn University performed fish assemblage studies in 2019 and 2020 for the relicensing's Aquatic Resources Study at Horseshoe Bend, Wadley, the Harris Dam tailrace, and an unregulated reference site about 4 miles upstream of Lee's Bridge (DeVries et al., 2021, attached as Appendix D in Alabama Power and Kleinschmidt, 2021a). Unlike the reach referred to as Wadley by Alabama Power's sampling, Auburn University's Wadley site was near the Wadley bridge. Auburn University used standardized boat and barge electrofishing to sample the fish community in the Tallapoosa River.[136] Auburn University's bimonthly sampling yielded 57 species, with 20 occurring at all four sites (DeVries et al., 2021, as attached as Appendix D in Alabama Power and Kleinschmidt, 2021a) (table 3.3.2-20). The most common species collected, in order of numbers collected and CPE over 3.0 fish/hour, included bluegill, Alabama bass, black-tail redhorse, red-breast sunfish, bronze darter, shadow bass, channel catfish, black-tail shiner, silver-stripe shiner, Alabama shiner, and Alabama hogsucker. Species richness was lowest at Horseshoe Bend (35) and greatest at the reference site and the tailrace (39). Shannon's diversity index 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.

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[136] The Final Aquatic Resources Study Plan stated that wadeable, shallow water habitats would be sampled by the 30+2 method. However, Auburn University determined that standardized boat and barge electrofishing was a more feasible sampling methodology than wadeable 30+2 sampling, due to depth and flow at the sampling sites. 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 (Auburn, 2020). Alabama DCNR provided no comments or concerns in response to the change. *See* pp 140-142 of Exhibit E filed December 27, 2022, for additional discussion.

Alabama Fish & Wildlife Unit, Alabama Power, and Auburn University used different sampling protocols, which offer different interpretations regarding the fish community downstream from Harris Dam. The methodology used by Alabama Fish & Wildlife Unit is best for sampling riffles and runs and for studying shoal-dwelling fishes. The wadeable 30+2 method used by Alabama Power 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). 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 used 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 deep, non-wadeable waters, as well as 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, a barge electrofishing unit was used to cover both deeper and shallower areas of the tailrace.[137] Given that different methodologies were used in these surveys, the results are not directly comparable. Nonetheless, the results do provide a glimpse over time of the fish community in the Tallapoosa River.

As part of its fish community assessment, Auburn University also gathered telemetry data to determine whether fish behavior in the Tallapoosa River downstream from Harris Dam is affected by fluctuating flows. Combined acoustic and radio tags (CARTs) were used to track fish movement downstream from the dam.[138] 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. Results indicated that fish movement upstream and downstream within the river was minimally influenced by Harris Dam peaking operations, and fish were regularly detected within the same general areas (maximum movement was 6.2 km, or about 3.9 miles). Manual tracking data suggested that fish closer to Harris Dam may move somewhat less than fish farther downstream.

In addition to evaluating the fish community, Auburn University integrated published data, field sampling, and laboratory investigations into a bioenergetics model to describe the potential effects of fluctuating flow and temperature on the performance of select target fish species downstream from Harris Dam. Target species were selected in consultation with stakeholders, and included channel catfish, redbreast sunfish, Alabama bass, and Tallapoosa

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[137] There are some differences in boat-mounted and barge electrofishing gear (e.g., voltage/amperage, mobility). However, the differences in fish community at the tailrace compared to other sites cannot simply be attributed to the two different types of gear used, but, rather, much of the difference may be the result of difference in habitat in the tailrace.

[138] The Final Aquatic Resources Study Plan and Auburn University study proposal indicated that 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. The intent was to use this information in a bioenergetics model. However, preliminary work determined that EMG tags did not provide an accurate representation of muscle activity.

bass. Auburn University used the fish bioenergetics model Fish Bioenergetics 4.0 (Deslauriers et al., 2017) to simulate growth of target species. Input data included fish growth parameters (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 from Harris Dam. Energy density of prey items was 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; 50 or 69.8°F) 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 Harris Dam 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 (9°F)[139] 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 the critical swimming speed[140] for the target species.

The only species with models that accurately predicted respiration rates was redbreast sunfish. Age-1 fish lost approximately 0.41% of body weight during generation and lost 0.43% in non-generation, or 0.02% less during generation. Age-3 fish lost approximately 0.39% of body weight during generation and 0.33% during non-generation, and age-5 fish lost approximately 0.38% body weight during generation and 0.33% during non-generation. As observed by researchers at Auburn University, these changes in growth rates would have multiplicative effects over longer periods. However, the model assumed that fish do not take shelter from increased flow and that generation events caused hourly decreases in temperature of 5°C (9°F); however, 99.7% of actual hourly temperature fluctuations were shown to be less than 2°C (3.6°F) (DeVries et al., 2021, attached as Appendix D in Alabama Power and Kleinschmidt, 2021a).

Water Temperature

As described above, water temperatures in the Tallapoosa River downstream from Harris Dam are generally coldest in January and warmest in August. Daily average water temperatures reach a maximum of approximately 26°C (78.8°F) in August at the downstream locations, with a maximum of 24°C (75.2°F) in the tailrace. Monthly average water temperatures at each of these

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[139] A decrease in temperature of 5°C was used to simulate the more extreme fluctuations associated with releases seen downstream from Harris Dam.

[140] Critical swimming speed is a measure of the time and velocity at which a fish becomes fatigued and can no longer swim (DeVries et al., 2021, attached as Appendix D in Alabama Power and Kleinschmidt, 2021a).

three locations, as well as from the unregulated sites on the Tallapoosa River (Heflin) and Little Tallapoosa River (Newell) upstream of Harris Lake, are provided in table 3.3.2-21.

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. The dams 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. None of the dams on the Tallapoosa River have locks or fish passage facilities. Use of the Tallapoosa River by migratory fish species has been impeded or blocked by the construction of navigation and hydropower projects on the Alabama River, including the Corps' Claiborne Dam and Millers Ferry Dam.

There are 144 species of fish in the Alabama River and 30 of these species are known to be migratory (Mettee et al., 1996). Alabama Power conducted fisheries surveys periodically between 1984 and 2015 in the Tallapoosa River downstream from Thurlow Dam and of the 30 migratory species known to inhabit the Alabama River (see figure 9-7 on page E-147 of Exhibit E filed December 27, 2022), only nine species were collected from the Tallapoosa River downstream from Thurlow Dam during its surveys. The species include Alabama shad, Alabama sturgeon, American eel, mooneye, paddlefish, river redhorse, skipjack herring, southeastern bluesucker, and southern walleye.

Benthic Macroinvertebrates

Alabama DEM sampled the benthic macroinvertebrate community in the Tallapoosa River at Wadley, Alabama, in July 2010. Thirty-eight taxa were collected, with 11 of those taxa in the EPT orders (i.e., Ephemeroptera [mayfly], Plecoptera [stonefly], or Trichoptera [caddisfly] species). Based on metrics that compare sample results to those expected for the region, this sample was assessed a rating of Fair/Poor (Alabama DEM, 2010).

Alabama Fish & Wildlife Unit collected benthic macroinvertebrate samples at the same six sites at which fish were sampled. Analyses were conducted on sub samples collected during 2005 and 2014. Alabama Fish & Wildlife Unit identified a total of 151 taxa in the 2005 and 2014 samples, 62 of which were from the family Chironomidae (i.e., non-biting midges). Table 3.3.2-22 provides a summary of the benthic macroinvertebrates collected during the surveys. Generally, more individuals and taxa were collected in 2005 samples versus 2014. 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 consisted of a higher percentage of Ephemeroptera (mayflies) (Kleinschmidt, 2018b). Total macroinvertebrate abundance was highest in 2005 at the regulated site nearest Harris Dam (Malone).

An estimated nine crustacean species are reported as occurring in the Upper and Middle Tallapoosa River Basins in Alabama DCNR's Natural Heritage Database (table 3.3.2-23). The virile crayfish was reported as present only in the Upper Tallapoosa River Basin, while the jewel mudbug and grainy crayfish were reported only in the Middle Tallapoosa River Basin (Alabama DCNR, 2020a; Johnson, 1997). A list of state protected species is provided in Appendix E of Exhibit E.

Aquatic Special Status Species

Alabama state special status or protected fish species known to occur in the Tallapoosa River downstream from Harris Dam include the lipstick darter, bronze darter, bandfin darter, and snail bullhead. State special status or protected crayfish include the Tallapoosa crayfish.

Aquatic Invasive Species

Excluding non-native plants, which are discussed below in *Terrestrial Resources*, the only aquatic invasive species in the project area is Asian clam. Johnson and DeVries (1997) developed a list of mussels, snails, and crayfish species in the Tallapoosa River drainage from surveys at 39 tributary sites, 2 impoundment sites, and 4 main channel sites upstream of Harris Lake, within and downstream from the impoundment, from June through August 1995. Asian clams were present at nearly every mainstem and tributary site. Asian clams were also documented in 2019 in tributaries upstream of Harris Lake during Alabama Power's surveys for the endangered finelined pocketbook mussel. Management methods for Asian clams include mechanical (e.g., removing colonies from the sediment), bottom barriers, suction removal and chemical and temperature alteration, though some of these techniques cannot be used in many water bodies. Given the difficulty of controlling Asian clams, particularly in larger water bodies, prevention, where still possible, remains the best means of management (USGS, 2023d).

Non-Native Invasive Plants

Aquatic non-native, invasive and nuisance vegetation was assessed in sedimentation areas of Harris Lake during Alabama Power's erosion and sedimentation study. Of the nine sedimentation sites that were surveyed, alligatorweed was the only non-native invasive aquatic plant observed. Alligatorweed occurred in about 0.50-acre at one of the sedimentation sites located on within the upstream extent of the Tallapoosa River arm of Harris Lake. In addition, Alabama Power's 2012-2013 wetlands surveys at Harris Lake generally identified the extent of poor and moderate quality wetlands which consist primarily of invasive or noxious plants (see table 3.3.2-28). However, the species compositions of these wetlands were not provided. Hydrilla (*Hydrilla verticillata*) was confirmed to be present upstream of the Harris Project in 2010. Since that time Alabama Power conducts aquatic plant surveys annually. Alabama Power surveys the upper reaches of the Tallapoosa River more intensely using an airboat and canoe/kayak to monitor the spread of hydrilla. Over the last few years, Alabama Power implemented aquatic vegetation control applications a couple of times. The targets for those treatments were duckweed, a native aquatic plant, and various other aquatic plants (target species not provided) in an area that was identified as a highly productive mosquito breeding site near a mosquito monitoring station.[141]

Other than the botanical inventories at Blake's Ferry Pluton adjacent to Flat Rock Park and the nine sedimentation survey areas, the area within the project boundary was not surveyed for non-native invasive plants during relicensing studies. Additional non-native invasive aquatic plants that potentially occur in the Harris Project boundary are listed in table 5-23 of Alabama

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[141] As part of its vector control program, Alabama Power checks six mosquito stations monthly from May to November. Sites requiring larvicide applications are treated on an as needed basis. Typically, only two sites need minimal product each year.

Power's pre-application document. The relative rankings/threat levels, characteristics, and typical habitats of the non-native invasive plants that were observed in the project boundary are available in table 3.3.2-31 (Alabama Invasive Plant Council, 2012; Alabama Power and Kleinschmidt, 2018).

Skyline WMA

Aquatic Habitat and Fish Community

Little information is available on the aquatic habitat and fish communities within the Skyline WMA. Available aquatic habitat information for the Skyline WMA indicates it is comprised primarily of intermittent and first order streams. Alabama Power performed surveys at four locations in Little Coon Creek to determine if the federally endangered palezone shiner was present. The most upstream location sampled occurred just downstream from a spring. Above that point, Little Coon Creek appears more intermittent in nature and likely is periodically dry. No palezone shiner were collected (*see* Appendix D). The most common fish species in those surveys included banded sculpin, striped shiner, bluegill, and bluntnose minnow (Alabama Power and Kleinschmidt, 2020b). In addition, a Geological Survey of Alabama study in nearby Hurricane Creek found fish assemblages dominated by cyprinids (minnows), small catostomids (suckers), and darters (Geological Survey of Alabama, 2013).

Benthic Macroinvertebrates

Alabama DEM sampled the benthic macroinvertebrate community in Little Coon Creek, Alabama, in June 2013, using standardized methodology. The sample site was located about 4 miles downstream from the Skyline WMA. A total of 72 taxa were sampled, with 13 of those taxa in the EPT orders. Based on metrics that compare sample results to those expected for the region, this sample was assessed at a rating of Fair (Alabama DEM, 2013b).

Aquatic Special Status Species

Alabama Special Status or protected fish species known to occur, or potentially occurring, within the project boundary or in the vicinity of the Skyline WMA include the palezone shiner. State special status or protected mussels include the snuffbox, shiny pigtoe, fine-rayed pigtoe, Alabama lampmussel, slabside pearlymussel, rabbitsfoot, and pale lilliput. All of these species are federally listed and described further in Appendix D. In addition, state special status or protected benthic macroinvertebrates include a variety of caddisfly species. A full listing of the Alabama state special status or protected species that occur in the Skyline WMA or the counties surrounding the Skyline WMA can be found in Appendix E of Exhibit E, filed December 27, 2022, and on the Alabama Natural Heritage Program website.[142]

[142] *Id*.

Terrestrial Resources

Vegetation

Harris Lake and the Tallapoosa River Downstream from Harris Dam

The project boundary at Harris Lake encompasses the impounded portion of the Tallapoosa River and includes mainly open water, deciduous, and evergreen forests with small areas of agricultural and residential development. Similarly, mixed forests with small agricultural and residential sites are found adjacent to the Tallapoosa River downstream from Harris Dam. Upland ridges and mid-slopes in the project area are dominated by Southern Piedmont Dry Oak-(Pine) Forests. Overstory vegetation commonly found within this forest type includes upland oaks and hickory species such as white oak, northern red oak, black oak, post oak, scarlet oak, southern red oak, pignut hickory, and mockernut hickory. Other common species include loblolly pine, shortleaf pine, Virginia pine, red maple, American sweetgum, and tulip tree. Generally, there is a well-developed shrub layer, and species vary with soil chemistry. Shrub species may include mountain laurel, common sweetleaf, flowering dogwood, deerberry, and farkleberry. The herb layer is typically sparse (NatureServe, 2009; 2024).

Wetland and Riparian Vegetation

Alabama Power's 2012-2013 wetland surveys identified a total of 189 wetlands located at, or below 793 feet along the Harris Lake shoreline (Cahaba Consulting, 2018b). These wetlands total 11.35 miles of shoreline or 14.89 acres of area, and include emergent/lacustrine fringe wetlands, alluvial forested or scrub-shrub wetlands, and riverine wetlands. The relative condition of these wetlands was also assessed (i.e., poor, moderate, and good) and maps of these wetlands are provided in Cahaba Consulting (2018b). Most of the wetlands in the project boundary were found to be of good (9.28 acres) or moderate (3.45 acres) quality, and only 2.16 acres were rated as poor quality (table 3.3.2-28).

In addition, Alabama Power used wetland data from the National Wetland Inventory (NWI) to identify wetlands from Harris Dam to Horseshoe Bend (NWI, 2021). This area downstream contains: 1,320.51 acres of riverine wetlands, 33.10 acres freshwater forested/scrub-shrub wetlands, 4.0 acres of freshwater emergent wetlands, and 0.36 acres of freshwater pond wetlands.

Emergent and lacustrine fringe wetlands are primarily located along shoreline at or near the 793 feet elevation, at the confluence of the reservoir and streams, and their resulting alluvial plains, as well as being present on point bars, in sloughs, or at, or below the ordinary lake pool. The elevation of the lake and sometimes groundwater discharge determine the water table of the adjacent wetland. Lacustrine wetlands lose water during reservoir drawdown, by saturation surface flow, and by evapotranspiration. These wetlands can accumulate organic matter in areas protected from shoreline wave erosion and are usually dominated by small shrubs, herbaceous and emergent hydrophytic vegetation.

Alluvial forested, and scrub-shrub wetlands are generally located in areas where perennial or intermittent streams flow into Harris Lake. As sediment and other organic debris accumulate at or near the surface elevation of the reservoir, land mass is formed which allows for the formation of these wetlands. Saturated, hydric soils are common in these formations and in turn, have allowed for the propagation of hydrophytic saplings, large shrubs, and herbaceous vegetation.

Riverine wetlands are associated with the floodplains and riparian corridors of streams and rivers and typically occur where perennial streams flow into Harris Lake. 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.

Representative vegetation occurring in riparian and/or wetland areas within the project boundary at Harris Lake and downstream from Harris Dam include trees such as maples (e.g., southern sugar, sugar, chalk, red, and box elder), oaks (white, scarlet, red, southern red, black, swamp chestnut, chestnut, chinkapin, cherrybark, Shumard's, post), pines (shortleaf, pitch, white, loblolly, and Virginia), mockernut and pignut hickories, river birch, eastern red and northern white cedars, beech, American chestnut, black locust, tulip tree, white and green ash, sycamore, black walnut, basswood, sweetgum, and sugarberry. Understory trees and shrubs include flowering dogwood, witch-hazel, mapleleaf viburnum, spicebush, possumhaw, and yaupon holly. Herbaceous species include longleaf woodoats, black seed speargrass, poverty oatgrass, little bluestem, greater tickseed, narrowleaf silkgrass, crownbeard, wandflower, wall rue, sensitive fern, lady fern, northern maidenhair, purple cliffbrake, black cohosh, licorice bedstraw, Venus's pride, early saxifrage, coral bell, oakleaf hydrangea, goat's rue, nakedflower tick trefoil, fringed sedge, Boott's sedge, jack-in-the-pulpit, littlebrownjug, and mountain spleenwort.

Non-Native Invasive Plants

Non-native invasive plants that are known to occur within the Harris Project boundary include terrestrial and aquatic non-native invasives observed during relicensing studies and lake monitoring efforts. Terrestrial non-native plants observed during the botanical inventories at Blake's Ferry Pluton adjacent to Flat Rock Park include trees and shrubs such as Chinese and Japanese privets, Bradford pear, mimosa, heavenly bamboo, leather leaf mahonia, and multiflora rose. The botanists also observed non-native invasive vines and herbaceous species such as Chinese wisteria, Japanese honeysuckle, Japanese climbing fern, Chinese yam, greater (bigleaf) periwinkle, orange day lily, beefsteak plant, Brazilian vervain, Japanese stiltgrass, tall fescue, and bahia grass.

Other than the botanical inventories at Blake's Ferry Pluton adjacent to Flat Rock Park (described further below) and the nine sedimentation survey areas, the area within the project boundary was not surveyed for non-native invasive plants during relicensing studies. Terrestrial non-native invasive species that are known to occur at Martin Lake area and could occur near, within, or be more broadly dispersed within, the Harris Project boundary, include mimosa, Japanese honeysuckle, kudzu, Chinese privet, giant cut grass (millet), torpedo grass, and golden bamboo (Alabama Power and Kleinschmidt, 2018). Additional non-native invasive terrestrial and aquatic plants that potentially occur in the Harris Project boundary are listed in table 5-23 of Alabama Power's pre-application document. The relative rankings/threat levels, characteristics, and typical habitats of the non-native invasive plants that were observed in the project boundary are available in table 3.3.2-31 (Alabama Invasive Plant Council, 2012; Alabama Power and Kleinschmidt, 2018).

Special Status Plant Species and Communities

Local botanists conducted inventories to catalog all plant species present at a 20-acre parcel and a 35-acre parcel at the rare Blake's Ferry Pluton (Diggs et al., 2020) (figures 3.3.3-1 and 3.3.3-2). These parcels are located adjacent to Alabama Power's Flat Rock Park on Harris Lake. 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. A total of 365 plant species, representing 97 plant families, were documented from the 20-acre parcel and surrounding buffer areas. Also, a total of 401 plant species, representing 106 plant families, were documented from the 35-acre parcel and surrounding buffer areas. Although no federally protected species were found during the surveys, some plant species of conservation concern were observed in both the 20-acre and 35-acre parcels (table 3.3.2-29) (Diggs et al., 2020). The results of Alabama Power's surveys for federally listed plant species at Harris Lake are discussed in the *Biological Assessment* in Appendix D of this EIS. Alabama Natural Heritage Program (NHP) maintains the list of state special status plant species that occur in the counties surrounding Harris Lake and/or the Tallapoosa River downstream from Harris Dam (Alabama NHP, 2023). Habitat descriptions are available in the revised license application (i.e., Appendix E, of Exhibit E) (Alabama Power, 2022e).

Vegetation Management - Silviculture Activities

Alabama Power has actively managed timber on its lands since approximately 1945. Initially, Alabama Power had a sustained-yield management scheme in which trees would be grown to an average age of 60 years and would produce forest products on a continuous basis. Saw timber (i.e., trees of sufficient size for lumber) were harvested on 16-year cycles and pulpwood (i.e., generally smaller diameter trees or trees of lower quality that are used to produce pulp and paper) were thinned as a secondary product every 10 years. In the early 1970s, Alabama Power began using equipment that allowed for larger volume harvests, and increased its reseeding in harvested areas to stabilize soil given increases ground disturbance caused by the new equipment. In addition, to provide sufficient time for the volume of saw timber to recover, the harvest cycle was lengthened to every 20 years.

At Harris Lake, contemporary forests are dominated by mixed pine-hardwood. Timber stand composition on the 6,269 acres within the project boundary is shown in table 3.3.2-30 and illustrated in figure 3.3.3-3. Selective cutting is the primary means of timber harvest on Alabama Power's project land at Harris Lake. Alabama Power also uses prescribed fire on about 160 acres in a timber management area northeast of Flat Rock Park. In these locations, burns are conducted on a 2-year rotation, during the dormant season initially to reduce fuel load and may occur during the growing season, too (see figure 3.3.3-4).

Vegetation Management - Rights-of-Way Maintenance

Within its transmission line rights-of-way (ROW) corridors, Alabama Power maintains vegetation using a combination of mechanical, chemical, and biological treatments to establish and maintain vegetative cover types that are compatible with existing land uses. Alabama Power trims trees and uses herbicides to control tall-growing vegetation, and to promote low-growing vegetation that provides some wildlife habitat, while preventing vegetation contact with the powerlines. Alabama Power uses foliar, stump, stem, and vine herbicide application methods.[143] Planned vegetation maintenance is prioritized, in part, by evaluating field conditions. However, there are instances when Alabama Power must trim or remove trees outside its planned maintenance activities. State and county agencies and utility companies (water authority, co-operative electric utilities, natural gas companies) also conduct vegetation management in their ROWs that cross project land.

Skyline WMA

Located in the Cumberland Plateau Region of Alabama, the landscape within Skyline WMA consists of flat-topped, high-elevation plateaus separated by deep, steep-sided valleys. Overall, the plateaus slope gently from the northeast to the southwest. Most of the area is forested, with characteristics of Southern Ridge and Valley/Cumberland Dry Calcareous Forest, South-Central Interior Mesophytic forest, and Allegheny Cumberland Dry Oak Forest and Woodland. Timber stand composition on the approximately 15,000 acres within the project boundary is shown in table 3.3.2-32 and illustrated in figure 3.3.3-5.

There are 6,745 acres of Southern Ridge and Valley/Cumberland Dry Calcareous Forest on project land at Skyline WMA (Alabama Power and Kleinschmidt, 2018). This dry to dry-mesic calcareous forest type occurs in a variety of landscape positions, including ridge tops and upper to mid-slopes. High quality examples are characteristically dominated by white oak, chinkapin oak, post oak, and Shumard's oak, with varying amounts of hickory, sugar maple, southern sugar maple, chalk maple, red maple, and other species. This system also includes successional communities resulting from logging or agriculture that are dominated by tulip tree, pine, eastern red cedar, and black locust.

There are 3,938.7 acres of South-Central Interior Mesophytic Forest on project land at Skyline WMA (Alabama Power and Kleinschmidt, 2018). This highly diverse forest type typically occurs on deep, enriched soils in protected landscapes such as lower slopes. Although dominated by deciduous species such as sugar maple, American beech, tulip tree, American basswood, northern red oak, cucumber tree, and eastern black walnut, Eastern hemlock trees are present in some stands. Common shrubs include coralberry, bladdernut, bursting-heart, and flowering dogwood. The herb layer is often very plentiful and may include licorice bedstraw, black cohosh, southern lady fern, and crownbeard.

There are 1,798.2 acres of Allegheny-Cumberland Dry Oak Forest and Woodland on project land at Skyline WMA (Alabama Power and Kleinschmidt, 2018). These dry hardwood forests are found in nutrient-poor or acidic substrates on plateaus or ridges. Dominant trees typically include oak species (e.g., white, southern red, chestnut, and scarlet), with lesser amounts of red maple, pignut hickory, and mockernut hickory. Shortleaf and/or Virginia pines can occur adjacent to steep cliffs or slopes or in areas affected by fire, while white pine can be prominent in stands in the absence of fire. American chestnut saplings potentially occur where it was once a common tree. Typical shrub species include lowbush blueberry, bear huckleberry, deerberry, hillside blueberry, oakleaf hydrangea, and mapleleaf viburnum. Common herbs

[143] All herbicides used by Alabama Power are EPA-registered and approved by appropriate state agencies.

include Boott’s sedge, black seed speargrass, nakedflower tick trefoil, longleaf woodoats, and dwarf violet iris.

Wetland and Riparian Vegetation

In 2017, Alabama Power conducted a desktop assessment of wetlands in Skyline WMA. This assessment found that it was unlikely that large areas of wetlands occur in the project boundary at Skyline WMA due to steep terrain and smaller floodplains (Alabama Power and Kleinschmidt 2018). According to NWI data, there are no wetlands, and only a few ponds and about 49 streams within the project boundary at Skyline WMA. The streams include perennial, intermittent, and ephemeral classifications totaling 44.97 miles. Many of the streams have medium steep gradients with minimal narrow flood plains. The intermittent streams are generally not as steep. Although the larger perennial streams are flat with relatively wide floodplains, only a few of these exist within the project boundary at Skyline WMA. The riparian zones along all of the streams consist primarily of mature forests.

Special Status Plant Species

Alabama Power’s surveys for federally listed plant species on project land at Skyline WMA are discussed in the Biological Assessment in Appendix D of this draft EIS. Alabama NHP maintains the list of state special status plant species that may occur in Jackson County (Alabama NHP, 2023). Habitat descriptions are available in the revised license application (i.e., Appendix E, of Exhibit E) (Alabama Power, 2022e).

Vegetation Management - Silviculture Activities

Contemporary forests within the approximately 15,000-acre project boundary at Skyline WMA are mature to over-mature mixed hardwood forest, composed primarily of red and white oak, tulip tree, maple, and hickory species (table 3.3.2-32 and illustrated in figure 3.3.3-5). There is also a small component of pine species (i.e., shortleaf, loblolly, and Virginia pines). Historically, silvicultural practices focused on harvesting higher value red and white oak trees, resulting in many stands that are dominated by maple, hickory, tulip tree and chestnut oak. Most stands have closed canopies with little or no natural regeneration of tree species that are desirable for use as saw timber. Selective harvesting and natural regeneration are Alabama Power’s primary goals for timber harvest on Harris Project land at Skyline WMA. In coordination with Alabama DCNR and consistent with the management objectives in its existing 1990 Skyline WMP, Alabama Power conducts selective clear cutting in small areas on the mountain tops of project land at Skyline WMA. Alabama Power does not conduct prescribed burns at Skyline WMA.

Wildlife

<u>Harris Lake and the Tallapoosa River Downstream from Harris Dam</u>

Common Wildlife Species

Harris Lake and surrounding woodland, agricultural, and residential areas provide habitat for a variety of upland and semi-aquatic wildlife species. Large mammals that are known to occur in vicinity of Harris Lake, include white-tailed deer, bobcats, coyotes, red and gray foxes, feral swine, raccoons, beavers, Virginia opossum, Eastern spotted skunk, and nine-banded armadillo. Common smaller mammals including Eastern cottontail, Eastern chipmunk, squirrels (e.g., gray, fox, and Southern flying squirrels), marsh rice rat, and muskrat. Various bat species including tricolored,[144] big brown, Eastern red, Seminole, and evening bats were also found to be common in the project vicinity.

A wide variety of birds are known to breed in the vicinity of Harris Lake. They include common upland game birds such as wild turkey and northern bobwhite, and many waterfowl/water-/shoreline birds such as Canada goose, wood duck, mallard, and hooded merganser, pied-billed grebe, great egret, herons (e.g., great blue, little blue, and green), killdeer, spotted sandpiper, and belted kingfisher. Common raptors include vultures (i.e., black and turkey), osprey, American kestrel, various hawk species (e.g., red-shouldered, broad-winged, and red-tailed hawks), and owls (e.g., great horned, barred, and Eastern screech owls). Smaller forest dwelling bird species that are common to the project vicinity include woodpeckers (e.g., red-headed, downy, pileated, and northern flicker), mourning dove, yellow-billed cuckoo, blue jay, American crow, wood thrush, American robin, catbird, cedar waxwing, and various species of vireos, wrens, warblers, sparrows, tanagers, orioles, and finches. Common grass- and shrubland species in the project vicinity include mockingbird and various swallows (e.g., tree, Northern rough-winged, and cliff swallows).

Amphibians that are known to occur in the vicinity of Harris Lake, include American and Fowler's toads, Northern cricket frog, Cope's gray treefrog, Northern spring peeper, Eastern narrow-mouthed toad, and bullfrog. Various salamander species are also common, including marbled, spotted dusky, Southern two-lined, three-lined, and Northern red salamanders). Reptiles that are common in the vicinity of Harris Lake, include common snapping turtle, river cooter, Eastern box turtle, yellow-billed pond slider, red-eared pond slider, Eastern mud turtle, common musk turtle, green anole, common five-lined and ground skinks, and fence lizard. Common snakes include scarlet snake, black racer, ringneck snake, rat and gray rat snakes, plain-bellied water snake, queen snake, Dekay's brown snake, Northern red-bellied snake, timber rattlesnake, copperheads (i.e., Southern and Northern), and cottonmouths (i.e., Eastern, Florida, and Western).

Special-Status Wildlife Species

Special status or protected wildlife species that are known to occur, or potentially occur in the vicinity of Harris Lake and the Tallapoosa River downstream from Harris Dam, include the black bear, eastern spotted skunk, Indiana bat, northern long-eared bat, bald eagle,[145] Bachman's sparrow, red crossbill, American kestrel, American woodcock, red-cockaded woodpecker, Southern five-lined skink, and Alabama map turtle.[146] In addition, birds designated

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[144] FWS proposed to list the tricolored bat as an endangered species under the Endangered Species Act. *See* 87 Fed. Reg. 56,381-56,393 (September 14, 2022). The tricolored bat is discussed further in Appendix D, *Biological Assessment*.

[145] The bald eagle is federally protected under the Bald and Golden Eagle Protection Act. *See* 16 U.S.C. 668-668c.

[146] The Indiana bat, northern long-eared bat, and red-cockaded woodpecker are federally listed and described further in Appendix D, *Biological Assessment*.

by the FWS as Birds of Conservation Concern[147] that occur within the vicinity of Harris Lake and the Tallapoosa River downstream from Harris Dam include the red-headed woodpecker, chimney swift, Eastern whip-poor-will, wood thrush, and the cerulean, Kentucky, and prairie warblers. Alabama NHP maintains the list of state special status animal species that occur in the counties surrounding Harris Lake and/or the Tallapoosa River downstream from Harris Dam (Alabama NHP, 2023). Habitat descriptions are available in the revised license application (Alabama Power, 2022).

Wildlife Management

As part of its original license, Alabama Power developed the 1988 Harris Project Wildlife Mitigation Plan in consultation with the Alabama DCNR and FWS, to mitigate effects on wildlife and habitats associated with the development of the Harris Project (Alabama Power and Kleinschmidt, 1988).[148] The plan included provisions for managing 5,900 acres of existing project lands and acquiring 779.5 acres of additional land in the vicinity of Harris Lake. Within these areas, Alabama Power identified 263 acres of suitable wood duck habitat, installed wood duck boxes, released Canada geese to establish a population at Harris Lake, and constructed osprey nesting platforms along the reservoir shoreline. In addition, Alabama Power constructed and installed 300 large animal/cavity-nesting bird structures and 300 small animal/cavity-nesting bird structures. Alabama Power also established forest management areas in various locations surrounding Harris Lake and 105 acres of permanent openings to provide grassland habitat for game and non-game species (Alabama Power, 2021e).[149]

Alabama Power conducts annual monitoring and maintenance of the wood duck boxes installed around Harris Lake. Maintenance activities included repair and replacement of broken boxes, as well as the relocation of underused boxes. Double boxes were installed in most areas, but clusters of 10 boxes were installed in higher use areas. Annual use of the wood duck boxes from 2000 to 2019 ranged from 17% in 2000 to 47% in 2017. Annual wood duck hatchings ranged from 28 successful nests in 2011 to 47 successful nests in 2017, averaging 37 hatchings since 2010. Unlike the wood duck boxes, Alabama Power does not monitor use of the small and large animal/cavity-nesting bird structures which were intended to benefit species such as the Eastern screech owl, flycatchers, and Eastern gray squirrel. However, these species are among the wildlife that were observed using some of the wood duck boxes (Alabama Power and Kleinschmidt, 2018).

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[147] FWS maintains a list of Birds of Conservation Concern (BCC) to carry out the mandate in the 1988 amendment to the Fish and Wildlife Conservation Act to "identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the ESA" (FWS, 2021). BCC species listed herein were identified using FWS's Information for Planning and Conservation (IPaC) database on February 22, 2023.

[148] The Commission approved Alabama Power's Harris Project Wildlife Mitigation Plan on July 29, 1988.

[149] *See* Accession Nos. 20181113-0016 and 20181113-4002.

Alabama Power maintains certain lands surrounding Harris Lake for hunting game animals. One hunting area includes four shooting houses within permanent openings and associated access roads maintained by Alabama Power to create hunting opportunities for hunters with disabilities.

Alabama Power also developed and maintains pollinator plots at Little Fox Creek. Within these plots, Alabama Power planted native plants to provide habitat for butterflies such as the monarch and other pollinators such as bees, moths, and beetles.

Skyline WMA

Common Wildlife Species

Many wildlife species common to the vicinity of the Skyline WMA are the same as those that are found in Harris Lake and Tallapoosa River downstream from Harris Dam. A list of representative wildlife species that potentially occur in both of these portions of the project area, as well as descriptions of their habitats, are available in Alabama Power's license application (Appendix D of Exhibit E, tables 1, 2, and 3), filed on December 27, 2022.

Special-Status Wildlife Species

Special status or protected wildlife species known to occur or potentially occurring within the project boundary or in the vicinity of the Skyline WMA include mammals such as the long-tailed weasel, Indiana bat, northern long-eared bat, and gray bat. In addition, the tricolored bat and Rafinesque's big-eared bat were observed in caves within Alabama Power's land at Skyline WMA (Alabama Power, 2021g). Special status bird species at Skyline WMA include the bald and golden eagles,[150] yellow warbler, Bachman's sparrow, American kestrel, and American woodcock, and red-cockaded woodpecker.[151] In addition, Birds of Conservation Concern that are known to occur in the vicinity of Skyline WMA include the red-headed woodpecker, chimney swift, Eastern whip-poor-will, wood thrush, and the Canada, cerulean, Kentucky, and prairie warblers. Alabama NHP maintains the list of state special status animal species that may occur in Jackson County (Alabama NHP, 2023). Habitat descriptions are available in the revised license application (Alabama Power, 2022e).

Wildlife Management

The 1988 Harris Project Wildlife Mitigation Plan also included provisions for Alabama Power to purchase and subsequently lease to the Alabama DCNR, over 15,000 acres of land adjacent to the existing Skyline WMA. In 1989, Alabama Power developed a Skyline WMP to guide the development and maintenance of wildlife habitat, timber management,[152] and

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[150] Bald and golden eagles are federally protected under the Bald and Golden Eagle Protection Act. *See* 16 U.S.C. 668-668c.

[151] The Indiana bat, northern long-eared bat, gray bat, and red-cockaded woodpecker are federally listed and described further in Appendix D, *Biological Assessment*.

[152] Alabama Power's timber management practices are described above under *Skyline WMA; Vegetation Management - Silvicultural Activities*.

recreational access.[153] Generally, Alabama Power's silviculture activities at Skyline WMA are intended to maintain or enhance the long-term sustainability of the forest, and provide a variety of ecological conditions suitable for local wildlife communities.

Alabama Power's management activities on project land at Skyline WMA are conducted by Alabama DCNR and include the establishment and management of wildlife openings, roads, camping areas, and hunting areas. Alabama DCNR maintains about 42 acres of wildlife openings/food plots by planting cool season grains and/or perennial legumes annually, or by disking. Alabama DCNR mows or disks an additional 210 acres of openings to maintain native grass stands, or early successional fields. There are 32 miles of roads that Alabama DCNR maintains using a road grader, dozer, and gravel deliveries as needed, as well as seven gates (not connected to fencing) that Alabama DCNR uses to limit access to areas outside hunting season. In addition, Alabama DCNR manages two designated campsites and the hunting season on project land at Skyline WMA (i.e., issues permits, maps, and regulations on hunting seasons and bag limits (Alabama Power, 1989).

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 WMA to date. Prescribed burning is not implemented as part of timber management at Skyline WMA, and therefore firebreaks have not been added. In addition, there are several natural ponds at Skyline WMA that are monitored and maintained by Alabama DCNR, and therefore no waterholes have been installed. Nesting structures have not been added at Skyline WMA, and no plantings outside those in conjunction with managed openings have been needed. Also, invasive wildlife species such as feral swine are not currently being managed on project lands at Skyline WMA.

Threatened and Endangered Species

A *Biological Assessment* of the effects of project operation, maintenance, construction, and project-related recreation on federally listed threatened and endangered species is presented as Appendix D of this EIS.

Recreation Resources

Alabama DCNR manages 15 boat launches within 50 miles of the Harris Project (Alabama Power and Kleinschmidt, 2022d). There are many area reservoirs that provide recreational opportunities including Martin, Yates, and Thurlow downstream on the Tallapoosa River; Weiss, Neely Henry, Logan Martin, Lay, Mitchell, and Jordan to the west on the Coosa River; and West Point Lake[154] located about 30 miles southeast on the Chattahoochee River.

The Talladega National Forest includes about 392,567 acres along the ridge of the Appalachian Mountains providing land-based recreation such as hiking, ATV riding, mountain biking, camping, scenic viewing, and hunting. The National Forest is adjoined by Cheaha State

[153] The Commission approved Alabama Power's Skyline Wildlife Management Plan on June 29, 1990.

[154] Managed by the Corps for flood control, hydroelectric power, navigation, fish and wildlife development, and general recreation.

Park which hosts a 7,245-acre Cheaha Wilderness Preserve that provides access to hiking and ATV trails, day-use areas, cabins, a lodge, campgrounds, and a restaurant. There are many private, commercial, state, and federal campgrounds and RV parks near the project. These regional facilities provide over 3,700 RV sites and many other campsites in the project vicinity. Most of these campgrounds are located to the west and northwest of the Harris Project, near Talladega and Auburn, Alabama, and to the southwest at West Point Lake.

Harris Lake

There are 11 project recreation sites at Harris Lake (table 3.3.5-1). Amenities at these sites include single and group picnic pavilions, many picnic tables, designated swimming areas, playgrounds, parking spaces, 12 boat launches, sites that offer public fishing access, and restroom facilities. Flat Rock Park has additional amenities; including a nature trail, elevated boardwalk, and interpretive displays. Hunting opportunities are available on project lands near Harris Dam and an area north along the Tallapoosa River. Natural undeveloped areas along Harris Lake are available for public use including for activities such as hiking, picnicking, primitive camping, backpacking, and wildlife observation.

Alabama DCNR constructed several boat ramps to be usable during a winter pool elevation of 785 feet, including boat ramps at Big Fox Creek, Crescent Crest, Foster's Bridge, and Highway 48 Bridge. In 2021, Lonnie White boat ramp was extended to be fully usable at winter pool elevation.

Non-project recreation facilities and commercial facilities at Harris Lake provide additional camping areas, lodging, cabin rentals, groceries, restaurants, boat rentals, boat launching and storage, and gasoline (figure 3.3.5-1). There are also more than 2,000 private recreation structures providing access to Harris Lake including boardwalks, boathouses, wet slips, floats, and piers.

Tallapoosa River Downstream from Harris Dam

Several recreation areas are located downstream from Harris Dam outside the project boundary. These include private and public access points to the Tallapoosa River. Below Harris Dam are two privately owned access points: Malone and Wadley canoe portages located at RM 7.3 and 13, respectively. There are no public river access points along the Tallapoosa River between Harris Dam and the two privately owned portages at Malone and Wadley. Downstream, below Wadley, between RM 25.2 and RM 48.6 is the Harold Banks Canoe Trail, which contains four access points along the Tallapoosa River known as Bibby's Ferry (RM 25), Germany's Ferry (privately owned), Horseshoe Bend (RM 43), and Jaybird Landing (RM 48.6). Bibby's Ferry is a public portage managed by the Chambers County; Horseshoe Bend National Military Park is managed by the U.S. Department of the Interior, National Park Service (Park Service); and Jaybird Landing is a public boat launch managed by Alabama Power, as part of the Martin Project (FERC No. 349) license.[155] Non-project recreation facilities downstream from Harris Dam on the Tallapoosa River are shown in figure 3.3.5-2.

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[155] 153 FERC ¶ 61,298.

Skyline WMA

There are no project recreation facilities located at Skyline WMA, but Alabama Power owns about 15,000 acres that are managed by Alabama DCNR through a lease agreement as part of the 1988 Harris Project Wildlife Mitigation Plan. These acres provide public hunting opportunities and other outdoor recreation activities.

Recreation Use

Recreational opportunities are available year-round, with most use occurring during the peak season from Memorial Day to Labor Day when visitors participate in boating, fishing, swimming, camping, hiking, picnicking, and other activities.

Harris Lake Use

Project recreation sites at Harris Lake had about 227,358 days of use in 2019 (table 3.3.5-2). Highway 48 Bridge had the highest use, and Flat Rock Park had the third highest number of recreation days in 2019, even though it is only open from May through September each year. The capacity use was higher in 2019 than 2014 at most of the boat ramps and fishing areas; however, some recreation areas experienced lower capacity usage. Highway 48 Bridge was at 84% capacity and Harris Tailrace Fishing Area at 65% capacity, whereas all other project recreation sites were found to be used at capacities less than 50% in 2019. Wedowee Marine South is a commercial marina facility with large numbers in annual visitation, and has 79% use capacity.

Tallapoosa River Downstream from Harris Dam Use

Downstream recreation accounted for an estimated 14,060 days of use in summer months. The most popular activities included swimming, scenic/wildlife viewing, kayaking, and tubing/rafting. The Recreation Evaluation Study found that about 70% of all Tallapoosa River trips began at Horseshoe Bend, 12.7% of trips began at the Germany's Ferry Bridge, 10.4% of trips began at Jaybird Landing, 3.5% of trips began at Bibby's Ferry, and 0.6% began at Malone Bridge, with the remaining 2.8% of trips beginning at unidentified remote access locations. None of the individuals interviewed in 2019 started their trip at the Wadley Bridge boat ramp. Of all Tallapoosa River trips, 60.9% ended at Jaybird Landing, 24.1% ended at Horseshoe Bend, 9.2% ended at Germany's Ferry Bridge, 2.9% ended at Bibby's Ferry, and 0.6% ended at Wadley Bridge, with the remaining 2.3% of trips ending at unidentified remote access locations. Recreational fishing accounted for an estimated 6,471 days of recreation participation in 2019. This study did not evaluate recreation use between Harris Dam and the private portage at Malone, however, the landowner survey results, estimated 4,750 individuals from January to December 2019 used private lands to access the Tallapoosa River for the purposes of river-related recreation. The survey also found that about 45% of landowners disagreed that public access to Tallapoosa River below Harris Dam for recreational purposes is sufficient, and about 87% allowed other people to participate in river-related recreation from their downstream property. Downstream landowners also participate in a variety of recreation activities including swimming, shore or wade fishing, scenic/wildlife viewing, boat fishing, and kayaking.

Most recreation users found all water levels acceptable, and there was no significant relationship between satisfaction and water level. Alabama Power estimated that the number of boatable days[156] downstream from Harris Dam was 30 days in winter, 18 days in spring, 23 days in summer, and 29 days in fall for a total of about 100 boatable days under existing conditions. Responses to the downstream user surveys showed that 78% of recreationists on the Tallapoosa requested more access points.

Skyline WMA Use

Recreation use at Skyline WMA provides public hunting opportunities for large and small game. Hunting accounted for about 10,033 days in the 2016-2017 season, 9,280 days in the 2017-2018 season, and 9,933 days in the 2018-2019 season. Deer hunting is the predominant type of hunting activity followed by turkey hunting. Alabama DCNR noted an increase in hunting at all its WMAs during 2020, associated with COVID-19.

Land Use and Aesthetics

Harris Lake

Most of the lands around Harris Lake are located in Randolph County, with a small portion located in Clay and Cleburne counties. Predominant land cover within all three counties is forest (deciduous and evergreen), followed by pasture and hay. The project lands adjoining the 367 miles of Harris Lake shoreline total about 7,545 acres. There are 4.9 acres of federal lands within the Harris Lake portion of the project boundary, managed by the BLM.

The Harris Land Use Plan describes land use classifications for management of Harris project lands located within the project boundary. Land use designations are shown in table 3.3.6-1, and include hunting, natural undeveloped, recreational use (public use areas), and prohibited access. Hunting lands located around Harris Lake (2,707 acres) provide hunting opportunities in accordance with the 1988 Harris Project Wildlife Mitigation Plan. The natural undeveloped designation (2,440 acres) is for lands preserved for vegetation (including wetlands), wildlife, cultural, and other sensitive resources. The recreational use classification (874 acres) designates lands for existing or future recreational activities. The prohibited access (also called Project Operations) classification (300 acres) reserves lands for current and potential future operational activities. Each designation guides use, and management of project lands based on existing qualities and in accordance with other management plans, and project purposes. The Harris Land Use Plan includes shoreline permitting guidelines, outlines public education programs, and encourages the use of BMPs to minimize the effects of construction on existing resources.

Non-project uses along the shoreline are managed through a shoreline permitting program that includes development guidelines for residential use, non-residential use (e.g., marinas, campgrounds, commercial properties), and multi-single family dwelling use. The shoreline permitting program guides and manages development activities and allows for monitoring of the shoreline areas to preserve the scenic, recreational, and environmental values of Harris Lake. There is also a shoreline compliance program that addresses encroachment issues, and any permitting related compliance issues.

[156] Alabama Power defined boatable day as any day (between sunrise and sunset) when river flows are between 450 and 2,000 cfs as measured at the Wadley gage station.

No lands within the Harris Project boundary are part of, or under study for, National Trail Systems or Wilderness Areas. No river segments within the Harris Lake portion of the project boundary are designated as Wild and Scenic or listed in the National Rivers Inventory. Views around Harris Lake include rolling, forested hills; vegetated shorelines, recreation facilities; residences; open water and coves; and Harris Dam and associated project facilities.

Tallapoosa River Downstream from Harris Dam

Land use downstream from Harris Dam, outside the project boundary, is typically undeveloped forest land with recreation access areas, farmland, and residential areas interspersed along the river, including the towns of Malone and Wadley. The tailrace area downstream from Harris Dam has naturally armored banks and some riprap lined areas. About 20 miles downstream, the Harold Banks Canoe Trail includes four access points, as described in section 3.3.5, *Recreation Resources*, where the public can access and view the Tallapoosa River. The Tallapoosa River is characterized by clear water and rocky shoals and provides natural and historic views to paddlers.

There are no river segments designated as Wild and Scenic within the Harris Project boundary. However, the section of the Tallapoosa River between Bibby's Ferry (RM 25.2) and Jaybird Landing (RM 48.6) located downstream from the Harris Project, but upstream of Horseshoe Bend Park is listed in the NRI.[157]

Skyline WMA

The Harris Project also contains approximately 15,000 acres of land within Skyline WMA (about 110 miles north of the project reservoir), acquired and incorporated project boundary as part of the 1988 Harris Project Wildlife Mitigation Plan and the 1990 Skyline Wildlife Management Plan. These lands continue to be leased to, and managed by Alabama DCNR for conservation, wildlife management, and public hunting as part of the Skyline Wildlife Management Plan. Most lands within Skyline WMA are designated for wildlife management.

Distant views include rolling forested hills and agricultural lands, while views within the Skyline WMA include wooded forests, rock outcroppings, and streams that are characterized by rocky substrates, with vegetative riparian areas along the banks. Use and management of Skyline WMA for hunting, timber management, and recreational use is detailed in Alabama Power's WMP. There are no national trails, wilderness designations, or stream reaches designated as Wild and Scenic or on the NRI in the Skyline WMA portion of the project boundary. However, a portion of the Trail of Tears National Historic Trail is located about 10 miles away from Skyline WMA.

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[157] The NRI is a list of more than 3,200 free-flowing river segments in the U.S. that are believed to possess one or more "outstandingly remarkable" natural or cultural values judged to be at least regionally significant could be included in the National Wild and Scenic River System (Interior, 2021).

Cultural Resources

Section 106 of the National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA)[158] requires the Commission take into account the effects of licensing a hydropower project on any historic properties and allow the Advisory Council on Historic Preservation (Advisory Council) a reasonable opportunity to comment if any adverse effects on historic properties are identified within the project's Area of Potential Effects (APE).

Historic properties are defined as any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register. In this document, the term "cultural resources" also means resources of an age (generally, 50 years or older) but that have not been evaluated for eligibility in the National Register. Historic properties generally must possess integrity of location, design, setting, materials, workmanship, feeling, and association, and must meet one or more of the criteria specified in 36 C.F.R. 60.4. For example, dilapidated structures or heavily disturbed archaeological sites may not have enough contextual integrity to be considered eligible. Traditional cultural properties (TCPs) are a type of historic property eligible for listing in the National Register because of their association with cultural practices or beliefs of a living community that: (1) are rooted in that community's history; or (2) are important in maintaining the continuing cultural identity of the community (Parker and King, 1998). In most cases, cultural resources less than 50 years old are not considered eligible for listing in the National Register. However, properties that are less than 50 years old may be considered eligible for the National Register if they have achieved significance within the past 50 years and are of exceptional importance or if they are a contributing part of a National Register-eligible district.

Consultation with SHPO, Native American Tribes and Other Interested Parties

Under section 106 of the NHPA,[159] consultation is defined as the process of seeking, discussing, and considering the views of other participants, and, where feasible, seeking agreement with them regarding matters arising in the section 106 process. Section 106 also requires that the Commission seek concurrence with the Alabama State Historic Preservation Officer (Alabama SHPO) on any finding involving effects or no effects on historic properties and allow the Advisory Council an opportunity to comment. If Native American properties have been identified, section 106 requires that the Commission consult with interested Indian Tribes that might attach religious or cultural significance to such properties (i.e., TCPs).

On February 2, 2018, the Commission sent letters to seven federally recognized Indian Tribes and Tribal organizations for the Harris Project. Indian Tribes who received letters from the Commission included the Alabama-Coushatta Tribe of Texas, the Alabama-Quassarte Tribal Town, the Coushatta Tribe of Louisiana, the Kialegee Tribal Town, the Muscogee (Creek) Nation, the Poarch Band of Creek Indians, and the Thlopthlocco Tribal Town. On

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[158] Section 106 of the National Historic Preservation Act of 1966, as amended, 54 U.S.C. § 306108, Pub. L. No. 113-287, 128 Stat. 3188 (2014). (The National Historic Preservation Act was recodified in Title 54 in December 2014).

[159] 36 C.F.R. 800.16(f).

May 25, 2018, the Commission sent additional letters to three Tribes. The Tribes included the Cherokee Nation, the Eastern Band of Cherokee Indians, and the United Keetoowah Band of Cherokee Indians in Oklahoma. These letters invited the Tribes to meet with Commission staff to discuss their participation in the process and to establish communication procedures. By letter dated June 22, 2018 (filed July 2, 2018), the Cherokee Nation replied with recommendations for cultural resources surveys within the Skyline WMA, a request to cease project activities should items of cultural significance be identified and advised that other Tribes with potential interests in the project be consulted. By letter dated July 18, 2018 (filed July 24, 2018), the Choctaw Nation responded that the Harris Project was located outside its area of interest. No other response letters were received. However, at their request, Commission staff subsequently consulted with the Muscogee (Creek) Nation in conference calls held on August 10, 2021; October 22, 2021; and February 24, 2022.

In its July 31, 2018, Notice of Intent to File License Application, the Commission initiated consultation with the Alabama SHPO and designated Alabama Power as the Commission's non-federal representative for carrying out day-to-day consultation with regard to the project's licensing efforts, pursuant to section 106 of the NHPA; however, the Commission remains ultimately responsible for all findings and determinations regarding the effects of the project on any historic property. To facilitate consultation with interested parties, Alabama Power established a cultural resources working group for the project relicensing, known as the Harris Action Team 6 (HAT 6), and consulted with the group regarding study plans, progress, and other cultural resources matters. The HAT 6 met at least 11 times between September 2018 and July 2021 and comprised representatives from the Commission, Alabama DCNR, Alabama Historical Commission (Alabama SHPO), American Rivers Alliance, Auburn University, BLM, Park Service, Nature Conservancy, Wedowee Property Owners Association, Alabama-Coushatta Tribe of Texas, Alabama Quassarte Tribe, Cherokee Nation, Coushatta Tribe of Louisiana, Eastern Band of Cherokee Indians, Muscogee (Creek) Nation of Oklahoma, Poarch Band of Creek Indians, Thlopthocco Tribal Town, United Keetoowah Band of Cherokee Indians, and interested property owners and other stakeholders.

Alabama Power provided the Commission with cultural resources information, analyses, and recommendations, in accordance with the Advisory Council's regulations for implementing section 106 at 36 C.F.R. 800.2(a)(3) and the Commission's regulation at 18 C.F.R. 380(f). The federal land managing agencies have obligations regarding cultural resources under other federal laws and regulations, including the Federal Land Policy and Management Act, the Antiquities Act of 1906, section 110 of the NHPA, the Archaeological and Historic Preservation Act of 1974, the Archaeological Resources Protection Act of 1970, and the Native American Graves Protection and Repatriation Act.

Construction activities, maintenance, and operation of the project could adversely affect historic properties (i.e., cultural resources listed or eligible for listing in the National Register). These historic properties could include prehistoric or historic archaeological sites, districts, buildings, structures, and objects, as well as locations with traditional value to Native Americans or other groups. Direct effects could include destruction or damage to all, or a portion, of an historic property. Indirect effects could include the introduction of visual, atmospheric, or audible elements that affect the setting or character of a historic property.

If existing or potential adverse effects are identified to historic properties, a Historic Properties Management Plan (HPMP) is developed to establish protocols to avoid, reduce, or mitigate for potential effects to historic properties over the term of the license. Alabama Power submitted a draft HPMP on November 23, 2021 (Alabama Power and Kleinschmidt, 2021b), which would serve as an overarching guide and protocol for management of all historic properties, or properties that have otherwise been found culturally important, through consultation under section 106, over the term of the license.

Commission Staff intends to execute a PA with the SHPO that requires the November 2021 HPMP to be updated upon license issuance to include additional information related to cultural resources within the project APE and future management of project-related effects on historic properties and unevaluated cultural resources. Involved Indian Tribes would be invited to sign the PA as concurring parties.

Identification of the Area of Potential Effects

Pursuant to section 106, the Commission must take into account whether any historic property within a project's APE could be affected by the issuance of a new license. The APE is determined in consultation with the Alabama SHPO and is defined as "the geographic area or areas within which an undertaking may cause changes in the character or use of historic properties," including TCPs (36 C.F.R. 800.16[d]).

Alabama Power consulted with the HAT 6 regarding the project APE and other matters. Alabama Power filed an "APE report" on June 29, 2020, that included maps of the APE and documentation of consultation with the Alabama SHPO and HAT 6 regarding the APE (Alabama Power, 2020b). This report contained a copy of the Alabama SHPO's June 18, 2020, concurrence with the APE. On August 11, 2020, Commission staff also approved the boundaries of the APE. The APE includes: (a) lands enclosed by the Harris Project boundary, and (b) lands or properties which may be outside the Harris Project boundary, where authorized project uses may cause changes in the character or use of the historic properties, if historic properties exist." While not located within the project boundary, the APE encompasses lands within the Skyline WMA. Additionally, to address any potential flow-related effects on cultural resources, the banks of the Tallapoosa River downstream from Harris Dam to Horseshoe Bend National Military Park are also located within the APE.

Cultural History Overview

Alabama Power conducted archival research to obtain background information relevant to understanding past lifeways, cultural sequences, and historic period developments within and adjacent to the Harris Project. Based on this gathered background information, a cultural context was prepared for the project and is summarized below (as adapted from Watkins, 2021, Alabama Power and Kleinschmidt Associates, 2021b). This context applies to Harris Lake, Skyline WMA, and the Tallapoosa River downstream from Harris Dam.

Prehistory

The earliest evidence of human occupation in the vicinity of the Harris Project is known as the Paleoindian stage (13,450–12,900 Before Present [B.P.]). During this time, nomadic hunter-gatherers may have arrived in the Southeast, but there is little evidence of human occupation of the Tallapoosa River Basin. Throughout the Paleoindian stage, subsistence focused on hunting, fishing, and the procurement of wild plant resources.

While hunting and gathering remained the primary subsistence strategy during the Archaic stage (11.400–3,150 B.P.), a changing climate resulted in a corresponding change in local resources and shifts in settlement patterns and technology. Populations experienced increased sedentism and greater exploitation of riverine environments with freshwater shellfish becoming an important resource. The presence in archaeological sites dating to this period of net-sinker weights, ground and polished stone implements and ornaments, such as atlatl weights and grooved axes, and tools made of bone and shell reflects this change. This period is also marked by an increase in long-distance trade. Archaeological sites dating to the Lake Archaic have included features such as house floors, hearths, and storage pits reflecting a more sedentary lifestyle. Burial mounds containing ornamental non-local grave goods indicate the trade of raw materials, social hierarchy, and territoriality.

The Gulf Formational stage (4,450–3,150 B.P.) indicates further changes in technology, including the emergence of ceramics. Sites dating to the Late Gulf Formational period are generally located in elevated areas near waterways and swamps where important resources could be obtained year-round. Storage pits and silos indicate long-term habitation of these sites.

During the Woodland Stage (2,050–950 B.P) in the Tallapoosa River Basin, populations congregated into larger settlements but retained smaller camps for hunting and gathering purposes. Trade was increasingly important and an increase in population resulted in decreased mobility. Evidence of domesticates in the archaeological record indicate the adoption of horticulture. Other characteristics of the Woodland stage are the appearance of larger mortuary mounds, the introduction of the bow and arrow, and the identification of fish weirs in the Tallapoosa River drainage.

The Mississippian stage (950–450 B.P.) represents the last cultural tradition prior to European contact. Mississippian settlements included mound centers surrounded by farms and villages. Mississippian society was complex with hierarchical social stratification, including a ruling class, extensive trade networks, specialized craftsmen, and artisans. Mississippian sites are not well represented in the Tallapoosa River Basin.

Exploration and Settlement

Spanish explorers were the first Europeans to arrive in the Southeast in the early sixteenth century and their contact with the Tribes in the region had a significant effect. It is speculated that the indigenous people had been decimated by the introduction of European diseases.

The French were the first Europeans to establish a permanent presence with native groups. Fort Toulouse was established in 1717 at the confluence of the Coosa and Tallapoosa Rivers where they merge to form the Alabama River. British influence increased throughout the eighteenth century, and many British trading posts and supply depots were established. Euro-Americans continued to venture into the area after the Treaty of Paris in 1783. In 1830, Andrew Jackson signed the Indian Removal Act which forced Tribes to move away from their traditional lands to lands set aside for them in Oklahoma. This forced removal came to be known as the Trail of Tears.

The vacated lands were quickly occupied by American settlers who created farms, plantations, and took advantage of timber in the forested areas. The power of streams was harnessed for the machinery that operated grist and sawmills. The rural areas along the Tallapoosa, however, remained primarily agricultural.

Hydroelectric Development

Throughout the nineteenth century, power development in Alabama was confined almost entirely to streams. By the early twentieth century, prospective waterpower sites along the Tallapoosa River began to attract the attention of hydraulic engineers. In 1907, the founding president of Alabama Power, Captain William Patrick Lay, received congressional approval to construct the company's first dam and electric generating plant on the Coosa River (Lay Dam).

Alabama Power began hydropower construction on the Tallapoosa River in 1923 at the Cherokee Bluffs site. James Mitchell and Thomas Martin, the other two founders of Alabama Power overcame several engineering and design issues to start construction of the dam, finally completing the Martin Project in 1926. In addition, Alabama Power constructed two hydropower dams near Tallassee, Alabama, on the Tallapoosa River: Yates (in-service 1928) and Thurlow (in-service 1930). The R.L. Harris Dam was the final Alabama Power dam constructed on the Tallapoosa River (Atkins 2006). Construction of the dam and its appurtenant hydroelectric system features began in 1974 and was completed in 1983.

Cultural Resource Investigations

Archaeological and Historic Resources

During development of the pre-application document and subsequent research, Alabama Power reviewed records, including the Alabama Cultural Resources Online Database, housed at the Alabama Office of Archaeological Research (OAR) to identify known surveys and sites in the vicinity of the Harris Project and Skyline WMA. Alabama Power determined that 29 cultural resources investigations were previously conducted in the vicinity of the Harris Project both prior to, and subsequent to project construction. These studies included archaeological surveys conducted between 1974 and 1977 of the proposed dam construction area and proposed Harris Lake. After the reservoir was inundated, additional surveys were conducted of shoreline areas within the scenic easement to aid in future permitting, construction, and environmental activities. At Skyline WMA, two previous archaeological surveys were identified: one of six tracts of Alabama Power lands (3,000 acres) conducted between 1990 and 1991 by Alabama Power and the University of Alabama, and a second one of two tracts (284 acres) conducted in 2005 by the OAR. Both surveys were anticipated to contain a high probability of prehistoric or historic occupation.

For the current relicensing, Alabama Power conducted intensive archaeological and built environment field investigations within the APE in accordance with the cultural resources study plan filed on May 13, 2019. Field methods included visual inspection and mapping of sites selected for assessment. Excavation of 30-centimeter (12-inch) diameter shovel tests placed at 30-meter (98-foot) intervals was also conducted to determine site depth and boundaries. These tests were excavated to a depth of 30 centimeter or until sterile sediments or bedrock was encountered. A representative sample of artifacts recovered using a ¼ screen was collected to determine site function and/or temporal/cultural affiliation. Recovered materials were analyzed at the DeJarnette Archaeological Laboratory and are curated at the Erskine Ramsay Archaeological Repository, both located at Moundville Archaeological Park in Moundville, Alabama.

During field documentation of archaeological sites, the condition of each site was assessed to aid in the identification of project-related effects. Select National Register evaluations were undertaken based on background research, documented remains, and other factors. A recommendation was made for the potential National Register eligibility of each site based on the criteria specified in 36 C.F.R. 800.4 and the guidance provided in National Register Bulletin 15 (Park Service, 1997) and National Register Bulletin 36 (Park Service, 1993). These criteria are:

- **Criterion A.** Association with events that have made a significant contribution to the broad patterns of our history;
- **Criterion B.** Association with the lives of persons significant in our past;
- **Criterion C.** [Resources] that embody the distinctive characteristics of a type, period, method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- **Criterion D.** [Resources] that have yielded or may be likely to yield, information important in prehistory or history.

Typically, the National Register does not include properties that are less than 50 years old. However, properties that are less than 50 years old may be eligible for listing in the National Register if they are of exceptional importance.

During the field investigations, the research potential of each evaluated site was also assessed based on site condition, integrity, location, and other factors.

Harris Lake Archaeological Resources

The record search conducted at the OAR identified 330 previously recorded sites within the APE at Harris Lake. In accordance with the cultural resources study plan, Alabama Power consulted with the Alabama SHPO and participating Tribes, and identified 96 of the 330 archaeological sites for preliminary assessment. The purpose of the assessment was to identify sites that were originally misplotted, deflated, located below winter drawdown levels, or had been altered such that their potential to retain intact cultural deposits was negated. Representatives of the Muscogee Nation subsequently requested that five additional sites also be subject to preliminary assessment bringing the total number of assessed sites to 101.

Following the preliminary assessment of these 101 sites, 52 sites located on Alabama Power lands were believed to retain integrity and were further investigated. Each of these 52 sites was then either recommended to be eligible for listing on the National Register, recommended ineligible, or if questions regarding to eligibility could not be addressed, their eligibility status from previous studies remained unchanged or was stated as undetermined. During fieldwork, 11 new sites were identified, and other sites were combined, bringing the total number sites at Harris Lake to 338, 63 of which were assessed. The results of these investigations (Watkins, 2021) were filed with the Commission on June 29, 2021. Of the 63 sites that were selected for assessment, 22 sites were recommended to be eligible for listing on the National Register, 27 sites were recommended ineligible, and the eligibility of 14 sites remains undetermined.

On June 15, 2022, with its AIR response, Alabama Power filed a subsequent report that addressed cultural resources located on tracts of land proposed for removal from the project boundary (Watkins, 2022). A total of 17 tracts within ten areas were surveyed. The survey resulted in the investigation of 2 previously recorded sites and also identified 7 new sites bringing the total number of identified sites at Harris Lake to 345 and the number of fully assessed sites to 72.

As defined in section 3.3.6.2, Land Use and Aesthetics, *Shoreline Management Plan-Shoreline Classifications*, Alabama Power designates some shoreline areas as sensitive resources, which defines project lands that 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 includes cultural resources, sites and structures listed on, or eligible for listing on, the National Register of Historic Places (NRHP); and other culturally and ecologically important areas. These sites would be considered during the discussions regarding land proposed for removal from the project boundary.

Of the 345 total archaeological resources at Harris Lake, 140 are prehistoric sites, 28 are historic-period sites, 2 are multi-component sites, and the composition of 175 previously recorded sites is unknown. The prehistoric sites at Harris Lake include lithic/artifact scatters, rock and bluff shelters, quarries, and prehistoric features. Many historic-period sites were also identified at the Harris Project, including the remains of historic homesteads and other structures, mills, weirs, and artifact scatters. Multi-component sites contain a varied combination of both prehistoric and historic site artifacts and features as described above.

According to an updated site table prepared by Alabama Power and filed on December 17, 2022, with its response to the Commission's request for additional information[160], 22 of the original 338 sites at Harris Lake were recommended to be eligible for listing on the National Register, 151 were recommended to be ineligible, and the National Register status of the remaining 165 sites is undetermined. In a letter dated October 28, 2022 (filed with the table), the Alabama SHPO concurred with these recommendations. However, Alabama Power's updated site table did not include the seven new sites that were recorded and evaluated during its 2022 survey (Watkins, 2022) of tracts to be removed from the project boundary. In a separate letter filed on June 16, 2022, the Alabama SHPO concurred with the additional National Register recommendations provided in the tract report. In total, of the 345 sites identified within the project APE, 24 sites have been determined to be eligible for listing, 153 sites have been determined to be ineligible, and the eligibility of 168 sites remains undetermined.[161] Table 3.3.7-1 provides a summary of current National Register status of the 345 archaeological sites located within the APE at the Harris Project.

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[160] Accession No. 20221227-5103 AIR3Q11_Site Information Table.

[161] The Alabama SHPO's October 28, 2022, letter states that the National Register eligibility of 152 sites at Harris Lake remains undetermined. However, according to Alabama Power's updated site table filed on with its AIR response, the eligibility of 165 sites is undetermined. With the inclusion of 3 additional sites identified during the tract survey, the total number of sites that remain unevaluated for National Register eligibility is 168 sites.

Archaeological Resources on the Tallapoosa River Downstream from Harris Dam

The record search conducted at the OAR identified 19 previously recorded sites located within the APE along the Tallapoosa River downstream from Harris Dam. Nine of these are prehistoric sites, one is an unknown aboriginal site, one is a historic site, six sites contain both prehistoric and historic components, and two sites consist of historic structural remains including the historic Miller Bridge piers and abutments (circa 1907) and the remains of the historic Horseshoe Bend Breastworks associated with the Creek Indians. Both sites, and one village site with both prehistoric and historic Creek components, are located on National Park Service lands and contribute to the National Register eligibility of the Horseshoe Bend National Military Park, which was listed on the National Register on October 15, 1966 (nomination form updated by Stout and Kretschmann, 1976). Four additional sites are located on lands owned by Alabama Power and the remaining twelve sites are located on privately held lands.

Of the 19 sites within the APE along the Tallapoosa River downstream from Harris Dam, 3 sites are listed on the National Register as part of the Horseshoe Bend National Military Park, 3 sites were recommended to be eligible for listing on the National Register and 4 sites were recommended to be ineligible. The National Register eligibility of the remaining 9 sites is undetermined. In its October 28, 2022, letter, the Alabama SHPO concurred with these recommendations. Table 3.3.7-2 provides a summary of current National Register status of all archaeological sites documented within the APE along the Tallapoosa River downstream from Harris Dam.

Skyline WMA Archaeological Resources

The record search conducted at the OAR identified 141 previously recorded sites located within APE at the Skyline WMA. Of these, 29 sites that were considered significant according to previous studies were selected for preliminary assessment in consultation with the Alabama SHPO and participating Tribes. The purpose of the assessment was to relocate the sites, assess their condition, and formally evaluate them for listing on the National Register. During fieldwork, 4 of the sites were combined into two sites, and 8 new sites were identified, bringing the total number of known sites at Skyline WMA to 148 resources and the number of investigated sites to 37. The results of the archaeological survey of selected sites at the Skyline WMA (Stager and Watkins, 2021) were filed with the Commission on November 23, 2021.

Caves and bluff shelters in the region often contain prehistoric rock art. According to Alabama Power's cultural resources report for Skyline WMA, 198 caves are located on Alabama Power lands at Skyline WMA. Investigations were conducted at eleven of these caves and bluff shelters to determine if they contained archaeological materials and/or features (Shaw, 2020). None of the caves contained evidence of prehistoric activity, but four caves showed historic-period use. Along the bluffs, two pictograph sites were documented, and one historic-period site was identified. No vertical caves were investigated, but the report indicated the one such cave is located within the study area and is known to contain human remains and prehistoric artifacts. The location of this cave was not identified in the report.

Most of the archaeological resources within the APE at the Skyline WMA are prehistoric. These include 130 lithic scatters, the two pictograph sites, and one isolated find. Nine sites are historic-period resources. These consist of house/homestead remains and/or scattered historic materials. Other historic sites include two mining operation sites (coal and saltpeter), a whiskey manufacturing site, and a cemetery. Two sites contain both historic and prehistoric materials and/or features.

Of the 37 sites that were assessed at the Skyline WMA, Alabama Power recommended that 19 sites are eligible for listing on the National Register and 18 are ineligible. The National Register status of the remaining 111 sites within the Skyline WMA area is undetermined. In its October 28, 2022, letter, the Alabama SHPO concurred with these recommendations. Table 3.3.7-3 provides a summary of current National Register status of archaeological sites documented within the APE at the Skyline WMA.

Built Environment Resources

While several archaeological sites containing structural remains were identified during Alabama Power's cultural resources investigations, no standing historic structures were identified at Harris Lake or at Skyline WMA. Construction of Harris Dam and its appurtenant hydroelectric system features was completed in 1983 and they do not yet meet the 50-year threshold for National Register consideration.

Within the APE on the Tallapoosa River downstream from Harris Dam, one location containing structural remains, the historic Miller Bridge piers and abutments, contribute to the National Register eligibility of the Horseshoe Bend National Military Park. This site is discussed above as an archaeological resource. The Miller Bridge piers and abutments are locally significant under National Register criteria A and C for their contribution to the history of transportation and engineering in the region.

Traditional Cultural Properties

Alabama Power filed a Traditional Cultural Properties (TCP) Identification Plan with the Commission on April 10, 2020. During the Updated Study Report meeting held via teleconference on April 27, 2021, the Alabama-Coushatta Tribe of Texas requested that both the Alabama-Coushatta Tribe and the Coushatta Tribe of Louisiana be consulted about potential TCPs within the project's area of potential effects. In a May 3, 2021, teleconference with Alabama Power, Commission staff reiterated this request. In the Commission's Updated Study Report Comment letter issued on June 9, 2021, Alabama Power was asked to consult with these two Tribes regarding the need, timeline, and process for identifying TCPs and include any details about TCP identification in the draft HPMP. Alabama Power consulted with these Tribes during development of the TCP Identification Plan.

On August 10, 2021, Commission staff, Alabama Power, and representatives of the Muscogee (Creek) Nation met via conference call to discuss the TCP consultation protocol. Alabama Power provided attendees with the status of its TCP report, *Traditional Cultural Properties Identification Study for The R.L. Harris Relicensing Project in Clay, Cleburne, and Randolph Counties, Alabama* prepared by the University of Alabama Office of Archaeological Research (OAR, 2021) in consultation with the Muscogee (Creek) Nation. Two potential TCPs were identified during the study, both of which were recommended to be eligible for listing on the National Register. At the request of the Muscogee (Creek) Nation, the TCP report has not been filed with the Commission.[162] During the call, Alabama Power also reviewed the TCP Consultation Protocol with the group.

On October 22, 2021, and February 24, 2022, Commission staff, Alabama Power, and representatives of the Muscogee (Creek) Nation met via conference call to further discuss the TCP consultation protocol to be implemented over any new license term to address potential effects on TCPs.

Environmental Justice

In conducting NEPA reviews of hydroelectric projects, the Commission follows Executive Orders 12898 and 14096, which direct federal agencies to identify, analyze, and address disproportionate and adverse human health or environmental effects of their actions on environmental justice communities.[163] Executive Order 14008 also directs agencies to develop programs, policies, and activities to address the disproportionate and adverse "human health, environmental, climate-related and other cumulative impacts on disadvantaged communities, as well as the accompanying economic challenges of such impacts."[164] Environmental justice is "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies."[165] The term "environmental justice community" includes communities that have been historically marginalized and overburdened by pollution.[166]

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[162] Specific sensitive information regarding the nature of identified TCPs does not need to be filed with the Commission. Instead, the Commission will accept general background information and a description of the measures that would be taken to protect these resources. Specific information only would be required should any disagreement arise regarding project effects and resolution of those effects.

[163] Exec. Order No. 12,898, 59 Fed. Reg. 7629 (Feb. 11, 1994); Exec. Order No. 14,096, 88 Fed. Reg. 25251 (Apr. 21, 2023).

[164] Exec. Order No. 14,008, 86 Fed. Reg. 7619, 7629 (January 27, 2021).

[165] *See* EPA, EJ 2020 Glossary (February 2024), https://www.epa.gov/system/files/documents/2024-02/ej-2020-glossary.pdf. Fair treatment means that no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental, and commercial operations or policies. *Id.* Meaningful involvement of potentially affected environmental justice community residents means: (1) people have an appropriate opportunity to participate in decisions about a proposed activity that may affect their environment and/or health; (2) the public's contributions can influence the regulatory agency's decision; (3) community concerns will be considered in the decision-making process; and (4) decision makers will seek out and facilitate the involvement of those potentially affected. *Id.*

[166] Environmental justice communities include, but may not be limited to minority populations, low-income populations, or indigenous peoples. *See* EPA, EJ 2020 Glossary (Feb. 2024), https://www.epa.gov/system/files/documents/2024-02/ej-2020-glossary.pdf.

Commission staff used *Promising Practices for EJ Methodologies in NEPA Reviews* (*Promising Practices*),[167] which provides methodologies for conducting environmental justice analyses throughout the NEPA process for this project. Additionally, consistent with EPA recommendations, Commission staff used EPA's Environmental Justice Screening and Mapping Tool (EJScreen) as an initial screening tool to better understand locations that require further review or additional information regarding minority and/or low-income populations; potential environmental quality issues; environmental and demographic indicators; and other important factors.[168]

Consistent with *Promising Practices*, and Executive Orders 12898 and 14096, we reviewed the project to determine if its resulting impacts would be disproportionate and adverse on minority and low-income populations and also whether impacts would be significant.[169] *Promising Practices* provides that agencies can consider any of a number of conditions in this determination and the presence of any of these factors could indicate a potential disproportionate and adverse impact.[170] For this project, a disproportionate and adverse effect on an environmental justice community means the adverse effect is predominantly borne by such population. Relevant considerations include the location of project facilities and the project's human health and environmental impacts on identified environmental justice communities, including direct, indirect, and cumulative impacts.

Meaningful Engagement and Public Involvement

In addition to the information provided above, the Council on Environmental Quality's (CEQ) Environmental Justice Guidance Under the National Environmental Policy Act (CEQ, 1997) and *Promising Practices*, recommend that federal agencies provide opportunities for effective community participation in the NEPA decision-making process by: identifying potential effects and mitigation measures in consultation with affected communities; improving accessibility of public meetings, crucial documents, and notices; and using adaptive approaches

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167 Federal Interagency Working Group on Environmental Justice & NEPA Committee, *Promising Practices for EJ Methodologies in NEPA Reviews* (March 2016) (*Promising Practices*), https://www.epa.gov/sites/default/-files /2016-08/documents/nepa_promising_practices_document_2016.pdf.

168 EPA, *Purposes and Uses of EJScreen* (January 9, 2024), https://www.epa.gov/ejscreen/purposes-and-uses-ejscreen ("Screening tools should be used for a 'screening-level' look. Screening is a useful first step in understanding or highlighting locations that may be candidates for further review.").

169 An agency may determine that impacts are disproportionate and adverse, but not significant within the meaning of NEPA and in other circumstances an agency may determine that an impact is *both* disproportionate and adverse and significant within the meaning of NEPA. *See Promising Practices* at 33.

170 There are various approaches for determining whether an impact will cause a disproportionate and adverse impact, and one recommended approach is to consider whether an impact would be "predominantly borne by minority populations or low-income populations." *See id.* at 44-46.

to overcome potential barriers to effective participation. In addition, Executive Orders 13985 and 14096, strongly encourage independent agencies to "consult with members of communities that have been historically underrepresented in the [f]ederal Government and underserved by, or subject to discrimination in, Federal policies and programs,"[171] and "provide opportunities for the meaningful engagement of persons and communities with environmental justice concerns who are potentially affected by [f]ederal activities."[172]

Identification of Environmental Justice Communities

According to CEQ's *Environmental Justice Guidance* and *Promising Practices*, minority populations are those groups that include: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. Following the recommendations set forth in *Promising Practices*, FERC uses the 50 percent and the meaningfully greater analysis methods to identify minority populations. Using this methodology, minority populations are defined in this EIS where either: (a) the aggregate minority population of the block groups in the affected area exceeds 50 percent; or (b) the aggregate minority population in the block group affected is 10 percent higher than the aggregate minority population percentage in the county. The guidance also directs low-income populations to be identified based on the annual statistical poverty thresholds from the U.S. Census Bureau. Using *Promising Practices*' low-income threshold criteria method, low-income populations are identified as census block groups where the percent low-income population in the identified block group is equal to or greater than that of the county. To identify potential environmental justice communities for the analysis presented here, Commission staff used 2022 U.S. Census American Community Survey data for the race, ethnicity, and poverty data at the block group level (Census, 2023). For this project, staff chose a 5-mile radius around the proposed recreation and construction portions of the Harris Lake project boundary and a 1-mile radius around the remainder of the Harris Lake project boundary, the Tallapoosa River from Harris Dam through Horseshoe Bend, and the project boundary at Skyline WMA, as the areas of study. More specifically, a 5-mile radius is the appropriate unit of geographic analysis for the proposed construction sites (i.e., minimum flow unit at Harris Dam, a new day use park on Harris Lake, and a canoe/kayak access downstream from Harris Dam) given the larger scope of the project's effects on the area surrounding Harris Lake. A 1-mile radius is the appropriate unit of geographic analysis for Skyline WMA, the remainder of the Harris Lake boundary, and the Tallapoosa River downstream to Horseshoe Bend given the limited scope the project's effects on the area surrounding Skyline WMA and the segment of the Tallapoosa River from Harris Dam through Horseshoe Bend, where no construction is proposed. However, staff also chose to evaluate potential effects on recreational resources for block groups within a 5-mile buffer of the project to better represent the population that uses the project area for recreation.

Within the study areas, staff identified 10 census block groups in the Harris Lake and Tallapoosa River portion of the project (see table 3.3.8-1 and figure 3.3.8-1) and six (6) census block groups in the Skyline WMA portion of the project, in which the populations qualify as environmental justice communities (see table 3.3.8-2 and figure 3.3.8-2). Of the 10 identified census block groups in the Harris Lake and Tallapoosa River portion of the project area, five (5)

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[171] Exec. Order No. 13985, 86 Fed. Reg. 7009, 7011 (Jan. 20, 2021).

[172] Exec. Order No. 14,096, 88 Fed. Reg. 25251 (Apr. 21, 2023).

had minority populations meaningfully greater than the surrounding counties (Census Tract 958900, Block Group 2; Census Tract 958900, Block Group 3; Census Tract 959700, Block Group 2; Census Tract 300, Block Group 2; and Census Tract 600, Block Group 2). Of these block groups, three (3) also qualified as environmental justice communities based on low-income status (Census Tract 958900, Block Group 3; Census Tract 959700, Block Group 2; and Census Tract 600, Block Group 2). Five (5) census block groups in the Harris Lake and Tallapoosa River portion of the project area met the low-income threshold alone (Census Tract 953800, Block Group 2; Census Tract 100, Block Group 1; Census Tract 100, Block Group 2; Census Tract 300, Block Group 3; and Census Tract 962501, Block Group 1).[121] Of the six census block groups in the Skyline WMA portion of the project which are identified as environmental justice groups, all met the threshold for low-income status (Census Tract 950300, Block Group 4; Census Tract 950400, Block Group 2; Census Tract 950400, Block Group 3; Census Tract 950500, Block Group 1; Census Tract 950600, Block Group 3; and Census Tract 960600, Block Group 3). Census Tract 950300, Block Group 4 and Census Tract 950400, Block Group 3 also met the criteria for inclusion based on minority status.[173]

[173] Data from the 2022 U.S. Census American Community Survey File # B01017 and File# B03002, the most recently available data, were used as the source for race, ethnicity, and poverty data at the census block group level (U.S. Census Bureau, 2023).

APPENDIX G
FIGURES AND TABLES

LIST OF FIGURES

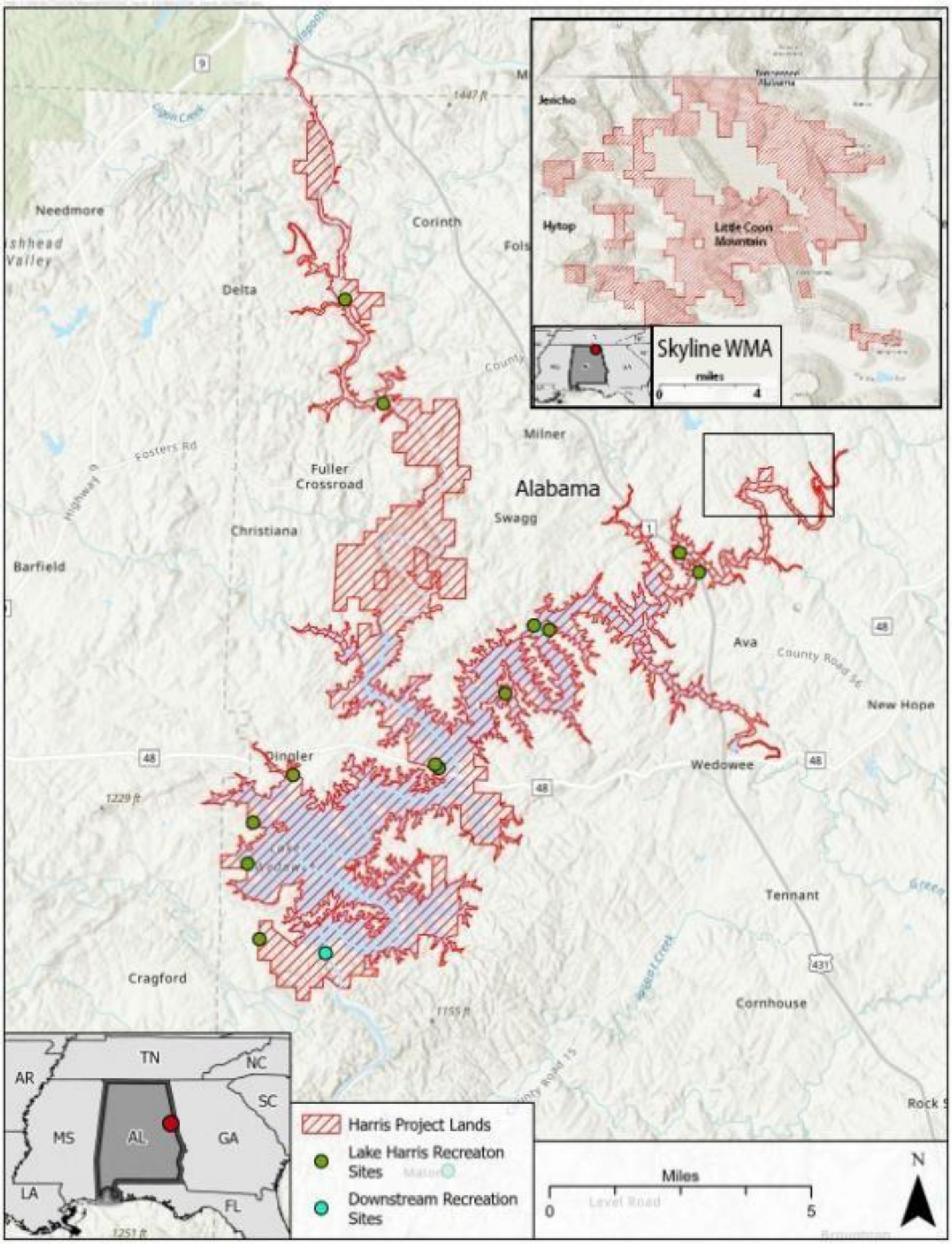


Figure 1-1. Location of Harris Hydroelectric Project (Source: staff).

Figure 1-2. Proposed minimum flow unit location (Source: Alabama Power, 2022a).

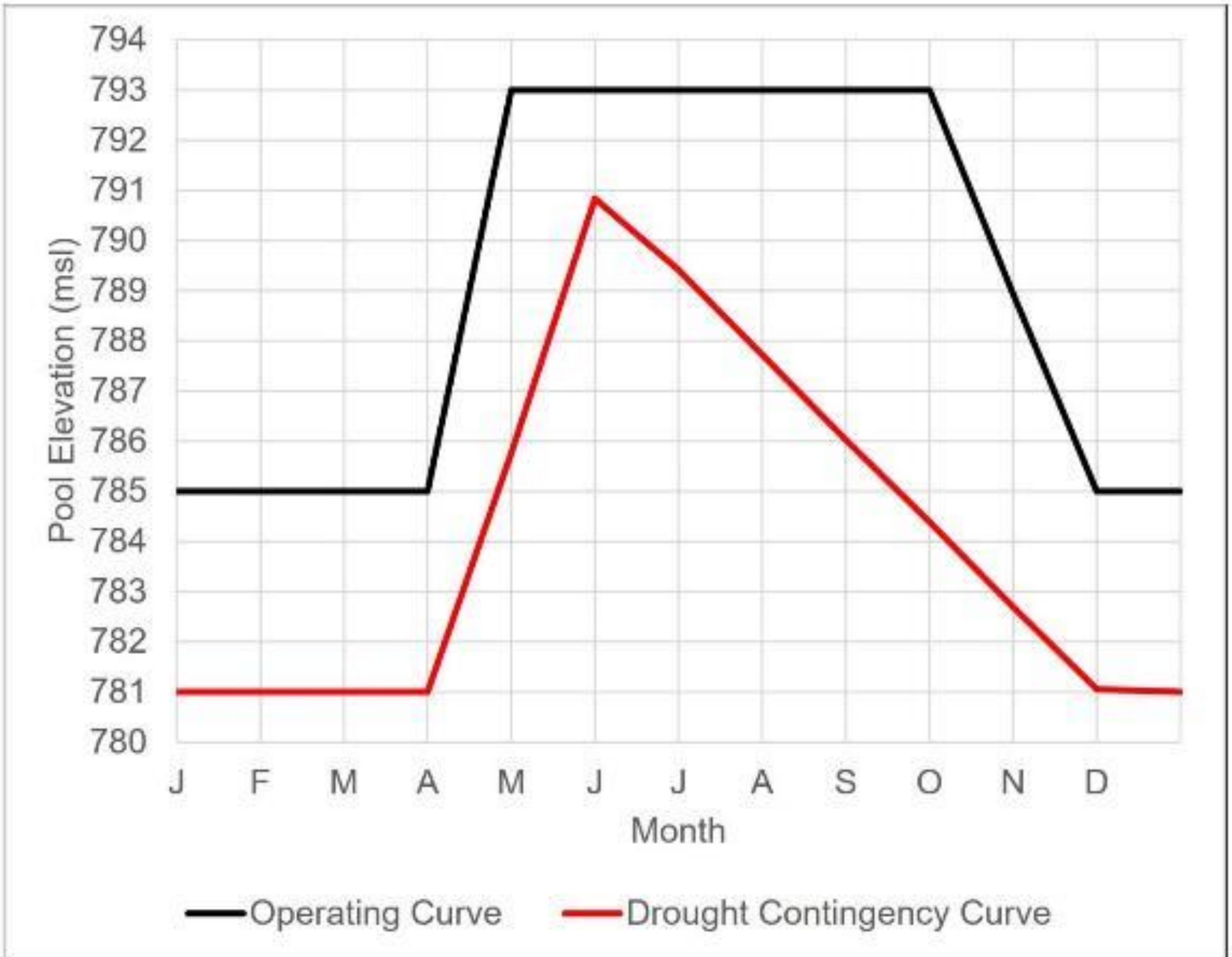


Figure 2-1. Harris Reservoir operating curve (Source: Alabama Power, 2021a).

GREEN PLAN OPERATIONS PROCEDURE

Alabama Power notes that while this version of the Green Plan looks different than that distributed with the various relicensing studies (e.g., the Downstream Release Alternatives Phase 2 Report), the operations outlined below are identical to the previous version. The document has been edited to remove the redundancy (e.g., two sections on the Daily Release Schedule) in the previous version and to make it more clear how the Harris Project is operated under the Green Plan.

STEP 1: CREATE SCHEDULE BASED ON PRIOR DAY'S HEFLIN FLOW

Prior Day's Heflin Flow (DSF)	Generation At 6 AM	Generation At 12 Noon	Generation As System Needs	Total Machine Time	Daily Volume Release (DSF)
0 < HEFLIN Q < 150	10 MIN	10 MIN	10 MIN	30 MIN	133
150 < HEFLIN Q < 300	15 MIN	15 MIN	30 MIN	1 HR	267
300 < HEFLIN Q < 600	30 MIN	30 MIN	1 HR	2 HRS	533
600 < HEFLIN Q < 900	30 MIN	30 MIN	2 HRS	3 HRS	800
900 < HEFLIN Q	30 MIN	30 MIN	3 HRS	4 HRS	1,067

STEP 2: ADD ADDITIONAL PEAK GENERATION AS NEEDED

STEP 3: ADJUST SCHEDULE IF NECESSARY

TOTAL SCH GENERATION	Generation At 6 AM	Generation At 12 Noon	Generation As System Needs	Total Machine Time	Daily Volume Release (DSF)
IF GENERATION = 1 MACH HR	15 MIN	15 MIN	30 MIN	1 HR	267
IF GENERATION = 2 MACH HRS	30 MIN	30 MIN	1 HR	2 HRS	533
IF GENERATION = 3 MACH HRS	30 MIN	30 MIN	2 HRS	3 HRS	800
IF GENERATION = 4 MACH HRS	30 MIN	30 MIN	3 HRS	4 HRS	1,067
IF GENERATION = 5 MACH HRS			ALL		

INTERPRETATION OF THE ADJUST SCHEDULE TABLE

If less than two machine hours are scheduled for a given day, then the generation will be scheduled as follows:

i. One-fourth of the generation will be scheduled at 6 AM.
ii. One-fourth of the generation will be scheduled at 12 Noon.
iii. One-half of the generation will be scheduled for the peak load.
iv. If the peak load is during the morning, one-fourth of the generation will be scheduled at 6 PM.

If two to four machine hours are scheduled for a given day, then generation will be scheduled as follows:

i. Thirty minutes of generation will be scheduled at 6 AM.
ii. Thirty minutes of generation will be scheduled at 12 Noon.
iii. The remaining generation will be scheduled for the peak load.
iv. If the peak load is during the morning, thirty minutes of the generation will be scheduled at 6 PM.

NOTES

1) Scheduling of generation does not preclude the addition of generation at any time.
2) All start times are approximate.
3) If the system does not dictate generation during the PM, a pulse will be scheduled at 6 PM.
4) Two Unit Operation
   a. On the average, there will be more than 30 minutes between the start times between the two units.
   b. Two units may come online with less than 30 minute difference in their start times for flood control and for system emergency needs.
5) The minimum flow procedure will be suspended during any of the following conditions:
   a. The Tallapoosa River has been placed under flood control operations.
   b. Alabama Power has declared that conditions exist that threaten the spring filling of Harris Reservoir.
6) The required Daily Volume Release will be at least 75% of the prior day's flow at the USGS Heflin gage.
7) In the unlikely event that the Heflin gage is not in service, the "Prior's Day Heflin Flow" in the first table will be calculated as 1.6 times the flow at the Tallapoosa, GA gage (USGS Gage No. 02411930). This is based on the ratio of the drainage area above the Heflin gage to the Tallapoosa, GA gage.
8) Drought Release Criteria
   a. If the flows at the Heflin gage are less than 50 cfs, there will be two ten minute pulses per day, which will result in a Daily Volume Release of approximately 85 DSF.
   b. The flows at Wadley will not be lower than the flows at Heflin.

Figure 2-2. Green Plan (Source: Alabama Power, 2021a).

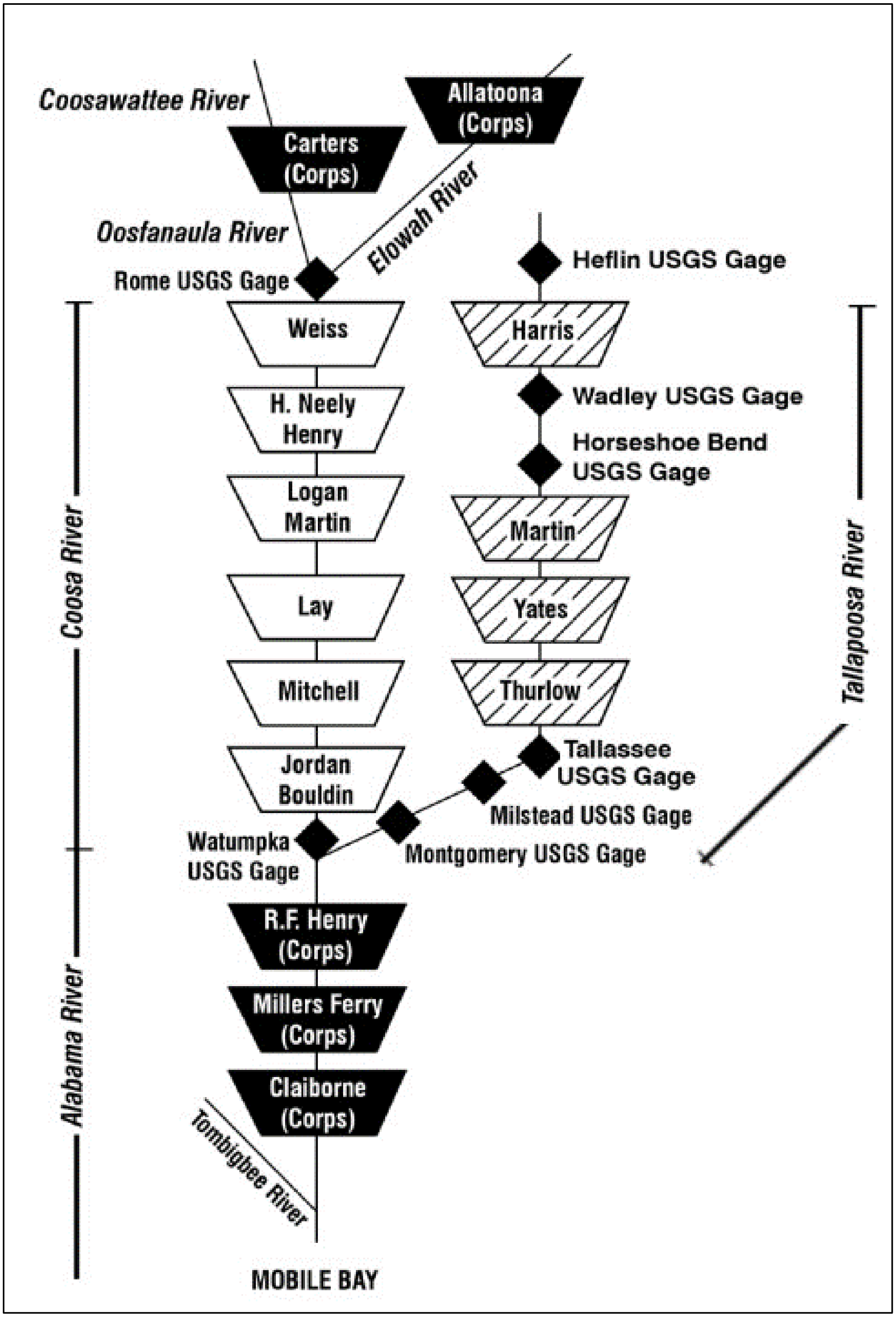


Figure 2-3. Schematic overview of the Harris Project (Source: Corps, 1998, as modified by staff).

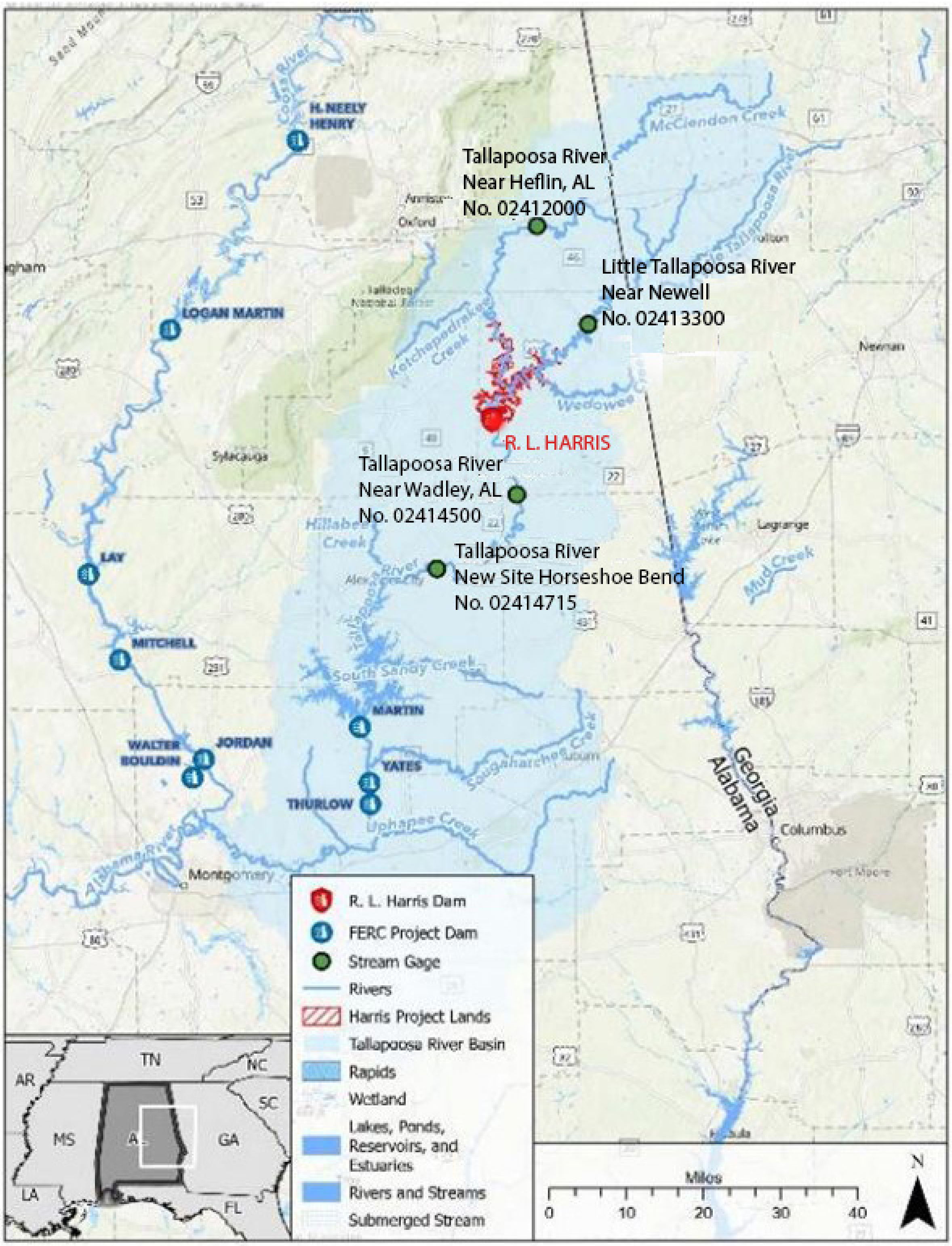


Figure 2-4. The flow of water through the project (Source: Alabama Power, 2022a, as modified by staff).

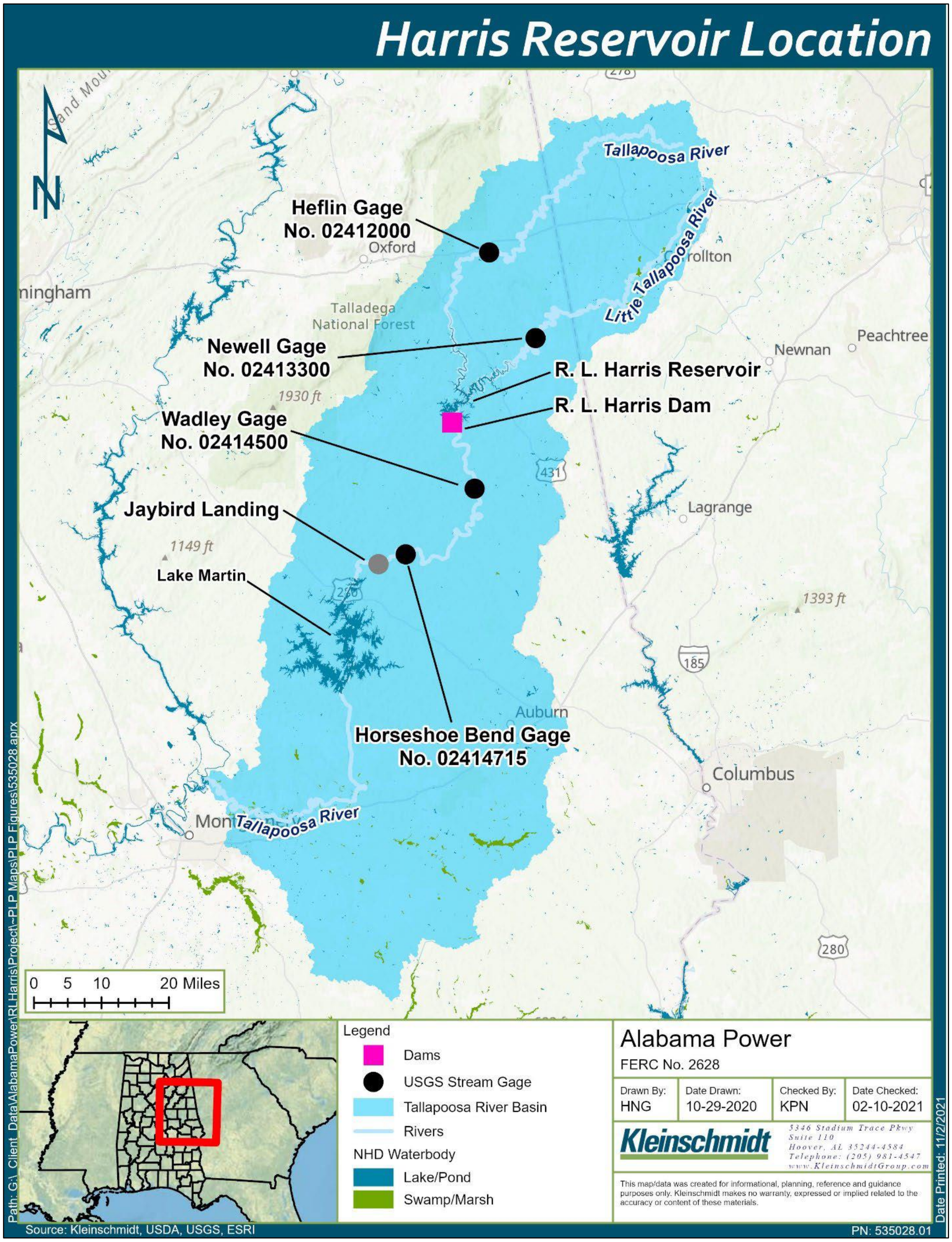
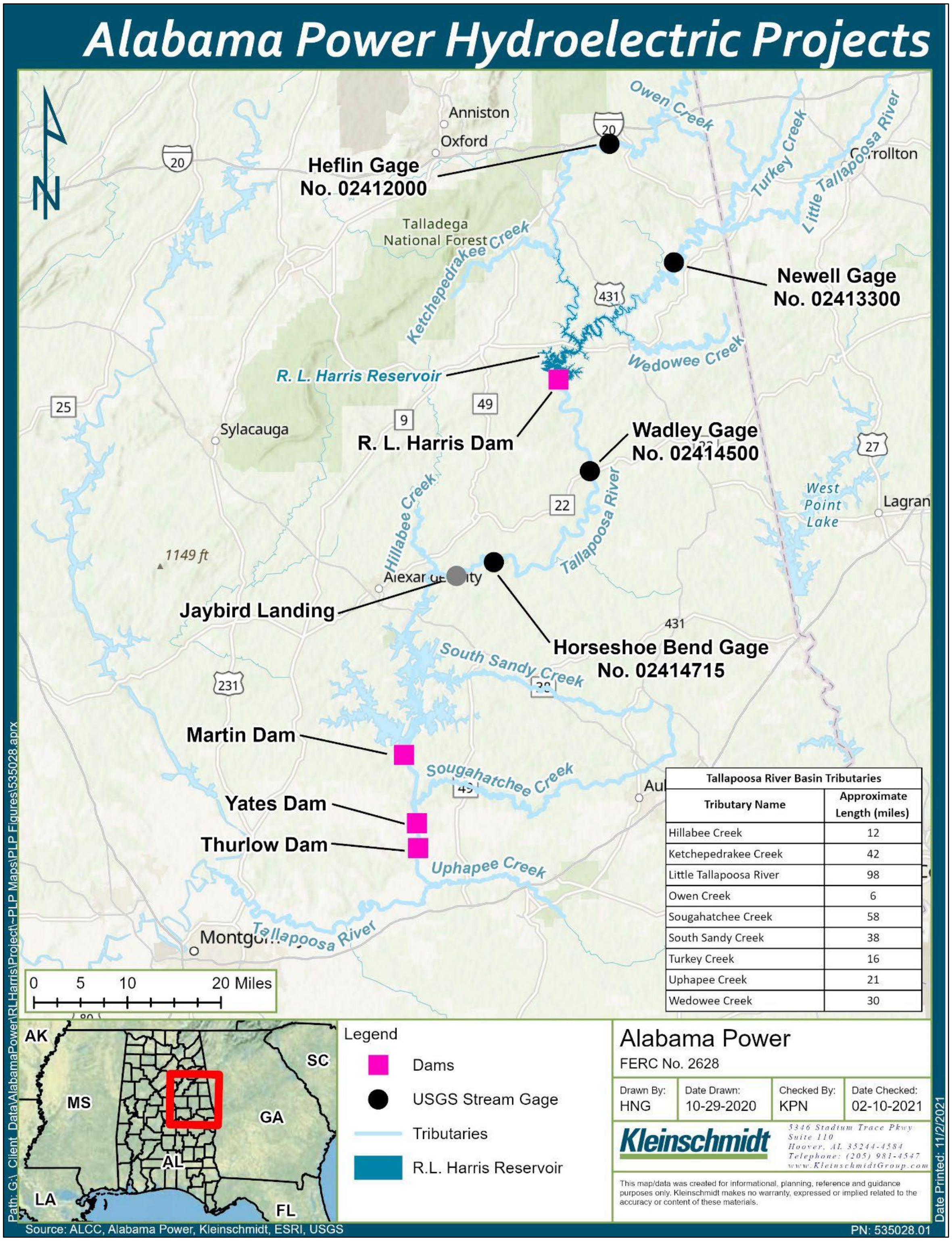


Figure 3.1-1. Map of the Tallapoosa River Basin with the location of the Harris Project and USGS gages within it (Source: Alabama Power, 2022a).



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 3.1-2. Alabama Power's Hydroelectric Projects on the Tallapoosa River (Source: Alabama Power, 2022a).

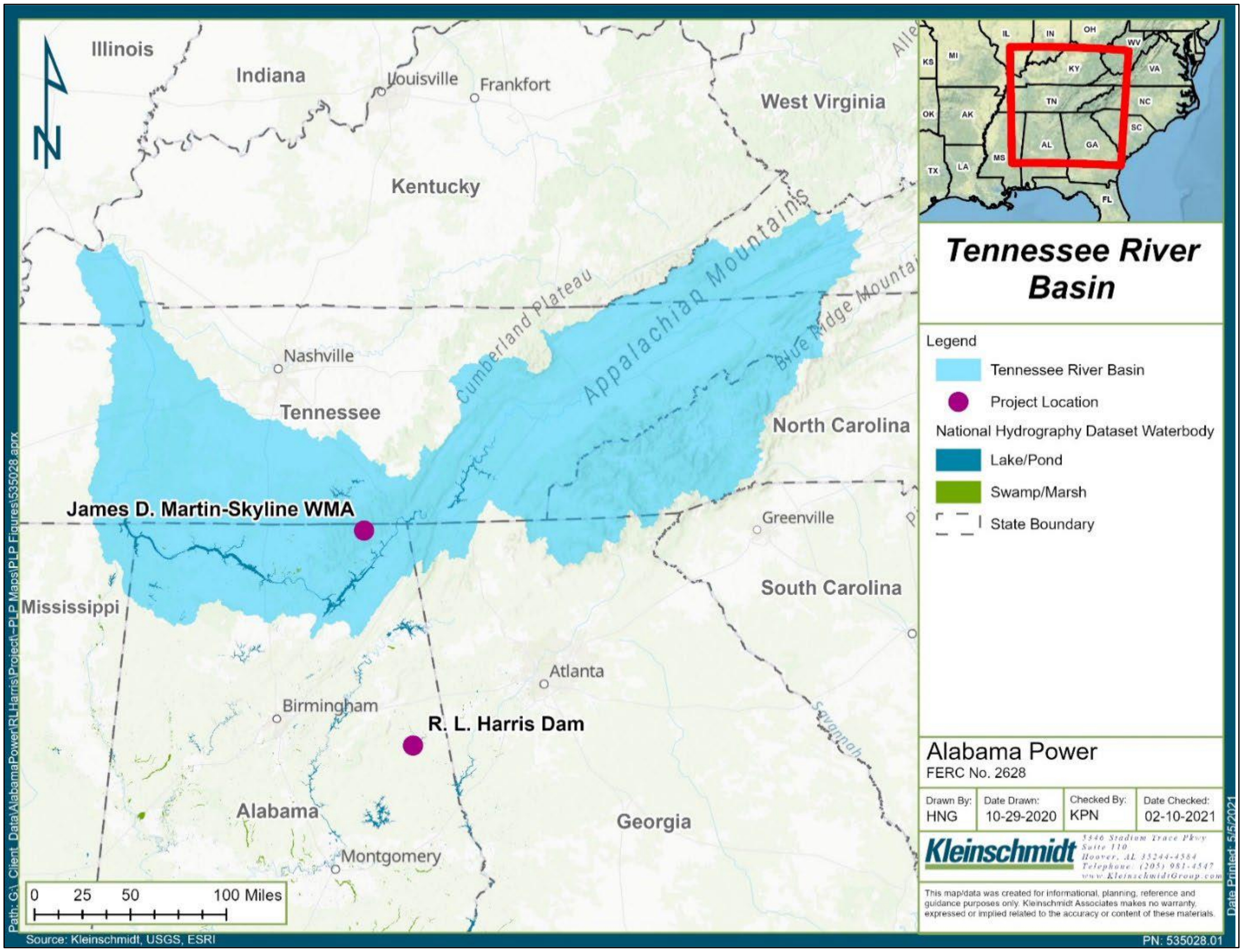


Figure 3.1-3. Map of the Tennessee River Basin (Source: Alabama Power, 2022a).

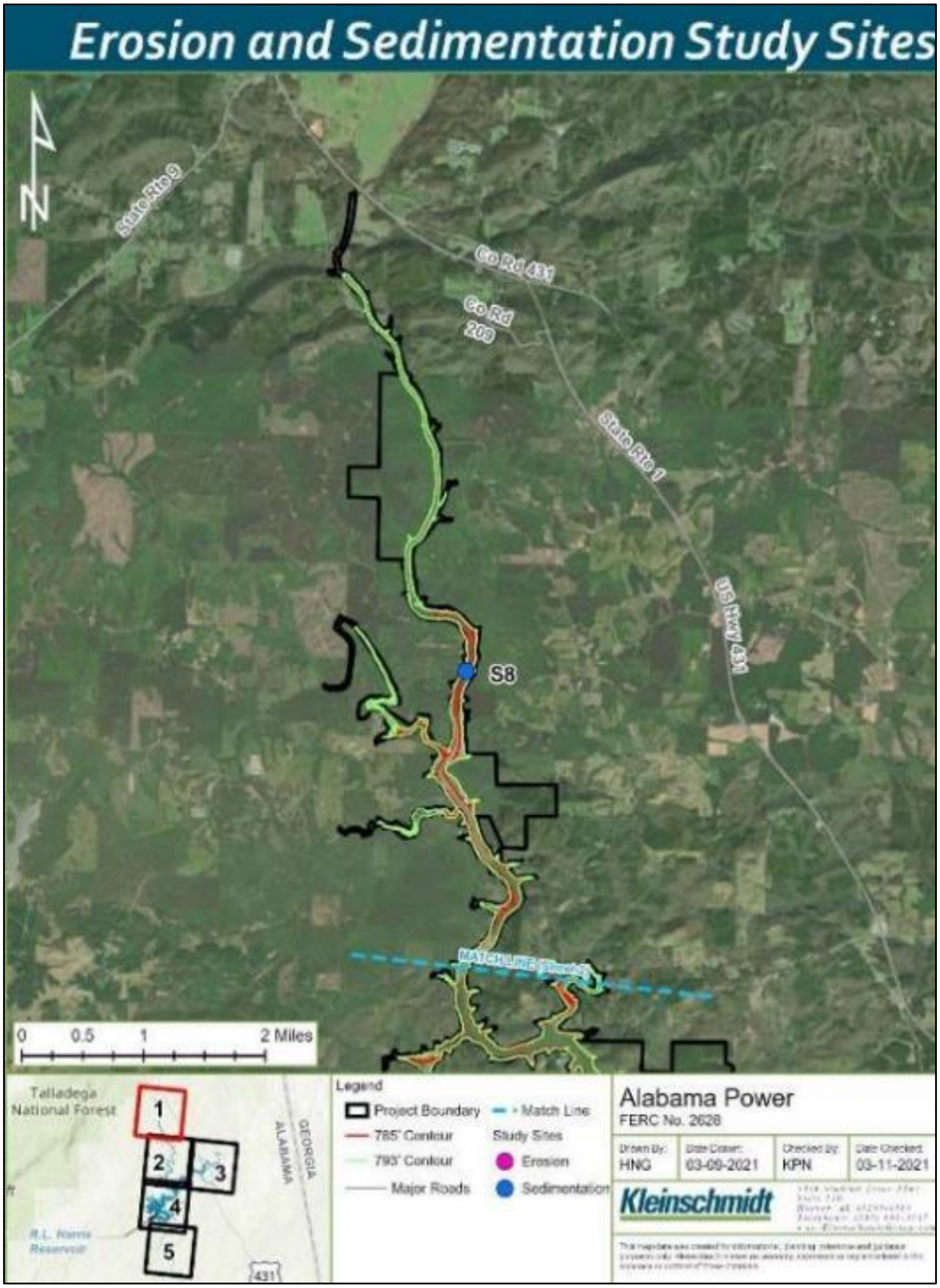


Figure 3.3.1-1. Location of existing erosion and sedimentation sites identified during the Erosion and Sedimentation Study – map 1 (Source: Alabama Power and Kleinschmidt, 2022b).

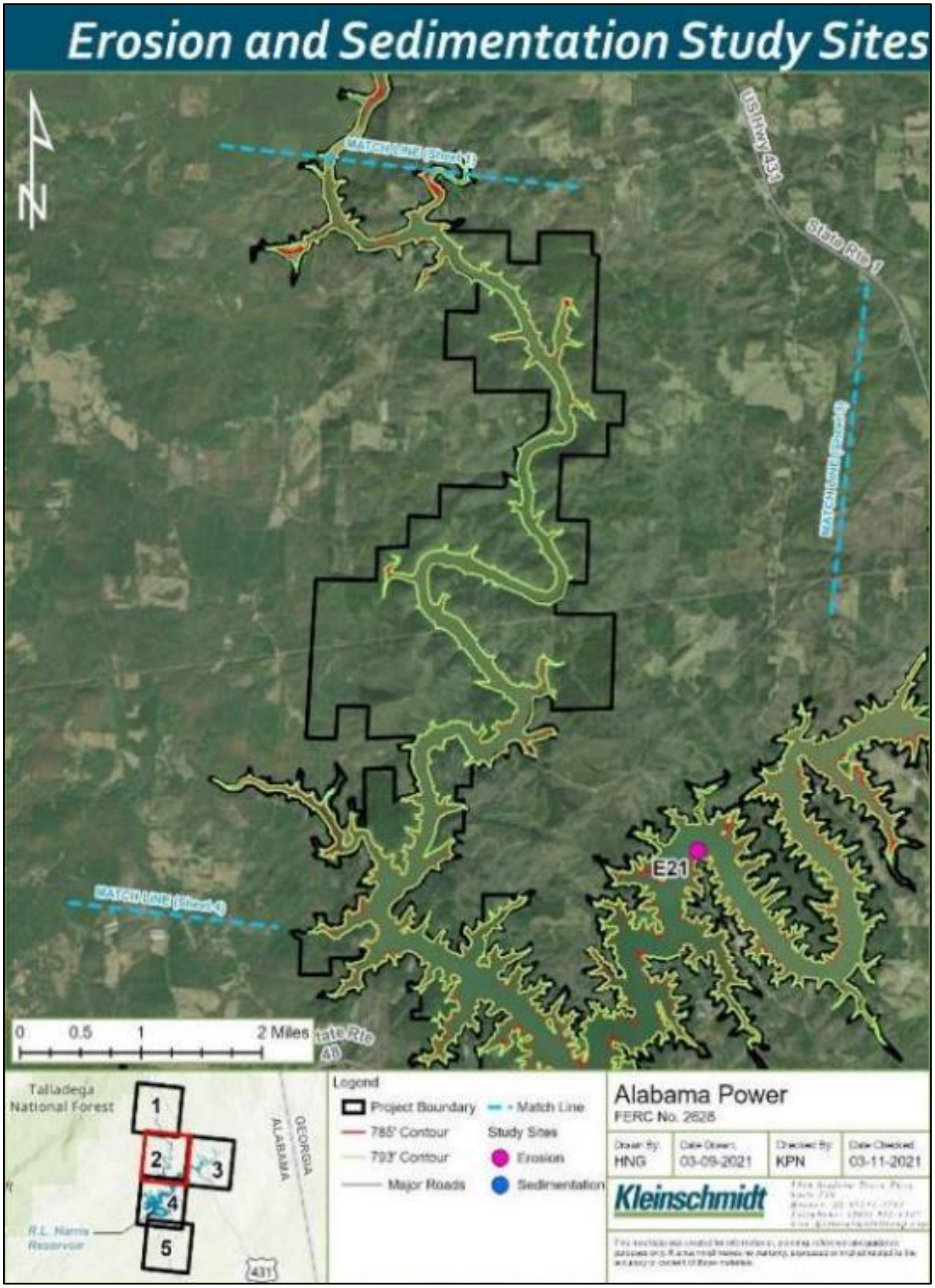


Figure 3.3.1-2. Location of existing erosion and sedimentation sites identified during the Erosion and Sedimentation Study – map 2 (Source: Alabama Power and Kleinschmidt, 2022b).

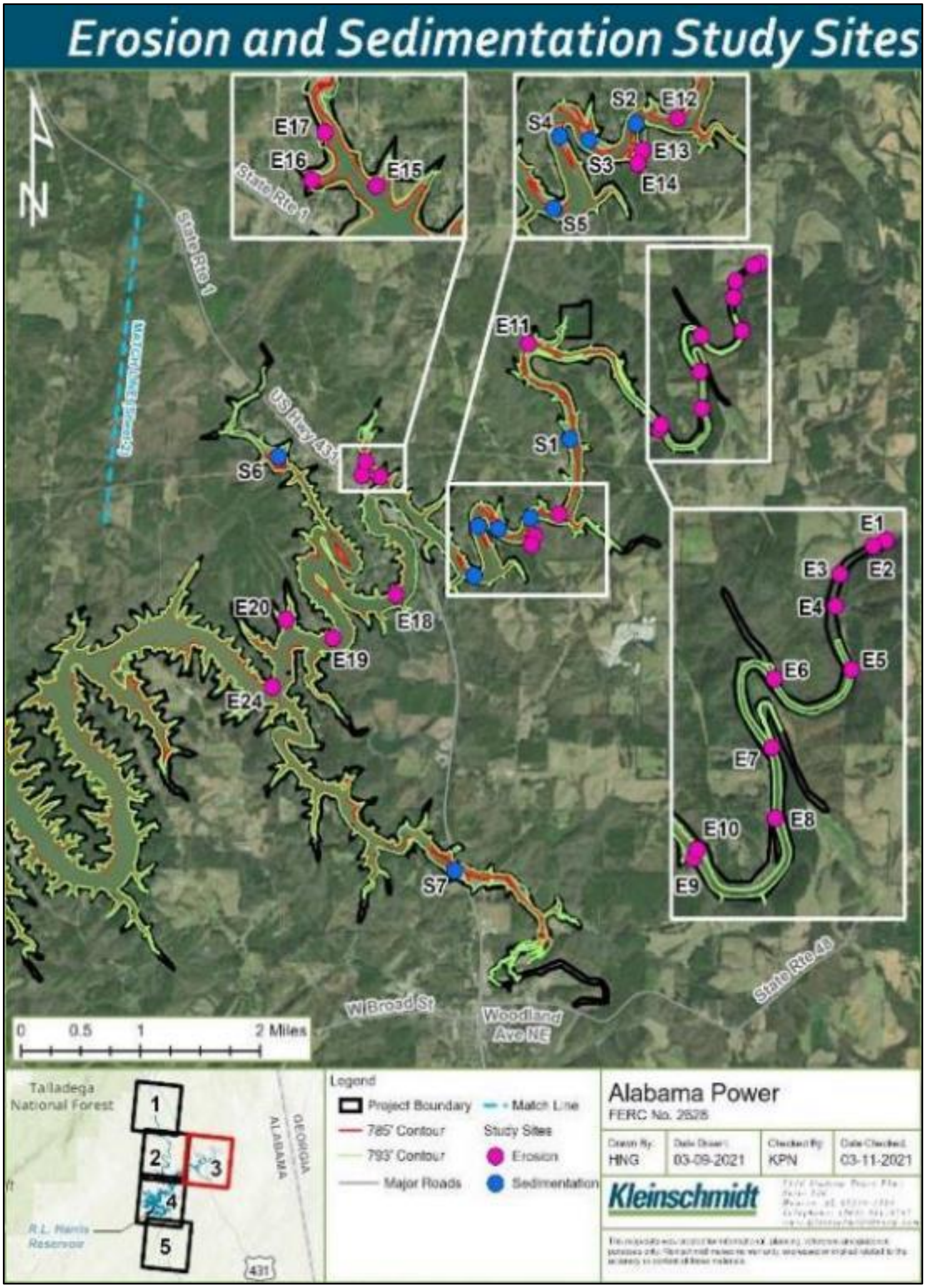


Figure 3.3.1-3. Location of existing erosion and sedimentation sites identified during the erosion and sedimentation study – map 3 (Source: Alabama Power and Kleinschmidt, 2022b).

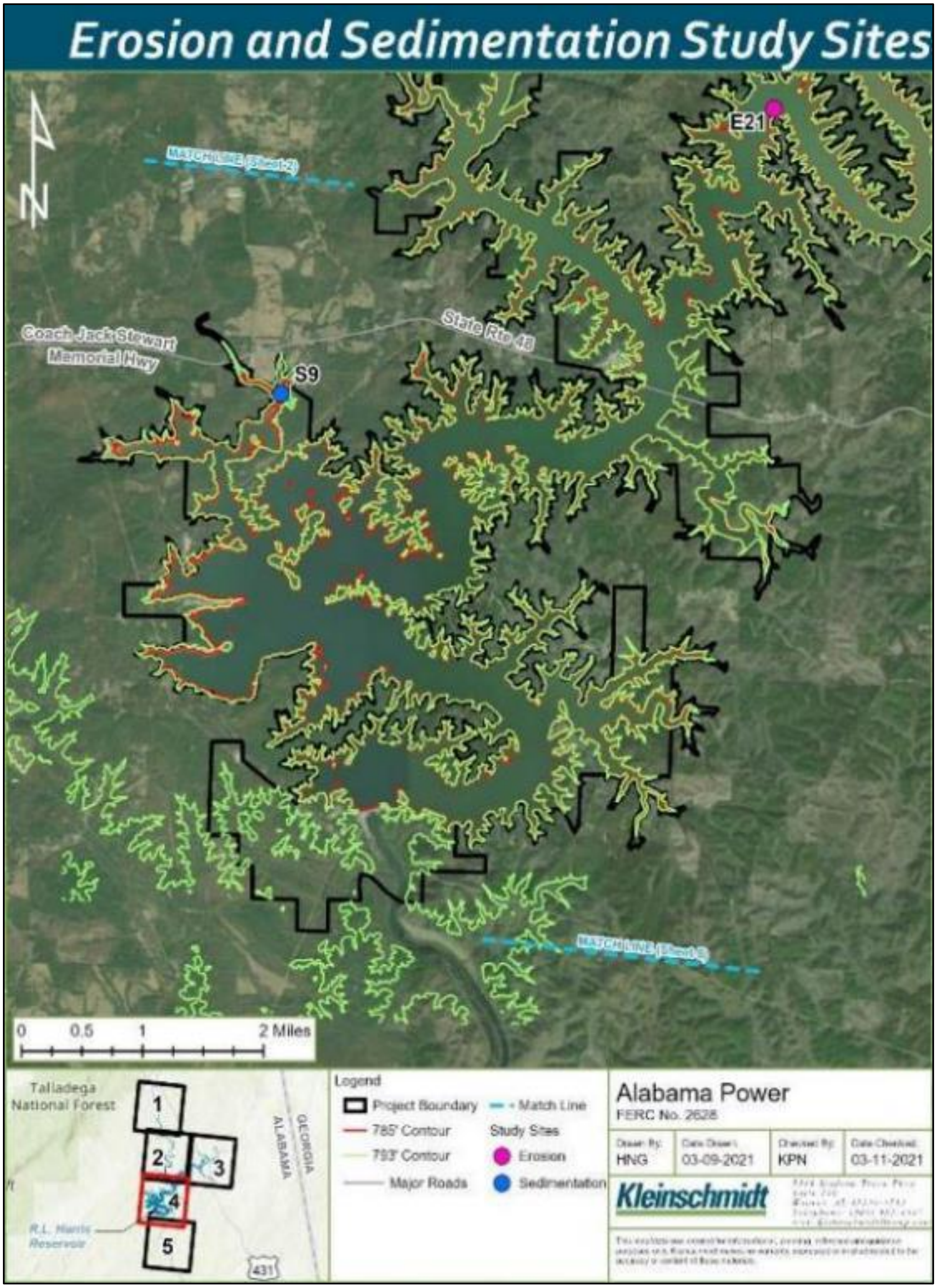


Figure 3.3.1-4. Location of existing erosion and sedimentation sites identified during the erosion and sedimentation study - map 4 (Source: Alabama Power and Kleinschmidt, 2022b).

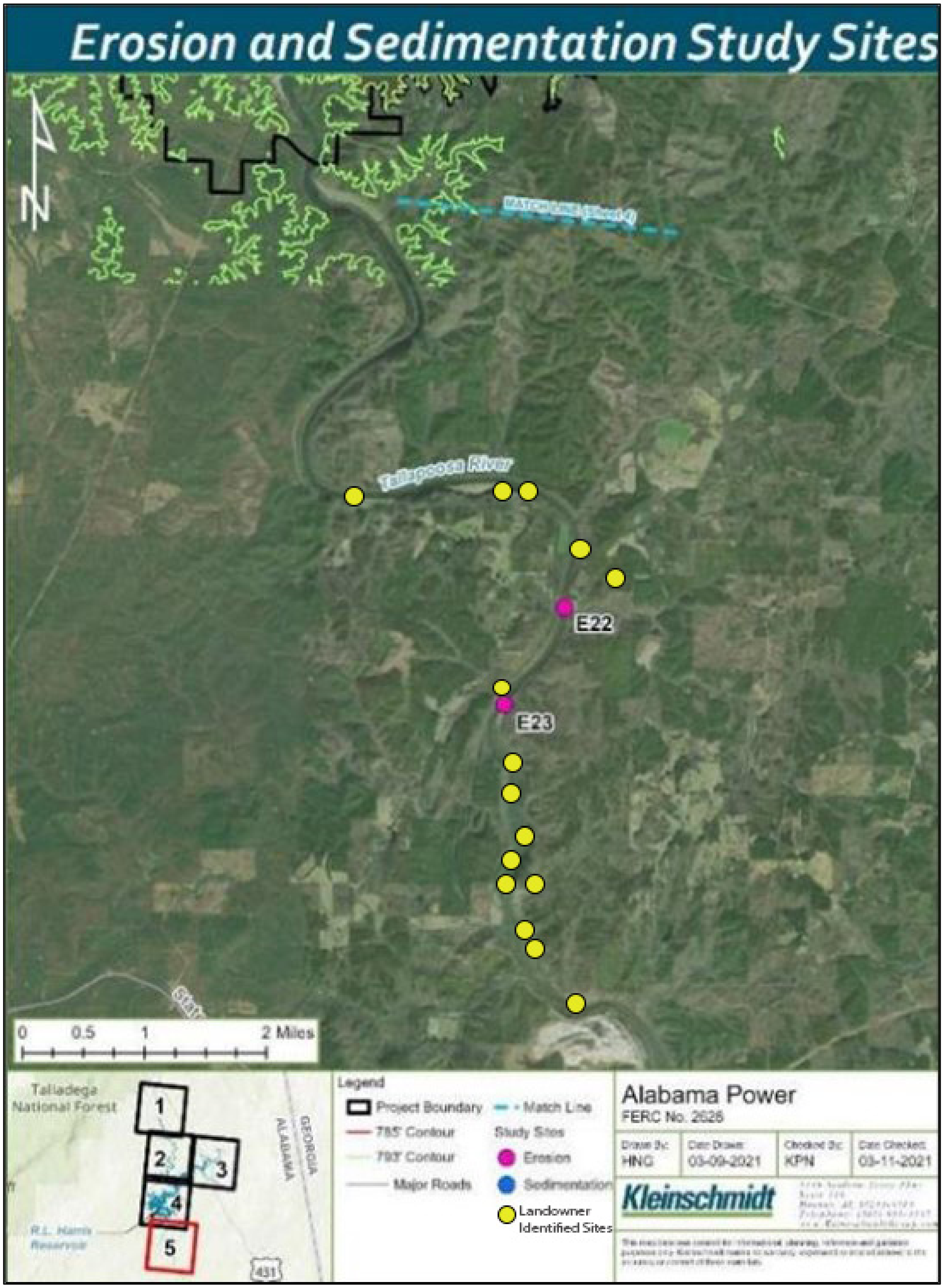


Figure 3.3.1-5. Location of existing erosion and sedimentation sites identified during the erosion and sedimentation study with additional downstream landowner-identified sites – map 5 (Source: Alabama Power and Kleinschmidt, 2022b, as modified by staff).

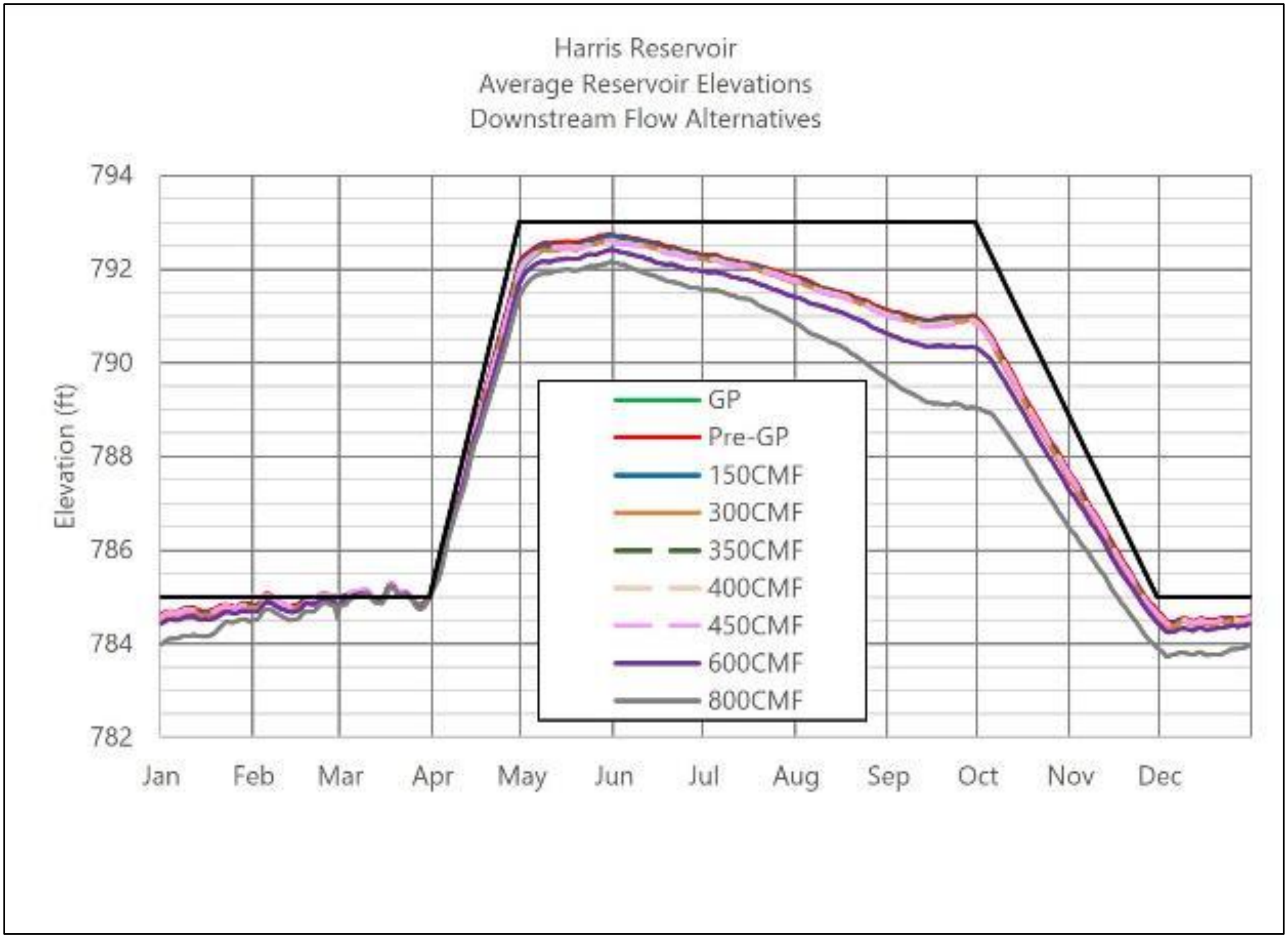


Figure 3.3.1-6. Harris Lake average water surface elevations under various release alternatives (Source: Alabama Power and Kleinschmidt, 2022a).

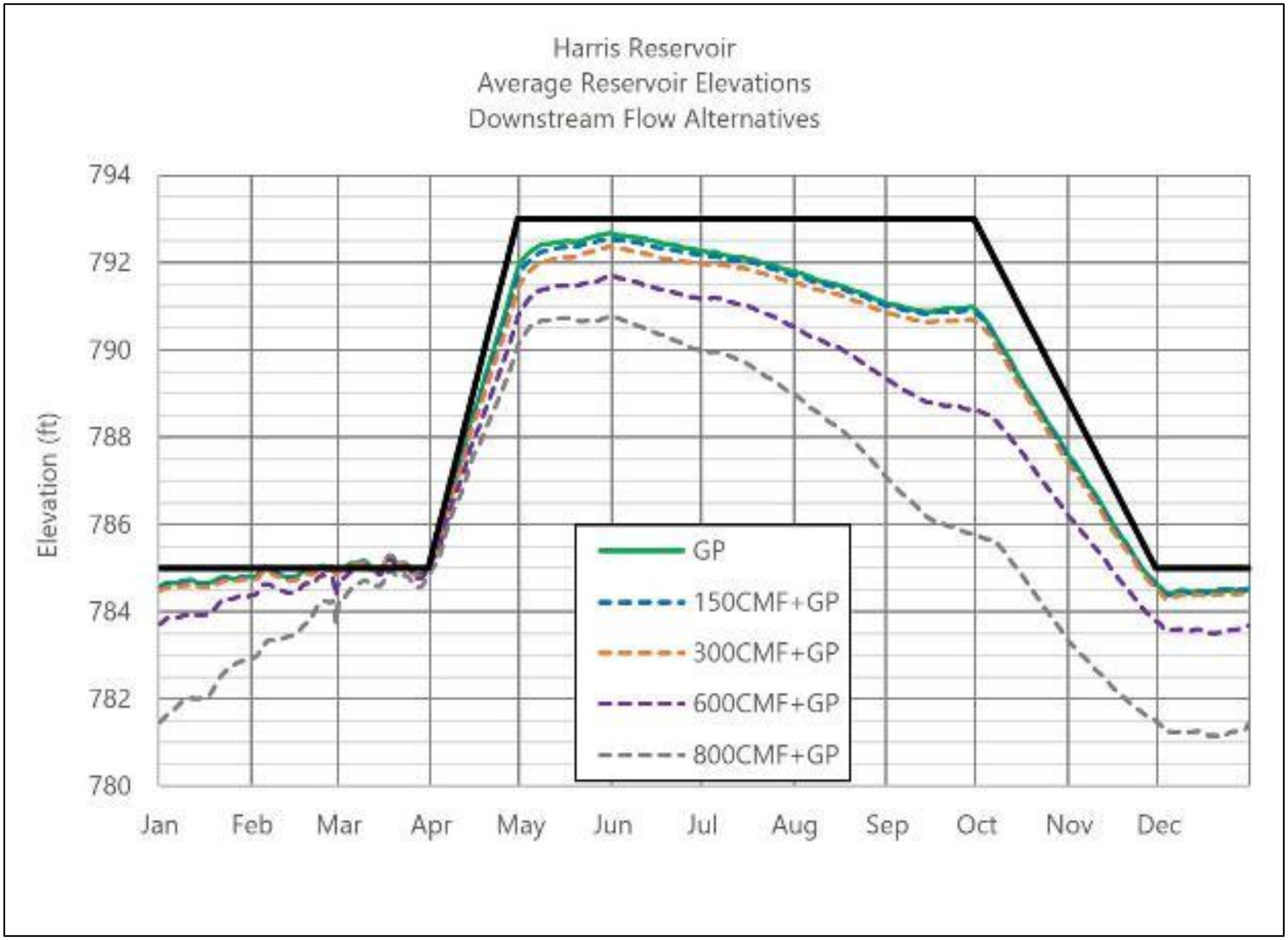


Figure 3.3.1-7. Harris Lake average water surface elevations under various release alternatives (Source: Alabama Power and Kleinschmidt, 2022a).

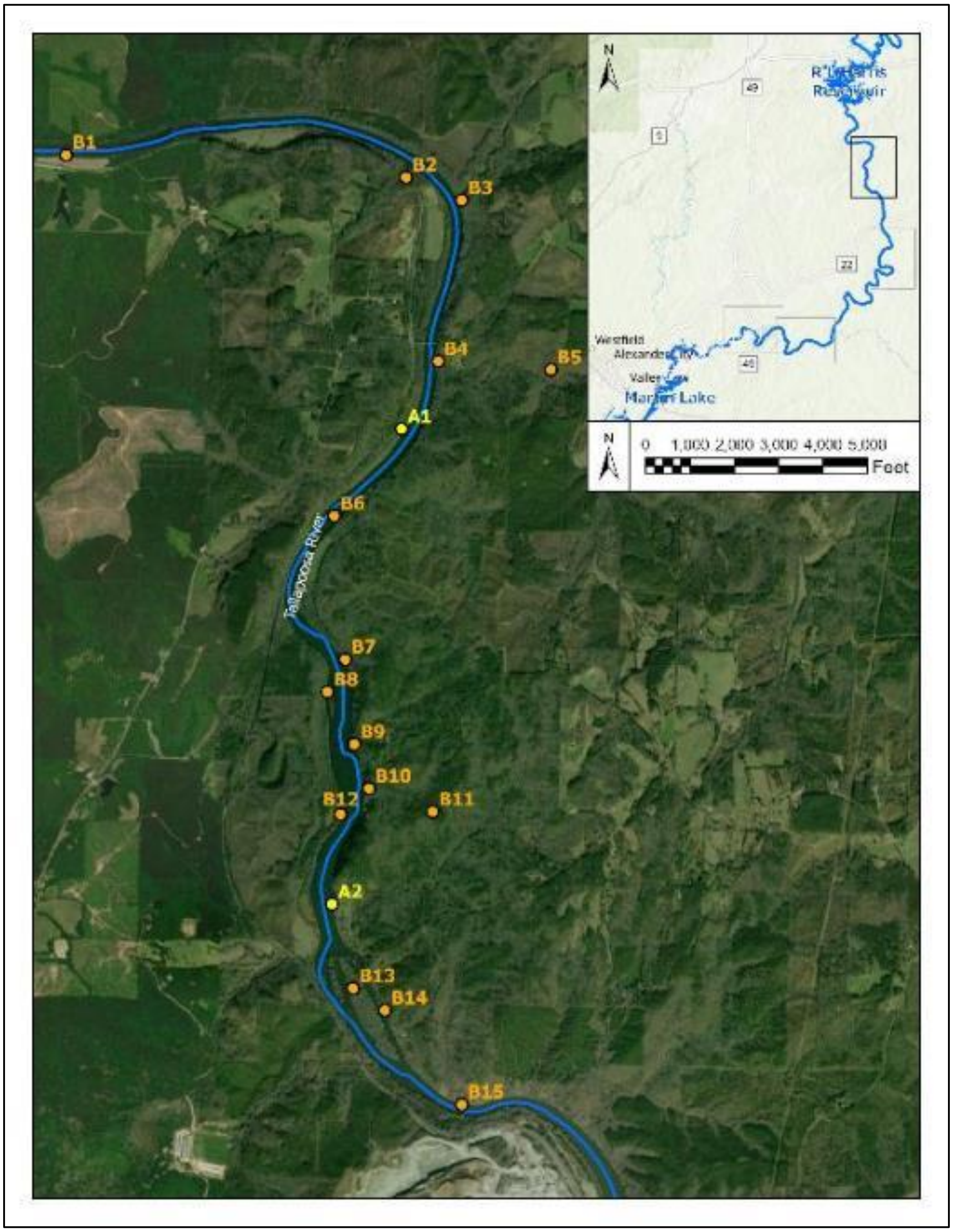


Figure 3.3.1-8. Erosion sites on the Tallapoosa River downstream from Harris Dam, #1 of 4 (Source: staff).

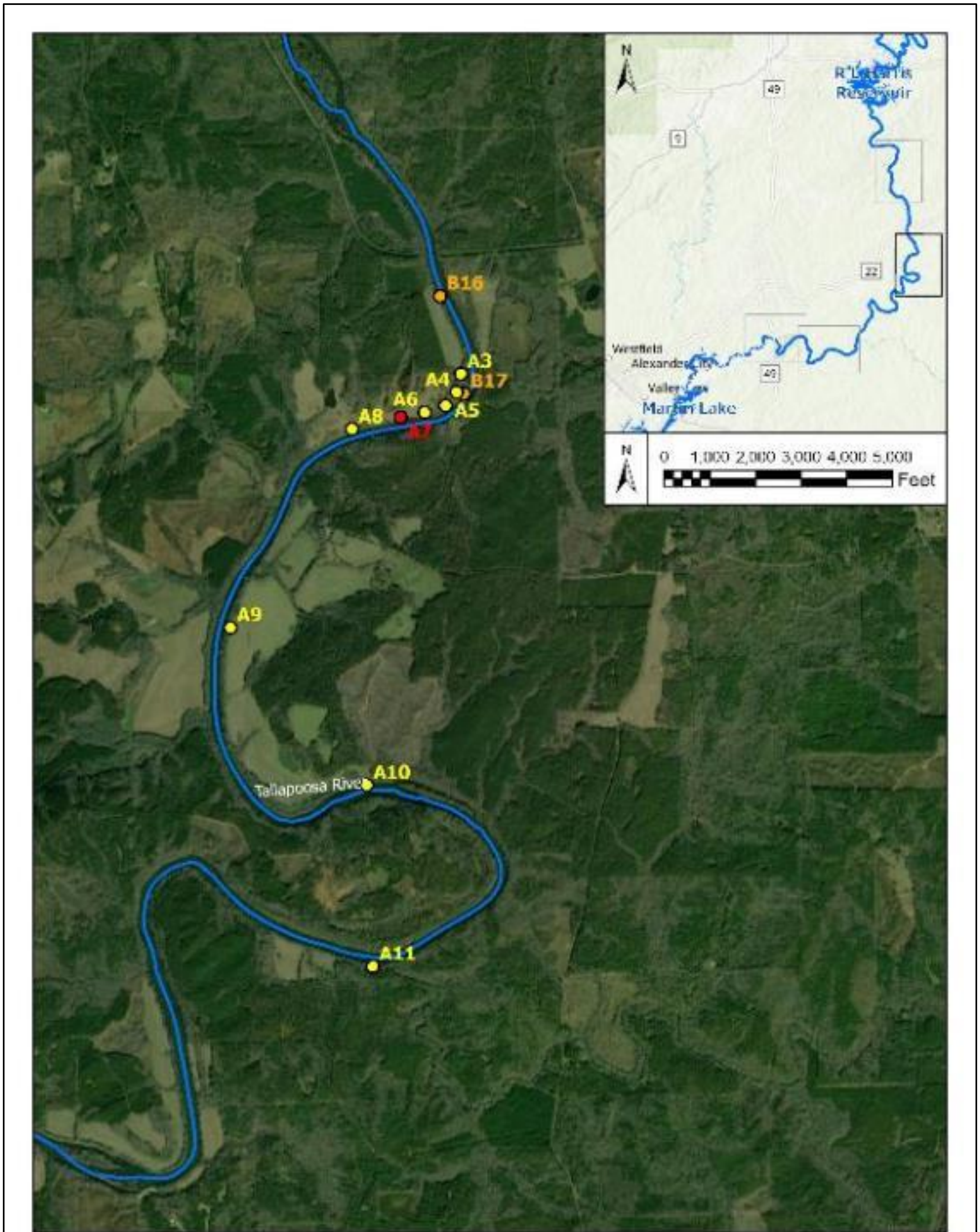


Figure 3.3.1-9. Erosion sites on the Tallapoosa River downstream from Harris Dam, #2 of 4 (Source: staff).

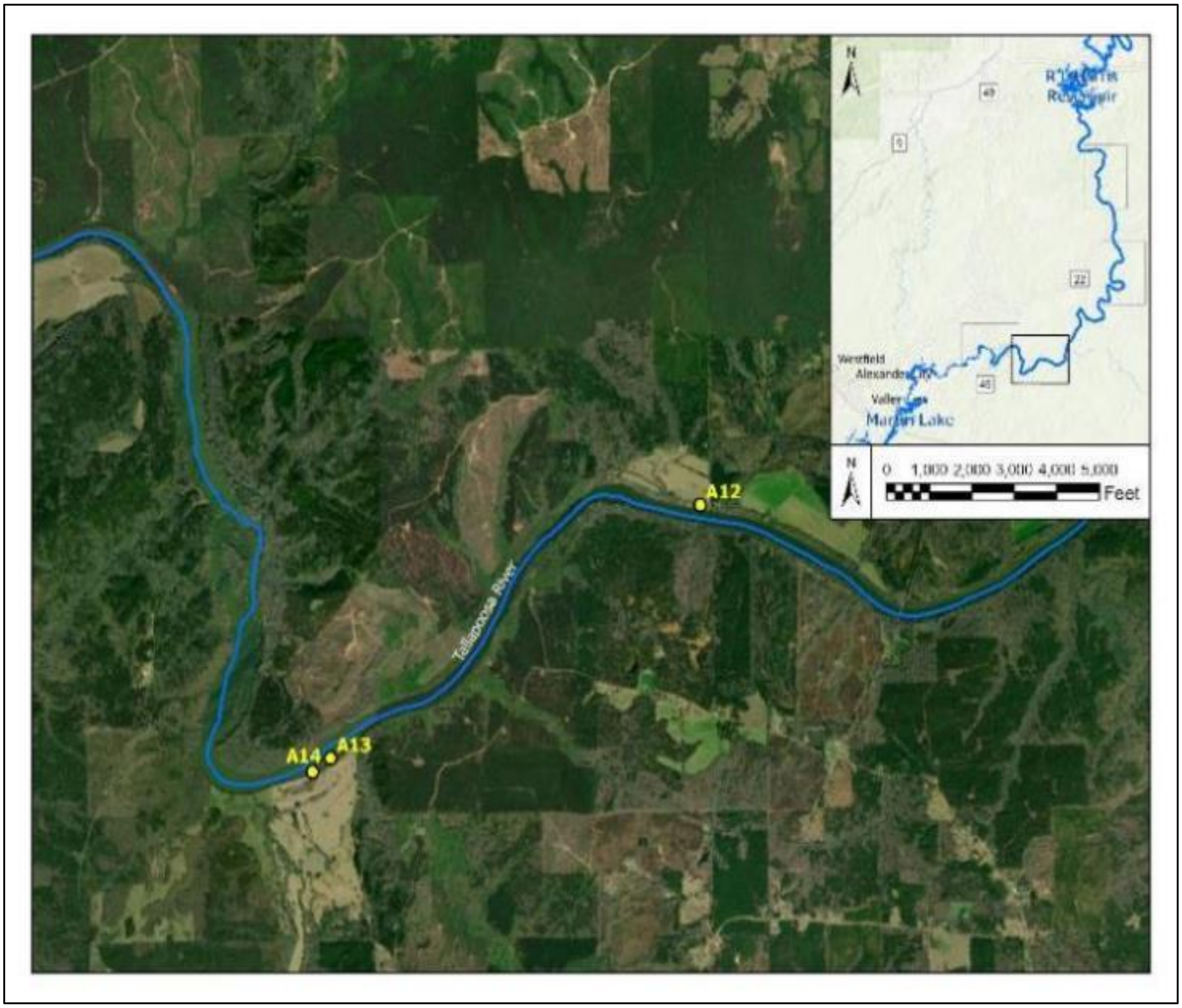


Figure 3.3.1-10. Erosion sites on the Tallapoosa River downstream from Harris Dam, #3 of 4 (Source: staff).

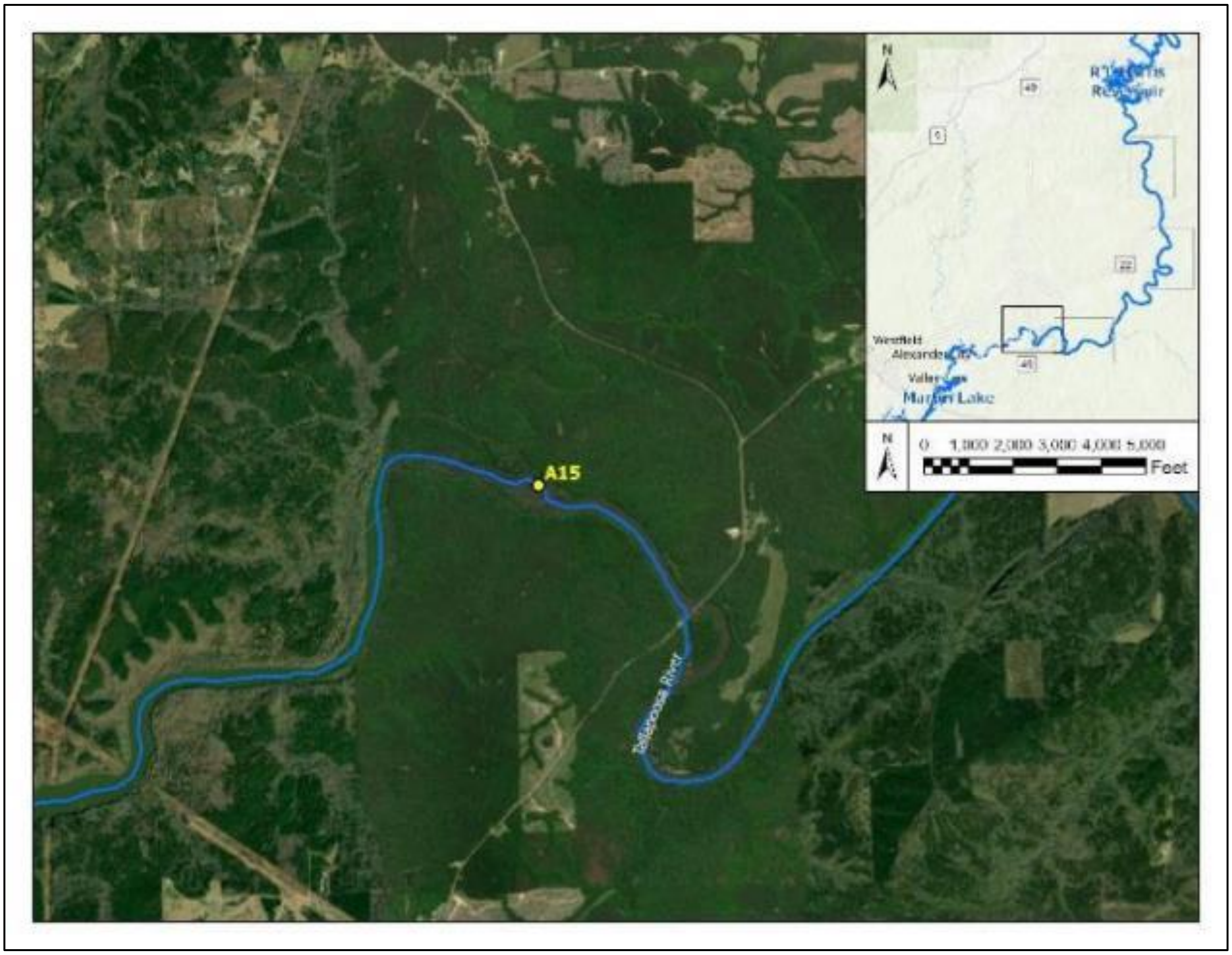


Figure 3.3.1-11. Erosion sites on the Tallapoosa River downstream from Harris Dam, #4 of 4 (Source: staff).

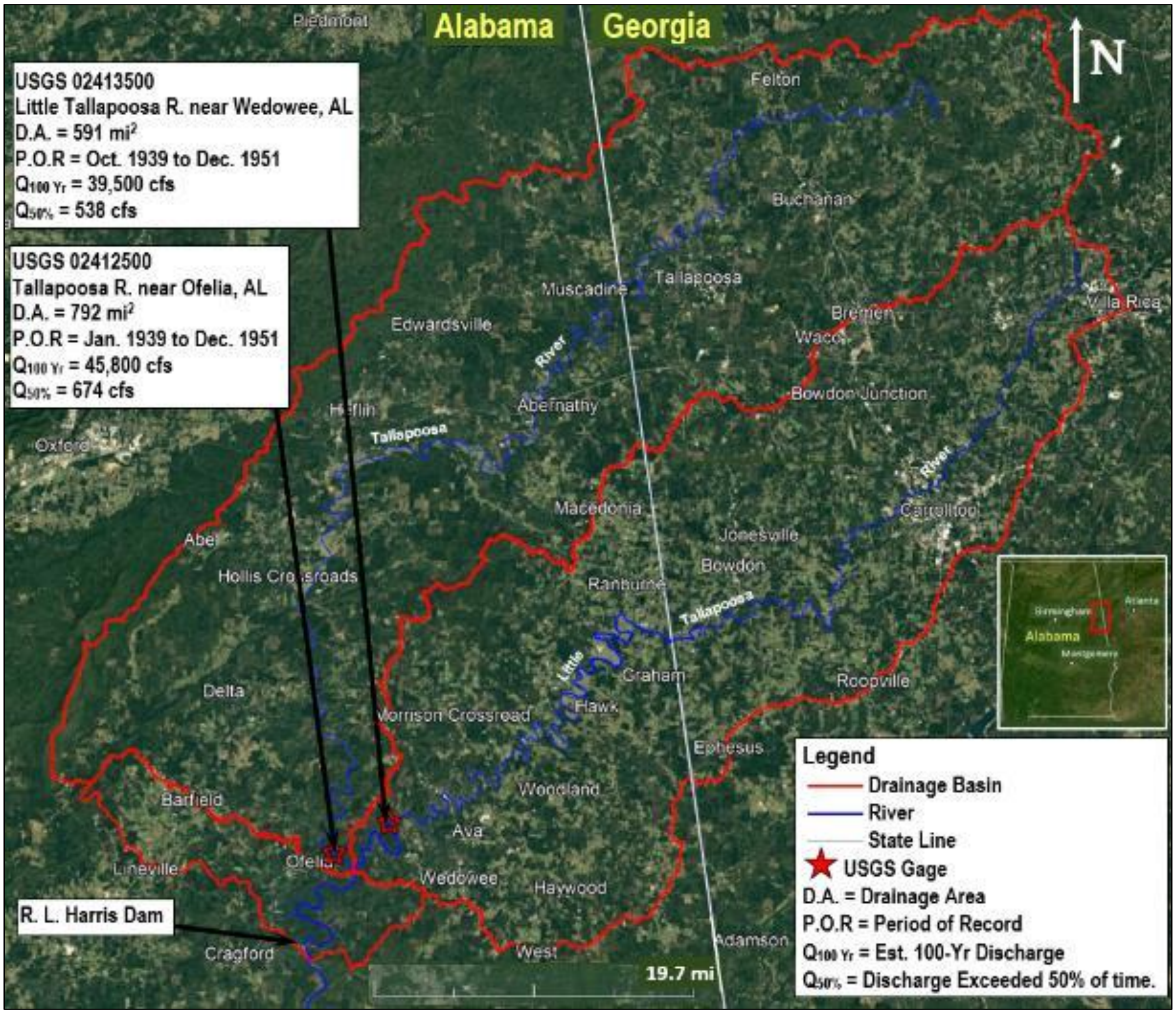


Figure 3.3.2-1. Map showing Harris Dam drainage area and subbasins with locations of Wedowee and Ofelia USGS gages (Source: staff).

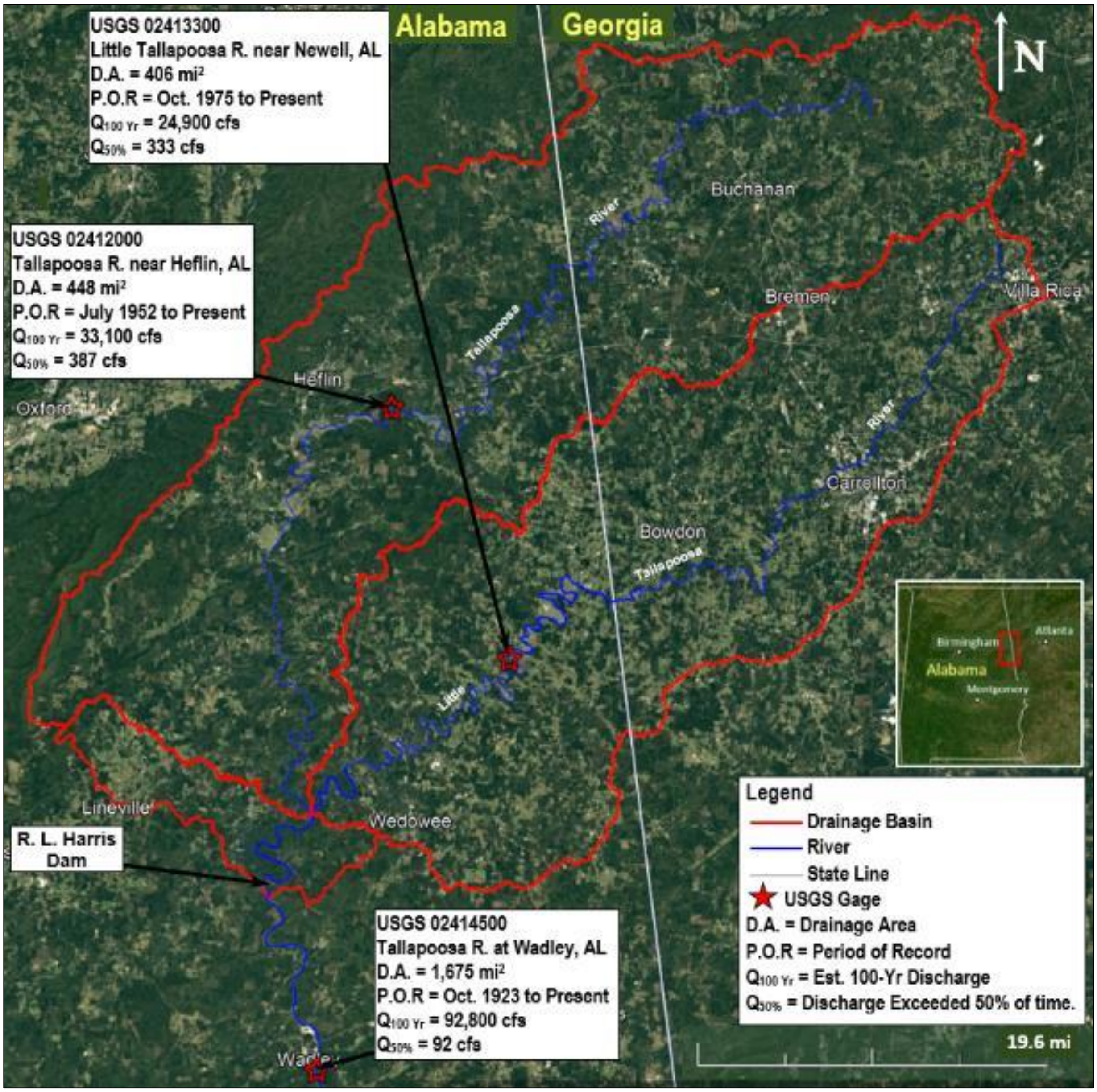


Figure 3.3.2-2. Map showing Harris Dam drainage area and subbasins with location of Newell, Heflin, and Wadley USGS gages (Source: staff).

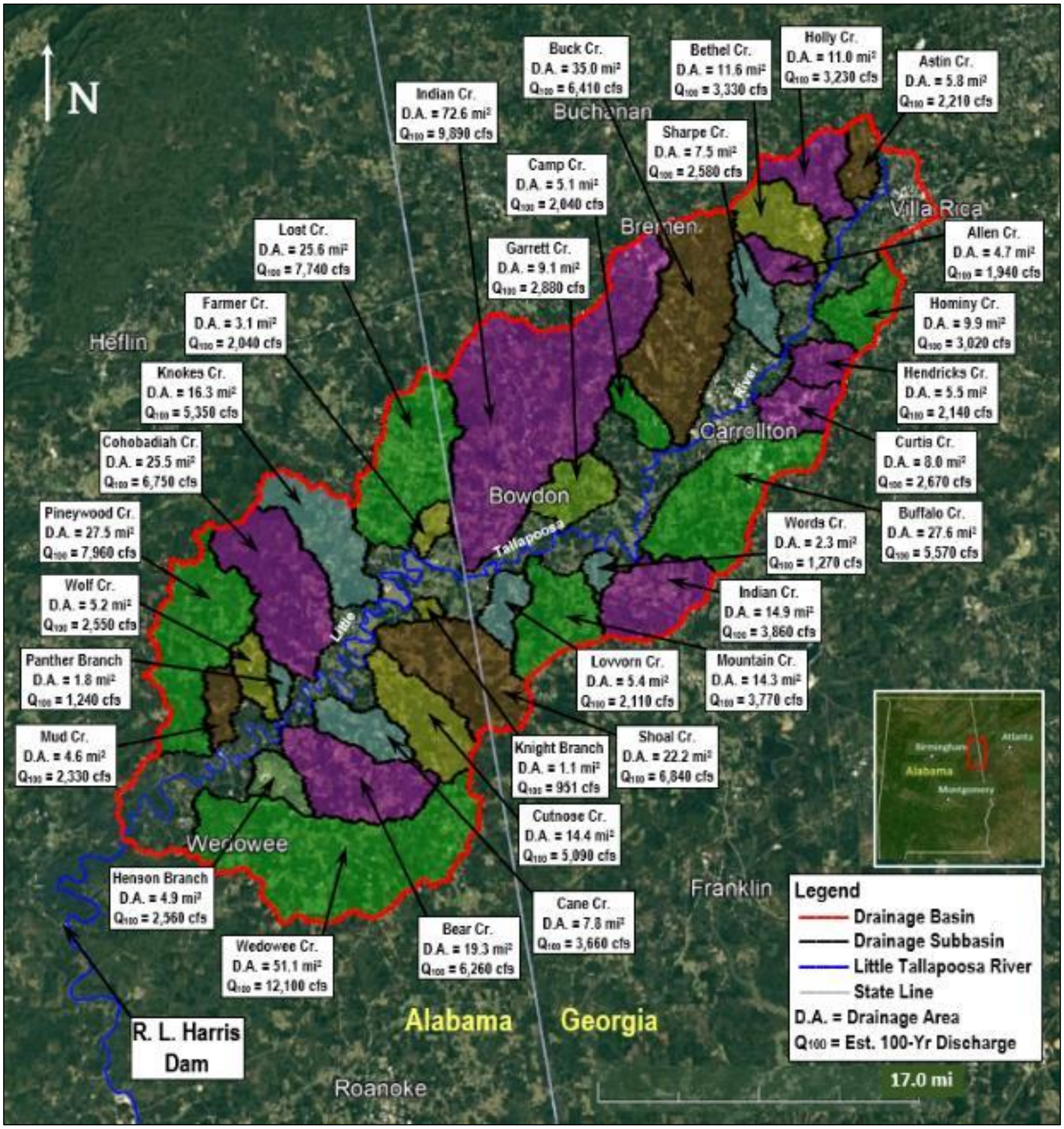


Figure 3.3.2-3. Little Tallapoosa River basin drainage area (Source: staff).

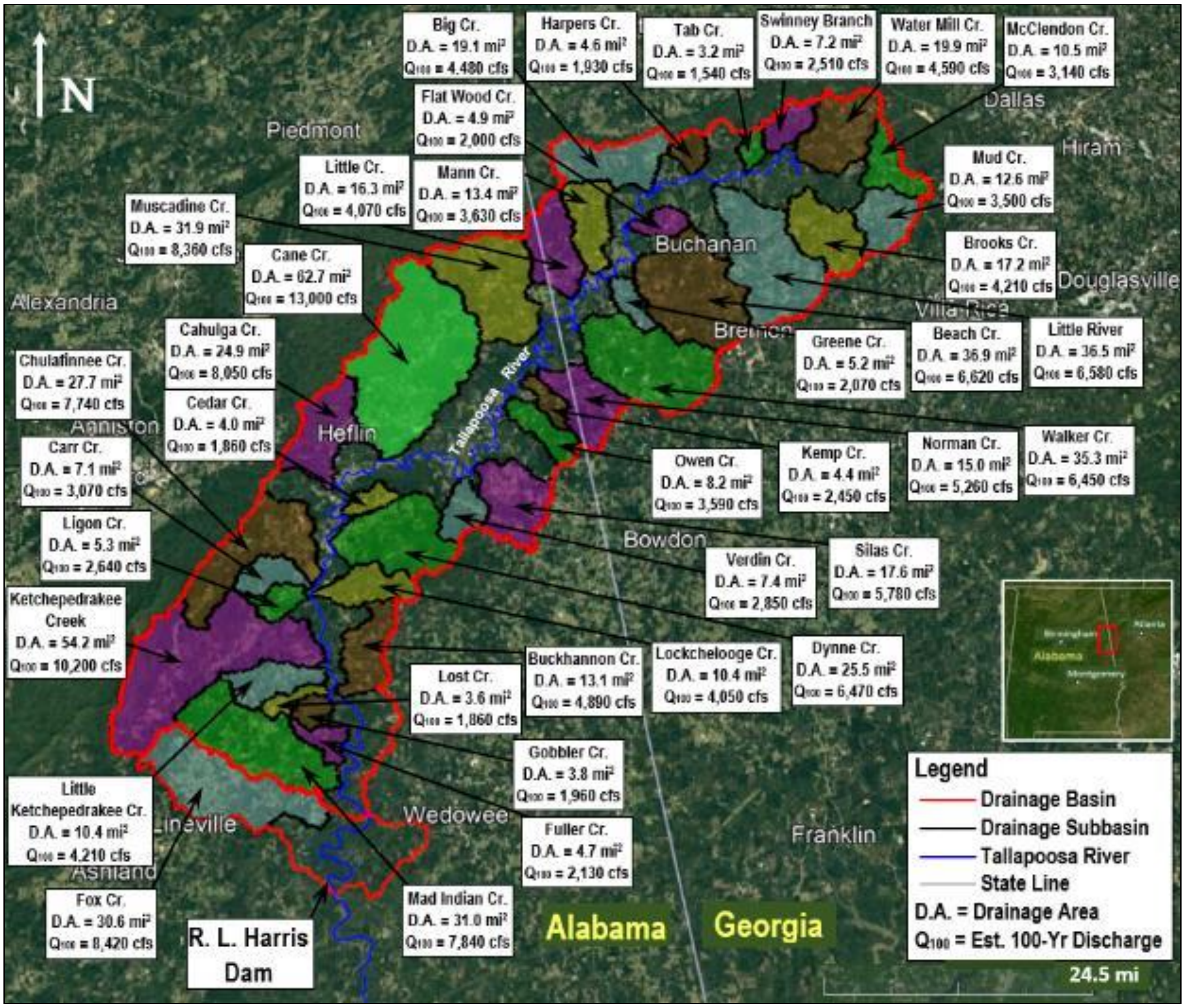


Figure 3.3.2-4. Tallapoosa River basin drainage area (Source: staff).

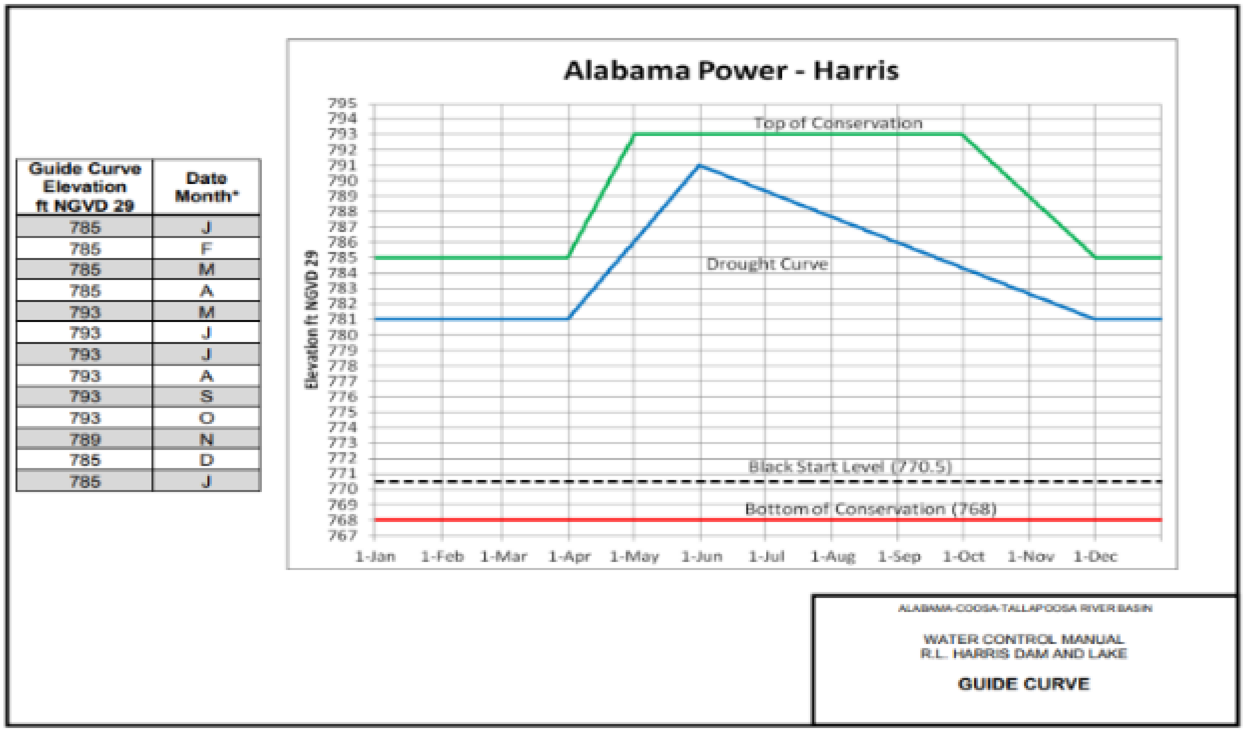


Figure 3.3.2-5. Alabama Power's operating curve (Source: Alabama Power and Kleinschmidt, 2022a).

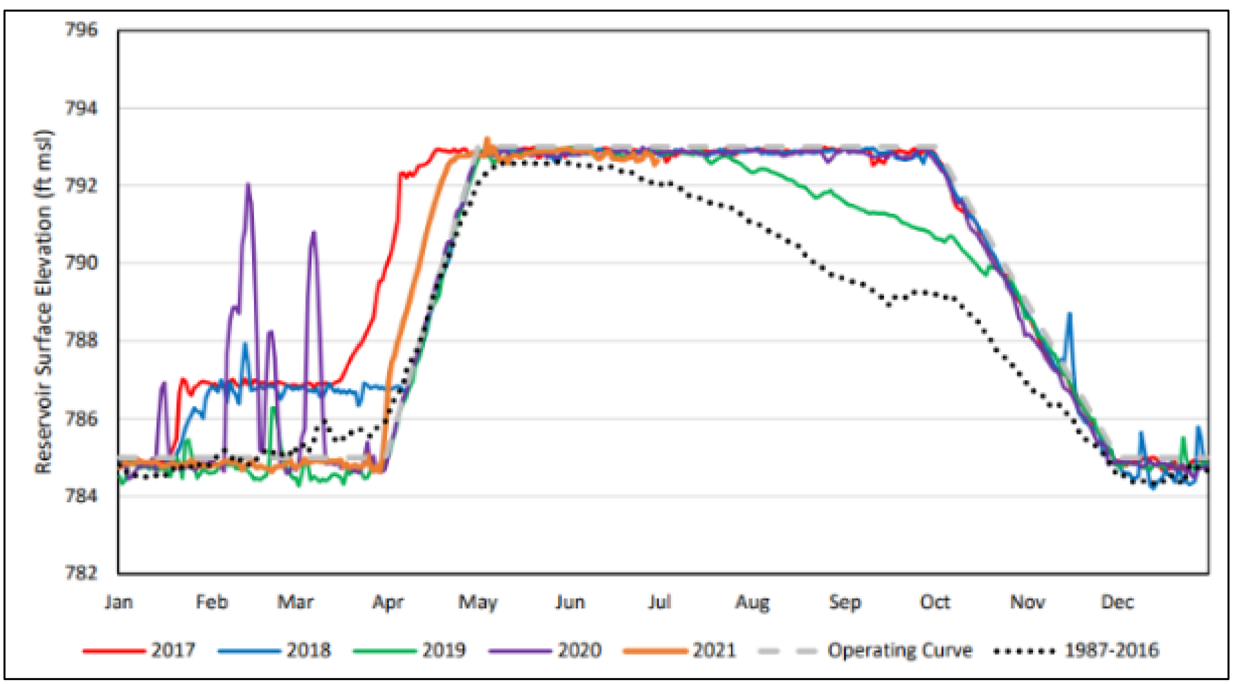


Figure 3.3.2-6. Actual Harris Lake surface elevations from 2017 to 2021, compared to Alabama Power's operating curve (Source: Alabama Power and Kleinschmidt, 2022a).

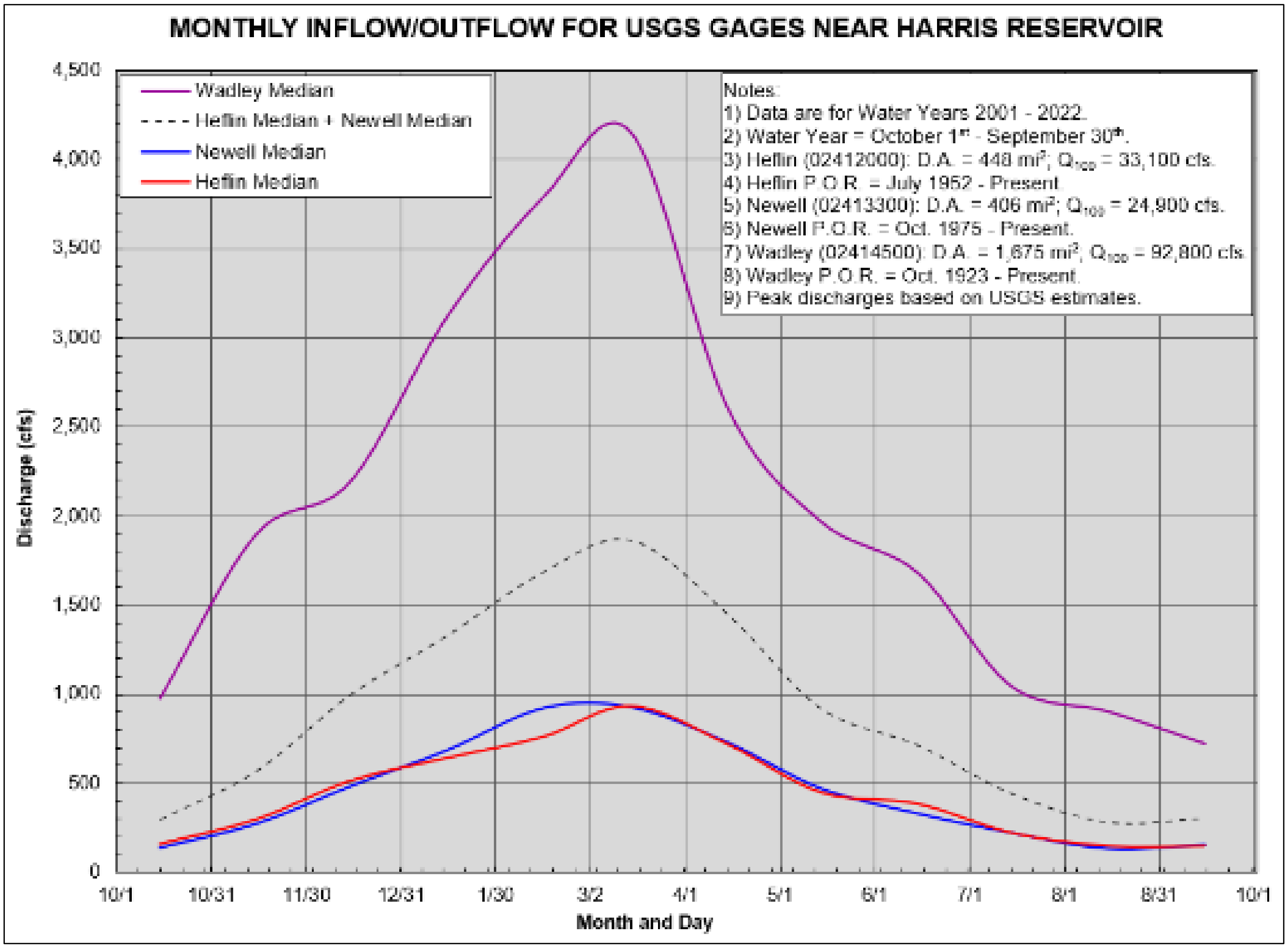
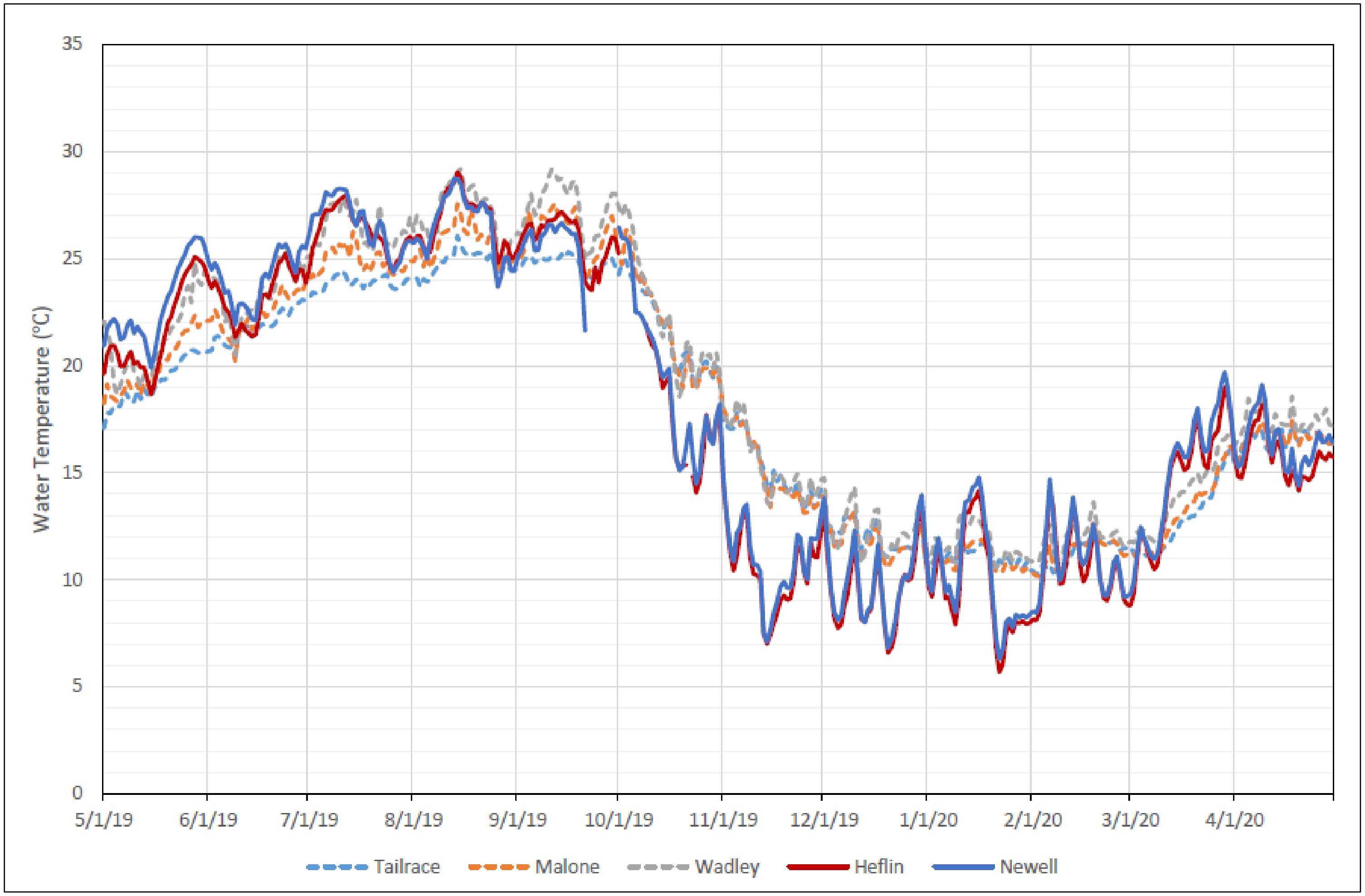


Figure 3.3.2-7. Comparison of monthly median inflows to Harris Lake via the USGS Heflin and Newell gages, and monthly median outflows via the USGS Wadley gage (Source: Alabama Power and Kleinschmidt, 2022a).



Notes: Upstream to downstream order is Tallapoosa River at Heflin, Little Tallapoosa River at Newell, project tailrace, and Tallapoosa River at Malone and Wadley.

Figure 3.3.2-8. Daily average water temperature upstream of Harris Lake in the Tallapoosa River (at Heflin USGS Gage) and in the Little Tallapoosa River (at Newell USGS Gage), and downstream from Harris Dam in the Tallapoosa River (at the Tailrace, at Malone, and at Wadley), May 2019-April 2020 (Source: Alabama Power and Kleinschmidt, 2021a).

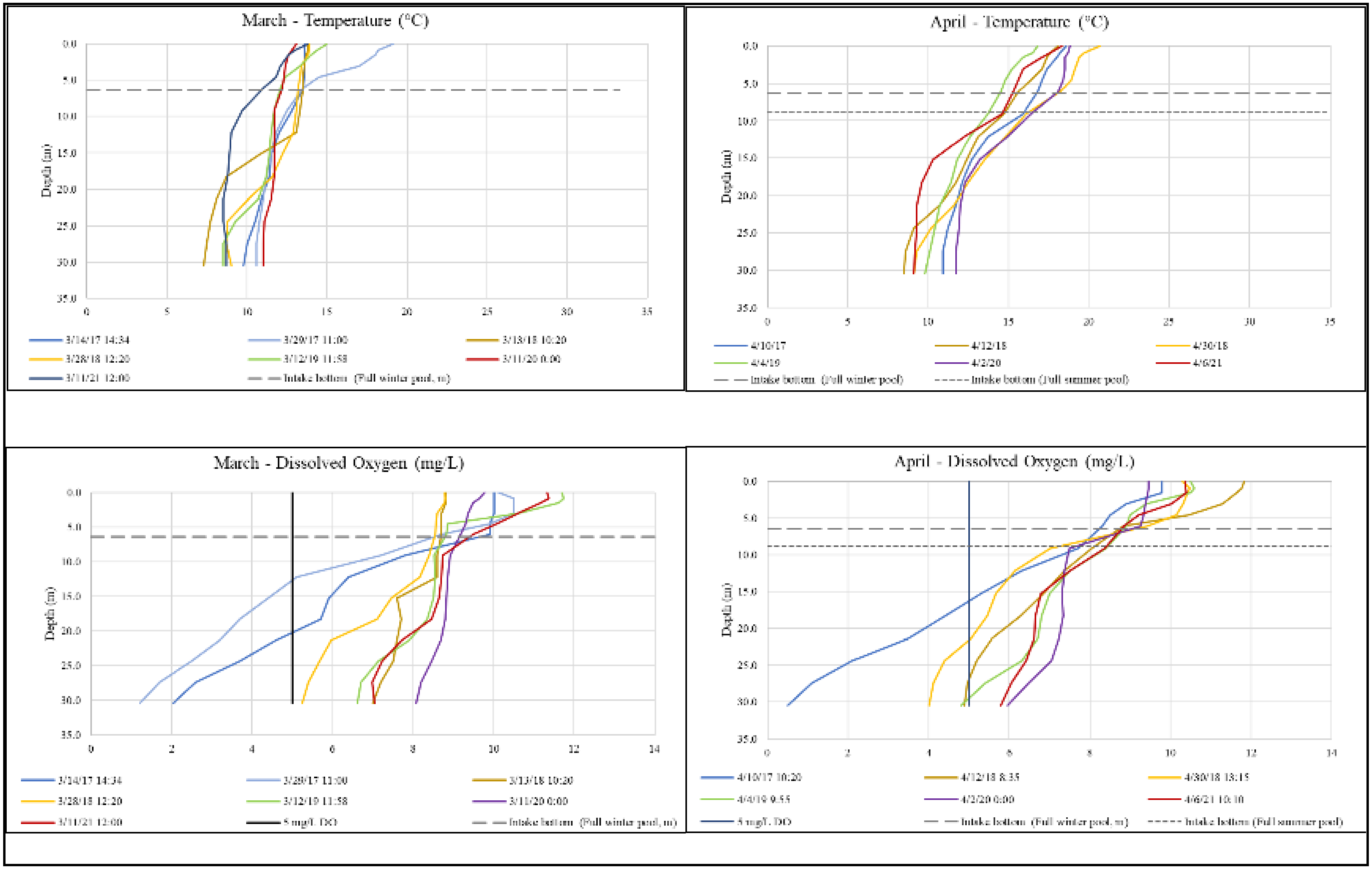


Figure 3.3.2-9. Vertical profile data for temperature and dissolved oxygen – Alabama Power Harris forebay location (March and April), 2017-2021 (Source: Kleinschmidt, 2021a, as modified by staff).

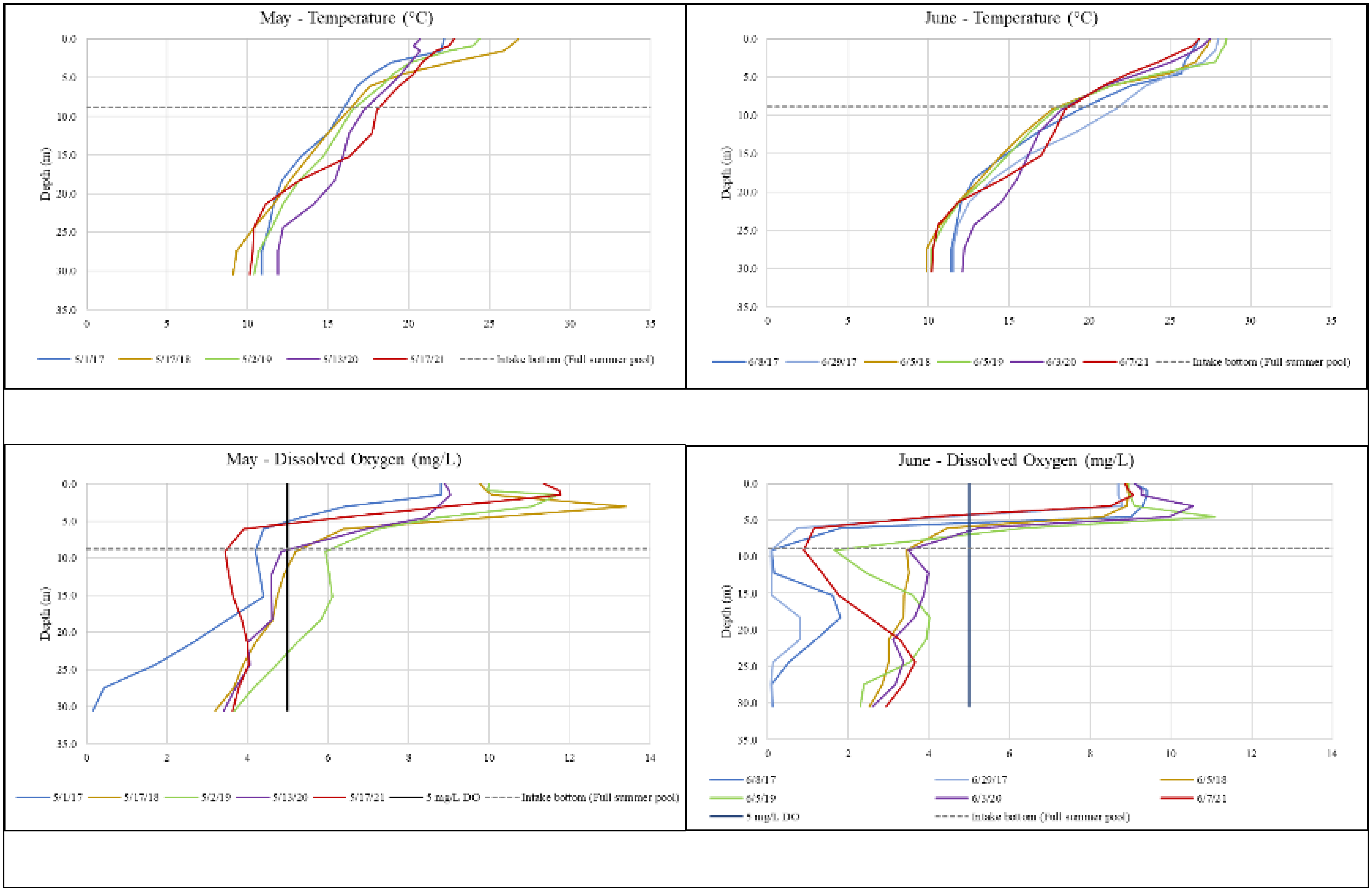


Figure 3.3.2-10. Temperature and dissolved oxygen vertical profiles at Alabama Power Harris forebay location, (May and June), 2017-2021 (Source: Kleinschmidt, 2021a, as modified by staff).

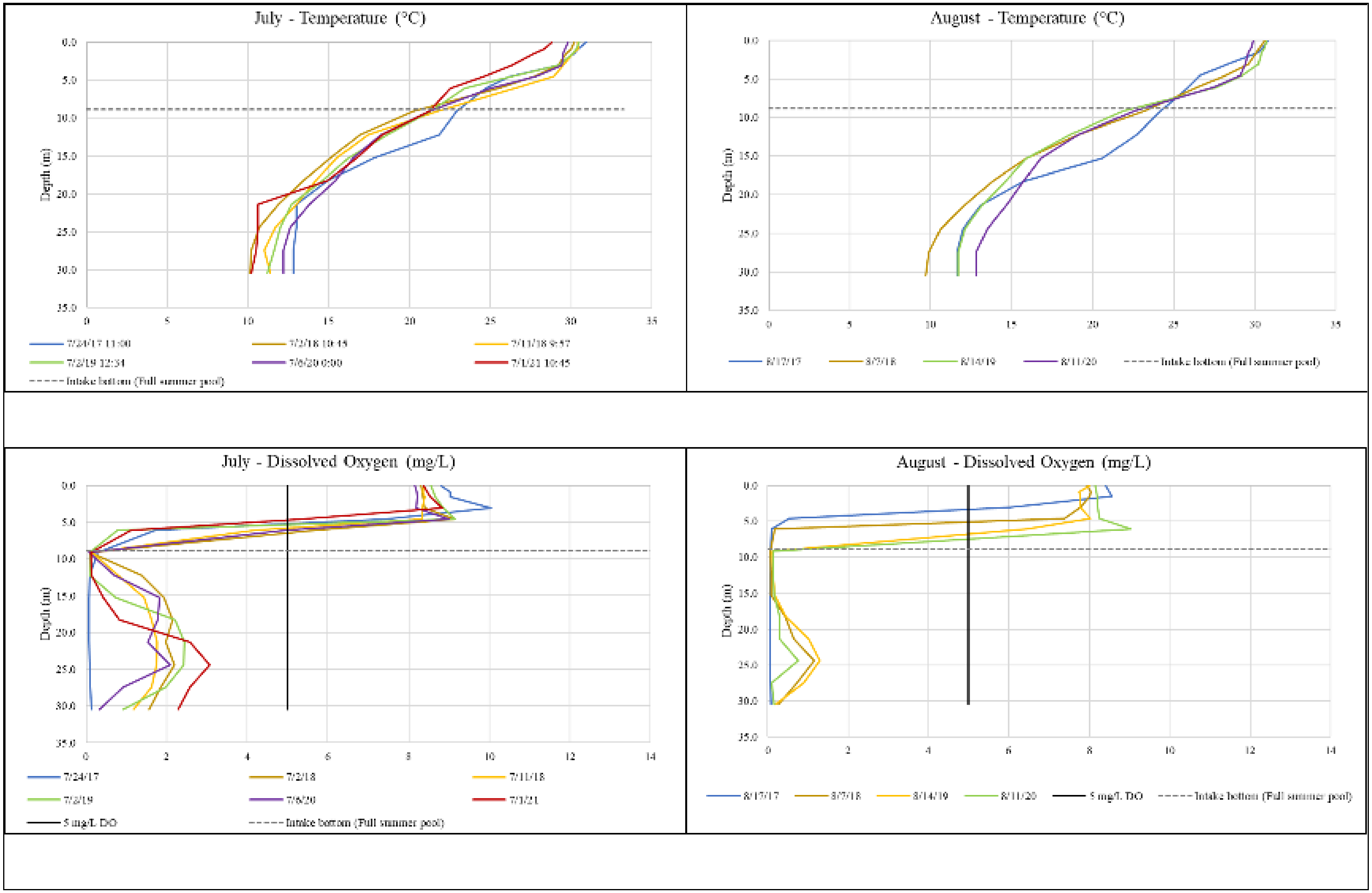


Figure 3.3.2-11. Temperature and dissolved oxygen vertical profiles at Alabama Power Harris forebay location, July and August, 2017-2021 (Source: Kleinschmidt, 2021a, as modified by staff).

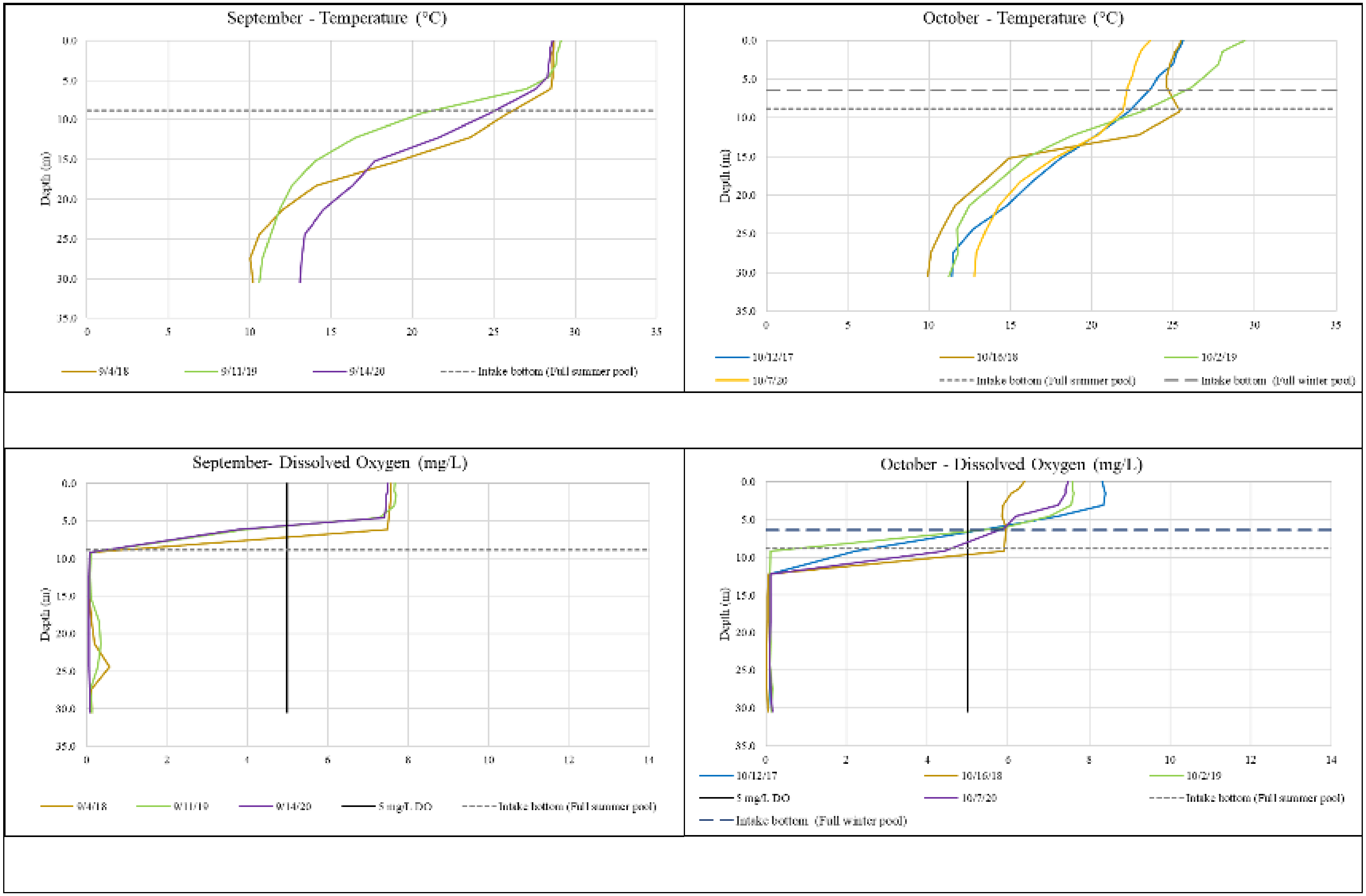
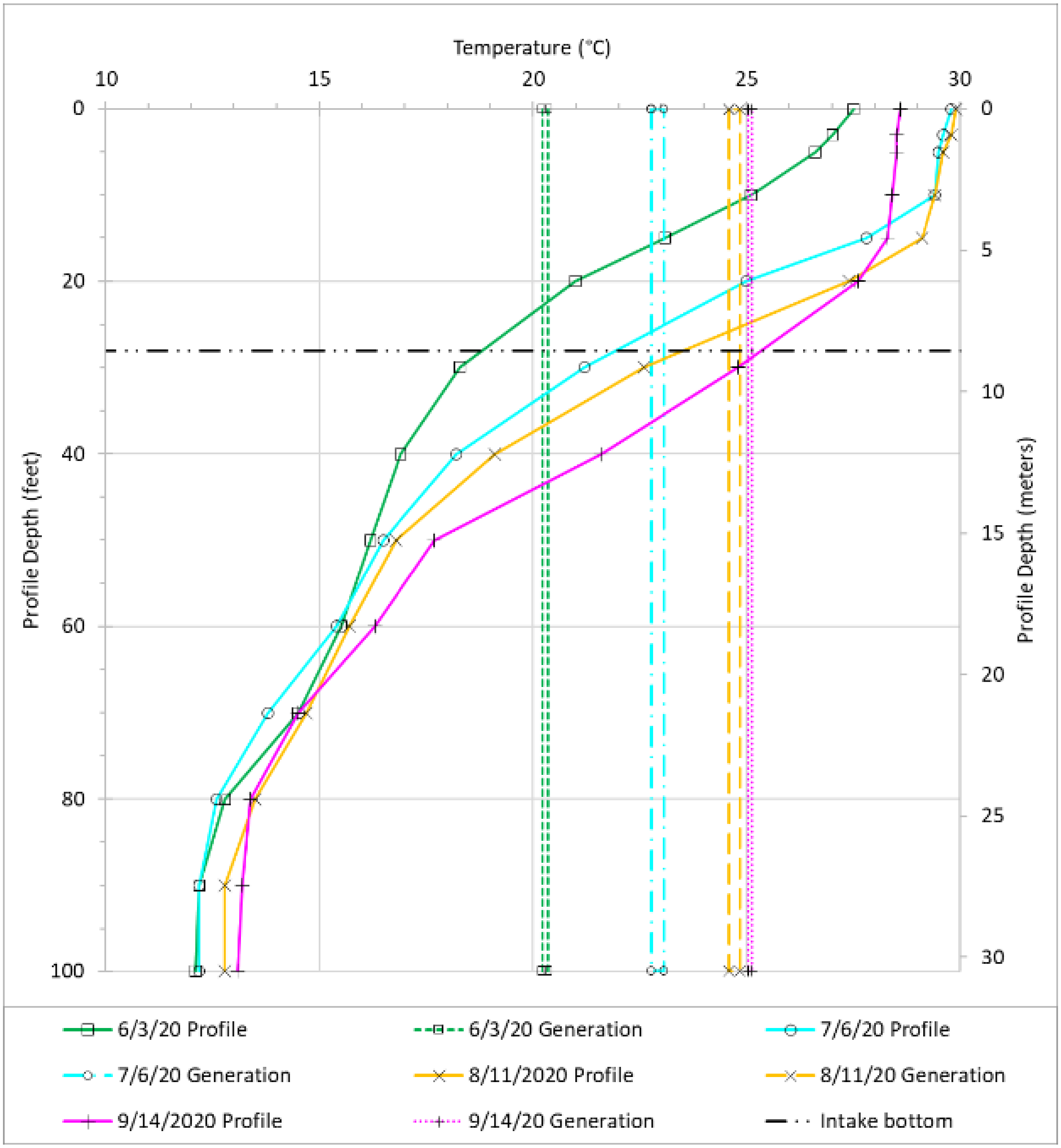


Figure 3.3.2-12. Temperature and dissolved oxygen vertical profiles at Alabama Power Harris forebay location, September and October, 2017-2021 (Source: Kleinschmidt, 2021a, as modified by staff).



Note: Temperatures for the generation station are the range of values on the profile day excluding the first value immediately following generation startup to avoid bias from water that was in the tailrace prior to generation.

Figure 3.3.2-13. Water temperature in forebay vertical profiles and at the Generation station during project generation, June–September, 2020 (Source: APC, 20211123-5079, as modified by staff).

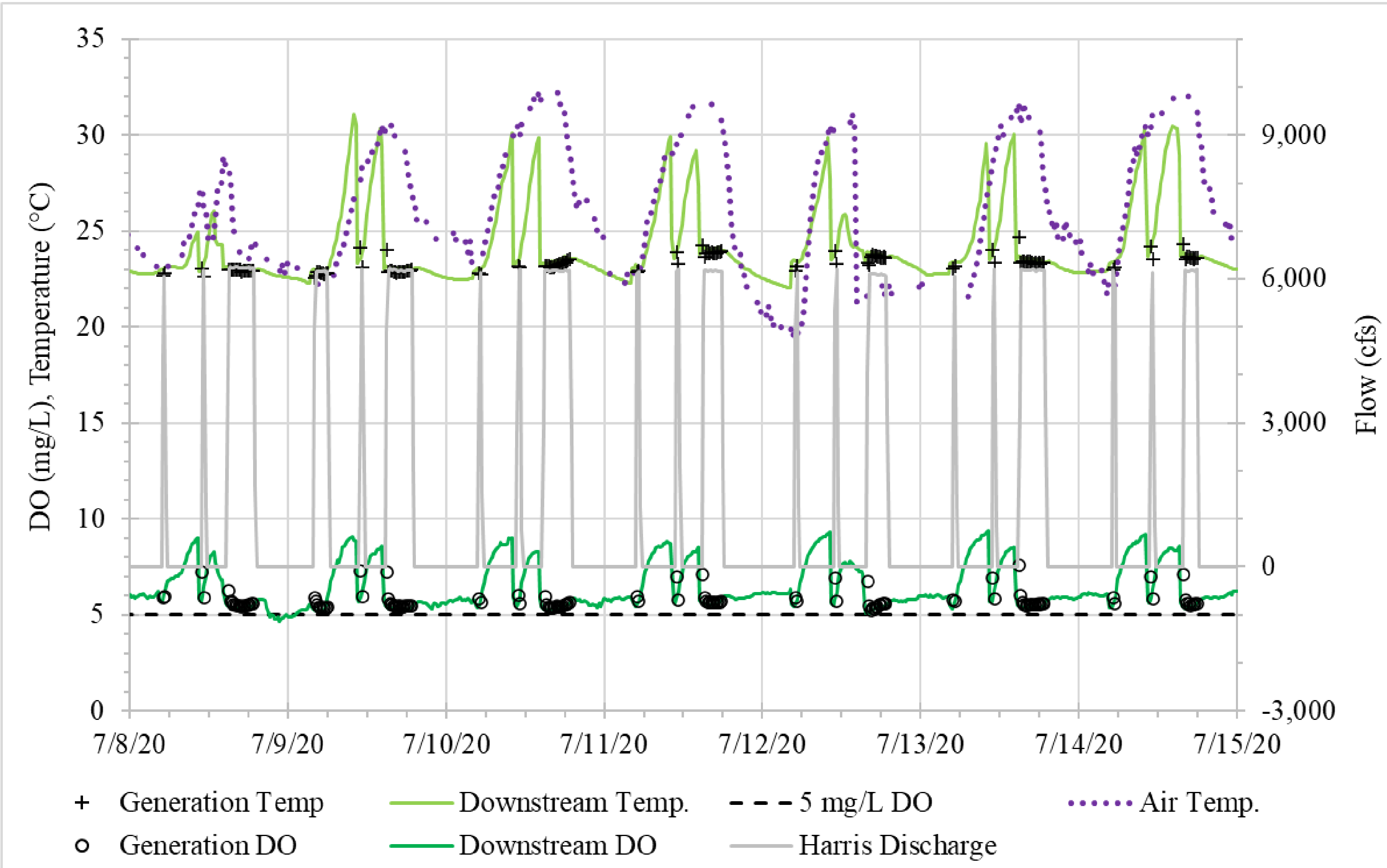


Figure 3.3.2-14. Water temperature and dissolved oxygen concentration below Harris Dam at the generation site (about 800 feet below the dam) during generation only and at the downstream site (about 0.5 miles below the dam) continuously, July 8-14, 2020 (Source: Kleinschmidt, 2021a, as modified by staff).

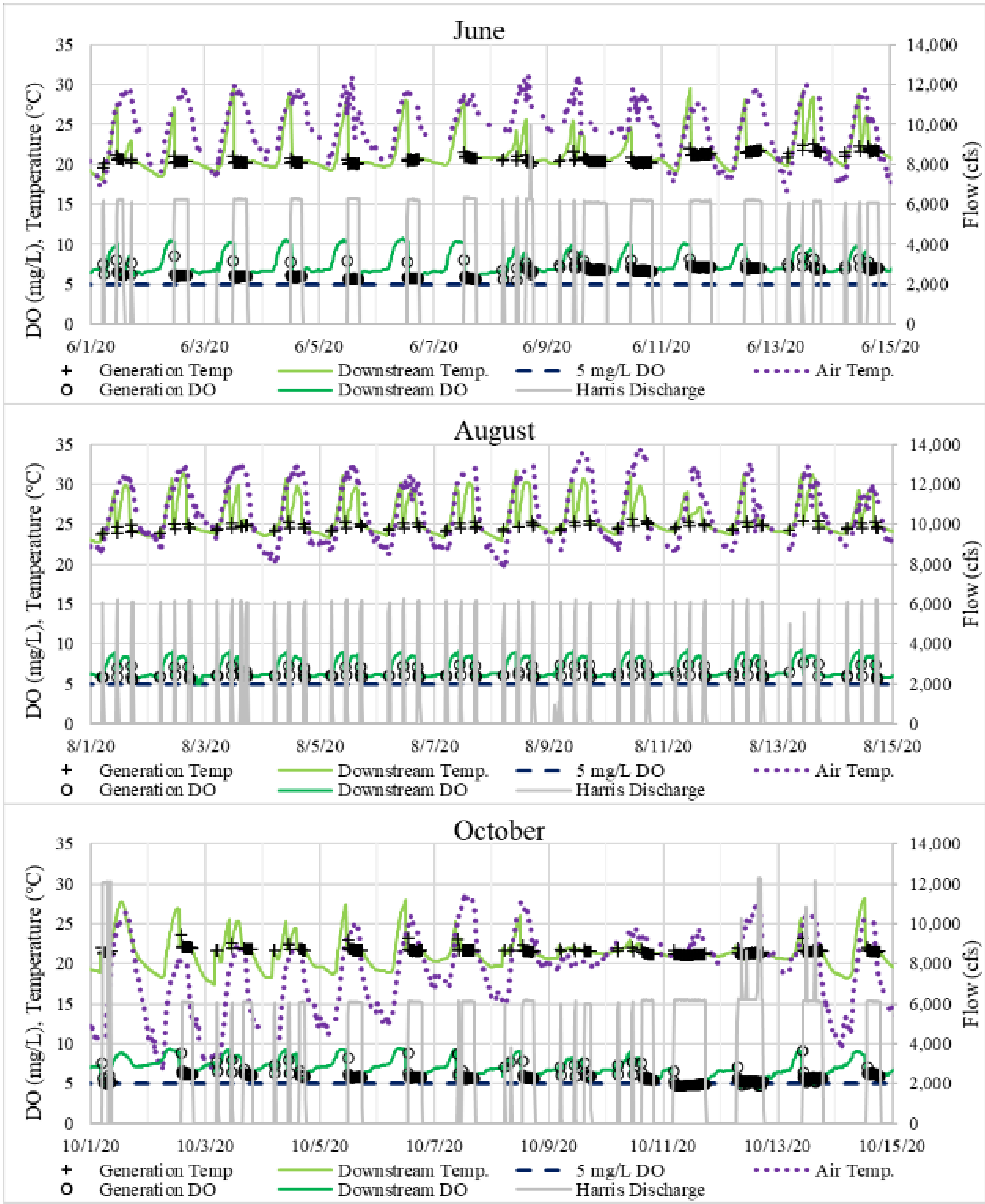
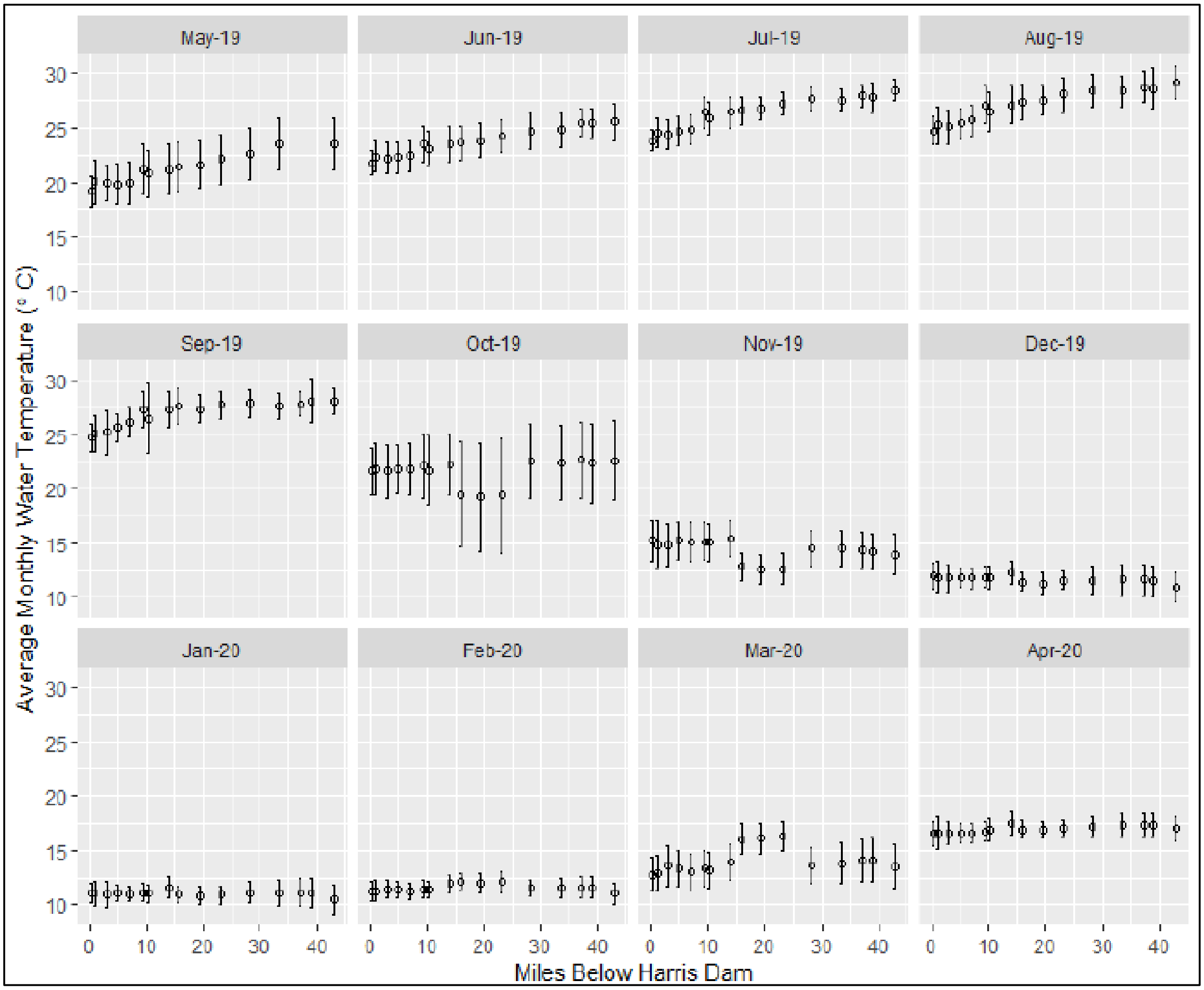
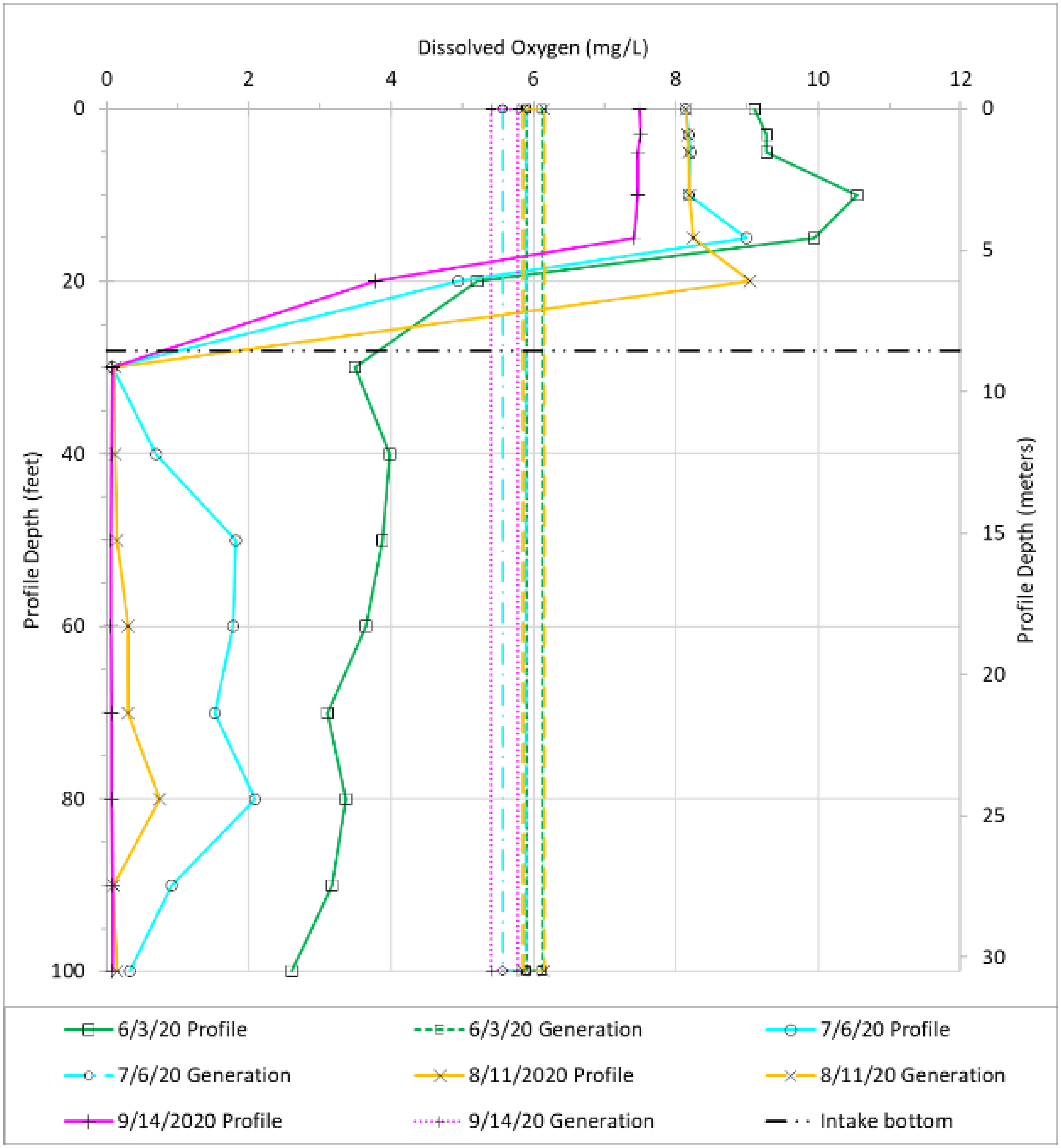


Figure 3.3.2-15. Water temperature and dissolved oxygen at the generation site about 800 feet below Harris Dam during periods of generation, and at the downstream site about 0.5 miles below Harris Dam compared with air temperature and Harris discharge, 2020 (Source: Kleinschmidt, 2021a, as modified by staff).



Note: Average monthly temperatures for each logger are denoted by a circle. We assume the bars represent the range of daily average values for each month.

Figure 3.3.2-16. Average monthly water temperatures for logger locations between Harris Dam and Irwin Shoals, May 2019–April 2020 (Source: Alabama Power and Kleinschmidt, 2021a).



Note: Dissolved oxygen for the generation station are the range of values on the profile day excluding the first value immediately following generation startup to avoid bias from water that was in the tailrace prior to generation.

Figure 3.3.2-17. Dissolved oxygen concentrations in forebay vertical profiles and at the Generation station during project generation, June–September, 2020 (Source: APC, 20211123-5079, as modified by staff).

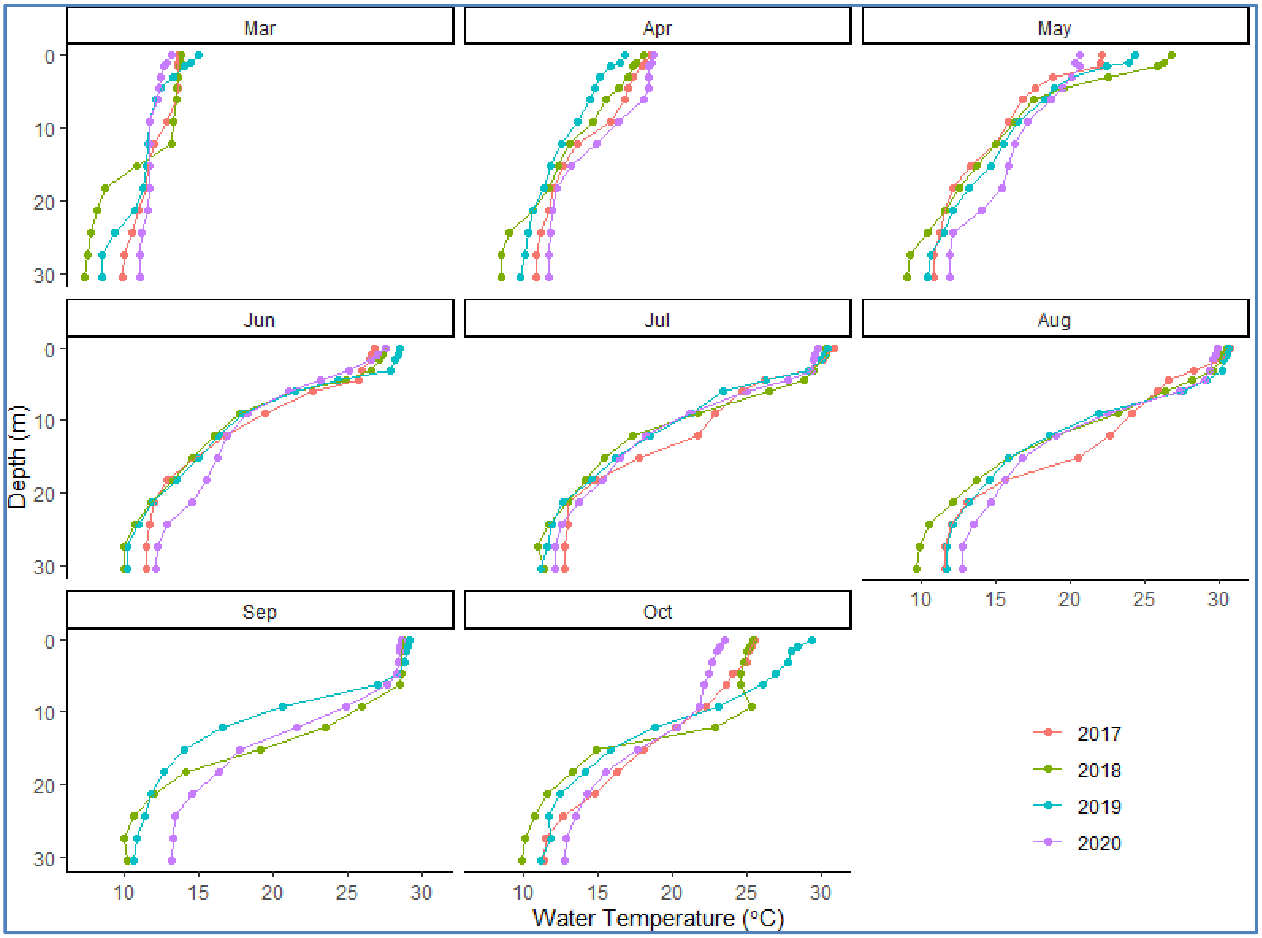
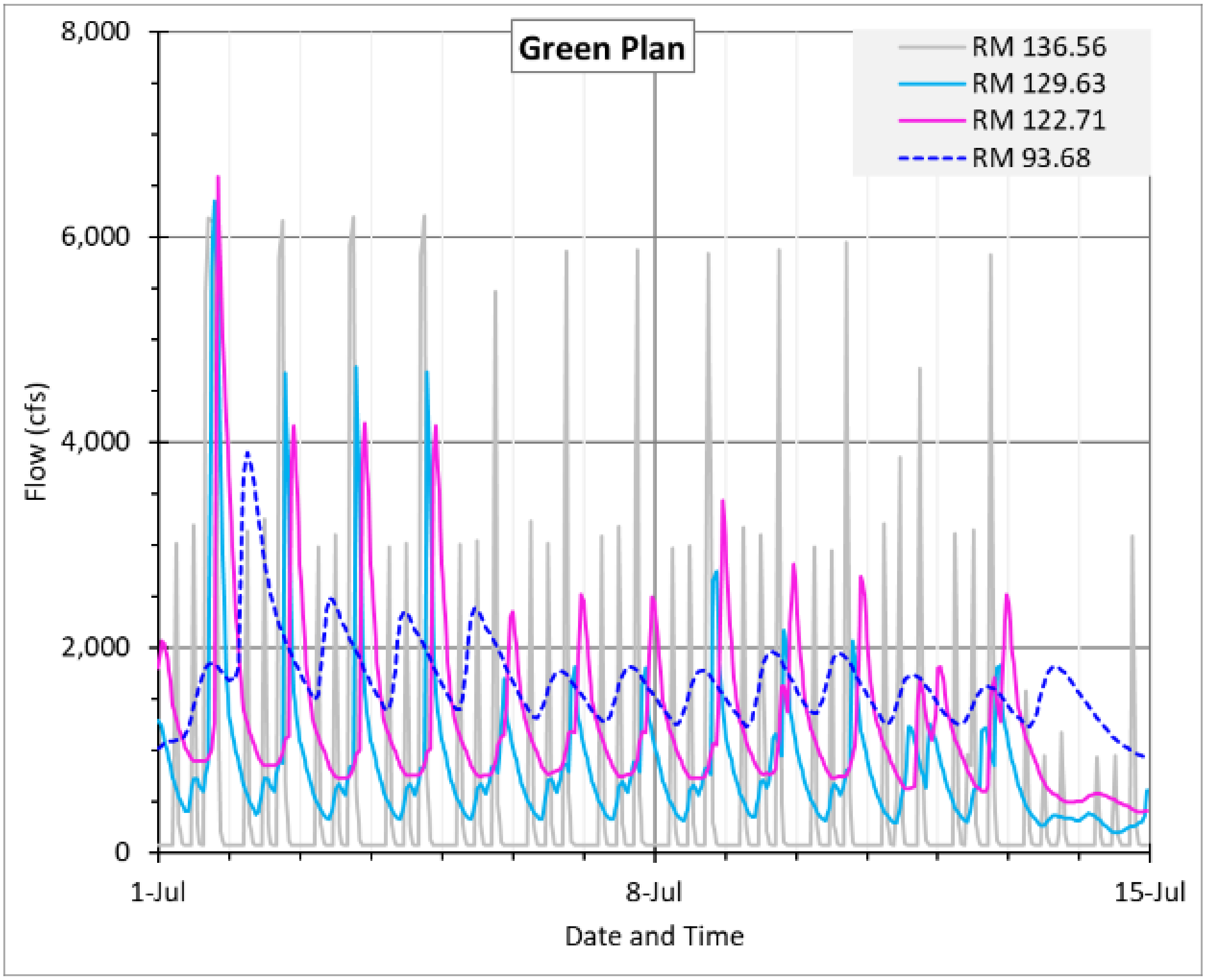


Figure 3.3.2-18. Vertical water temperature profiles in Harris Lake at the Harris Dam Forebay (Source: Alabama Power, 2022).



Note: Locations are RM 136.56 immediately downstream from Harris Dam, RM 129.63 near Malone gage, RM 122.71 near Wadley gage, and RM 93.68 near Horseshoe Bend gage.

Figure 3.3.2-19. Time series of simulated hourly flow at selected locations downstream from Harris Dam under existing operations (Green Plan), July 1–14, 2019 (Source: Kleinschmidt, 2021b, as modified by staff).

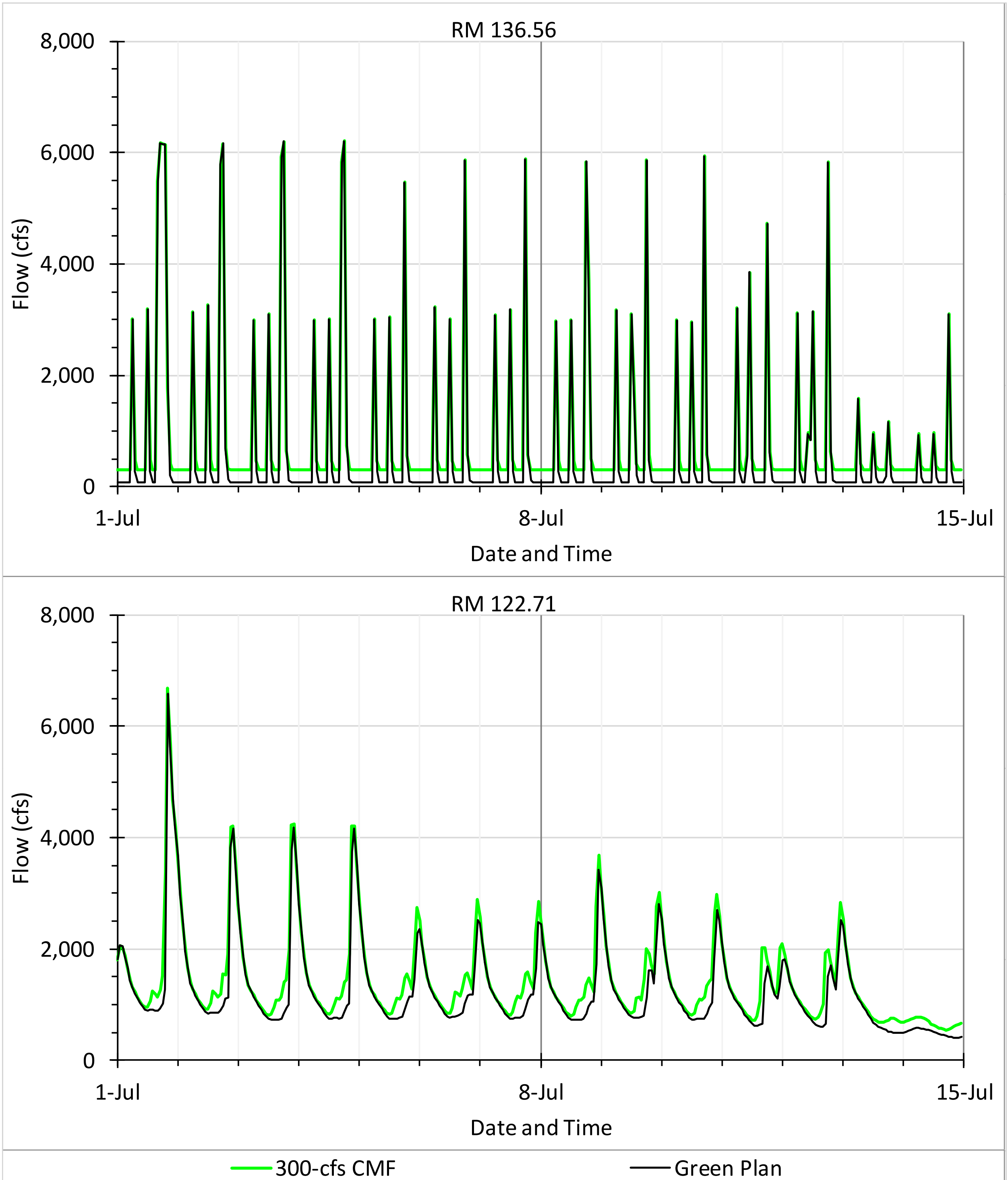


Figure 3.3.2-20. Time series of simulated hourly flow immediately downstream from Harris Dam (top) and near the Wadley gage (bottom) under existing operations (Green Plan) and Alabama Power's proposed operations (300-cfs CMF), July 1–14, 2019 (Source: Kleinschmidt, 2021b, as modified by staff).

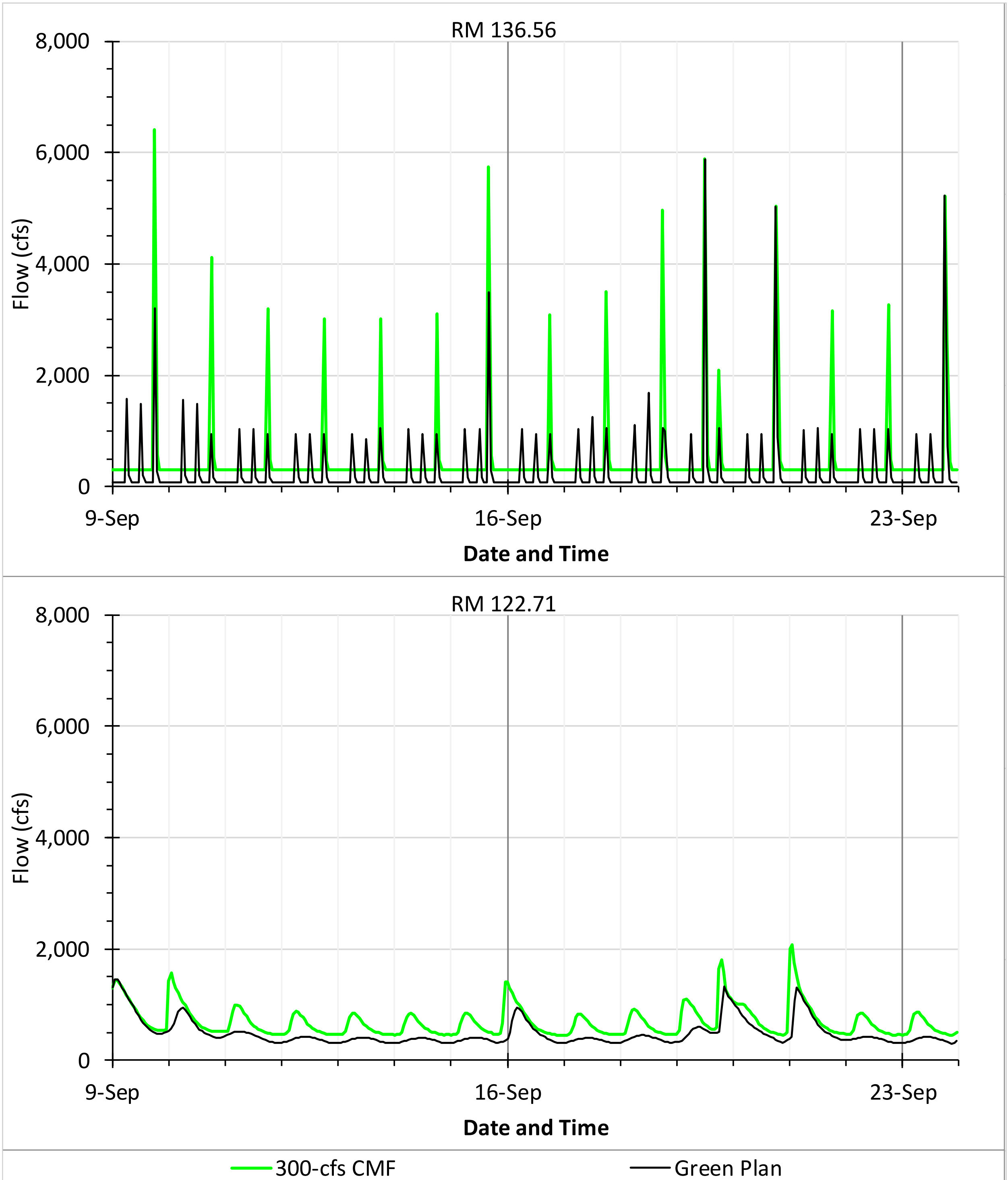


Figure 3.3.2-21. Time series of simulated hourly flow immediately downstream from Harris Dam (top) and near the Wadley gage (bottom) under existing operations (Green Plan) and Alabama Power's proposed operations (300-cfs CMF), September 9–23, 2019 (Source: Kleinschmidt, 2021b, as modified by staff).

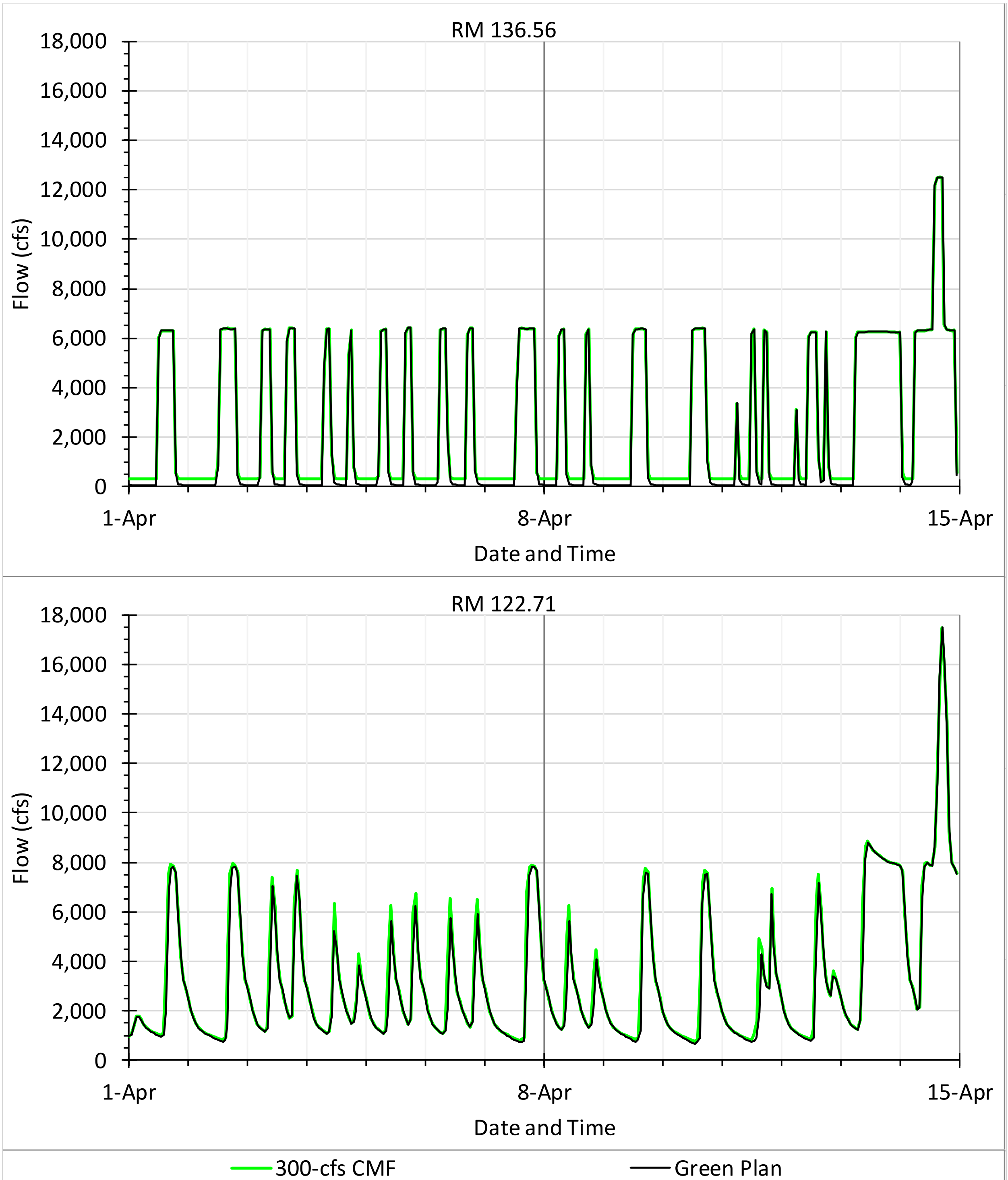


Figure 3.3.2-22. Time series of simulated hourly flow immediately downstream from Harris Dam (top) and near the Wadley gage (bottom) under existing operations (Green Plan) and Alabama Power's proposed operations (300-cfs CMF), April 1–14, 2020 (Source: Kleinschmidt, 2021b, as modified by staff).

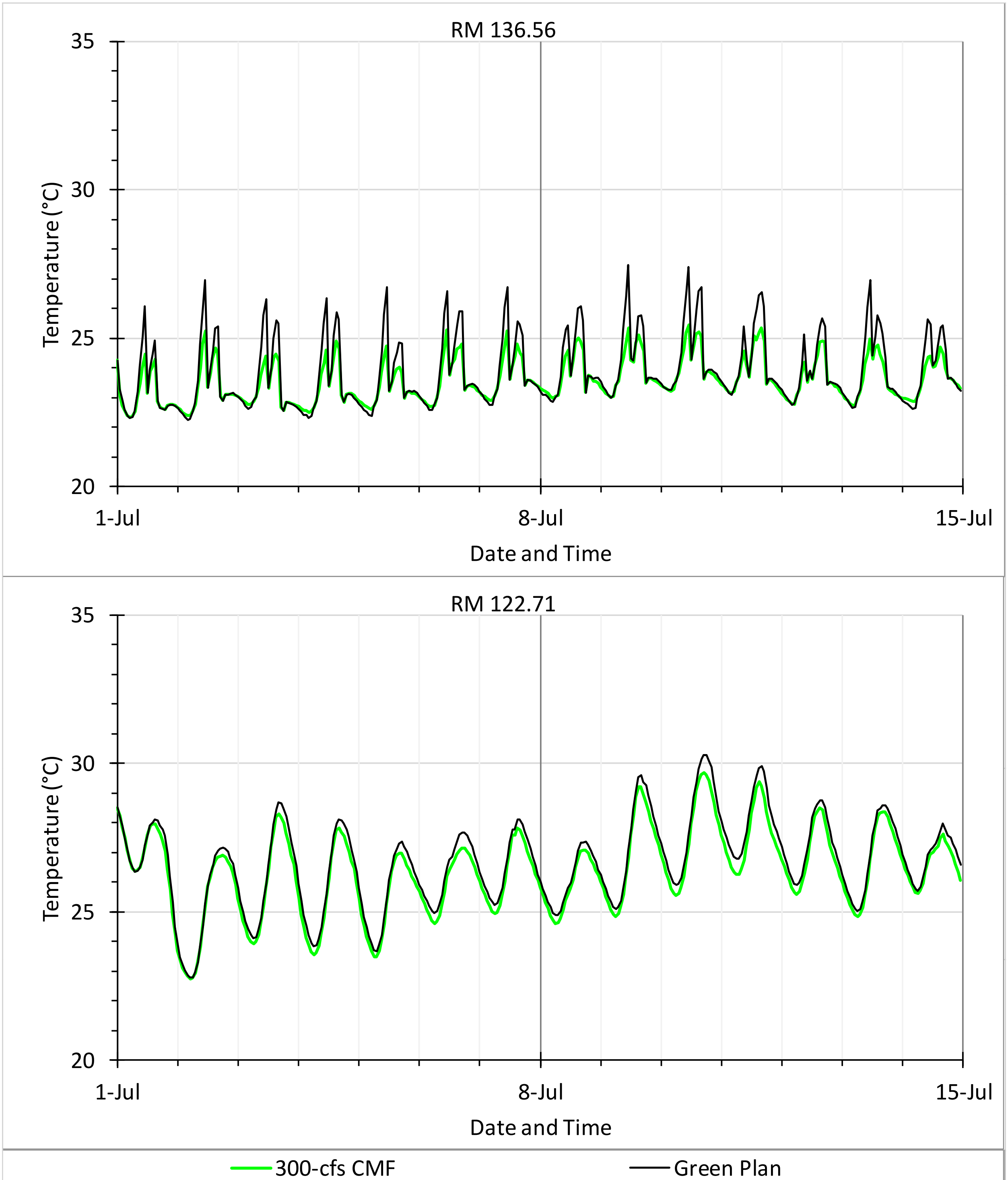


Figure 3.3.2-23. Time series of simulated hourly water temperature immediately downstream from Harris Dam (top) and near the Wadley gage (bottom) under existing operations (Green Plan) and Alabama Power's proposed operations (300-cfs CMF), July 1–14, 2019 (Source: Kleinschmidt, 2021b, as modified by staff).

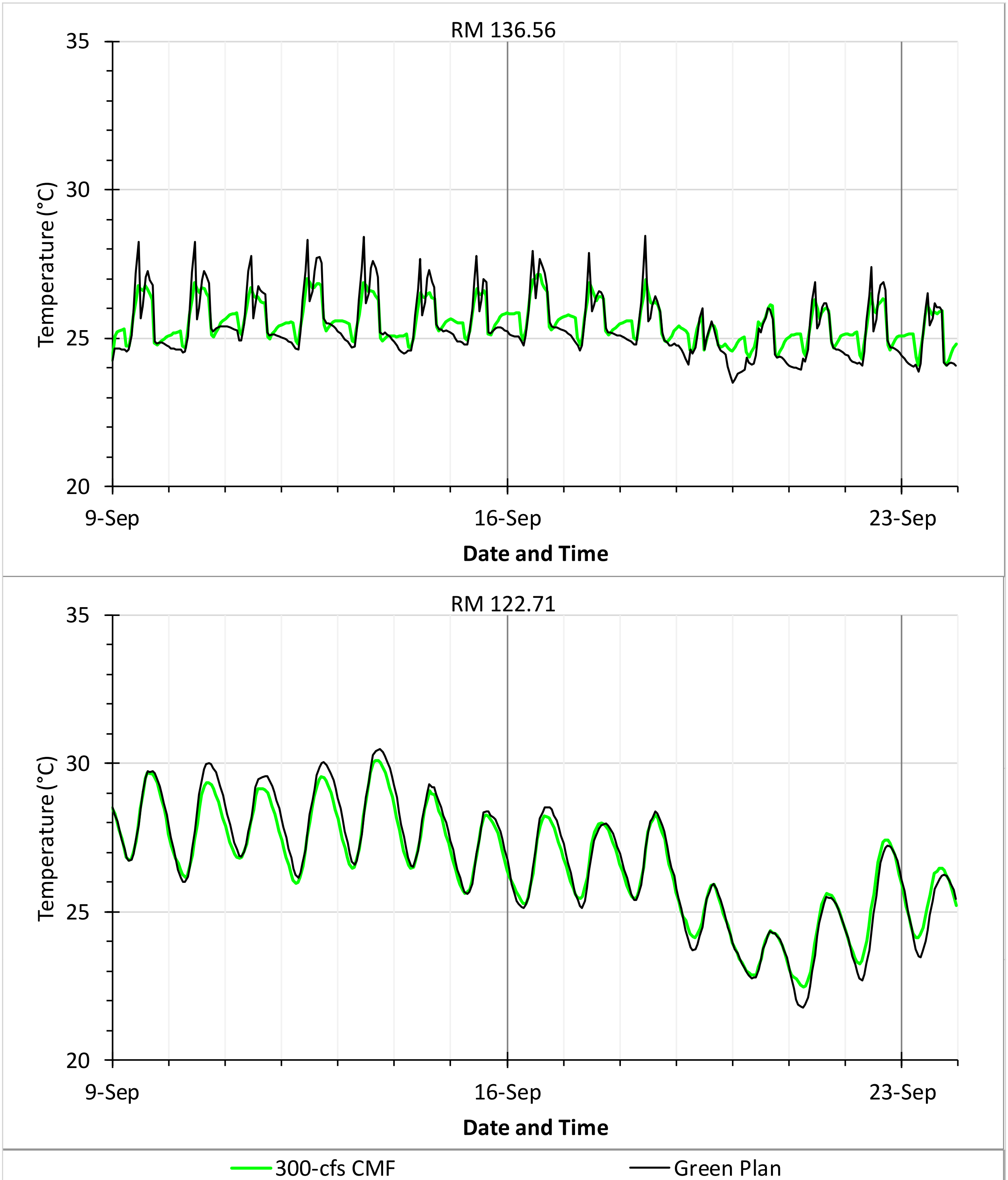


Figure 3.3.2-24. Time series of simulated hourly water temperature immediately downstream from Harris Dam (top) and near the Wadley gage (bottom) under existing operations (Green Plan) and Alabama Power's proposed operations (300-cfs CMF), September 9–23, 2019 (Source: Kleinschmidt, 2021b, as modified by staff).

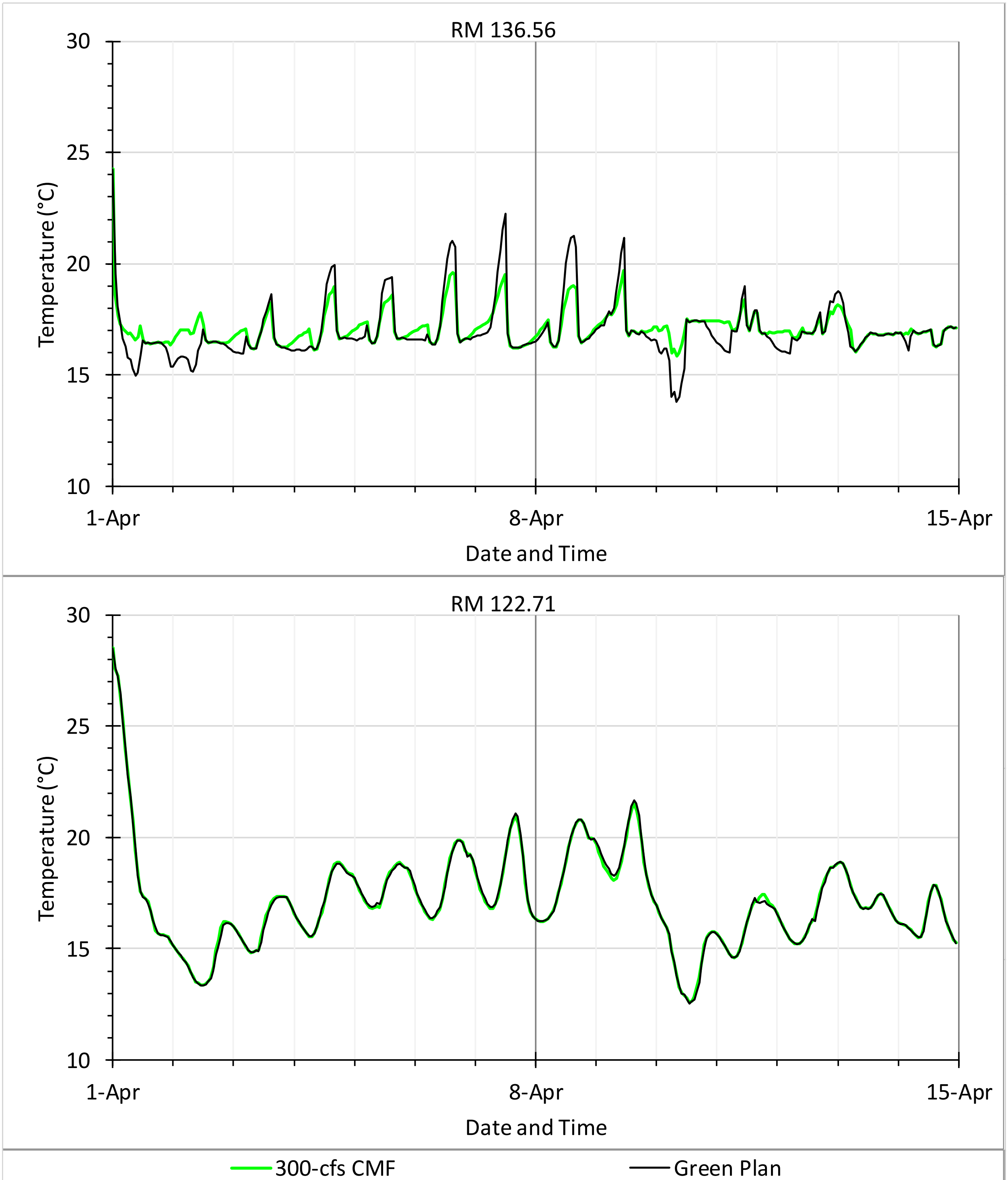


Figure 3.3.2-25. Time series of simulated hourly water temperature immediately downstream from Harris Dam (top) and near the Wadley gage (bottom) under existing operations (Green Plan) and Alabama Power's proposed operations (300-cfs CMF), April 1–14, 2020 (Source: Kleinschmidt, 2021b, as modified by staff).

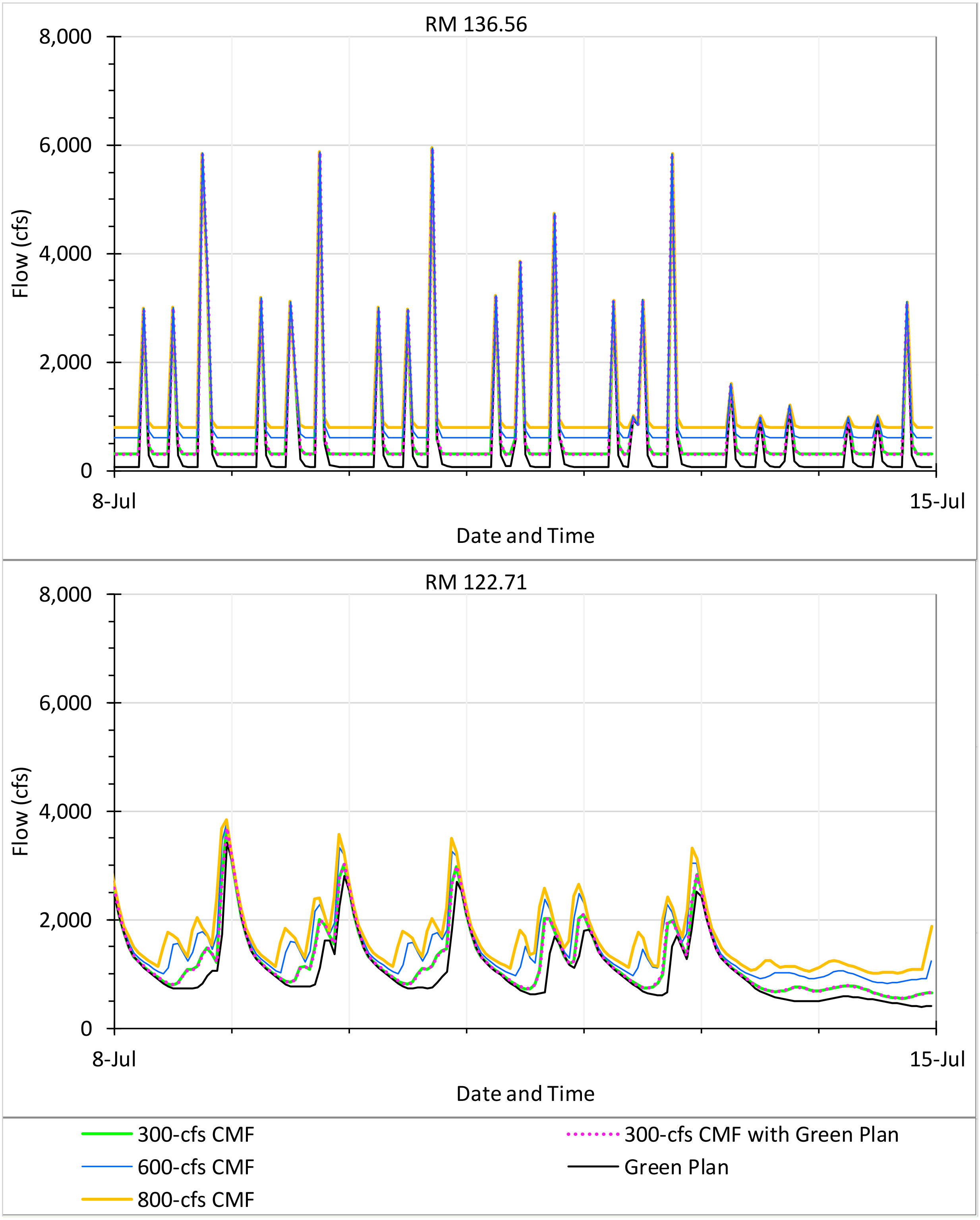


Figure 3.3.2-26. Time series of simulated hourly flow immediately downstream from Harris Dam (top) and near Wadley gage (bottom) under various alternative operations, July 8–14, 2019 (Source: Kleinschmidt, 2021b, as modified by staff).

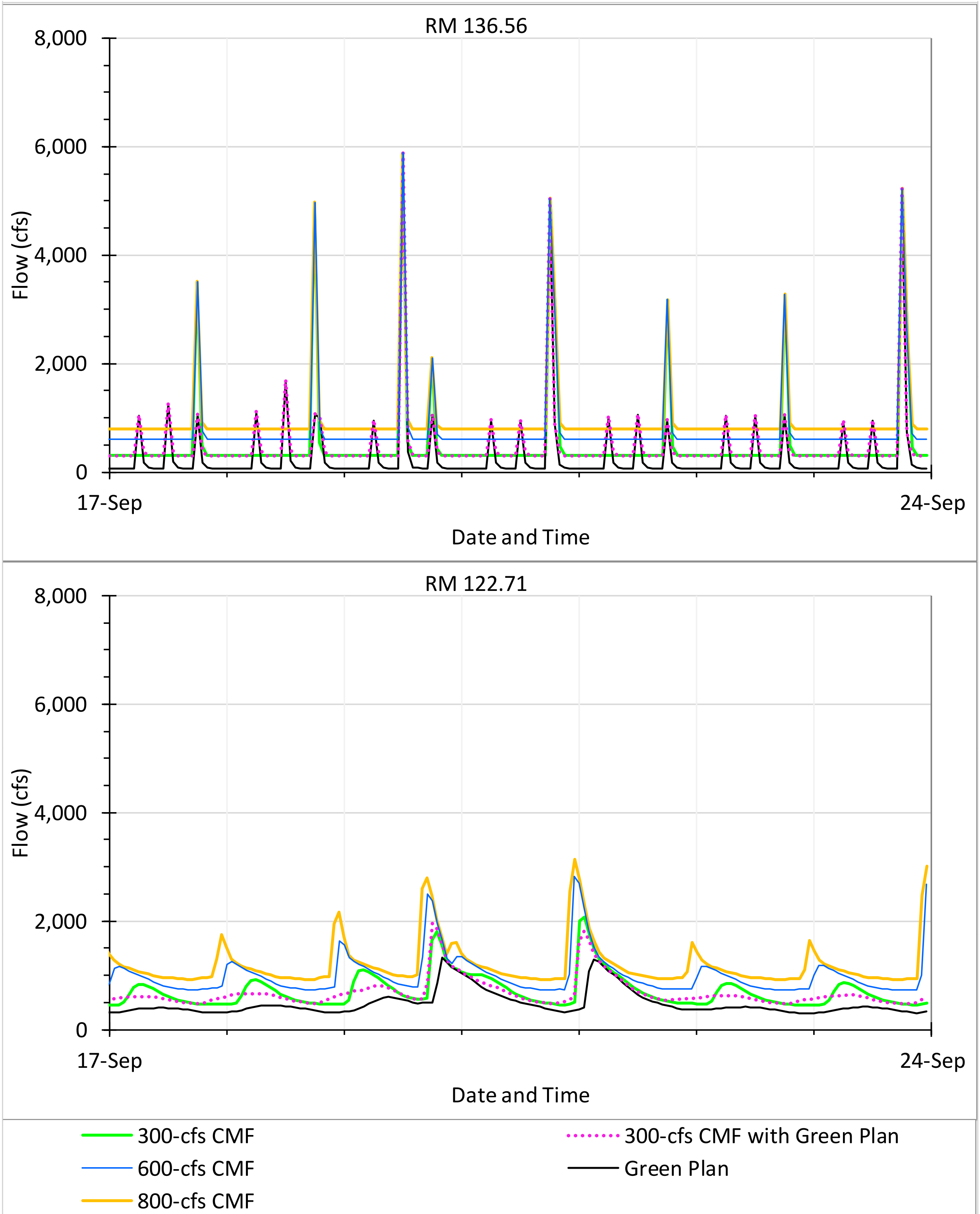


Figure 3.3.2-27. Time series of simulated hourly flow immediately downstream from Harris Dam (top) and near Wadley gage (bottom) under various alternative operations, September 17–23, 2019 (Source: Kleinschmidt, 2021b, as modified by staff).

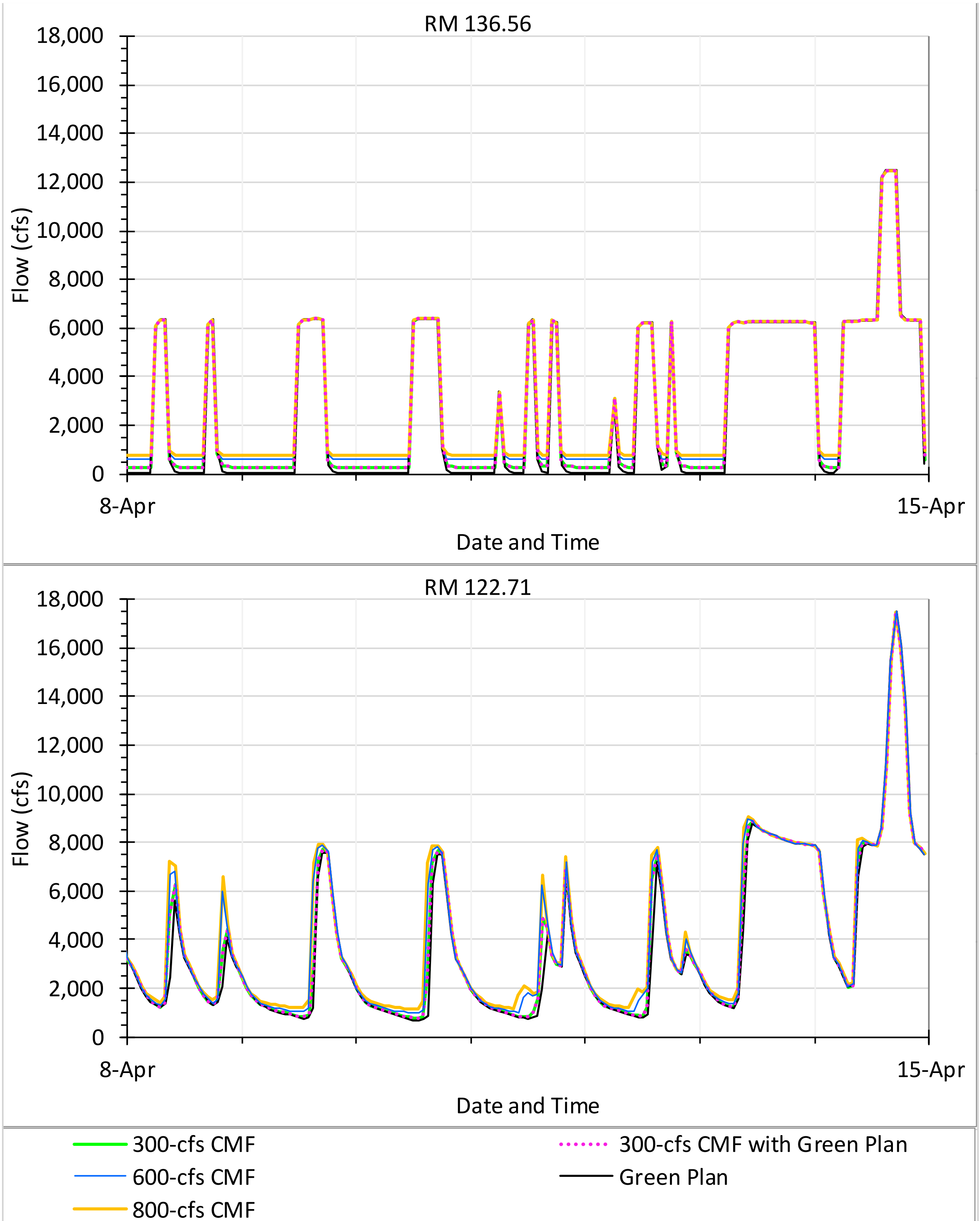


Figure 3.3.2-28. Time series of simulated hourly flow immediately downstream from Harris Dam (top) and near Wadley gage (bottom) under various alternative operations, April 8–14, 2020 (Source: Kleinschmidt, 2021b, as modified by staff).

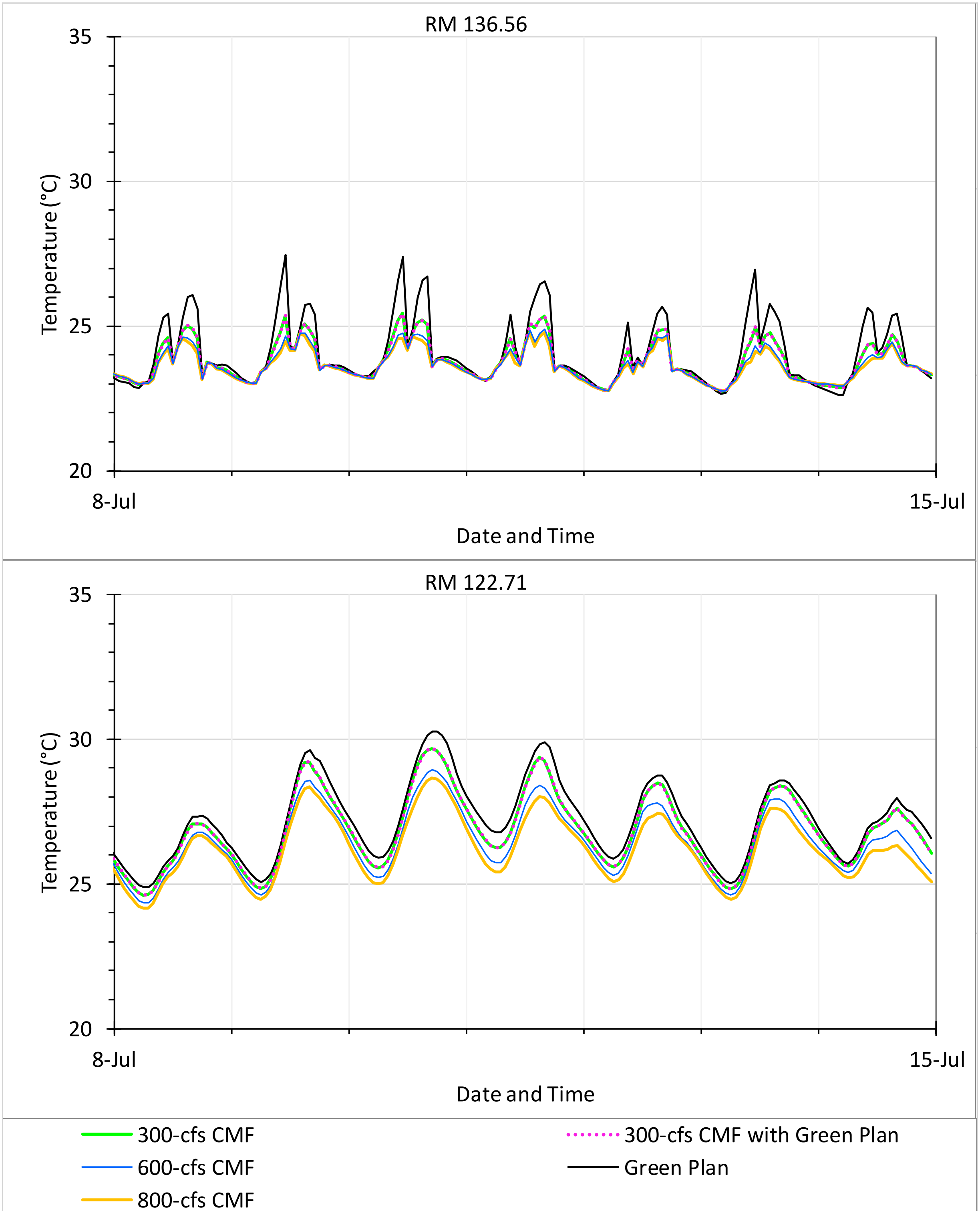


Figure 3.3.2-29. Time series of simulated hourly water temperature immediately downstream from Harris Dam (top) and near Wadley gage (bottom) under various alternative operations, July 8–14, 2019 (Source: Kleinschmidt, 2021b, as modified by staff).

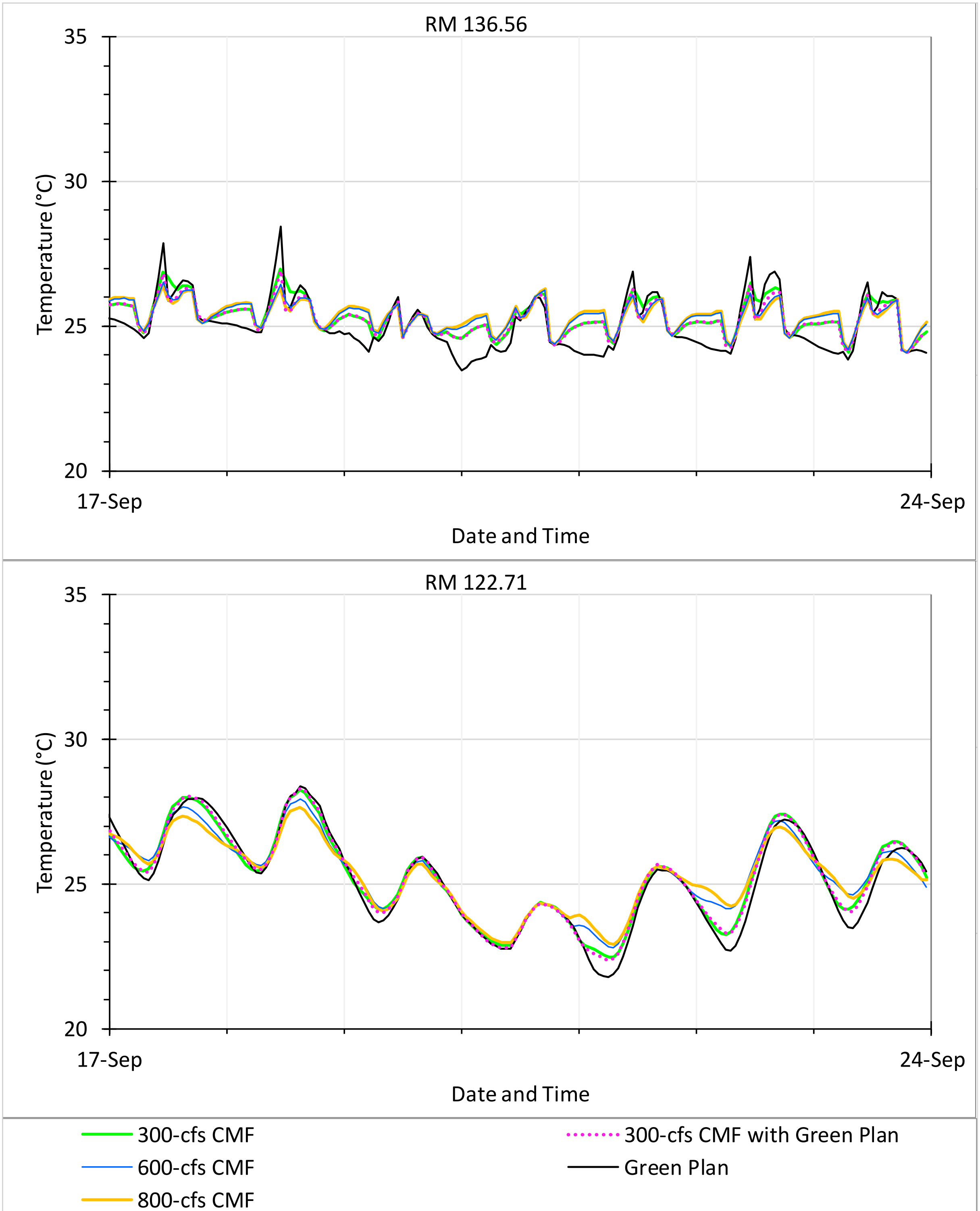


Figure 3.3.2-30. Time series of simulated hourly water temperature immediately downstream from Harris Dam (top) and near Wadley gage (bottom) under various alternative operations, September 17–23, 2019 (Source: Kleinschmidt, 2021b, as modified by staff).

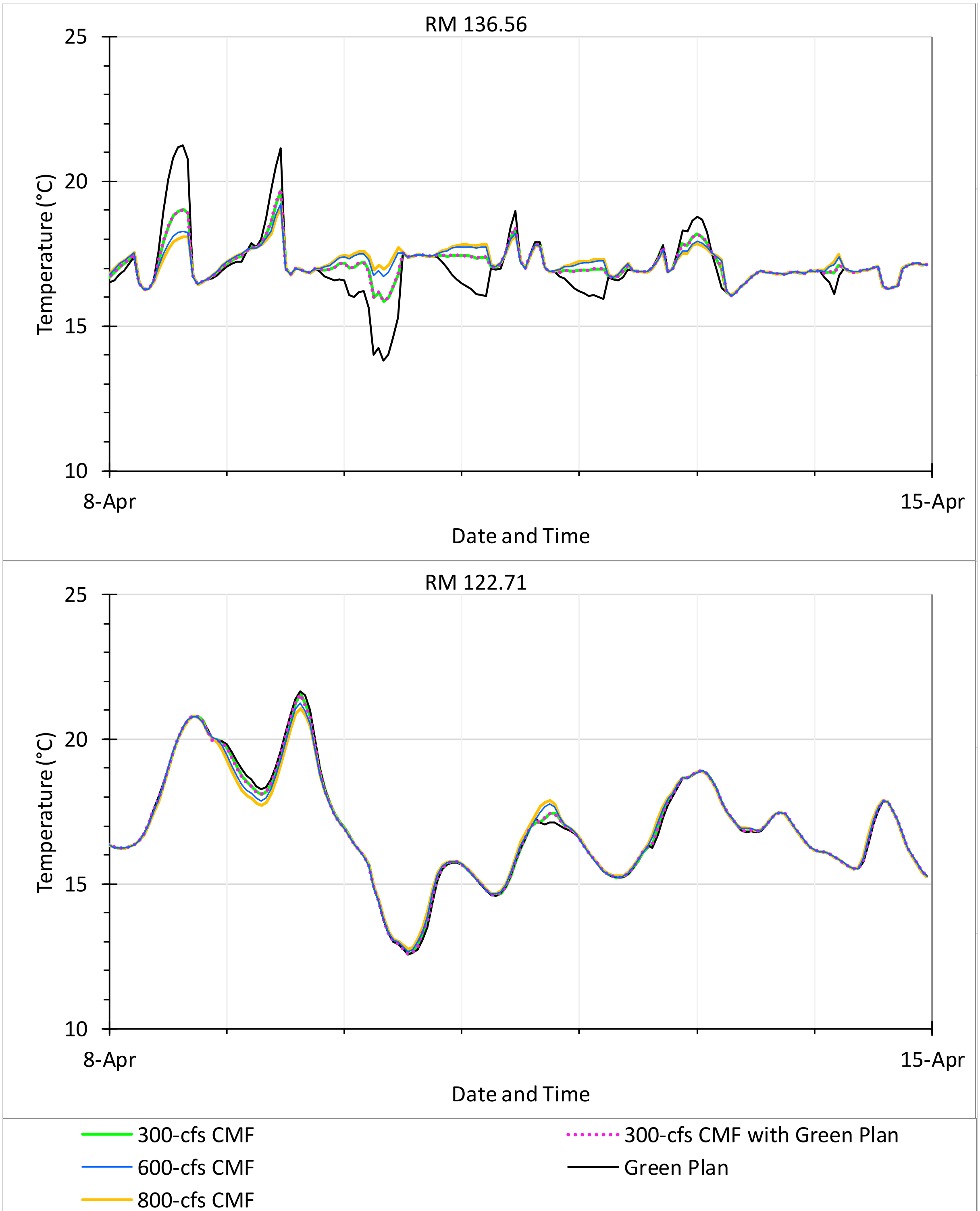


Figure 3.3.2-31. Time series of simulated hourly water temperature immediately downstream from Harris Dam (top) and near Wadley gage (bottom) under various alternative operations, April 8–14, 2020 (Source: Kleinschmidt, 2021b, as modified by staff).

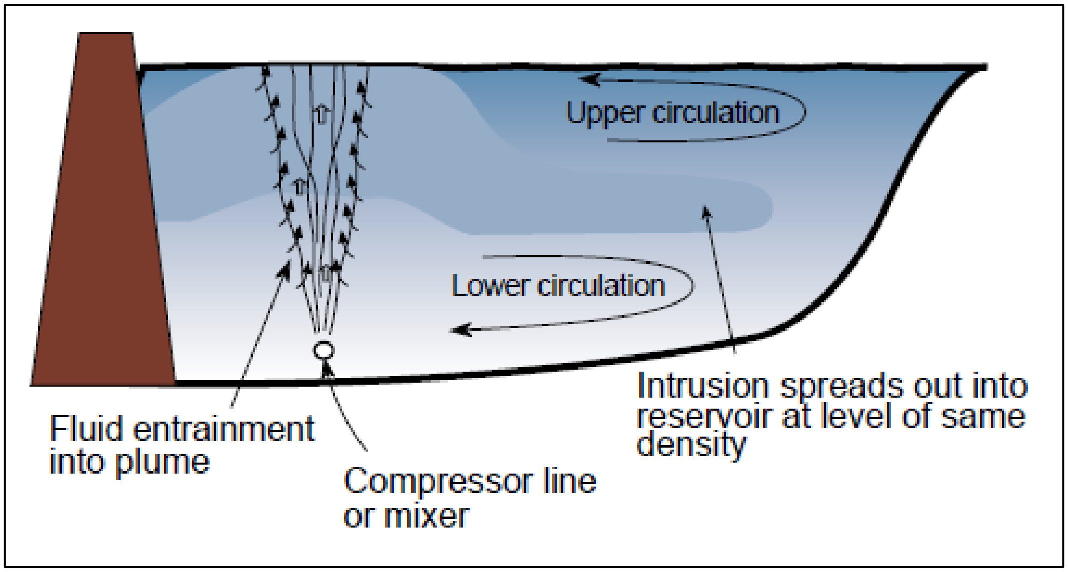


Figure 3.3.2-32. Typical circulation pattern set up by artificial destratification (Source: Sherman, 2000).

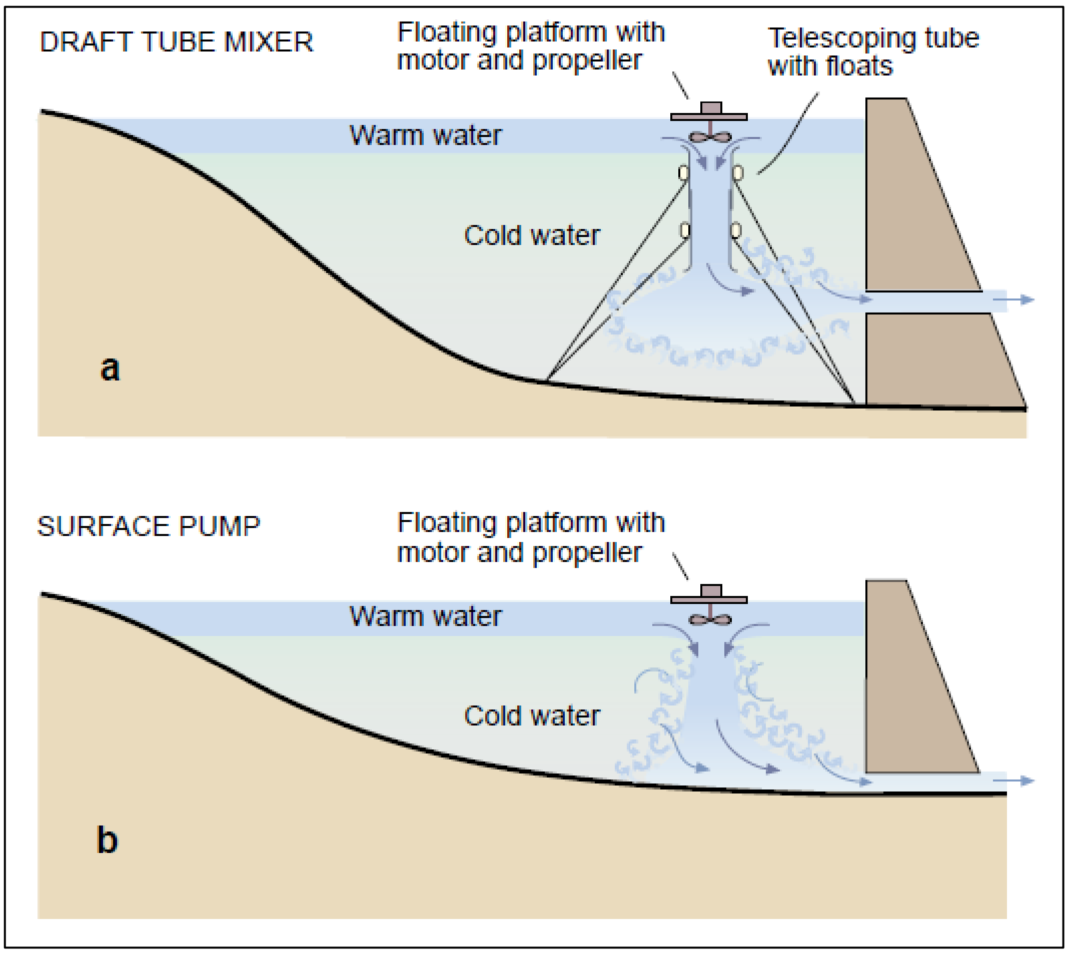
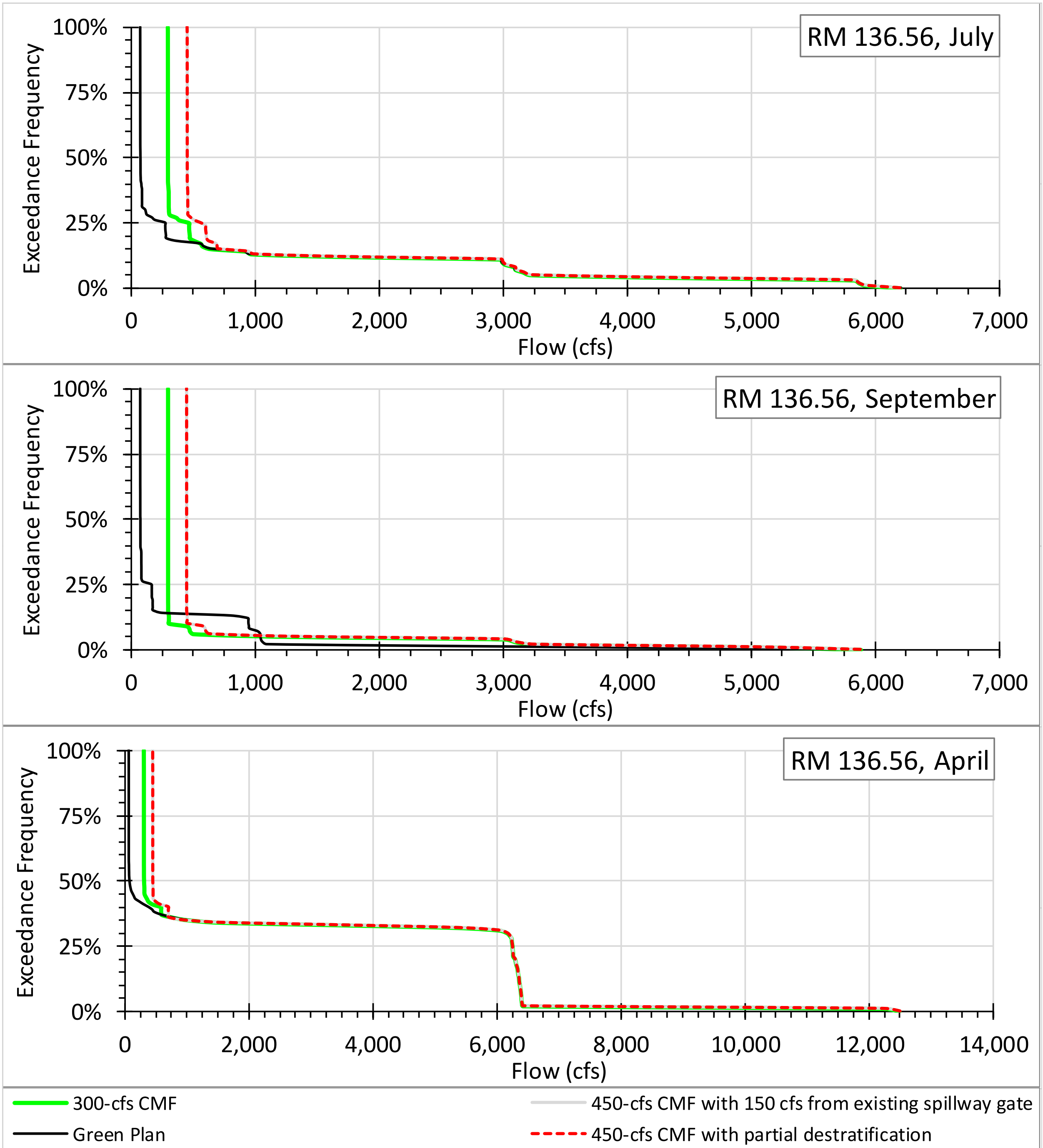
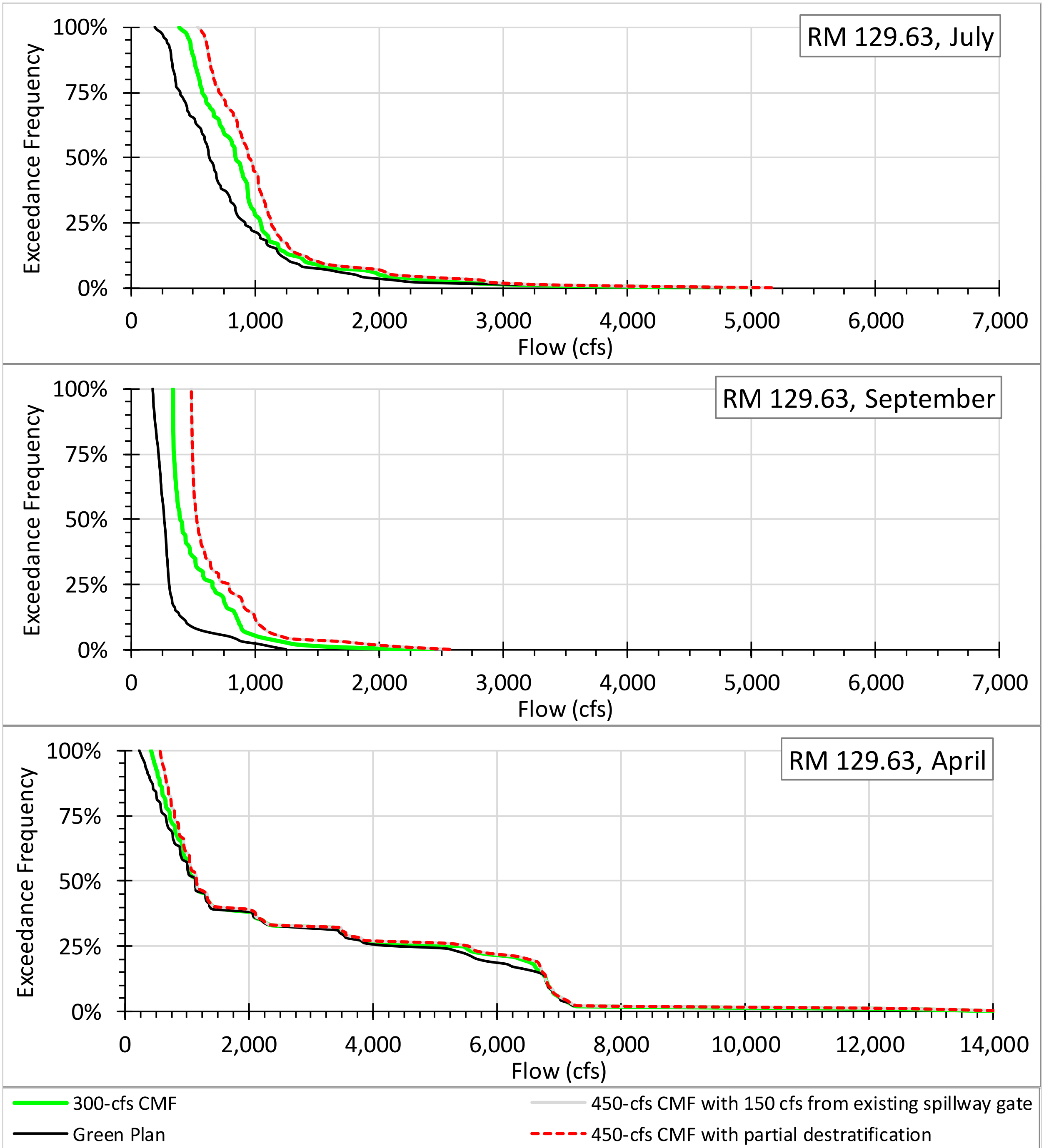


Figure 3.3.2-33. Typical circulation patterns set up by draft tube mixer and surface pump (Source: Sherman, 2000, as modified by staff).



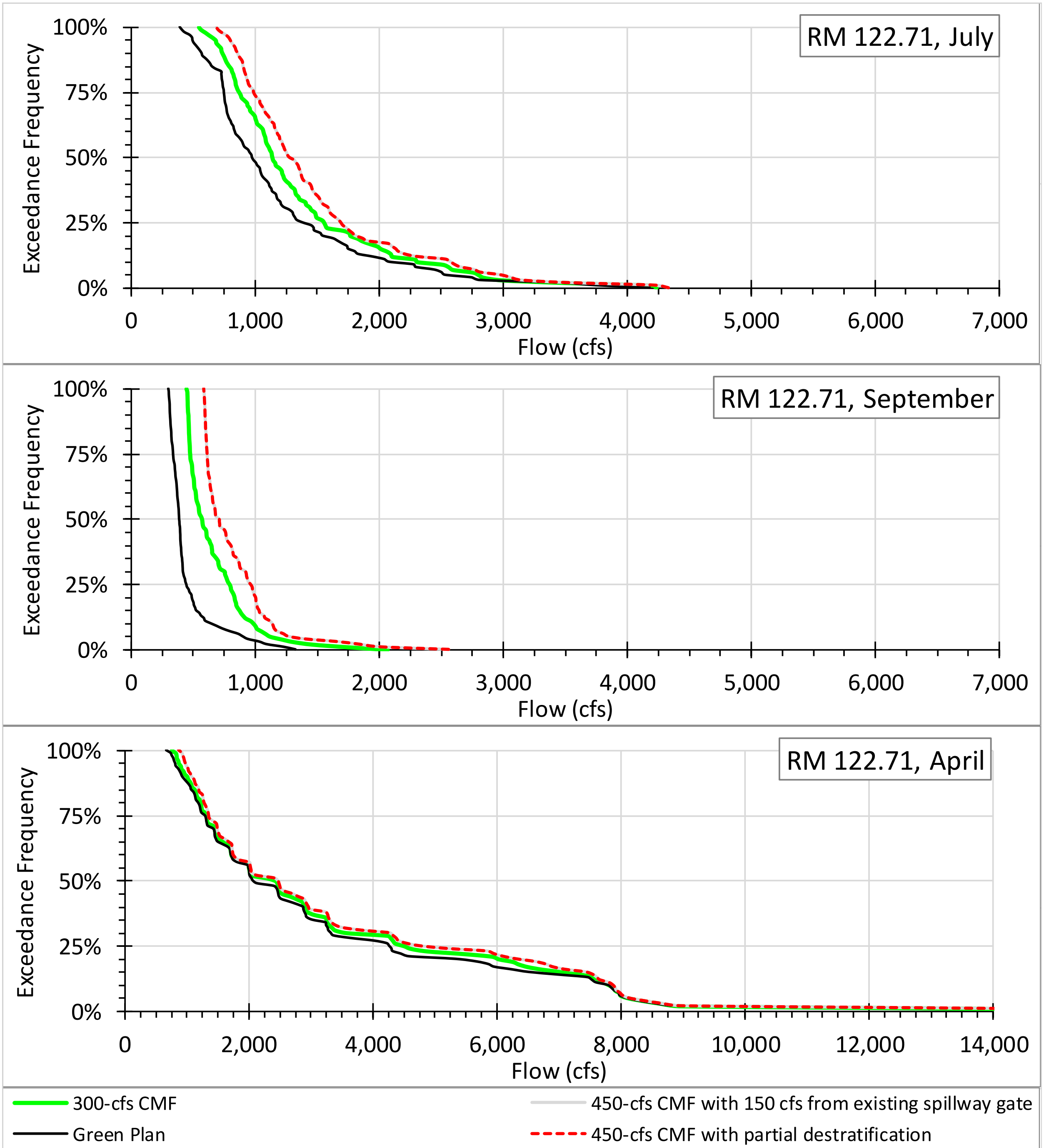
Note: We modified boundary conditions in Alabama Power's HEC-RAS model to simulate the two 450-cfs CMF scenarios.

Figure 3.3.2-34. Exceedance frequencies of simulated hourly flow immediately downstream from Harris Dam under existing conditions (Green Plan), proposed operations (300-cfs CMF), 450-cfs CMF with 150 cfs through existing spillway gate, and 450-cfs CMF from a partially destratified forebay, July 3–14 and September 11–23, 2019 and April 3–14, 2020 (Source: Kleinschmidt, 2021b, as modified by staff).



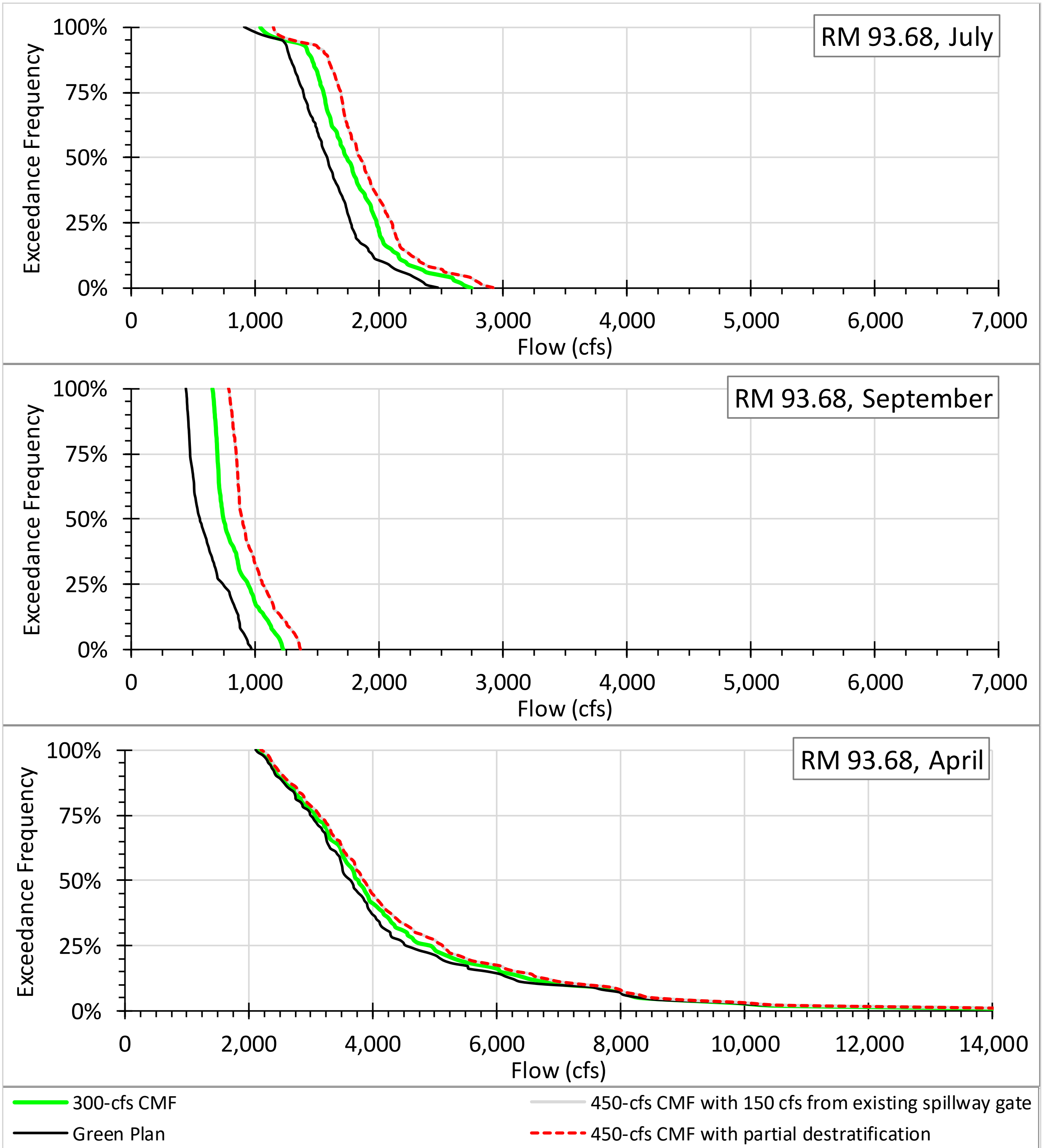
Note: We modified boundary conditions in Alabama Power's HEC-RAS model to simulate both 450-cfs CMF scenarios.

Figure 3.3.2-35. Exceedance frequencies of simulated hourly flow near Malone gage under existing conditions (Green Plan), proposed operations (300-cfs CMF), 450-cfs CMF with 150 cfs through existing spillway gate, and 450-cfs CMF from a partially destratified forebay, July 3–14 and September 11–23 of 2019 and April 3–14, 2020 (Source: Kleinschmidt, 2021b, as modified by staff).



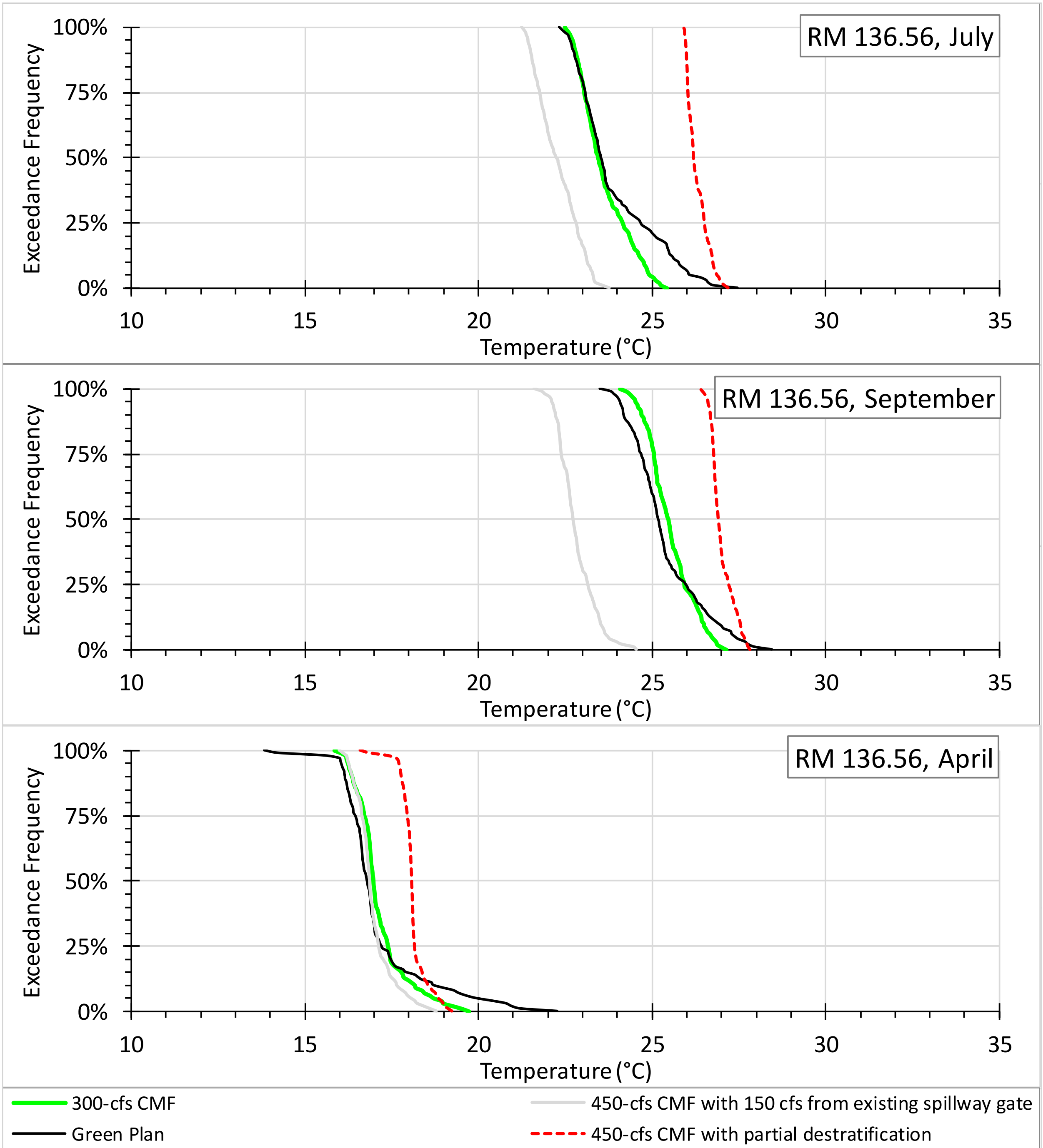
Note: We modified boundary conditions in Alabama Power's HEC-RAS model to simulate both 450-cfs CMF scenarios.

Figure 3.3.2-36. Exceedance frequencies of simulated hourly flow near Wadley gage under existing conditions (Green Plan), proposed operations (300-cfs CMF), 450-cfs CMF with 150 cfs through existing spillway gate, and 450-cfs CMF from a partially destratified forebay, July 3–14 and September 11–23 of 2019 and April 3–14, 2020 (Source: Kleinschmidt, 2021b, as modified by staff).



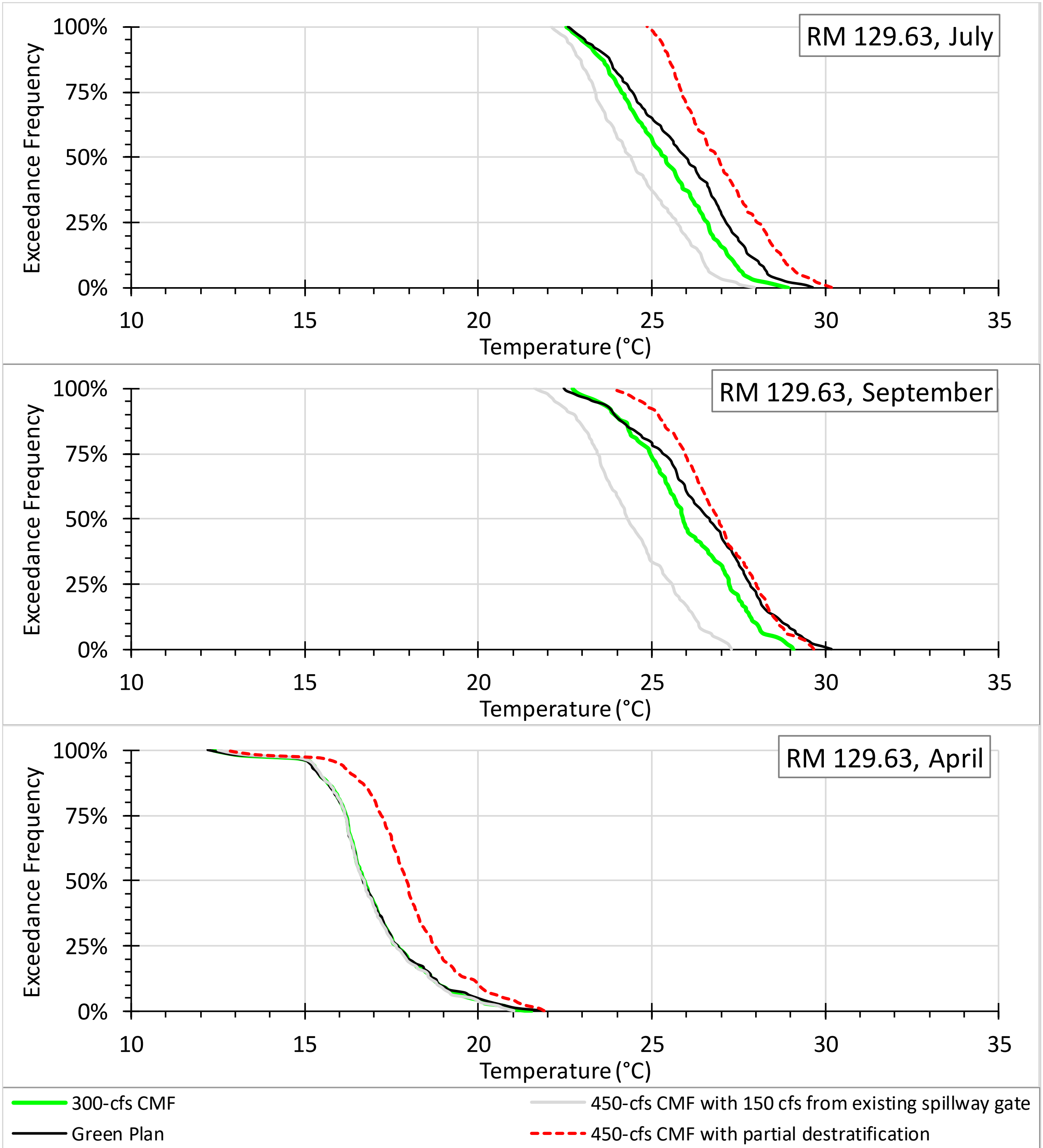
Note: We modified boundary conditions in Alabama Power's HEC-RAS model to simulate both 450-cfs CMF scenarios.

Figure 3.3.2-37. Exceedance frequencies of simulated hourly flow near Horseshoe Bend gage, under existing conditions (Green Plan), proposed operations (300-cfs CMF), 450-cfs CMF with 150 cfs through existing spillway gate, and 450-cfs CMF from a partially destratified forebay, July 3–14 and September 11–23 of 2019 and April 3–14, 2020 (Source: Kleinschmidt, 2021b, as modified by staff).



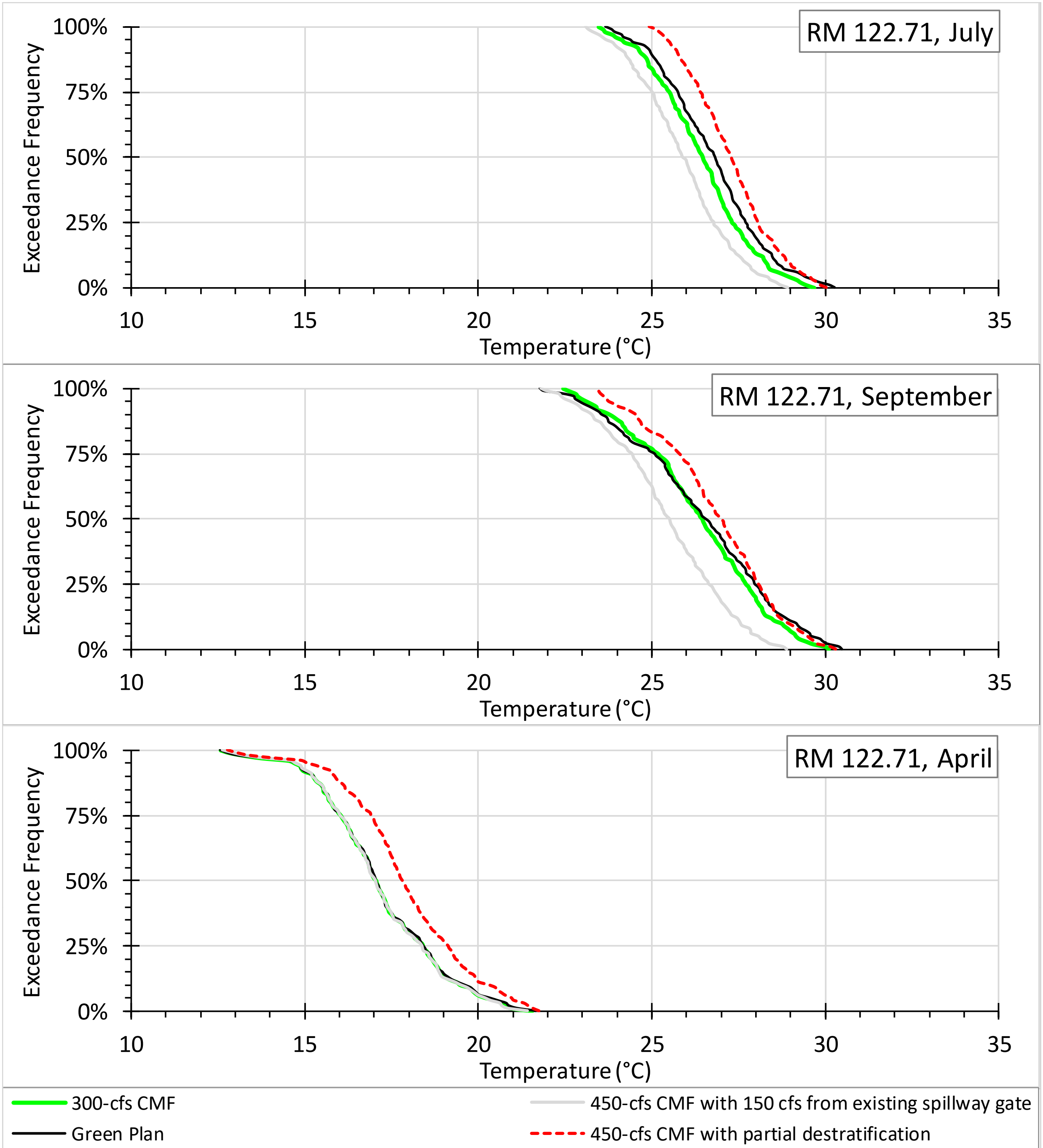
Note: We modified boundary conditions in Alabama Power's HEC-RAS model to simulate the two 450-cfs CMF scenarios.

Figure 3.3.2-38. Exceedance frequencies of simulated hourly temperature immediately downstream from Harris Dam under existing conditions (Green Plan), proposed operations (300-cfs CMF), 450-cfs CMF with 150 cfs through existing spillway gate, and 450-cfs CMF from a partially destratified forebay, July 3–14 and September 11–23 of 2019 and April 3–14, 2020 (Source: Kleinschmidt, 2021b, as modified by staff).



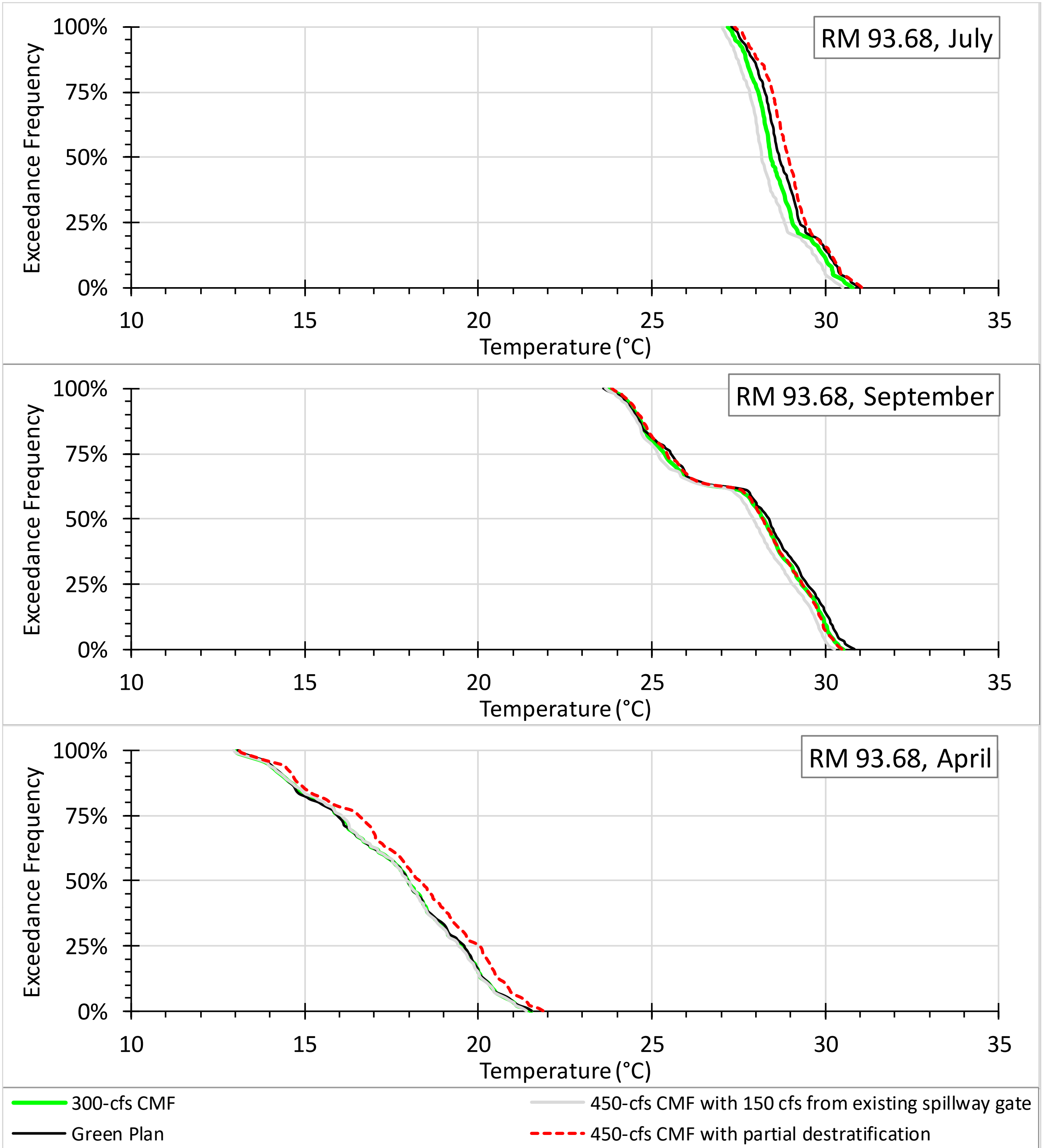
Note: We modified boundary conditions in Alabama Power's HEC-RAS model to simulate both 450-cfs CMF scenarios.

Figure 3.3.2-39. Exceedance frequencies of simulated hourly temperature near Malone gage under existing conditions (Green Plan), proposed operations (300-cfs CMF), 450-cfs CMF with 150 cfs through existing spillway gate, and 450-cfs CMF from a partially destratified forebay, July 3–14 and September 11–23 of 2019 and April 3–14, 2020 (Source: Kleinschmidt, 2021b, as modified by staff).



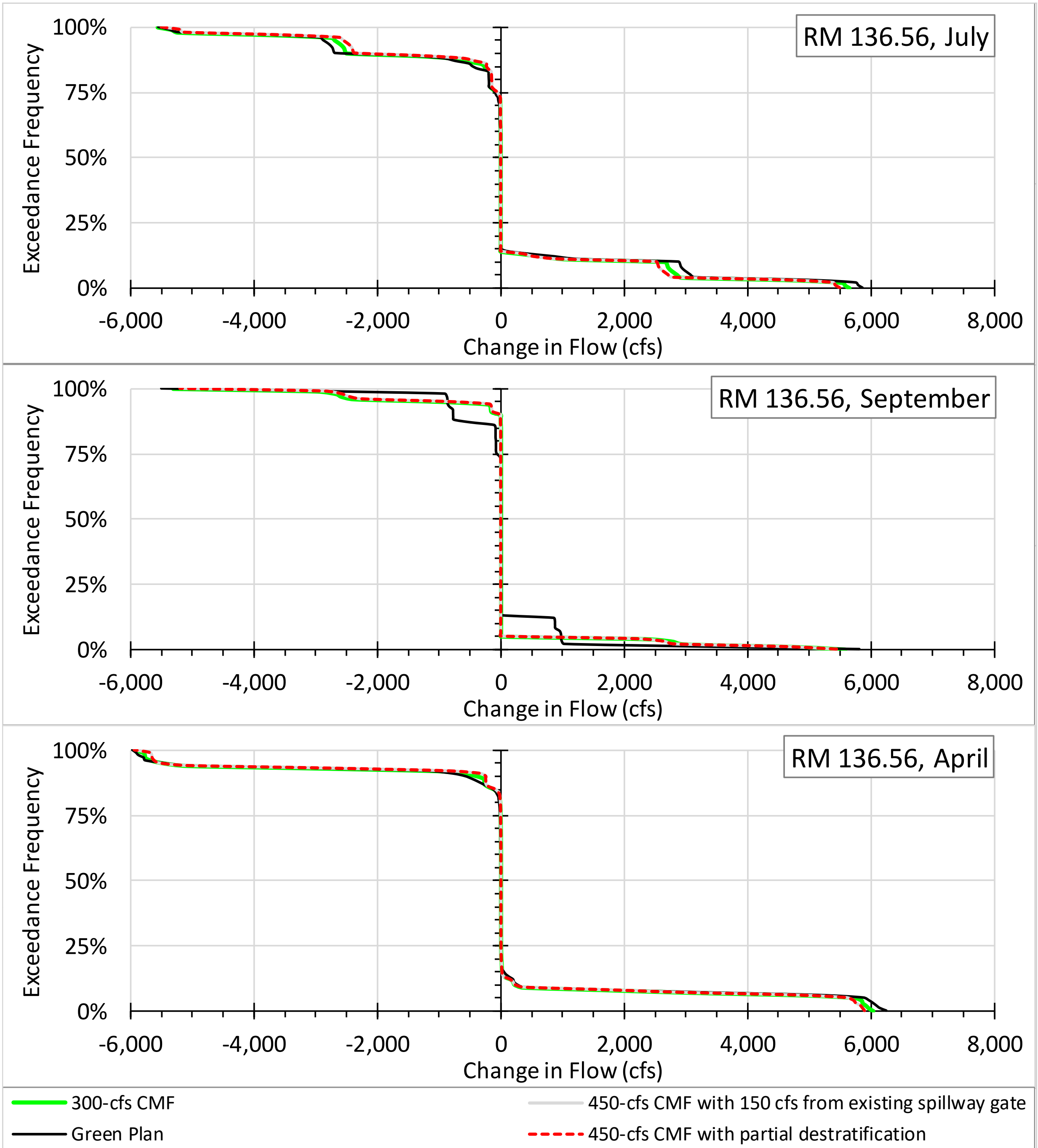
Note: We modified boundary conditions in Alabama Power's HEC-RAS model to simulate both 450-cfs CMF scenarios.

Figure 3.3.2-40. Exceedance frequencies of simulated hourly temperature near Wadley gage under existing conditions (Green Plan), proposed operations (300-cfs CMF), 450-cfs CMF with 150 cfs through existing spillway gate, and 450-cfs CMF from a partially destratified forebay, July 3–14 and September 11–23 of 2019 and April 3–14, 2020 (Source: Kleinschmidt, 2021b, as modified by staff).



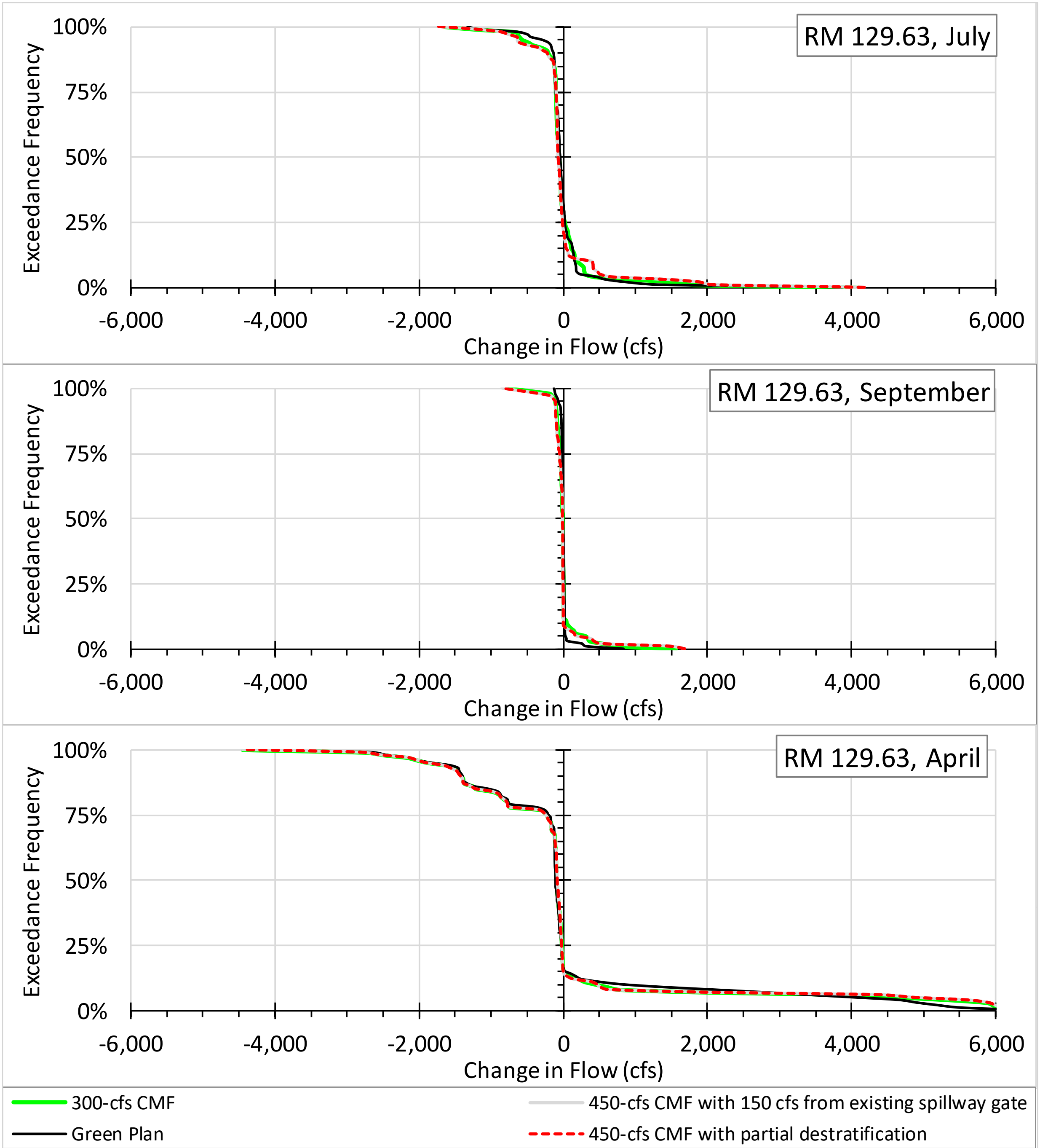
Note: We modified boundary conditions in Alabama Power's HEC-RAS model to simulate both 450-cfs CMF scenarios.

Figure 3.3.2-41. Exceedance frequencies of simulated hourly temperature near Horseshoe Bend gage, under existing conditions (Green Plan), proposed operations (300-cfs CMF), 450-cfs CMF with 150 cfs through existing spillway gate, and 450-cfs CMF from a partially destratified forebay, July 3–14 and September 11–23 of 2019 and April 3-14, 2020 (Source: Kleinschmidt, 2021b, as modified by staff).



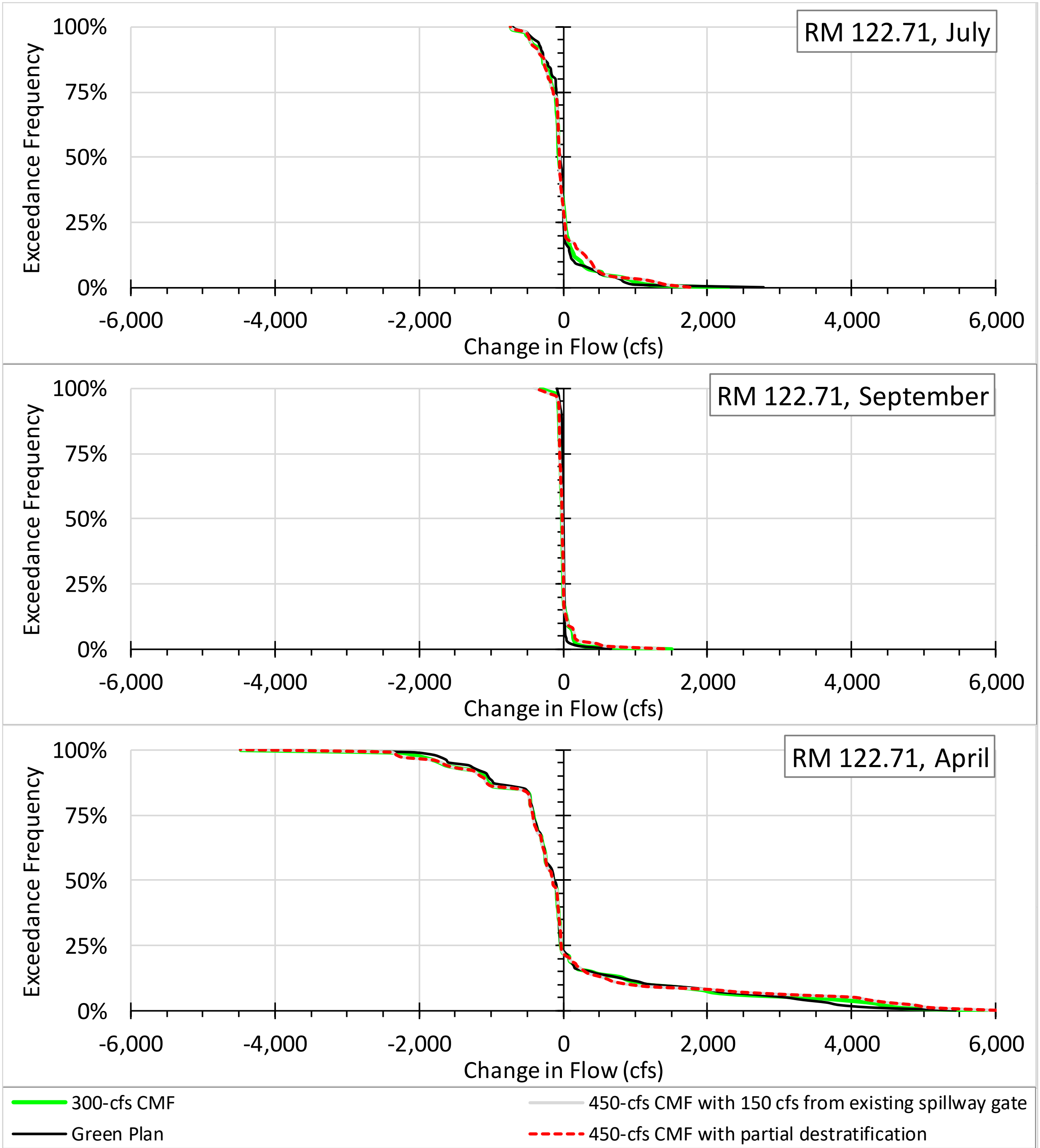
Note: We modified boundary conditions in Alabama Power's HEC-RAS model to simulate the two 450-cfs CMF scenarios.

Figure 3.3.2-42. Exceedance frequencies of simulated hourly change in flow immediately downstream from Harris Dam under existing conditions (Green Plan), proposed operations (300-cfs CMF), 450-cfs CMF with 150 cfs through existing spillway gate, and 450-cfs CMF from a partially destratified forebay, July 3–14 and September 11–23 of 2019 and April 3–14, 2020 (Source: Kleinschmidt, 2021b, as modified by staff).



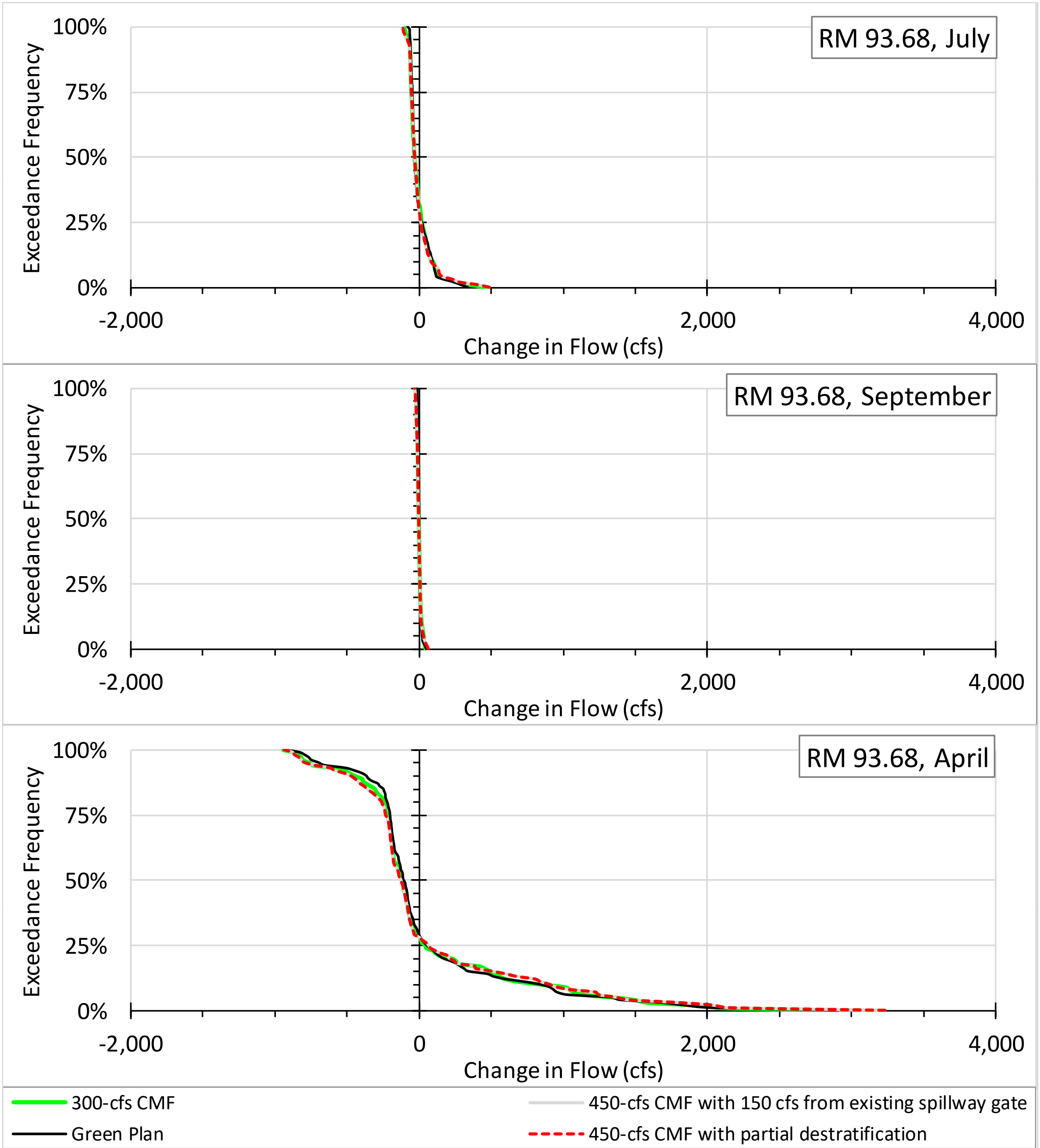
Note: We modified boundary conditions in Alabama Power's HEC-RAS model to simulate both 450-cfs CMF scenarios.

Figure 3.3.2-43. Exceedance frequencies of simulated hourly change in flow near Malone gage under existing conditions (Green Plan), proposed operations (300-cfs CMF), 450-cfs CMF with 150 cfs through existing spillway gate, and 450-cfs CMF from a partially destratified forebay, July 3–14 and September 11–23 of 2019 and April 3–14, 2020 (Source: Kleinschmidt, 2021b, as modified by staff).



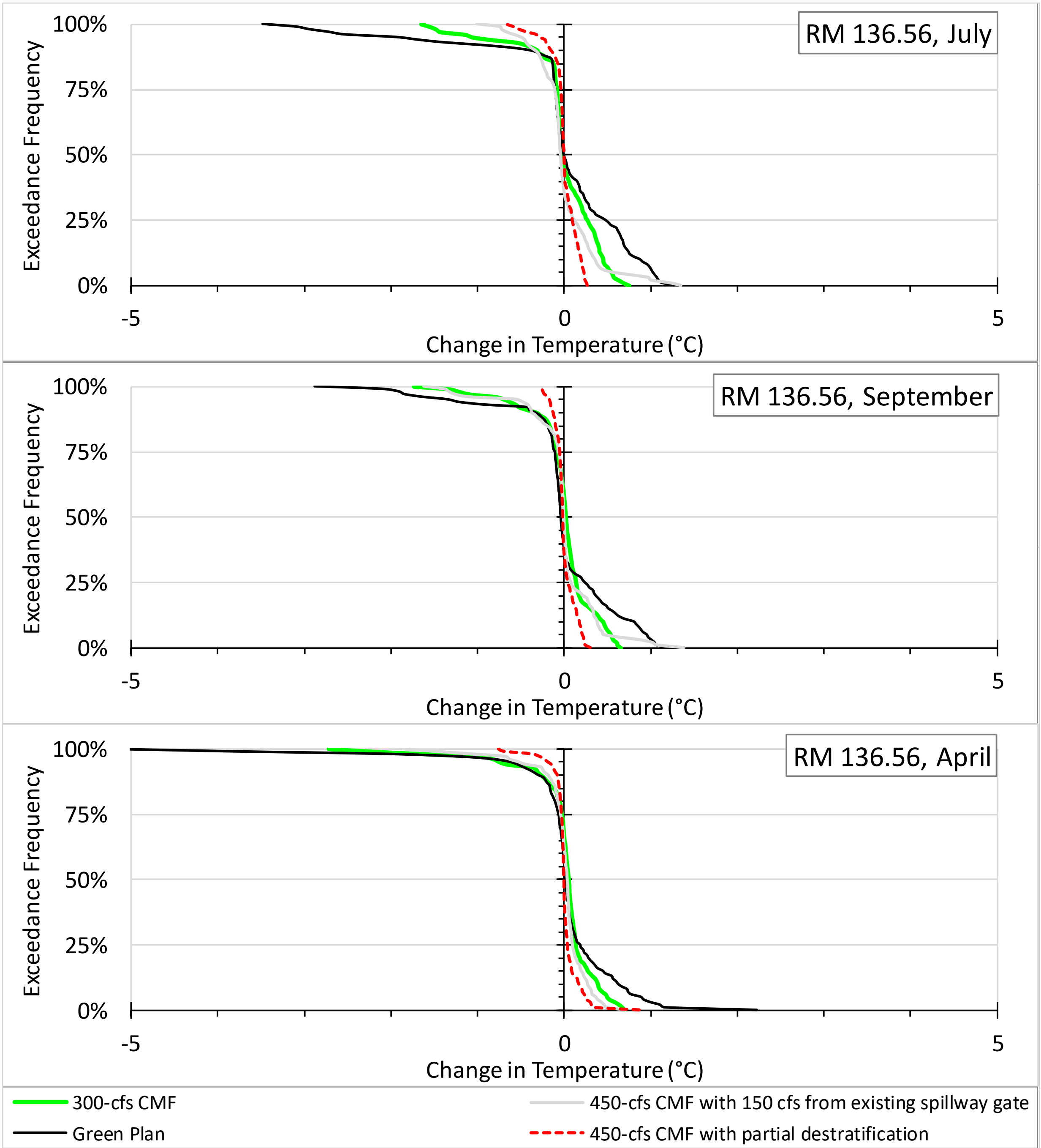
Note: We modified boundary conditions in Alabama Power's HEC-RAS model to simulate both 450-cfs CMF scenarios.

Figure 3.3.2-44. Exceedance frequencies of simulated hourly change in flow near Wadley gage under existing conditions (Green Plan), proposed operations (300-cfs CMF), 450-cfs CMF with 150 cfs through existing spillway gate, and 450-cfs CMF from a partially destratified forebay, July 3–14 and September 11–23 of 2019 and April 3–14, 2020 (Source: Kleinschmidt, 2021b, as modified by staff).



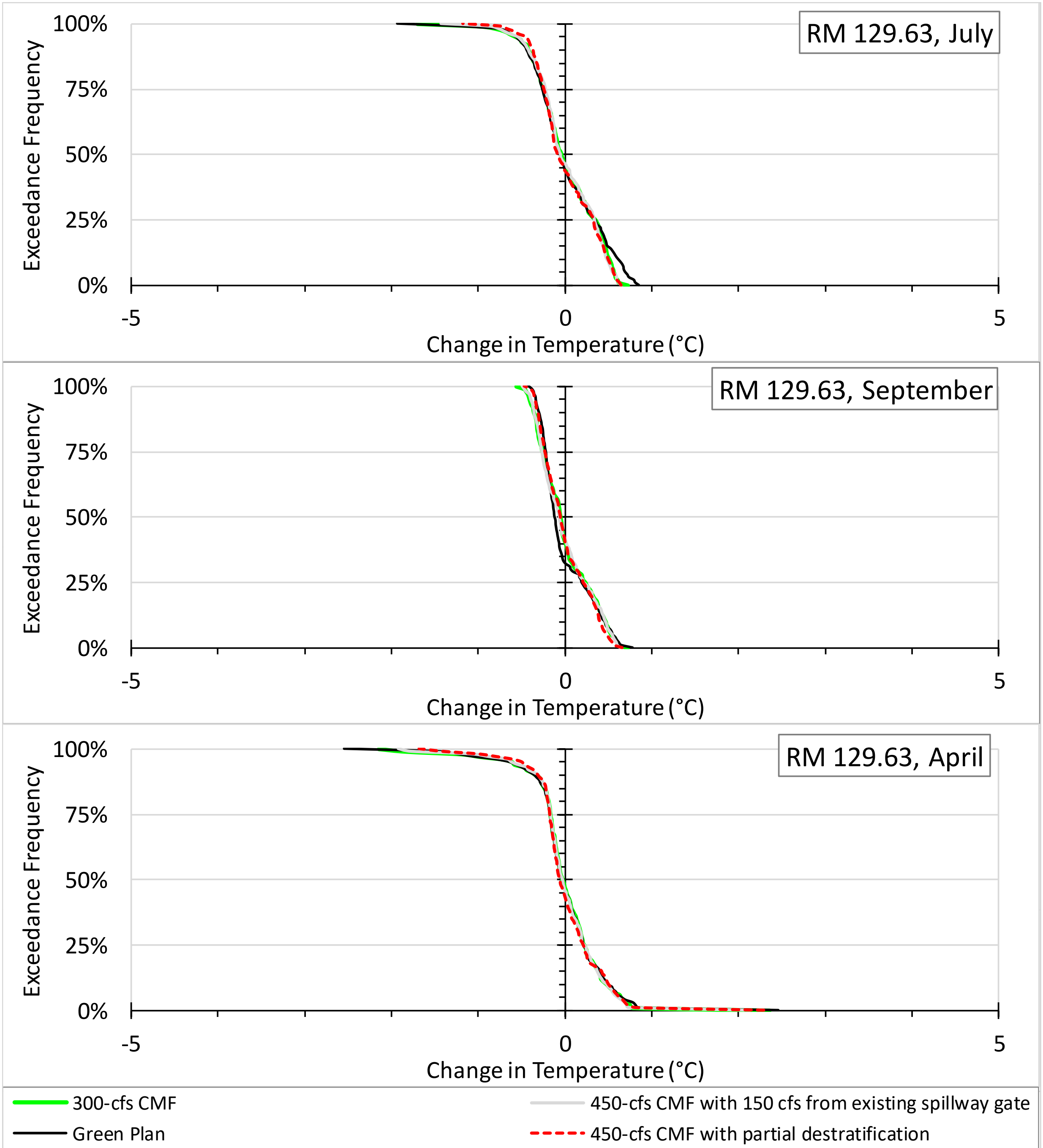
Note: We modified boundary conditions in Alabama Power's HEC-RAS model to simulate both 450-cfs CMF scenarios.

Figure 3.3.2-45. Exceedance frequencies of simulated hourly change in flow near Horseshoe Bend gage, under existing conditions (Green Plan), proposed operations (300-cfs CMF), 450-cfs CMF with 150 cfs through existing spillway gate, and 450-cfs CMF from a partially destratified forebay, July 3-14 and September 11-23 of 2019 and April 3-14, 2020 (Source: Kleinschmidt, 2021b, as modified by staff).



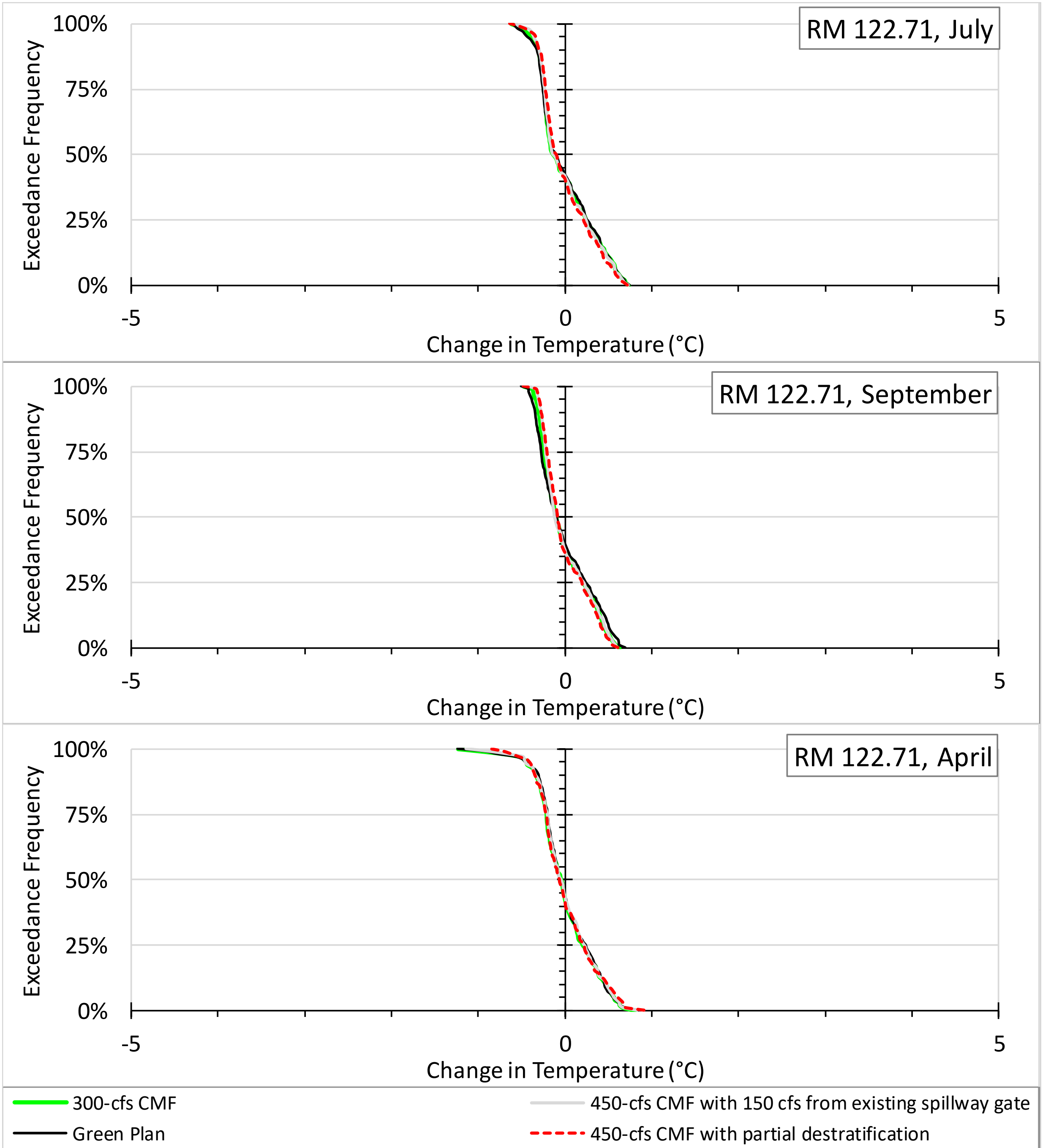
Note: We modified boundary conditions in Alabama Power's HEC-RAS model to simulate the two 450-cfs CMF scenarios.

Figure 3.3.2-46. Exceedance frequencies of simulated hourly change in temperature immediately downstream from Harris Dam under existing conditions (Green Plan), proposed operations (300-cfs CMF), 450-cfs CMF with 150 cfs through existing spillway gate, and 450-cfs CMF from a partially destratified forebay, July 3–14 and September 11–23 of 2019 and April 3–14, 2020 (Source: Kleinschmidt, 2021b, as modified by staff).



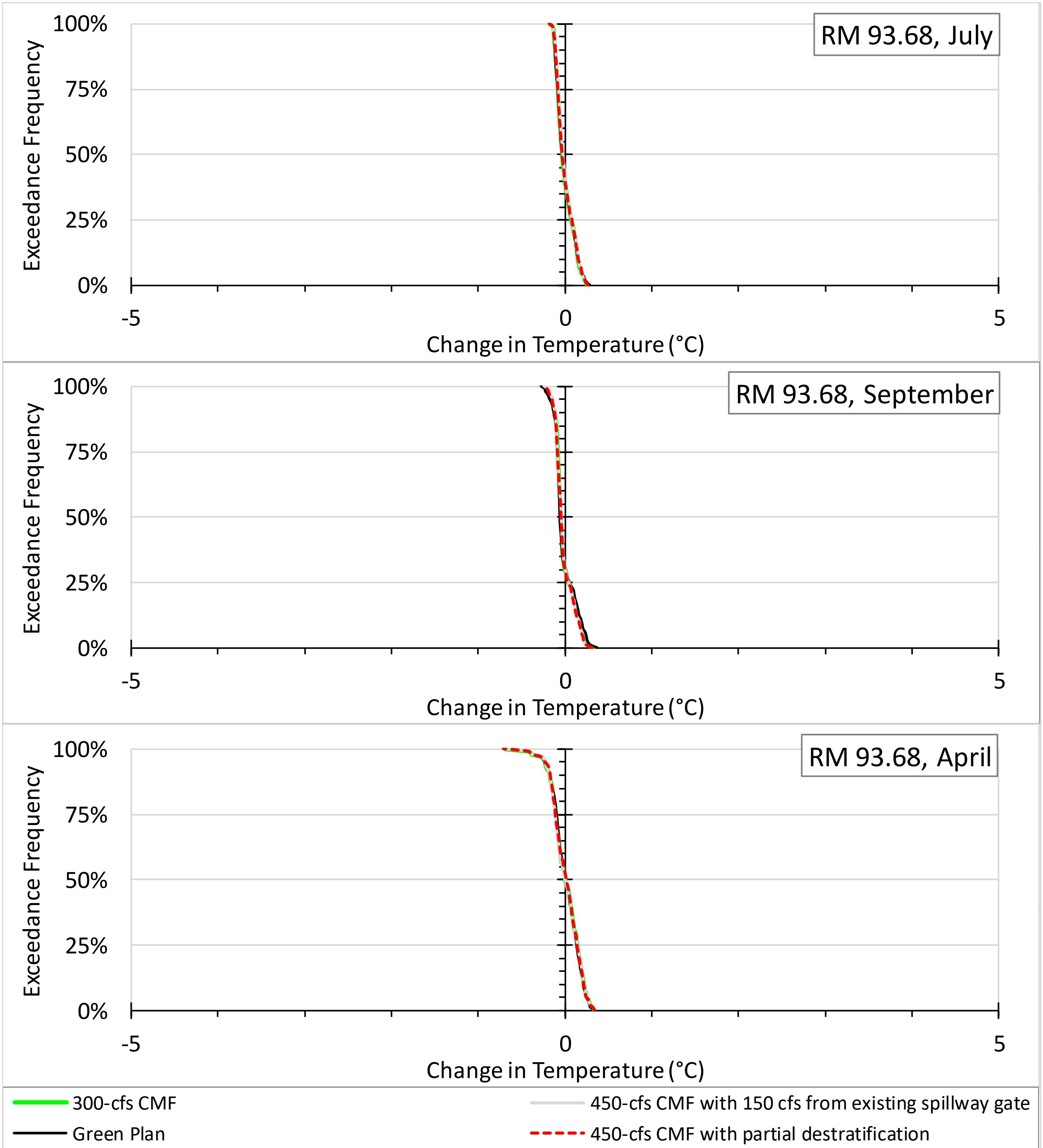
Note: We modified boundary conditions in Alabama Power's HEC-RAS model to simulate both 450-cfs CMF scenarios.

Figure 3.3.2-47. Exceedance frequencies of simulated hourly change in temperature near Malone gage under existing conditions (Green Plan), proposed operations (300-cfs CMF), 450-cfs CMF with 150 cfs through existing spillway gate, and 450-cfs CMF from a partially destratified forebay, July 3-14 and September 11-23 of 2019 and April 3-14, 2020 (Source: Kleinschmidt, 2021b, as modified by staff).



Note: We modified boundary conditions in Alabama Power's HEC-RAS model to simulate both 450-cfs CMF scenarios.

Figure 3.3.2-48. Exceedance frequencies of simulated hourly change in temperature near Wadley gage under existing conditions (Green Plan), proposed operations (300-cfs CMF), 450-cfs CMF with 150 cfs through existing spillway gate, and 450-cfs CMF from a partially destratified forebay, July 3-14 and September 11-23 of 2019 and April 3-14, 2020 (Source: Kleinschmidt, 2021b, as modified by staff).



Note: We modified boundary conditions in Alabama Power's HEC-RAS model to simulate both 450-cfs CMF scenarios.

Figure 3.3.2-49. Exceedance frequencies of simulated hourly change in temperature near Horseshoe Bend gage, under existing conditions (Green Plan), proposed operations (300-cfs CMF), 450-cfs CMF with 150 cfs through existing spillway gate, and 450-cfs CMF from a partially destratified forebay, July 3–14 and September 11–23 of 2019 and April 3–14, 2020 (Source: Kleinschmidt, 2021b, as modified by staff).

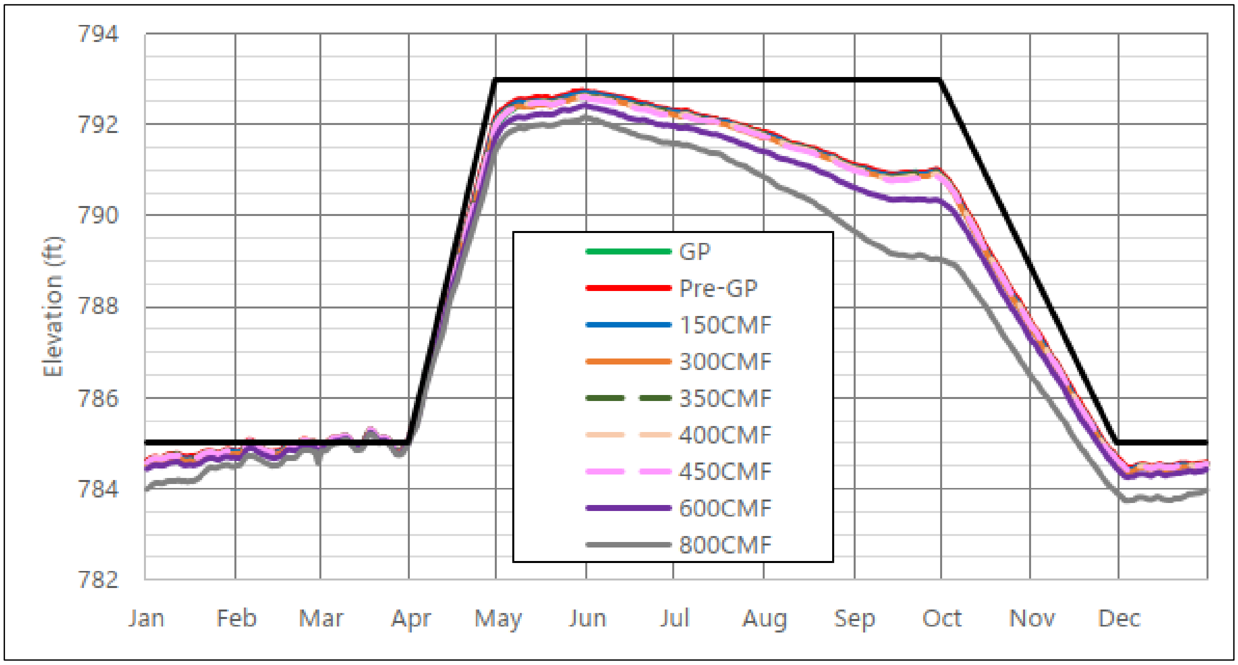


Figure 3.3.2-50. Average water surface elevation in Harris Reservoir based on HEC-ResSim modeling of alternative downstream release scenarios over the period of record (1939–2011) (Source: Alabama Power and Kleinschmidt, 2022a).

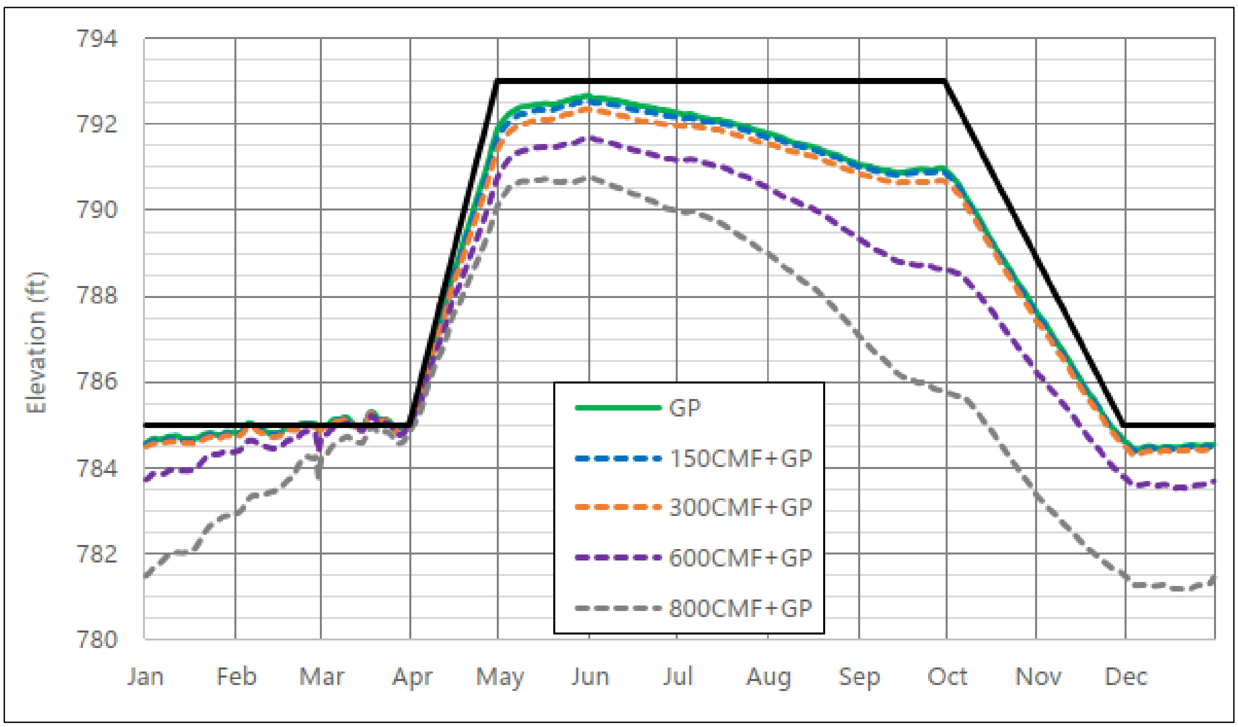


Figure 3.3.2-51. Average water surface elevation in Harris Reservoir based on HEC-ResSim modeling of alternative downstream release scenarios over the period of record (1939–2011) (Source: Alabama Power and Kleinschmidt, 2022a).

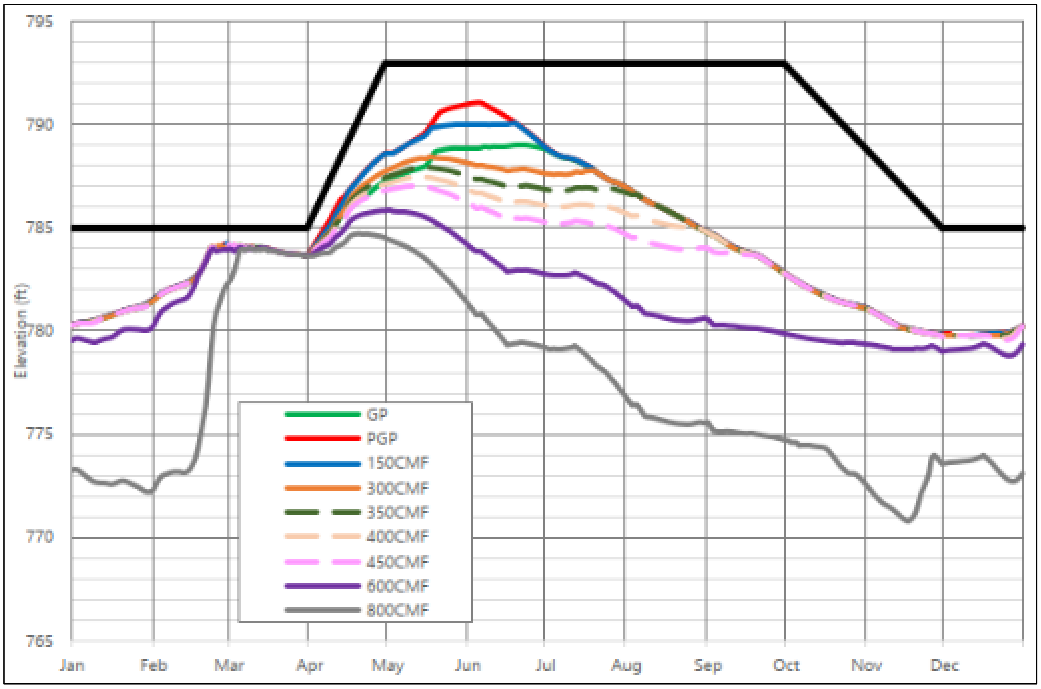


Figure 3.3.2-52. Minimum water surface elevation in Harris Reservoir based on HEC-ResSim modeling of alternative downstream release scenarios over the period of record (1939–2011) (Source: Alabama Power and Kleinschmidt, 2022a).

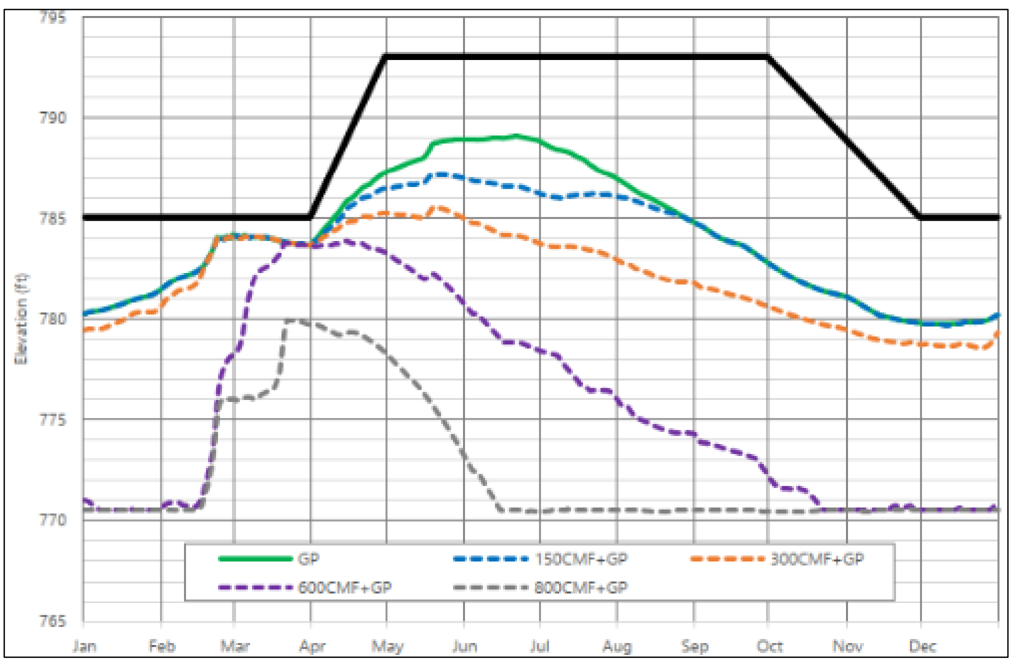


Figure 3.3.2-53. Minimum water surface elevation in Harris Reservoir based on HEC-ResSim modeling of alternative downstream release scenarios over the period of record (1939–2011) (Source: Alabama Power and Kleinschmidt, 2022a).

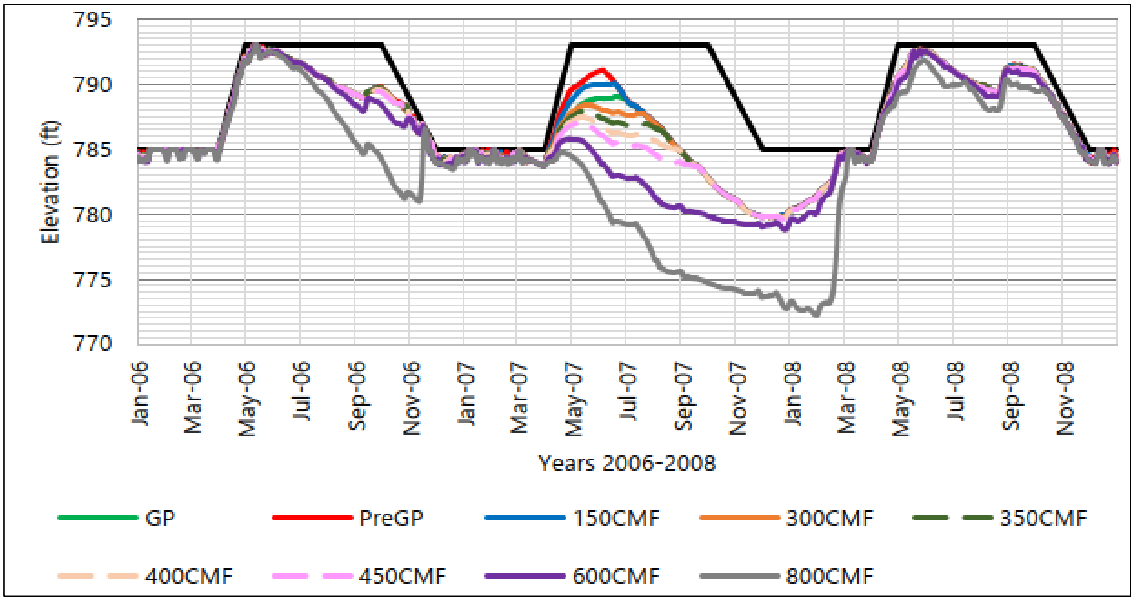


Figure 3.3.2-54. Water surface elevations in Harris Reservoir from 2006 through 2008 based on HEC-ResSim modeling of alternative downstream release scenarios (Source: Alabama Power and Kleinschmidt, 2022a).

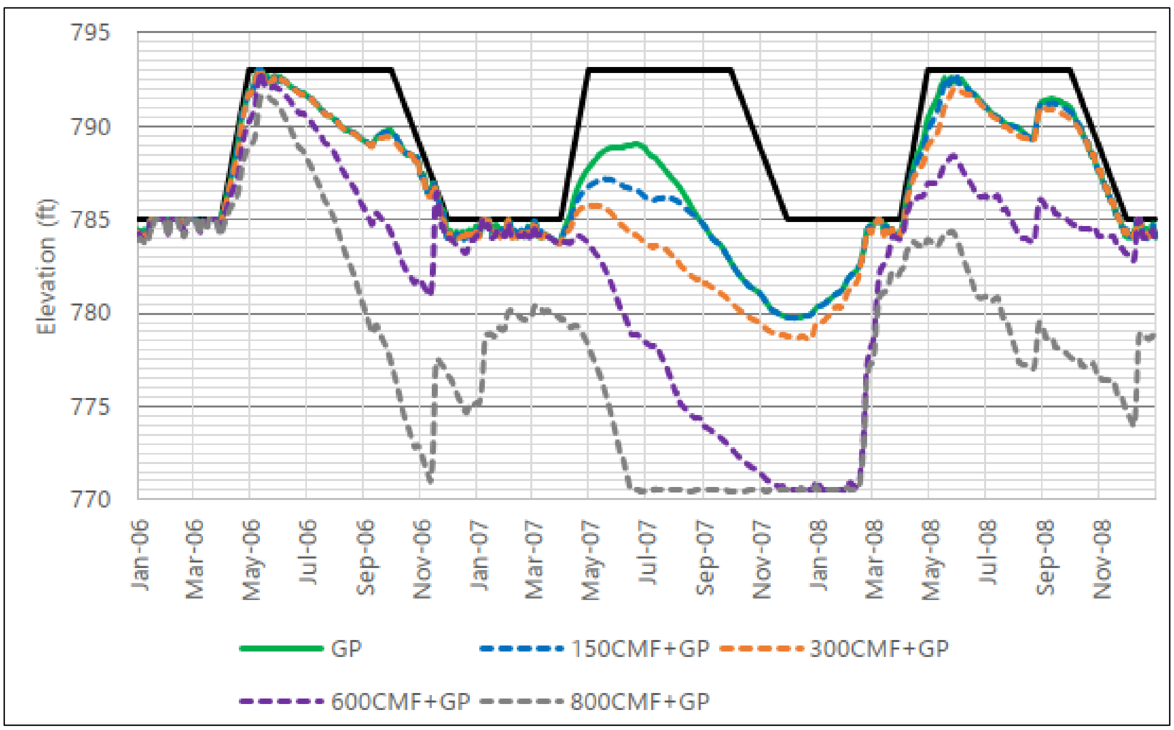


Figure 3.3.2-55. Water surface elevations in Harris Reservoir from 2006 through 2008 based on HEC-ResSim modeling of alternative downstream release scenarios (Source: Alabama Power and Kleinschmidt, 2022a).

Figure 3.3.3-1. Botanical inventory areas including a 20-acre parcel within the Harris Project boundary adjacent to Alabama Power's Flat Rock Park (Source: Alabama Power, 2021a).

Figure 3.3.3-2. Botanical inventory areas including a 35-acre parcel within the Harris Project boundary adjacent to Alabama Power's Flat Rock Park (Source: Alabama Power, 2021a).

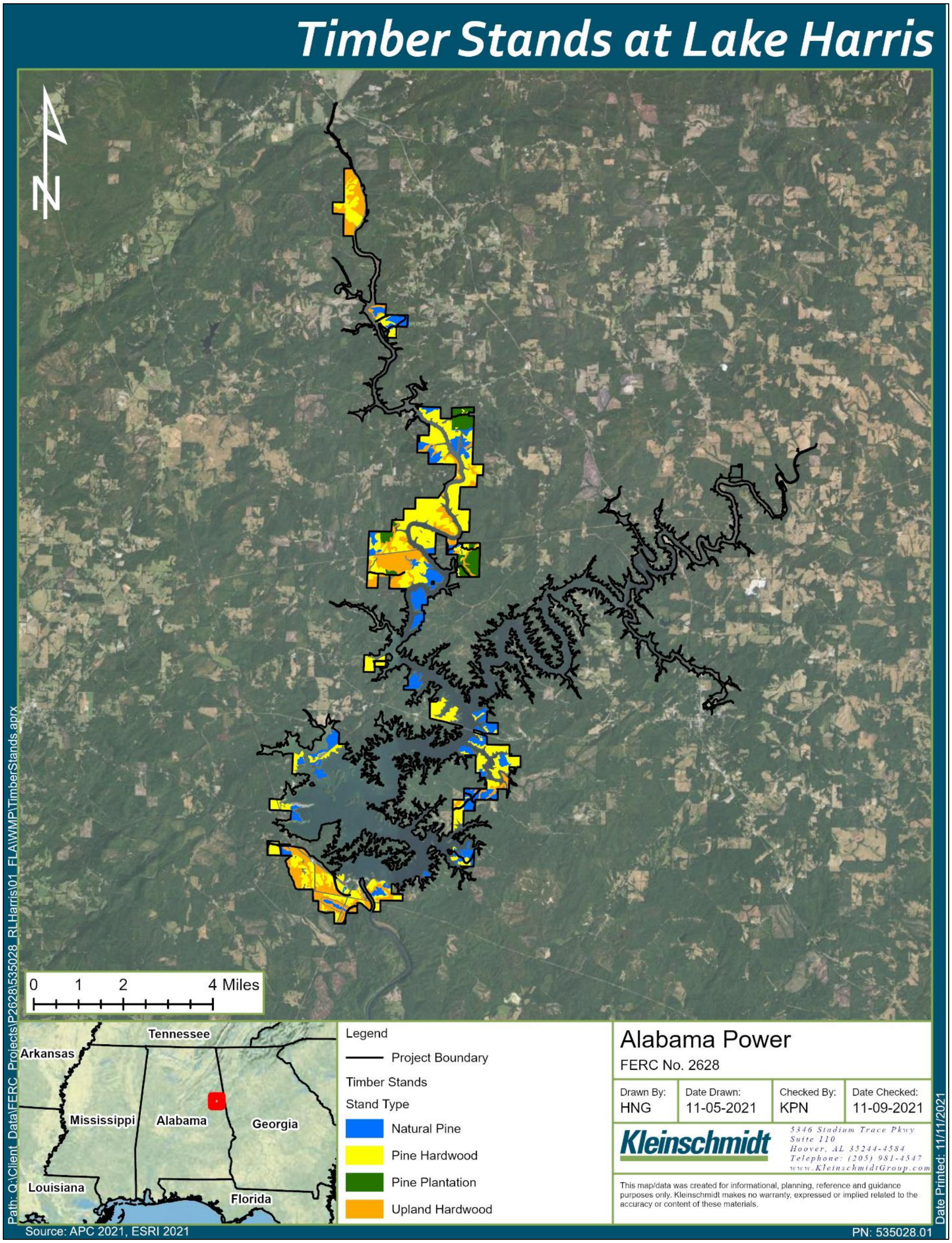


Figure 3.3.3-3. Location of timber stands and types at Harris Lake within Alabama Power's proposed project boundary (Source: Alabama Power, 2022a).

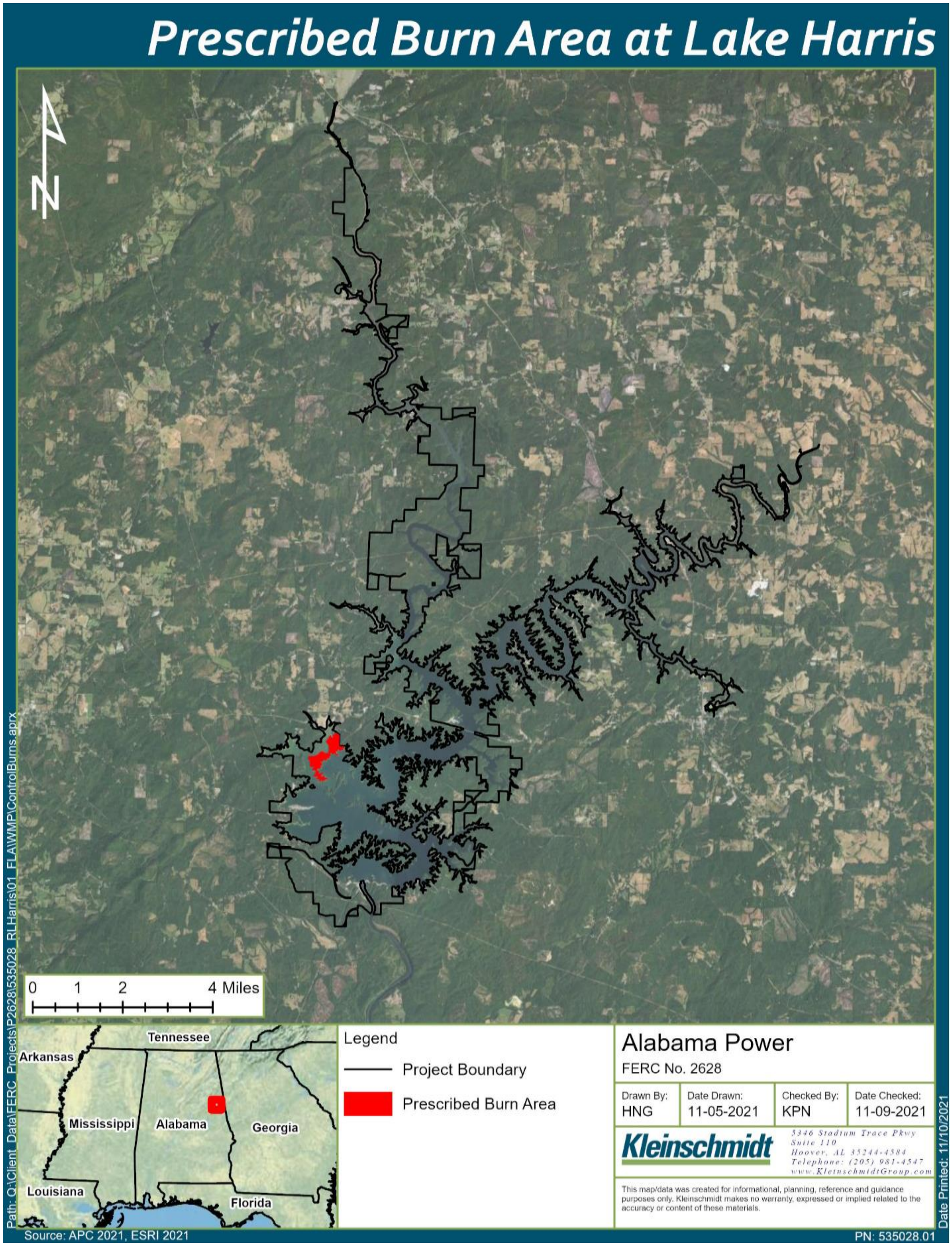


Figure 3.3.3-4. Location of prescribed burn area (160 acres) at Harris Lake (Source: Alabama Power, 2022a).

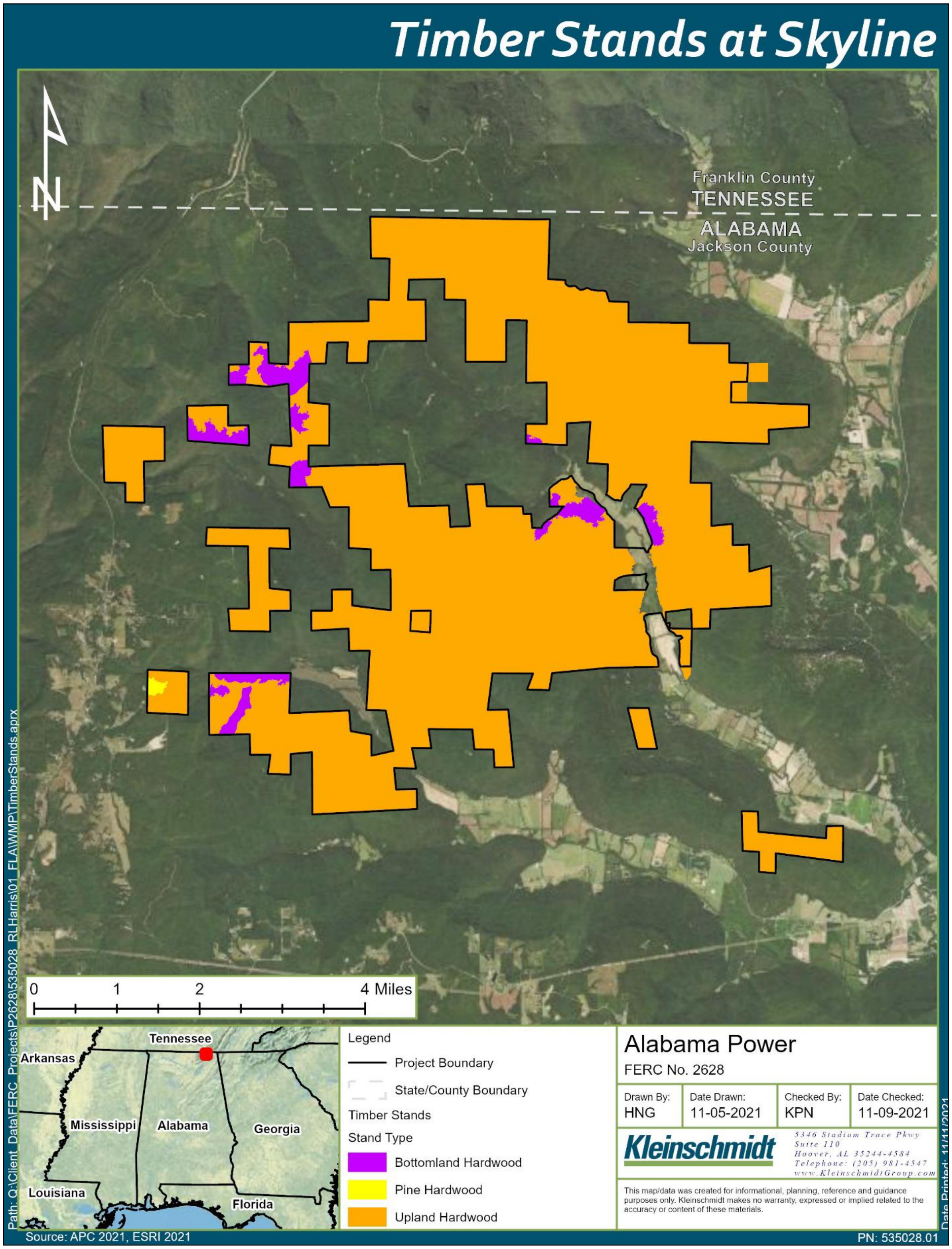


Figure 3.3.3-5. Location of timber stands and types on project land at Skyline WMA (Source: Alabama Power, 2022a).

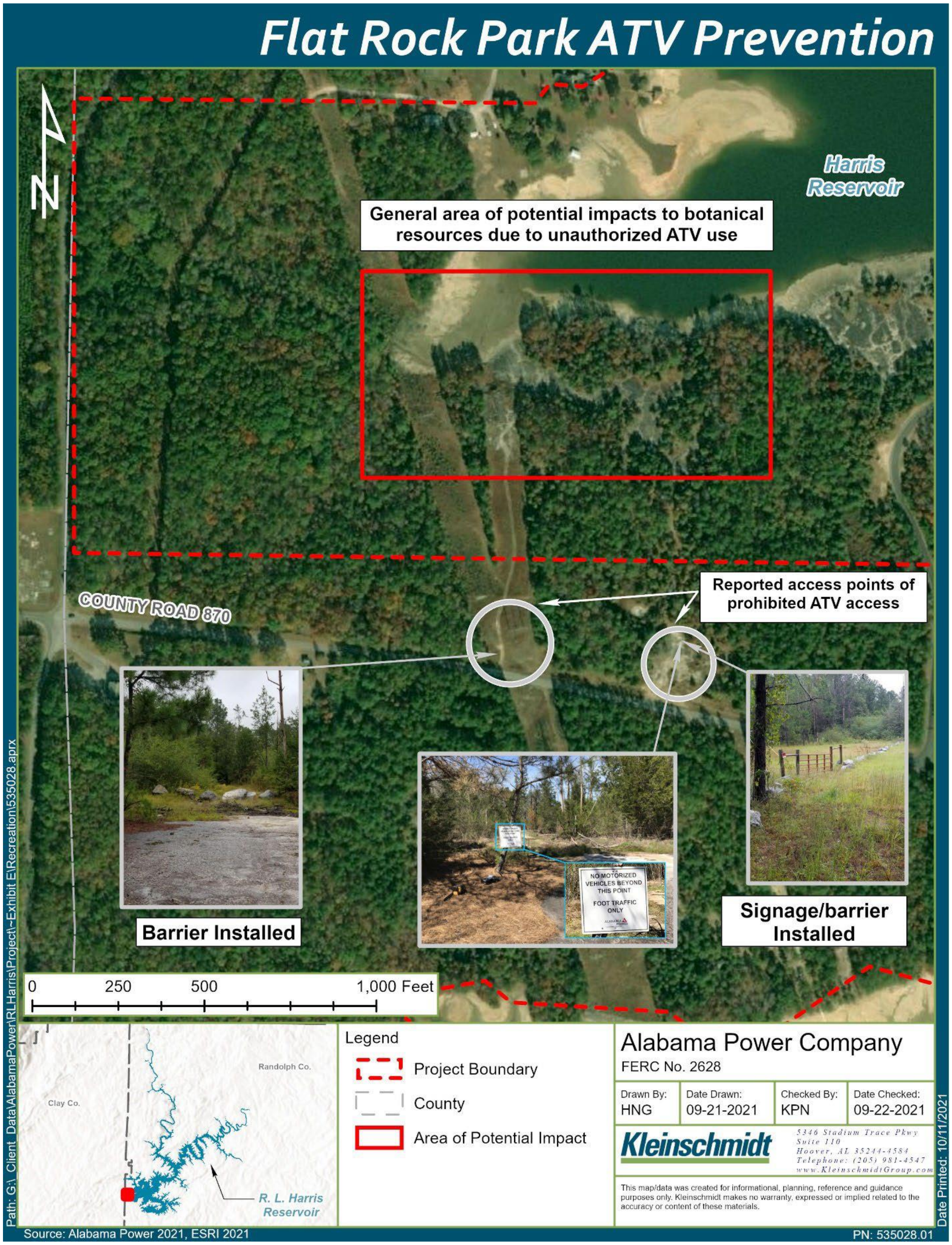


Figure 3.3.3-6. Location of prohibited ATV use within 20-acre botanical inventory area adjacent to Flat Rock Park (Source: Alabama Power, 2022a).

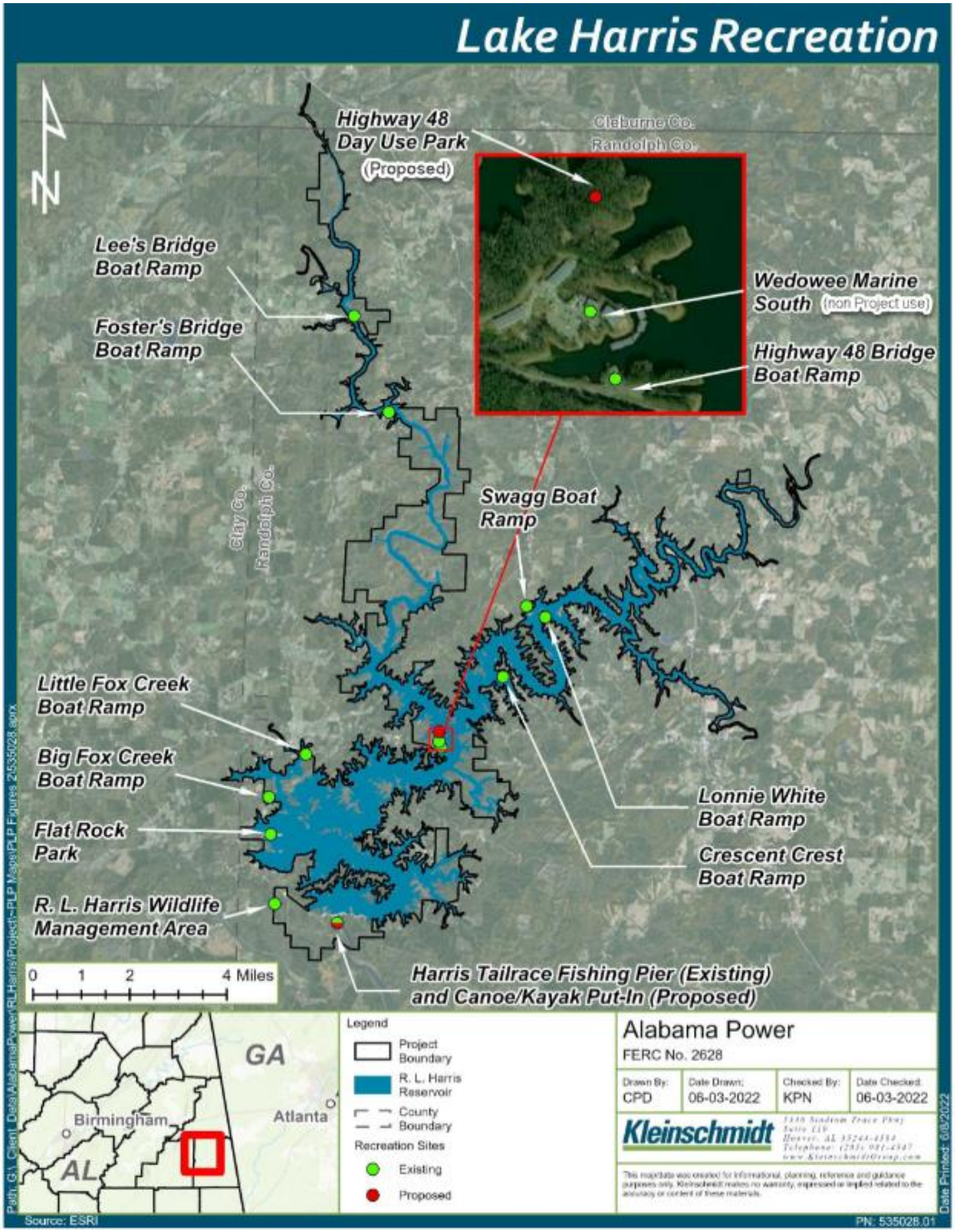


Figure 3.3.5-1. Project and non-project recreation facilities at Harris Hydroelectric Project (Source: Alabama Power, 2022a, as modified by staff).

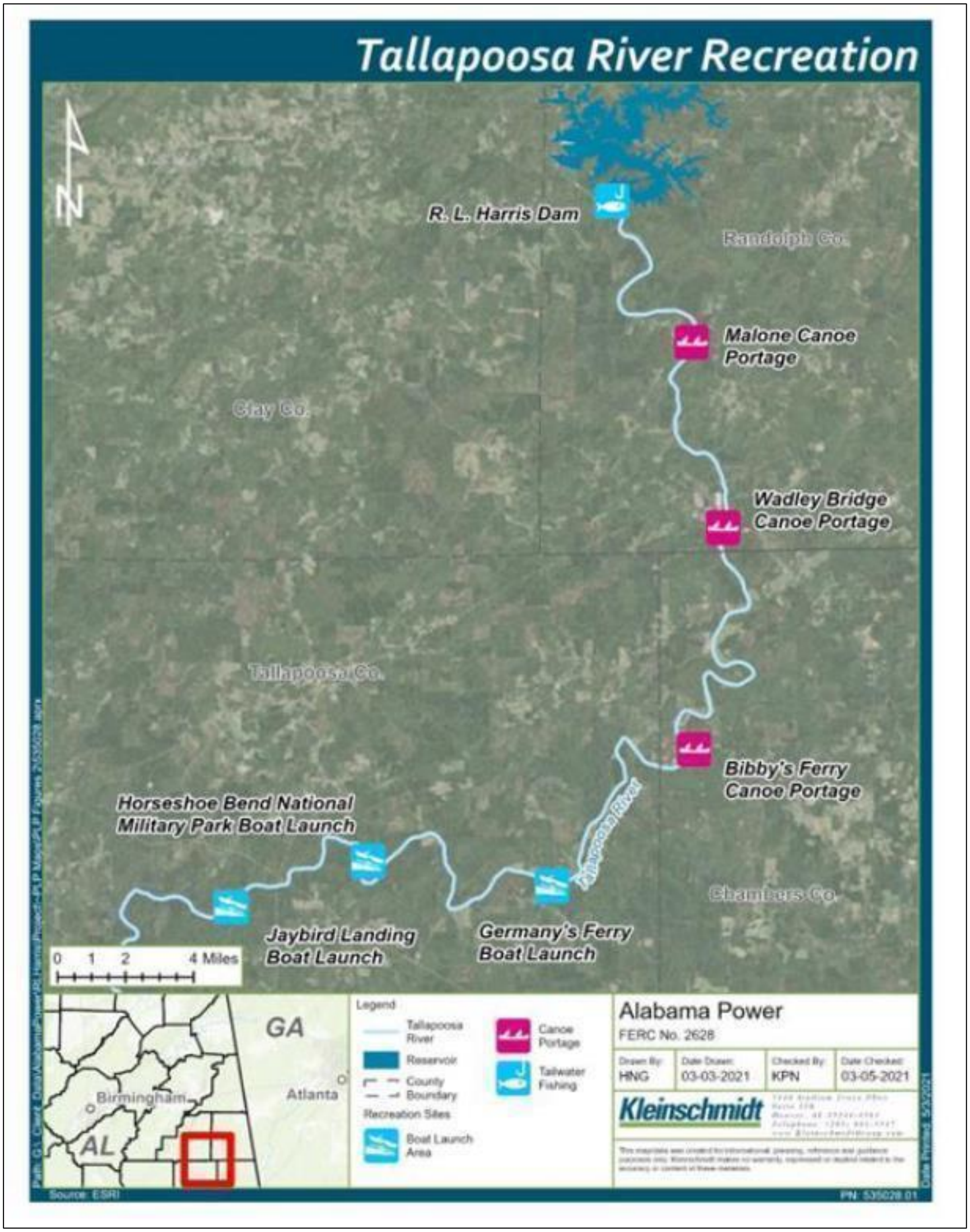


Figure 3.3.5-2. Non-project recreation facilities downstream on the Tallapoosa River (Source: Alabama Power, 2022d, as modified by staff).

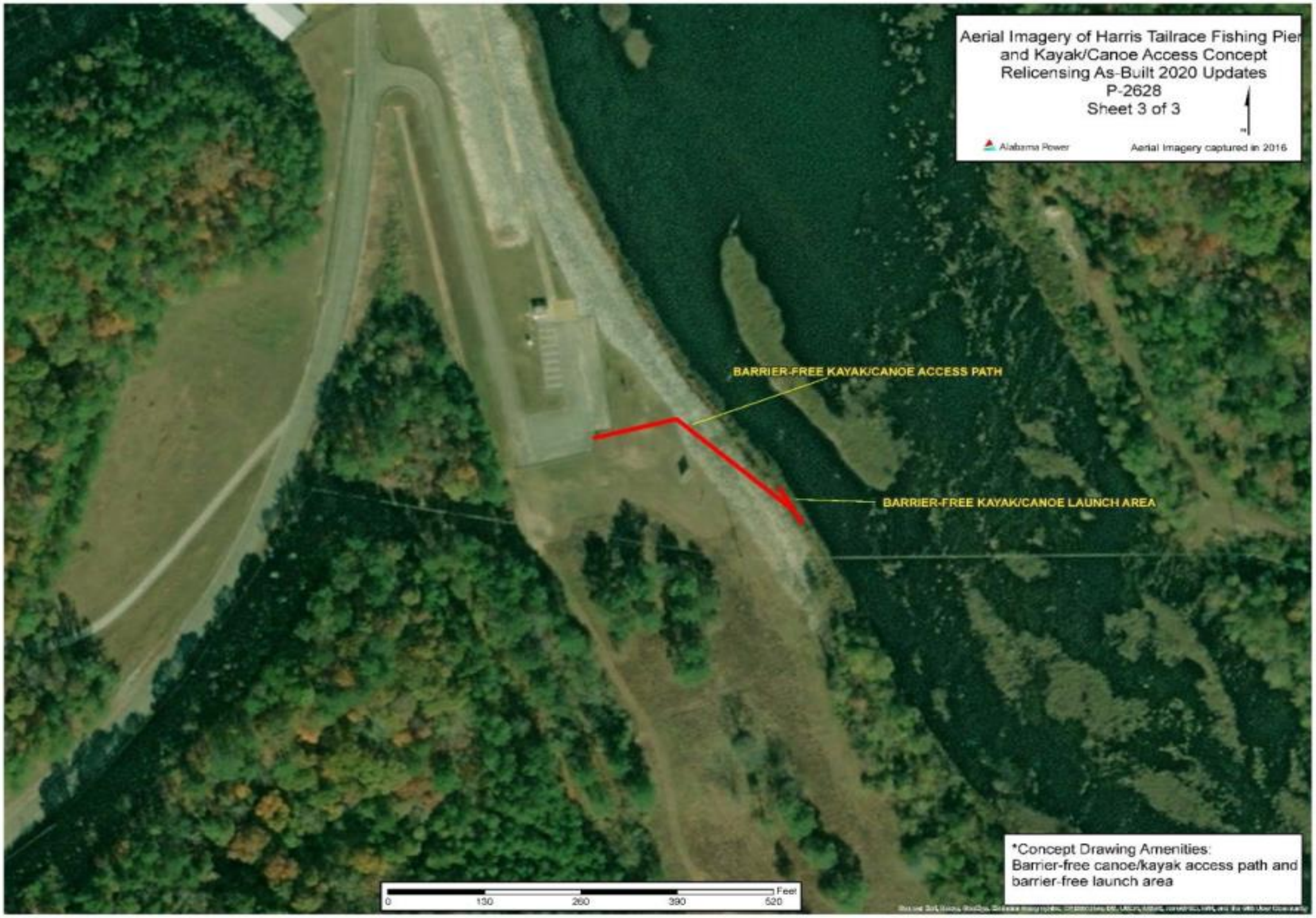


Figure 3.3.5-3. Conceptual design for Harris Tailrace Fishing Area (Source: Alabama Power, 2022d, as modified by staff).

Figure 3.3.5-4. Conceptual design for Highway 48 Day Use Park (Source: Alabama Power, 2022d, as modified by staff).

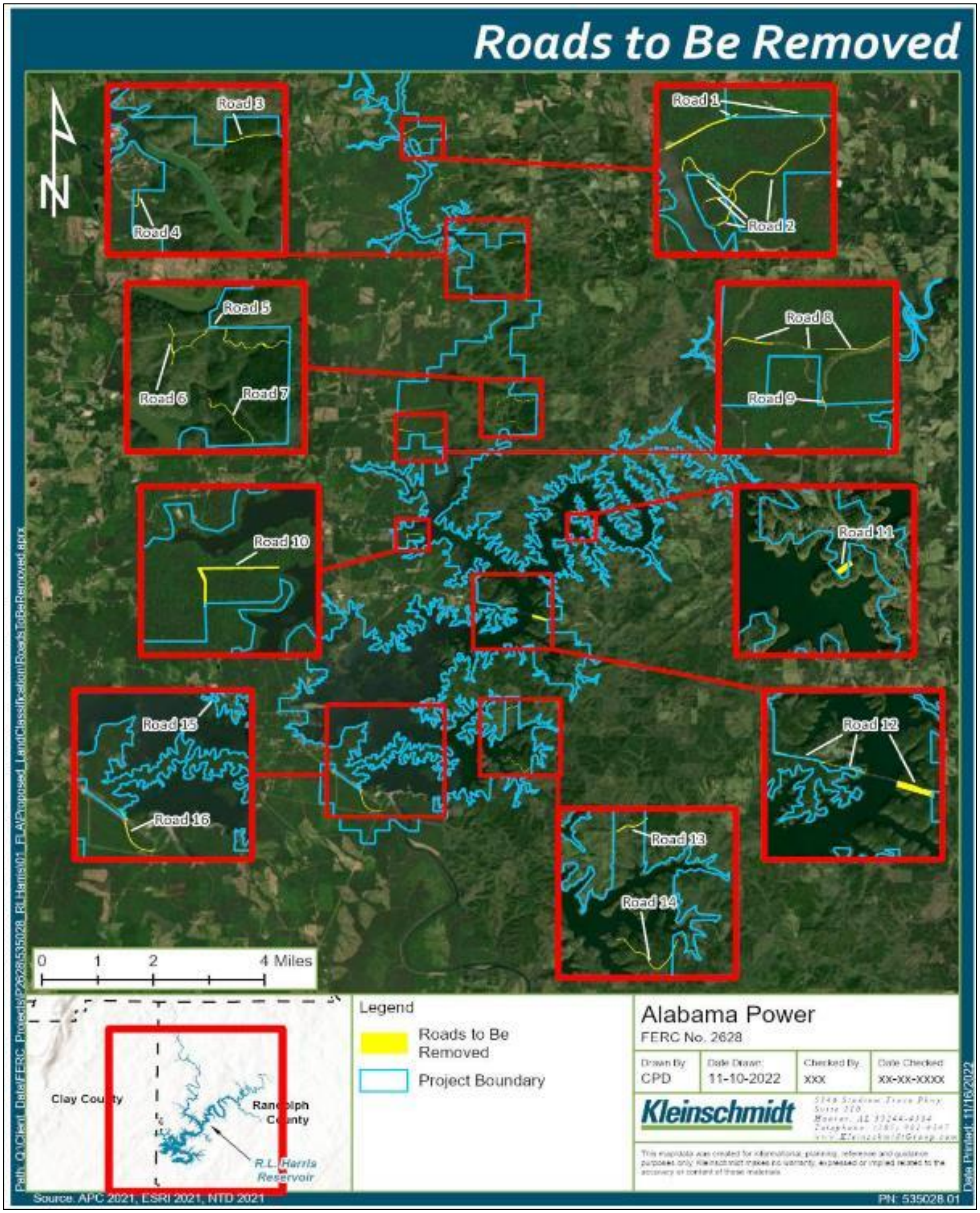


Figure 3.3.5-5. Roads proposed to be removed from project boundary (Source: Alabama Power, 2022b, as modified by staff).

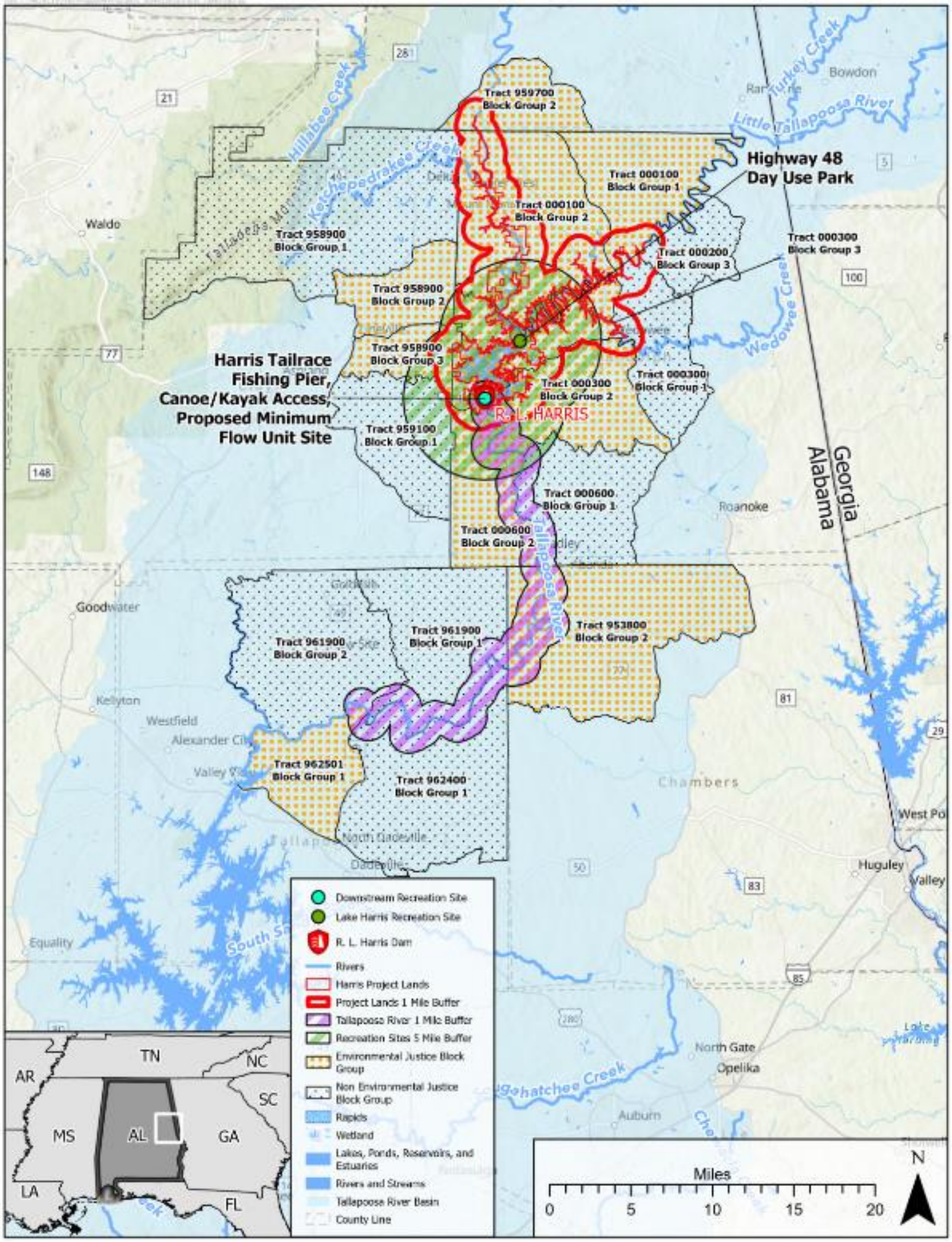


Figure 3.3.8-1. Block Groups and Environmental Justice Communities within 5-miles of the proposed recreation and construction sites and 1-mile of Harris Lake and the Tallapoosa River from Harris Dam through Horseshoe Bend (Source: staff).

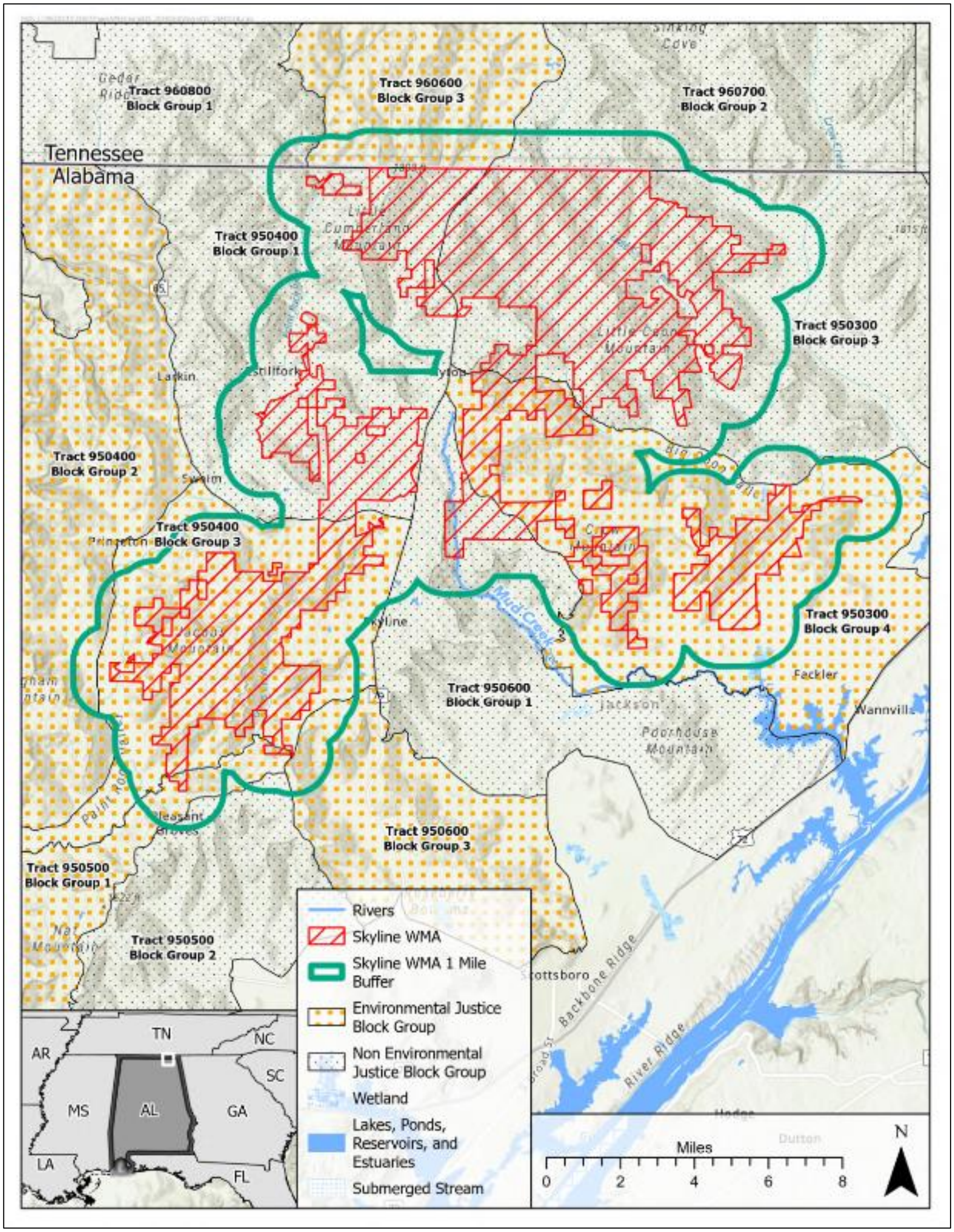


Figure 3.3.8-2. Block Groups and Environmental Justice Communities within 1-mile of the Skyline WMA portion of the project boundary (Source: staff).

LIST OF TABLES

Table 2-1. Target Lake Elevations for the Harris Project (Source: Alabama Power, 2021a).

Period	Lake Elevation (feet)
January 1 through March 31	Maintain elevation at 785
April 1 through April 30	Raise elevation from 785 to 793
May 1 through September 30	Maintain elevation at 793
October 1 through November 30	Lower elevation from 793 to 785
December 1 through December 31	Maintain elevation at 785

Table 2-2. Alabama Power's proposed additions and removals from the project boundary at Harris Lake and Skyline WMA (Source: Alabama Power, 2022a and staff).

Additions to the Project Boundary	Removals from the Project Boundary
Harris Lake Area	
• Include 64-acre parcel to fill a "donut hole" within current project lands classified for hunting trail. • Include a 4-acre tract adjacent to existing project lands classified as natural/undeveloped. • Include a 2-acre parcel adjacent to a large tract of land currently classified as recreation that is proposed to be reclassified as commercial recreation. • Include a 154-acre parcel bordered by natural/undeveloped project lands to the north and to the south of the tract. • Include a 261-acre parcel adjacent to existing project lands classified as hunting lands, which are designated for disabled hunting. • Include a 14-acre parcel adjacent to existing project lands classified as natural/undeveloped that include a birding trail extending from Little Fox Creek public recreation site. • Include a 6-acre parcel adjacent to existing project lands classified as natural/undeveloped. • Include a 0.25-acre parcel consisting of two small tips of a peninsula	• Remove a 149-acre parcel adjacent to existing private development that serves no project purpose. • Remove a 3-acre parcel located at the end of an old road that serves no project purpose and is not adjacent to existing project lands or proposed additions of project lands. • Remove a 20-acre parcel that was added to the Harris Project in 1995 for use by the Boy Scouts but was never developed and which serves no project purpose. • Remove a 61-acre parcel that serves no project purpose that is located on a peninsula, but the tip of the peninsula is non-project land. • Remove a 19-acre parcel that serves no project purpose nearby private development resulting in landowners needing access across project lands. • Remove a 37-acre parcel that serves no project purpose that landlocks privately owned tracts with the project boundary. • Remove a 9-acre parcel that serves no project purpose that is in proximity to private development. • Remove a 2-acre parcel classified as

Additions to the Project Boundary	Removals from the Project Boundary
adjacent to existing project lands on the peninsula classified as natural/undeveloped.	recreation in 1995 land use plan for a potential boat launch, but the surrounding area has been developed for private residential developments that include private boat launches.
Skyline Wildlife Management Area[174]	
• Include a 13.1-acre parcel of land conveyed by Crawford to Alabama Power (Crawford proposed property) to settle a land ownership dispute. • Include several parcels of land totaling approximately 107 acres conveyed by Hicks to Alabama Power (Hicks proposed property) to settle a land ownership dispute.	• Remove three parcels of land totaling 37.5 acres awarded by the Alabama Court of Civil Appeals and the Alabama Supreme Court to Mr. Keller (Keller disputed property) from the project boundary. • Remove a 24.7-acre parcel of land conveyed by Alabama Power to Crawford (Crawford disputed property) to settle a land ownership dispute. • Remove several parcels of land totaling 82.1 acres conveyed by Alabama Power to Hicks (Hicks disputed property) to settle a land ownership dispute. • Correct the project boundary to match boundary survey information, which would remove approximately 8 acres of land currently mapped within the project boundary.

[174] see Order Amending Project Boundary Issued June 13, 2022, (Accession No. 20220613-3023)

Table 3.3.1-1. Reduction in Harris Reservoir Elevations vs Green Plan (May–October) under various release alternatives (Source: Alabama Power Company and Kleinschmidt Associates, 2022a).

<table>
<tr><th rowspan="2">Alternative</th><th colspan="7">AVERAGE HARRIS RESERVOIR ELEVATION (Feet Below Green Plan) FOR MONTH</th></tr>
<tr><th>May</th><th>June</th><th>July</th><th>August</th><th>September</th><th>October</th><th>November</th></tr>
<tr><td>150CMF</td><td rowspan="8">< 0.5</td><td rowspan="8">< 0.5</td><td rowspan="8">< 0.5</td><td rowspan="8">< 0.5</td><td rowspan="7">< 0.5</td><td rowspan="7">< 0.5</td><td rowspan="8">< 0.5</td></tr>
<tr><td>150CMF+GP</td></tr>
<tr><td>300CMF</td></tr>
<tr><td>300CMF+GP</td></tr>
<tr><td>350CMF</td></tr>
<tr><td>400CMF</td></tr>
<tr><td>450CMF</td></tr>
<tr><td>600CMF</td><td>0.5</td><td>0.7</td></tr>
<tr><td>600CMF+GP</td><td>1.1</td><td>1.0</td><td>1.1</td><td>1.3</td><td>1.7</td><td>2.3</td><td>1.4</td></tr>
<tr><td>800CMF</td><td>0.6</td><td>0.6</td><td>0.7</td><td>0.9</td><td>1.4</td><td>1.9</td><td>1.2</td></tr>
<tr><td>800CMF+GP</td><td>1.8</td><td>1.9</td><td>2.3</td><td>2.8</td><td>4.0</td><td>5.1</td><td>4.3</td></tr>
</table>

Reservoir elevations based on HydroBudget analysis using inflow data for 1940 through 2019.

Table 3.3.1-2 Streambank segments downstream from Harris Dam categorized as slightly impaired or worse (Source: Alabama Power and Kleinschmidt, 2022b, modified by staff).

ID	River Mile [1]	Bank [2]	Score [3]	Condition
A1	7.7	Right	3.57	Slightly Impaired
A2	10.0	Left	3.22	Slightly Impaired
A3	16.3	Right	3.35	Slightly Impaired
A4	16.4	Right	3.18	Slightly Impaired
A5	16.5	Right	3.55	Slightly Impaired
A6	16.6	Right	3.96	Slightly Impaired
A7	16.7	Right	4.45	Impaired
A8	16.9	Right	3.20	Slightly Impaired
A9	17.9	Left	3.09	Slightly Impaired
A10	19.2	Left	3.11	Slightly Impaired
A11	20.6	Left	3.05	Slightly Impaired
A12	34.4	Right	3.07	Slightly Impaired
A13	36.5	Left	3.05	Slightly Impaired
A14	36.6	Left	3.04	Slightly Impaired
A15	43.8	Right	3.17	Slightly Impaired

[1] Distance downstream from Harris Dam.
[2] Left bank or right bank is a reference to the side of the river when traveling downstream.
[3] Bank Condition Scores: 1-Fully Functional 2-Functional, 3-Slightly Impaired, 4-Impaired, 5-Non-Functional.

Table 3.3.1-3. Daily average water surface elevation fluctuations (in feet) downstream from Harris Dam under various release alternatives (Source: Alabama Power and Kleinschmidt, 2022a).

	Miles Below Harris Dam										
Alternative	**0.2**	**1**	**2**	**4**	**7**	**10**	**14**	**19**	**23**	**38**	**43**
PreGP	4.67	4.38	4.17	4.47	3.26	2.68	3.66	3.06	2.03	0.92	1.80
GP	4.62	4.24	3.99	4.22	3.20	2.56	3.60	3.01	2.01	0.92	1.79
ModGP	4.18	3.96	3.80	3.95	3.00	2.45	3.53	2.96	1.98	0.90	1.74
150CMF	4.10	3.94	3.81	4.07	3.15	2.56	3.63	3.02	2.01	0.93	1.80
300CMF	3.59	3.51	3.44	3.72	2.96	2.34	3.54	2.99	1.99	0.92	1.74
350CMF	3.43	3.43	3.32	3.61	2.89	2.28	3.48	2.97	1.99	0.92	1.74
400CMF	3.29	3.29	3.22	3.51	2.82	2.22	3.42	2.94	1.97	0.92	1.73
450CMF	3.16	3.16	3.12	3.41	2.75	2.17	3.36	2.92	1.96	0.92	1.72
600CMF	2.84	2.87	2.86	3.14	2.56	2.01	3.17	2.82	1.92	0.90	1.68
800CMF	2.50	2.57	2.57	2.85	2.34	1.83	2.97	2.70	1.85	0.88	1.63
150CMF+GP	4.06	3.86	3.71	3.91	3.04	2.44	3.54	2.99	2.00	0.91	1.75
300CMF+GP	3.53	3.43	3.33	3.56	2.84	2.23	3.41	2.92	1.96	0.91	1.72
600CMF+GP	2.78	2.80	2.77	3.03	2.46	1.95	3.11	2.77	1.88	0.89	1.65
800CMF+GP	2.43	2.49	2.49	2.76	2.26	1.79	2.95	2.67	1.82	0.86	1.61

Table 3.3.1-4. Daily average water surface elevation fluctuations (in feet) at the 15 most impaired streambank segments downstream from Harris Dam under various release alternatives (Source: Alabama Power and Kleinschmidt, 2022a).

ID	River Mile	PreGP	GP	ModGP	150CMF	300CMF	350CMF	400CMF	450CMF	600CMF	800CMF	150CMF +GP	300CMF +GP	600CMF +GP	800CMF +GP
A1	7.7	3.26	3.20	3.00	3.15	2.96	2.89	2.83	2.76	2.56	2.34	3.04	2.46	2.84	2.26
A2	10.0	2.75	2.64	2.52	2.63	2.42	2.36	2.31	2.25	2.08	1.89	2.51	2.01	2.31	1.85
A3	16.3	3.37	3.32	3.26	3.34	3.28	3.24	3.19	3.15	3.01	2.85	3.28	2.95	3.18	2.82
A4	16.4	3.37	3.32	3.26	3.34	3.28	3.24	3.19	3.15	3.01	2.85	3.28	2.95	3.18	2.82
A5	16.5	3.37	3.32	3.26	3.34	3.28	3.24	3.19	3.15	3.01	2.85	3.28	2.95	3.18	2.82
A6	16.6	3.34	3.29	3.23	3.31	3.25	3.21	3.16	3.12	2.99	2.83	3.25	2.93	3.15	2.80
A7	16.7	3.34	3.29	3.23	3.31	3.25	3.21	3.16	3.12	2.99	2.83	3.25	2.93	3.15	2.80
A8	16.9	3.31	3.26	3.20	3.28	3.22	3.18	3.14	3.10	2.97	2.82	3.22	2.91	3.13	2.79
A9	17.9	3.22	3.17	3.12	3.19	3.14	3.10	3.07	3.03	2.92	2.78	3.14	2.86	3.06	2.75
A10	19.2	3.08	3.04	2.98	3.05	3.01	2.98	2.95	2.93	2.84	2.71	3.01	2.78	2.94	2.68
A11	20.6	2.72	2.68	2.64	2.69	2.66	2.64	2.62	2.60	2.53	2.42	2.66	2.48	2.61	2.39
A12	34.4	0.26	0.27	0.28	0.29	0.31	0.31	0.31	0.32	0.32	0.32	0.29	0.32	0.31	0.32
A13	36.5	1.03	1.03	1.02	1.04	1.03	1.03	1.02	1.02	1.01	0.98	1.02	0.99	1.02	0.96
A14	36.6	1.01	1.01	1.00	1.02	1.02	1.02	1.01	1.01	0.99	0.96	1.01	0.97	1.00	0.95
A15	43.8	2.00	1.99	1.93	2.00	1.93	1.92	1.91	1.90	1.86	1.80	1.94	1.83	1.91	1.78

Table 3.3.2-1. Monthly discharge metrics (cfs) for the Tallapoosa and Little Tallapoosa River upstream and downstream from Harris Lake, for WYs 2001–2022 (Source: USGS, 2023a,b,c).

	Oct	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**Jul**	**Aug**	**Sept**
Tallapoosa River near Heflin, AL, USGS Gage No. 02412000. Drainage area 448 square miles (upstream gage)												
Mean	202	409	695	767	1,000	977	807	600	361	362	224	231
Median	161	299	514	642	761	933	719	449	385	223	150	150
Max	1,169	1,298	1,839	1,570	3,060	1,916	1,465	2,766	934	1,809	589	726
Min	4	13	59	177	302	379	226	124	44	73	25	18
Little Tallapoosa River near Newell, AL, USGS Gage No. 02413300. Drainage area 406 square miles (upstream gage)												
Mean	225	431	703	758	989	1,000	835	577	357	358	216	265
Median	138	273	483	686	924	929	730	471	330	222	133	155
Max	1,046	1,275	1,924	1,569	2,577	2,102	1,741	2,311	1,316	1,943	601	1,195
Min	21	31	83	181	339	381	242	117	50	44	27	20
Tallapoosa River at Wadley, AL, USGS Gage No. 02414500. Drainage area 1,675 square miles (downstream gage)												
Mean	1,410	2,180	3,020	3,340	4,220	4,270	2,680	2,850	1,830	1,800	1,190	1,120
Median	974	1,898	2,191	3,115	3,790	4,152	2,606	1,967	1,679	1,043	902	721
Max	5,477	6,434	8,425	6,876	1,2970	9,439	5,848	14,320	4,819	7,058	3,030	3,180
Min	255	185	220	299	1,623	1,205	471	381	538	450	281	202

Table 3.3.2-2. Daily average water surface elevation fluctuations (feet) in the Tallapoosa River downstream from Harris Dam (Source: Alabama Power, 2022c).

Operating Regime	Miles Below Harris Dam										
	0.2	1	2	4	7	10	14	19	23	38	43
Pre-Green Plan (Base)	4.67	4.38	4.17	4.47	3.26	2.68	3.66	3.06	2.03	0.92	1.80
Green Plan	4.62	4.24	3.99	4.22	3.20	2.56	3.60	3.01	2.01	0.92	1.79

Table 3.3.2-3. Selected specific water quality criteria for waters upstream (Tallapoosa and Little Tallapoosa Rivers), within, and downstream from Harris Lake (Tallapoosa River) according to use classifications within the state of Alabama (Source: Alabama DEM Administrative Code 335-6-10).

Parameter	Fish & Wildlife	Swimming	Public Water Supply
Bacteria [a]	Not to exceed a geometric mean of 548 colonies/100 mL; nor to exceed a maximum of 2,507 colonies/100 ml in any sample	Not to exceed a geometric mean of 126 colonies/100 ml; nor to exceed a maximum of 235 colonies/100 ml in any sample.	Same as Fish & Wildlife
Chlorophyll-a[b]	Upstream of the Tallapoosa River - Little Tallapoosa River confluence: 12 µg/L, as measured at the deepest point and main river channel. Downstream from the Tallapoosa River - Little Tallapoosa River confluence: not to exceed 10 µg/L, as measured at the deepest point, main river channel and dam forebay; Downstream from Harris Reservoir: Not applicable until Martin Dam Reservoir		
Dissolved oxygen (DO)[c]	For a diversified warm water biota, including game fish, daily dissolved oxygen concentrations shall not be less than 5 mg/L at all times; except under extreme conditions due to natural causes, it may range between 5 mg/L and 4 mg/L, provided that the water quality is favorable in all other parameters. The normal seasonal and daily fluctuations shall be maintained above these levels. In no event shall the dissolved oxygen level be less than 4 mg/L due to discharges from existing hydroelectric generation impoundments. All new hydroelectric generation impoundments, including addition of new hydroelectric generation units to existing impoundments, shall be designed so that the discharge will contain at least 5 mg/L dissolved oxygen where practicable and		

Parameter	Fish & Wildlife	Swimming	Public Water Supply
	technologically possible. The Environmental Protection Agency, in cooperation with the State of Alabama and parties responsible for impoundments, shall develop a program to improve the design of existing facilities.		
pH	Between 6.5 and 8.5		
Water temperature	Not to exceed 90 degrees Fahrenheit (32.2 degrees Celsius)		
Turbidity	Not to be greater than 50 nephelometric turbidity units (NTUs) above background (i.e., natural) conditions		

Notes: ml is milliliter, µg/L is micrograms per liter, and mg/L is milligrams per liter. A small portion of the Tallapoosa River near the Alabama-Georgia border has an Outstanding Alabama Water use designation (related water quality criteria can be found in Alabama DEM Administrative Code 335-6-10).

[a] Applicable to non-coastal waters. The geometric mean shall be calculated from no less than five samples collected at a given station over a 30-day period at intervals not less than 24 hours.

[b] Applicable to the mean of photic zone composite chlorophyll a samples collected monthly April through October.

[c] As measured at a depth of 5 feet (for waters $\geq$10 feet in depth); and mid-depth (for waters <10 feet depth).

Table 3.3.2-4. Status of Tallapoosa River Basin waterbody segment use classifications, impairments, 303(d) listings, and total maximum daily loads (TMDLs), upstream to downstream in Alabama (Source: Alabama DEM Administrative Code 335-6-11-.02 last amended 8/20/19; Alabama DEM, 2022a; EPA, 2020).

	Use Classification Status [a]				303(d) Status	
Waterbody Segment	**Outstanding Alabama Water (OAW)**	**Public Water Supply (PWS)**	**Water Sports (S)**	**Fish & Wildlife (F&W)**	**Listed & Year(s)**	**TMDL Status [b]**
Tallapoosa River above Harris Lake						
Alabama-Georgia border to Cane Creek	Impaired (*E. coli*)	---	---	Impaired (*E. coli*)	Since 2016	Low
Cane Creek to Cleburne County Road 19	---	---	---	*Insufficient data*	No	---
Cleburne County Rd 19 to 0.5 mile upstream of Cleburne County Road 36	---	Good	*Insufficient Info*	Impaired (BOD)	1996 - 2007	Alabama DEM, 2002 (low DO)
0.5 mile upstream of Cleburne County Road 36 to four miles upstream of Randolph County Road 88 (Lee Bridge)	---	---	---	*Insufficient data*	No	---
0.5 mile upstream of Cleburne County Road 36 to dam at Cleburne County Road 36	---	---	---	Impaired (BOD)	1996 - 2007	Alabama DEM, 2002 (low DO)
Dam at Cleburne County Road 36 to 4 miles upstream of Randolph County Road 88	---	---	---	*Insufficient data*	No	---
Ketchepedrakee Creek, its source to Tallapoosa River	---	---	---	Good	No	---

Little Tallapoosa River Branch above Harris Lake						
Alabama-Georgia state line to Wolf Creek	---	---	Impaired (*E. coli*)	Good	2010 – 2017	Alabama DEM, 2017 (*E. coli*)
Wedowee Creek above Harris Lake						
Source to Harris Lake	---	---	---	Good	No	---
Harris Lake						
Tallapoosa River, 4 miles upstream of Randolph County Road 88 to Little Tallapoosa River confluence	---	---	Good	Good	No	---
Little Tallapoosa, Wolf Creek to US Highway 431	---	Good	Good	Good	No	---
Little Tallapoosa, US Highway 431 to Tallapoosa River confluence	---	---	Good	Good	No	---
End of Wedowee Creek embayment to Little Tallapoosa River confluence	---	---	Good	Good	No	---
Tallapoosa River, from Little Tallapoosa River to Harris Dam	---	---	Good	Impaired (mercury)	Since 2018	Low
Harris Dam → Irwin Shoals						
Harris Dam to Alabama Hwy 77	---	---	---	Impaired (abnormal flow)	No	---
Alabama Hwy 77 to Irwin Shoals [c]	---	---	---	Good	No	---

Notes: --- = not applicable.

[a] The Alabama use classification of "swimming and other whole-body water contact sports" has been shortened to: "water sports" to keep the table concise. Status categorizations are good, impaired, insufficient data, and not applicable. *E. coli* is *Escherichia coli*; BOD is biological oxygen demand.

[b] TMDL Status indicates the status for required TMDL (i.e., --- for not needed, low for low priority, and citation for EPA-approved).

[c] Irwin Shoals is approximately 6 river miles downstream from Horseshoe National Military Park.

Table 3.3.2-5. Harris forebay water temperature and dissolved oxygen estimates for surface water column intake (0–9.1 meters), May 1–October 1, 2017–2021, when the reservoir was at summer pool elevation (Source: staff, using data from Kleinschmidt, 2021a).

Year	Temperature (°C)					DO (mg/L)				
	Minimum	**Maximum**	**Average**	**Median**	**Count**	**Minimum**	**Maximum**	**Average**	**Median**	**Count**
2017	15.9	30.9	25.2	25.9	35	0.1	10.0	6.1	8.5	35
2018	16.3	30.6	26.5	27.6	42	0.1	13.4	7.0	8.0	42
2019	16.5	30.7	25.9	28.0	34	0.1	11.7	7.1	7.8	34
2020	17.2	29.9	25.4	27.4	35	0.1	10.6	7.2	8.2	35
2021	18.0	28.8	23.3	22.5	21	0.1	11.8	6.6	8.5	21
Overall	**15.9**	**30.9**	**25.3**	**27.4**	**167**	**0.1**	**13.4**	**6.8**	**8.2**	**167**

Notes: °C = degrees Celsius; mg/L = milligram per liter; estimates are generally based on one to two profiles for each month.

Table 3.3.2-6. Monthly water temperature and dissolved oxygen statistics for the Tallapoosa River at the generation (Gen) station about 800 feet downstream from Harris Dam and at the downstream station, about 800 feet downstream from Harris Dam (DS), June-October in 2017-2021 (Source: Kleinschmidt, 2021a, as modified by staff).

	Temperature (°C) [a]								Dissolved Oxygen (mg/L) [a]							
	2017	2018	2019		2020		2021 [b]		2017	2018	2019		2020		2021 [b]	
	Gen	Gen	Gen	DS	Gen	DS	Gen	DS	Gen	Gen	Gen	DS	Gen	DS	Gen	DS
June																
min	18.7	19.1	19.3	18.5	19.6	18.0	19.2	17.6	2.6	5.3	4.8	4.7	5.5	5.4	4.4	4.2
max	25.8	24.9	25.3	32.0	22.9	30.3	24.1	29.6	8.3	9.9	8.7	10.0	8.7	10.7	8.0	10.4
average	21.0	21.2	21.3	22.3	21.2	22.0	21.2	21.7	4.9	6.8	6.2	7.0	6.5	7.3	5.4	6.3
count	981	709	805	2,069	672	2,880	1,029	2,879	981	709	805	2,069	672	2,880	1,029	2,879
percent <5 mg/L									56%	0%	0%	1%	0%	0%	15%	0.1
percent <4 mg/L									8%	0%	0%	0%	0%	0%	0%	0.0
July																
min	21.1	22.4	22.3	21.1	22.0	21.4	---	---	3.6	4.7	5.4	5.3	5.2	5	---	---
max	28.8	29.4	25.8	32.5	25.4	32.2	---	---	8.4	8.5	8.6	9.5	7.7	10	---	---
average	23.5	23.9	23.7	24.7	23.5	24.6	---	---	5.0	5.9	6.1	7.1	6.0	7	---	---
count	932	616	406	2,976	432	2,970	---	---	932	616	406	2,976	432	2,970	---	---
percent <5 mg/L									67%	1%	0%	0%	0%	0%	--	--
percent <4 mg/L									0%	0%	0%	0%	0%	0%	--	--
August																
min	23.9	23.7	23.4	21.4	23.7	22.8	---	---	3.5	4.2	4.2	4.3	4.6	4	---	---
max	28.1	27.7	26.6	35.6	25.7	31.7	---	---	7.6	7.0	8.1	9.7	7.9	10	---	---
average	24.8	24.3	24.4	25.5	24.7	25.5	---	---	4.6	5.2	5.7	7.0	5.9	7	---	---

	Temperature (°C) [a]								Dissolved Oxygen (mg/L) [a]							
	2017	2018	2019		2020		2021 [b]		2017	2018	2019		2020		2021 [b]	
	Gen	Gen	Gen	DS	Gen	DS	Gen	DS	Gen	Gen	Gen	DS	Gen	DS	Gen	DS
count	707	685	352	2,976	410	2,976	---	---	707	685	352	2,976	410	2,976	---	---
percent <5 mg/L									83%	33%	1%	0%	9%	3%	--	--
percent <4 mg/L									7%	0%	0%	0%	0%	0%	--	--
September																
min	21.6	24.1	24.0	21.2	21.9	18.4	---	---	3.5	4.5	5.2	5.1	4.8	5	---	---
max	26.3	27.0	26.8	31.9	26.2	32.0	---	---	8.1	7.1	8.5	9.3	8.8	10	---	---
average	23.2	24.9	25.0	25.4	23.9	24.1	---	---	5.7	5.5	6.5	7.1	6.2	7	---	---
count	817	342	160	2,878	503	2,879	---	---	817	342	160	2,878	503	2,879	---	---
percent <5 mg/L									13%	22%	0%	0%	4%	2%	--	--
percent <4 mg/L									2%	0%	0%	0%	0%	0%	--	--
October																
min	17.5	19.2	19.1	13.7	19.5	14.5	--	--	4.3	5.0	4.9	4.7	4.6	4	--	--
max	24.7	26.2	26.7	31.1	23.5	28.5	--	--	8.5	10.5	9.9	9.5	9.1	10	--	--
average	21.4	22.9	21.2	22.0	21.1	20.9	--	--	5.7	6.0	6.4	7.2	6.0	7	--	--
count	904	872	478	2,972	873	2,974	--	--	904	872	478	2,972	873	2,974	--	--
percent <5 mg/L									5%	0%	0%	0%	10%	5%	--	--
percent <4 mg/L									0%	0%	0%	0%	0%	0%	--	--

Table Notes: °C = degrees Celsius, mg/L = milligram per liter, NA = not applicable, "---" = none.

[a] "Gen" = generation station monitored in 15-minute intervals during generation at the Harris powerhouse, "DS" = downstream station monitored in 15-minute intervals continuously (i.e., during generation and non-generation).

[b] 2021 analysis is limited to June based on data available.

Table 3.3.2-7. Summary of dissolved oxygen events that did not meet the 5-mg/L criterion at generation station and downstream station (Source: Kleinschmidt, 2021a, as modified by staff).

Year/ Month	Generation Station [a]					Downstream Station [b]				
	Event(s) below 5 mg/L			DO (mg/L) [c]		Event(s) below 5 mg/L			DO (mg/L) [c]	
	No.	Average duration (hours)	Approx. time (hours) [d]	Min	Max	No.	Average duration (hours)	Approx. time (hours) [d]	Min	Max
2017										
June	24	7.2	173	2.6	8.3	---	---	---	---	---
July	43	2.3	99	3.6	8.4	---	---	---	---	---
August	57	2.5	143	3.5	7.6	---	---	---	---	---
September	17	1.3	22	3.5	8.1	---	---	---	---	---
October	4	2.8	11	4.3	8.5	---	---	---	---	---
Overall	**145**	**3.1**	**450**	**2.6**	**8.5**	---	---	---	---	---
2018										
Aug	25	6.4	160	4.2	7.0	---	---	---	---	---
Sep	3	8.7	26	4.5	7.1	---	---	---	---	---
Overall	**28**	**6.6**	**185**	**4.2**	**7.1**	---	---	---	---	---
2019										
Jun	1	0.5	1	4.8	8.7	2	1.8	3.6	4.7	10.0
Aug	1	0.3	0	4.2	8.1	4	0.4	1.6	4.3	9.7
Oct	1	---[e]	---[e]	4.9	9.9	1	0.3	0.3	4.7	9.5
Overall	**2**	**0.4**	**1**	**4.2**	**9.9**	7	**0.8**	**5.5**	**4.3**	**10.0**
2020										
Jul	0	0	0	5.2	7.7	2	1.4	2.8	4.7	9.5
Aug	6	1.2	7	4.6	7.9	13	1.4	18.2	4.3	9.6
Sep	1	4.0	4	5.2	8.8	11	1.1	12.1	4.6	9.9
Oct	5	3.9	20	4.9	9.1	5	6.3	31.5	4.3	10.4
Overall	**12**	**2.5**	**30**	**4.6**	**9.1**	**31**	**2.1**	**65.1**	**4.3**	**10.4**
2021										
May	0	---	---	---	---	1	2.8	2.8	4.8	10.2
Jun	8	4.5	36	4.4	8.0	21	3.6	75.6	4.2	10.4
Overall	**8**	**4.5**	**36**	**4.4**	**8.0**	**22**	**3.6**	**79.2**	**4.2**	**10.4**

Notes: No. = number, "---" indicates not applicable.

[a] The generation station about 800 feet (0.15 mile) downstream from Harris Dam was monitored only during generation at 15-minute intervals.

[b] The downstream station about 0.5 mile downstream from Harris Dam was continuously monitored during generation and non-generation at 15-minute intervals.

[c] Minimum and maximum DO values show the range of measured DO concentrations for the entire month.

[d] Approximate time was calculated by obtaining the product of the number of events in the month and the average event duration for that month.

[e] This “event” occurred over the course of a single 15-minute interval.

Table 3.3.2-8. Average values for surface water quality sample parameters collected by Alabama Department of Environmental Management at Harris Lake sites; April to October 2018 and June, July, September, and October 2020 (Source: Kleinschmidt, 2018b, with staff modification; Alabama Power, 2021a; EPA, 2022c).

Parameter (unit)	n	Alabama DEM monitoring sites in upstream to downstream order [a]					
		RLHR-3 Foster's Bridge	**RLHR-6** Mad Indian Creek	**RLHR-2** Upper Tallapoosa	**RLHR-5** Wedowee Creek	**RLHR-4** Little Tallapoosa	**RLHR-1** Harris Forebay
Alkalinity, total (mg/L)	12	13.5	12.1	12.8	13.7	13.6	12.3
Ammonia-nitrogen (mg/L)	12	0.011	0.003	0.006	0.009	0.007	0.011
5-day BOD (mg/L)	12	ND (<2)	ND (<2)	ND (<2)	[b]	ND (<2)	ND (<2)
Calcium (mg/L)	7	2.92	2.54	2.72	2.68	2.78	2.23
Chloride (mg/L)	12	2.12	2.34	2.63	3.84	3.9	2.53
Chlorophyll a (mg/L)	12	11.89	5.79	6.06	11.08	10.86	7.82
Secchi disk depth (m)	12	1.3	2.06	2.4	1.9	2.02	2.86
Escherichia coli (MPN/100mL)	7	6.8	3.1	1.5	6	4	1.3
Hardness (mg/L)	7	13	11.5	12.2	12.4	12.9	10.1
Nitrate + nitrite (mg/L)	12	0.054	0.025	0.029	0.062	0.073	0.024
Kjeldahl nitrogen (mg/L)	12	0.406	0.313	0.287	0.42	0.366	0.292
Light attenuation depth at 99% (m)	12	3.3	5.2	6.1	4.9	5.3	6.8
Magnesium (mg/L)	7	1.4	1.26	1.32	1.39	1.44	1.11
Orthophosphate (mg/L)	12	0.004	0.001	ND (<0.0040)	0.001	0.001	0.001
Phosphorus, total (mg/L)	12	0.031	0.016	0.014	0.022	0.018	0.011
Total dissolved solids (mg/L)	12	30.3	22.2	31.1	29.7	28.5	25.1

Parameter (unit)	n	Alabama DEM monitoring sites in upstream to downstream order [a]					
		RLHR-3 Foster's Bridge	**RLHR-6** Mad Indian Creek	**RLHR-2** Upper Tallapoosa	**RLHR-5** Wedowee Creek	**RLHR-4** Little Tallapoosa	**RLHR-1** Harris Forebay
Total suspended solids (mg/L)	12	5	3	1.4	3.2	2.3	1.8
Turbidity (NTU)	12	9.1	4.1	3	3.6	3.2	2.2

Notes: BOD = biological oxygen demand, m = meter, m^3 = cubic meter, mg/L = milligram per liter, MPN = most probable number (i.e., calculated estimate for concentration), n = number of samples, ND = non-detect, NTU = Nephelometric turbidity units.

[a] Alabama DEM monitoring site descriptions:

RLHR-3 Upper Tallapoosa River near Foster's Bridge
RLHR-6 Mad Indian Creek 0.5 mi upstream of Harris Lake
RLHR-2 Tallapoosa River immediately upstream of Little Tallapoosa confluence
RLHR-5 Wedowee Creek 0.5 mi upstream of Harris Lake
RLHR-4 Little Tallapoosa between Wedowee Creek and Tallapoosa River confluence
RLHR-1 Harris Lake forebay, Harris project

[b] The average BOD was not calculated for RLHR-5 because BOD concentrations consisted of two detected values (i.e., 2.4 and 2.7 mg/L) and 10 ND (<2 mg/L) values.

Table 3.3.2-9. *E. coli* concentrations (MPN/100 mL) upstream to downstream in relation to Harris Dam; compared with non-coastal Alabama DEM *E. coli* criteria of 235 colonies/100 mL, 2012-2022 (Source: AWW, 2022; Kleinschmidt, 2021a, as modified by staff).

Site ID	Location [a]	n	Average	Median	Min.	Max.	Count >235
	Upstream of Harris Dam (7/27/12 – 10/2/2022)						
7004070	1.35 miles upstream Wedowee Creek confluence	7	457	33	0	2,867	1
7004056	1.6 miles downstream Wedowee Creek confluence	49	74	11	0	789	4
7004052	Mouth of Andandley Branch (approx. 4 miles downstream Wedowee Creek)	27	19	11	0	233	0
7004069	Upper Lake (about 3.7 miles downstream from Little Tallapoosa confluence	4	219	277	0	322	3
7004058	Mid-Lake (about 2.6 miles from Harris Dam)	29	9	0	0	233	0
7004065	Lower Lake (about 1 mile from Harris Dam)	14	95	78	11	356	1
Overall		**130**	**90**	**11**	**0**	**2,867**	**9**
	Downstream from Harris Dam (5/28/15 – 8/24/20)						
Harris tailrace [b]	Tallapoosa River, dam tailrace	14	2	1	1	6	0
Wadley [c]	Tallapoosa River, Wadley	26	143	19	8	2,420	2
Overall		**40**	**80**	**12**	**1**	**2,420**	**2**

Notes: n = number of samples, MPN = most probable number (i.e., calculated estimate for concentration).

[a] Locations upstream of Harris Dam were collected by Alabama Water Watch (AWW). Locations downstream from Harris Dam were collected by the Alabama DEM. Note that this table does not include *E. coli* data for all locations monitored by AWW within Harris Lake.

[b] This location is referred to as MARE-12 in Alabama data sources and other sources that discuss this station but is renamed the "Harris Tailrace" station for purposes of this Draft EIS to minimize confusion.

[c] This location is referred to as TA-1 in Alabama data sources and other sources.

Table 3.3.2-10. Summary statistics for Alabama DEM water quality samples collected immediately downstream from Harris Dam (Harris Tailrace), 2018 and 2020 (Source: Alabama Power and Kleinschmidt, 2021a, as modified by staff).

Parameter (unit)	n	Min.	Max.	Average
Alkalinity, total (mg/L)	13	9.4	21	12
Ammonia-nitrogen (mg/L)	13	ND	0.1	0.01
BOD, 5-day (mg/L)	12	ND	ND	ND
Chloride (mg/L)	13	2.3	2.8	2.6
Chlorophyll a (µg/L)	12	1.8	6.9	3.4
Nitrate +nitrite (mg/L)	13	0.0	0.3	0.12
Kjeldahl nitrogen (mg/L)	13	ND	0.54	0.27
Orthophosphate (mg/L)	12	ND	0.0	0.00
Phosphorus, total (mg/L)	13	0.01	0.02	0.01
Total dissolved solids (mg/L)	13	13	36	25
Total suspended solids (mg/L)	13	0	17	3.3
Turbidity (NTU)	13	0	4.5	2.9

Notes: n = number of samples, ND = non-detect (i.e., sample concentration was not measured to be above method detection limit), mg/L = milligrams per liter, MPN = most probable number (i.e., calculated estimate for concentration), NTU = Nephelometric turbidity units. Data are available on EPA Water Quality Portal at Water Quality Data Home. This sampling location is called “MARE-12” in the EPA Water Quality Portal.

Table 3.3.2-11. Fishes known or expected to occur in the vicinity of Harris Lake (Source: Alabama Power, 2022a).

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	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 aestvalis*
	Coosa Chub	*Macrhybopsis etnieri*
	Bluehead Chub	*Nocomis leptacephalus*
	Golder Shiner	*Notempgonus 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	*Phehacobius 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 dequesnei*
	Golden Redhorse	*Moxostoma erythrurum*
	Blacktail Redhorse	*Moxostoma poecilurum*

Family	Common Name	Scientific Name
Ictaluridae (Catfishes)	Snail Bullhead	*Ameiurus brunneus*
	Black Bullhead	*Ameiurus melas*
	Yellow Bullhead	*Ameiurus natalis*
	Brown Bullhead	*Ameiurus nebulosus*
	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*
Poecillidae (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*

Table 3.3.2-12. Harris Dam trashrack information (Source: Alabama Power, 2022a).

# Trash Racks	Trash Rack Dimensions	Bar Spacing	Velocity	
			Approach	**Through-Rack**
30	27 feet, 9 inches X 11 feet	6 inch 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

Table 3.3.2-13. Estimated seasonal number of fish entrained, by family, for the existing turbine units at the Harris Project (Source: Alabama Power, 2022a).

Family	Winter	Spring	Summer	Fall	Total
Castostomidae	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**

Table 3.3.2-14. Summary of estimated fish entrainment for the existing turbine units and proposed minimum flow unit (Source: Kleinschmidt, 2022).

Month	Estimated Number of Fish Entrained through Existing Units	Estimated Number of Fish Entrained through Proposed Minimum Flow Unit
December	6,698	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

Month	Estimated Number of Fish Entrained through Existing Units	Estimated Number of Fish Entrained through Proposed Minimum Flow Unit
September	863	459
October	1,092	337
November	9,337	2,006
Totals	**294,427**	**37,353**

Table 3.3.2-15. Comparison of turbine characteristics at the Harris Project and selected mortality study sites (Source: Kleinschmidt, 2018a; 2022).

Site Name	Turbine Type	Head (ft)	Power (MW)	Flow (cfs)	Speed (rpm)	Diameter (in)	Runner Blades
Existing Harris Turbines	**Francis (vertical)**	**121**	**67.5**	**8,000**	**105.9**	**209**	**13**
E.J. West	Francis (vertical)	63	12.8	2,450	112.5	131	15
Vernon	Francis (vertical)	34	2.5	1,280	133.3	62	14
Stevens Creek	Francis (vertical)	28	2.35	1,000	75	135	14
White Rapids	Francis (vertical)	29	3.27	1,540	100	134	14
Schaghticoke	Francis (vertical)	153	4.7	410	300	51	17
Proposed Minimum Flow Unit	**Francis (horizontal)**	**115**	**3**	**300**	**360**	**46**	**15**
Colton	Francis (horizontal)	258	112	450	360	59	19
High Falls	Francis (horizontal)	83	1.4	275	359	39	--
Higley	Francis (horizontal)	45	2.1	695	257	48	13

Key: ft = feet; MW = megawatts; cfs = cubic feet per second; rpm = revolution per minute

Table 3.3.2-16. Mortality rates for the existing units and the proposed minimum flow unit at the Harris Project (Source: Kleinschmidt, 2022).

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**

Table 3.3.2-17. Estimated number of entrained fish lost due to turbine mortality by season and family for the existing turbine units at the Harris Project (Source: Alabama Power, 2022c).

Family	Winter	Spring	Summer	Fall	Total
Castostomidae	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**

Table 3.3.2-18. Summary of estimated fish entrainment by season and family for the proposed minimum flow unit (Source: Kleinschmidt, 2022).

Family	Winter	Spring	Summer	Fall	Total
Castostomidae	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**

Table 3.3.2-19. Relative abundance of the 10 most common fish species collected during the Alabama Cooperative Fish and Wildlife Research Unit Surveys, 2005-2015 (Source: Alabama Power and Kleinschmidt, 2018).

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	8.3%	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%

Table 3.3.2-20. Fish species collected and catch-per-effort (fish/hour) during Auburn University's sampling on the Tallapoosa River in 2019 and 2020 by sampling site (Source: DeVries et al., 2021, as attached as Appendix D in Alabama Power and Kleinschmidt, 2021a; as modified by staff).

	Sampling Site				
Common Name	**Lee's Bridge**	**Harris Tailrace**	**Wadley**	**Horseshoe Bend**	**Overall CPE[a]**
Bowfin	X				0.15
Blueback Herring				X	0.04
Skipjack Herring				X	0.02
Gizzard Shad	X		X	X	1.3
Threadfin Shad	X		X	X	1.43
Largescale Stoneroller	X	X	X		2.6
Alabama Shiner		X	X	X	5.25
Tallapoosa Shiner	X	X	X		0.29
Blacktail Shiner	X	X	X	X	9.11
Common Carp	X	X	X	X	1.43
Grass Carp	X				0.02
Striped Shiner		X	X		0.24
Bandfin Shiner		X			0.04
Pretty Shiner	X				0.07
Golden Shiner				X	0.02
Rough Shiner		X			0.02
Silverstripe Shiner	X		X	X	6.77
Weed Shiner	X	X			0.22
Coosa Shiner	X	X	X	X	1.72
Bullhead Minnow	X				1.15
Dixie Chub		X			0.24
Alabama Hog Sucker	X	X	X	X	3.2
Spotted Sucker	X	X	X	X	0.93
River Redhorse	X				0.07
Black Redhorse	X		X	X	1.32
Blacktail Redhorse	X	X	X	X	10.8
Snail Bullhead		X			0.18
Black Bullhead				X	0.02
Yellow Bullhead	X	X	X	X	1.35
Brown Bullhead		X	X		0.07
Blue Catfish	X			X	0.79

	Sampling Site				
Common Name	**Lee's Bridge**	**Harris Tailrace**	**Wadley**	**Horseshoe Bend**	**Overall CPE[a]**
Channel Catfish	X	X	X	X	3.84
Black Madtom		X			0.07
Speckled Madtom			X		0.07
Flathead Catfish	X	X		X	0.68
Blackspotted Topminnow	X	X	X	X	0.49
White Bass	X				0.09
Striped Bass	X	X			0.15
Shadow Bass	X	X	X	X	3.22
Redbreast Sunfish	X	X	X	X	9.28
Green Sunfish		X	X	X	1.15
Warmouth	X	X	X	X	0.11
Bluegill	X	X	X	X	18.68
Redear Sunfish	X	X	X	X	1.3
Bluegill X Green Sunfish		X	X	X	0.11
Hybrid Redbreast Sunfish			X	X	0.15
Alabama Bass	X	X	X	X	12.46
Tallapoosa Bass	X	X	X	X	1.54
White Crappie	X	X	X		0.24
Black Crappie	X	X	X	X	0.93
Lipstick Darter		X	X	X	2.34
Speckled Darter	X	X	X		0.55
Tallapoosa Darter		X	X		0.13
Yellow Perch	X				0.02
Mobile Logperch	X	X	X	X	1.81
Bronze Darter	X	X	X	X	7.19
Muscadine Darter	X	X	X	X	2.47
Total Species	**39**	**39**	**37**	**35**	
Shannon's Diversity Index (H)	**2.80**	**2.59**	**2.88**	**2.49**	

[a] CPE equals catch per effort (fish per hour).

Table 3.3.2-21. Monthly average water temperatures (in Celsius) in the Tallapoosa River and Little Tallapoosa River (Source: Alabama Power and Kleinschmidt, 2021a).

Month	Tailrace[a]	7 Miles Downstream from Harris Dam[a]	14 Miles Downstream from Harris Dam[a]	Heflin[b]	Newell[b]
March	11.2	11.7	11.9	13.2	13.9
April	14.8	15.5	16.1	16.1	16.9
May	17.8	18.9	19.7	20.5	21.3
June	20.7	22.5	23.4	23.6	24.2
July	22.7	24.5	25.3	26.0	26.4
August	24.0	25.4	26.1	25.9	26.1
September	23.5	24.1	24.5	24.6	24.5
October	20.7	20.0	20.0	18.5	19.5

[a] 2000–2018
[b] 2018–2020

Table 3.3.2-22. Number of individual benthic macroinvertebrates collected in the Tallapoosa River by taxon in 2005 and 2014 (Source: Kleinschmidt, 2018b).

	Heflin		**Hillabee**		**Malone**[a]		**Wadley**[b]	
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**	**1,286**	**463**	**424**	**447**

[a] 7 miles downstream from Harris Dam.
[b] 14 miles downstream from Harris Dam.

Table 3.3.2-23. Crustacean species reported in the Upper and Middle Tallapoosa River Basins (Source: Alabama DCNR, 2020a; Johnson, 1997).

Common Name	**Pre-Dam**	**Pre-Green Plan**	**Green Plan**
Tallapoosa Crayfish	U,M	U,M	U,M
Slackwater Crayfish	U,M	U,M	U,M
Variable Crayfish	U,M	U,M	U,M
Ambiguous Crayfish	U,M		U,M
Jewel Mudbug		M	
Reticulate Crayfish		U,M	
Virile Crayfish			U
White Tubercled	U,M	U,M	U,M
Grainy Crayfish			M

Note: Upper Tallapoosa Basin (U); Middle Tallapoosa Basin (M).

Table 3.3.2-24. Downstream release alternatives (Source: staff).

Name/Description	**Abbreviation**
Green Plan (baseline or existing condition) – pulsing flows as described in the Green Plan release criteria	GP
Pre-Green Plan (peaking only; no pulsing or continuous minimum flow)	PreGP or PGP
Modified Green Plan (moving the pulses associated with Green Plan to 2 AM, 10 AM, and 6 PM)	ModGP
150 cfs continuous minimum flow (CMF)	150CMF
300 cfs continuous minimum flow	300CMF
350 cfs continuous minimum flow	350CMF
400 cfs continuous minimum flow	400CMF
450 cfs continuous minimum flow	450CMF
600 cfs continuous minimum flow	600CMF
800 cfs continuous minimum flow	800CMF
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	150CMF + 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	300CMF + GP
A hybrid Green Plan that incorporates both a base minimum flow of 600 cfs and the pulsing described in the existing Green Plan release criteria	600CMF + 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	800CMF + GP

Table 3.3.2-25. Comparison of percent difference from existing conditions (Green Plan) in average wetted perimeter based on HEC-RAS model of downstream release alternatives (Source: Alabama Power and Kleinschmidt, 2022a).

	Miles Below Harris Dam Habitat Type										
	0.2	1	2	4	7	10	14	19	23	38	43
Alternative	Riffle	Riffle	Riffle	Pool	Pool	Riffle	Run-Pool	Riffle-Run	Riffle	Riffle	Pool
PreGP	-1.2%	-0.5%	-2.2%	-0.2%	-2.0%	-0.3%	-0.1%	-0.6%	-0.5%	-0.1%	-0.1%
GP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
ModGP	2.2%	0.6%	2.3%	0.2%	2.8%	0.5%	0.3%	0.6%	0.5%	0.5%	0.1%
150CMF	2.5%	0.7%	2.4%	0.2%	2.3%	0.5%	0.3%	0.7%	1.1%	0.6%	0.3%
300CMF	5.8%	2.2%	6.8%	0.5%	6.0%	1.1%	0.6%	2.4%	2.8%	1.3%	0.7%
350CMF	6.8%	2.4%	7.2%	0.6%	6.9%	1.3%	0.6%	3.0%	3.5%	1.5%	0.8%
400CMF	7.7%	2.6%	7.5%	0.7%	7.8%	1.4%	0.7%	3.7%	4.2%	1.7%	0.9%
450CMF	8.5%	2.7%	7.7%	0.7%	8.6%	1.5%	0.8%	4.5%	4.9%	1.8%	1.1%
600CMF	10.9%	3.2%	8.3%	1.0%	10.6%	1.9%	1.0%	7.1%	7.2%	2.2%	1.4%
800CMF	14.1%	4.0%	9.1%	1.2%	12.4%	2.4%	1.2%	10.9%	10.6%	2.8%	1.9%
150CMF+GP	3.0%	1.0%	3.4%	0.3%	3.5%	0.6%	0.3%	1.0%	1.0%	0.6%	0.2%
300CMF+GP	6.3%	2.4%	7.0%	0.5%	6.6%	1.2%	0.6%	2.7%	3.0%	1.3%	0.7%
600CMF+GP	11.1%	3.3%	8.4%	1.0%	10.8%	1.9%	1.0%	7.1%	7.4%	2.2%	1.4%
800CMF+GP	14.1%	4.1%	9.2%	1.2%	12.5%	2.4%	1.2%	10.8%	10.8%	2.8%	1.9%

Table 3.3.2-26. Comparison of percent difference from existing conditions (Green Plan) in daily wetted perimeter fluctuation based on HEC-RAS model of downstream release alternatives (Source: Alabama Power and Kleinschmidt, 2022a).

	Miles Below Harris Dam Habitat Type										
	0.2	1	2	4	7	10	14	19	23	38	43
Alternative	Riffle	Riffle	Riffle	Pool	Pool	Riffle	Run-Pool	Riffle-Run	Riffle	Riffle	Pool
PreGP	-1%	3%	5%	13%	16%	5%	4%	2%	0%	1%	1%
GP	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
ModGP	-15%	-7%	-21%	-9%	-19%	-7%	-9%	-2%	0%	-5%	-4%
150CMF	-20%	-7%	-31%	-7%	-11%	-3%	-5%	1%	1%	-3%	-2%
300CMF	-37%	-23%	-68%	-14%	-31%	-13%	-13%	0%	3%	-9%	-9%
350CMF	-42%	-24%	-72%	-17%	-35%	-15%	-15%	0%	3%	-10%	-11%
400CMF	-46%	-25%	-73%	-19%	-40%	-17%	-16%	0%	3%	-11%	-13%
450CMF	-50%	-26%	-74%	-21%	-44%	-18%	-18%	-1%	3%	-12%	-15%
600CMF	-61%	-29%	-78%	-28%	-56%	-22%	-23%	-5%	4%	-14%	-20%
800CMF	-77%	-32%	-82%	-35%	-64%	-26%	-28%	-16%	2%	-17%	-27%
150CMF+GP	-19%	-10%	-32%	-10%	-19%	-8%	-10%	-1%	1%	-5%	-5%
300CMF+GP	-37%	-25%	-70%	-18%	-35%	-16%	-16%	-3%	2%	-10%	-10%
600CMF+GP	-61%	-31%	-78%	-30%	-58%	-24%	-25%	-8%	2%	-15%	-21%
800CMF+GP	-78%	-34%	-82%	-37%	-66%	-28%	-29%	-17%	1%	-18%	-27%

Table 3.3.2-27. Water temperature ranges (degrees Celsius) for key fish species in the Tallapoosa River downstream from Harris Dam (Source: Alabama Power and Kleinschmidt, 2021a, as modified by staff).[a]

Species	Thermal Min.	Optimal Range	Preferred Range	Spawn/ Hatch	Thermal Max.
Channel Catfish	0-9.8	24-30	18-30	21-30	33-40
Redbreast Sunfish	5-10	22-30	18-32	21-27	35-40
Tallapoosa Darter				22.8	26
Muscadine Darter				22.8	26
Tallapoosa Shiner[b]			24		
Alabama Bass[c]	<10		24-31	13-23	30-34
Largemouth Bass	15	24-30		17-20	36
Tallapoosa Bass[d]				17-22	

a Temperature data was compiled from Alabama Power's November 2021 Final Aquatic Resources Study Report and Habitat Suitability Indices.

b Common shiner was used as a surrogate species for Tallapoosa Shiner.

c Spotted bass was used as a surrogate species for Alabama bass.

d Redeye bass and Shoal bass were used as surrogate species for Tallapoosa Bass.

Table 3.3.2-28. Wetland types, acres, linear feet, and quality at Harris Lake (Source: Alabama Power, 2022a, as modified by staff).

Lacustrine/Littoral Wetlands on Shoreline		Shoreline and Alluvial Wetlands	Quality
Linear Feet	Miles	Acres	
30,430	5.76	9.28	Good
24,258	4.59	3.45	Moderate
5,268	1.00	2.16	Poor
59,956	11.35	14.98	Total

Table 3.3.2-29. Special status plant species observed during botanical inventories of 20-acre and 35-acre parcels at the rare Blake's Ferry Pluton adjacent to Alabama Power's Flat Rock Park on Harris Lake (Source: Alabama Power, 2021a, as modified by staff).

Common Name (*Scientific Name*)	**Conservation Rank**	**Observed in 20-Acre Parcel**	**Observed in 35-Acre Parcel**
Harper's dodder (*Cuscuta harperi*)	S2, G2G3	Yes	
granite flatsedge (*Cyperus granitophilus*)	S2, G3	Yes	
elf orpine (*Diamorpha smallii*)	S3	Yes	
soapwort gentian (*Gentiana saponaria*)	S3	Yes	Yes
longleaf sunflower (*Helianthus longifolius*)	S1S2, G3	Yes	Yes
confederate daisy (*Helianthus porteri*)	S2	Yes	
Pinesap (*Hypopitys monotropa*)	S2	Yes	
Appalachian sandwort (*Mononeuria glabra*)	G3	Yes	
spotted scorpion weed (*Phacelia maculata*)	S1, G1	Yes	Yes
Menges' fameflower (*Phemeranthus mengesii*)	S2S3, G3	Yes	
Smith's sunflower (*Helianthus smithii*)	S2, G2		Yes
southern twayblade orchid (*Listera australis*)	S2, G4		Yes
Appalachian phacelia (*Phacelia dubia* var. *dubia*)	S1S2		Yes

Legend: In all of the rankings, "S" denotes the range of the plant in the state of Alabama. "G" denotes the entire natural range of the plant (Master et al., 2012).

G1 or S1: Critically Imperiled — At very high risk of extinction or elimination due to very restricted range, very few populations or occurrences, very steep declines, very severe threats, or other factors. S1 denotes fewer than 5 known occurrences within the state.

G2 or S2: Imperiled — At high risk of extinction or elimination due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors. S2 denotes 6-20 known occurrences within the state.

G3 or S3: Vulnerable — At moderate risk of extinction or elimination due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors. S3 denotes 21-100 occurrences within the state

G4 or S4: Apparently Secure — At fairly low risk of extinction or elimination due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors. S4 denotes species which are apparently secure within the state.

G5 or S5: Secure — At very low risk or extinction or elimination due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats.

Table 3.3.2-30. Timber stand composition on project lands at Harris Lake (Source: Alabama Power, 2022a).

Forest Stand Type	Percent Cover	Acreage
Mixed Pine-Hardwood	47	2,938
Natural[a] Longleaf Pine	0	0
Natural Pine	18	1,109
Upland Hardwood	21	1,343
Planted Pines	8	476
Other	6	403
Total	**100**	**6,269**

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

Table 3.3.2-31. Non-native invasive plants known to occur within the project boundary at Harris Lake (Source: Alabama Invasive Plant Council, 2012; Alabama Power, 2018).

Common Name (*Scientific Name*)	**Alabama Overall Ranking**	**Alabama Worst 10 Invasive Plant (Yes/No)**	**Invasive Characteristics and Habitats in Alabama**
Chinese privet (*Ligustrum sinense*)	1	Yes	Forms dense thickets that can shade out native vegetation. Occurs along roadsides, fencerows, fields, rights-of-way, and bottomland forests.
Japanese privet (*Ligustrum japonicum*)	2	No	Shrub that spreads to the urban/wildland interface, natural areas and parks, ROWs, fencerows, and wetland/riparian areas.
Bradford pear (*Pyrus calleryana*)	2	No	Tree that spreads to the urban/wildland interface, natural areas and parks, ROWs, fencerows, pastures, and wetland/riparian areas.
Mimosa/Silk tree (*Albizia julibrissin*)	1	No	Aggressive invasive that occurs in a variety of disturbed habitats such as old fields, stream banks, roadsides, and ROWs.
Nandina/heavenly/ sacred bamboo (*Nandina domestica*)	2	No	Ornamental shrub that spreads to the urban/wildland interface, natural areas and parks.
Leather leaf mahonia (*Mahonia bealei*)	2	No	Ornamental shrub that spreads to the urban/wildland interface, natural areas and parks.
Multiflora rose (*Rosa multiflora*)	1	Yes	Forms dense thickets that can displace native vegetation. Occurs in pastures, fields, and forest edges.
Chinese wisteria (*Wisteria sinensis*)	1	No	Ornamental vine that spreads to the urban/wildland interface, natural areas and parks.
Japanese honeysuckle (*Lonicera japonica*)	1	No	Aggressive invasive that mostly occurs in disturbed habitat such as roadsides, fencerows, fields, and ROWs.
Japanese climbing fern (*Lygodium japonicum* (Thunb. ex Murr.) Sw.)	1	Yes	Forms dense masses that smother native vegetation. Occurs in the urban/wildland interface, managed forests, natural areas, parks, wildlife habitat/food plots, glades, hammocks, and swamps.

Common Name (*Scientific Name*)	**Alabama Overall Ranking**	**Alabama Worst 10 Invasive Plant (Yes/No)**	**Invasive Characteristics and Habitats in Alabama**
Chinese yam (*Dioscorea oppositifolia*)	2	No	Forms dense masses of vines that may cover and kill native vegetation. Occurs in disturbed areas such as forest edges, managed forests, natural areas and parks, ROWs, fencerows, pastures, and wetland/riparian areas.
Greater (bigleaf) periwinkle (*Vinca major*)	2	No	Ornamental vine that invades the urban/wildland interface, natural areas, and parks.
Orange day lily (*Hemerocallis fulva* (L.) L.)	N/A	No	Ornamental herbaceous plant that escapes or persists along roadsides, in pastures, along railroads, and around old home sites.
Beefsteak plant (*Perilla frutescens*)	N/A	No	Ornamental herb that spreads from gardens and flower beds, to pastures, disturbed woodlands, old home sites, and along rivers and creeks.
Brazilian vervain (*Verbena incompta* P.W. Michael)	N/A	No	A perennial herb that can rapidly spread into disturbed areas such as roadsides, in fields, and in clear-cut areas.
Japanese stiltgrass (*Microstegium vimineum*)	1	No	Very shade tolerant and can displace native vegetation. Occurs in forested floodplains, ditches, forest edges, fields, and trails.
Tall fescue (*Festuca arundinacea* Schreb.)	N/A	No	Grass that invades fields, forest margins, roadsides, forest openings, and savannas. It spreads mainly through rhizomes and can form extensive colonies that compete with and displace native vegetation.
Bahia grass (*Paspalum notatum*)	N/A	No	Ornamental turf grass that can invade a wide variety of soil types but is most productive on drought prone, sandy soils.
Alligatorweed (*Alternanthera philoxeroides*)	1	Yes	Forms thick mats that can displace native vegetation. Occurs in open water, wetlands, and low-lying as well as upland areas.
Hydrilla (*Hydrilla verticillata*)	1	Yes	Aggressive aquatic invasive that forms thick beds and may displace native submersed vegetation. Can choke waterways and water supplies.

Ranking Key:
1 = "Extensive and dense infestations in Alabama."

2 = “Scattered and localized infestations in Alabama.”

The 10 Worst Invasive Plants in Alabama = “…biological pollutants that stop land and water productivity, displace native species, degrade wildlife and fish habitat, and threaten many endangered species” (Alabama Invasive Plant Council, n d a).

Table 3.3.2-32. Forest stand composition within the Harris Project boundary at Skyline WMA (Source: Alabama Power, 2022a).

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

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

* The total acreage of project land at Skyline WMA prior to the Commission’s June 13, 2022 order amending the project boundary (*see* 179 FERC ¶ 62,134).

Table 3.3.5-1. Project recreation facilities in the Harris Lake project boundary and land ownership and management responsibility (Source: Alabama Power, 2022a, as modified by staff).

Recreation Facility	Capacity	Owner / Management
Big Fox Creek Boat Ramp	26 parking spaces (vehicle w/ trailer)	Alabama Power/Alabama DCNR
Crescent Crest Boat Ramp	12 parking spaces (1 accessible, 11 vehicle w/trailer)	Alabama Power
Flat Rock Park	189 single-car parking spaces (7 accessible)	Alabama Power
Foster’s Bridge Boat Ramp	18 parking spaces (vehicle w/ trailer)	Alabama Power/Alabama DCNR
Harris Tailrace Fishing Pier	8-single car parking spaces (2 accessible)	Alabama Power

Recreation Facility	Capacity	Owner / Management
Highway 48 Bridge Boat Ramp	30 parking spaces (27 vehicle w/ trailer, 3 accessible)	Alabama Power/Alabama DCNR
Lee's Bridge Boat Ramp	4 parking spaces (vehicle w/ trailer)	Alabama Power
Little Fox Creek Boat Ramp	22 parking spaces (20 vehicle w/ trailer; 2 accessible); gravel lot with 8 single vehicle parking (1 accessible)	Alabama Power/Alabama DCNR
Lonnie White Boat Ramp	20 parking spaces (18 vehicle w/ trailer, 2 accessible)	Alabama Power /Alabama DCNR
R.L Harris Wildlife Management Area	4 accessible hunting blinds with accessible parking	Alabama Power/Alabama DCNR
Swagg Boat Ramp	8 parking spaces (4 vehicle w/ trailer, 4 single vehicle spaces).	Alabama Power/Alabama DCNR

Table 3.3.5-2. Project recreation sites utilization (Source: Alabama Power, 2022a, as modified by staff).

Project Recreation Site	Total Recreation Days		Percent Capacity	
	2014	2019	2014	2019
Big Fox Creek boat ramp	14,905	18,506	17%	33%
Crescent Crest boat ramp	10,160	12,112	47%	24%
Flat Rock Park	53,770	26,554	54%	36%
Foster's Bridge boat ramp	10,182	15,705	18%	40%
Harris Tailrace Fishing Pier	3,197	8,198	9%	65%
Highway 48 Bridge boat ramp	38,093	54,986	60%	84%
Lee's Bridge boat ramp	2,040	1,734	12%	20%
Little Fox Creek boat ramp	2,024	10,304	11%	15%
Lonnie White boat ramp	15,861	16,033	36%	29%

Project Recreation Site	Total Recreation Days		Percent Capacity	
	2014	2019	2014	2019
R.L Harris Wildlife Management Area	93	82	51%	47%
Swagg boat ramp	7,614	7,664	18%	39%
Total	**238,297**	**227,358**		

Table 3.3.5-3. Minimum and maximum projected capacity in 2040 (Source: Alabama Power, 2022a, as modified by staff).

Recreation Site	Recreation Days	2040 Minimum Projected Capacity Utilization	Max 2040 Capacity Projection
Big Fox Creek	18,506	26%	54%
Crescent Crest	12,112	17%	45%
Flat Rock Park	26,554	29%	57%
Foster's Bridge	15,705	33%	61%
Harris Tailrace Fishing Pier	8,198	58%	86%
Highway 48 Bridge	54,986	77%	105%
Lee's Bridge	1,734	13%	41%
Little Fox Creek	10,304	8%	36%
Lonnie White	16,033	22%	50%
Swagg	7,664	32%	60%
Wedowee Marine South	55,480	72%	100%
R.L. Harris WMA	82	40%	68%

Table 3.3.5-4. Number of boatable days in the Tallapoosa River below Harris Dam by season (Source: Downstream Release Alternative Report (Source: Alabama Power and Kleinschmidt, 2022a, as modified by staff).

Alternative	Winter	Spring	Summer	Fall	Total Annual
GP (baseline)	30	18	23	29	100
300 CMF	32	15	29	61	137
600 CMF	29	7	27	63	126
GP + 300 CMF	35	16	31	63	145
GP + 600 CMF	30	11	28	63	132

Table 3.3.6-1. Existing land use classifications and acreages within the project boundary at Harris Lake (Source: Alabama Power, 2021g).

Land Use Plan – Land Use Designation	Estimated Acres within Harris Lake Project Boundary
Natural Undeveloped (including islands)	2,440
Hunting (near reservoir)	2,707
Recreation (Public Use Area)	874
Prohibited Access	312
Total	6,333[a]

[a] 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 or 50 horizontal feet from 793.0 feet, whichever is less, but never less than 795.0 feet).

Table 3.3.6-2. Proposed shoreline classifications acres, miles, and sensitive designation (Source: SMP in Alabama Power and Kleinschmidt, 2022e, as modified by staff).

Classification	**Acres**	**Shoreline (miles)**	**Sensitive Designation (miles)**
Project Operations	307	2.86	0.07
Recreation	310	8.06	2.81
Commercial Recreation	107	2.99	0.27
Flood Storage	264	290.89	49.24
Scenic Buffer Zone/Easement	745	0	0
Hunting	2,932	14.94	1.67
Natural /Undeveloped	2,877	47.26	7.44
Total	**7,542**	**367**	**61.5**

Table 3.3.6-3. Analysis of proposed project boundary changes at Harris Lake (Source: staff, using APC provided GIS files and historic records for WMP, LUP, & other management plans).

#	Proposed Action	Acres	Existing Classification	Proposed Classification	Analysis / Rationale
Additions					
1	Addition	63.93	Non-Project Lands	Hunting	Lands surrounded by existing project lands classified as hunting lands, therefore this addition classified as hunting provides consistency of land use and ensures hunting opportunities are maintained in the entire area.
2	Addition	3.83	Non-Project Lands	Natural Undeveloped	Lands adjacent are classified as natural/undeveloped therefore this addition provides consistency of land use in the area and would ensure protection of natural resources. Classifying as natural/undeveloped (from existing scenic easement/flood storage) would continue to ensure maintenance of the shoreline for project purposes and preservation.
	Reclassify Shoreline	0.056	Flood Storage	Natural Undeveloped	
	Reclassify Shoreline	0.154	Scenic Easement	Natural Undeveloped	
3	Addition	1.861	Non-Project Lands	Commercial Recreation	Lands adjacent to a large tract of land currently classified as recreation and proposed to be reclassified as commercial recreation (RC9) associated with Wedowee Marina South. Reclassifying these lands would allow public recreation as it has in the past, accommodate future camping associated with Wedowee Marine South, and match existing land use. The adjacent lands would continue to be part of Alabama Power's proposal to develop Highway 48 Day Use Park.
	Reclassify Shoreline	0.077	Flood Storage	Commercial Recreation	
	Reclassify Shoreline	0.281	Scenic Easement	Commercial Recreation	
4	Addition	154.00	Non-Project Lands	Natural Undeveloped	Lands on both sides are classified as Natural/Undeveloped therefore this addition provides consistency of land use in the area and would ensure protection of natural resources. Classifying as natural/ undeveloped (from existing scenic easement) would continue to ensure maintenance of the shoreline for project purposes and preservation.
	Reclassify Shoreline	0.029	Scenic Easement	Natural Undeveloped	
5	Addition	260.582	Non-Project Lands	Hunting	Lands adjacent to existing project lands classified as hunting lands, designated for disabled hunting. This

#	Proposed Action	Acres	Existing Classification	Proposed Classification	Analysis / Rationale
					addition would allow for future expansion of disabled hunting area if needed.
6	Addition	14.486	Non-Project Lands	Natural Undeveloped	Lands adjacent to existing project lands classified as Natural/ Undeveloped, on a peninsula that includes a birding trail extending from Little Fox Creek public recreation site, in an area also identified with sensitive resources. This addition provides consistency of land use in the area, would ensure protection of natural resources, and preserve acreage for future expansion of birding trail.
	Reclassify Shoreline	1.117	Flood Storage	Natural Undeveloped	
	Reclassify Shoreline	4.379	Scenic Easement	Natural Undeveloped	
7	Addition	5.569	Non-Project Lands	Natural Undeveloped	Lands adjacent to existing project lands classified as natural/ undeveloped allowing consistency of land use in the area. Classifying as natural/undeveloped (from existing scenic easement and flood storage) would continue to ensure maintenance of the shoreline for project purposes and preservation.
	Reclassify Shoreline	0.140	Flood Storage	Natural Undeveloped	
	Reclassify Shoreline	0.521	Scenic Easement	Natural Undeveloped	
8	Addition	0.172	Non-Project Lands	Natural Undeveloped	Lands adjacent are classified as natural/undeveloped therefore this addition provides consistency of land use in the area and would ensure protection of natural resources. Classifying as natural/undeveloped (from existing scenic easement/flood storage) would continue to ensure maintenance of the shoreline for project purposes and preservation.
	Reclassify Shoreline	0.017	Flood Storage	Natural Undeveloped	
	Reclassify Shoreline	0.089	Scenic Easement	Natural Undeveloped	
Removals					
1	Removal	144.3	Natural Undeveloped	Non-Project Lands	Uplands that do not appear to be part of the original mitigation lands to be preserved and managed as part of the Wildlife Management Plan per Alabama Power provided baseline GIS data, and review of historic wildlife management plan maps. Reclassification of the shoreline
	Reclassify retained shoreline	1.008	Natural Undeveloped	Flood Storage	

#	Proposed Action	Acres	Existing Classification	Proposed Classification	Analysis / Rationale
	Reclassify retained shoreline	4.035	Natural Undeveloped	Scenic Easement	would continue to ensure maintenance of the shoreline for project purposes as defined by the license. Removal of these lands from the project would expose them to potential future changes in ownership and/or development.
2	Removal	2.822	Recreation	Non-Project Lands	Lands do not appear to be part of original mitigation lands to be preserved and managed as part of the Wildlife Management Plan. This area appears to be part of the original public access corridor (road end) that was to be retained for public use; however, it is unclear whether the road still exists.
	Reclassify retained shoreline	0.095	Recreation	Flood Storage	
	Reclassify retained shoreline	0.289	Recreation	Scenic Easement	
3	Removal	19.038	Recreation	Non-Project Lands	Lands do not appear to be part of original mitigation lands to be preserved and managed as part of the Wildlife Management Plan. Removal of excess lands, and reclassification of the shoreline would continue to ensure maintenance of the shoreline for project purposes. If sensitive resources are in the area, this designation can be used in combination with the proposed classification to protect resources. Removal of these lands from the project would expose them to potential future changes in ownership and/or development.
	Reclassify retained shoreline	0.268	Recreation	Flood Storage	
	Reclassify retained shoreline	0.946	Recreation	Scenic Easement	
4	Removal	52.21	Natural Undeveloped	Non-Project Lands	Uplands that do not appear to be part of the original mitigation lands to be preserved and managed as part of the Wildlife Management Plan per Alabama Power provided baseline GIS data, and review of historic wildlife management plan maps. Reclassification of the shoreline
	Reclassify retained shoreline	2.098	Natural Undeveloped	Flood Storage	

#	Proposed Action	Acres	Existing Classification	Proposed Classification	Analysis / Rationale
	Reclassify retained shoreline	6.991	Natural Undeveloped	Scenic Easement	would continue to ensure maintenance of the shoreline for project purposes as defined by the license. Removal of these lands from the project would expose them to potential future changes in ownership and/or development.
5	Removal	20.191	Recreation	Non-Project Lands	Lands do not appear to be part of original mitigation lands to be preserved and managed as part of the Wildlife Management Plan. Removal of excess lands, and reclassification of the shoreline would continue to ensure maintenance of the shoreline for project purposes. Removal of these lands from the project, specifically designated for public recreation, would expose them to potential future changes in ownership and/or development.
	Reclassify retained shoreline	0.123	Recreation	Flood Storage	
	Reclassify retained shoreline	0.530	Recreation	Scenic Easement	
6	Removal	36.61	Natural Undeveloped	Non-Project Lands	Uplands that do not appear to be part of the original mitigation lands to be preserved and managed as part of the Wildlife Management Plan per Alabama Power provided baseline GIS data, and review of historic wildlife management plan maps. Reclassification of the shoreline would continue to ensure maintenance of the shoreline for project purposes as defined by the license. If sensitive resources are in the area, this designation can be used in combination with the proposed classification to protect resources. Removal of these lands from the project would expose them to potential future changes in ownership and/or development.
	Reclassify retained shoreline	0.336	Natural Undeveloped	Flood Storage	
	Reclassify retained shoreline	1.269	Natural Undeveloped	Scenic Easement	
7	Removal	9.327	Recreation	Non-Project Lands	Lands do not appear to be part of the original mitigation lands to be preserved and managed as part of the Wildlife Management Plan per Alabama Power provided baseline GIS data, and review of historic wildlife management plan maps. Reclassification of the shoreline would continue to
	Reclassify retained shoreline	0.001	Recreation	Scenic Easement	

#	Proposed Action	Acres	Existing Classification	Proposed Classification	Analysis / Rationale
					ensure maintenance of the shoreline for project purposes as defined by the license. Removal of these excess uplands from the project, would expose them to potential future changes in ownership and/or development, and be outside the jurisdiction of the Commission.
8	Removal	1.812	Recreation	Non-Project Lands	Uplands that do not appear to be part of the original mitigation lands to be preserved and managed as part of the Wildlife Management Plan per Alabama Power provided baseline GIS data, and review of historic wildlife management plan maps. Reclassification of the shoreline would continue to ensure maintenance of the shoreline for project purposes as defined by the license. Removal of these lands from the project, specifically reserved for public recreation, would expose them to potential future changes in ownership and/or development.
	Reclassify retained shoreline	0.099	Recreation	Flood Storage	
	Reclassify retained shoreline	0.537	Recreation	Scenic Easement	
Changes to Land Classifications					
1	Reclassify	104.79	Recreation	Natural Undeveloped	Lands originally classified as recreation in 1995 for future recreation site #4, however Alabama Power finds this area less accessible than the tract to the north. Reclassifying lands would be consistent with adjacent land use and continue to protect natural resources. The natural undeveloped classification allows lands to continue to be managed for wildlife mitigation as originally designated by the Wildlife Mitigation Plan; however undeveloped land or future use lands classified as recreation (public access) according to the 1995 land use plan would also be managed for wildlife mitigation. According to Alabama Power's forestry division, this land is currently managed for Upland

#	Proposed Action	Acres	Existing Classification	Proposed Classification	Analysis / Rationale
					and Pine hardwoods, which aligns with natural/undeveloped classification.
2	Reclassify	62.67	Recreation	Natural Undeveloped	Lands originally classified as recreation in 1995 for future recreation site #3. Reclassifying lands would be consistent with adjacent land use and continue to protect natural resources. The natural undeveloped classification allows lands to continue to be managed for wildlife mitigation as originally designated by the Wildlife Mitigation Plan; however undeveloped land or future use lands classified as recreation according to the 1995 land use plan would also be managed for wildlife mitigation. Change from recreation to natural/undeveloped is a more protective classification but removes the designation that these lands be used for recreation purposes. According to Alabama Power's forestry division, this land is currently managed for Pine hardwood, which aligns with natural/undeveloped classification.
3	Reclassify	61.28	Recreation	Natural Undeveloped	Lands originally classified as recreation in 1995 Land Use Plan for future recreation use. Alabama Power manages this area for forest/timber management of natural pines. Therefore, the natural undeveloped classification allows lands to continue to be managed consistent with existing uses and for protection of resources; however, removes the designation that this area be used solely for future recreation opportunities.

#	Proposed Action	Acres	Existing Classification	Proposed Classification	Analysis / Rationale
4	Reclassify	25.02	Recreation	Commercial Recreation	Lands contain the existing marina (Wedowee Marine South) and Alabama Power's shoreline office. Reclassification to commercial recreation would align with existing current use and continues to provide public recreation and access to the project as it has in the past and consistent with other non-project uses.
5	Reclassify	62.72	Recreation	Natural Undeveloped	Lands originally classified as recreation in 1995 for future recreation use; however, Alabama Power states the tract located north provides better terrain for opportunities for future recreation access. Reclassifying lands would be consistent with existing (forestry/timber management) and adjacent land use and would continue to protect natural resources or sensitive resources identified in the area. The natural undeveloped classification allows lands to continue to be managed for wildlife mitigation as originally designated by the Wildlife Mitigation Plan; however undeveloped land or future use lands classified as recreation according to the 1995 land use plan would also be managed for wildlife mitigation. Change from recreation to natural/undeveloped is a more protective classification but removes the designation that these lands be used solely for recreation purposes.
6	Reclassify	4.803	Prohibited Access	Recreation	Lands contain the existing tailrace fishing recreation site that is proposed to be upgraded, which would align the classification with current use at this site.
7	Reclassify	56.77	Recreation	Natural Undeveloped	Lands adjacent to Flat Rock Park, originally identified in the 1995 land use plan for expansion but found not to be ideal for future expansion because of proximity of a transmission line corridor and adjacent private development. Since Flat Rock Park has been developed,

#	Proposed Action	Acres	Existing Classification	Proposed Classification	Analysis / Rationale
					the reclassification to natural/undeveloped would allow for protection of natural resources including rare botanical species identified at Flat Rock Park.
8	Reclassify	51.33	Recreation	Natural Undeveloped	Lands originally classified as recreation to develop Big Fox Creek Boat Ramp which is fully developed on the south end of this tract on about 15 acres retaining the recreation classification and appears to include acreage for future expansion. Reclassifying this section to natural/undeveloped would preserve natural resources and serve as a buffer around the existing project recreation site.
9	Reclassify	80.24	Recreation	Commercial Recreation	Reclassify lands associated with Wedowee Marina South which would be consistent with other marinas and non-project uses of project lands but continue to maintain recreation available to the public as in past.
10	Reclassify	103.39	Hunting Lands	Natural Undeveloped	Reclassification to natural/undeveloped would protect natural resources, aesthetics, and serve as a buffer around the existing disabled hunting area and nearby project lands classified as prohibited access. This reclassification would be consistent with existing land use across the river, and lands designated for hunting for future expansion of the disabled hunting area have been proposed to be added (A5) which would directly replace this lost hunting opportunity. The natural undeveloped classification allows lands to be managed for wildlife mitigation as originally designated by the Wildlife Mitigation Plan.

Table 3.3.6-4. Analysis of roads proposed to be removed from project boundary (Source: Alabama Power, 2022b, GIS data, modified by staff).

Roads Proposed to be Removed from Project Boundary	**Road # (Figure 3.3.5-3)**	**Analysis / Rationale**
Randolph County Road 88 (3 sections)	1	Public road not necessary solely for project purposes, removal from project appears appropriate.
Randolph County Road 272 (1 section)	2	Public road crosses Alabama Power lands but road to private residential property unnecessary for project.
Unnamed Hunting Road (-85.5770°W, 33.4084°N) (1 section)	3	Road does not appear necessary solely for project purposes, may be private, removal from project appears appropriate.
Randolph County Road 263 (1 section)	4	Public road not necessary solely for project purposes, removal from project appears appropriate.
Randolph County Road 299 (2 sections)	5	Public road not necessary solely for project purposes, removal from project appears appropriate.
Unnamed Hunting Road (-85.5822°W, 33.3658°N) (1 section)	6	Public road not necessary solely for project purposes, removal from project appears appropriate.
Private Road (-85.5762°W, 33.3587°N) (1 section)	7	Road leads to private residential properties but crosses Alabama Power lands. Does not appear necessary for project purposes.
Randolph County Road 281 (3 sections)	8	Public road not necessary solely for project purposes, removal from project appears appropriate.
Randolph County Road 2811 (1 section)	9	Public road not necessary solely for project purposes, removal from project appears appropriate.
Private Road (-85.6109°W, 33.3287°N) (1 section)	10	Public road not necessary solely for project purposes, removal from project appears appropriate.
Crescent Creek Ridge Road (1 section)	11	Public road leads to Crescent Crest Boat Launch and on lands designated for Recreation Use and owned by Alabama Power within the project boundary. Retaining this section as a project road would ensure the access road to a project recreation site would be maintained into the future as part of the license.
Alabama Highway 48 (2 sections)	12	Public road not necessary solely for project purposes, removal from project appears appropriate.

Roads Proposed to be Removed from Project Boundary	Road # (Figure 3.3.5-3)	Analysis / Rationale
Randolph County Road 816 (1 section)	13	Public road not necessary solely for project purposes, removal from project appears appropriate.
Private Road (-85.5772°W, 33.2651°N) (1 section)	14	Private road crosses Alabama Power lands but does not appear necessary for project purposes.
Randolph County Road 804 (1 section)	15	Public road not necessary solely for project purposes, removal from project appears appropriate.
RL Harris Dam Road (1 section)	16	Public road leading to or through designated hunting lands and RL Harris WMA on lands owned by Alabama Power. Retaining this section as a project road would ensure the access road to a project recreation site would be maintained into the future as part of the license.

Table 3.3.7-1. National Register status of Harris Lake archaeological sites documented within the project boundary (Source: Alabama Power, 2022b, modified by staff).

Site Type	Eligible	Ineligible	Undetermined	Total
Prehistoric	16	35	40	91
Unknown Aboriginal	1	44	25	70
Historic	6	5	19	30
Multi-Component	1	1	1	3
Unknown	0	68	83	151
Total	**24**	**153**	**168**	**345**

Table 3.3.7-2. National Register status of cultural resources located within the APE on the Tallapoosa River downstream from Harris Dam (Source: Alabama Power, 2022b, modified by staff).

Site Type	Listed	Eligible	Ineligible	Undetermined	Total
Prehistoric	0	2	2	6	10
Unknown Aboriginal	0	1	0	0	1
Historic	1	0	0	1	2
Multi-Component	2	0	2	2	6
Total	**3**	**3**	**4**	**9**	**19**

Table 3.3.7-3. National Register status of Skyline WMA archaeological sites documented within the project APE (Source: Alabama Power, 2022b, modified by staff).

Site Type	**Eligible**	**Ineligible**	**Undetermined**	**Total**
Prehistoric	7	18	108	133
Historic	11	0	2	13
Multi-Component	1	0	1	2
Total	**19**	**18**	**111**	**148**

Table 3.3.7-4. National Register status of archaeological sites located within the APE and proposed treatment (Source: Alabama Power, 2022b, modified by staff).

National Register Eligibility	**Proposed Treatment**	**Harris Lake**	**Tallapoosa River Downstream**	**Skyline WMA**	**Total**
Eligible	Treatment to be Determined	24	4	19	**47**
Eligible (Private Lands)	Mitigation Contract	0	2	0	**2**
Ineligible	No Treatment	153	4	18	**175**
Undetermined	Treatment to be Determined	11	1	0	**12**
Undetermined (Private Lands)	Mitigation Contract	0	8	0	**8**
Undetermined (Inundated)	Assess if Exposed	132	0	0	**132**

National Register Eligibility	Proposed Treatment	Harris Lake	Tallapoosa River Downstream	Skyline WMA	Total
Undetermined (Limited data potential)	No Treatment Proposed	4	0	0	**4**
Undetermined (No cultural materials identified)	No Treatment Proposed	2	0	0	**2**
Undetermined (Compromised integrity)	No Treatment Proposed	11	0	0	**11**
Undetermined (No details provided)	No Treatment Proposed	8	0	111	**119**
		345	**19**	**148**	**512**

Table 3.3.8-1. Environmental Justice Communities 1-mile from Harris Lake and 1-mile from Tallapoosa River Portions of the Harris Dam Project and 5-miles from sites of proposed recreation site and construction (Source: Census Bureau, 2023, as modified by staff).

Geographic Area	**Total Population**	**White Alone, not Hispanic (%)[a]**	**African American/ Black (%)[a]**	**American Indian/ Alaska Native (%)[a]**	**Asian (%)[a]**	**Native HI & Other Pacific Islander (%)[a]**	**Some Other Race (%)[a]**	**Two or More Races (%)[a]**	**Hispanic Origin (any race) (%)[a]**	**Total Minority Population (%)[a]**	**Households in Poverty (%)[b]**
ALABAMA	4,864,680	65.7%	26.4%	0.5%	1.3%	0.0%	0.2%	1.7%	4.2%	34.3%	17.2%
Chambers County (017)	**33,826**	**55.8%**	**39.4%**	**0.3%**	**1.2%**	**0.0%**	**0.1%**	**1.0%**	**2.3%**	**44.2%**	**17.9%**
Census Tract 953800, Block Group 2	1,700	78.8%	19.3%	1.1%	0.0%	0.0%	0.0%	0.8%	0.0%	21.2%	22.4%
Clay County (027)	**13,378**	**80.3%**	**14.7%**	**0.9%**	**0.1%**	**0.0%**	**0.2%**	**0.7%**	**3.1%**	**19.7%**	**19.8%**
Census Tract 958900, Block Group 1	1,654	96.4%	3.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.6%	15.3%
Census Tract 958900, Block Group 2	952	68.7%	30.9%	0.0%	0.0%	0.0%	0.0%	0.4%	0.0%	31.3%	12.6%
Census Tract 958900, Block Group 3	1,594	55.2%	31.1%	4.9%	0.0%	0.0%	0.9%	0.4%	7.4%	44.8%	21.2%
Census Tract 959100, Block Group 1	458	99.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.9%	0.0%	0.9%	15.2%
Cleburne County (029)	**14,938**	**92.6%**	**2.6%**	**0.3%**	**0.0%**	**0.0%**	**0.1%**	**1.9%**	**2.4%**	**7.4%**	**20.2%**
Census Tract 959700, Block Group 2	564	83.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	16.1%	16.1%	39.7%
Randolph County (111)	**22,574**	**75.3%**	**19.5%**	**0.2%**	**0.3%**	**0.2%**	**0.1%**	**1.4%**	**2.9%**	**24.7%**	**17.6%**
Census Tract 000100, Block Group 1	1,197	93.1%	5.6%	0.0%	0.0%	0.0%	0.0%	0.0%	1.3%	6.9%	25.1%
Census Tract 000100, Block Group 2	1,993	89.8%	1.4%	0.0%	1.2%	0.0%	0.0%	0.7%	7.0%	10.2%	22.1%

Geographic Area	Total Population	White Alone, not Hispanic (%)[a]	African American/ Black (%)[a]	American Indian/ Alaska Native (%)[a]	Asian (%)[a]	Native HI & Other Pacific Islander (%)[a]	Some Other Race (%)[a]	Two or More Races (%)[a]	Hispanic Origin (any race) (%)[a]	Total Minority Population (%)[a]	Households in Poverty (%)[b]
Census Tract 000200, Block Group 3	1,006	82.4%	5.9%	0.0%	0.0%	0.0%	0.0%	0.0%	11.7%	17.6%	11.5%
Census Tract 000300, Block Group 1	1,403	76.8%	17.2%	0.0%	0.0%	0.0%	0.0%	6.0%	0.0%	23.2%	6.1%
Census Tract 000300, Block Group 2	1,042	53.4%	42.8%	0.0%	0.0%	0.0%	0.0%	0.4%	3.5%	46.6%	15.8%
Census Tract 000300, Block Group 3	1,621	90.6%	8.8%	0.0%	0.0%	0.0%	0.0%	0.6%	0.1%	9.4%	22.5%
Census Tract 000600, Block Group 1	1,115	81.7%	13.8%	0.0%	3.9%	0.0%	0.0%	0.5%	0.0%	18.3%	16.8%
Census Tract 000600, Block Group 2	1,097	63.8%	26.7%	0.0%	0.0%	0.0%	0.0%	2.2%	7.3%	36.2%	31.0%
Tallapoosa County (123)	**40,636**	**68.9%**	**27.1%**	**0.3%**	**0.4%**	**0.0%**	**0.0%**	**0.9%**	**2.3%**	**31.1%**	**18.9%**
Census Tract 961900, Block Group 1	526	82.1%	10.3%	0.0%	0.0%	0.0%	0.0%	7.6%	0.0%	17.9%	16.0%
Census Tract 961900, Block Group 2	1,959	92.8%	6.6%	0.0%	0.0%	0.0%	0.0%	0.4%	0.3%	7.2%	13.6%
Census Tract 962400, Block Group 1	1,111	88.2%	11.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	11.8%	2.9%
Census Tract 962501, Block Group 1	1,014	85.0%	13.4%	0.9%	0.3%	0.0%	0.0%	0.4%	0.0%	15.0%	25.9%

[a] Percent of Total Population (Table B03002 – Hispanic or Latino Origin by Race. 2022 ACS 5-Year Estimates Detailed Tables. U.S. Census Bureau, 2018-2022 American Community Survey 5-Year Estimates: https://data.census.gov/table/ACSDT5Y2022.B03002). Accessed March 28, 2024.

[b] Percent of Households (Table B17017 – Poverty Status in the Past 12 Months by Household Type and Age of Householder. 2022 ACS 5- Year Estimates Detailed Tables. U.S. Census Bureau, 2018-2022 American Community Survey 5-Year Estimates: https://data.census.gov/table/ACSDT5Y2022.B17017). Accessed March 28, 2024.

Note: Gray shading denotes an Environmental Justice community.

Table 3.3.8-2. Environmental justice communities 1-mile from Skyline WMA portion of the Harris Dam Project (Source: Census Bureau, 2023, as modified by staff).

Geographic Area	Total Population[a]	White Alone, not Hispanic (%)[a]	African American/ Black (%)[a]	American Indian/ Alaska Native (%)[a]	Asian (%)[a]	Native HI & Other Pacific Islander (%)[a]	Some Other Race (%)[a]	Two or More Races (%)[a]	Hispanic Origin (any race) (%)[a]	Total Minority Population (%)[a]	Households in Poverty (%)[b]
ALABAMA	4,864,680	65.7%	26.4%	0.5%	1.3%	0.0%	0.2%	1.7%	4.2%	34.3%	17.2%
Jackson County (071)	**52,094**	**89.3%**	**3.5%**	**1.0%**	**0.4%**	**0.1%**	**0.1%**	**2.6%**	**2.9%**	**10.7%**	**19.8%**
Census Tract 950300, Block Group 3	1,229	89.0%	5.6%	0.0%	0.4%	0.0%	0.0%	5.0%	0.0%	11.0%	10.5%
Census Tract 950300, Block Group 4	881	84.9%	0.0%	0.6%	1.6%	0.0%	0.0%	12.9%	0.0%	15.1%	22.3%
Census Tract 950400, Block Group 1	496	98.8%	0.0%	1.2%	0.0%	0.0%	0.0%	0.0%	0.0%	1.2%	12.7%
Census Tract 950400, Block Group 2	528	93.4%	0.0%	0.0%	0.0%	0.0%	0.0%	6.6%	0.0%	6.6%	34.4%
Census Tract 950400, Block Group 3	1,105	78.9%	0.6%	4.1%	0.0%	0.0%	0.0%	3.4%	12.9%	21.1%	24.2%
Census Tract 950500, Block Group 1	1,308	88.8%	0.0%	4.3%	0.2%	0.8%	0.0%	3.8%	2.1%	11.2%	25.4%
Census Tract 950500, Block Group 2	2,052	89.4%	1.5%	0.7%	0.2%	0.0%	0.0%	3.4%	4.9%	10.6%	14.1%
Census Tract 950600, Block Group 1	1,977	95.5%	2.5%	0.5%	0.0%	0.0%	0.0%	0.4%	1.1%	4.5%	19.7%
Census Tract 950600, Block Group 3	1,572	98.4%	0.0%	1.1%	0.0%	0.0%	0.0%	0.5%	0.0%	1.6%	21.6%
TENNESSEE	6,651,089	74.0%	16.6%	0.2%	1.7%	0.0%	0.1%	1.9%	5.3%	26.0%	15.5%
Franklin County (051)	**41,512**	**88.6%**	**4.7%**	**0.2%**	**0.5%**	**0.1%**	**0.2%**	**2.4%**	**3.3%**	**11.4%**	**16.2%**

Geographic Area	Total Population[a]	White Alone, not Hispanic (%)[a]	African American/ Black (%)[a]	American Indian/ Alaska Native (%)[a]	Asian (%)[a]	Native HI & Other Pacific Islander (%)[a]	Some Other Race (%)[a]	Two or More Races (%)[a]	Hispanic Origin (any race) (%)[a]	Total Minority Population (%)[a]	Households in Poverty (%)[b]
Census Tract 960600, Block Group 3	1,998	93.6%	1.6%	0.3%	0.8%	0.0%	0.0%	1.9%	2.0%	6.4%	29.2%
Census Tract 960700, Block Group 2	1,083	94.4%	0.8%	0.0%	0.6%	0.0%	0.0%	0.8%	3.4%	5.6%	15.0%
Census Tract 960800, Block Group 1	2,106	88.1%	2.9%	0.0%	0.0%	0.0%	0.0%	4.8%	4.1%	11.9%	12.7%

[a] Percent of Total Population (Table B03002 – Hispanic or Latino Origin by Race. 2022 ACS 5-Year Estimates Detailed Tables. U.S. Census Bureau, 2018-2022 American Community Survey 5-Year Estimates: https://data.census.gov/table/ACSDT5Y2022.B03002). Accessed March 28, 2024.

[b] Percent of Households (Table B17017 -Poverty Status in the Past 12 Months by Household Type and Age of Householder. 2022 ACS 5- Yr Estimates Detailed Tables. U.S. Census Bureau, 2018-2022 American Community Survey 5-Year Estimates: https://data.census.gov/table/ACSDT5Y2022.B17017)). Accessed March 28, 2024.

Note: Gray shading denotes an Environmental Justice community.

APPENDIX H
ECONOMICS TABLES AND COSTS OF ENVIRONMENTAL MEASURES

Table 4-1. Parameters for economic analysis of the R.L. Harris Hydroelectric Project (Source: Alabama Power, as modified by staff).

Parameter	Value	Source
Installed capacity	135.0 MW	Alabama Power [a]
Capacity benefit	132.0 MW	Alabama Power [b]
Average annual generation	177,487 MWh	Alabama Power [c]
Period of analysis	30 years	Staff [d]
Net investment	$133,006,519	Alabama Power [e]
Operation and maintenance	$1,466,628/year	Alabama Power [f]
Interest rate	0.0%	Alabama Power
Application cost	$12,011,520	Alabama Power [g]
Federal, Local, Property Taxes, and Insurance	Included in O&M	
Estimated Commission Annual Charges	$406,500	Staff [h]
Alternative source of power's cost of energy (2023)		Staff [i,j,k]
1) Energy Cost	$50.65/MWh	Staff
1a) Equivalent On-peak Energy Cost	$64.62/MWh	Staff [l]
1b) Equivalent Off-peak Energy Cost	$49.15/MWh	Staff [l]
2) Capacity Benefit Cost	$179.08/kW-year	Staff

[a] Exhibit A, filed December 27, 2022, for the installed capacity.

[b] Exhibit B, filed December 27, 2022, for the capacity benefit.

[c] Exhibit D, Section 7, filed June 15, 2022, for generation.

[d] The economic analysis is based on a standard 30-year period, regardless of license term.

[e] Exhibit D, Section 3.2, filed June 15, 2022, for the Net investment.

[f] Commission Form 1 (End of 2023 / Q4), Line 34 Total Production Expenses (total 23 through 33) for operation and maintenance cost.

[g] Exhibit D, Section 9, filed June 15, 2022. Alabama Power stated a cost of $10.2 million for the application, which Commission staff escalated by 17.76% from (December) 2020 to (December) 2023 based on U.S. Bureau of Labor Statistics CPI Index.

[h] The Commission collects an annual administration charge for all licensed projects which is based on the authorized installed capacity of the project and amount of federal land occupied by the project.

i The alternative source of power cost is based on the current cost of providing the same amount of generation and capacity benefit from a natural gas-fired combined cycle plant, as reported by the most recent publication of The U.S. Energy Information Administration

(EIA), Annual Energy Outlook. This analysis is based on The U.S. Energy Information Administration (EIA), Annual Energy Outlook 2023, for the Division 6, East South-Central Region. The alternative source of power total cost is reported in Table 4-2, and is a combination of the cost of energy and capacity benefit.

[j] Alabama Power provided an estimate of the value of on-peak and off-peak power based on the avoided cost for the project (Exhibit D, Section 10, filed June 15, 2022). These rates are $32.33/MWh for on-peak energy, $24.59/MWh for off-peak energy, and a combined cost of $$25.34/MWh. In keeping with Commission policy as articulated in Mead, staff does not use a project's avoided costs in its analysis, rather, as described above, staff uses the most likely alternative source of power's cost.

[k] Alabama Power provided an estimate of the value of project power based on the most likely alternative source of power for the project (Exhibit D, Section 7, filed June 15, 2022). The reported rate is $242.3/MWh and is based on using a simple cycle combustion turbine as the least cost alternative source of power. Alabama Power's estimate is based on proprietary sources of information, which is not available to staff, thus is not used in our analysis. Regardless, the information is useful in estimating the value of the project's power.

[l] Some operating alternatives do not reduce total generation, rather moves generation from on-peak to off-peak periods. Staff developed on-peak and off-peak energy costs, equivalent to the standard energy cost of $50.65/KWh, to account for movement of generation from on-peak to off-peak periods. Staff adjusted on-peak and off-peak information provided by Alabama Power (Exhibit D, Section 10, filed June 15, 2022) to estimate the values of on-peak and off-peak power.

Table 4-2. Costs of environmental mitigation and enhancement measures considered in assessing the environmental effects of continuing to operate the R.L. Harris Hydroelectric Project (Source: Application unless otherwise noted).

Identifier	Enhancement/Mitigation Measures	Entities	Capital Cost [a] (2023$)	Annual Cost [b] (2023$)	Annual Levelized Cost [c] (2023$)
	Geology and Soils				
GS-1	Develop and implement an erosion monitoring plan (Alabama Power, 2021c) for the Tallapoosa River downstream from Harris Dam.	Alabama Power; Staff	$23,552	$11,776	$12,561
	Aquatic Resources				
AR-0	Continue to make releases through the project turbines to provide, in combination with intervening flows, a 45 cfs minimum flow at the downstream Wadley gage.	None, No Action Alternative	$0 [d]	$0 [d]	$0 [d]
AR-1	Release a continuous minimum flow of approximately 300 cfs through the proposed continuous minimum flow unit.	Alabama Power	$44,631,040	$88,320	$1,576,021 [e] Plus, generation reduced by 2,310 MWh/yr
AR-2	Develop drought operations procedures for the minimum-flow unit that would be consistent with the ADROP.	Alabama Power; Staff	$29,440	$0	$981
AR-3	Develop and implement an operations and flow monitoring plan to monitor compliance with: (1) project operation and water level management; (2) flow releases from Harris Dam (Alabama Power, 2021b); (3) flood control operations; and (4) drought management.	Alabama Power; Staff	$117,760	$11,776	$15,701

Identifier	Enhancement/Mitigation Measures	Entities	Capital Cost [a] (2023$)	Annual Cost [b] (2023$)	Annual Levelized Cost [c] (2023$)
AR-4	Continue to maintain the existing skimmer weir that is part of the existing intake's design at its highest elevation to allow the intake to draw from higher levels in the water column.	Alabama Power; Staff	$0	$0	$0
AR-5	Continue to operate the existing aeration system that is part of the existing turbines' design.	Alabama Power; Staff	$0	$0	$0
AR-6	Include an aeration system in the proposed continuous minimum flow unit.	Alabama Power	$0	$0	$0
AR-7	Develop and implement a water quality monitoring plan (Alabama Power, 2022c) consistent with the water quality certification.	Alabama Power; Staff	$76,544	$235,520	$238,071
AR-8	Develop and implement an aquatic resources monitoring plan (Alabama Power, 2021d) following implementation of the continuous minimum flow.	Alabama Power; Staff	$23,552	$15,309	$16,094
AR-9	When conditions permit, and upon request from Alabama DCNR, continue to hold Harris Lake water levels constant or slightly increasing for a 14-day period for spring fish spawning.	Alabama Power; Staff	$0	$0	$0
AR-10	Include in the Harris Lake aquatic habitat enhancement plan a provision to improve fish habitat by adding fish attraction devices (e.g., brush piles and other woody debris [recycled Christmas trees, felled trees] and synthetic materials [spider blocks, concrete, and PVC structures]) to Harris Lake.	Alabama Power; Staff	$0	$35,328	$35,328

Identifier	Enhancement/Mitigation Measures	Entities	Capital Cost [a] (2023$)	Annual Cost [b] (2023$)	Annual Levelized Cost [c] (2023$)
AR-11	Finalize and implement a nuisance aquatic vegetation and vector control program for Harris Lake (Alabama Power, 2021e).	Alabama Power; Staff	$0	$47,104	$47,104
AR-12	Release a continuous minimum flow of 300 cfs July through November; 350 cfs May and June; 400 cfs in December; and 450 cfs from January through April.	Staff	NA [f]	NA [f]	NA [g] Plus, generation reduced by 30,181 MWh/yr
AR-13	Limit annual reductions in minimum flows down to 254 cfs, as necessary for project maintenance, to the months of October through January, and for no longer than 3 consecutive weeks at a time.	Staff	$0 [h]	$0 [h]	$0

Identifier	Enhancement/Mitigation Measures	Entities	Capital Cost [a] (2023$)	Annual Cost [b] (2023$)	Annual Levelized Cost [c] (2023$)
AR-14a	Develop a minimum flow release plan, in consultation with Alabama DEM, Alabama DCNR, Alabama Rivers Alliance, and FWS, that includes, at a minimum: (1) a description of the source(s) of water releases for each seasonal period; (2) a description of any proposed new facilities and/or modifications of existing facilities needed to release the required minimum flows, including an evaluation (with requisite conceptual design drawings) of fish-friendly turbine design options for any proposed minimum flow unit; (3) a provision for any deviation from normal operations; (4) a provision to monitor the efficacy of any proposed release mechanism(s) to provide the required flows and to modify the plan, with Commission approval, if necessary; and (5) an implementation schedule for the provisions of the plan.	Staff	$5,000 [h]	$1,000 [h]	$1,167
AR-14b	Potential cost to construct any release mechanism which may be required to pass the recommended minimum flows.	Staff	$6,201,000 [f,h]	$103,350 [f,h]	$310,050
AR-15	As part of the water temperature and DO monitoring plan, design and implement a system to destratify a portion of the forebay at the level of the turbine intakes to achieve the specified thermal regime and DO targets downstream from the project.	Staff	$1,500,000 [h]	$50,000 [h]	$100,000

Identifier	Enhancement/Mitigation Measures	Entities	Capital Cost [a] (2023$)	Annual Cost [b] (2023$)	Annual Levelized Cost [c] (2023$)
AR-16	Include, as a provision of the project operations and flow monitoring plan, a measure, requiring an average of 30 minutes or more before starting operation of the second turbine, except for emergencies or flood conditions, as described in the Green Plan.	Staff	$0 [h]	$0 [h]	$0 [i]
AR-17	Develop a water temperature and DO monitoring plan to ensure that the staff-recommended Alabama DCNR thermal regime and staff-recommend Alabama DEM DO targets are achieved, and that includes: (1) the goals and objectives of the plan; (2) measurable response objectives and success criteria; (3) measures, including a narrative description and requisite conceptual design drawings, to destratify a portion of Harris Lake to meet the staff-recommended water temperature regime and DO targets in the Tallapoosa River downstream from the project; (4) a monitoring program that, at a minimum, includes the elements of Alabama Power's proposed Water Quality Monitoring Plan (i.e., measures consistent with Alabama DEM's 401 certification) and Alabama DCNR 10(j) recommendations nos. 2 and 9 through 13; (5) a provision to file annual monitoring report(s) that include (a) the data collected, (b) a discussion of the effectiveness of the water temperature and DO enhancement measures implemented, and (c) any recommendations to the Commission, for approval, of any needed changes to project facilities and/or operations; and (6) an implementation schedule that	Staff [j]	$86,544 [h]	$250,520 [h]	$253,405

Identifier	Enhancement/Mitigation Measures	Entities	Capital Cost [a] (2023$)	Annual Cost [b] (2023$)	Annual Levelized Cost [c] (2023$)
	includes monitoring after flows and water quality enhancement measures required by the license are implemented.				
AR-18	Develop a Harris Lake aquatic habitat enhancement plan, in consultation with Alabama DCNR, that includes provisions to: (1) consult with Alabama DCNR regarding timing prior to annually holding Harris Lake water levels constant or slightly increasing for a 14-day period for spring fish spawning within Harris Lake; (2) identify candidate areas for littoral enhancement and establish native aquatic plants in the selected areas within Harris Lake; (3) file a proposed schedule for carrying out lake habitat enhancement activities; (4) continue to selectively cut and monitor felled trees for shoreline cover; (5) add fish attraction devices such as brush piles and other woody debris (e.g., recycled Christmas trees, felled trees) and synthetic materials (e.g., spider blocks, concrete, and PVC structures) in Harris Lake to provide cover for fish and to enhance angling opportunities; and (6) file a summary report with the Commission, within 3 months of completing any enhancement activity, that describes the area enhanced, the measures used, and any areas within Harris Lake recommended to the Commission for approval, for future enhancement.	Staff	$20,000 [h]	$15,000 [h]	$15,667
AR-19	Develop a Tallapoosa River aquatic resources monitoring plan to measure the effectiveness of the	Staff	$30,000 [k]	$15,000 [k]	$16,000

Identifier	Enhancement/Mitigation Measures	Entities	Capital Cost [a] (2023$)	Annual Cost [b] (2023$)	Annual Levelized Cost [c] (2023$)
	minimum flows and water quality enhancement measures required by the license for the first 3 years after commencement of the minimum flow releases and water quality enhancement measures, and that includes the elements of Alabama Power's proposed Aquatic Resources Monitoring Plan, with the following additional provisions: (1) the goals and objectives (ecological and navigational) for the Tallapoosa River in project-affected waters downstream from Harris Dam; (2) criteria for measuring the effectiveness of the required minimum flow regime at achieving the environmental objectives in item 1 (to include developing degree day criteria for selected fish species in consultation with FWS, Alabama DCNR, and Alabama DEM); (3) the methodologies for (a) monitoring the project-related effects of the minimum flow regime required by the license on the environmental objectives identified in item 1, including monitoring (for the first 3 years after providing the required minimum flows and water quality enhancement measures) through monitoring aquatic organisms at the same locations as water temperature and DO, and (b) the methods that will be used to isolate the effects of the minimum flows from other, non-project-related effects; (4) the formation of a Tallapoosa River Flow Advisory Committee, consisting of Alabama Power, Alabama DCNR, and Alabama DEM, to the extent they are willing to participate;				

Identifier	Enhancement/Mitigation Measures	Entities	Capital Cost [a] (2023$)	Annual Cost [b] (2023$)	Annual Levelized Cost [c] (2023$)
	(5) annual monitoring reports and a 3-year monitoring report that includes (a) the monitoring methods used, (b) the data collected, (c) a discussion of the effectiveness of the minimum flow regime required by the license in achieving the environmental objectives identified in item 1, and (d) any recommendations to the Commission, for approval, for changes to project facilities and/or operations, including changes to the minimum flow regime, and any changes to the monitoring schedule, including the need for additional monitoring after the third year of monitoring is completed; and (6) an implementation schedule.				
AR-20	As a provision of the Harris Lake aquatic habitat enhancement plan, consult with Alabama DCNR regarding timing prior to annually holding Harris Lake water levels constant or slightly increasing for a 14-day period for spring fish spawning.	Staff	$0 [h]	$2,000 [h]	$2,000
AR-21	As part of the minimum flow release plan, for any proposed minimum flow unit, file turbine design plans that include an evaluation of fish-friendly turbine design options that would minimize fish mortality.	EPA; Staff	$0 [h]	$0 [h]	$0

Identifier	Enhancement/Mitigation Measures	Entities	Capital Cost [a] (2023$)	Annual Cost [b] (2023$)	Annual Levelized Cost [c] (2023$)
AR-22	Develop an aquatic invasive species management plan that includes, at a minimum, provisions for: (1) educating the public regarding preventative actions that can be taken to help control invasive species on project land and waters; (2) consulting with agencies regarding appropriate signage to be provided on project land; (3) developing BMPs for specific activities that have the potential to introduce aquatic invasive species into Harris Lake; and (4) documenting incidental observations of aquatic invasive species on project land and waters and reporting such observations to Alabama DCNR.	Staff	$10,000 [h]	$5,000 [h]	$5,333
AR-23	Operate the project to maintain DO of no less than 5.0 mg/L in the tailrace waters downstream from R.L. Harris Dam.	Alabama DEM (WQC no. 1)	$0 [h]	$0 [h]	$0 [l]
AR-24	Adaptively implement structural and/or operational modifications throughout the duration of a new license to maintain DO of no less than 5.0 mg/L downstream from the project.	Alabama DEM (WQC no. 2)	$0 [h]	$0 [h]	$0 [l]
AR-25	Monitor DO and temperature at 15-minute intervals in the project's tailrace approximately 800 feet downstream from the dam on the west bank of the river at 33.255448° N and 85.615765° W for the period January 1 through December 31 to determine compliance with Conditions 1 and 2.	Alabama DEM (WQC no. 3)	$0 [h]	$0 [h]	$0 [l]

Identifier	Enhancement/Mitigation Measures	Entities	Capital Cost [a] (2023$)	Annual Cost [b] (2023$)	Annual Levelized Cost [c] (2023$)
AR-26	Coordinate with USGS to conduct additional monitoring in the Tallapoosa River at Malone and Wadley (USGS Nos. 02414300) and 02414500, respectively) to document water quality conditions following proposed structural and operational changes as outlined in the November 2021 FLA.	Alabama DEM (WQC no. 4)	$0 [h]	$0 [h]	$0 [l]
AR-27	During the term of a new license, Alabama Power and Alabama DEM may work together to modify the monitoring and reporting requirements.	Alabama DEM (WQC no. 5)	$0 [h]	$0 [h]	$0 [l]
AR-28	Conduct all monitoring according to applicable Alabama DEM and/or USGS Standard Operating Procedures (SOPs), and conduct appropriate maintenance and calibration of monitoring equipment.	Alabama DEM (WQC no. 6)	$0 [h]	$0 [h]	$0 [l]
AR-29	Within 90 days following the end of each annual monitoring period, submit DO and temperature monitoring reports with appropriate certifications to Alabama DEM.	Alabama DEM (WQC no. 7)	$0 [h]	$0 [h]	$0 [l]
	Terrestrial Resources				
TR-1	Continue to maintain the two existing native plant plots at Little Fox Creek to provide habitat for pollinators.	Alabama Power; Staff	$0 [h]	$0 [h]	$0
TR-2	Protect a rare plant community by reclassifying a 57-acre area adjacent to Flat Rock Park at Harris Lake from "Recreation" to "Natural/Undeveloped" in the Shoreline Management Plan (SMP).	Alabama Power; Staff	$0 [h]	$0 [h]	$0

Identifier	Enhancement/Mitigation Measures	Entities	Capital Cost [a] (2023$)	Annual Cost [b] (2023$)	Annual Levelized Cost [c] (2023$)
TR-3	Finalize and implement a new WMP that includes measures to protect and enhance wildlife habitat within the Harris Lake and Skyline WMA projects boundaries.	Alabama Power; Staff	$2,119,680	$443,366	$514,022
TR-4	Implement the Alabama Power Company Avian Protection Plan (filed June 15, 2022) within the Harris Project boundary.	Alabama Power; Staff	$0 [h]	$0 [h]	$0
	Threatened and Endangered Species				
TES-1	Consult with the U.S. Department of the Interior, Fish and Wildlife Service (FWS) to develop measures to protect federally listed bats, including the Indiana, northern long-eared, and gray bats as part of the preparation of the final WMP.	Alabama Power; Staff	$0 [h]	$0 [h]	$0
TES-2	As part of the WMP, conduct surveys for Price's Potato-bean in the location of the extant population, and notify crews of any Price's Potato-bean occurrences prior to conducting timber management activities that may affect the extant population.	Alabama Power; Staff	$0 [h]	$0 [h]	$0
TES-3	Finalize the WMP in consultation with FWS and Alabama DCNR, and include provisions to: (1) manage vegetation in the Pollinator Plots at Little Fox Creek and project transmission line right-of-way to protect the monarch butterfly; (2) prior to conducting ongoing timber management, constructing proposed recreation amenities, and removing land from the Harris Project boundary, use FWS's current guidance to conduct additional surveys for the: (a) red-cockaded	Staff	$0 [h]	$0 [h]	$0

Identifier	Enhancement/Mitigation Measures	Entities	Capital Cost [a] (2023$)	Annual Cost [b] (2023$)	Annual Levelized Cost [c] (2023$)
	woodpecker at Harris Lake, (b) gray, Indiana, northern long-eared, and tricolored bats, and their habitats (i.e., hibernacula (for all four species), summer roost caves (for gray bats), and summer/maternity roost trees (for Indiana, northern long-eared, and tricolored bats) on project land at Harris Lake and/or Skyline WMA, and (c) Georgia rockcress, white fringeless orchid, Price's potato bean, Morefield's leather-flower, and American hart's-tongue fern at Harris Lake and/or Skyline WMA, as appropriate; (3) report alligator snapping turtle sightings; (4) based on survey results and incidental species sightings, identify potential measures to protect the species listed in items 2 and 3 during timber harvests and other vegetation management activities, construction of the proposed recreation sites/amenities, and project operations, if necessary to avoid project-related effects; (5) file, for Commission approval, the survey results, recommended protection measures, and proposed forestry management plans for project land at Harris Lake and Skyline WMA; and (6) incorporate Commission-approved species protection measures into the final WMP.				
	Recreation Resources				
RR-1	Implement the draft Recreation Plan as filed with the license application, which includes provisions to operate and maintain the existing recreation sites at	Alabama Power; Staff	$4,109,824	$328,550	$465,545

Identifier	Enhancement/Mitigation Measures	Entities	Capital Cost [a] (2023$)	Annual Cost [b] (2023$)	Annual Levelized Cost [c] (2023$)
	Harris Lake and the following facility modifications and new recreation facilities: (1) install a barrier-free access kayak/canoe access area and a barrier-free access trail to the launch from the existing Harris Dam tailrace fishing pier parking lot; (2) remove the Wedowee Marine South recreation area on Harris Lake from the project's licensed facilities to be replaced by a new recreation facility at another location (see next item); (3) install a new project recreation area on Harris Lake near the existing Alabama Power-owned and commercially-operated Wedowee Marine South facility. The new facility would be accessed from the existing Wedowee Marine South access road on Alabama State Route 48 (Highway 48). It would be a day use park with amenities including swimming, picnicking, boat launch and pier, fishing piers, and parking.				
	Land Use and Aesthetics				
LUA-1	Finalize and implement the SMP, filed November 23, 2021, and revised on June 15, 2022, that addresses all shorelines within the project boundary, and guides the use, occupancy, and management of shoreline resources, and future updates and revisions to the plan.	Alabama Power; Staff	$0	$210,202	$210,202
LUA-2	Implement proposed land additions to the project boundary and incorporate these changes into Exhibit G.	Alabama Power; Staff	$0	$0	$0

Identifier	Enhancement/Mitigation Measures	Entities	Capital Cost [a] (2023$)	Annual Cost [b] (2023$)	Annual Levelized Cost [c] (2023$)
LUA-3	Incorporate in the SMP provisions to protect rare plants within the project's 57-acre rare plant area adjacent to Flat Rock Park including: (1) periodically monitor the area for evidence of unauthorized uses (e.g., tire track marks on vegetation and rock outcrops); (2) maintain the new signs and barrier (gate); and (3) consult with Alabama DCNR to develop and recommend additional protection measures, for Commission approval, if needed, to avoid effects associated with recreation activities.	Staff	$0 [h]	$0 [h]	$0 [m]
LUA-4	Develop a public education and outreach plan in consultation with Alabama DCNR that includes a detailed description of provisions to: (1) share information about (a) the project's recreation opportunities and upgrades, (b) water levels in Harris Lake and the Tallapoosa River downstream from Harris Dam, (c) the new Harris Lake shoreline classifications, changes to land parcels in the project boundary, and the allowable activities in each area, (d) BMPs to protect natural resources from construction and maintenance activities (e.g., boat dock construction, shoreline stabilization, and vegetation management), (e) the procedures for permits to lease or occupy project lands and waters for purposes permitted by any license issued for the project, (f) license requirements for the enhancement of aquatic habitat, and management of invasive species, historic properties, and recreation at the project, as applicable; (2) file a schedule for	Staff	$5,000 [h]	$0 [h]	$167

Identifier	Enhancement/Mitigation Measures	Entities	Capital Cost [a] (2023$)	Annual Cost [b] (2023$)	Annual Levelized Cost [c] (2023$)
	distribution of the project information described in item 1 to stakeholders; and (3) review and update the plan every 6 years.				
	Cultural Resources				
CR-1	Finalize and implement an Historic Properties Management Plan (HPMP) to protect and preserve historic properties identified in the project area, and conduct ongoing inventory and evaluation of cultural resources in the project area.	Alabama Power; Staff	$0	$54,562	$54,562
CR-2	Revise the November 23, 2021, HPMP to include the following additional information regarding historic properties within the project Area of Potential Effects (APE): (1) the results of cultural resources surveys of the 17 tracts of land proposed for removal from the project boundary and measures to resolve adverse effects to eligible sites on these lands; (2) a plan to conduct National Register evaluations of all unevaluated sites proposed to be removed from the project boundary and 119 sites (8 sites at Lake Harris, 111 sites at Skyline WMA) within the APE that remain unevaluated but have been removed from consideration; (3) current, ongoing, project-related effects to National Register-eligible and unevaluated sites, including impacts of flow release alternatives; (4) documentation of all consultation efforts with the SHPO and applicable Tribes; (5) specific plans for cultural resources monitoring; (6) details regarding public interpretation	Staff	$10,000 [h]	$10,000 [h]	$10,333

Identifier	Enhancement/Mitigation Measures	Entities	Capital Cost [a] (2023$)	Annual Cost [b] (2023$)	Annual Levelized Cost [c] (2023$)
	and education; and (7) a schedule for completion of all HPMP actions.				
	Alabama DCNR				
DCNR-1	Within 5 years of license issuance release the following seasonal continuous minimum flows: 390 cfs (7/1–11/30); 510 cfs (5/1–6/30 and 12/1–12/30); and 760 cfs (1/1–4/30). These flows would be subject to flow variances described in recommendations 2–7 below.	Alabama DCNR (10[j] no. 1)	NA	NA	NA Plus, generation reduced by 4,179 MWh/yr
DCNR-2	Install, operate, and maintain a minimum flow unit designed to provide adjustable flows, as recommended in Measure 1 above; and provide a Continuous Minimum Flow Turbine Design Analysis to ensure all viable options regarding turbine design, type, hydraulic capacity (range), aeration capabilities, and environmental effects are fully assessed.	Alabama DCNR (10[j] no. 2)	$50,000,000 [h]	$100,000 [h]	$1,766,667
DCNR-3	Between 2/1 and 6/1 each year, (a) stabilize Harris Lake levels (hold constant or slight increase) for a 14-day period to improve lake spawning and hatching success, and (b) stabilize flows in the Tallapoosa River downstream from Harris Dam for a 14-day period to improve river spawning and hatching success.	Alabama DCNR (10[j] no. 3)	$0 [n]	$0 [n]	$0

Identifier	Enhancement/Mitigation Measures	Entities	Capital Cost [a] (2023$)	Annual Cost [b] (2023$)	Annual Levelized Cost [c] (2023$)
DCNR-4	(a) Operate the project with an up-ramp time for each turbine unit at Harris Dam of no less than 30 minutes from off-line to full gate. (b) Take the 2nd turbine unit off line at least 2 hours after the 1st turbine unit is taken off-line.	Alabama DCNR (10[j] no. 4)	$0 [n]	$0 [n]	$0 [i]
DCNR-5	Prepare an annual report of Harris Project operations during the flow adjustment periods, including meeting notes, as well as streamflow gaging and plant operations records. After 5 years of flow adjustment operations, evaluate operations and develop recommended changes.	Alabama DCNR (10[j] no. 5)	$0 [n]	$0 [n]	$0
DCNR-6	For maintenance of turbines at the Harris Powerhouse, reduce minimum flow releases to 254 cfs for short periods between October – January (except during drought conditions) to minimize environmental effects.	Alabama DCNR (10[j] no. 6)	$0 [n]	$0 [n]	$0
DCNR-7	Implement ADROP provisions during droughts and develop flow operations during drought and unit outages in the proposed Project Operations and Flow Monitoring Plan, with resource agencies consultation and Commission approval.	Alabama DCNR (10[j] no. 7)	$0 [n]	$0 [n]	$0
DCNR-8	Develop and implement a Project Operations and Flow Monitoring Plan to monitor compliance with the operational requirements of any license issued for the project.	Alabama DCNR (10[j] no. 8)	$0 [n]	$0 [n]	$0

Identifier	Enhancement/Mitigation Measures	Entities	Capital Cost [a] (2023$)	Annual Cost [b] (2023$)	Annual Levelized Cost [c] (2023$)
DCNR-9	Develop a Water Quality Monitoring Plan that includes provisions for real time monitoring of discharge, temperature, and DO year-round, in the project forebay and tailrace.	Alabama DCNR (10[j] no. 9)	$0 [n]	$0 [n]	$0
DCNR-10	Operate the project to meet a minimum DO concentration of 5.0 mg/L at all times during generation and non-generation.	Alabama DCNR (10[j] no. 10)	$0 [n]	$0 [n]	$0
DCNR-11	Develop a Dissolved Oxygen Improvement Plan that includes well defined endpoints, measurable response objectives, and a timeline for any needed changes.	Alabama DCNR (10[j] no. 11)	$0 [n]	$0 [n]	$0
DCNR-12	Operate the project to follow a 90°F (32.2°C) maximum and a ±5°F (2.7°C) change from ambient water temperatures, and a 1.8°F (1°C) rate of change per hour requirement.	Alabama DCNR (10[j] no. 12)	$0 [n]	$0 [n]	$0
DCNR-13	Develop a Temperature Regulation Plan that includes well-defined endpoints, measurable response objectives, and a timeline for any needed changes.	Alabama DCNR (10[j] no. 13)	$10,000 [h]	$15,000 [h]	$15,333
DCNR-14	Pursue and develop methods to eliminate, minimize, or mitigate for fish entrainment and turbine mortality.	Alabama DCNR (10[j] no. 14)	$0 [n]	$0 [n]	$0

Identifier	Enhancement/Mitigation Measures	Entities	Capital Cost [a] (2023$)	Annual Cost [b] (2023$)	Annual Levelized Cost [c] (2023$)
DCNR-15	The Commission reserve authority to require fishways, as may be prescribed by the Department of Commerce or Interior under section 18 of the FPA. Also recommends Alabama Power participate in discussions with FWS and the Corps regarding potential methods to provide or enhance fish passage on the Tallapoosa River.	Alabama DCNR (10[j] no. 15)	$0 [n]	$0 [n]	$0
DCNR-16	Pursue a Memorandum of Agreement with an approved and licensed hatchery/facility to develop and implement a freshwater fish, mollusk, and crayfish propagation program for the Tallapoosa River, as an alternative to installing fish passage at Harris Dam.	Alabama DCNR (10[j] no. 16)	$0 [n]	$0 [n]	$0
DCNR-17	Develop and implement, within 9 months of license issuance, an Aquatic Resources Monitoring Plan. The plan would be implemented at determined intervals throughout the license period, include standardized sampling protocols for all aquatic species (macroinvertebrates, mollusks, crayfish, and fish), and include pre- and post-operational changes monitoring and provisions for altering project operations based on the monitoring.	Alabama DCNR (10[j] no. 17)	$0 [n]	$0 [n]	$0

Identifier	Enhancement/Mitigation Measures	Entities	Capital Cost [a] (2023$)	Annual Cost [b] (2023$)	Annual Levelized Cost [c] (2023$)
DCNR-18	Develop a plan, schedule, and monitoring program, within 9 months of license issuance, to implement fish habitat enhancements (e.g., native aquatic plants; felled trees; fish attraction devices, e.g., brush piles, woody debris, and synthetic materials) in Harris Lake and the project tailrace.	Alabama DCNR (10[j] no. 18)	$0 [n]	$0 [n]	$0
DCNR-19	Recreation and Public Use. ADCNR-WFF supports the additional recreation site the licensee is proposing on Harris Lake to include a day use park (swimming, picnicking and boat ramp). ADCNR-WFF advocates that Alabama Power provide additional bank fishing opportunities on Harris Lake and in the tailrace. Site selection should be in consultation with ADCNR-WFF. ADCNR-WFF supports installing and maintaining recreational (canoe/kayak/small boat) access below Harris Dam within the Project Boundary provided that CMF and a plan for flow releases from Harris Dam are provided. ADCNR-WFF continues to recommend licensee pursue ways to provide public access at sites near Malone and Wadley. Sites should be selected and designed with this potential usage increase in mind and in consultation with ADCNR-WFF.	Alabama DCNR (10[a] no. 1)	$0 [n]	$0 [n]	$0

Identifier	Enhancement/Mitigation Measures	Entities	Capital Cost [a] (2023$)	Annual Cost [b] (2023$)	Annual Levelized Cost [c] (2023$)
DCNR-20	Shoreline Management. ADCNR-WFF is in support of SMP development and recommends continued consultation between the resource agencies and the licensee with the development of these plans for this project and others in the region. ADCNR-WFF continues to recommend the use of riprap rather than seawalls to protect the shorelines from erosion. ADCNR believes that specific criteria should be met before a new seawall is permitted. If seawalls are deemed necessary over alternative shoreline erosion control measures, bulkhead guidelines in the United States Army Corps of Engineers, Alabama General Permit Shoreline and Bank Stabilization and Protection should be followed. Alabama Power should encourage alternative bank stabilization techniques other than seawalls and work towards reducing permissible allowable seawall lengths or require mitigation for loss of shallow water aquatic species habitat. Proposed seawall projects should be evaluated on a case-by-case basis and permitted accordingly.	Alabama DCNR (10[a] no. 2)	$0 [n]	$0 [n]	$0

Identifier	Enhancement/Mitigation Measures	Entities	Capital Cost [a] (2023$)	Annual Cost [b] (2023$)	Annual Levelized Cost [c] (2023$)
DCNR-21	Sedimentation and Erosion. ADCNR-WFF is in support of the licensee development and implementation of an Erosion Monitoring Plan (EMP) within 9 months of license issuance, following consultation with resource agencies and FERC approval. This plan should evaluate any changes in downstream erosion following implementation of operational changes. The plan should also include reservoir monitoring of erosion and sedimentation that corresponds or works in conjunction with the SMP. In addition, the SMP should 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). Licensee should perform lake-wide surveys annually to identify areas of erosion in the reservoir project boundary and include a management plan with erosion control response measures for areas determined to be problematic in reports. These response measures should be included for both the reservoir and tailrace. Consideration should be given to the initialization of a landowner assistance program which would include providing expertise and potential licensee cost share for high erosion area improvements.	Alabama DCNR (10[a] no. 3)	$0 [n]	$0 [n]	$0

Identifier	Enhancement/Mitigation Measures	Entities	Capital Cost [a] (2023$)	Annual Cost [b] (2023$)	Annual Levelized Cost [c] (2023$)
DCNR-22	Invasive species. Develop an Invasive Species Management Plan within 9 months of license issuance, following consultation with resource agencies and FERC approval, with the goal to prevent introductions and establishment of invasive species in addition to managing nuisance aquatic vegetation to best suit the many uses in the reservoir and tailrace. An Invasive Species Management Plan should include evaluations and response criteria for invasive fish, mollusks, plants and crayfish. ADCNR-WFF is in support of the Alabama Power's proposed Nuisance Aquatic Vegetation Control Management Program.	Alabama DCNR (10[a] no. 4)	$0 [n]	$0 [n]	$0
DCNR-23	Wildlife Management. ADCNR-WFF is in support of Alabama Power's plans to finalize and implement a Wildlife Management Plan for Harris Lake and Skyline within 9 months of license issuance and recommends including FWS guidelines for timber management regarding federally and state protected bats. In addition, adding cave protection and maintenance components in the WMP for conservation of state protected species would improve the plan. ADCNR-WFF and FWS should be consulted to develop any additional measures protective of wildlife resources within the project boundary.	Alabama DCNR (10[a] no. 5)	$0 [n]	$0 [n]	$0

Identifier	Enhancement/Mitigation Measures	Entities	Capital Cost [a] (2023$)	Annual Cost [b] (2023$)	Annual Levelized Cost [c] (2023$)
DCNR-24	Public Education. ADCNR-WFF recommends a Public Education Outreach Plan be developed within 9 months of license issuance, following consultation with resource agencies and FERC approval, to ensure Shoreline Management Plans, Invasive Species Management Plans, Habitat Restoration Plans, and recreational opportunities are adequately distributed to stakeholders on a regular basis.	Alabama DCNR (10[a] no. 6)	$0 [n]	$0 [n]	$0

[a] Capital costs typically include equipment, construction, permitting, and contingency costs.

[b] Annual costs typically include operations and maintenance costs and any other costs which occur on a yearly basis.

[c] All capital and annual costs were converted to equal annual costs over a 30-year period to give a uniform basis for comparing costs.

[d] In combination with intervening flows, water to provide the 45 cfs minimum flow at the downstream Wadley gage is currently released through the project turbines, resulting in no reduction in annual generation.

[e] This cost for this measure consists only of the capital and O&M costs associated with the new minimum flow turbine. In addition, this measure would result in an annual reduction of 2,310 MWh. Reduced generation is not reflected in the Annual Levelized Cost presented here, but it is accounted for in the net annual generation values, as presented in Section 4.2 and Table 4-3 of this appendix. The U.S. Energy Information Administration (EIA), Annual Energy Outlook 2023 estimates that a typical U.S. household uses an average of 10.5 MWh of energy per year. Based on this annual energy usage, an annual reduction of 2,310 MWh of energy is equivalent to the average annual generation of 220 U.S. households.

[f] Measure AR-12 refers only to the release of water and does not include capital and annual costs for a release mechanism. These costs are included separately under measure AR-14b, and represent only a worst-case estimate. Neither measure accounts for any generation that could be reclaimed by making the releases through a minimum flow turbine. To estimate the potential costs, we used Alabama Power's December 27, 2022, AIR response which provided estimates of $6,000,000 capital cost and $100,000 annual operation and maintenance cost for a "Spillway Gate Modification to Accommodate a High-Level Release". Escalation by 3.35% (December 2022 to December 2023) would yield estimates of $6,201,000 capital cost and $103,350 annual cost; the associated annual levelized cost would be $310,050.

[g] This assumes that the releases would be made by non-generating means (e.g., spill, siphon), and would reduce annual generation by 30,181 MWh. Reduced generation is not reflected in the Annual Levelized Cost presented here, but it is accounted for in the net annual generation values, as presented in Section 4.2 and Table 4-3 of this appendix. The U.S. Energy Information Administration (EIA), Annual Energy Outlook 2023 estimates that a typical U.S. household uses an average of 10.5 MWh of energy per year. Based on this annual energy usage, an annual reduction of 30,181 MWh of energy is equivalent to the average annual generation of 2,874 U.S. households. These generation reductions could be lessened if all or part of the flows were released through a minimum flow turbine instead of being spilled.

[h] Staff estimate.

[i] Both starting the second turbine and shutting down the second and first turbines in the recommended manner would result in net reductions in generation when moving generation from on-peak to off-peak. Flow records show that flows needed to initiate the second turbine unit occur between 1% and 3% of the time; however, Alabama Power states two turbines may be operated on average 9% of the time. Operating the second turbine unit is not a common occurrence, thus we estimate the cost of this measure to be negligible.

[j] The staff-recommended water temperature and DO management plan includes Alabama Power's proposed water quality monitoring plan (AR-7); Alabama DEM's entire WQC (AR-23 through AR-29); and Alabama DCNR's 10(j) nos. 10, 11, and 13, and 10(j) no. 12 with modification to develop water temperature targets in consultation with pertinent agencies.

[k] Includes the cost of proposed plan plus additional measures recommended by staff.

[l] No incremental cost since all Alabama DEM WQC conditions are incorporated into measure AR-7 of the Applicant's Proposal.

[m] No incremental cost since staff assumes that Alabama Power's estimated cost for preparing a final SMP in consultation with the agencies would cover staff's recommendations.

[n] No incremental cost relative to measures already included in staff alternative.

Table 4-3. Summary of the annual cost of alternative power and annual project cost for four alternatives for the R.L. Harris Hydroelectric Project (Source: Alabama Power, 2022d, as modified by staff).

	No Action	**Applicant's Proposal**	**Staff Alternative**	**Staff Alternative with Mandatory Conditions**
Installed capacity	135.0 MW	137.5 MW	135.0 MW	135.0 MW
Annual generation	177,487 MWh	175,177 MWh	147,306 MWh	147,306 MWh
Capacity benefit	132.0 MW	132.0 MW	132.0 MW	132.0 MW
Current alternative source of power cost [a]	$34,790,647	$34,329,137	$33,057,783	$33,057,783
Total annual levelized cost (2023) [b]	$6,707,063	$9,893,255	$9,031,189	$9,031,189
Difference between the alternative source of power cost and total annual project cost	$28,083,584	$24,435,882	$24,026,594	$24,026,594

[a] The alternative source of power's cost is based on the alternative source of power for the East South-Central Region, as identified in Table 4.1 above.

[b] Project costs include the cost of environmental measures listed in Table 4-2 and the costs identified in Table 4.1. All project costs were adjusted to 2023 dollars.

APPENDIX I
CONCLUSIONS AND RECOMMENDATIONS

Comprehensive Development and Recommended Alternative

Sections 4(e) and 10(a)(1) of the FPA require the Commission to give equal consideration to all uses of the waterway on which a project is located. When we review a hydropower project, we consider the water quality, fish and wildlife, recreation, cultural, and other non-developmental values of the waterway equally with its electric energy and other developmental values. In deciding whether, and under what circumstances, a hydropower license should be issued, the Commission must determine that the project will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses. This section contains the basis for, and a summary of, our recommendations for relicensing the Harris Project. We weigh the costs and benefits of our recommended alternative against other proposed measures.

Based on our independent review of agency and public comments filed on this project and our review of the environmental and economic effects of the proposed project and its alternatives, we recommend the staff alternative as the preferred option. We recommend this option because: (1) issuance of a new hydropower license by the Commission would allow Alabama Power to operate the project as an economically beneficial and dependable source of electrical energy for its customers; (2) the 135-MW electric capacity comes from a renewable resource that does not contribute to atmospheric pollution, including greenhouse gases; (3) the public benefits of this alternative would exceed those of the no-action alternative; and (4) the proposed and recommended measures would protect and enhance fish and wildlife resources, and would improve recreation opportunities at the project.

In the following section, we make recommendations as to which environmental measures proposed by the licensees or recommended by agencies and other entities should be included in any license issued for the project.

Measures Proposed by the Applicant

Based on our environmental analysis of Alabama Power's proposal discussed in section 3 and the costs discussed in section 4, we recommend including the following environmental measures proposed by Alabama Power in any license issued for the project.

Operational Measures

- Operate the two main generating units at the Harris Powerhouse in a daily peaking mode, within the constraints of the existing Harris Lake operating curve.
- Continue to operate the project during high flow conditions in accordance with the Corps-approved flood control procedures in the Corps' Harris Water Control Manual (Corps, 2022).
- Continue to operate the project to maintain a navigation channel in the Alabama River.
- Continue to operate the project during drought conditions in accordance with ADROP procedures, as outlined in the Corps' Water Control Manual (Alabama Power, 2016).

Geology and Soils

- Develop and implement an erosion monitoring plan (Alabama Power, 2021c) for the Tallapoosa River downstream from Harris Dam.

Water and Aquatic Resources

- Develop drought operations procedures for the minimum-flow releases that would be consistent with the ADROP.
- Develop and implement a project operation and flow monitoring plan (Alabama Power, 2021b) to monitor compliance with: (1) project operation and water level management; (2) flow releases from Harris Dam; (3) flood control operations; and (4) drought management.
- Continue to maintain the existing skimmer weir that is part of the existing intake's design at its highest elevation to allow the intake to draw from higher levels in the water column.
- Continue to operate the existing aeration system that is part of the existing turbines.
- Improve fish habitat by adding fish attraction devices (e.g., brush piles and other woody debris [recycled Christmas trees, felled trees] and synthetic materials [spider blocks, concrete, and PVC structures] to Harris Lake.
- Finalize and implement a nuisance aquatic vegetation and vector control program for Harris Lake (Alabama Power, 2021e).

Terrestrial Resources

- Continue to maintain the existing native plant plots at Little Fox Creek to provide habitat for pollinators.
- Protect a rare plant community by reclassifying a 57-acre area adjacent to Flat Rock Park at Harris Lake from "recreation" to "natural/undeveloped" in the Shoreline Management Plan (SMP) (filed June 15, 2022).
- Finalize and implement a WMP that includes measures to protect and enhance wildlife habitat within the Harris Lake and Skyline WMA projects boundaries.
- Implement the Alabama Power Company Avian Protection Plan within the Harris Project boundary.

Threatened and Endangered Species

- Consult with FWS to develop measures to protect federally listed bats, including the Indiana, northern long-eared, and gray bats as part of the preparation of the final WMP.
- As part of the WMP, conduct surveys for Price's potato-bean at the location of the extant population, and notify crews of the location of any Price's potato-bean occurrences prior to conducting timber management activities that may affect the extant population.

Recreation Resources

- Implement the draft Recreation Plan as filed with the license application, which includes provisions to operate and maintain the existing recreation sites at Harris Lake and the following facility modifications and new recreation facilities:
  - Install a barrier-free access kayak/canoe access area and a barrier-free access trail to the launch from the existing Harris Dam tailrace fishing pier parking lot.
  - Remove the Wedowee Marine South recreation area on Harris Lake from the project's licensed facilities to be replaced by a new recreation facility at another location (see next item).
  - Install a new project recreation area on Harris Lake on licensee-owned land near the existing Alabama Power-owned and commercially-operated Wedowee Marine South facility. The new facility would be accessed from the existing Wedowee Marine South access road on Alabama State Route 48 (Highway 48). It would be a day use park with amenities including swimming, picnicking, boat launch and pier, fishing piers, and parking.

Land Use and Aesthetics

- Implement the SMP, filed November 23, 2021, and revised on June 15, 2022, that addresses all shorelines within the project boundary, and guides the use, occupancy, and management of shoreline resources, and future updates and revisions to the plan.
- Implement proposed land additions to the project boundary and incorporate into Exhibit G.

Cultural Resources

- Implement an HPMP to protect and preserve historic properties identified in the project area, and conduct ongoing inventory and evaluation of cultural resources in the project area.

Water Quality Certification Conditions

Alabama DEM issued a 401 certification on November 29, 2023, which was filed on December 4, 2023. The 401 certification (Appendix C) includes the following conditions:

- Condition 1: Operate the project to maintain DO of no less than 5.0 mg/L in the tailrace waters downstream from R.L. Harris Dam.
- Condition 2: Adaptively implement structural and/or operational modifications throughout the duration of the FERC license to maintain DO of no less than 5.0 mg/L downstream from the project.
- Condition 3: Monitor DO and temperature at 15-minute intervals in the project's tailrace approximately 800 feet downstream from the dam on the west bank of the river at 33.255448° N and 85.615765° W for the period January 1 through December 31 to determine compliance with Conditions 1 and 2.

- Condition 4: Coordinate with USGS to conduct additional monitoring in the Tallapoosa River at Malone and Wadley (USGS Nos. 02414300) and 02414500, respectively) to document water quality conditions following proposed structural and operational changes as outlined in the November 2021 FLA.
- Condition 5: During the term of the new FERC license, Alabama Power and Alabama DEM may work together to modify the monitoring and reporting requirements.
- Condition 6: Conduct all monitoring according to applicable Alabama DEM and/or USGS Standard Operating Procedures (SOPs), and conduct appropriate maintenance and calibration of monitoring equipment.
- Condition 7: Within 90 days following the end of each annual monitoring period, submit DO and temperature monitoring reports with appropriate certifications to Alabama DEM.[175]

Additional Measures Recommended by Staff

In addition to Alabama Power's proposed measures and the terms and conditions of Alabama DEM's 401 certification listed above, we recommend the following modifications to Alabama Power's proposal and staff-recommended measures:

- Continue to operate in accordance with Green Plan operations (a) until any minimum flow recommended by staff and required by the license is implemented, and (b) when any minimum flow required by the license is interrupted for maintenance.
- Release a continuous minimum flow from the Harris Project (dam and/or powerhouse) to the Tallapoosa River of 300 cfs July through November; 350 cfs May and June; 400 cfs in December; and 450 cfs from January through April.
- Limit annual reductions in minimum flows to down to 254 cfs, as necessary for project maintenance, in the months of October through January, and for no longer than 3 consecutive weeks at a time.
- Develop a minimum flow release plan, in consultation with Alabama Department of Environmental Management (Alabama DEM), Alabama DCNR, Alabama Rivers Alliance, and FWS, that includes: (1) a description of the source(s) of water releases for each seasonal period; (2) a description of any new facilities and/or modifications of existing facilities needed to release the required minimum flows, including an evaluation (with requisite conceptual design drawings) of fish-friendly turbine design options for any proposed minimum flow unit; (3) a provision for any deviation from normal operations; (4) provisions to monitor the efficacy of any proposed release mechanism(s) to provide the required flows and to modify the

[175] Subsequent to implementation of Alabama Power's proposed structural and operational changes.

plan, with Commission approval, if necessary; and (5) an implementation schedule for the provisions of the plan.

- Include, within Alabama Power's proposed project operations and flow monitoring plan, a provision to sequentially start the existing project turbines for all controllable, non-emergency flow releases by allowing at least 30 minutes (consistent with existing Green Plan operations) to pass before starting a second turbine after the first turbine has been started.
- Develop a water temperature and DO monitoring plan to ensure that the staff-recommended Alabama DCNR thermal regime and staff-recommend Alabama DEM DO targets are achieved, and that includes: (1) the goals and objectives of the plan; (2) measurable response objectives and success criteria; (3) measures, including a narrative description and requisite conceptual design drawings, to destratify a portion of Harris Lake to meet the staff-recommended water temperature regime and DO targets[176] in the Tallapoosa River downstream from the project; (4) a monitoring program that, at a minimum, includes the elements of Alabama Power's proposed Water Quality Monitoring Plan (i.e., measures consistent with Alabama DEM's 401 certification) and Alabama DCNR 10(j) recommendations nos. 2 and 9 through 13; (5) a provision to file annual monitoring report(s) that include (a) the data collected, (b) a discussion of the effectiveness of the water temperature and DO enhancement measures implemented, and (c) any recommendations to the Commission, for approval, of any needed changes to project facilities and/or operations; and (6) an implementation schedule that includes monitoring after flows and water quality enhancement measures required by the license are implemented.
- Develop a Harris Lake aquatic habitat enhancement plan, in consultation with Alabama DCNR, that includes provisions to: (1) consult with Alabama DCNR regarding timing prior to annually holding Harris Lake water levels constant or slightly increasing for a 14-day period for spring fish spawning within Harris Lake; (2) identify candidate areas for littoral enhancement and establish native aquatic plants in the selected areas within Harris Lake; (3) file a proposed schedule for carrying out lake habitat enhancement activities; (4) continue to selectively cut and monitor felled trees for shoreline cover; (5) add fish attraction devices such as brush piles and other woody debris (e.g., recycled Christmas trees, felled trees) and synthetic materials (e.g., spider blocks, concrete, and PVC structures) in Harris Lake to provide cover for fish and to enhance angling opportunities; and (6) file a summary report with the Commission, within 3 months of completing any enhancement activity, that describes the area enhanced, the measures used, and any areas within Harris Lake recommended to the Commission for approval, for future enhancement.

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[176] *See* Alabama DCNR (10(j) #12) and the DO targets described in Alabama DEM's 401 certification Conditions 1 and 2.

- Develop a Tallapoosa River aquatic resources monitoring plan to measure the effectiveness of the minimum flows and water quality enhancement measures required by the license for the first 3 years after commencement of the minimum flow releases and water quality enhancement measures, and that includes the elements of Alabama Power's proposed Aquatic Resources Monitoring Plan, with the following additional provisions: (1) the goals and objectives (ecological and navigational) for the Tallapoosa River in project-affected waters downstream from Harris Dam; (2) criteria for measuring the effectiveness of the required minimum flow regime at achieving the environmental objectives in item 1 (to include developing degree day criteria for selected fish species in consultation with FWS, Alabama DCNR, and Alabama DEM); (3) the methodologies for (a) monitoring the project-related effects of the minimum flow regime required by the license on the environmental objectives identified in item 1, including monitoring (for the first 3 years after providing the required minimum flows and water quality enhancement measures) through monitoring aquatic organisms at the same locations as water temperature and DO, and (b) the methods that will be used to isolate the effects of the minimum flows from other, non-project-related effects; (4) the formation of a Tallapoosa River Flow Advisory Committee, consisting of Alabama Power, Alabama DCNR, and Alabama DEM, to the extent they are willing to participate; (5) annual monitoring reports and a 3-year monitoring report that includes (a) the monitoring methods used, (b) the data collected, (c) a discussion of the effectiveness of the minimum flow regime required by the license in achieving the environmental objectives identified in item 1, and (d) any recommendations to the Commission, for approval, for changes to project facilities and/or operations, including changes to the minimum flow regime, and any changes to the monitoring schedule, including the need for additional monitoring after the third year of monitoring is completed; and (6) an implementation schedule.
- Develop an aquatic invasive species management plan that includes, at a minimum, provisions for: (1) educating the public regarding preventative actions that can be taken to help control invasive species on project land and waters; (2) consulting with agencies regarding appropriate signage to be provided on project land; (3) developing BMPs for specific activities that have the potential to introduce aquatic invasive species into Harris Lake; and (4) documenting incidental observations of aquatic invasive species on project land and waters and reporting such observations to Alabama DCNR.
- Finalize the WMP in consultation with FWS and Alabama DCNR, and include provisions to: (1) manage vegetation in the Pollinator Plots at Little Fox Creek and project transmission line right-of-way to protect the monarch butterfly; (2) prior to conducting ongoing timber management, constructing proposed recreation amenities, and removing land from the Harris Project boundary, use FWS's current guidance to conduct additional surveys for the: (a) red-cockaded woodpecker at Harris Lake, (b) gray, Indiana, northern long-eared, and tricolored bats, and their habitats (i.e., hibernacula (for all four species), summer roost caves (for gray bats), and summer/maternity roost trees (for Indiana, northern long-eared, and tricolored bats) on project land at Harris Lake and/or Skyline WMA, and (c) Georgia

rockcress, white fringeless orchid, Price's potato bean, Morefield's leather-flower, and American hart's-tongue fern at Harris Lake and/or Skyline WMA, as appropriate; (3) report alligator snapping turtle sightings; (4) based on survey results and incidental species sightings, identify potential measures to protect the species listed in items 2 and 3 during timber harvests and other vegetation management activities, construction of the proposed recreation sites/amenities, and project operations, if necessary to avoid project-related effects; (5) file, for Commission approval, the survey results, recommended protection measures, and proposed forestry management plans for project land at Harris Lake and Skyline WMA; and (6) incorporate Commission-approved species protection measures into the final WMP.

- Incorporate in the SMP provisions to protect rare plants within the project's 57-acre rare plant area adjacent to Flat Rock Park including: (1) periodically monitor the area for evidence of unauthorized uses (e.g., tire track marks on vegetation and rock outcrops); (2) maintain the new signs and barrier (gate); and (3) consult with Alabama DCNR to develop and recommend additional protection measures, for Commission approval, if needed, to avoid effects associated with recreation activities.
- Develop a public education and outreach plan in consultation with Alabama DCNR that includes a detailed description of provisions to: (1) share information about (a) the project's recreation opportunities and upgrades, (b) water levels in Harris Lake and the Tallapoosa River downstream from Harris Dam, (c) the new Harris Lake shoreline classifications, changes to land parcels in the project boundary, and the allowable activities in each area, (d) BMPs to protect natural resources from construction and maintenance activities (e.g., boat dock construction, shoreline stabilization, and vegetation management), (e) the procedures for permits to lease or occupy project lands and waters for purposes permitted by any license issued for the project, (f) license requirements for the enhancement of aquatic habitat, and management of invasive species, historic properties, and recreation at the project, as applicable; (2) file a schedule for distribution of the project information described in item 1 to stakeholders; and (3) review and update the plan every 6 years.
- Revise the November 23, 2021, HPMP to include the following additional information regarding historic properties within the project Area of Potential Effects (APE): (1) the results of cultural resources surveys of the 17 tracts of land proposed for removal from the project boundary and measures to resolve adverse effects to eligible sites on these lands; (2) a plan to conduct National Register evaluations of all unevaluated sites proposed to be removed from the project boundary and 119 sites (8 sites at Lake Harris, 111 sites at Skyline WMA) within the APE that remain unevaluated but have been removed from consideration; (3) current, ongoing, project-related effects to National Register-eligible and unevaluated sites, including impacts of flow release alternatives; (4) documentation of all consultation efforts with the SHPO and applicable Tribes; (5) specific plans for cultural resources monitoring; (6) details regarding public interpretation and education; and (7) a schedule for completion of all HPMP actions.

Below, we discuss our rationale for our additional staff recommended measures and modification to the proposed measures.

Changes to the Project Boundary

Alabama Power proposes project boundary changes around Harris Lake to: (1) add land necessary for current and future O&M and recreation development; (2) remove land not required for O&M or any other project purpose; and (3) reduce the shoreline buffer where project infrastructure and recreation facilities are not located along the shoreline. Overall, Alabama Power's proposed changes would result in the removal of 286 acres and the addition of 504 acres to the Harris Lake portion of the project boundary for a net, total addition to the boundary of 218 acres. Further, a number of acres, as described in table 3.3.6-3 would be reclassified. Alabama Power is not proposing any changes to the project boundary or to land use classification at Skyline WMA.

Areas that would be added to the project boundary at Harris Lake are owned by Alabama Power and include lands needed to fully encompass recreation sites; including trails, campground facilities, roads, and O&M facilities within the project boundary to ensure that Alabama Power would be able to protect resources and maintain these sites as defined in the license. Alabama Power also proposes shoreline reclassifications with these additions from the existing classifications of flood storage or scenic easement to natural/undeveloped or commercial recreation. Based on our analysis in section 3.3.6.2, subsection *Project Boundary*, we find that, in general, the licensees' proposed changes to the project boundary reflect land needed to fulfill project purposes.

Alabama Power proposes to remove the Wedowee Marine South recreation area on Harris Lake from the project's licensed facilities, replace it with a new project recreation site on Harris Lake near the existing commercially operated Wedowee Marine South facility, and reclassify the shoreline from Recreation to Commercial Recreation. The new project recreation site would be located on licensee-owned land and accessed from the existing Wedowee Marine South access road on Alabama State Route 48 (Highway 48). It would be a day use park with amenities including swimming, picnicking, boat launch and pier, fishing piers, and parking. Although Alabama Power proposes to remove Wedowee Marine South as a project recreation site, the site would remain available for recreation use by visitors as it has in the past. Therefore, recreation capacity would not be affected by the change. Wedowee Marine South, which is owned by Alabama Power and operated commercially, would be permitted and managed consistent with other non-project uses on project lands, including other private marinas on Harris Lake, as discussed in section 3.3.6, *Land Use and Aesthetics*, as part of the SMP.

Seasonal Continuous Minimum Flows

Alabama Power proposes to: (1) operate the two existing generating units at the Harris Powerhouse in a daily peaking mode within the constraints of the existing Harris Lake operating curve, and continue to operate in accordance with Green Plan operations until the proposed minimum flow unit is installed and operating; (2) construct and operate a new minimum flow generating unit at Harris Dam and use it to both generate electricity and release a continuous minimum flow of about 300 cfs; and (3) operate in accordance with Green Plan operations when the proposed minimum flow unit is shut down for maintenance or when flow to Unit 1 is interrupted.

Alabama DCNR recommends [10(j) no. 1] that Alabama Power implement the following seasonal continuous minimum flow regime within 5 years of any license issued for the project: 760 cfs from January 1 through April 30; 510 cfs from May 1 through June 30; 390 cfs from July 1 through November 30; and 510 cfs from December 1 through December 31. Alabama DCNR also recommends that, with the exception of drought periods, the new minimum flow regime should be allowed to drop as low as 254 cfs for short periods of time annually from October through January if turbine maintenance is needed. Finally, Alabama DCNR recommends that its recommended minimum flows be passed through a variable capacity turbine, and that Alabama Power provide a continuous minimum flow turbine design analysis to ensure all viable options regarding turbine design, type, hydraulic capacity (range), aeration capabilities, and environmental effects are fully assessed.

Alabama Rivers Alliance recommends a flow regime for the Tallapoosa River downstream from Harris Dam that mimics the natural hydrograph to the fullest extent possible, provides seasonal variability, restores aquatic habitat, reduces river level and water temperature fluctuations to mitigate the detrimental effects of hydropeaking, and is adaptively managed for the benefit of aquatic species. Alabama Rivers Alliance also recommends, [10(a) no. 3] that a combined 400–450 cfs flow be passed from the warmer epilimnion of the lake when stratified, and that the flow have a DO concentration of at least 5.0 mg/L at all times.

As discussed in section 3.3.2.2, studies have demonstrated the effects of hydrologic regulation on aquatic resources in the Tallapoosa River downstream of Harris Dam. Alabama Power's continuous minimum flow of 300 cfs would provide a stable flow and greater benefit than the Green Plan (baseline) operation of releasing periodic pulse flows downstream, which leads to fluctuations in the downstream shoreline wetted perimeter which in turn can lead to erosion, dewatering of aquatic habitat, and stranding of aquatic organisms. Alabama Power evaluated the effects of multiple flow release alternatives (table 3.3.2-24) on the downstream wetted perimeter and found that all downstream release alternatives would provide more wetted perimeter than the current Green Plan or the pre-Green Plan release alternatives (table 3.3.2-25). The larger flow releases resulted in larger increases in wetted perimeter relative to the existing conditions. However, at sites closer to the dam (i.e., RMs 0.2 to 7 downstream) the higher and lower flows were estimated to have relatively similar increases, while at sites between RM 7 and 43, the larger flow releases were estimated to provide larger increases in wetted perimeter. The addition of the Green Plan pulses to scenarios resulted in little additional wetted perimeter, especially at the higher continuous minimum flow releases of 600 and 800 cfs. As shown in tables 3.3.2-25 and 3.3.2-26, Alabama DCNR's higher seasonal continuous minimum flow regime (i.e., flows varying from 390 to 760 cfs) would provide more wetted perimeter and less fluctuation in wetted perimeter downstream from the dam than Alabama Power's proposed 300-cfs minimum flow.

Table 3.3.2-27 shows water temperature ranges for key fish species in the Tallapoosa River downstream from Harris Dam. We consider the spawning and hatching water temperature values to be the most important. Centrarchids (sunfish and basses) are early spring spawners, channel catfish are May to late summer spawners, Tallapoosa shiner spawn from April through June, Tallapoosa darter spawn in the early spring, and muscadine darter spawn from March through June. Figures 3.3.2-23 to 3.3.2-25 show that, relative to existing conditions, Alabama Power's proposed 300-cfs continuous minimum flow would reduce daily temperature fluctuations immediately downstream from Harris Dam. This would occur primarily through reduction of daily maximum temperatures in all three periods simulated, and increases in daily minimum temperatures for September and April. Figures 3.3.2-29 to 3.3.2-31 show that minimum flows greater than 300 cfs would further buffer temperatures and result in smaller temperature fluctuations. However, once the proposed flows reach Wadley, the thermal regime would remain nearly unchanged. Overall, modeled river temperatures under proposed operation and under higher alternative minimum flow releases are on the low side of the spawning and hatching temperature range for warmwater fishes during April, and for channel catfish immediately downstream from the dam during the summer. Moreover, the simulated temperature values represent average conditions for the entire wetted channel and do not indicate how temperatures along the river's margin would differ from in the main flow of the channel. During non-peaking periods, water temperature along the edges of the tailrace, especially in shallower habitats, would likely be warmer than in the main channel where minimum flow discharge from the dam keeps the water from stagnating. Therefore, channel catfish and sunfish species may find more suitable habitat (warmer) along the margins during these periods. However, during peaking periods, water throughout the width of the tailrace is moving and warmer habitat along the margins would likely be lost.

As discussed in section 3.3.2.2, *Environmental Effects, Water Temperature and Dissolved Oxygen,* there are several options for addressing cold-water releases. These options generally consist of either withdrawing water from a specific elevation where the water is at the desired temperature or artificially breaking up the thermal stratification in the forebay. Constructing a separate intake for the proposed minimum flow unit, given the limitations on potential locations and available space, may necessitate the use of a smaller unit with reduced capacity and would likely increase risks to dam safety. Partial destratification of the forebay, however, could increase temperatures and DO levels and reduce temperature fluctuations from peaking operations in the Tallapoosa River downstream from Harris Dam. The amount of change would be dependent on: (a) the extent of mixing throughout the water column, and (b) whether additional flow is released from the partially destratified area, or a location that is stratified but warmer than existing releases. Alabama Power's Aquatic Resources Study Report shows that mean daily water temperatures in the unregulated reaches were higher than temperatures in the regulated reaches during the spring and summer, and cooler than the regulated reaches during the fall and winter. Therefore, operation of any thermal destratification methods during the spring and summer months would be the most beneficial in terms of supporting a warmwater fish assemblage downstream from the dam.

As discussed in section 3.3.2.2, *Environmental Effects, Water Temperature and Dissolved Oxygen,* staff evaluated three alternatives for minimum flow releases to the project tailrace. Alabama DCNR recommended a variable flow turbine unit that would pass seasonal minimum flows ranging from 390 cfs to 760 cfs. Staff does not recommend this alternative because a minimum flow of 450 cfs or higher would result in lower lake elevations in Harris Lake, particularly during the summer recreation season. Lower lake elevations would adversely affect recreation, and boating access, on Harris Lake. In addition, Alabama Power states that a variable flow unit to pass this flow would be too large for the space available and pose potential safety concerns, thus is not feasible for the space available. Alabama DCNR's alternative could have an annual levelized cost up to $1,766,667 and reduce generation by 4,179 MWh annually.

Alabama Power proposed installing a minimum flow unit capable of passing up to 300 cfs. Staff determined that lake levels in Harris Lake would be unaffected by minimum flows equal to or less than 450 cfs, thus Alabama Power's proposal for 300 cfs would not reduce lake levels in Harris Lake. However, flows up to 800 cfs would increase the amount of littoral habitat, provide more wetted perimeter and less fluctuation in wetted perimeter, and add depth to the river which would benefit geology and soils, aquatic, and terrestrial resources as well as recreation downstream. Thus, Alabama Power's proposal would improve geology and soils, aquatic, terrestrial, and recreation resources downstream, but not provide the optimal benefits which could be achieved with up to 800 cfs minimum flow. Alabama Power's alternative would have an annual levelized cost of $1,576,021 and reduce generation by 2,310 MWh annually.

The staff alternative would require seasonal minimum flows, ranging from 300 cfs to 450 cfs, in the 0.5-mile reach between Harris Dam and the Crooked Creek confluence. Specifically, staff recommend Alabama Power release a continuous minimum flow of 300 cfs July through November; 350 cfs May and June; 400 cfs in December; and 450 cfs from January through April. As discussed in section 3.3.2.2, this flow regime would provide the greatest improvement to downstream resources that could be acquired without reducing lake levels in Harris Lake. Specifically, the staff alternative would: (1) maintain surface water levels in Harris Lake; (2) reduce fluctuations in temperature and DO in the Tallapoosa River downstream from Harris Dam, thus, improving overall water quality conditions in the river; and (3) provide a more stable flow regime in the river that would (a) reduce project-related erosion associated with fluctuating water levels, (b) increase wetted width of the river and enhance aquatic habitat conditions for fish and other aquatic organisms, (c) provide more stable flow conditions for wetland and other riparian habitats along the river, and (d) enhance recreational use of the river. In addition, this flow regime adds a seasonal component to the river's flow regime, and may provide ancillary benefits, including reducing the risk of downstream flooding (because flows higher than 300 cfs have the potential to slightly reduce Harris Lake levels, particularly in the summer and early fall when there is an enhanced risk of large storms). We estimate that the staff-alternative minimum flows would reduce generation by 30,181 MWh annually. As discussed below, implementing this flow could additionally cost up to $310,050 annually.

Alabama DCNR recommends decreasing minimum flows down to 254 cfs for short periods during the months of October through January, if necessary for turbine maintenance. This would allow for repairs during a time when environmental effects should be minimal. Limiting these short periods to no more than 3 weeks would further minimize the environmental effects of the reduced flows. We estimate that this measure would have a negligible annual cost. Therefore, we recommend a provision be included in the project operations and flow monitoring plan that allows Alabama Power to annually reduce the staff-recommended minimum flows to 254 cfs, if necessary for turbine maintenance.

In consideration of the benefits and costs, including the tradeoffs between protecting recreation benefits in Harris Lake, providing flows for downstream aquatic resource protection, and flows for project generation, among the various minimum flow alternatives, Commission staff finds that seasonal minimum flows, ranging from 300 cfs to 450 cfs, the staff-recommended minimum flow release plan, and reduced minimum up to 254 cfs for necessary turbine maintenance, would provide the most appropriate balance among aquatic resource protection, project generation, and cost.

Project Minimum Flow Release Plan

Alabama Power's proposed continuous minimum flow unit would not be capable of solely providing the staff-recommended seasonal minimum flows; thus, an additional, or alternative release mechanism would be necessary. Therefore, we recommend that Alabama Power develop a project minimum flow release plan, in consultation with Alabama DEM, Alabama DCNR, Alabama Rivers Alliance, and FWS that describes how the staff-recommended flows could be provided. At a minimum the plan should include: (1) a description of the source(s) of water releases for each seasonal period; (2) a description of any new facilities and/or modifications of existing facilities needed to release the required minimum flows, including an evaluation (with requisite conceptual design drawings) of fish-friendly turbine design options (including, but not limited to: (a) maximizing the openings between runner blades; (b) minimizing the gap between the runner blade tip and the turbine outer cylinder; (c) using long runner blades; and (d) slower turbine rotational speed) for any proposed minimum flow unit; (3) a provision for any deviation from normal operations; (4) a provision to monitor the efficiency of any proposed release mechanism(s) to provide the required flows and modifying the plan, with Commission approval, if necessary; and (5) an implementation schedule for the provisions of the plan. We estimate that developing this plan would have an annual levelized cost of $1,167. As discussed in table 4-2 (Appendix H), modification or construction of facilities to pass the recommended minimum flow could cost an additional $310,050 annually. Although we do not specifically recommend Alabama Power's proposed minimum flow unit, we do not exclude it from being part of the method to provide minimum flows.

Water Temperature and DO Management

Alabama Power proposes to: (1) operate the two existing main generating units at the Harris Powerhouse in a peaking mode and continue to operate in accordance with Green Plan operations until the proposed minimum flow unit is installed and operating; (2) continue to maintain the existing skimmer weir and operate it at its highest elevation; (3) continue to operate the existing turbine aeration system; and (4) install a new minimum-flow unit, with an aeration system that would draw water from the Unit 1 penstock and discharge about 300 cfs to the Tallapoosa River immediately downstream from the dam, and (5) develop and implement a water quality monitoring plan consistent with Alabama DEM's water quality certification for the project. The water quality certification requires: (1) that at all times DO in the dam's tailrace be no less than 5.0 mg/L (condition 1); (2) continuous monitoring of water temperature and DO to determine compliance with Alabama's water quality standards about 800 feet downstream from the dam on the west bank (condition 2); (3) coordination with USGS to conduct continuous monitoring of river temperature, DO, as well as river stage and flow at the downstream Malone and Wadley gages (condition 4); and (4) that all monitoring be in accordance with applicable Alabama DEM and/or USGS standard operating procedures (condition 6). The water quality certification also includes a provision for Alabama Power and Alabama DEM to work together to modify the monitoring and reporting requirements.

Alabama Rivers Alliance recommends [10(a) no. 2.B] that the powerhouse intake structure be modified to provide warmer water through enhancing the ability to raise the skimmer weir, destratifying a portion of the lake at the current intake level, or installation of a multi-level intake structure.

Alabama DCNR recommends [10(j) no. 2] that the project be designed to provide tailrace temperatures that mimic the natural water temperature regime of the system. In addition, Alabama DCNR supports Alabama Power's proposal to develop a water quality monitoring plan but recommends [10(j) no. 9] that the plan include temperature regulation and DO improvement components, both of which include well-defined endpoints, measurable response objectives, and a rigid timeline for completing any needed upgrades. The temperature component would include strategies to provide temperatures that mimic an unregulated thermal regime, and the DO component would address strategies to increase DO to meet Alabama's DO standard. Until the plan's provisions are implemented, Alabama DCNR recommends that Alabama Power provide flows to adequately oxygenate water released into the tailrace.

As discussed in section 3.3.2.2, *Environmental Effects — Water Quality,* Alabama Power's proposal would result in higher DO levels in the flows released through the new minimum-flow unit than the existing units, but this is expected to result in minimal effect on the overall DO when peaking occurs because the proposed 300-cfs continuous minimum flow would typically be less than 5% of the total discharge. Moreover, Alabama Power's proposal would reduce daily temperature fluctuations in the project's discharge, and these changes in temperature would be reduced by inflows and attenuation as water flows downstream resulting in negligible changes in the thermal regime at and downstream of Wadley. Therefore, in summary, Alabama Power's proposal would result in minimal water quality benefits.

Releasing warmer water in spring and summer as recommended by Alabama Rivers Alliance [10(a) no. 2.B] and Alabama DCNR [10(j) no. 2] would likely benefit native downstream fish (as discussed in section 3.3.2.2, *Fishery Resources —Minimum Instream Flows*. The fishery in the Tallapoosa River is primarily a warmwater fishery that depends on a warmer temperature regime than currently exists with releases of cool water from the Harris Project. As discussed in section 3.3.2.2, *Environmental Effects — Water Quality*, our evaluation of 9 primary technologies to provide warmer releases when the lake experiences vertical stratification[177] indicates that the most cost-effective practical approach would be to partially destratify the forebay's water column. This could be accomplished with surface mixers (figure 3.3.2-33) or possibly a bubble plume (figure 3.3.2-32).

In consideration of the various alternatives to improve water quality downstream of the powerhouse, Commission staff concludes that a partial destratification system, which is estimated to have an annual levelized cost of $100,000, would provide the most appropriate balance among water quality protection, fishery habitat enhancement, and project cost.

On the matter of water quality monitoring, water quality monitoring would be beneficial for the project-related purpose of determining the effectiveness of the staff-recommended minimum flow regime and other measures implemented to improve water quality and facilitate designing additional project modifications needed to accomplish that goal. Alabama Power's

[177] These technologies include use of a skimmer weir, existing spillway gates, modified spillway gates, a thermal curtain to block cold deep water, a siphon, pumps, multi-level intakes, a bubble plume, and surface mixers.

proposal for a water quality monitoring plan that is consistent with Alabama DEM's 401 certification would result in monitoring water temperature and DO year-around to demonstrate compliance with the water quality standards. This would provide the benefits of determining the project's effectiveness of meeting the water temperature and DO standards. The annual levelized costs of Alabama Power's proposed water quality monitoring plan would be $238,071. However, the extent for further project modifications to improve the thermal and DO regimes for native aquatic organisms downstream of Harris Dam is not evident. In consideration of the various alternatives for water quality monitoring, we conclude that developing and implementing a plan that ensures the staff-recommended Alabama DCNR thermal regime and staff-recommend Alabama DEM DO targets are achieved, which we estimate would have annual levelized cost of $253,405, would provide the most appropriate balance among water quality protection, fishery habitat enhancement, and project cost.

Tallapoosa River Aquatic Resources Monitoring Plan

Alabama Power proposes to develop an aquatic resources monitoring plan, which would be implemented following initiation of the proposed continuous minimum flow, to quantify the fish community at three sites downstream from Harris Dam and at a reference site upstream of Harris Lake. Alabama Power would use the results to compare the potential effects, if any, of the proposed continuous minimum flow release to the baseline sampling conducted during relicensing. Fish assemblages would be monitored at the tailrace, Wadley, Horseshoe Bend, and about 4 miles upstream of Lee's Bridge (upstream of Harris Lake) using methods similar to those used in the relicensing study (bi-monthly samples of six, 10-minute transects at each site using boat and barge electrofishing). All four sites would be sampled for a total of three sampling events (12 bi-monthly samples over 2 years for each sample event). Alabama Power would conduct the first sampling event 1 year after the minimum flow system is fully operational, with each subsequent event conducted on a 5-year interval. Field collections and subsequent analysis would be summarized in a report that would be made available to resource agencies for review and discussed with agencies and other stakeholders in a meeting the year following each full collection cycle. Reports and meeting summaries would be filed with the Commission. Alabama Power does not propose to adaptively manage the minimum flow.

Alabama DCNR recommends [10(j) no. 17] that Alabama Power develop and implement an aquatic resources monitoring plan that includes provisions to: (1) implement the plan at determined intervals throughout the license term with standardized sampling protocols for all aquatic species (macroinvertebrates, mollusks, crayfish, fish); (2) require both pre- and post-aquatic resource monitoring; (3) consider sportfish, state and federally protected species, and species of greatest conservation need during development of the plan; and (4) consider and prioritize the research, surveys, and monitoring needs outlined in Alabama DCNR's 2015 Alabama's Wildlife Action Plan 2015-2025. Alabama Rivers Alliance recommends [10(a) No. 3.D] that Alabama Power consider 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.

As discussed in section 3.3.2.2, *Fishery Resources —Aquatic Resource Monitoring Plan*, an aquatic resource monitoring plan would benefit aquatic resources by assessing if the staff-recommended minimum flows and water quality enhancement provide more stable hydraulic conditions conducive of a healthy aquatic ecosystem as opposed to current releases that vary greatly between peaking releases and non-peaking releases, as well as warmer water releases following staff's recommended water quality enhancements discussed above. However, because macroinvertebrates, mollusks, and crayfish are also affected by the project operations and are often the base of aquatic food webs, the monitoring component of Alabama Power's proposed plan should be expanded to include benthic macroinvertebrates, as well as mollusks and crayfish, in addition to fish species. Given that aquatic organisms are affected by variables other than the project's flow releases and the consensus among stakeholders is that restoring the thermal regime to a more natural condition would benefit the native fish community, monitoring water temperature in conjunction with implementing measures designed to address water temperature effects would provide better information than monitoring biotic populations alone. Monitoring water temperatures at the same sites that the aquatic organisms are monitored would enable Alabama Power and the resource agencies to more thoroughly assess the effects of enhancement measures than monitoring fish community composition alone. In addition, as discussed in section 3.3.2.2, *Environmental Effects, Minimum Instream Flow Releases,* given the daily fluctuations in downstream water temperatures due to peaking operations, incorporating the use of degree days into the protocol for assessing the effects of continuous minimum flows on downstream fish communities, such as proposed in Alabama Power's aquatic resources monitoring plan, would be appropriate. Use of degree days should be for select fish species that are important to resource agencies and recreationists, and determined in consultation with Alabama DCNR, Alabama Rivers Alliance, and FWS.

The proposed aquatic resources monitoring plan lacks a mechanism for making changes to minimum flows based on monitoring results, and without such a provision, the value of the monitoring effort and resulting data is unclear. Developing monitoring targets for groups of aquatic organisms (i.e., abundance and diversity of cyprinids or centrarchid species, composition of a macroinvertebrate community) and for individual species (i.e., abundance and relative condition factor of a particular game species) in consultation with the resource agencies would help inform decisions and management activities in the event that monitoring indicates that changes in flows are warranted. In addition, developing routine reports, in consultation with resource agencies, summarizing the monitoring data and including any recommended adjustments in the monitoring program or enhancement measures needed to achieve the program's success criteria, as well as filing these reports with the Commission would give value to the monitoring program and data, and would facilitate the Commission's administration of any new license issued for the project.

For the reasons discussed above, we recommend that Alabama Power develop a Tallapoosa River Aquatic Resources Adaptive Management Plan, in consultation with Alabama DEM, that includes the elements of Alabama Power's proposed Aquatic Resources Monitoring Plan, as well as the following additional provisions: (1) the goals and objectives (ecological and navigational) for the Tallapoosa River in project-affected waters downstream from Harris Dam; (2) criteria for measuring the effectiveness of the required minimum flow regime at achieving the environmental objectives in item 1 (to include developing degree day criteria for selected fish species in consultation with FWS, Alabama DCNR, and Alabama DEM); (3) the methodologies for monitoring the project-related effects of the minimum flow regime required by the license on the environmental objectives identified in item 1, including monitoring (for the first 3 years after providing the required minimum flows and water quality enhancement measures) water temperature and DO, as well as biological monitoring at the same locations and the methods that will be used to isolate the effects of the minimum flows from any other, non-project-related effects; (4) the formation of a Tallapoosa River Flow Advisory Committee consisting of Alabama Power, Alabama DCNR, and Alabama DEM, to the extent they are willing to participate; (5) annual monitoring reports that include (a) the data collected, (b) a discussion of the effectiveness of the minimum flow regime required by the license in achieving the environmental objectives identified in item 1, and (c) any recommendations to the Commission, for approval, for changes to project facilities and/or operations, including changes to the minimum flow regime, and any changes to the monitoring schedule, including the need for additional monitoring after the third year of monitoring is completed; and (6) an implementation schedule. We estimate that our recommended plan would have an annual levelized cost of $16,000. We conclude that the benefits to aquatic resources in the Tallapoosa River would be worth the cost.

Aquatic Habitat Improvement

Fluctuations in lake levels associated with hydropower peaking operations can reduce the availability of littoral habitat, as well as lead to shoreline erosion and sedimentation. Alabama Power proposes to continue its current practice of holding Harris Lake water levels constant or slightly increasing for a 14-day period for spring spawning upon request from Alabama DCNR. Alabama Power also proposes to improve habitat in Harris Lake by adding structures to enhance fish habitat (e.g., brush piles and other woody debris [recycled Christmas trees, felled trees] and synthetic materials [spider blocks, concrete, and PVC structures]) to Harris Lake. Alabama DCNR [10(j) no. 3] recommends holding Harris Lake water levels constant or slightly increasing for a 14-day period to provide improved conditions for fish spawning and hatching success, with timing determined after consultation with Alabama DCNR. In addition, Alabama DCNR [10(j) no. 18] recommends fish habitat improvement by adding habitat enhancements and developing a plan, schedule, and monitoring program. Specifically, Alabama DCNR recommends: (1) identifying and establishing candidate areas with native aquatic plants; (2) continuing to selectively cut and monitor felled trees for shoreline cover; and (3) adding fish attraction devices such as brush piles and other woody debris (e.g., recycled Christmas trees, felled trees) and synthetic materials (e.g., spider blocks, concrete, and PVC structures) in Harris Lake to provide cover for fish and to enhance angling opportunities in Harris Project waters.

Alabama Power's proposal to annually hold Harris Lake water levels constant or slightly increasing for a 14-day period for spring spawning would reduce the potential stranding of centrarchid nests in the shallow, shoreline areas. Consulting with Alabama DCNR to determine an ideal 2-week period would improve the effectiveness of the stabilization period to provide spawning and rearing habitat for the lake's fish populations. We estimate that this measure would have a negligible annual cost. Therefore, we recommend Alabama Power's proposed measure with a requirement to consult with Alabama DCNR prior to initiating the 2-week reservoir stabilization period.

Alabama Power has been using recycled Christmas trees to enhance aquatic habitat in the lake since 1993, and more recently has used artificial structures. These habitat structures provide cover from predators, increased habitat complexity, and act as anchor points for fish eggs. Continuing these enhancement efforts, as proposed by Alabama Power, would continue to enhance the aquatic habitat in Harris Lake. Alabama DCNR's recommendation to develop a formal plan, schedule, and monitoring program for such lake enhancement actions would help guide implementation and effectiveness of these measures over the course of any new license issued for the project.

We estimate that the cost of Alabama Power's proposed enhancements with Alabama DCNR's recommendation to develop a formal shoreline habitat enhancement plan would have an annual levelized cost of $15,667. We conclude that the benefits to shoreline habitat, the aquatic community, and the lake's fishery would be worth the cost. Therefore, we recommend Alabama Power, in consultation with Alabama DCNR, develop a Harris Lake aquatic habitat enhancement plan that includes: (1) a narrative description and/or map showing existing enhancement locations, as well as the locations of any candidate areas with native aquatic plants; (2) provisions to (a) continue selectively cutting and monitoring felled trees for shoreline cover, and (b) adding fish attraction devices such as brush piles and other woody debris (e.g., recycled Christmas trees) and synthetic materials (e.g., spider blocks, concrete, and PVC structures) in Harris Lake to provide cover for fish and to enhance angling opportunities; (3) a provision to file, within 3 months of completing any enhancement activity, a summary report with the Commission that describes the area enhanced, the measures used, and any areas designated for future enhancement; and (4) a schedule for implementing the plan, including identifying the frequency of enhancement activities and monitoring lake enhancement actions.

Ramping Rates/Staging Turbines

Sudden rapid increases in discharge associated with peaking operations can wash away spawning habitat and disrupt fish behavior in the tailrace. Alabama DCNR recommends [10(j) no. 4] the following ramping restrictions for the project: (1) that the up-ramp time of each turbine at the project would be no less than 30 minutes from off-line to full gate; and (2) for down-ramp time, after the first operating unit is taken off-line, the second operating unit would not be taken off-line for at least 2 hours after the first operating unit was taken off-line. Operating in this manner could potentially benefit downstream aquatic resources by reducing the downstream fluctuations in water levels and increasing habitat stability.

Staff interprets Alabama DCNR's recommendation to more accurately refer to staging operation of the turbines, rather than ramping. Ramping refers to variable flow operation of the turbines, which is not feasible for the turbines installed at the Harris Project which can only operate off or on without damaging the turbines. Staging refers to the schedule for operating multiple turbines which aligns with Alabama DCNR's recommendation to require set time periods between starting and stopping operation of the two turbines installed at the Harris Project.

Alabama DCNR requests up-ramp time for each turbine no less than 30 minutes. The first turbine to operate would be incapable of ramping, or variable flow operation, thus this recommendation for the first turbine is infeasible and not recommended by staff. The second turbine would begin operation no less than 30 minutes after the first turbine reaches capacity. The Green Plan currently implements a measure, requiring an average of 30 minutes or more time between start of unit two, except for emergencies or flood conditions. Since this represents current operation, staff recommends continuing this mode of operation as described in the Green Plan.

In cases where both turbines are operating, Alabama DCNR recommends a 2-hour delay between the second and first unit being taken offline. Alabama DCNR provides no information for staff to evaluate the potential benefits of a 2-hour delay to downstream resources, and makes no provision for evaluating alternative delay times. Thus, staff cannot determine the potential benefits of this measure. As discussed by Alabama Power,[178] the measure would be inconsistent with the design of the project, and place restrictions on the project's ability to provide peak energy on demand. A 2-hour delay could result in release of flows and generation when energy is not needed, thereby wasting energy which could be used in on-peak periods. In rare cases a 2-hour delay could affect lake levels in Harris Lake, negatively affecting recreation on Harris Lake. Additionally, operation of two turbines is not a common occurrence at Harris, as 2-turbine operation occurs less than 9% of the time, and on average few times a year. Thus, any potential benefits to downstream resources would rarely be realized.

As discussed above, staff recommends, as part of the project operations and flow monitoring plan, an average of 30 minutes or more time between start of unit two, except for emergencies or flood conditions, as described in the Green Plan. Since this measure is currently implemented, there would be no additional cost, thus any potential benefits to downstream resources would be justified by the little to no cost. Staff does not recommend a 2-hour delay between operating the turbine units, as the potential benefits are not quantified, could result in losses of on-peak energy, and affect recreation in Harris Lake. Any potential benefits to downstream resources, which would rarely be realized, do not justify the losses to generation and recreation.

Fish Entrainment and Fish Passage

Alabama Power does not propose any specific mitigation or enhancement measures related to fish entrainment. EPA states that neither the existing nor the proposed turbines are "fish friendly," and that throughout the relicensing process, EPA has encouraged Alabama Power to analyze ways to mitigate entrainment and turbine mortality. EPA recommends considering the use of fish friendly turbines. Alabama DCNR recommends [10(j) no. 14], without elaboration, that Alabama Power pursue and provide methods to eliminate, minimize, or mitigate for entrainment losses. Alabama DCNR also recommends [10(j) 15] the Commission reserve authority to require fishways, as may be prescribed by the Department of Commerce or Interior under section 18 of the FPA. Additionally, Alabama Power should participate in discussions with FWS and the Corps regarding potential methods to provide or enhance fish passage on the Tallapoosa River.

EPA states that while the mortality rates estimated in Alabama Power's entrainment reports (Kleinschmidt, 2018a, 2022) may appear low, when these numbers are added to those resulting from the operation of many other facilities along the waterways, the effect is no longer minimal.

Based on Alabama Power's desktop entrainment study, fish entrainment through the two existing turbine units was estimated to be 294,427 annually; with the highest rate during the winter (262,847 fish) and lowest during the summer (3,714 fish). The proposed minimum flow unit could potentially entrain 37,353 fish annually. The majority of fish would be entrained during the winter months and would be dominated by species in the family Clupeidae

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[178] *See* Alabama Power letter filed May 2, 2023, responding to Alabama DCNR's letter filed March 20, 2023, providing recommendations to be considered under 10(j).

(shads and herring). Estimated losses due to turbine mortality associated with the existing turbines and the proposed minimum flow unit are shown in tables 3.3.2-17 and 3.3.2-18. Clupeids (gizzard shad and threadfin shad) comprise most of the estimated fish losses associated with entrainment at the Harris Project, while sport fish represented about 20% of the fish lost due to entrainment at the project.

Gizzard shad often account for the majority of entrained species at a hydropower project because individuals become lethargic when water temperatures are cold for prolonged periods and are no longer capable of swimming away from intakes. Gizzard shad are an important forage species for various other fish that could be affected if entrainment rates are too high. However, gizzard shad are highly fecund species; a single female gizzard shad can produce up to about 300,000 eggs (Fuller *et al*., 2021), and therefore, entrainment and turbine mortality of the order of magnitude that occurs at the project (in hundreds of thousands) often has minimal effects on the species at the local population level.

With regard to the effects of entrainment and turbine mortality of sport fish in Harris Lake, several bass fishing tournaments occur on the lake annually. The percentage of largemouth bass in Harris Lake that are greater than 20 inches (12%) exceeds the state average (7%) for Alabama impoundments. Growth rates for largemouth bass in their first 4 years of life are similar to growth rates for largemouth bass found in other impoundments throughout the state (Alabama DCNR, 2015). In 2015, black crappie 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 Harris Lake and exhibited much better growth and size distribution than crappie in the Tallapoosa River near Foster's Bridge.[179] Hartline et al. (2018) attributed this to more abundant habitat and forage availability in the lake. The size and abundance of these game species suggest that the effects of entrainment and mortality are likely minimal, and do not appear to be appreciably affecting populations of game species and associated forage species in the lake.

Fish entrainment and turbine mortality is a concern at most hydroelectric projects. Engineers are designing new, more 'fish-friendly' turbines that allow for 100% survival of entrained species, in certain cases. For example, Natel Energy has designed its FishSafe Restoration Hydro Turbines that can be used at projects with 130 feet of head or less. These turbines have thin, curved runner blades that reduce the likelihood and severity of a blade strike compared to conventional thin, straight blade turbine designs. Survival rate studies have shown 98 to 100% survival for eels, juvenile alewife, and channel catfish using Natel's design (Natel Energy, 2024). Other design features that can make a turbine more fish-friendly include maximizing the openings between runner blades (or using fewer runner blades), minimizing the gap between the runner blade tip and the turbine outer cylinder, using long runner blades, and designing turbines to rotate more slowly. Alabama Power's proposed design for its minimum flow unit would include 15 runner blades and a rotational speed of 360 revolutions per minute (table 3.3.2-15). Consideration of a more fish-friendly design option for the proposed minimum flow unit, as recommended by EPA, could reduce the mortality rate of the proposed unit. Therefore, as a component of the staff-recommended project minimum flow release plan

[179] Foster's Bridge is about 11 miles upstream of the Tallapoosa and Little Tallapoosa River confluence.

discussed above, we recommend Alabama Power include an evaluation of the proposed design aspects of the minimum flow unit, including but not limited to: (1) maximizing the openings between runner blades; (2) minimizing the gap between the runner blade tip and the turbine outer cylinder; (3) using long runner blades; and (4) slower turbine rotational speed, to minimize turbine mortality. We estimate that this evaluation would have a negligible annual levelized cost and the benefits to fisheries resources would be worth the cost.

Aquatic Invasive Species Management

Aquatic invasive species such as Asian clams can clog facility pipes and cause structural damage, weakening dams and related structures. With the abundance of boat docks and associated launching of small boats, landscaping and access by people who also frequent other areas, there is an increased risk of invasive species being introduced into Harris Lake and the Tallapoosa River. Alabama Power does not propose any measures to control aquatic invasive animals. Alabama DCNR recommends [10(a) No. 4] that Alabama Power develop an invasive species management plan in consultation with resource agencies. The goal of the plan would be to prevent introductions and establishment of invasive species, in addition to managing nuisance aquatic vegetation to best suit the many uses in Harris Lake and the project tailrace. Alabama DCNR recommends that the plan include criteria for evaluating and responding to invasive fish, mollusk, plant, and crayfish introductions.

The only aquatic invasive animal that has been documented in the project area is Asian clam. With the abundance of boat docks and associated launching of small boats, landscaping, and access by people who also frequent other areas, there is an increased risk of invasive species being introduced into Harris Lake and the Tallapoosa River. To control invasive species at the project, Alabama Power could develop an aquatic invasive species management plan that includes, at a minimum, provisions for: (1) public education regarding preventative actions; (2) consultation with agencies regarding appropriate signage; (3) development of BMPs for specific activities that have the potential to introduce aquatic invasive species into a project reservoir; and (4) documenting incidental observations of aquatic invasive species and reporting such observations to Alabama DCNR. Such a plan would provide some protection against the potential spread of Asian clams and the establishment of other aquatic invasive species in project waters. We estimate that such a plan would have an annual levelized cost of $5,333 and conclude that the benefits of the plan would justify the cost.

Wildlife Management Plan: Additional T&E Species Protection Measures

In accordance with Article 63 of the 1973 original license for the Harris Project, Alabama Power developed a Wildlife Mitigation Plan in consultation with Alabama DCNR and FWS, which the Commission approved on July 29, 1988. The 1988 Wildlife Mitigation Plan included provisions for Alabama Power to manage 5,900 acres of existing project lands and acquire an additional 779.5 acres of land near Harris Lake to mitigate for the impacts to wildlife and habitats caused by the development of the project. In addition, the 1988 Wildlife Mitigation Plan included provisions for Alabama Power to purchase over 15,000 acres of land adjacent to the Skyline WMA. In 1990, the Commission approved Alabama Power's Skyline Wildlife Management Plan to guide the development and maintenance of wildlife habitat, timber management, and recreational access on project land at Skyline WMA. Alabama Power leases project land at Skyline WMA to the Alabama DCNR, which implements many of the wildlife enhancement measures in the existing Skyline Wildlife Management Plan. Alabama

Power also conducts timber harvests on project land at Harris Lake and Skyline WMA to maintain or enhance the long-term sustainability of the forest, and provide a variety of ecological conditions suitable for local wildlife communities. The Skyline Wildlife Management Plan includes a provision to avoid adverse impacts to identified federally listed species and sensitive species of plants and animals or unique and sensitive ecosystems by managing timber harvests with those particular interests being the primary concern (Alabama Power, 1989). As a requirement of a new license, Alabama Power proposes to finalize its draft WMP, filed on November 23, 2021, in consultation with FWS and Alabama DCNR. Alabama Power proposes the new WMP as a comprehensive effort, consolidating numerous wildlife and land management activities into a single plan to protect and enhance the available wildlife habitat within the project boundaries at Harris Lake and Skyline WMA.

Alabama Power's draft WMP includes provisions to: (1) manage shoreline areas at Harris Lake to promote communities of native vegetation; (2) continue to implement Alabama's BMPs for forestry at Harris Lake and Skyline WMA; (3) survey for Price's potato bean at Skyline WMA and consult with FWS to develop timber management measures to protect federally listed species at Harris Lake and Skyline WMA; (4) manage permanent openings (e.g., food plots) through mowing, disking, or prescribed burns, to benefit both game and non-game species; (5) continue to maintain two pollinator plots at Little Fox Creek Recreation Area on Harris Lake; and (6) manage public hunting areas at Harris Lake and Skyline WMA. As part of the draft WMP, Alabama Power would also continue to conduct annual timber harvests on one or two units on project land at Skyline WMA, and periodic timber harvests at Harris Lake. Over the course of a new 40-year license, Alabama Power estimates that it would harvest a total of 5,140 acres at Harris Lake and 13,120 acres at Skyline WMA. Alabama Power would also continue to conduct a prescribed burn every 2 years on 160 acres of mostly natural pine forest (i.e., with a narrow strip of mixed pine-hardwood forest) at Harris Lake, on a peninsula northeast of Flat Rock Park. Many of these are existing activities that would continue to enhance wildlife habitat and protect species occurring on project lands. However, the draft WMP does not include measures to protect some federally listed, proposed, and candidate species that could be affected by Alabama Power's ongoing management activities at Harris Lake and Skyline WMA.

Red Cockaded Woodpecker

The endangered red-cockaded woodpecker, which historically occurred throughout Alabama, has been sighted recently in areas northwest of Harris Lake, and could be affected by project-related activities that result in the loss or disturbance of suitable open old growth pine savannah habitats. Alabama Power's proposed construction of new recreation amenities and continued timber management activities would involve the removal of trees and disturbances to existing forested habitat overlapping with the red-cockaded woodpecker's current range at Harris Lake. Alabama Power's WMP does not include specific red-cockaded woodpecker protection measures. In addition, the proposed removals of forested land parcels would remove federal protection from these areas.

As part of the finalization of the WMP, to avoid adverse effects to red-cockaded woodpeckers that may disperse into and use habitat within the project boundary during a new license term, Alabama Power could consult with FWS and Alabama DCNR to identify the timing and locations of additional red-cockaded woodpeckers surveys. Locations for additional red-cockaded woodpecker surveys could include: (1) land parcels proposed for removal from the project boundary; (2) the 160-acre natural pine and other timber management sites on the southwestern side of Harris Lake prior to prescribed burns and timber harvests; (3) mature/over mature pine stands at Harris Lake prior to harvesting; (4) the area proposed for the Hwy 48 Day Use Park prior to removing mature pines; and (5) any pine forests where future recreation sites or amenities are proposed at Harris Lake (i.e., prior to clearing/construction). The WMP could also include provisions for Alabama Power to document and submit the survey results to FWS and Alabama DCNR, and consult with these agencies regarding other potential measures to recommend to the Commission, for approval, to protect any identified red cockaded woodpeckers or suitable/occupied habitat, such as timing prescribed burns based on red-cockaded woodpecker use/activity in the area. These measures would have a beneficial effect of protecting the red-cockaded woodpecker and its habitat on project land at Harris Lake. Given that these measures would be consistent with the provision in Alabama Power's draft WMP for continuing to work with FWS and Alabama DCNR to develop forestry management plans that are protective of listed species that may be present within the project boundary, the costs of these measures would be part of Alabama Power's estimated annual levelized cost of $514,022 for finalizing the WMP. Therefore, we find that the benefits of the measures would justify the cost and recommend that the final, comprehensive WMP include the provisions noted above.

Gray Bat, Indiana Bat, Northern Long-Eared Bat, and Tricolored Bat

The endangered gray, Indiana, and northern long-eared bats, and the proposed endangered tricolored bat could be affected by activities that result in the loss or disturbance of their summer or winter habitats. The gray bat's range overlaps with Skyline WMA and both Harris Lake and Skyline WMA are within the current ranges of the Indiana bat, northern long-eared bat, and tricolored bat. Alabama Power's proposed construction of new recreation amenities at Harris Lake and continued timber management activities at Harris Lake and Skyline WMA would involve tree removal and disturbances to existing forested habitat that could affect bats occurring in these areas. Specifically, construction of the proposed Hwy 48 Day Use Park at Harris Lake would involve the permanent removal of about 3.7 acres of mixed pine-hardwood forest and temporary disturbance of another 2.4 acres of mixed pine-hardwood forest to build the proposed recreation amenities (e.g., parking areas, access roads, boat launch, picnic area). In addition, Alabama Power conducts annual timber harvests on one or two units on project land at Skyline WMA, and periodic timber harvests at Harris Lake. In the draft WMP, Alabama Power estimates that over the course of a new 40-year license, it would harvest a total of 5,140 acres at Harris Lake and 13,120 acres at Skyline WMA, which would be roughly equivalent to an average annual timber harvest of 128.5 acres at Harris Lake and 328 acres at Skyline WMA.[180] Alabama Power also conducts a prescribed burn every 2 years on 160 acres of mostly natural pine forest (i.e., with a narrow strip of mixed pine-hardwood forest) at Harris Lake, on a peninsula northeast of Flat Rock Park. Additionally, there are 236 caves on project land at Skyline WMA, which may be subject to human disturbances, such as spelunking (exploring caves), hunting, primitive camping, and other recreation activities.

[180] Actual annual acreage harvested would vary from year to year. In addition, the overall harvest estimates do not include future salvage operations because their size and frequency are unknown.

Cavers and other recreationists can inadvertently transmit fungus that causes white-nose syndrome from one cave to another on their clothing.

Alabama Power did not conduct formal bat surveys as part of relicensing studies, but the cultural resources study included a visual inspection and documentation of incidental bat observations in eight caves that were surveyed on project land at Skyline WMA in February of 2020. A total of 45 tricolored bats were incidentally observed in 3 of the caves including: 16 bats in Ginormous Sink Cave, 27 bats in Tate Cave, and 2 bats in Cane Cave. Additionally, one dead tricolored bat was observed in the water below a small waterfall within Ginormous Sink Cave and surveyors noted that it most likely washed out of a low passage during a flood surge (Alabama Power, 2021a). Although there are no known occurrences of Indiana or northern long-eared bats within the project boundary at Harris Lake or Skyline WMA, and no Indiana or northern long-eared bats were observed during Alabama Power's cultural resource surveys, Alabama Power assumes that these species are present.

To avoid affects to Indiana and northern long-eared bats on project land, Alabama Power proposes to finalize the WMP, including provisions to: (1) continue consulting the Alabama Natural Heritage Program (NHP) and FWS's Alabama Ecological Services Field Office regarding locations of any known maternity roost trees and hibernacula; (2) if northern long-eared bat or Indiana bat hibernacula or maternity roost trees are identified in areas within the project boundary, follow current FWS guidance regarding timber management near known hibernacula and maternity roost trees (e.g., based on the former 4(d) rule for northern long-eared bats, includes limiting the cutting, trimming, or destruction of trees on project land within 0.25 miles of known hibernacula during any time of the year, and prohibits removing trees within 150 feet of known maternity roosts from June 1 through July 31, except for hazardous or fallen trees for the protection of human life); (3) harvest only live, standing pine trees measuring 15 inches at diameter breast height (dbh) and greater on a 20 year cycle at Harris Lake; (4) not harvest/retain hardwood species outside the streamside management zones, and retain all trees within these zones; (5) retain trees with potential roost tree characteristics (e.g., exfoliating bark, cracks, crevices, or hollows); (6) retain shagbark hickory (*Carya ovata*) in most stands retain snags and live trees exhibiting damage, basal openings, or hollowing of the bole at Skyline WMA; (7) avoid inadvertently damaging potential roost trees during harvests, especially during the pup season for Indiana and northern long-eared bats (i.e., May 1 through July 15 in Alabama); (8) if a high-quality potential roost tree is inadvertently damaged during harvest and outside the approved clearing season (i.e., October 15 through March 31), consult with the FWS's Daphne Field Office; (9) if a specific timber harvest plan does not adhere to the published avoidance guidelines or harvest prescriptions change, consult with FWS, as may be required, prior to commencing harvesting activities; and (10) continue working with FWS to develop forestry management plans that are protective of listed species that may be present within the project boundary.

Below we address the bat species and make our recommendations.

Gray Bat

Alabama Power's draft WMP includes some proposed measures that would benefit gray bat. For example, consulting the Alabama NHP and FWS's Alabama Ecological Services Field Office prior to timber harvests regarding locations of any known maternity roost caves and hibernacula for gray bats would help Alabama Power to identify methods to avoid disturbing this species. Although it is not clear what density of vegetation is optimal or adequate for gray bat movement corridors, harvesting timber units on a 60-year cycle (minimum) and leaving a residual stand of 30 to 100 or more trees of various age classes per acre would preserve some tree cover for gray bats, providing protection during migration and while traveling among summer caves and foraging areas at Skyline WMA. The proposed clear cuts on mountain tops to create wildlife openings and harvests associated with salvage operations after wind, fire, or insect damage, or to facilitate natural regeneration of oak species would result in some gaps in the forest, but these openings are expected to be relatively small. Gray bats would likely be able to avoid small forest gaps unless they are created at entrances of gray bat caves or around preferred foraging areas. Alabama Power's proposal to create and maintain forested (i.e., not harvest within) streamside management zones would preserve potential gray bat foraging habitat and maintain forested corridors to provide cover for gray bats at Skyline WMA. Continuing to implement Alabama Forestry Commission's other forestry BMPs would minimize potential soil disturbances, erosion, and associated adverse effects to water quality and habitat for gray bat prey species by avoiding stream crossings for roads, skid trails, or firebreaks. In addition, prohibiting the cutting, trimming, or destruction of trees on project land within 0.25 miles of known northern long-eared bat hibernacula during any time of the year could also benefit gray bats if they use any of the same caves for summer or winter roosting.

The draft WMP does not contain measures to protect bats from human disturbances, such as spelunking (exploring caves), hunting, primitive camping, and other recreation activities near caves. Although gray bats appear to be less susceptible to white-nose syndrome, they are more vulnerable to human disturbances than other bat species because they occupy caves year-round, caves tend to be accessible to humans, and some caves are popular recreation destinations (NatureServe, 2024). There are two designated campsites on project land at Skyline WMA. One of the campsites is within about 1.5 miles of Ginormous Sink Cave, and the other campsite is within about 2 miles of Cane and Tate Caves. There do not appear to be formal trails to these caves, but there are WMA roads that pass near all three of the caves. There is no information in the record regarding the status of the 236 caves on project land at Skyline WMA, including documentation of any existing gates, fences, or signs to protect bats, potential recreation use(s), evidence of vandalism, or other signs of human disturbance. There is also little information regarding current bat use of these caves.

To further avoid or minimize the effects of timber management and recreation on gray bats at Skyline WMA, Alabama Power could consult with the FWS and Alabama DCNR regarding revising the draft WMP to include the following additional provisions: (1) identify FWS's current protocols for surveying gray bats on project land, including potential passive techniques (e.g., acoustic detectors, infrared video surveillance) that could be conducted at summer and winter caves without disturbing bats; (2) within 1 year after Commission approval of the final WMP and prior to conducting timber harvests at Skyline WMA, survey caves on project land that are accessible to recreationists, prioritizing caves near the two designated campsites, popular hunting areas, WMA roads and trails, and other WMA features that may facilitate access; (3) prior to conducting each annual timber harvest, survey caves on project land within the management unit for use by gray bats; and (4) if gray bats are observed during surveys described in item 2 or 3, or evidence of bat use is present, consult with the FWS and Alabama DCNR to identify appropriate protection, mitigation, or enhancement (PM&E) measures to recommend to the Commission, for approval, to avoid adverse effects to the bats. Potential PM&E measures that should be considered at any caves occupied by gray bats that may be identified during the surveys include: (1) installing gates, fences, and/or signs at cave entrances to deter recreation or unauthorized activities at occupied caves, (2) limiting timber harvest activities to occur outside the gray bat pup season and active season near occupied summer caves; (3) maintaining a forested buffer at entrances, sinkholes, and other karst features connected to caves occupied by gray bats, similar to streamside management zones, where no timber is harvested, and heavy equipment does not enter/traverse to prevent inadvertently causing a collapse of caves, changing abiotic factors (e.g., air flow patterns, sun exposure, humidity, groundwater flow), and/or increasing public access to caves; and (4) maintaining forested corridors from caves occupied by gray bats to streamside management zones and other riparian areas that provide foraging habitat (FWS, 2024b; 1982). Conducting gray bat surveys using FWS's protocols would identify any caves that may require protection from disturbances associated with project-related recreation and timber harvesting activities. Implementing measures at caves occupied by gray bats and their foraging areas would have a beneficial effect of protecting the gray bat and its habitat on project land at Skyline WMA. These measures would be consistent with the provision in Alabama Power's draft WMP for continuing to work with FWS and Alabama DCNR to develop forestry management plans that are protective of listed species that may be present within the project boundary. The cost of these measures would be part of Alabama Power's estimated annual levelized cost of $514,022 for finalizing the WMP. We find that the benefits of the measures would justify the cost and recommend that the final, comprehensive WMP include the aforementioned additional measures.

Indiana, Northern Long-Eared, and Tricolored Bats

Alabama Power's draft WMP includes some PM&E measures specifically designed for the Indiana and northern long-eared bats that would also likely benefit the tricolored bat at Harris Lake and Skyline WMA. For example, consulting the Alabama NHP and FWS's Alabama Ecological Services Field Office prior to timber harvests regarding locations of any known maternity roost trees and hibernacula for Indiana and northern long-eared bats and following current FWS guidance regarding timber management near known hibernacula and maternity roost trees would help Alabama Power to avoid adverse effects to these species during these activities. Retaining snags and live trees with potential roost tree characteristics such as shagbark hickories and other trees with exfoliating bark, cracks, crevices, or hollows, and avoiding damage to potential roost trees during harvests, especially high-quality snags during the pup season for Indiana and northern long-eared bats would preserve potential summer roosting habitat for these species. Alabama Power noted that the pup season for Indiana and northern long-eared bats is May 1 through July 15 in Alabama. However, based on FWS's current *Range-Wide Indiana Bat & Northern Long-Eared Bat Survey Guidance*, this is the pup season for the year-round active range (Zones 1 and 2) (table 4, Appendix D)(FWS, 2024; 2024ii). Skyline WMA and Harris Lake are currently within the hibernating range for Indiana, northern long-eared, and tricolored bats and the pup season in those areas is listed as May 15 through July 31 (table 4, Appendix D)(FWS, 2024; 2024ii).

Additionally, continuing to implement Alabama Forestry Commission's forestry BMPs would minimize potential soil disturbances, erosion, and associated adverse effects to water quality and habitat for these bats and their prey species by avoiding stream crossings for roads, skid trails, or firebreaks. Creating and maintaining forested (i.e., not harvesting within) streamside management zones would preserve potential foraging habitat and maintain forested corridors to provide cover for bats at Harris Lake and Skyline WMA. The draft WMP does not specify the width of the streamside management zones, but the Alabama Forestry Commission's BMPs of Forestry states that the minimum width on each side of a perennial or intermittent stream is 35 feet from a definable bank (Alabama Forestry Commission, 1992). However, when wildlife protection is a primary objective, a minimum of 50 feet is recommended for streamside management zones. Wider streamside management zones and more stringent control of forestry operations within the streamside management zone may be appropriate depending on land management objectives, stream sensitivity, erodibility of soil, steepness of slopes, and activities planned outside the streamside management zone. Streamside management zones must always be wide enough to maintain water quality standards (Alabama Forestry Commission, 1992).

The draft WMP also includes some proposed timber management practices for project land at Skyline WMA that could adversely affect Indiana, northern long-eared, and tricolored bats. Harvesting timber units on a 60-year cycle (minimum), leaving a residual stand of 30 to 100 or more trees of various age classes per acre, and retaining all trees within the streamside management zones would preserve some potential summer roost trees and provide traveling and foraging areas. However, annual harvests of maples, tulip trees, and other "less desirable" tree species, well as over mature oaks, could result in the harvest of potential summer roost trees, including maternity roosts. Indiana bat maternity roosts have been observed on a variety of hardwood trees including maple, ash, elm, cottonwood and other poplars, black locust, red and white oak trees, as well as coniferous trees (e.g., white, shortleaf, and pitch pines) (FWS, 2007). Northern long-eared bats are also flexible in selecting roosts, choosing a variety of tree species that retain bark or provide cavities or crevices (FWS, 2022e). Tricolored bats are similarly opportunistic, roosting in live and dead leaf clusters of live or recently dead deciduous hardwood trees, Eastern red cedar, pines, and Spanish moss hanging from trees (FWS, 2021f). Without pre-harvest surveys, undocumented maternity roosts, other summer roost trees, and hibernacula for these species might be affected during timber harvests. It is also not clear that residual stands of 30 to 100 trees would provide adequate densities of vegetation for Indiana, northern long-eared, and tricolored bat roosting (e.g., buffers around maternity roosts), foraging, movement corridors, and/or spring staging/fall swarming areas near hibernacula. In addition, the proposed (a) clear cuts on mountain tops for wildlife openings, (b) salvage operation harvests after wind, fire, or insect damage, and (c) harvests to facilitate natural regeneration of oak species would result in some gaps in the forest, potential removal of summer roosting habitat, and potential exposure of hibernacula entrances.

Similarly, there are certain elements of Alabama Power's draft WMP proposal for timber management units at Harris Lake that could adversely affect Indiana, northern long-eared, and tricolored bats. Not harvesting any hardwood species and retaining all trees within the streamside management zones would preserve some potential roosting, foraging, and traveling habitat for these bats. However, harvesting an annual average of 128.5 acres of only live, standing pine trees measuring 15 inches at dbh and greater on a 20-year cycle could result in the harvest of some summer roost trees, including maternity roosts. Depending on the time of year, Alabama Power's prescribed burns within 160 acres of mostly natural pine forest on a peninsula northeast of Flat Rock Park on Harris Lake could also affect tree-roosting bats (see figures 34 and 35). Northern long-eared bats and Indiana bats have been observed roosting on pine tree trunks and tricolored bats may roost among pine needles (South Carolina DNR, 2019; FWS, 2007; FWS, 2021f).

Alabama Power did not propose measures to protect special status bat species during tree removal and disturbance associated with the construction of the proposed Highway 48 Day Use Park or the removal of undeveloped forested land from the project boundary at Harris Lake. There are no bat survey data on the record for these areas and therefore the occurrence of bats in these areas is unknown. The permanent removal of about 3.7 acres of mixed pine-hardwood forest and temporary disturbance of another 2.4 acres of mixed pine-hardwood forest to build the proposed recreation amenities (e.g., parking areas, access roads, boat launch, picnic area) could remove and/or disturb summer roosting habitat Indiana, northern long-eared, and tricolored bats. In addition, removal of undeveloped forested land from the project boundary would remove these areas from federal protection and potentially expose Indiana, northern long-eared, and tricolored bats to unmitigated effects.

Limiting timber harvests and other planned tree removal activities to the inactive/hibernating period (i.e., November 16 through March 14 in the hibernating range) would allow Alabama Power to avoid direct impacts to any summer roosting habitat while it is occupied by Indiana, northern long-eared, and tricolored bats. This timber management strategy may be effective on project land at Harris Lake, which does not have karst topography. However, given the large number of caves (i.e., 236) on project land at Skyline WMA and the lack of information about bat use within them, there is potential for timber harvests during the winter to adversely affect hibernating Indiana, northern long-eared, and tricolored bats.

As mentioned above, the draft WMP does not contain measures to protect hibernating bats from human disturbances and the inadvertent spread of the fungus that causes white-nose syndrome through recreation activities such as spelunking, hunting, primitive camping, and other recreation activities in or near caves located on project land. Indiana, northern long-eared, and tricolored bats are susceptible to white-nose syndrome as well as being vulnerable to human disturbances during hibernation, both of which can interrupt torpor and cause a depletion of fat reserves that are needed to survive the winter (FWS, 2007; 2022c; 2024jj; and 2021f). Cavers and other recreationists can inadvertently transmit the fungus that causes white-nose syndrome from one cave to another on their clothing. The 45 tricolored bats observed in three caves surveyed during Alabama Power's cultural resource study did not show signs of white-nose syndrome. However, given the presence of the fungus that causes white-nose syndrome in Jackson County since 2012 (FWS, 2019c), some of the caves on project land at Skyline WMA could be infected. One of the two designated campsites on project land at Skyline WMA is within about 1.5 miles of Ginormous Sink Cave, and the other campsite is within about 2 miles of Cane and Tate Caves. Although there do not appear to be formal trails to these caves, they could be generally accessible to people given that there are WMA roads that pass near all three of them. There is no information in the record regarding the locations or status of the 236 caves on project land at Skyline WMA, potential recreation use(s), evidence of vandalism, or other signs of human disturbance, or documentation of any existing gates, fences, or signs installed to protect bats. There is also little information regarding current use of these caves by bats.

Alabama Power's proposal to finalize the WMP, with a provision to develop additional forestry management plans that are protective of special status bat species in consultation with the FWS, based on current bat avoidance guidance would not be feasible at this time. Presence of tricolored bat has been confirmed at three caves on project land at Skyline WMA. However, the remaining winter and summer habitats at the project have not been surveyed to identify any existing hibernacula, or summer roosts, including maternity roosts for Indiana, northern long-eared, and tricolored bats. Without current bat survey data, FWS and other resource agencies such as Alabama DCNR could not advise Alabama Power regarding bat protection measures to incorporate into the forestry management plans. As a result, take of these species could occur.

To avoid or minimize the effects of forest management, recreation site development, and recreation activities on, and avoid incidental take of, Indiana, northern long-eared and tricolored bats, Alabama Power could use FWS's current range-wide survey guidance for these species (FWS, 2024ii) to develop a survey strategy, in consultation with the FWS and Alabama DCNR, to identify hibernacula and roost trees, including maternity roosts, within the project boundaries at Skyline WMA and Harris Lake. The Indiana, northern long-eared, and tricolored bat survey strategy could include provisions for: (1) prioritizing presence/absence surveys for all three species among the 236 caves on project land at Skyline WMA, and evaluating whether they are subject to adverse effects associated with timber harvests, recreation, or other human disturbances[181]; (2) conducting pre-harvest surveys within and immediately adjacent to timber management units to identify hibernacula and summer roosts, including maternity roosts; and (3) conducting surveys prior to removing undeveloped forested land from the project boundary at Harris Lake to determine whether any existing roost trees for Indiana, northern long-eared, and tricolored bats would be affected by the loss of federal protection. FWS could provide guidance regarding preferred site-specific survey methods[182] and the timeframe for which the bat surveys would remain valid.[183]

Alabama Power could also consult with Alabama DCNR and FWS regarding the initial winter and summer habitat survey results, and file, for approval, Alabama Power's proposed final forestry management plans, with any agency recommendations to ensure the protection of any identified hibernacula, and roost trees, including maternity roosts within the project boundaries at Skyline WMA and Harris Lake, and incorporate the revised forestry management plans and bat protection measures into the final WMP. Potential PM&E measures that should be considered at any hibernacula or summer roost trees occupied by Indiana, northern long-eared, and/or tricolored bats that may be identified during the surveys include: (1) installing FWS-approved gates, fences, and/or signs at cave entrances to deter recreation or unauthorized activities at occupied caves (e.g., at Ginormous Sink Cave, Cane Cave, and Tate Caves where tricolored bats were observed), (2) limiting timber harvest activities to occur outside the active

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[181] The caves nearest to the two designated campsites on project land at Skyline WMA, popular hunting areas, WMA roads and trails, and other WMA features could be surveyed first considering that they could be the most easily accessible and/or are likely known by recreationists.

[182] For example, FWS may recommend potential passive bat detection techniques (e.g., acoustic detectors, infrared video surveillance) to minimize any disturbance to bats during the surveys.

[183] Based on FWS's current survey guidance for Indiana, northern long-eared, and tricolored bats, Alabama Power's surveys would be valid for 5 years from their completion. This timeframe may be reduced if significant habitat changes have occurred in the area, or increased based on new local information (e.g., other nearby surveys) (FWS, 2024ii).

season; (3) prohibiting timber harvests during the inactive season near known cave hibernacula; (4) maintain a forested buffer around documented roost trees, including maternity roosts; (5) maintaining a forested buffer at cave entrances, sinkholes, and other karst features connected to caves occupied by these bats, similar to streamside management zones, where no timber is harvested, and heavy equipment does not enter/traverse to prevent inadvertently causing a collapse of caves, changing abiotic factors (e.g., air flow patterns, sun exposure, humidity, groundwater flow), and/or increasing public access to caves; (6) maintaining forested corridors from caves occupied by these bats to known roost trees, streamside management zones and other riparian areas that provide foraging habitat; and (7) consulting with FWS and Alabama DCNR regarding the appropriate width of all forested buffers (e.g., occupied hibernacula, occupied roost trees, and streamside management zones). Conducting Indiana, northern long-eared, and tricolored bat surveys using FWS's current survey guidelines would help Alabama Power to identify any caves and summer roost trees that may require protection from disturbances associated with timber harvesting activities and project-related recreation. Implementing protection measures at caves and summer roosts occupied by Indiana, northern long-eared, and tricolored bats would avoid adverse effects to these species. These measures would be consistent with the provision in Alabama Power's draft WMP for continuing to work with FWS and Alabama DCNR to develop forestry management plans that are protective of listed species that may be present within the project boundary. The cost of these additional measures would be part of Alabama Power's estimated annual levelized cost of $514,022 for finalizing the WMP. We conclude that the benefits noted above would justify the cost and recommend that the final, comprehensive WMP include the provisions noted above.

Alligator Snapping Turtle

The alligator snapping turtle range overlaps with project land at Harris Lake. This species could be affected by project operations that affect their prey species, activities that affect their nests, and some recreation activities (e.g., boating, fishing, hunting). Construction of the proposed Highway 48 Day Use Park and tailrace fishing pier and canoe/kayak put-in could disturb potential shoreline habitat for this species.

Alabama Power's proposal to continue implementing the current reservoir operating curve would maintain the existing hydroperiod and shoreline conditions at the project including the availability of littoral, and lake bottom habitat for alligator snapping turtles at Harris Lake. Continuing existing reservoir operations would also not be expected to affect the alligator snapping turtle's prey base. Alabama Power's proposal and Commission staff's recommended increase minimum flows downstream from Harris Dam would benefit alligator snapping turtles by increasing riverine/littoral habitat and improving conditions for prey species. Given the secretive nature of the species, it is unlikely that alligator snapping turtles would select high-traffic sites near docks, boat ramps, or within commercial and residential areas in the project area for nesting or foraging when more favorable, undisturbed sites are available within the project boundary at Harris Lake. Additionally, Alabama Power's proposed SMP contains provisions that would help to preserve and potentially improve some areas of shoreline, and/or minimize potential effects of shoreline activities in terms of nesting habitat suitability for alligator snapping turtles.

The proposed 4(d) rule for the alligator snapping turtle contains some exceptions for incidental take prohibitions, including the following actions: (1) construction, operation, and maintenance activities near and in a stream, operation and maintenance of existing flood control features, and directional boring, when implemented with industry and/or state-approved BMPs; (2) pesticide application that follows appropriate application rates; (3) silviculture and forestry management activities following state-approved BMPs; and (4) maintenance dredging activities that remain in the previously disturbed portion of a maintained channel. Although the proposed 4(d) rule does not provide further information to determine if an action qualifies for an exception to the take prohibition, staff assumes that the following Alabama Power proposed measures would meet the rule's BMPs requirements: (1) as described above, BMPs in the SMP to minimize the effects of shoreline uses; (2) only staff biologists certified as commercial applicators by the State of Alabama, Department of Agriculture and Industries would continue to apply EPA-approved aquatic herbicides, algaecides, and larvicides within small areas at the project in conjunction with the proposed Nuisance Aquatic Vegetation and Vector Control Management Program (Alabama Power, 2021e); (3) ongoing implementation of the Alabama Forestry Commission's BMPs during timber management activities; and (4) ongoing conformity with U.S. Corps of Engineers (Corps) general permits for dredging at Harris Lake, as described in Alabama Power's Dredge Permit Program (Appendix A of the proposed SMP).

To further facilitate avoidance of potential project-related adverse effects to this species, the final WMP could include a provision for Alabama Power to report any alligator snapping turtle sightings at the Harris Project to FWS and Alabama DCNR. The final WMP could also include a provision to consult with FWS and Alabama DCNR if alligator snapping turtles are observed, develop protection measures, based on current FWS guidance and/or the final listing decision and 4(d) rule (e.g., any prohibitions on/or exceptions to incidental take prohibitions), and file them, for Commission approval. These measures would be consistent with the provisions in Alabama Power's draft WMP for continuing to work with FWS and Alabama DCNR to manage shoreline areas for native vegetative communities and enhanced value as wildlife habitat and develop forestry management plans that protect listed species that may be present within the project boundary. Therefore, the cost of these measures would be included in Alabama Power's annual levelized cost of $514,022 for finalizing the WMP. We find that the benefits of the additional measures would justify the cost and recommend that the final, comprehensive WMP also include the aforementioned additional measures.

Monarch Butterfly

Monarch butterflies could occur throughout the entirety of the project boundaries at Harris Lake and Skyline WMA and could be affected by vegetation management activities that affect milkweeds and other native plants that provide forage for this species, as well as by the use of insecticides. Monarch surveys have not been conducted at the Harris Project. However, Alabama Power staff observed adult monarch butterflies at the pollinator plots. No monarch eggs, larvae, or pupa were observed at the pollinator plots. Additionally, Alabama Power staff observed adult monarch butterflies at the nearby Flat Rock Park (Alabama Power, 2022b).

As part of the WMP, Alabama Power proposes to continue to maintain the pollinator plots at Little Fox Creek to benefit the monarch and other pollinators. The pollinator plots are approximately 2 acres in size and are part of a larger program called "The Preserves," which are a collection of recreation sites at Alabama Power's reservoirs in Alabama that were developed to foster appreciation for nature and provide educational opportunities to learn about native plants and animals (Alabama Power, 2021h; 2024). Alabama Power planted these plots with a native seed blend that was selected for compatibility with the soil and habitat type and to attract pollinators such as bees, butterflies, moths, and beetles. These types of herbaceous species are recommended to support monarchs during their active life stages (Xerces Society, 2022).

Although not specified in the draft WMP, prior to planting the current seed mix in the pollinator plots, and over the course of a year, Alabama Power performed three rounds of herbicidal foliar applications to minimize nutrient competition for the native seed mix (Alabama Power, 2022b). Once established, Alabama Power anticipates that the native seed mix would maintain itself for up to five years with no management. If the native seed mix becomes overwhelmed by undesirable vegetation species, and after each five-year period, Alabama Power proposes to continue to replicate the initial methods (i.e., applying three rounds of herbicide treatment over the course of a year and then replanting the current seed mix) (Alabama Power, 2022b).

Adjacent to the pollinator plots, Alabama Power manages three permanent openings as brushy (early successional) areas by mechanical means (i.e., annual mowing)(Alabama Power, 2021d). Alabama Power also uses integrated vegetation management (i.e., a combination of mechanical, chemical, and biological treatments) within the adjacent transmission line right-of-way (Alabama Power, 2022b). Additionally, every two years, both during the dormant and growing season, Alabama Power conducts prescribed burns of 160 acres, including the entire peninsula with the pollinator plots, the three managed openings, and a (non-project) transmission line right-of-way (see figure 35)(Alabama Power, 2021d).

Continuing to maintain the pollinator plots at Little Fox Creek would benefit monarchs and other native pollinators at Harris Lake; however, Alabama Power's additional vegetation management techniques adjacent to, and/or overlapping with, the pollinator plots could benefit and/or adversely affect these species. The draft WMP does not specify what if any coordination occurs to ensure the compatibility of the regular vegetation management techniques with the goals of the "The Preserves" and specifically the 5-year management cycle for the pollinator plots at Harris Lake. It is not clear from the draft WMP whether the pollinator plots are excluded from prescribed burns that are conducted during the growing season when monarchs are likely to be present. Given that there are multiple vegetation management techniques occurring immediately adjacent to and potentially overlapping with the pollinator plots, the final WMP could include additional descriptions, maps, figures, and schedules to ensure that prescribed burns, use of herbicides, and other vegetation management methods are coordinated to minimize potential adverse effects on the monarch butterfly.

Similarly, Alabama Power's ongoing maintenance of the Harris Project's primary transmission line right-of-way could provide benefits to and/or adversely affect monarchs. Continued use of mechanical, chemical, and biological treatments would maintain low-growing vegetation and may promote the growth of some milkweed species and other nectar-rich species known to benefit monarchs. Depending on the timing and types of treatments, use of herbicides and mechanical vegetation control methods could adversely affect foraging monarch caterpillars or butterflies and monarchs in the process of metamorphosis. To minimize potential adverse effects on monarch butterflies using habitat in the project transmission line corridor, the final WMP could include provisions to: (1) preserve any milkweed and other low-growing, nectar rich plants for monarchs; (2) target only non-native plants and woody vegetation that exceeds right-of-way height limits via mechanical methods; and (3) use herbicides only sparingly, if necessary, when mechanical methods are ineffective. These measures would benefit the monarch butterfly and its habitats at Harris Lake. They would also be consistent with the provisions in Alabama Power's draft WMP for continuing to work with FWS and Alabama DCNR to manage shoreline areas for native vegetative communities and enhanced value as wildlife habitat. Therefore, the cost of these measures would be part of Alabama Power's annual levelized cost of $514,022 for finalizing the WMP. We find that the benefits of the additional measures would justify this cost and recommend that the final, comprehensive WMP include the provisions noted above.

Monarchs could also be affected by ongoing herbicide and certain insecticide treatments that Alabama Power proposes part of its proposed Nuisance Aquatic Vegetation and Vector Control Management Program. Although applications of these pesticides have been targeted and limited in frequency and area during the current license term, and three of the four proposed larvicides are bacterial insecticide are safe for pollinators (Chandler, 2018), methoprene is a hormone that can prevent normal growth and development of insects, including some pollinators (Wick et al., 2012). To protect the native wildflowers as well as the monarch butterfly and other native pollinators, WMP could include a provision to ensure that herbicides and larvicides used to control nuisance aquatic vegetation and mosquitos are not applied near the pollinator plots or other known locations of milkweeds. This measure would be consistent with the provisions in Alabama Power's draft WMP for continuing to work with FWS and Alabama DCNR to manage shoreline areas for native vegetative communities and enhanced value as wildlife habitat. Therefore, the cost of these measures are already included in Alabama Power's annual levelized cost of $514,022 for finalizing the WMP. We find that the benefits of the measures would justify the annual levelized cost and recommend that the final, comprehensive WMP also include the aforementioned additional measures.

Listed Plants/Fern: Georgia Rockcress, White Fringeless Orchid, Price's Potato Bean, Morefield's Leather-Flower, and American Hart's-Tongue Fern

The range of Georgia rockcress overlaps with project land at Harris Lake, the ranges of Price's potato-bean, Morefield's leather flower, and American hart's-tongue fern overlap with project land at Skyline WMA, and the range of white fringeless orchid overlaps with both Harris Lake and Skyline WMA. Generally, these species could be affected by timber harvesting, road construction, and recreation activities that disturb the soil, eliminate tree canopy, and/or facilitate the spread of non-native, invasive plants. Although Alabama Power conducted surveys for white fringeless orchid at both Harris Lake and Skyline WMA and Price's potato bean at Skyline WMA, these species are difficult to detect so they could have been missed during Alabama Power's surveys, and there is additional suitable habitat that could be affected by timber harvesting. In addition, there is no survey data available for Georgia rockcress, Morefield's leather-flower, and American hart's-tongue fern because these species did not appear on the initial IPaC species list for the project and so they were not evaluated during relicensing studies. As part of the finalization of its WMP, Alabama Power could conduct additional species-specific surveys for these plants (i.e., within their respective ranges) prior to conducting soil disturbing activities, such as timber harvesting, construction of the proposed Highway 48 Day Use Park, and construction of the proposed tailrace fishing pier and canoe/kayak put-in. If these species are observed at the project, Alabama Power could then consult with FWS to identify measures to avoid adverse effects to these species during timber management, recreation site construction (including access roads), and other soil disturbing activities at Skyline WMA and/or at Harris Lake (e.g., shorelines and along the Tallapoosa

River in the tailrace area downstream from Harris Dam), as applicable, and obtain Commission approval to implement the measures, as necessary. These measures would be consistent with the provision in Alabama Power's draft WMP for continuing to work with FWS and Alabama DCNR to develop forestry management plans that are protective of listed species that may be present within the project boundary. Therefore, the cost of these measures is already included in Alabama Power's annual levelized cost of $514,022 for finalizing the WMP. We find that the benefits of the measures would justify the cost and recommend that the final, comprehensive WMP include the provisions noted above.

In summary, Alabama Power's proposed WMP and staff's recommended alternative (i.e., Alabama Power's proposed WMP with staff's recommended modifications) would have the same annual levelized cost of $514,022. We find that the benefits of staff's recommended alternative would be greater than that of Alabama Power's proposed WMP and that the benefits would justify the cost. Therefore, we recommend staff's alternative.

Shoreline Compliance

Alabama Power's proposal to reclassify 57 acres of project land (Blake's Ferry Pluton) adjacent to Flat Rock Park from "Recreational" to "Natural/Undeveloped" would provide the rare plant community at this location protection from development. However, as indicated in the consultation record, stakeholders notified Alabama Power in March 2020 of trespassing vehicles (ATVs) over the rare plant communities in this area. During the pre-filing phase of the relicensing process, Alabama Power installed signs and a barrier (i.e., a gate) to prevent ATV traffic (figure 3.3.3-36). Given the new proposed change in shoreline classification, the relatively recent restrictions on recreation use, and the potential need for repairs or replacement of the signs and barrier gate over the course of a new license term, the SMP could include additional measures to ensure greater long-term protection of the rare plant community. Specifically, the SMP could include provisions to: (1) periodically monitor this 57-acre area for evidence of unauthorized uses (e.g., tire track marks on vegetation and rock outcrops); (2) maintain the new signs and barrier; and (3) consult with Alabama DCNR to identify additional measures, if needed, to recommend to the Commission, for approval, to avoid effects to rare plants associated with project-related recreation activities. Alabama Power's proposed SMP includes general provisions for monitoring the shoreline and maintaining signs and other facilities to ensure compliance with land uses associated with shoreline classifications, and so, there would be no additional cost to implementing the aforementioned measures. Therefore, we recommend them.

Public Education and Outreach Plan

Alabama DCNR recommends that Alabama Power develop and implement a public education and outreach plan to ensure that shoreline management plans, invasive species management plans, habitat restoration plans, and recreational opportunities are adequately distributed to stakeholders on a regular basis.

Developing such a plan would help to protect natural resources at Harris Lake by making the public aware of rules and opportunities for shoreline protection. The plan could include provisions to: a) the project's recreation opportunities and upgrades, (b) water levels in Harris Lake and the Tallapoosa River downstream from Harris Dam, (c) the new Harris Lake shoreline classifications, changes to land parcels in the project boundary, and the allowable activities in each area, (d) BMPs to protect natural resources from construction and maintenance activities (e.g., boat dock construction, shoreline stabilization, and vegetation management), (e) the procedures for permits to lease or occupy project lands and waters for purposes permitted by any license issued for the project, (f) license requirements for the enhancement of aquatic habitat, and management of invasive species, historic properties, and recreation at the project, as applicable; (2) file a schedule for distribution of the project information described in item 1 to stakeholders; and (3) review and update the plan every 6 years. We estimate that such a plan would have an annual levelized cost of $167, and conclude that the benefits would justify the cost. Therefore, we recommend that Alabama Power develop a public education and outreach plan that includes its existing educational brochures and public website, updated as needed, and its proposed regular educational opportunities, including a workshop to review and update the SMP every 10 years, and annual public education workshops to share information about events and resource issues.

Historic Properties Management Plan

The continued operation and maintenance of the Harris project could directly and indirectly affect a number of archaeological resources. On November 23, 2021, Alabama Power filed an updated HPMP. The updated HPMP contains the following measures: (a) the evaluation of actions that may affect historic properties; (b) public involvement and interpretation; (c) the treatment of human remains and unanticipated discoveries of cultural materials; (d) a plan for periodic reporting to agencies and Tribes regarding HPMP actions; (e) a plan for review and revision of HPMP every six years; (f) dispute resolution; (g) activities that would be exempt from section 106 consultation; and (h) a requirement to evaluate the Harris Project hydroelectric facilities for inclusion in the National Register when they reach the 50-year threshold for potential eligibility in 2033.

As discussed in section 3.3.7.2, the following additional measures would provide additional cultural resource protection: (a) updated determinations of National Register eligibility for 224 archaeological sites at Harris Lake and 9 sites located on lands that Alabama Power proposes to remove from the project boundary; (b) inclusion in the HPMP of an updated site table that includes the site-specific reasons why each of the 119 resources that has been removed from consideration and specific reference to any agreement with the SHPO in this regard; (c) discussions of known impacts to a number of sites that are eligible for listing on the National Register, including but not limited to erosion and inundation (including effects of flow release alternatives), ATV use, vandalism, development, roads, removal of sites from federal oversight, and other impacts; (d) discussion of consultations with the Alabama SHPO and Muscogee (Creek) Nation that have occurred subsequent to November 2021; (e) a schedule for monitoring and reporting; (e) clarification of the circumstances under which public interpretation and education would occur; and (f) a schedule for the completion of all required actions.

Staff recommends that the November 23, 2021 HPMP be revised to address current determinations of eligibility for existing sites and those sites proposed to be removed from the project boundary; sites within the APE that remain unevaluated; current, ongoing, project-related effects to National Register-eligible and unevaluated sites, including impacts of flow release alternatives; all consultation efforts with SHPO and applicable Tribes; specific plans for cultural resources monitoring; details regarding public interpretation and education; and a schedule for completion of all HPMP actions.

Measures Not Recommended by Staff

Staff finds that some of the measures proposed by Alabama Power or recommended by other interested parties would not contribute to the best comprehensive use of the Harris Project water resources, do not exhibit sufficient nexus to project environmental effects, or would not result in benefits to non-power resources that would be worth their cost. The following discusses the basis for staff's conclusion not to recommend such measures.

Downstream Habitat Enhancement

Alabama DCNR recommends [10(j) no. 3] a 14-day water level spawning stabilization period be implemented each year in the tailrace, with the specific timing to be determined in consultation with resource agencies. Alabama DCNR also recommends that Alabama Power consult with resource agencies and the Commission to determine expected flow and hydrologic conditions and to schedule flow adjustment periods for upcoming spawning seasons. Following establishment of an adjusted flow period, Alabama Power would inform resource agencies of its daily generation/flow release schedule for the flow adjustment period at least 1 week prior to the start of the flow adjustment period. If unexpected conditions occur during any flow adjustment period, Alabama Power would inform resource agencies of any necessary changes in its daily generation/flow release schedule for the remainder of the flow adjustment period. Finally, Alabama DCNR recommends [10(j) no. 18] that Alabama Power evaluate tailrace fish habitat enhancement measures.

As noted in section 3.3.2, *Aquatic Resources*, the most abundant fish species downstream of Harris Dam are spring spawners (shiners, catfish, and centrarchids), which are common species in the Tallapoosa River. The benefit to these species of relatively stable flows in the Tallapoosa River downstream of Harris Dam could be the provision of stable habitat availability (particularly in terms of depth and velocity availability) during the important spawning period.

In addition to the benefits, the recommended measure would have costs. Staff found that maintaining stable downstream flows for a 14-day period during the spring would be difficult and require substantial effort to meet, due to naturally high inflows during the spring and reservoir management obligations during that time. In addition, Alabama Power would be unable to operate the project in a peaking mode during that time, which would lead to a reduction in power generation during high demand (i.e., peak) periods of the day. Finally, if Alabama Power were to operate the project as recommended by Alabama DCNR, lake levels would be held relatively constant, which could potentially result in excessive flow being spilled, which could result in unstable downstream flows. The uncertain benefits, as described above, would not be worth the cost to Alabama Power.

In consideration of the benefits and costs of the recommended measure, we find that the benefits would not justify the costs, and therefore, do not adopt Alabama DCNR's recommendation to maintain stable flows in the river for a 14-day period.

Regarding tailrace fish habitat enhancement options, Alabama DCNR's recommendation is for a process to identify fish habitat enhancement measures; therefore, there are no specific measures for us to analyze and consider under the FPA. An additional process to identify potential mitigation measures for relicensing is unnecessary, as we are already conducting the relicensing process that provides opportunities for stakeholders to identify and recommend environmental measures. Therefore, there is no justification for requiring, as a license condition, a post-license process for identifying additional relicensing measures, and we do not recommend it.

Compensatory Mitigation

Alabama DCNR suggests that the American Fisheries Society's publication "Investigation and Monetary Values of Fish and Freshwater Mussel Kills" be used to calculate replacement costs values for public trust resource losses. However, compensatory mitigation for lost fish would constitute a payment of damages. The Commission lacks the authority under the Federal Power Act to either adjudicate claims, or require compensation, for damages.[184] Therefore, we do not recommend a license condition requiring monetary compensation to off-set fish loss due to entrainment.

Aquatic Resources Propagation Program

Alabama DCNR recommends [10(j) no. 16] that Alabama Power should establish a Memorandum of Agreement with an approved and licensed hatchery/facility to develop and implement a freshwater fish, mollusk and crayfish propagation program for the Tallapoosa River. The goals of this program would be to: (1) stabilize existing populations of select rare, state listed, species of greatest conservation need, and federally listed species; (2) reintroduce extirpated species; and (3) establish select faunal representative species into restored habitats. Program activities would include, but not be limited to: (1) collection and maintenance of brood stock and fish hosts; (2) developing propagation and rearing techniques; (3) artificial culture and rearing of fish, mollusks, or crayfish; (4) testing of proposed release sites to determine habitat suitability; and (5) monitoring of release sites to determine success of releases and population status of target species. The propagation program would continue until monitoring data indicate that self-sustaining populations are established. Finally, Alabama Power would reimburse (i.e., capital and operational costs) for selected propagation programs not to exceed replacement costs outlined in the American Fisheries Society, Investigation and Monetary Values of Fish and Freshwater Mussel Kills (Bowen and O'Hearn, 2017).

As we stated in section 3.3.2, *Aquatic Resources*, it is unclear which reaches of the Tallapoosa River are intended to be enhanced through such a program. Propagating fish and invertebrate species that are then used to enhance aquatic communities in the Tallapoosa River upstream of the project boundary or downstream of Lake Martin would not be commensurate with effects of the Harris Project. Moreover, it is not clear what specific project effects would be mitigated by the propagation program. Therefore, we have no justification for recommending a license condition requiring development of an aquatic resources propagation program.

UNAVOIDABLE ADVERSE EFFECTS

The continued operation of the R.L. Harris Hydroelectric Project would result in some temporary minor, unavoidable, adverse effects on soil, geomorphic, water quality, aquatic, and terrestrial resources. Effects on geology and soil resources could include some temporary

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[184] *See* City of Jackson, Ohio, and Certain Ohio Municipalities, 105 FERC ¶ 61,136, P 11 (2003).

minor continued erosion associated with project operation (operating curve), the maintenance and development of recreation access sites, and proposed minimum flow unit. Fluctuations in water levels associated with project operations do not have a significant impact on erosion at Harris Lake. Changes in reservoir level appear to influence the elevation at which erosion and sedimentation may occur in the impoundment, but they have little impact on the frequency and magnitude of shoreline loss. Most of these effects would be reduced by recommended resource enhancement measures, including implementation of the following plans and measures: (1) Erosion Monitoring Plan; (2) Shoreline Management Plan; (3) Wildlife Management Plan; (4) Recreation Plan; and (5) best management practices.

Project operations would continue to affect fishery resources. Reservoir storage and manipulation of flow releases for power production, flood control, and drought management would continue to cause fluctuations in flow and aquatic habitat downstream from the project, potentially affecting the production of resident fish species. Provision of adaptive flows, water quality and aquatic resource monitoring and minimum flows, as proposed would mitigate many of these affects. Resident fish species in the project reservoirs would continue to be entrained through the powerhouses and be subjected to stress, injury, and mortality. As discussed in section 3.3.2.2, *Effects of Project Operation on Fish Entrainment*, considering the low number of fish occurring at depth in project reservoirs, it is likely that the number of fish subject to entrainment mortality is relatively low. However, some minor levels of mortality would still be likely to occur.

For terrestrial resources, unavoidable adverse effects could include loss of vegetation and wildlife habitat from construction of project recreation facilities that require permanent removal of vegetation and from project maintenance. Effects on vegetation and wildlife habitat, including rare plant communities, would be reduced by implementing the Shoreline Management Plan and Wildlife Management Plan.

Under the proposed action, the continued operation of the project would adversely affect some archaeological sites. Proposed construction activities, including recreation enhancements, also have the potential for unavoidable adverse effects on cultural resources, particularly in areas that have not yet been surveyed (e.g., submerged areas and areas with steep slopes and/or dense vegetation). The implementation of an updated HPMP would ensure proper protection and management of significant cultural resources within the project's APE and would provide satisfactory resolution of any project-related adverse effects.

SUMMARY OF SECTION 10(j) RECOMMENDATIONS AND 4(e) CONDITIONS

Fish and Wildlife Agency Recommendations

Under the provisions of section 10(j) of the FPA, each hydroelectric license issued by the Commission shall include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, and enhancement of fish and wildlife resources affected by the project.

Section 10(j) of the FPA states that whenever the Commission believes that any fish and wildlife agency recommendation is inconsistent with the purposes and the requirements of the FPA or other applicable law, the Commission and the agency will attempt to resolve any such inconsistency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agency.

In response to our January 17, 2023, notice soliciting comments, recommendations, terms and conditions, and preliminary fishway prescriptions, the Alabama Department of Conservation and Natural Resources, Wildlife and Freshwater Fisheries Division (Alabama DCNR) filed section 10(j) recommendations. Table 5-1 lists each of these recommendations filed pursuant to section 10(j) and indicates whether the recommendations are included under the staff alternative, as well as the basis for our preliminary determinations concerning measures that we consider inconsistent with section 10(j). The environmental recommendations that we consider outside the scope of section 10(j) are considered under section 10(a) of the FPA. All costs are represented in 2023 dollars and levelized over a 30-year period of analysis.

Table 5-1. Fish and wildlife agency Section 10(j) recommendations for the R.L. Harris Hydroelectric Project and Commission staff analysis of those recommendations. (Source: Commission staff).

Recommendation	Agency	Within the Scope of Section 10(j)	Annual Levelized Cost	Recommend Adopting
1. Within 5 years of license issuance release the following seasonal continuous minimum flows: 390 cfs (7/1 – 11/30); 510 cfs (5/1 – 6/30 and 12/1 – 12/30); and 760 cfs (1/1 – 4/30). These flows would be subject to flow variances described in recommendations 2 – 7 below.	Alabama DCNR [a]	Yes	$618,475 [b]	No
2. Install, operate, and maintain a minimum flow unit designed to provide adjustable flows, as recommended in Measure 1 above; and provide a Continuous Minimum Flow Turbine Design Analysis to ensure all viable options regarding turbine design, type, hydraulic capacity (range), aeration capabilities, and environmental effects are fully assessed.	Alabama DCNR [a]	No [c]	$1,766,667 [d]	No
3. Between 2/1 and 6/1 each year, (a) stabilize Harris Lake levels (hold constant or slight increase) for a 14-day period to improve lake spawning and hatching success, and (b) stabilize flows in the Tallapoosa River downstream from Harris Dam for a 14-day period to improve river spawning and hatching success. [e]	Alabama DCNR	Yes	$0 [f]	Yes part a No part b

Recommendation	Agency	Within the Scope of Section 10(j)	Annual Levelized Cost	Recommend Adopting
4. (a) Operate the project with an up-ramp time for each turbine unit at Harris Dam of no less than 30 minutes from off-line to full gate.	Alabama DCNR	Yes	$0 [g]	Yes, in part (30-minute delay before starting operation of second turbine);
(b) Take the 2nd turbine unit off-line at least 2 hours after the 1st turbine unit is taken off-line.	Alabama DCNR	Yes	NA [h]	No, part b
5. Prepare an annual report of Harris Project operations during the flow adjustment periods, including meeting notes, as well as streamflow gaging and plant operations records. After 5 years of flow adjustment operations, evaluate operations and develop recommended changes.	Alabama DCNR	No [i]	$0	Yes
6. For maintenance of turbines at the Harris Powerhouse, reduce minimum flow releases to 254 cfs for short periods between October – January (except during drought conditions) to minimize environmental effects.	Alabama DCNR	Yes	$0	Yes
7. Implement ADROP provisions during droughts and develop flow operations during drought and unit outages in the proposed Project Operations and Flow Monitoring Plan, with resource agencies consultation and Commission approval.	Alabama DCNR	Yes	$0	Yes

Recommendation	Agency	Within the Scope of Section 10(j)	Annual Levelized Cost	Recommend Adopting
8. Develop and implement a Project Operations and Flow Monitoring Plan to monitor compliance with the operational requirements of any license issued for the project.	Alabama DCNR	Yes	$0 [j]	Yes
9. Develop a Water Quality Monitoring Plan that includes provisions for real time monitoring of discharge, temperature, and DO year-round, in the project forebay and tailrace.	Alabama DCNR	Yes	$0	Yes
10. Operate the project to meet a minimum DO concentration of 5.0 mg/L at all times during generation and non-generation.	Alabama DCNR	Yes	$0 [k]	Yes
11. Develop a Dissolved Oxygen Improvement Plan that includes well-defined endpoints, measurable response objectives, and a timeline for any needed changes.	Alabama DCNR	No	$0 [l]	No
12. Operate the project to follow a 90°F (32.2°C) maximum and a ±5°F (2.7°C) change from ambient water temperatures, and a 1.8°F (1°C) rate of change per hour requirement.	Alabama DCNR	Yes	$0 [k]	Yes (max and change in temperature, but select rate of change in consultation

Recommendation	Agency	Within the Scope of Section 10(j)	Annual Levelized Cost	Recommend Adopting
13. Develop a Temperature Regulation Plan that includes well-defined endpoints, measurable response objectives, and a timeline for any needed changes.	Alabama DCNR	No	$15,333 [m]	No
14. Pursue and develop methods to eliminate, minimize, or mitigate for fish entrainment and turbine mortality.	Alabama DCNR	No [n]	$0	No
15. The Commission reserve authority to require fishways, as may be prescribed by the Department of Commerce or Interior under section 18 of the FPA. Also recommends Alabama Power participate in discussions with FWS and the Corps regarding potential methods to provide or enhance fish passage on the Tallapoosa River.	Alabama DCNR	No [o]	$0	No (Neither Commerce nor Interior requested reservation of authority to prescribe fishways)
16. Pursue a Memorandum of Agreement with an approved and licensed hatchery/facility to develop and implement a freshwater fish, mollusk, and crayfish propagation program for the Tallapoosa River, as an alternative to installing fish passage at Harris Dam.	Alabama DCNR	No [p, q]	$0	No

Recommendation	Agency	Within the Scope of Section 10(j)	Annual Levelized Cost	Recommend Adopting
17. Develop and implement, within 9 months of license issuance, an Aquatic Resources Monitoring Plan. The plan would be implemented at determined intervals throughout the license period, include standardized sampling protocols for all aquatic species (macroinvertebrates, mollusks, crayfish, and fish), and include pre- and post-operational changes monitoring and provisions for altering project operations based on the monitoring.	Alabama DCNR	Yes	$0	No
18. Develop a plan, schedule, and monitoring program, within 9 months of license issuance, to implement fish habitat enhancements (e.g., native aquatic plants; felled trees; fish attraction devices, e.g., brush piles, woody debris, and synthetic materials) in Harris Lake and the project tailrace.	Alabama DCNR	Yes	$0	Yes

[a] Alabama Rivers Alliance recommends a slightly different measure than Alabama DCNR, releasing an additional 100 - 150 cfs beyond Alabama Power's proposed release of 300 cfs through the continuous minimum flow turbine, for a total, continuous minimum release of 400-450 cfs. Reductions in generation are assumed to be similar to those resulting from Alabama DCNR's recommended measure.

[b] This consists only of the reduced energy associated with these releases and assumes that releases are made through a new turbine, as specified in 10(j) Recommendation no. 2, resulting in 4,179 MWh/yr reduced energy relative to the No-Action (Green Plan). The capital and O&M costs associated with the turbine are accounted for under 10(j) Recommendation no. 2 (below).

[c] Installation of a generating unit is not a fish and wildlife measure.

[d] This consists only of the capital and O&M costs associated with the new turbine, estimated by staff at $50,000,000 capital, $100,000 O&M. The reduced energy associated with the releases through this turbine are identified in 10(j) Recommendation no. 1 (above).

[e] Attachment A, *ADCNR-WFF Proposed Alternative – Instream Flow Schedule*, of Alabama DCNR's March 17, 2023, letter describes the "flow adjustment operations" as occurring each year as (a) one 14-day and one 10-day period, or (b) five 5-day periods.

[f] Part (a) of this recommendation is assumed to have no effect on power generation relative to the Applicant's Proposal and the Staff Alternative (see measure AR-9 in Appendix H, Table 4-2), and part (b) is not recommended for adoption because its benefits would not justify the costs.

[g] As discussed in Appendix I, *Ramping Rates/Staging Turbine*, the first part of measure 4a is infeasible, and the second part of measure 4a, requiring a 30 minute delay before operating the second turbine, is current operation, thus there is no additional cost for continuing this measure.

[h] As discussed in Appendix I, *Ramping Rates/Staging Turbine*, a 2-hour delay is not justified because the potential benefits are not quantified and, when implemented, would result operation limits inconsistent with the purpose of the project. This operation is generally considered infeasible; thus, no cost is assigned to this alternative.

[i] Preparation of an annual operations report is an administrative matter and the recommendation for a 5-year report is vague. Therefore, the reporting measure is not a specific fish and wildlife measure.

[j] We assume no additional cost because this is a component of Alabama Power's proposed project operations and flow monitoring plan (measure AR-3).

[k] No incremental cost since the Staff Alternative is intended to meet this criterion.

[l] We assume no additional cost because this is a component of Alabama Power's proposed water quality monitoring plan (measure AR-7).

[m] Cost estimated by staff at $10,000,000 capital, $15,000 O&M.

[n] Developing measures to address fish entrainment and turbine mortality as general matter is vague, in that no specific measures are identified; thus, the measure is not a specific fish and wildlife measure and cannot be evaluated.

[o] Commission policy is to reserve authority to prescribe fishways only when requested by Commerce and Interior. Moreover, reservation of authority is not a specific fish and wildlife measure.

[p] While the fish/mollusk/crayfish propagation program plan is a fish and wildlife measure, developing a Memorandum of Agreement is an administrative matter and not a specific fish and wildlife measure.

[q] The propagation program would include, but not be limited to: (1) collection and maintenance of brood stock and fish hosts; (2) developing propagation and rearing techniques; (3) artificial culture and rearing of fish, mollusks or crayfish; (4) testing of proposed release sites to determine habitat suitability; and (5) monitoring of release sites to determine success of releases and population status of target species.

CONSISTENCY WITH COMPREHENSIVE PLANS

Section 10(a)(2)(A) of the FPA, 16 U.S.C.§803(a)(2)(A), requires the Commission to consider the extent to which a project is consistent with the federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the project. We reviewed 12 comprehensive plans that are applicable to the R.L. Harris Hydroelectric Project, located in Alabama. No inconsistencies were found.

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.

Alabama Department of Conservation and Natural Resources. n.d. Alabama’s Comprehensive Wildlife Conservation Strategy. Montgomery, Alabama.

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. 1988. Great Lake and Northern Great Plains Piping Plover Recovery Plan. Department of the Interior, Twin Cities, Minnesota. May 12, 1988.

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. n.d. Fisheries USA: The Recreational Fisheries Policy of the U.S. Fish and Wildlife Service. Washington, D.C.

U.S. Fish and Wildlife Service. n.d. Aquatic Resource Management Plan for the Alabama River Basin. Department of the Interior, Daphne, Alabama.

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.

APPENDIX J
DRAFT LICENSE CONDITIONS RECOMMENDED BY STAFF

Draft Article 401. Commission Approval and Filing of Reports and Amendments.

(a) Requirement to File Reports.

Condition 7 of the Alabama Department of Environmental Management's (Alabama DEM) water quality certification in Appendix C requires the licensee to file reports with Alabama DEM. Because these reports relate to compliance with the requirements of this license, this report must also be submitted to the Commission, annually, no later than 60 days following the report's submittal to Alabama DEM.

The licensee shall submit to the Commission documentation of any consultation, and copies of any comments and recommendations made by Alabama DEM or any consulted entity in connection with this report. The Commission reserves the right to require changes to project operation or facilities based on the information contained in the report and any other available information.

(b) *Requirement to File Amendment Applications*

Certain conditions of the Alabama Department of Environmental Management's water quality certification in Appendix C contemplate long-term changes to project operation or facilities (e.g., conditions 2 and 5). These changes may not be implemented without prior Commission authorization granted after the filing of an application to amend the license. In any amendment request, the licensee must identify related project requirements and request corresponding amendments or extensions of time as needed to maintain consistency among requirements.

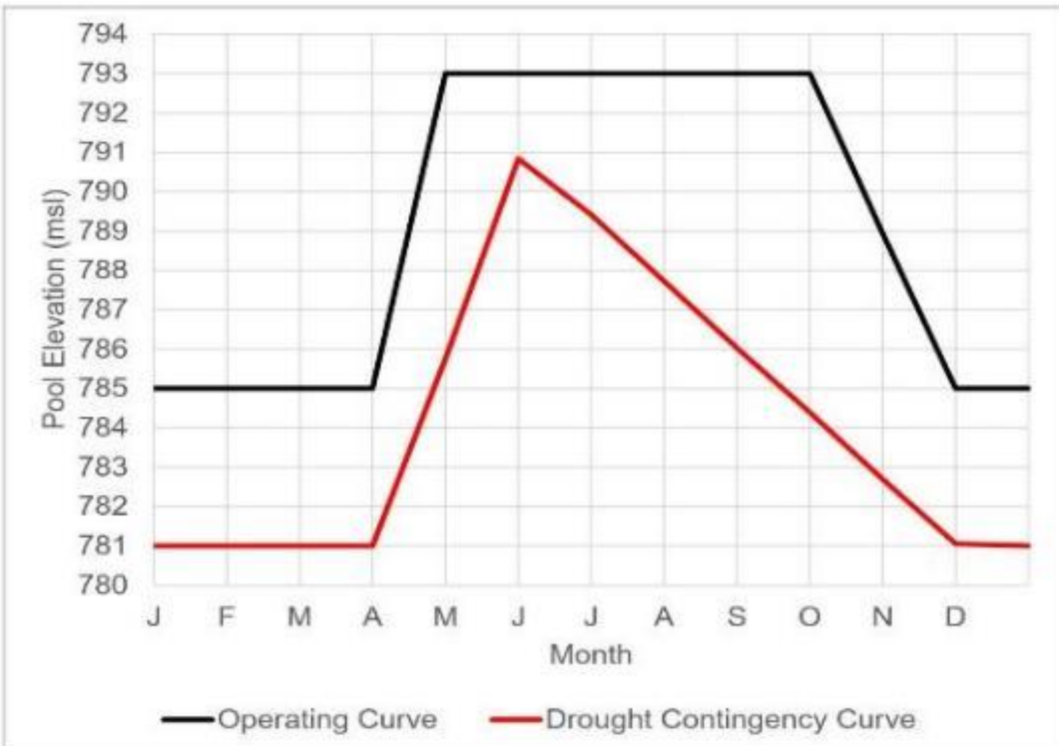
Draft Article 402. *Erosion Monitoring Plan.* Within 12 months of license issuance, the licensee must file, for Commission approval, an Erosion Monitoring Plan to evaluate any change in downstream erosion following implementation of the flow requirements of Article 404. The plan must include:

(1) The goals of the monitoring.
(2) Anticipated erosion parameters to be monitored and methods for monitoring those parameters.
(3) The number and general locations of monitoring sites, which should include, at a minimum, the sites evaluated during the relicensing studies.
(4) Monitoring and reporting frequency.
(5) A schedule for implementing the plan.
(6) Estimated capital and annual costs associated with the plan.

The Erosion Monitoring Plan must be developed after consultation with the Alabama Department of Environmental Management, Alabama Department of Conservation and Natural Resources, the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, and the U.S. Geological Survey. The licensee must include with the plan documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the agencies above, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan with the Commission for approval. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Implementation of the plan must not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Draft Article 403. *Project Operation and Lake Levels.* The licensee must operate the Harris Project to maintain Harris Lake in accordance with the operating curve and elevations for Harris Lake filed in Exhibit B of the licensee's December 27, 2022, Final License Application, and reproduced below.



The operating curve specifies the following daily target lake levels for Harris Lake:

• January 1 through March 31	Maintain elevation at 785 fee
• April 1 through April 30	Raise elevation from 785 to 793 feet
• May 1 through September 30	Maintain elevation at 793 feet
• October 1 through November 30	Lower elevation from 793 to 785 feet
• December 1 through December 31	Maintain elevation at 785 feet

As described below, the operating curve and lake levels shown above may be temporarily modified if required by operating emergencies beyond the control of the licensee, or for short periods upon mutual agreement among the licensee, the Alabama Department of Environmental Management, the Alabama Department of Conservation and Natural Resources, the U.S. Army Corps of Engineers, and the U.S. Fish and Wildlife Service (collectively, the agencies).

Planned Deviation

The operating curve and lake levels may be temporarily modified for short periods, of up to 3 weeks, after mutual agreement among the licensee and the agencies. After concurrence from the agencies, the licensee must notify the Commission within 14 days and file a report with the Secretary of the Commission as soon as possible, but no later than 30 days after the onset of the planned deviation. Each report must include: (1) the reasons for the deviation and how project operations were modified; (2) the duration and magnitude of the deviation; (3) any observed or reported environmental effects and how potential effects were evaluated; and (4) documentation of consultation with the agencies. For planned deviations exceeding 3 weeks, the licensee must file an application for a temporary variance from operational requirements of this license and receive Commission approval prior to implementation.

Unplanned Deviations

In the event of an emergency modification to the operating curve and lake levels that lasts longer than 3 hours **or** results in visible environmental effects such as a fish kill, the licensee must notify the agencies within 24 hours, and file a report with the Commission as soon as possible, but no later than 14 days after each such incident. The report must include: (1) the cause of the deviation; (2) the duration and magnitude of the deviation; (3) any pertinent operational and/or monitoring data; (4) a timeline of the incident and the licensee's response; (5) any comments or correspondence received from the agencies, or confirmation that no comments were received from the agencies; (6) documentation of any observed or reported environmental effects; and (7) a description of measures implemented to prevent similar deviations in the future.

For unplanned deviations to the operating curve and lake levels, lasting 3 hours or less, that do not result in visible environmental effects, the licensee must file an annual report, by March 1, describing each incident that occurred during the prior January 1 through December 31 time period. The report must include for each 3 hours or less deviation: (1) the cause of the deviation; (2) the duration and magnitude of the deviation; (3) any pertinent operational and/or monitoring data; (4) a timeline of the incident and the licensee's response to each deviation; (5) any comments or correspondence received from the agencies, or confirmation that no comments were received from the agencies; and (6) a description of measures implemented to prevent similar deviations in the future.

Draft Article 404. *Project Minimum Flows.* Per the schedule developed under Article 405, the licensee shall implement the following instantaneous minimum flows at Harris Dam:

- January 1 through April 30 — 450 cubic feet per second (cfs)
- May 1 through June 30 — 350 cfs
- July 1 through November 30 — 300 cfs
- December 1 through December 31 — 400 cfs

Pending the implementation of this new minimum flow regime, the licensee shall maintain the existing Green Plan operations[185] and minimum flow of 45 cfs at U.S. Geological Survey Gage 02414500 (Tallapoosa River at Wadley, AL).

The project minimum flows may be temporarily modified if required by operating emergencies beyond the control of the licensee, or for short periods upon mutual agreement among the licensee, the Alabama Department of Environmental Management, the Alabama Department of Conservation and Natural Resources, the U.S. Army Corps of Engineers, and the U.S. Fish and Wildlife Service (collectively, the agencies).

Planned Deviation

The project minimum flows may be temporarily modified for short periods, of up to 3 weeks, after mutual agreement among the licensee and the agencies. After concurrence from the agencies, the licensee must notify the Commission within 14 days and file a report with the Secretary of the Commission as soon as possible, but no later than 30 days after the onset of the planned deviation. Each report must include: (1) the reasons for the deviation and how project operations were modified; (2) the duration and magnitude of the deviation; (3) any observed or reported environmental effects and how potential effects were evaluated; and (4) documentation of consultation with the agencies. For planned deviations exceeding 3 weeks, the licensee must file an application for a temporary variance from operational requirements of this license and receive Commission approval prior to implementation.

Unplanned Deviations

In the event of an emergency modification to the project minimum flows that lasts longer than 3 hours **or** results in visible environmental effects such as a fish kill, the licensee must notify the agencies within 24 hours, and file a report with the Commission as soon as possible, but no later than 14 days after each such incident. The report must include: (1) the cause of the deviation; (2) the duration and magnitude of the deviation; (3) any pertinent operational and/or monitoring data; (4) a timeline of the incident and the licensee's response; (5) any comments or correspondence received from the agencies, or confirmation that no comments were received from the agencies; (6) documentation of any observed or reported environmental effects; and (7) a description of measures implemented to prevent similar deviations in the future.

For unplanned deviations in the project minimum flows, lasting 3 hours or less, that do not result in visible environmental effects, the licensee must file an annual report, by March 1, describing each incident that occurred during the prior January 1 through December 31 time period. The report must include for each 3 hours or less deviation: (1) the cause of the deviation; (2) the duration and magnitude of the deviation; (3) any pertinent operational and/or monitoring data; (4) a timeline of the incident and the licensee's response to each deviation; (5) any comments or correspondence received from the agencies, or confirmation that no

[185] *See* figure 2-2 in Appendix G.

comments were received from the agencies; and (6) a description of measures implemented to prevent similar deviations in the future.

Draft Article 405. *Project Minimum Flow Release Plan.* Within 12 months of license issuance, the licensee must file, for Commission approval, a Project Minium Flow Release Plan that describes how the minimum flows required by Article 404 would be provided. The plan must include, at a minimum:

(1) A description of the source(s) of water releases for each seasonal period;
(2) A description of any new facilities and/or modifications of existing facilities needed to release the required minimum flows, including an evaluation (with requisite conceptual design drawings) of fish-friendly turbine design options for any proposed minimum flow unit;
(3) A provision for any deviation from normal operations;
(4) A provision to monitor the efficacy of any proposed release mechanism(s) to provide the required flows and modify the plan, with Commission approval, if necessary; and
(5) An implementation schedule for the provisions of the plan.

The Project Minimum Flow Release Plan must be developed after consultation with the Alabama Department of Environmental Management, Alabama Department of Conservation and Natural Resources, the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, and the U.S. Geological Survey. The licensee must include with the plan documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the agencies above, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan with the Commission for approval. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Implementation of the plan must not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Draft Article 406. *Drought Management*. The licensee must implement the Alabama-ACT Drought Response Operating Proposal (ADROP), dated November 2013, as described in Appendix C to the licensee's December 12, 2022, Final License Application, Exhibit B. The licensee must notify the Commission in writing, as soon as possible, but no later than 10 days after modifying operations in response to drought conditions.

Any proposed revisions to the Drought Response Proposal, including any revisions filed through the Report on Consistency, must be developed after consultation with the Corps, U.S. Fish and Wildlife Service, Alabama Office of Water Resources, Alabama Department of Environmental Management, and Alabama Department of Conservation and Natural Resources. The licensee must include with the Drought Response Proposal documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the entities above, and specific descriptions of how the entities' comments are accommodated by the revised Drought Response Proposal. The licensee must allow a minimum of 30 days for the entities to comment and to make recommendations before filing the revisions with the Commission for approval. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on project-specific reasons.

The Commission reserves the right to require changes to the Drought Response Proposal, including changes based on the Report on Consistency. Upon Commission approval, the licensee must implement the revised Drought Response Proposal, including any changes required by the Commission.

Draft Article 407. *Project Operation and Flow Monitoring Plan.* Within 12 months of license issuance, the licensee must file, for Commission approval, a Project Operation and Flow Monitoring Plan that describes and consolidates all existing equipment, mechanisms, procedures, and reporting requirements for documenting compliance with the lake level requirements of Article 403 and the flow requirements of Article 404. The plan must include:

(1) A provision to allow at least 30 minutes (consistent with existing Green Plan operations) to pass before starting a second turbine after the first turbine has been started;

(2) Criteria and a reporting thresholds for identifying deviations from the operating curve requirement of Article 403;

(3) A description of all existing and proposed mechanisms and procedures to be used to document compliance with project operation, including lake levels and minimum flows;

(4) The location of all gages and other devices that would be used to monitor project operation;

(5) A description of the procedures for maintaining and calibrating all monitoring equipment;

(6) A provision to maintain a log of project operation;

(7) A description of the protocols or methods to be used for reporting the monitoring data;

(8) A description of the operating procedures to be implemented outside normal operation (i.e., during planned and unplanned deviation periods as discussed in Article 403 and Article 404); and

(9) A definition of hydrological and emergency electrical system conditions that result in deviations from normal operation.

The Project Operation and Flow Monitoring Plan must be developed after consultation with the Alabama Department of Environmental Management, Alabama Department of Conservation and Natural Resources, the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, and the U.S. Geological Survey. The licensee must include with the plan documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the agencies above, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee must allow a minimum of

30 days for the agencies to comment and to make recommendations before filing the plan with the Commission for approval. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Implementation of the plan must not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Draft Article 408. *Water Temperature and Dissolved Oxygen (DO) Monitoring Plan.* Within 6 months of license issuance, the licensee must file, for Commission approval, a plan to ensure that the Alabama Department of Conservation and Natural Resources (Alabama DCNR)'s thermal regime (90°F (32.2°C) maximum and a ± 5° F (2.7° C) change from ambient water temperature limit, and a 1.8° F (1° C) rate of change per hour) and the Alabama Department of Environmental Management's (Alabama DEM) DO target (no less than 5 milligrams per liter) are achieved. At a minimum, the plan must include:

(1) The goals and objectives of the plan;

(2) Measurable response objectives and success criteria;

(3) Measures, including a narrative description and requisite conceptual design drawings, to destratify a portion of Harris Lake to meet the staff-recommended water temperature regime and DO targets in the Tallapoosa River downstream from the project;

(4) A 3-year monitoring program that, at a minimum, includes the elements of Alabama Power's proposed Water Quality Monitoring Plan (i.e., measures consistent with Alabama DEM's 401 certification) and Alabama DCNR's 10(j) recommendations nos. 2 and 9 through 13;

(5) A provision to file annual monitoring report(s) that includes (a) the data collected, (b) a discussion of the effectiveness of the water temperature and DO enhancement measures implemented, and (c) any recommendations to the Commission, for approval, for any needed changes to project facilities and/or operations; and

(6) An implementation schedule, including monitoring that commences after the flows required by Article 405 and the water quality enhancement measures required by this article are implemented.

The Water Temperature and DO Monitoring Plan must be developed after consultation with the Alabama DEM, Alabama DCNR, the U.S. Fish and Wildlife Service, and Alabama Rivers Alliance. The licensee must include with the plan documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the entities above, and specific descriptions of how the entities' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the entities to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Implementation of the plan must not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval the licensee shall implement the plan, including any changes required by the Commission.

Draft Article 409. *Tallapoosa River Aquatic Resources Monitoring Plan*. Within 12 months of (a) license issuance, or (b) implementation of the minimum-flows under article 404 as well as the water temperature and dissolved oxygen enhancement measures implemented under Article 408, whichever occurs first, the licensee must file, for Commission approval, a Tallapoosa River Aquatic Resources Monitoring Plan. The purpose of the plan is to establish a 3-year program to evaluate the biological response and effectiveness of the required instream flows and water quality enhancement measures in the Tallapoosa River between Harris Dam and the upstream limit of Martin Reservoir. The plan must include, at a minimum, the following provisions:

(1) The goals and objectives (ecological and navigational) for the Tallapoosa River in project-affected waters downstream from Harris Dam;

(2) Criteria for measuring the effectiveness of the required minimum flow regime at achieving the environmental objectives in item 1 (to include developing degree day criteria for selected fish species in consultation with the Alabama Department of Conservation and Natural Resources (Alabama DCNR), the Alabama Department of Environmental Management (Alabama DEM) and the U.S. Fish and Wildlife Service (FWS);

(3) The methodologies for (a) monitoring the project-related effects of the minimum flow regime required by the license on the environmental objectives identified in item 1, including monitoring (for the first 3 years after providing the required minimum flows and water quality enhancements) water temperature and DO, as well as monitoring aquatic organisms at the same locations, and (b) the methods that will be used to isolate the effects of the minimum flows from other, non-project-related effects;

(4) The formation of a Tallapoosa River Flow Advisory Committee, consisting of Alabama Power, Alabama DCNR, and Alabama DEM, to the extent they are willing to participate;

(5) Annual monitoring reports and a 3-year monitoring report that includes (a) the monitoring methods used, (b) the data collected, (c) a discussion of the effectiveness of the minimum flow regime required by the license in achieving the environmental objectives identified in item 1, and (d) any recommendations to the Commission, for approval, for changes to project facilities and/or operations, including changes to the minimum flow regime and destratification practices, and any changes to the monitoring schedule, including the need for additional monitoring after the third year of monitoring is completed; and

(6) An implementation schedule.

The Tallapoosa River Aquatic Resources Monitoring Plan must be developed after consultation with the Alabama Department of Environmental Management, Alabama Department of Conservation and Natural Resources, the FWS, the U.S. Geological Survey, and the U.S. Army Corps of Engineers. The licensee must include with the plan documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the agencies above, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan with the Commission for approval. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Implementation of the plan must not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

<u>Draft Article 410</u>. *Harris Lake Aquatic Habitat Enhancement Plan*. Upon license issuance, the licensee must stabilize Harris Lake water levels to enhance spawning habitat and provide other fish habitat improvements within Harris Lake. Within 6 months of license issuance, the licensee must file, for Commission approval, a Harris Lake Aquatic Habitat Enhancement Plan. At a minimum, the plan must include provisions to:

(1) (a) Consult with the Alabama Department of Conservation and Natural Resources (Alabama DCNR) regarding timing prior to annually holding Harris Lake water levels constant or slightly increasing for a 14-day period for spring fish spawning within Harris Lake, and (b) notifying the Commission 10 days prior to implementing the lake level stabilization event;

(2) Identify candidate areas for littoral enhancement within Harris Lake and establish native aquatic plants in the selected areas;

(3) File a proposed schedule for the frequency of enhancement activities;

(4) Continue to selectively cut and monitor felled trees for shoreline cover;

(5) Add fish attraction devices such as brush piles and other woody debris (e.g., recycled Christmas trees, felled trees) and synthetic materials (e.g., spider blocks, concrete, and PVC structures) in Harris Lake to provide cover for fish and to enhance angling opportunities; and

(6) File a summary report with the Commission, within 3 months of completing any enhancement activity that describes the area enhanced, the measures used, and any areas within Harris Lake recommended to the Commission for approval, for future enhancement.

The Harris Lake Aquatic Habitat Enhancement Plan must be developed after consultation with the Alabama DCNR, the Alabama Department of Environmental Management, and the U.S. Fish and Wildlife Service. The licensee must include with the plan documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the entities above, and specific descriptions of how the entities' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the entities to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Upon Commission approval the licensee must implement the plan, including any changes required by the Commission.

Draft Article 411. *Aquatic Invasive Species Management Plan*. Within 6 months of license issuance, the licensee must file, for Commission approval, an Aquatic Invasive Species Management Plan. At a minimum, the plan must include provisions for: (1) educating the public regarding preventative actions that can be taken to help control invasive species on project land and waters; (2) consulting with agencies regarding appropriate signage to be provided on project land; (3) developing BMPs for specific activities that have the potential to introduce aquatic invasive species into Harris Lake; and (4) documenting incidental observations of aquatic invasive species on project land and waters and reporting such observations to the Alabama Department of Conservation and Natural Resources (Alabama DCNR).

The Aquatic Invasive Species Management Plan must be developed after consultation with the Alabama DCNR, the Alabama Department of Environmental Management, and the U.S. Fish and Wildlife Service. The licensee must include with the plan documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the entities above, and specific descriptions of how the entities' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the entities to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Upon Commission approval the licensee must implement the plan, including any changes required by the Commission.

Draft Article 412. *Non-Native Aquatic Vegetation and Vector Control Plan.* Within 6 months of license issuance, the licensee must file, for Commission approval, a revised Non-Native Aquatic Vegetation and Vector Control Plan. The plan must specifically address project operating conditions required by this license and include, but not be limited to, the following:

(1) Methods, including 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 the reservoir;
(2) Methods for monitoring increases in nuisance aquatic vegetation;
(3) Methods for controlling nuisance aquatic vegetation; and
(4) An implementation schedule for control measures and monitoring.

The Non-Native Aquatic Vegetation and Vector Control Program must be revised after consultation with the U.S. Fish and Wildlife Service, Alabama Department of Conservation and Natural Resources, and the U.S. Bureau of Land Management. The licensee must include with the plan documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the entities above, and specific descriptions of how the entities' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the entities to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Upon Commission approval the licensee must implement the plan, including any changes required by the Commission.

Draft Article 413. *Wildlife Management Plan*. Within one year of license issuance, the licensee must file, for Commission approval, a final Wildlife Management Plan (WMP) to protect and enhance wildlife habitat on project land at Harris Lake and the Skyline Wildlife Management Area (WMA). To protect federally listed species, the WMP must be approved by the Commission prior to removal of land from the project boundary, construction of the Highway (Hwy) 48 Day Use Park at Harris Lake, and implementation of regular forest management activities, including timber harvests and prescribed burns.

The plan must include the following parts of the draft WMP filed on November 21, 2024:

(1) Descriptions of land uses and existing habitats at Harris Lake and Skyline WMA;

(2) A description of the wildlife management objectives and associated methods to protect and enhance native vegetation and wildlife habitat through management of: (a) shorelines at Harris Lake; (b) forests at Harris Lake and Skyline WMA; (c) food plots and other permanent openings at Harris Lake and Skyline WMA; (d) the Pollinator Plots at Little Fox Creek on Harris Lake; and (e) public hunting areas at Harris Lake and Skyline WMA; and

(3) Specific best management practices (BMPs) that reduce or prevent runoff, erosion, turbidity, and sedimentation that may impact streams and waterbodies on project lands during timber management activities, to include, but not be limited to the following Alabama Forestry Commission forestry BMPs: (a) establish streamside management zones, on each side of a perennial or intermittent stream with a minimum of 35 feet from a definable bank, or 50 feet if appropriate for wildlife protection; (b) avoid stream crossings by roads, skid trails, or firebreaks, when possible; (c) when unavoidable, use the fewest possible steam crossings located where the bank and streamside management zones would be least disturbed; and (d) properly plan and locate roads.

The final WMP plan must also include the following measures to identify and protect federally listed and other special status species on project land at Harris Lake and/or Skyline WMA:

(1) *Red-Cockaded Woodpecker*

(a) Develop, in consultation with the U.S. Fish and Wildlife Service (FWS) and the Alabama Department of Conservation and Natural Resources (Alabama DCNR), a strategy for surveying red-cockaded woodpeckers at Harris Lake. The locations for red-cockaded woodpecker surveys must include: (i) land parcels proposed for removal from the project boundary (i.e., prior to removal from the project boundary); (ii) the 160-acre natural pine and other timber management sites on the southwestern side of Harris Lake prior to prescribed burns and timber harvests; (iii) mature/over mature pine stands at Harris Lake prior to harvesting; (iv) the area proposed for the Hwy 48 Day Use Park prior to removing mature pines and construction; and (v) any pine forests where future recreation sites or amenities are proposed at Harris Lake (i.e., prior to clearing/construction). The red-cockaded woodpecker survey strategy, including documentation of consultation, must be filed with the Commission as part of the final WMP;

(b) Include provisions to: (i) document and submit the red-cockaded woodpecker survey results to FWS and Alabama DCNR, and (ii) consult with these agencies to develop measures, if needed, to protect any identified red-cockaded woodpeckers or suitable/occupied habitat, such as timing the prescribed burns based on red-cockaded woodpecker use/activity in the area;

(c) File, with the Commission, the red-cockaded woodpecker survey methods and results, documentation of consultation with FWS and Alabama DCNR, and any proposed red-cockaded woodpecker protection measures for inclusion in the final WMP;

(d) File an implementation schedule.

(2) *Gray Bat, Indiana Bat, Northern Long-Eared Bat, and Tricolored Bat*

(a) Prior to continuing tree removal activities, including timber harvests, and land removal at Harris Lake, use FWS's current gray bat survey guidance, and FWS's *Range-Wide Indiana Bat and Northern Long-eared Bat Survey Guidelines* (2024) which also applies to the tricolored bat,[186] (or use updated FWS bat survey protocols, as they may become available), to develop a strategy for surveying:

(i) The 236 caves and other karst features within the project boundary at Skyline WMA, to identify hibernacula and summer roost caves occupied by the gray bat, and hibernacula occupied by the Indiana bat, northern long-eared bat, and tricolored bat, within 1 year after Commission approval of the final WMP;

(ii) Forest management units to identify summer roost trees, including maternity roost trees, occupied by the Indiana bat, northern long-eared bat, and tricolored bat within the project boundary at Harris Lake and Skyline WMA; and

(iii) Land proposed for removal from the project boundary at Harris Lake.

(b) Prepare and file, with the Commission, all bat survey reports including:

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[186] FWS's April 2024 Range-Wide Indiana Bat and Northern Long-eared Bat Survey Guidelines are available at https://www.fws.gov/sites/default/files/documents/2024-04/final_usfws_range-wide_ibat-nleb_survey_guidelines_508-compliant.pdf.

(i) The survey methods and results;

(ii) An evaluation of whether any caves, other karst features, and roost trees occupied by gray, Indiana, northern long-eared, and/or tricolored bats, would be affected by timber harvests, recreation, other human disturbances, and/or the loss of federal protection on parcels proposed for removal from the project boundary;

(iii) Documentation of consultation with FWS and Alabama DCNR; and

(iv) Any proposed bat protection measures for inclusion in the final WMP.

(c) Indiana, northern long-eared, and/or tricolored bat protection measures must include the following:

(i) Implement time-of-year restrictions for tree trimming and removal, including timber harvests, including:

- Within project land at Harris Lake, to avoid the Indiana, northern long-eared, and tricolored bats' active season, which is from March 15 through November 15 (i.e., as long as this area remains within the "Hibernating Range" for these species in Alabama, as defined by FWS)

- Within project land at Skyline WMA, based on the survey results described in item (2)(a)(i) and (ii) above, in consultation with the FWS and Alabama DCNR;

(ii) If tree trimming and removal cannot be avoided during the periods identified in items (2)(c)(i) above, and if no valid survey data (i.e., based on FWS's guidance regarding survey validity) is available for the affected area(s), then:

- Conduct surveys for gray, Indiana, northern long-eared, and/or tricolored bats, as appropriate, per FWS's current gray bat survey protocols and *Range-Wide Indiana Bat and Northern Long-eared Bat Survey Guidelines* (2024), (i.e., or updated FWS guidance, as it may become available);

- Prepare a survey report and submit it to the FWS and Alabama DCNR;

- Consult with the FWS and Alabama DCNR regarding the survey results and prepare measures to protect federally listed and other special status bats, as appropriate; and

- File the survey results, documentation of consultation, and any proposed measures to protect federally listed and other special status bats, with the Commission, for approval.

(iii) Maintain a forested buffer (i.e., no-harvest zone) around identified Indiana, northern long-eared, and tricolored bat roost trees, including maternity roost trees, with the width of each buffer determined in consultation with FWS and Alabama DCNR;

(iv) Evaluate, in consultation with FWS and Alabama DCNR, potential cave protection methods to prevent or minimize human disturbances of bats and the spread of white-nose syndrome in the project boundary, including, but not limited to:

- Installing gates, fences, and/or signs at cave entrances to deter recreation or unauthorized activities at caves occupied by gray, Indiana, northern long-eared, and/or tricolored bats;
- Limiting timber harvest activities to occur outside periods when the caves are occupied by gray, Indiana, northern long-eared, and/or tricolored bats;
- Maintaining forested buffers at cave entrances, sinkholes, and other karst features connected to caves occupied by gray, Indiana, northern long-eared, and/or tricolored bats, similar to streamside management zones, where no timber is harvested, and heavy equipment does not enter/traverse;
- Maintaining forested corridors from caves occupied by gray Indiana, northern long-eared, and/or tricolored bats to streamside management zones and other riparian areas that provide foraging habitat;
- Reporting to FWS and Alabama DCNR any observed changes to caves or karst features that occur during or after forest management activities, including timber harvests, such as: collapse of, or other damage to caves; changes in forest density that could affect abiotic factors such as air flow patterns, sun exposure, humidity, groundwater flow; and/or increased public access to caves; and

(v) Hazardous or fallen trees may be removed for the protection of human life and property at the project at any time.

(d) Prior to finalizing each annual timber management plan, consult with FWS and Alabama DCNR to confirm whether the geographic boundaries and time frames of Indiana, northern long-eared, and tricolored bats' activities in Alabama, as shown in Appendix J of FWS's *Range-Wide Indiana Bat and Northern Long-eared Bat Survey Guidelines* (2024) (i.e., or updated FWS guidance, as it may become available), have changed,

(e) File, with the Commission, for approval, any proposed updates to the bat survey methods and annual timber management plans in the WMP to reflect any changes in bat activity as identified by FWS and Alabama DCNR, if applicable; and

(f) File an implementation schedule.

(3) *Alligator Snapping Turtle*

(a) Report any alligator snapping turtle sightings at the Harris Project to the FWS and Alabama DCNR;

(b) If alligator snapping turtles are observed, consult with FWS and Alabama DCNR to develop and recommend protection measures for inclusion in the final WMP, if necessary, to avoid adverse effects to this species during project operation, maintenance, and project-related recreation activities;

(c) File any recommended alligator snapping turtle protection measures with the Commission, for approval;

(d) After FWS's listing decision and 4(d) rule, if applicable, for the alligator snapping turtle is issued:

(i) Consult with FWS and Alabama DCNR to develop and recommend updated alligator snapping turtle protection measures in the WMP, if needed, to ensure compliance with any prohibitions on/or exceptions to incidental take prohibitions, and file them with the Commission, for approval; and

(ii) Review and recommend, for Commission approval, updates to the Shoreline Management Plan (SMP), including applicable components of the SMP (e.g., best management practices and Dredge Permit Program) required in Article 415, and the Non-Native Aquatic Vegetation and Vector Control Management Program required in Article 413, for consistency with the alligator snapping turtle's listing status, as appropriate; and

(e) Incorporate any Commission-approved protection measures for this species into the final WMP.

(4) *Monarch Butterfly*

(a) Revise the WMP to include descriptions of the methods used to maintain the Pollinator Plots and adjacent lands at Little Fox Creek on Harris Lake, including:

(i) The list of species in the native plant seed mix for the Pollinator Plots;

(ii) The 5-year management cycle (i.e., applying three rounds of herbicide treatment over the course of a year and then replanting the seed mix), including the names of the herbicides used and methods of application in the Pollinator Plots;

(iii) Methods to control non-native invasive plants in the Pollinator Plots within each management cycle;

(iv) A description of the vegetation management methods (mechanical, chemical, and biological treatments, as well as prescribed burns) used in the areas adjacent to the Pollinator Plots, including within the three permanent openings, non-project transmission line corridor, and the 160-acre open/savannah;

(b) Ensure that herbicides and larvicides used to control nuisance aquatic vegetation and mosquitos, as part of the Non-Native Aquatic Vegetation and Vector Control Management Program required in Article 413, would not be applied near the Pollinator Plots or other known locations of milkweeds on project land; and

(c) Manage vegetation in the project transmission line to minimize adverse effects to monarchs by: (i) preserving any milkweed and other low-growing nectar rich plants for monarchs; (ii) targeting only non-native plants and woody vegetation that exceeds right-of-way height limits via mechanical methods; and (iii) using spot herbicide treatments only if mechanical methods are ineffective.

(5) *Listed Plants/Fern: Georgia Rockcress, White Fringeless Orchid, Price's Potato Bean, Morefield's Leather-Flower, and American Hart's-Tongue Fern*

(a) Consult with FWS regarding the need for surveying Georgia rockcress on project land at Harris Lake, prior to conducting soil disturbing activities near the project shoreline and riverbank, such as timber harvesting, construction of the proposed Hwy 48 Day Use Park, and construction of the proposed tailrace fishing pier and canoe/kayak put-in. If Georgia rockcress surveys are deemed necessary:

(i) Identify FWS's current Georgia rockcress survey protocols;

(ii) Prepare a Georgia rockcress survey report and submit it to the FWS;

(iii) Consult with the FWS regarding the survey results and develop Georgia rockcress protection measures, if needed to avoid adverse project-related effects on this species; and

(iv) File the survey results, documentation of consultation, and any proposed Georgia rockcress protection measures, with the Commission, for approval; and

(v) Incorporate any Commission-approved Georgia rockcress protection measures into the final WMP.

(b) Develop a strategy to conduct white fringeless orchid surveys on project land at both Harris Lake and Skyline WMA. The white fringeless orchid survey strategy must include provisions to:

(i) Survey for white fringeless orchids prior to timber harvests, prescribed burns, construction of the proposed recreation amenities, and removal of land from the project boundary at Harris Lake;

(ii) Survey within the project transmission line corridor for white fringeless orchids prior to vegetation management activities (e.g., herbicide application, mowing);

(iii) If white fringeless orchids are found, develop protection measures in consultation with FWS and Alabama DCNR. Protection measures that much be considered, but not be limited to, include:

- Creating a protected buffer and routing timber harvest equipment around identified white fringeless orchids;
- Identifying the optimal density of residual trees to benefit white fringeless orchid;
- Removing any non-native invasive plants near identified white fringeless orchids; and
- Timing vegetation management activities to avoid white fringeless orchid's flowering period.

(iv) File the survey results, documentation of consultation, and any proposed white fringeless orchid protection measures, with the Commission, for approval; and

(v) Incorporate any Commission approved white fringeless orchid protection measures into the final WMP.

(c) Develop strategies to conduct surveys for Price's potato bean, Morefield's leather-flower, and American hart's-tongue fern on project land at Skyline WMA. The survey strategies must include provisions to:

(i) Consult with FWS to confirm the current survey protocols for these species;

(ii) Survey forest management units with potentially suitable habitat for these species prior to timber harvests;

(vi) If any Price's potato bean, Morefield's leather-flower, and/or American hart's-tongue ferns are found, develop protection measures in consultation with FWS and Alabama DCNR. Protection measures that much be considered, but not be limited to, include:

- Creating a protected buffer and routing timber harvest equipment around identified occurrences of these species;
- Identifying and maintaining the optimal density of residual trees to benefit identified occurrences of these species;
- Removing any non-native invasive plants near identified occurrences of these species; and
- Timing vegetation management activities to avoid Price's potato bean and Morefield's leather-flower's flowering period.

(vii) File the survey results, documentation of consultation, and any proposed measures to protect these species, with the Commission, for approval.

(viii) Incorporate any Commission-approved protection measures for these species into the final WMP; and

(d) File an implementation schedule.

In addition, consult with FWS and Alabama DCNR to develop and finalize any other measures protective of wildlife resources within the project boundary at Harris Lake and Skyline WMA.

The draft WMP plan must be revised in consultation with the FWS and Alabama DCNR. The licensee must include with the plan documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the entities above, and specific descriptions of how the entities' comments are accommodated by the program. The licensee must allow a minimum of 30 days for the entities to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Upon Commission approval the licensee must implement the plan, including any changes required by the Commission.

<u>Draft Article 414</u>. *Recreation Plan.* Within one year of license issuance, the licensee must file, for Commission approval, a revised Recreation Plan for the Harris Hydroelectric Project. The conceptual and as-built drawings of the project recreation sites contained in Appendix B of the Recreation Plan filed on June 15, 2022 are not approved and must be included in the revised plan.

In addition, the revised Recreation Plan must include, at a minimum, the following:

(1) Provisions for the operation and maintenance (O&M) of the following project recreation sites, described in the draft Recreation Plan filed on June 15, 2022: Big Fox Creek boat ramp; Crescent Crest boat ramp; Flat Rock Park; Foster's Bridge boat ramp; Harris Tailrace Fishing Pier; Highway 48 Bridge boat ramp; Lee's Bridge boat ramp; Little Fox Creek boat ramp; Lonnie White boat ramp; R.L Harris Wildlife Management Area; and Swagg boat ramp. The O&M provisions must include, at a minimum:

(a) Signage at each project recreation site as specified in section 8.2 of the Commission's regulations, and updated for accuracy as needed;

(b) "Carry-in/carry-out" signage to inform the public to carry out their trash from the project recreation sites, and the identification and removal of existing trash receptacles and replacement of containers with appropriately-sized trash bags at the identified project recreation sites for use by the public to remove trash; and

(c) A description of soil erosion and sediment control measures to be used where ground-disturbing activities are proposed.

(2) A description of the project recreation sites, the amenities at each site, and how the needs of the disabled were considered in the planning and design of the recreation facilities.

(3) A map or maps identifying the 11 project recreation sites from item No. (1) above in relation to the project boundary as licensed herein.

(4) Provisions for (a) improving the Harris Tailrace Fishing area and Highway 48 Day Use Park to include barrier-free access; (b) removal of Wedowee Marine South as a project recreation site; (c) install a new project recreation area on Harris Lake near the existing commercially-operated Wedowee Marine facility; and (d) consideration of extending additional boat ramps on Harris Lake to improve boating access at lower reservoir levels minimizing any effects to reservoir related recreational access.

(5) A description of maintenance at project recreation sites according to Alabama Power's General Guidelines for Operations & Maintenance of Developed Project Recreation Sites which may be periodically updated and includes general maintenance measures for each site. This would include monitoring use of project recreation sites every 10 years after Commission approval of the final Recreation Plan. Monitoring would include conducting use counts at the project recreation sites using an appropriate methodology, such as trail cameras, spot counts, drone/aerial counts, or other readily available and cost-effective technology. Monitoring information, along with any proposed revisions to the Recreation Plan, would be distributed to consulting stakeholders for review and filed for Commission approval by January 31 every 10 years over the term of the new license.

The revised Recreation Plan must be developed after consultation with the U.S. Fish and Wildlife Service, Alabama Department of Conservation and Natural Resources, the U.S. Bureau of Land Management, and Randolph, Clay, Cleburne, and Jackson Counties, Alabama. The licensee must include with the plan an implementation schedule, documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the entities above, and specific descriptions of how the entities' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the entities to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Upon Commission approval the licensee must implement the plan, including any changes required by the Commission.

Draft Article 415. *Shoreline Management Plan.* Within 6 months of license issuance, the licensee must revise the Shoreline Management Plan filed in the licensee's June 15, 2022, Response to License Application Additional Information Requests. The revised plan must include: (1) a description, including acreage and a map or maps of the following shoreline classifications: (i) Project Operations; (ii) Recreation; (iii) Commercial Recreation; (iv) Flood Storage; (v) Scenic Buffer Zones/Easements; (vi) Hunting; and (vii) Natural/Undeveloped;

(2) a provision for using a geographic information system to record areas designated as Sensitive Resources; (3) a description of allowable and prohibited uses for each of the above shoreline classifications; (4) a description of best management practices, including bio-engineering techniques such as willow and wetland plantings to control erosion; (5) a description of the Dredging Permit Program; (6) a description of the Shoreline Compliance Program specific to the Harris Project; (7) a provision to limit construction of new seawalls and criteria that must be applied in approving the installation of any new seawall; (8) a description of the encroachments at the Harris Project, including any that have been addressed, the method of resolution, and the number and location of encroachments that remain unresolved; and (9) a provision to review and update the Shoreline Management Plan.

The plan must also include provisions to protect rare plants within the 57-acre rare plant area adjacent to Flat Rock Park including: (1) periodically monitoring the area for evidence of unauthorized uses (e.g., tire track marks on vegetation and rock outcrops); (2) maintaining the new signs and barrier (gate); and (3) consulting with Alabama DCNR to develop and recommend additional protection measures, for Commission approval, if needed, to avoid effects associated with recreation activities.

The revised Shoreline Management Plan must also reflect the project boundary modifications, and the reclassification of project lands as described in section 2.2.2 *Proposed Project Boundary Changes* and 3.3.6.2 *Project Boundary Revisions* and be updated to incorporate any revisions approved in other FERC filings, including but not limited to the approval to reduce Skyline WMA by about 31.6 acres. This filing must include two separate sets of GIS data in a georeferenced electronic file format (such as ArcView shape files, GeoMedia files, MapInfo files, or a similar GIS format) with the Secretary of the Commission, ATTN: OEP/DHAC. The data must include (a) a polygon file of the project reservoir surface area including a separate polygon for the tailrace area, (b) a polygon file of the project lands included within the project boundary, as approved to date, including Skyline WMA, (c) a polyline file of the land use/shoreline management classifications that reflect all modifications and reclassifications at Harris Lake and Skyline WMA, as approved to date, and (d) a GIS file showing the designated sensitive resource areas. The attribute table for the classification polyline file must contain the name of each shoreline/land use management classification and its associated reservoir/tailrace/WMA, consistent with the shoreline management plan.

All GIS data must be positionally accurate to ±40 feet in order to comply with National Map Accuracy Standards for maps at a 1:24,000 scale. The file name(s) must include: FERC Project Number, data description, date of this order, and file extension in the following format [P-XXXX, reservoir name polygon/or reservoir name shoreline polyline data, MM-DD-YYYY.SHP]. The filing must be accompanied by a separate text file describing the spatial reference for the georeferenced data: map projection used (i.e., UTM, State Plane, Decimal Degrees), the map datum (i.e., North American 27, North American 83), and the units of measurement (i.e., feet, meters, miles). The text file name must include FERC Project Number, data description, date of this order, and file extension in the following format [P-XXXX, project reservoir/or shoreline classification metadata, MM-DD-YYYY.TXT].

The revised Shoreline Management Plan must be developed after consultation with the Alabama Department of Conservation and Natural Resources, the U.S. Fish and Wildlife Service, and the U.S. Bureau of Land Management. The licensee must include with the plan an implementation schedule, documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the entities above, and specific descriptions of how the entities' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the entities to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Upon Commission approval the licensee must implement the plan, including any changes required by the Commission.

Draft Article 416. *Public Education and Outreach Plan.* Within one year of license issuance, the licensee must file, for Commission approval, a Public Education and Outreach Plan to enhance the public experience and protect natural resources at the Harris Project.

The plan must include, at a minimum, provisions to: (1) update, as needed, and share information Alabama Power's existing educational brochures and public website; (2) provide regular educational opportunities (e.g., 10 year workshop to review and update the *Shoreline Management Plan* (SMP) described in Article 416, annual public education workshops) to share information about events and resource issues; (3) share information about (a) recreation opportunities and upgrades, including when the new proposed recreation sites/amenities become available (b) water levels in Harris Lake and the Tallapoosa River downstream from Harris Dam, (c) the new shoreline classifications, changes to land parcels in the project boundary, and the allowable activities in each area, (d) BMPs to protect natural resources from construction and maintenance activities (e.g., boat dock construction, shoreline stabilization, and vegetation management), (e) the procedures for permits to lease or occupy project lands and waters for purposes permitted by any license issued for the project, (f) Alabama Power's proposed and staff-recommended plans to restore aquatic habitat, and manage invasive species, historic properties, and recreation at the project; (4) file a schedule for regular distribution of the project information described in item 3 to stakeholders; and (5) review and update the plan every 6 years.

The Public Education and Outreach Plan must be developed after consultation with the Alabama Department of Conservation and Natural Resources, the U.S. Fish and Wildlife Service, and the U.S. Bureau of Land Management. The licensee must include with the plan an implementation schedule, documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the entities above, and specific descriptions of how the entities' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the entities to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Upon Commission approval the licensee must implement the plan, including any changes required by the Commission.

Draft Article 417. *Historic Properties Management Plan*. The licensee must file, for Commission approval, a revised Historic Properties Management Plan (HPMP) within one year of issuance of this order. The revised HPMP must include: (1) National Register of Historic Places determinations provided for 9 sites (i.e., 2 previously recorded sites, and 7 new sites) located on tracts of land that the licensee proposes to remove from the project boundary; (2) a list of updated sites within the project's area of potential effects (APE) that remain unevaluated yet have been removed from consideration and appropriate treatment measures; (3) addressing current, ongoing, project-related impacts; (4) a plan to develop mitigation contracts with private landowners for an additional 10 downstream sites (i.e., 2 eligible sites, and 8 unevaluated sites); (5) deletion of an exemption from consultation for reservoir fluctuation and drawdowns (Appendix F of the draft HPMP); (6) copies of the Alabama State Historic Preservation Officer's (SHPO) determinations of eligibility and results of consultation with the Alabama SHPO that has already taken place regarding the licensee's proposed removal of the 17 tracts, the SHPO's determinations of eligibility for 9 potentially affected sites, and results of further consultation with the Muscogee (Creek) Nation to manage identified traditional cultural properties (TCPs) and also plans to consult with other applicable Tribes to identify TCPs; and (7) a schedule for completion of all HPMP actions.

The Commission reserves the authority to require changes to the HPMP at any time during the term of the license. The licensee must obtain approval from the Commission and the Alabama SHPO before engaging in any ground-disturbing activities or taking any other action that may affect any historic properties within the project's APE.

Draft Article 418. *Use and Occupancy*. (a) In accordance with the provisions of this article, the licensee must have the authority to grant permission for certain types of use and occupancy of project lands and waters and to convey certain interests in project lands and waters for certain types of use and occupancy, without prior Commission approval. The licensee may exercise the authority only if the proposed use and occupancy is consistent with the purposes of protecting and enhancing the scenic, recreational, and other environmental values of the project. For those purposes, the licensee must also have continuing responsibility to supervise and control the use and occupancies for which it grants permission, and to monitor the use of, and ensure compliance with the covenants of the instrument of conveyance for, any interests that it has conveyed, under this article. If a permitted use and occupancy violates any condition of this article or any other condition imposed by the licensee for protection and enhancement of the project's scenic, recreational, or other environmental values, or if a covenant of a conveyance made under the authority of this article is violated, the licensee must take any lawful action necessary to correct the violation. For a permitted use or occupancy, that action includes, if necessary, canceling the permission to use and occupy the project lands and waters and requiring the removal of any non-complying structures and facilities.

(b) The type of use and occupancy of project lands and waters for which the licensee may grant permission without prior Commission approval are: (1) landscape plantings; (2) non-commercial piers, landings, boat docks, or similar structures and facilities that can accommodate no more than 10 water craft at a time and where said facility is intended to serve single-family type dwellings; (3) embankments, bulkheads, retaining walls, or similar structures for erosion control to protect the existing shoreline; and (4) food plots and other wildlife enhancement. To the extent feasible and desirable to protect and enhance the project's scenic, recreational, and other environmental values, the licensee must require multiple use and occupancy of facilities for access to project lands or waters. The licensee must also ensure that, to the satisfaction of the Commission's authorized representative, the use and occupancies for which it grants permission are maintained in good repair and comply with applicable state and local health and safety requirements. Before granting permission for construction of bulkheads or retaining walls, the licensee must: (1) inspect the site of the proposed construction, (2) consider whether the planting of vegetation or the use of riprap would be adequate to control erosion at the site, and (3) determine that the proposed construction is needed and would not change the basic contour of the impoundment shoreline. To implement this paragraph (b), the licensee may, among other things, establish a program for issuing permits for the specified types of use and occupancy of project lands and waters, which may be subject to the payment of a reasonable fee to cover the licensee's costs of administering the permit program. The Commission reserves the right to require the licensee to file a description of its standards, guidelines, and procedures for implementing this paragraph (b) and to require modification of those standards, guidelines, or procedures.

(c) The licensee may convey easements or rights-of-way across, or leases of project lands for: (1) replacement, expansion, realignment, or maintenance of bridges or roads where all necessary state and federal approvals have been obtained; (2) storm drains and water mains; (3) sewers that do not discharge into project waters; (4) minor access roads; (5) telephone, gas, and electric utility distribution lines; (6) non-project overhead electric transmission lines that do not require erection of support structures within the project boundary; (7) submarine, overhead, or underground major telephone distribution cables or major electric distribution lines (69-kilovolts or less); and (8) water intake or pumping facilities that do not extract more than one million gallons per day from a project impoundment. No later than January 31 of each year, the licensee must file with the Commission a copy of a report briefly describing for each conveyance made under this paragraph (c) during the prior calendar year, the type of interest conveyed, the location of the lands subject to the conveyance, and the nature of the use for which the interest was conveyed. No report filing is required if no conveyances were made under paragraph (c) during the previous calendar year.

(d) The licensee may convey fee title to, easements or rights-of-way across, or leases of project lands for: (1) construction of new bridges or roads for which all necessary state and federal approvals have been obtained; (2) sewer or effluent lines that discharge into project waters, for which all necessary federal and state water quality certification or permits have been obtained; (3) other pipelines that cross project lands or waters but do not discharge into project waters; (4) non-project overhead electric transmission lines that require erection of support structures within the project boundary, for which all necessary federal and state approvals have been obtained; (5) private or public marinas that can accommodate no more than 10 water craft at a time and are located at least one-half mile (measured over project waters) from any other private or public marina; (6) recreational development consistent with an approved report on recreational resources of an Exhibit E; and (7) other uses, if: (i) the amount of land conveyed for a particular use is five acres or less; (ii) all of the land conveyed is located at least 75 feet, measured horizontally, from project waters at normal surface elevation; and (iii) no more than 50 total acres of project lands for each project development are conveyed under this clause (d)(7) in any calendar year. At least 60 days before conveying any interest in project lands under this paragraph (d), the licensee must file a letter with the Commission, stating its intent to convey the interest and briefly describing the type of interest and location of the lands to be conveyed (a marked Exhibit G map may be used), the nature of the proposed use, the identity of any federal or state agency official consulted, and any federal or state approvals required for the proposed use. Unless the Commission's authorized representative, within 45 days from the filing date, requires the licensee to file an application for prior approval, the licensee may convey the intended interest at the end of that period.

(e) The following additional conditions apply to any intended conveyance under paragraph (c) or (d) of this article:

(1) Before conveying the interest, the licensee must consult with federal and state fish and wildlife or recreation agencies, as appropriate, and the State Historic Preservation Officer.

(2) Before conveying the interest, the licensee must determine that the proposed use of the lands to be conveyed is not inconsistent with any approved report on recreational resources of an Exhibit E; or, if the project does not have an approved report on recreational resources, that the lands to be conveyed do not have recreational value.

(3) The instrument of conveyance must include the following covenants running with the land: (i) the use of the lands conveyed must not endanger health, create a nuisance, or otherwise be incompatible with overall project recreational use; (ii) the grantee must take all reasonable precautions to ensure that the construction, operation, and maintenance of structures or facilities on the conveyed lands would occur in a manner that would protect the scenic, recreational, and environmental values of the project; and (iii) the grantee must not unduly restrict public access to project lands and waters.

(4) The Commission reserves the right to require the licensee to take reasonable remedial action to correct any violation of the terms and conditions of this article, for the protection and enhancement of the project's scenic, recreational, and other environmental values.

(f) The conveyance of an interest in project lands under this article does not in itself change the project boundaries. The project boundaries may be changed to exclude land conveyed under this article only upon approval of revised Exhibit G drawings (project boundary maps) reflecting exclusion of that land. Lands conveyed under this article will be excluded from the project only upon a determination that the lands are not necessary for project purposes, such as operation and maintenance, flowage, recreation, public access, protection of environmental resources, and shoreline control, including shoreline aesthetic values. Absent extraordinary circumstances, proposals to exclude lands conveyed under this article from the project must be consolidated for consideration when revised Exhibit G drawings would be filed for approval for other purposes.

(g) The authority granted to the licensee under this article must not apply to any part of the public lands and reservations of the United States included within the project boundary.

APPENDIX K
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