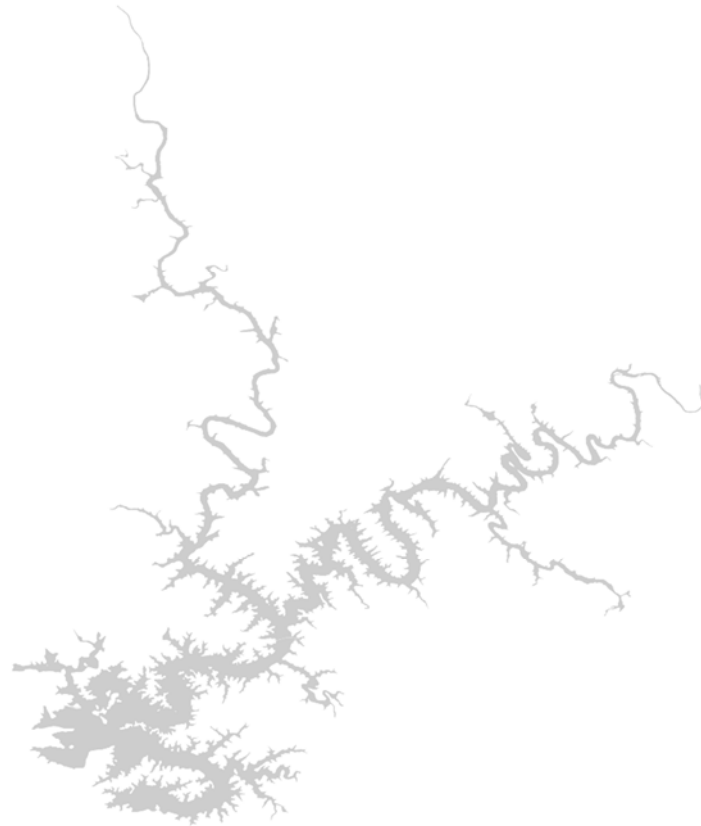




AQUATIC RESOURCES STUDY PLAN

R. L. HARRIS HYDROELECTRIC PROJECT
FERC NO. 2628



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FINAL May 2019

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TABLE OF CONTENTS

1.0	INTRODUCTION	1
1.1	Resource Management Goals	2
1.2	Current Operations and Operational Alternatives.....	3
2.0	GOALS AND OBJECTIVES OF STUDY.....	3
3.0	PROJECT NEXUS AND GEOGRAPHIC SCOPE	3
4.0	METHODS	5
4.1	Desktop Assessment of Aquatic Resources.....	5
4.2	Downstream Fish Population Study.....	5
4.2.1	Literature Based Temperature Requirements for Fish.....	5
4.2.2	Comparison of Temperature Data in Regulated and Unregulated Portions of the Study Area.....	6
4.2.3	Description of Current Fish Population	6
4.2.4	Bioenergetics Modeling.....	7
5.0	REPORTS.....	7
6.0	SCHEDULE.....	8
7.0	COST AND EFFORT.....	8
8.0	REFERENCES	8

LIST OF TABLES

TABLE 4-1	AVAILABLE TEMPERATURE DATA	6
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LIST OF FIGURES

FIGURE 4-1	AQUATIC RESOURCES STUDY AREA	4
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APPENDICES

APPENDIX A	CHRONOLOGICAL BIBLIOGRAPHY OF RELEVANT RESEARCH	
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AQUATIC RESOURCES STUDY PLAN

1.0 INTRODUCTION

Alabama Power Company (Alabama Power) is initiating the Federal Energy Regulatory Commission (FERC) relicensing of the 135-megawatt (MW) R.L. Harris Hydroelectric Project (Harris Project), FERC Project No. 2628. The Harris Project consists of a dam, spillway, powerhouse, and those lands and waters necessary for the operation of the hydroelectric project and enhancement and protection of environmental resources. These structures, lands, and water are enclosed within the FERC Project Boundary. Under the existing Harris Project license, the FERC Project Boundary encloses two distinct geographic areas, described below.

Harris Reservoir is the 9,870-acre reservoir (Harris Reservoir) created by the R.L. Harris Dam (Harris Dam). Harris Reservoir is located on the Tallapoosa River, near Lineville, Alabama. The lands adjoining the reservoir total approximately 7,392 acres and are included in the FERC Project Boundary. This includes land to 795 feet mean sea level (msl)¹, as well as natural undeveloped areas, hunting lands, prohibited access areas, recreational areas, and all islands.



The Harris Project also contains 15,063 acres of land within the James D. Martin-Skyline Wildlife Management Area (Skyline WMA) located in Jackson County, Alabama. These lands are located approximately 110 miles north of Harris Reservoir and were acquired and incorporated into the FERC Project Boundary as part of the FERC-approved Harris Project Wildlife Mitigative Plan and Wildlife Management Plan. 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 (ADCNR 2016b).

For the purposes of this study plan, “Lake Harris” refers to the 9,870-acre reservoir, adjacent 7,392 acres of project land, and the dam, spillway, and powerhouse. “Skyline” refers to the 15,063 acres of Project land within the Skyline WMA in Jackson County. “Harris Project” refers to all the lands, waters, and structures enclosed within the FERC Project Boundary, which includes both Lake Harris and Skyline. Harris Reservoir refers to the 9,870-acre reservoir only; Harris Dam refers to the dam, spillway, and powerhouse. The Project Area refers to the land and water in the Project Boundary and immediate geographic area adjacent to the Project Boundary (Alabama Power Company 2018).

Lake Harris and Skyline are located within two river basins: the Tallapoosa and Tennessee River Basins, respectively. The only waterbody managed by Alabama Power as part of their FERC license for the Harris Project is the Harris Reservoir.

¹ Also includes a scenic easement (to 800 feet msl or 50 horizontal feet from 793 feet msl, whichever is less, but never less than 795 feet msl)

Background and Existing Information

Alabama Power completed construction and began operating the Harris Project in 1983. The creation of Lake Harris converted approximately 57 miles of the Tallapoosa and Little Tallapoosa Rivers to reservoir. Combined with the hydro projects located downstream of Harris (Martin, Yates, and Thurlow), approximately 25 percent of the 264-mile Tallapoosa River mainstem has been impounded. The unimpounded reach of the Tallapoosa River between Harris Dam and the headwaters of Lake Martin is approximately 52 miles in length.

Initially, the Project only operated in a peaking mode with no intermittent flows in between peaks. Agencies and non-governmental organizations requested that Alabama Power modify operations to enhance the downstream fishery. In 2005, based on recommendations developed in cooperation with stakeholders, Alabama Power implemented a pulsing scheme for releases from Harris Dam known as the Green Plan (Kleinschmidt 2018a). The purpose of the Green Plan was to reduce the effects of peaking operations on the aquatic community downstream.

Numerous studies have been conducted in the Tallapoosa River below Harris Dam (see Appendix A). Monitoring conducted since initiation of the Green Plan has indicated a positive fish community response and increased shoal habitat availability (Irwin et al. 2011); however, there is little existing information characterizing the extent that the Green Plan has enhanced the aquatic habitat from Harris Dam downstream through Horseshoe Bend. Some results indicated a positive response by some fish species, while other research indicates that cooler stream temperatures may be affecting the reproduction, growth, and recruitment of other fish species downstream of Harris Dam (Goar 2013; Irwin and Goar 2015). The Alabama Department of Conservation and Natural Resources (ADCNR) has noted the abundance of some species is below expected levels. This could be due to several factors including sampling methodologies, thermal regime, flow regime, and/or nutrient availability.

During the October 19, 2017 issue identification workshop and meetings with resource agencies, stakeholders noted that stream temperatures in the Tallapoosa River downstream of Harris Dam are generally cooler than other unregulated streams in the same geographic area and this portion of the Tallapoosa River experiences temperature fluctuations due to peaking operations at Harris Dam. There is concern that the lower stream temperatures and temperature fluctuations are impacting the aquatic resources (especially fish) downstream of Harris Dam. The ADCNR recommended use of a Bioenergetics Model to evaluate the potential effects of temperature fluctuations due to current Project operations on fish downstream of Harris Dam.

In addition to effects on downstream fish populations discussed above, the Harris Project may have effects on other aquatic fauna within the Project Area, including macroinvertebrates such as mollusks and crayfish. Comments received on the Pre-Application Document (PAD) and Scoping Document 1 recommended that Alabama Power investigate the effects of the Harris Project on these aquatic species. Additionally, commenters suggested Alabama Power perform an assessment of the Harris Project's effects on species mobility and population health.

1.1 Resource Management Goals

FERC has a responsibility to evaluate Project impacts. Some stakeholders believe that temperatures associated with Project operations are adversely affecting fishery resources

downstream of Harris Dam. The goal of ADCNR and other resource agencies/stakeholders is to protect and enhance the health of populations of game and non-game species of fish and other aquatic fauna and their habitats.

1.2 Current Operations and Operational Alternatives

As discussed in Section 1.0, in 2005 Alabama Power implemented a pulsing scheme known as the Green Plan for releases from Harris Dam (Kleinschmidt 2018a). The purpose of the Green Plan was to reduce the effects of peaking operations on the downstream aquatic community. From 2005 to 2017, the Alabama Cooperative Fish and Wildlife Research Unit (ACFWRU) conducted monitoring of shallow-water fish and benthic macroinvertebrate communities in the Tallapoosa River downstream of Harris Dam, upstream of Harris Reservoir, and in an unregulated stream within the Tallapoosa Basin.

Any effects on aquatic resources from potential changes in operations will be analyzed in the R.L. Harris Project Operating Curve Change Feasibility Study and the Downstream Release Alternatives Study.

2.0 GOALS AND OBJECTIVES OF STUDY

The overall goal of this study is to evaluate the effects of the Harris Project on aquatic resources. This will be accomplished through desktop assessments, field studies, and laboratory studies. Alabama Power will compile and summarize data from existing information sources to provide a comprehensive characterization of aquatic resources within the Project Area. Alabama Power will conduct field and laboratory studies of the fish population in the Tallapoosa River downstream of Harris Dam through Horseshoe Bend and determine how Harris Dam may be affecting the fish community in this reach.

3.0 PROJECT NEXUS AND GEOGRAPHIC SCOPE

The Harris Project operations have direct, indirect, and potential cumulative effects on lake and downstream resources. The geographic scope of this study is Harris Reservoir, Tallapoosa River downstream of Harris Dam through Horseshoe Bend, and in selected unregulated reference streams (i.e., the Study Area) (**Figure 3-1**).

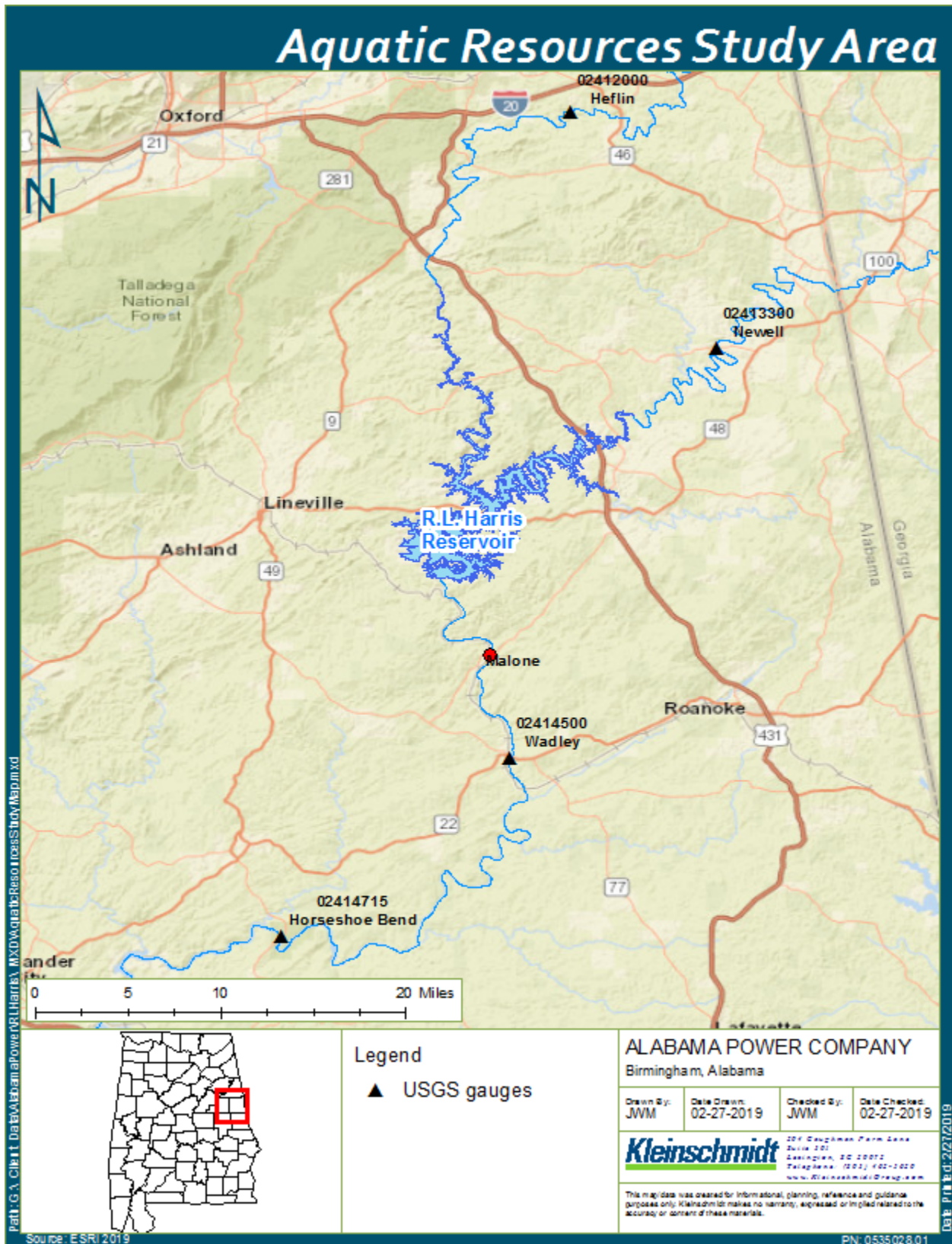


FIGURE 3-1 AQUATIC RESOURCES STUDY AREA

4.0 METHODS

Existing information, supplemented by field and laboratory data, may be used to accomplish the goals and objectives identified in Section 2.0.

4.1 Desktop Assessment of Aquatic Resources

Alabama Power will compile and summarize relevant current and historic information characterizing aquatic resources in the Study Area. Sources of information for this effort will include the following:

- Reservoir fisheries management reports;
- Scientific literature from aquatic resource studies conducted in the Study Area;
- ADCNR Natural Heritage Database data;
- Alabama Power faunal survey data; and
- State and Federal faunal survey data.

Additional sources of information and data identified by Harris Action Team (HAT) 3 will be included in the assessment.

The assessment will identify aquatic species and populations whose presence and/or sustainability within the Study Area may have been affected by the Harris Project. This assessment will describe the factors affecting their presence and sustainability.

4.2 Downstream Fish Population Study

Alabama Power and Auburn University (Auburn) will evaluate factors affecting fish populations in the Tallapoosa River below Harris Dam through field and laboratory studies. Although this study will include an assessment of the entire fish population, a subset of target species will be studied more intensively. The target species include Tallapoosa Bass (*Micropterus tallapoosae*), Channel Catfish (*Ictalurus punctatus*), and Redbreast Sunfish (*Lepomis auritus*).

Target Species for this study were selected based on several factors, including:

- The species are thought to be negatively impacted by current project operations;
- The species are common in unregulated rivers in geographical proximity;
- The species are present in sufficient numbers for collection;
- The species are hearty enough to withstand transport to laboratory and subsequent experimentation; and
- The target species are also considered recreationally important gamefish species.

4.2.1 Literature Based Temperature Requirements for Fish

Auburn will review existing information to determine preferred temperature ranges for target species, including data on specific life stages (e.g., spawning). Auburn researchers will prepare a summary of their findings and present them to the HAT 3 for review and discussion.

4.2.2 Comparison of Temperature Data in Regulated and Unregulated Portions of the Study Area

Auburn researchers will consolidate existing temperature data available for the Study Area and determine if data gaps exist. Existing temperature data is described in **Table 4-1**. Auburn will collect temperature data to address data gaps, if needed, to provide supplemental information for bioenergetics modeling (see Section 4.2.4). Auburn will compare temperatures at regulated sites (i.e., Tallapoosa River from Harris Dam to Horseshoe Bend) to unregulated sites (i.e., Newell and Heflin). The summaries and comparisons of temperature data will include metrics such as daily averages, degree days, daily range (delta), etc. Results of the temperature data analysis will be compared to the temperature requirements of target species (see Section 4.2.1) to determine how those species may be affected by baseline operations.

In addition, a subset of temperature data will be analyzed by comparing metrics from pre- and post-Green Plan temperature data.

TABLE 4-1 AVAILABLE TEMPERATURE DATA

Location	Entity	Availability
Tailrace	Alabama Power	2000 – present (Mar - Oct)
Tallapoosa River at Malone	Alabama Power	2000 – present (Mar - Oct)
Tallapoosa River at Wadley	Alabama Power	2000 – present (Mar - Oct)
	USGS	02/13/2018 - present
Tallapoosa River at Horseshoe Bend	USGS	03/02/2018 - present
Little Tallapoosa River near Newell	USGS	12/05/2017 - present
Tallapoosa River near Heflin	USGS	12/05/2017 - present

4.2.3 Description of Current Fish Population

Auburn and Alabama Power will perform field sampling to characterize the current fishery in deep and shallow water habitats in the Study Area and in unregulated portions of the Tallapoosa River. Wadeable, shallow water habitats will be sampled using a standardized protocol known as the 30+2 method (O’Neil et al. 2006). Backpack electrofishing will consist of 10 efforts each in riffle, run, and pool habitats, with an additional 2 shoreline efforts. Non-wadeable, deepwater habitats will be sampled using boat and barge electrofishing under standardized protocols (O’Neil et al. 2014).

Auburn will perform boat sampling quarterly for 7 events between fall 2018 and fall 2020 in reaches at varying distances downstream of Harris Dam, including sites in the tailrace, near Malone, Wadley, Horseshoe Bend, and at least one additional site on an unregulated reach. Auburn researchers may employ additional passive capture techniques as conditions warrant (e.g., hoop nets, minnow traps, etc.). Data from ADEM’s 2018 fish surveys in the Tallapoosa River may be used to supplement collections by Auburn and Alabama Power.

At minimum, researchers will identify all collected fish species and record length and weight. A sub-sampling of length and weights may be used for highly abundant species. The gut contents, scales, otoliths, and spines of some species may be retained to obtain age, growth, and diet data

for use in bioenergetics modeling. Age and growth data for some species will be compared to data from similar streams. Common metrics such as abundance, diversity, evenness, etc. will be calculated for each study reach.

4.2.4 Bioenergetics Modeling

Auburn will develop a Bioenergetics Model for the three target fish species. The model will be used to assess the extent to which Harris Dam operations affect fish growth in the Tallapoosa River. The Bioenergetics Model will use a variety of inputs including: existing literature/studies, water temperature data (see Section 4.2.2), age, growth, and diet data (see Section 4.2.3), fish tracking data, and laboratory testing.

Auburn will perform a field telemetry study by implanting fish with electromyogram (EMG) coded radio tags. The EMG tags will measure fish movement, including tail-beat frequency, to provide an in-situ measure of energy expenditures across the range of flow conditions experienced during baseline Harris Dam operations for use in the bioenergetics model.

Auburn will perform respirometry testing in a laboratory facility to determine the relative effects of temperature regimes on fish energy expenditures. This testing will include an assessment of the effects of “rapid” temperature change on respiration. Testing scenarios will be developed by HAT 3 after the initial assessment of temperature data (see Section 4.2.2).

5.0 REPORTS

As the various components of this study are completed and available for review and comment, Alabama Power will share results with HAT 3 through written documentation and stakeholder meetings, as discussed in Section 2.0 of the PAD. Stakeholders will have between 7-30 days to review and comment on documents, depending on the document length and complexity. Additional meetings (in-person and via conference call) will be held as necessary to discuss study results and solicit stakeholder input. Draft and final reports, if applicable to the study, will be filed with FERC as well as provided to the HAT members and posted to the Harris relicensing website for access by the general public.

As part of the Integrated Licensing Process (ILP), FERC requires licensees to file two status reports: the Initial Study Report and Updated Study Report. These reports provide a status update on all the FERC-approved relicensing studies. Alabama Power will prepare these FERC reports per the requirements of 18 CFR 5.15(c) and (f).

While not required in FERC’s ILP process, Alabama Power will also file two Progress Updates during the relicensing process to provide additional updates to FERC, stakeholders, and the general public on the status of the relicensing studies, any interim work products, and any draft and final reports issued. The Progress Update will also include HAT meeting summaries. The first Progress Update will be distributed (and filed with FERC) in October 2019, approximately six months prior to the Initial Study Report; the second update will be distributed (and filed with FERC) in October 2020, approximately six months prior to the Updated Study Report.

6.0 SCHEDULE

This schedule corresponds to the FERC-approved Harris Project Process Plan and Schedule. Consultation meeting dates will be finalized with HAT 3 members upon FERC approval of the study plan.

FERC Study Plan Determination	April 2019
Literature Review	April 2019 – November 2019
Field Work (Auburn University)	May 2019 – November 2020
Progress Update	October 2019
Bioenergetics Modeling	February 2020 – November 2020
HAT 3 Meeting on progress to date	March 2020
ILP Initial Study Report	April 2020
Initial Study Report Meeting	April 2020
HAT 3 Meeting(s), as needed	April 2020 – April 2021 ²
Draft Study Report (desktop assessment, downstream fish population study, literature-based water temperature requirements)	July 2020
Progress Update	October 2020
Final Study Report (bioenergetics analysis)	April 2021
ILP Updated Study Report	April 2021
Updated Study Report Meeting	April 2021
File Preliminary Licensing Proposal	By July 3, 2021
File Final License Application with FERC	November 2021

7.0 COST AND EFFORT

Alabama Power estimates the cost to consult on and implement this study plan, including costs to collect and review existing information, conduct field and laboratory studies, and to and develop draft and final reports, is \$350K.

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² Meeting dates will be determined with the HAT 3 members based on results of field work, desktop analyses, and modeling studies.

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APPENDIX A

CHRONOLOGICAL BIBLIOGRAPHY OF RELEVANT RESEARCH

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