

FEDERAL ENERGY REGULATORY COMMISSION
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OFFICE OF ENERGY PROJECTS

Project No. 2336-094 – Georgia
Lloyd Shoals Hydroelectric
Project
Georgia Power Company

Courtenay O’Mara, P.E.
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Southern Company Generation
241 Ralph McGill Boulevard, NE, BIN 10193
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Reference: Study Plan Determination for the Lloyd Shoals Hydroelectric Project

Dear Ms. O’Mara:

Pursuant to 18 C.F.R. § 5.13(c) of the Commission’s regulations, this letter contains the study plan determination for the Lloyd Shoals Hydroelectric Project No. 2336 (project). The project is located on the Ocmulgee River in Butts, Henry, Jasper, and Newton Counties, Georgia. The determination is based on the study criteria set forth in section 5.9(b) of the Commission’s regulations, applicable law, Commission policy and practice, and the record of information.

Background

On December 20, 2018, Georgia Power Company (Georgia Power) filed a proposed study plan (PSP) with eight studies in support of its intent to relicense the project. The PSP addresses the following issues and resources: (1) geology and soils; (2) water resources, including project operation and water quality; (3) fish and aquatic resources; (4) American eel abundance and upstream movements; (5) terrestrial, wetland, and riparian resources; (6) rare, threatened, and endangered species; (7) recreation and land use; and (8) cultural resources.

Georgia Power held Study Plan Meetings on the PSP on January 16, 2019, and February 26, 2019. Comments on the PSP were filed by the Georgia Department of Natural Resources (Georgia DNR), the U.S. Fish and Wildlife Service (FWS), the National Marine Fisheries Service (NMFS), the U.S. Environmental Protection Agency

(EPA), the Georgia DNR Historic Preservation Division (Georgia HPD), the Muscogee (Creek) Nation, Ms. Kathleen O'Neal, and Mr. Leonard Blakeley.

On April 19, 2019, Georgia Power filed a Revised Study Plan (RSP). Comments on the RSP were filed by NMFS, the Muscogee (Creek) Nation, and Mr. Lou DuFresne.

General Comments

Some comments on the RSP do not directly address study plans. For example, Mr. DuFresne's comments discuss the management of water levels in the upper reaches of Lake Jackson prior to high-flow events. This determination does not address such comments, but rather addresses comments specific to the merits of the proposed studies submitted pursuant to section 5.13 of the Commission's regulations and received thereon.

Study Plan Determination

Georgia Power's RSP is approved, with the staff-recommended modifications discussed in Appendix B. As indicated in Appendix A, of the eight studies proposed by Georgia Power, seven are approved as filed by Georgia Power and one is approved with staff-recommended modifications. Appendix B discusses the specific modifications to the study plan and the bases for modifying, adopting, or not adopting studies. Although Commission staff considered all study plan criteria in section 5.9 of the Commission's regulations, Appendix B only references the specific study criteria that are particularly relevant to the determination.

Studies for which no issues were raised in comments on the RSP are not discussed in this determination. Unless otherwise indicated, all components of the approved studies not modified in this determination must be completed as described in Georgia Power's RSP. Pursuant to section 5.15(c)(1) of the Commission's regulations, the Initial Study Report for all studies in the approved study plan must be filed by May 19, 2020.

Nothing in this study plan determination is intended, in any way, to limit any agency's proper exercise of its independent statutory authority to require additional studies. In addition, Georgia Power may choose to conduct any study not specifically required herein that it feels would add pertinent information to the record.

If you have any questions, please contact Navreet Deo at navreet.deo@ferc.gov, or (202) 502-6304.

Sincerely,

Terry L. Turpin
Director
Office of Energy Projects

Enclosures: Appendix A – Summary of studies subject to this determination
Appendix B – Staff’s recommendations on proposed studies

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APPENDIX A**SUMMARY OF DETERMINATIONS ON
PROPOSED STUDIES**

Study	Recommending Entity	Approved	Approved with Modifications
Geology and Soils	Georgia Power	X	
Water Resources	Georgia Power	X	
Fish and Aquatic Resources	Georgia Power	X	
American Eel Abundance and Upstream Movements	Georgia Power		X
Terrestrial, Wetland, and Riparian Resources	Georgia Power	X	
Rare, Threatened, and Endangered Species	Georgia Power	X	
Recreation and Land Use	Georgia Power	X	
Cultural Resources	Georgia Power	X	

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APPENDIX B

STAFF'S RECOMMENDATIONS ON PROPOSED STUDIES

The following discusses staff's recommendations on studies proposed by Georgia Power Company (Georgia Power). We base our recommendations on the study criteria outlined in the Commission's regulations [18 C.F.R. section 5.9(b)(1)-(7)]. Except as explained below, the Revised Study Plan (RSP), filed on April 19, 2019, adequately addresses all study needs at this time.

American Eel Abundance and Upstream Movement Study

Applicant's Proposed Study

Fisheries sampling on the Ocmulgee River from 1987 to 2014, indicates the presence of American eel in the Ocmulgee River Basin downstream from Lloyd Shoals Dam. The data provides information on the size, range, life stage, and abundance of eels migrating up to Lloyd Shoals Dam, but does not address the timing of upstream movement. Georgia Power proposes an American Eel Abundance and Upstream Movement Study to supplement this information.

The goals of the study are to: (1) capture the onset and peak period of the spring upstream migration; and (2) characterize the seasonal variation in eel abundance and upstream movement as the water temperature approaches, and falls below, 15 degrees Celsius (°C). The specific objectives of Georgia Power's proposed American Eel Abundance and Upstream Migration Study are to:

- (1) identify the life stage and size range of American eel migrating to Lloyd Shoals Dam;
- (2) identify the timing of upstream movements of American eel migrating to Lloyd Shoals Dam in terms of seasonality and correlation to environmental variables, including discharge, water temperature, and the percent of moon illumination; and
- (3) calculate indices of abundance of American eel migrating to the Lloyd Shoals Project.

Georgia Power proposes to sample once per month when eels are likely to be migrating, based on water temperature and discharge. Sampling would occur when water

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temperature is consistently above 15°C and below 28°C, which Georgia Power identifies as eight months of the year; February through June, and September through November. Sampling would occur when river discharge is relatively high.

In the first year of the study, Georgia Power would conduct daytime backpack and boat electrofishing (conducted during off-peak flow releases from Lloyd Shoals Dam), as appropriate for water depth and habitat conditions in each of the eight proposed months. Also in the first year, Georgia Power would deploy eel traps at the dam for one multi-day sampling event (including setting the eel traps overnight for at least two consecutive nights) in each of the eight proposed months. Georgia Power proposes to conduct a second year of study, if needed, which would focus on nighttime surveys of eel arriving at the base of Lloyd Shoals Dam, and could involve flashlight surveys and eel trapping. Georgia Power proposes to develop the study approach for any second year of study in consultation with the U.S. Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS), after reviewing the findings of the first year of study.

Comments on the Study

In its comments on the RSP, NMFS recommends that: (1) sampling occur within the study area for a minimum of 2 years; (2) the study plan include year-round sampling; and (3) Georgia Power use nighttime boat electrofishing. NMFS states that 2 years of sampling is necessary to capture a range of environmental variation and potential eel behavioral responses to the environmental conditions. NMFS also states that year-round sampling is necessary because previous surveys on the Ocmulgee River show eels are present year-round. Finally, NMFS supports boat electrofishing at night by pointing to the fact that elver¹ migration typically occurs at night, and is correlated with moon phase, increased river discharge, and reaching a minimum water temperature of 10 to 12°C.

Discussion and Staff Recommendations

Study Duration

Georgia Power sampled American eel in the Ocmulgee River by electrofishing in 1987 and 1988. The 1988 sampling included sampling eel quarterly at four locations

¹ The term elver refers to the pigmented, juvenile stage of American eel that enters freshwater rivers and migrates upstream.

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downstream from Lloyd Shoals Dam.² In addition, American eel were sampled in the Ocmulgee River as part of the surveys conducted for the National Rivers and Streams Assessment (EPA, 2016),³ and by the Georgia Department of National Resources in 2014. This information, along with the information from Georgia Power's proposed study, should be sufficient to address NMFS's concern regarding year-to-year variability in environmental conditions and associated eel population characteristics and behavior responses [section 5.9(b)(7)]. In addition, multiple eel age classes inhabit the Ocmulgee River,⁴ including large yellow eels that would typically be considered non-migratory.⁵ Electrofishing would not necessarily distinguish a migrating eel from one inhabiting its home range, whereas setting eel traps at the base of Lloyd Shoals Dam is more likely to capture juvenile eels migrating upstream. Sampling potentially non-migratory yellow eels would provide limited data toward the goal of identifying movement near the dam and establishing a need for upstream eel passage [section 5.9(b)(2)].

One year of electrofishing data, combined with existing eel sampling data, should: (1) support the first study objective of helping to identify life stage and size of eels in the system; and (2) provide some information toward the study's second and third objectives related to timing (or seasonality) of eel movement and numbers. Trapping eels at the base of Lloyd Shoals Dam would sample migratory eels almost exclusively. This data would inform the second and third objectives of the study more directly than electrofishing. Therefore, a second year of electrofishing sampling, as requested by NMFS, is not warranted [section 5.9(b)(6); section 5.9(b)(7)].

² Station 1 was located 0.6 to 1.1 miles downstream from Lloyd Shoals Dam; Station 2 was located 4.2 to 4.8 miles downstream; Station 3 was located 14.0 to 15.0 miles downstream; and Station 4 was located 27.6 to 28.2 miles downstream.

³ See U.S. Environmental Protection Agency. 2016. National rivers and streams assessment, 2008-2009: a collaborative survey. Office of Water and Office of Research and Development. EPA/841/R-16/007. Washington, D.C. March 2016.

⁴ See Table 5-1 in Georgia Power's RSP.

⁵ See Atlantic States Marine Fisheries Commission. 2012. American eel benchmark stock assessment. Stock Assessment Report No. 12-01. Accepted for management use May 2012.

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Although we do not recommend a study plan provision stipulating a second year of studies at this time, we note that the ILP regulations provide a procedure for modifying the study plan, as necessary, based in part, on the results of the first year of studies.

Seasonality of Sampling

Studies have reported that upstream movement triggers for juvenile eels include water temperatures that exceed 15°C (Hammond and Welsh, 2009),⁶ range from 19°C to 28°C (Walsh and Liller, 2013),⁷ and are above 10°C to 12°C (Sullivan *et al.*, 2009).⁸ In all three studies, movement was associated with high discharge and, in the latter study, with a dark moon phase. These studies, along with other literature, indicate that the exact timing of upstream eel movement in a river system varies considerably, depending on water temperature.

There is a lack of information regarding the seasonality of eel movement on the Ocmulgee River. Moreover, two of the objectives of the study are to gain an understanding of the seasonality of eel movement and numbers. Because water temperature is dependent on season, using water temperature as a trigger for sample timing would provide information on the seasonality of eel movement and numbers in the system.

As noted above, studies show that American eel exhibit upstream movement behavior when water temperatures are between 10°C and 28°C. According to Georgia Power, and based on Ocmulgee River temperatures downstream from Lloyd Shoals

⁶ See Hammond, S.D. and S.A. Welsh. 2009. Seasonal movements of large yellow American eels downstream of a hydroelectric dam, Shenandoah River, West Virginia. *American Fisheries Society Symposium* 58:309-323.

⁷ See Walsh, S.A. and H.L. Liller. 2013. Environmental correlates of upstream migration of yellow-phase American eels in the Potomac River drainage. *Transactions of the American Fisheries Society* 141(2):483-491.

⁸ See Sullivan, M.C., M.J. Wuenschel, and K.W. Able. 2009. Inter and intra-estuary variability in ingress, condition, and settlement of the American eel *Anguilla rostrata*: implications for estimating and understanding recruitment. *Journal of Fish Biology*, 74(9):1949-1969.

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Dam,⁹ the periods on the Ocmulgee River when water temperatures are suitable for upstream juvenile eel movement are February through June and September through November. Water temperatures are too warm in July and August and too cold in December and January¹⁰ for significant juvenile eel movement to occur.

For the reasons discussed above, sampling for a full year (12 months), as recommended by NMFS, is not warranted [section 5.9(b)(6); section 5.9(b)(7)]. Using 15°C as the water temperature threshold for commencing sampling, as proposed by Georgia Power, would likely cause Georgia Power to miss the early part of the upstream migration. The timing of upstream eel movement is dependent upon water temperatures, and the study objectives include gaining an understanding of the full range of eel migration timing (i.e., seasonality) and numbers. **Therefore, we recommend using the minimum water temperature threshold of 10°C, as cited by NMFS, and the maximum water temperature threshold of 28°C, as proposed by Georgia Power, for establishing when sampling should begin and end [section 5.9(b)(6)].**

Sampling Methodology

Regarding NMFS's recommendation that Georgia Power use nighttime boat electrofishing to collect juvenile eels, the information provided in Table 5-1 of the RSP indicates that daytime electrofishing is effective for collecting eels in the Ocmulgee River [section 5.9(b)(6)]. In addition, Georgia Power proposes to sample American eel at night using eel traps, which is also a generally accepted method for American eel sampling. As discussed above, trapping eels at the base of the dam would confirm upstream migrating eel approaching Lloyd Shoals Dam, and using multiple eel trap(s) fished throughout the entire night would be a more efficient means to collect this information as compared to nighttime boat electrofishing over no more than a few hours. Therefore, we do not

⁹ Figure 5-1 in Georgia Power's RSP shows the 2017 and 2018 daily water temperatures for a U.S. Geological Survey gage located on the Ocmulgee River downstream from Lloyd Shoals Dam (USGS Gage No. 02215000).

¹⁰ A number of studies have shown that upstream eel migration is minimal during winter months. *See e.g.*, Shepard, S.L. 2015. American eel biological species report. Supplement to, Endangered and Threatened Wildlife and Plants: 12-Month Petition for the American eel (*Anguilla rostrata*). Docket Number FWS-HQ-ES-2015-0143. U.S. Fish and Wildlife Service, Region 5. June 2015.

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recommend nighttime boat electrofishing to sample American eels at the Lloyd Shoals Project.

Cultural Resources Study

Applicant's Proposed Study

Georgia Power proposes a Cultural Resources Study to: (1) identify historic resources through a literature review; (2) determine if any identified properties are eligible for listing on the National Register of Historic Places (National Register); and (3) evaluate the potential effects of continued project operation on the historic properties. The study would include a first year report with recommendations and an assessment of sites currently monitored by Georgia Power, as well as those assessed in prior cultural resources studies, to evaluate the effectiveness of the current historic properties management plan (HPMP). Georgia Power would provide photographic documentation of the project dam, powerhouse, and associated equipment.

Comments on the Study

In comments on the RSP, the Muscogee (Creek) Nation requests that the review of previously conducted surveys consider whether the survey site was covered adequately. In particular, the tribe asks that Georgia Power closely examine cultural resource survey sites for which prior evaluation predates the year 2000 to determine if the previous evaluation sufficiently covers the area of concern. The tribe states that additional testing may be necessary in some of the areas based on the results of Georgia Power's review.

Discussion and Staff Recommendation

Brockington and Associates conducted a cultural resource study in 1988 and 1989 as part of the Lloyd Shoals Project's previous relicensing. The study included a review of relevant local and regional cultural resource documents, multiple days of on-site reconnaissance by an archaeologist and historian, and evaluation studies (Resource Inventory I). Field research and general reconnaissance of lake shoreline areas and associated creek and river drainages (Tussahaw Creek; South, Yellow, and Alcovy Rivers) was accomplished by boat and on foot. Brockington and Associates conducted a cultural resource inventory and evaluation (Resource Inventory II) to determine if cultural properties were present within the project boundary, and to assess the eligibility of any properties for the National Register of Historic Places. Field inventory methods consisted of screen shovel cutting and surface examination of

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cleared areas. Georgia Power proposes to review the pre-2000 studies, giving specific attention to the adequacy of survey coverage during the previous investigation.

Further, six of the eligible, or potentially eligible, sites from the previous studies are included in Georgia Power's HPMP for the project. These sites are eligible for the National Register, and are monitored annually, with a report submitted to FERC.

Georgia Power's proposal to review survey sites assessed in previous cultural resource studies would be adequate to determine if the area of concern is sufficiently evaluated. Therefore, we do not recommend modifying the Cultural Resources Study to include testing of additional survey sites at this time. **Based on the results of the first year of study, the need for additional evaluation of previous survey sites can be addressed through the study modification process after the first year of study, if necessary.**

Document Content(s)

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