600 North 18th Street
Hydro Services 16N-8180
Birmingham, AL 35203
205 257 2251 tel
arsegars@southernco.com

November 19, 2021

VIA ELECTRONIC FILING

Project No. 2628-065
R.L. Harris Hydroelectric Project
Transmittal of the Final Operating Curve Change Feasibility Analysis Phase 2 Report

Ms. Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street NE
Washington, DC 20426

Dear Secretary Bose,

Alabama Power Company (Alabama Power) is the Federal Energy Regulatory Commission (FERC or Commission) licensee for the R.L. Harris Hydroelectric Project (Harris Project) (FERC No. 2628-065). On April 12, 2019, FERC issued its Study Plan Determination[1] (SPD) for the Harris Project, approving Alabama Power's ten relicensing studies with FERC modifications. On May 13, 2019, Alabama Power filed Final Study Plans to incorporate FERC's modifications and posted the Final Study Plans on the Harris relicensing website at www.harrisrelicensing.com.

Consistent with FERC's April 12, 2019 SPD, Alabama Power filed the Draft Operating Curve Change Feasibility Analysis Phase 2 Report (Draft Report) on April 12, 2021. Stakeholders were to submit their comments to Alabama Power on the Draft Report by May 11, 2021. Comments on the Draft Report were submitted by the Lake Wedowee Property Owners Association, Alabama Department of Conservation and Natural Resources, FERC, Alabama Rivers Alliance, and an individual stakeholder. These comments are included in the updated consultation record (April 2019 through September 2021)[2] for this study (Attachment 1) and responses to these comments are provided in Attachment 2. The final Operating Curve Change Feasibility Analysis Phase 2 Report is contained in Attachment 3.

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[1] Accession Number 20190412-3000.

[2] Note that in its October 1, 2021 comments on the Preliminary Licensing Proposal (Accession No. 20211001-3009), FERC included comments on the *Draft Operating Curve Change Feasibility Analysis Phase 2 Report* that have been addressed in the Final Report (including a new appendix on the "extended summer pool" alternatives). These comments are included in the consultation record.

If there are any questions concerning this filing, please contact me at arsegars@southernco.com or 205-257-2251.

Sincerely,

Angela Anderegg

Angie Anderegg
Harris Relicensing Project Manager

Attachment 1 – Operating Curve Change Feasibility Analysis Consultation Record (April 2019 – September 2021)
Attachment 2 – Comments and Responses on the Draft Operating Curve Change Feasibility Analysis Phase 2 Report
Attachment 3 – Final Operating Curve Change Feasibility Analysis Phase 2 Report

cc: Harris Stakeholder List

Attachment 1
Operating Curve Change Feasibility Analysis Consultation Record (April 2019 – September 2021)

Benjamin M Bennett, Wadley, AL.
I have spent most of my life on the river. But it is sad to see the banks and the old trees falling in the river. 25 foot of the banks gone in some places . Places where the water was 10 to 20 foot deep now 5 foot . And I know there are a lot of Native American burial grounds up and down the river either gone or will be within 2 years because of erosion. Something has to be done soon. Why cant we let what water comes in the lake come out ?

HAT 1 meeting - September 11, 2019

Anderegg, Angela Segars

Tue 8/13/2019 6:18 PM

To: 'harrisrelicensing@southernco.com' <harrisrelicensing@southernco.com>
Bcc damon.abernethy@dcnr.alabama.gov <damon.abernethy@dcnr.alabama.gov>; steve.bryant@dcnr.alabama.gov <steve.bryant@dcnr.alabama.gov>; stan.cook@dcnr.alabama.gov <stan.cook@dcnr.alabama.gov>; taconya.goar@dcnr.alabama.gov <taconya.goar@dcnr.alabama.gov>; chris.greene@dcnr.alabama.gov <chris.greene@dcnr.alabama.gov>; keith.henderson@dcnr.alabama.gov <keith.henderson@dcnr.alabama.gov>; mike.holley@dcnr.alabama.gov <mike.holley@dcnr.alabama.gov>; evan.lawrence@dcnr.alabama.gov <evan.lawrence@dcnr.alabama.gov>; nick.nichols@dcnr.alabama.gov <nick.nichols@dcnr.alabama.gov>; brian.atkins@adeca.alabama.gov <brian.atkins@adeca.alabama.gov>; tom.littlepage@adeca.alabama.gov <tom.littlepage@adeca.alabama.gov>; jhaslbauer@adem.alabama.gov <jhaslbauer@adem.alabama.gov>; cljohnson@adem.alabama.gov <cljohnson@adem.alabama.gov>; mlen@adem.alabama.gov <mlen@adem.alabama.gov>; fal@adem.alabama.gov <fal@adem.alabama.gov>; djmoore@adem.alabama.gov <djmoore@adem.alabama.gov>; arsegars@southernco.com <arsegars@southernco.com>; dkanders@southernco.com <dkanders@southernco.com>; jefbaker@southernco.com <jefbaker@southernco.com>; jcarlee@southernco.com <jcarlee@southernco.com>; kechandl@southernco.com <kechandl@southernco.com>; mcoker@southernco.com <mcoker@southernco.com>; cggoodma@southernco.com <cggoodma@southernco.com>; sgraham@southernco.com <sgraham@southernco.com>; ammcvica@southernco.com <ammcvica@southernco.com>; tlmills@southernco.com <tlmills@southernco.com>; cmnix@southernco.com <cmnix@southernco.com>; kodom@southernco.com <kodom@southernco.com>; alpeeple@southernco.com <alpeeple@southernco.com>; dpreston@southernco.com <dpreston@southernco.com>; scsmith@southernco.com <scsmith@southernco.com>; twstjohn@southernco.com <twstjohn@southernco.com>; dawhatle@southernco.com <dawhatle@southernco.com>; cchaffin@alabamarivers.org <cchaffin@alabamarivers.org>; clowry@alabamarivers.org <clowry@alabamarivers.org>; gjobsis@americanrivers.org <gjobsis@americanrivers.org>; kmo0025@auburn.edu <kmo0025@auburn.edu>; devridr@auburn.edu <devridr@auburn.edu>; irwiner@auburn.edu <irwiner@auburn.edu>; wrighr2@aces.edu <wrighr2@aces.edu>; lgallen@balch.com <lgallen@balch.com>; jhancock@balch.com <jhancock@balch.com>; allan.creamer@ferc.gov <allan.creamer@ferc.gov>; rachel.mcnamara@ferc.gov <rachel.mcnamara@ferc.gov>; sarah.salazar@ferc.gov <sarah.salazar@ferc.gov>; monte.terhaar@ferc.gov <monte.terhaar@ferc.gov>; gene@wedoweelakehomes.com <gene@wedoweelakehomes.com>; kate.cosnahan@kleinschmidtgroup.com <kate.cosnahan@kleinschmidtgroup.com>; colin.dinken@kleinschmidtgroup.com <colin.dinken@kleinschmidtgroup.com>; amanda.fleming@kleinschmidtgroup.com <amanda.fleming@kleinschmidtgroup.com>; chris.goodell@kleinschmidtgroup.com <chris.goodell@kleinschmidtgroup.com>; henry.mealing@kleinschmidtgroup.com <henry.mealing@kleinschmidtgroup.com>; jason.moak@kleinschmidtgroup.com <jason.moak@kleinschmidtgroup.com>; kelly.schaeffer@kleinschmidtgroup.com <kelly.schaeffer@kleinschmidtgroup.com>; jessecunningham@msn.com <jessecunningham@msn.com>; mdollar48@gmail.com <mdollar48@gmail.com>; drheinzen@charter.net <drheinzen@charter.net>; sforehand@russelllands.com <sforehand@russelllands.com>; 1942jthompson420@gmail.com <1942jthompson420@gmail.com>; nancyburnes@centurylink.net <nancyburnes@centurylink.net>; sandnfrench@gmail.com <sandnfrench@gmail.com>; lgarland68@aol.com <lgarland68@aol.com>; rbmorris222@gmail.com <rbmorris222@gmail.com>; Ira Parsons (irapar@centurytel.net) <irapar@centurytel.net>; mitchell.reid@tnc.org <mitchell.reid@tnc.org>; richardburnes3@gmail.com <richardburnes3@gmail.com>; eilandfarm@aol.com <eilandfarm@aol.com>; athall@fujifilm.com <athall@fujifilm.com>; ebt.drt@numail.org <ebt.drt@numail.org>; georgettraylor@centurylink.net <georgettraylor@centurylink.net>; beckyrainwater1@yahoo.com <beckyrainwater1@yahoo.com>; dbronson@charter.net <dbronson@charter.net>; wmcampbell218@gmail.com <wmcampbell218@gmail.com>; jec22641@aol.com <jec22641@aol.com>; sonjaholloman@gmail.com <sonjaholloman@gmail.com>; butchjackson60@gmail.com <butchjackson60@gmail.com>; donnamat@aol.com <donnamat@aol.com>; goxford@centurylink.net <goxford@centurylink.net>; mhpwedowee@gmail.com <mhpwedowee@gmail.com>; jerrelshell@gmail.com <jerrelshell@gmail.com>; bsmith0253@gmail.com <bsmith0253@gmail.com>; inspector_003@yahoo.com

<inspector_003@yahoo.com>; paul.trudine@gmail.com <paul.trudine@gmail.com>; lindastone2012@gmail.com <lindastone2012@gmail.com>; granddadth@windstream.net <granddadth@windstream.net>; trayjim@bellsouth.net <trayjim@bellsouth.net>; straylor426@bellsouth.net <straylor426@bellsouth.net>; robert.a.allen@usace.army.mil <robert.a.allen@usace.army.mil>; randall.b.harvey@usace.army.mil <randall.b.harvey@usace.army.mil>; james.e.hathorn.jr@sam.usace.army.mil <james.e.hathorn.jr@sam.usace.army.mil>; lewis.c.sumner@usace.army.mil <lewis.c.sumner@usace.army.mil>; jonas.white@usace.army.mil <jonas.white@usace.army.mil>; gordon.lisa-perras@epa.gov <gordon.lisa-perras@epa.gov>; holliman.daniel@epa.gov <holliman.daniel@epa.gov>; jennifer_grunewald@fws.gov <jennifer_grunewald@fws.gov>; jeff_powell@fws.gov <jeff_powell@fws.gov>; jeff_duncan@nps.gov <jeff_duncan@nps.gov>

HAT 1,

Alabama Power Company will be hosting a series of HAT meetings on **Wednesday, September 11, 2019 at the Oxford Civic Center,** 401 Mccullars Ln, Oxford, AL 36203. The HAT 1 meeting will be from **9:00 to 11:00**. The purpose of the HAT 1 meeting is to review the models, model assumptions, inputs and scenarios, and to review the schedule for deliverables and respond to stakeholder questions on the models. This is for both the Operating Curve Change Feasibility Analysis and the Downstream Release Alternatives studies. Note that Alabama Power will not be presenting results of any of the modeling efforts at this meeting; however we will be explaining how the analyses will provide results.

Please RSVP by Friday, September 6, 2019. Lunch will be provided (~11:45) so please indicate any food allergies or vegetarian preferences on or before September 6, 2019. I encourage everyone to attend in person. If this is not feasible, we are also offering a Skype option (info below). It would be ideal to join on your computer as we will be viewing presentations and maps.

If you have any questions about the agenda or meeting, please email or call me at ARSEGARS@southernco.com or (205) 257-2251.

Join Skype Meeting [meet.lync.com]

Trouble Joining? Try Skype Web App [meet.lync.com]

Join by phone

Toll number: +1 (207) 248-8024

Find a local number [dialin.lync.com]

Conference ID: 892052380

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

HAT 1 (Project Operations) Stakeholder Meeting Summary
September 11, 2019
9 am to 11 am
Oxford Civic Center, Oxford, AL

Participants:
See Attachment A

Participants by Phone:
Chuck Denman – Downstream Property Owner
Sarah Salazar – FERC
Monte TerHaar – FERC
Kyrstin Wallach – FERC

Action Items:

- Alabama Power will post the HAT 1 meeting summary and all meeting materials to the Harris Relicensing website (www.harrisrelicensing.com)

Summary
The following summarizes the September 11, 2019 Harris Action Team (HAT) 1 (Project Operations) meeting. The meeting presentation is included in Attachment B; therefore, this meeting summary focuses on the overall meeting purpose, highlights of the presentation, and stakeholders' questions/comments and Alabama Power's responses.

Introduction – Angie Anderegg (Alabama Power)
Angie introduced the HAT 1 meeting purpose, reviewed the safety procedures, and introduced participants in the meeting room and by phone. The purpose of the HAT 1 meeting was to discuss all the models, the methods, and the model inputs and outputs (how the model will be used) for the Operating Curve Change Feasibility Analysis and the Downstream Release Alternatives Studies.

Operating Curve Change Feasibility Analysis – Kenneth Odom (Alabama Power)
Kenneth presented a detailed overview of the three models: Hydrologic Engineering Center (HEC) – Statistical Software Package (SSP) (HEC-SSP) and the Flood Frequency Analysis (HEC-FFA); the HEC-Reservoir Simulation (HEC-RES-Sim); and HEC-River Analysis System (HEC-RAS). Kenneth explained how each of the tools were used in the process and how Alabama Power will use these tools in evaluating the baseline condition (existing winter pool elevation) and the four alternative winter pool elevations (raising the winter curve by 1, 2, 3, and 4 feet). Kenneth also explained that the 100-year flood is a high streamflow event that has a 1 percent chance of being equaled or exceeded in any year. Barry Morris (Lake Wedowee Property Owners Association-LWPOA) asked Kenneth to explain the difference between peak and inflow volume. Kenneth responded that the peak inflow is the maximum inflow – like the instantaneous peak. Inflow volume is the volume (acre-feet) that occurs over the full duration of the storm, which provides a better picture of the area occupied in the reservoir. This volume is cumulative over a flow event.

Barry asked about other data inputs in addition to the U.S. Geological Survey (USGS) that Alabama Power would consider during a flood event. Kenneth noted that Alabama Power uses a network of rainfall gages in addition to the stream flow gages. Additionally, Alabama Power knows the amount of water going through the forebay and spillway, which allows inflow as well as outflow to be calculated.

Barry Morris asked about the forebay water quality modeling. Jason Moak (Kleinschmidt) noted that the forebay water quality modeling would be used to address effects of the alternative winter pool elevations on water quality and temperature in the reservoir. Barry asked if the forebay modeling focused on temperature and dissolved oxygen; Kenneth stated that while the focus of the study is evaluating impacts to DO and temperature, the Environmental Fluid Dynamics Code (EFDC) model does incorporate other water quality/chemistry data.

Downstream Release Alternatives Study – Kenneth Odom

Kenneth also reviewed the tools for the Downstream Alternatives Study. Taconya Goar (Alabama Department of Conservation and Natural Resources – ADCNR) asked if this study would also include flood flows downstream. Angie Anderegg clarified that Alabama Power would review high, normal, and low flow operations in the Downstream Release Alternatives Study.

FERC staff asked if Alabama Power had determined what the modified Green Plan would entail. Jason Moak responded that Alabama Power is working to complete the habitat study and, based on the results of that study, Alabama Power will better define modifications to the existing Green Plan. A stakeholder asked about the difference between the continuous minimum flow alternative and the Green Plan and whether the Green Plan would have a minimum flow. Angie Anderegg responded that the Green Plan does not have a continuous minimum flow; however, the minimum flow alternative is the same daily volume (150 cfs) as the Green Plan pulses and the modified Green Plan would likely include changes to the timing of those pulses. Angie provided an example of how Alabama Power could modify the Green Plan to include shifting the pulses to occur in the early morning hours (e.g., 3 am) to support kayaking/boating activity later in the day.

Alabama Power discussed the cross-section data used to develop the HEC-RAS model. Jason Moak noted that this data will be available as x, y, and z points, and currently there are over 200 between the dam and Jaybird Landing. Donna Matthews asked if any of the 200 transects were monitoring real time data. Jason Moak responded that the transects are not monitors but are necessary to build the downstream HEC-RAS model. Alabama Power has deployed 20 level logger monitors in the Tallapoosa River below Harris Dam that are collecting data (elevation and temperature). Jason also noted that the USGS has recently installed a gage at Malone. Albert Eiland (downstream property owner) shared his experience with the high flow events in the Tallapoosa River and its effect on his property. He is concerned that raising the winter curve at Lake Harris will reduce any flood protection he may have on his property downstream of the Harris Dam. Barry Morris asked at what point in a rain event does the U.S. Army Corps of Engineers (USACE) intervene. Alan Peeples (Alabama Power) noted that Alabama Power and the USACE are in constant communication during high flow events and that Alabama Power's flood control operations are dictated by the USACE Harris Reservoir Regulation Manual. Barry asked if Alabama Power can override the Harris Reservoir Regulation Manual. Alan noted that it is possible to ask the USACE for a variance; however, Alabama Power would be required to do additional modeling prior to that variance request. Mr. Eiland asked about operations in 2003, including why Alabama Power did not release water when they knew a rain event was coming to the Harris area. Alabama Power does not pre-evacuate the reservoir because weather forecasts are often inaccurate, and Alabama Power must abide by the USACE flood control procedures specified in the Harris Reservoir Regulation Manual.

Angie Anderegg reviewed the next steps for the Operating Curve Change Feasibility Analysis and the Downstream Release Alternatives studies. Alabama Power will file a Progress Update on all the studies before the end of October 2019. Between October and the first quarter (Q1) of 2020, Alabama Power will be modeling the alternatives in each study plan and will prepare an Initial Study Report that must be filed with FERC in April 2020. The Phase 1 Modeling report will be part of the Initial Study Report and will include effects on downstream flooding, generation, navigation, and drought management. Phase 2 of these studies will address effects on other resources. Additional HAT 1 meetings will be held in Q1 2020.

ATTACHMENT A
HARRIS ACTION TEAM 1 MEETING ATTENDEES

HARRIS DAM RELICENSING

HARRIS PROJECT RELICENSING

HAT 1 SIGN-IN SHEET

September 11, 2019 9:00 AM

	Name/ Affiliation or Organization	Email
1	*John Smith/ Stakeholder*	*jsmith@email.com*
2	Kelly Yates, Env. Affairs	kayates@southernco.com
3	Stacy Thompson APC Env. Affairs	sthompso@southernco.com
4	DAVID Smith	inspector_003@yahoo.com
5	Glenell Smith	gardenergirl07@yahoo.com
6	Trey Stevens	trsteven@southernco.com
7	Joe/ Stevens	tjsteven@southernco.com
8	Jason Moak	jason.moak@kleinschmidtgroup.com
9	Kelly Schaeffer	Kelly.Schaeffer@Kleinschmidtgroup.com
10	Barry Morris	rbmorris333@gmail.com
11	Mike Holley	mike.holley@dcnr.alabama.gov
12	Tina Freeman	tpfreema@southernco.com

HARRIS DAM RELICENSING

HARRIS PROJECT RELICENSING

HAT 1 SIGN-IN SHEET

<u>September 11, 2019 9:00 AM</u>

	Name/ Affiliation or Organization	Email
13	Sheila Smith APC	scsmith@southernco.com
14	ALBERT EILAND	EILANDFARM@AOL.COM
15	Nathan Aycock	Nathan.Aycock@dcnr.alabama.gov
16	Butch Jackson	~~Keller~~ lakebutch@kw.com
17	Taconya Goar	taconya.goar@dcnr.alabama.gov
18	Sylvia French	sandnfrench@gmail.com
19	TOM GARLAND	jfcrew@southernco.com
20	Jim Crew	
21	Alan Peeples	alpeeple@Southernco.co
22	Kenneth Odom	kodom@southernco.com
23	Mitch Reed	mitchell.reed@tnc.org
24	TINA L Mills	tlmills@southernco.com

HARRIS DAM
RELICENSING

HARRIS PROJECT RELICENSING

HAT 1 SIGN-IN SHEET

September 11, 2019 9:00 AM

	Name/ Affiliation or Organization	Email
25	Fred Leslie/ADEM Field Ops	fal@adem.alabama.gov
26	Chris Goodman	cggoodma@southernco.com
27	Keith Chandler	
28	Curt Chaffin	cchaffin@alabama.org
29	Jason Carlee	jcarlee@southernco.com
30	Ashley McVicar	ammcvica@southernco.com
31	Donna Matthews	donnamat@aol.com
32	Kristie Coffman /ALCFWRU	kmo0025@auburn.edu
33	Jennifer Rasberry /APC	
34	Harry E. Merrill	Harry.Merrill47@gmail.com
35	FERC Staff on phone	Sarah Salazar
36		

ATTACHMENT B
SEPTEMBER 11, 2019 HAT 1 PRESENTATION

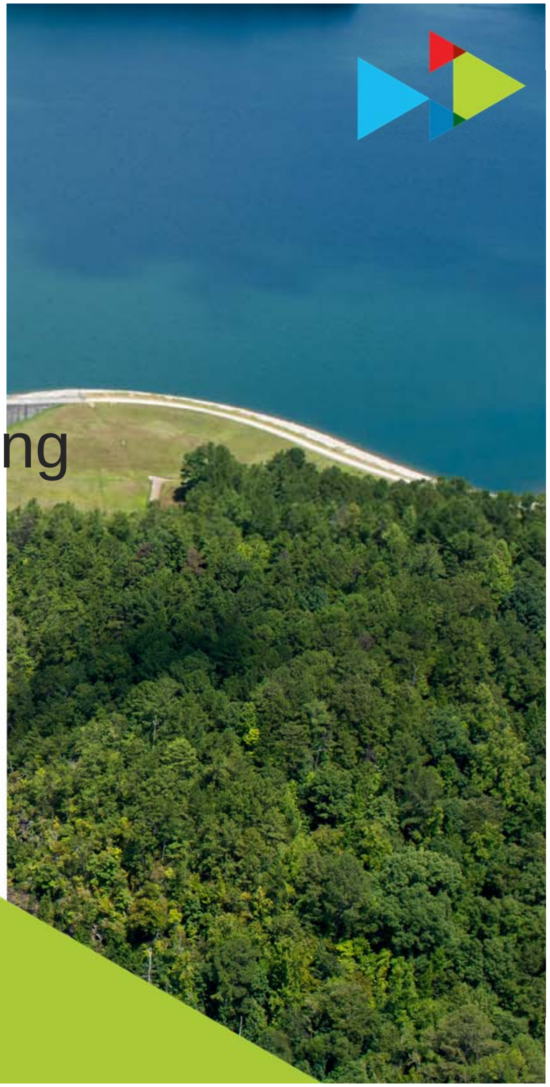
Alabama Power

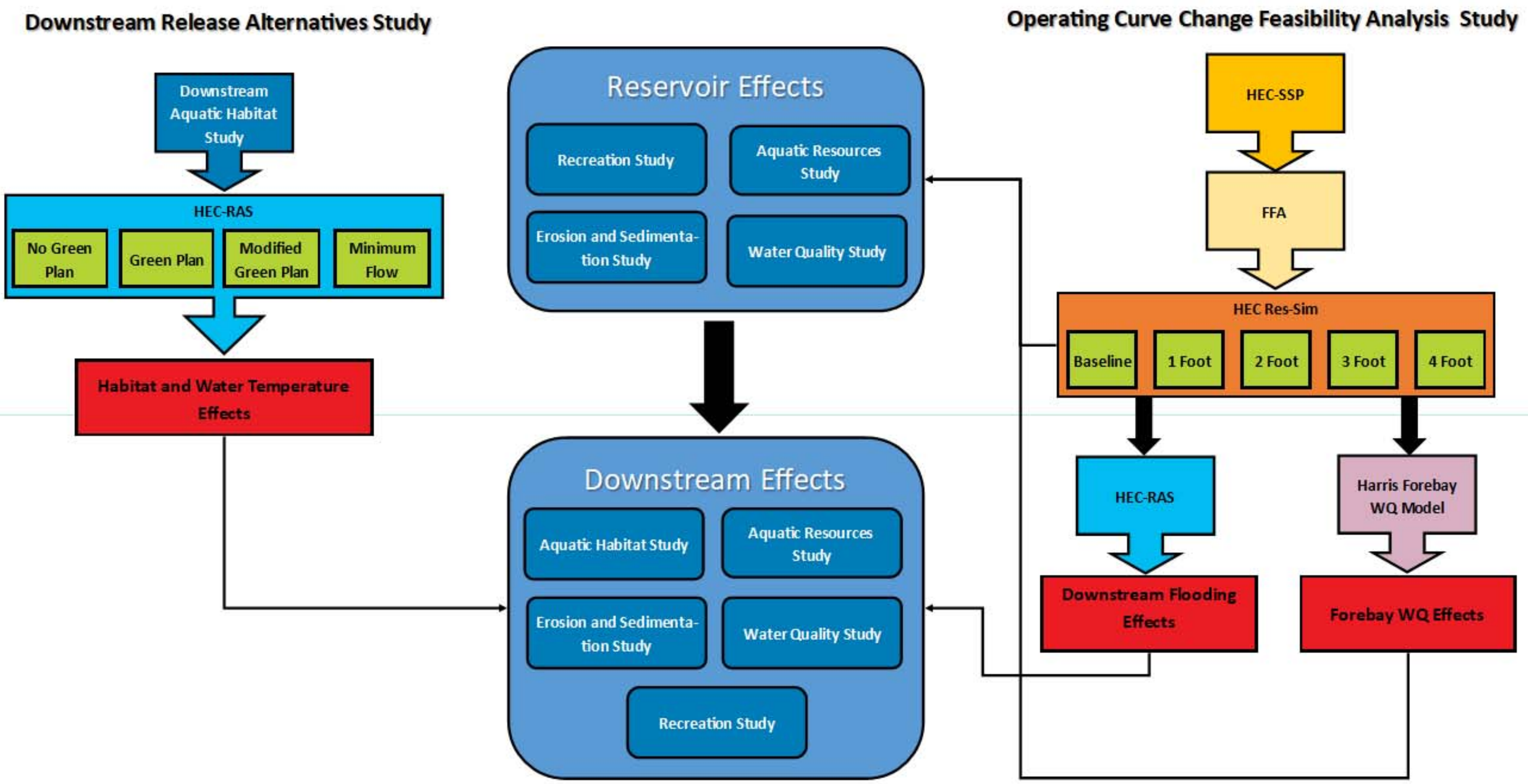
R.L. Harris Project Relicensing

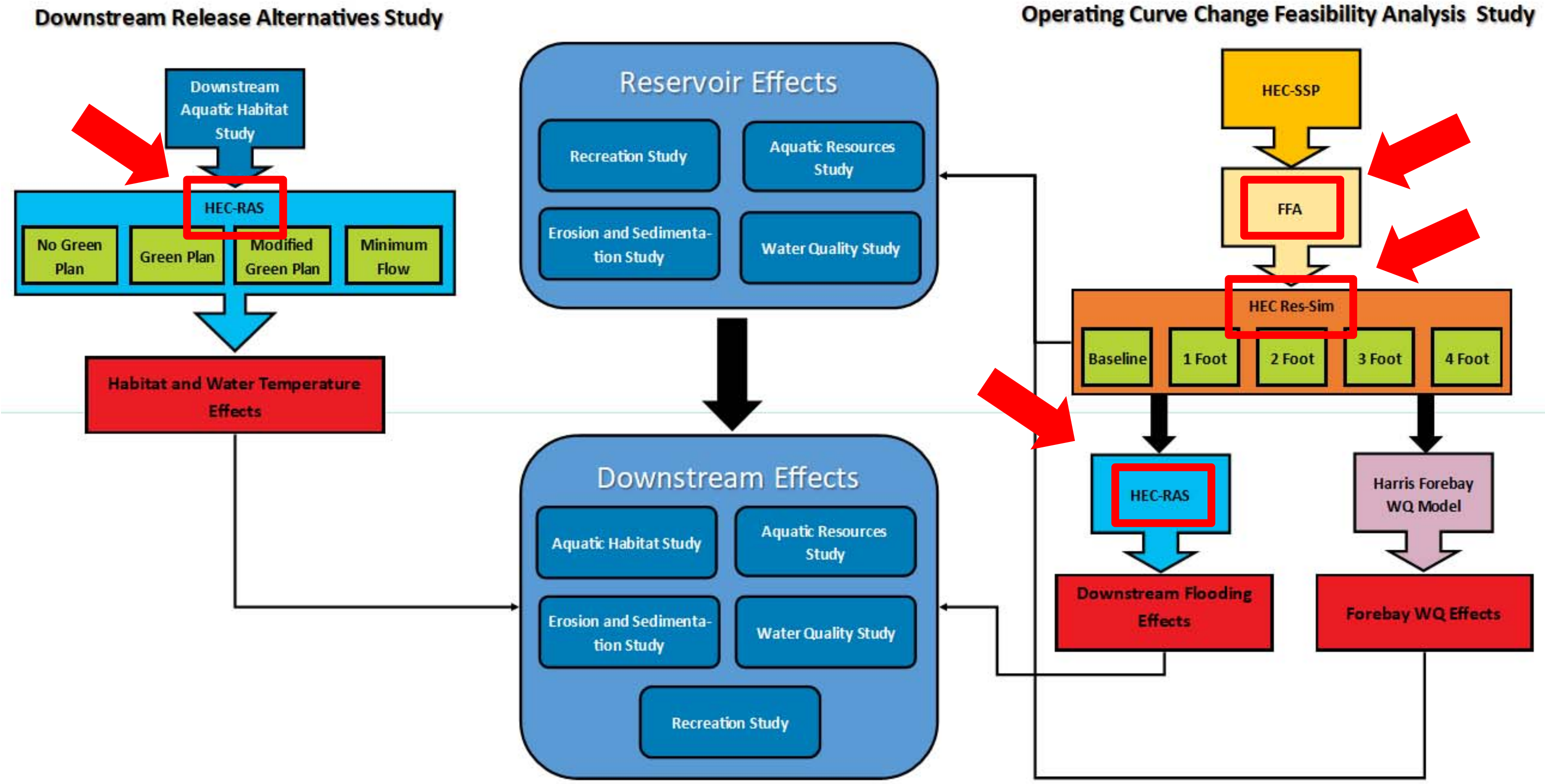
Project Operations – HAT 1

Model Inputs and Methodologies for Operating Curve Change Analysis and Downstream Release Alternatives

September 11, 2019




Downstream Release Alternatives Study
Downstream Aquatic Habitat Study
HEC-RAS
No Green Plan
Green Plan
Modified Green Plan
Minimum Flow
Habitat and Water Temperature Effects
Reservoir Effects
Recreation Study
Aquatic Resources Study
Erosion and Sedimentation Study
Water Quality Study
Downstream Effects
Aquatic Habitat Study
Aquatic Resources Study
Erosion and Sedimentation Study
Water Quality Study
Recreation Study
Operating Curve Change Feasibility Analysis Study
HEC-SSP
FFA
HEC Res-Sim
Baseline
1 Foot
2 Foot
3 Foot
4 Foot
HEC-RAS
Harris Forebay WQ Model
Downstream Flooding Effects
Forebay WQ Effects


Downstream Release Alternatives Study
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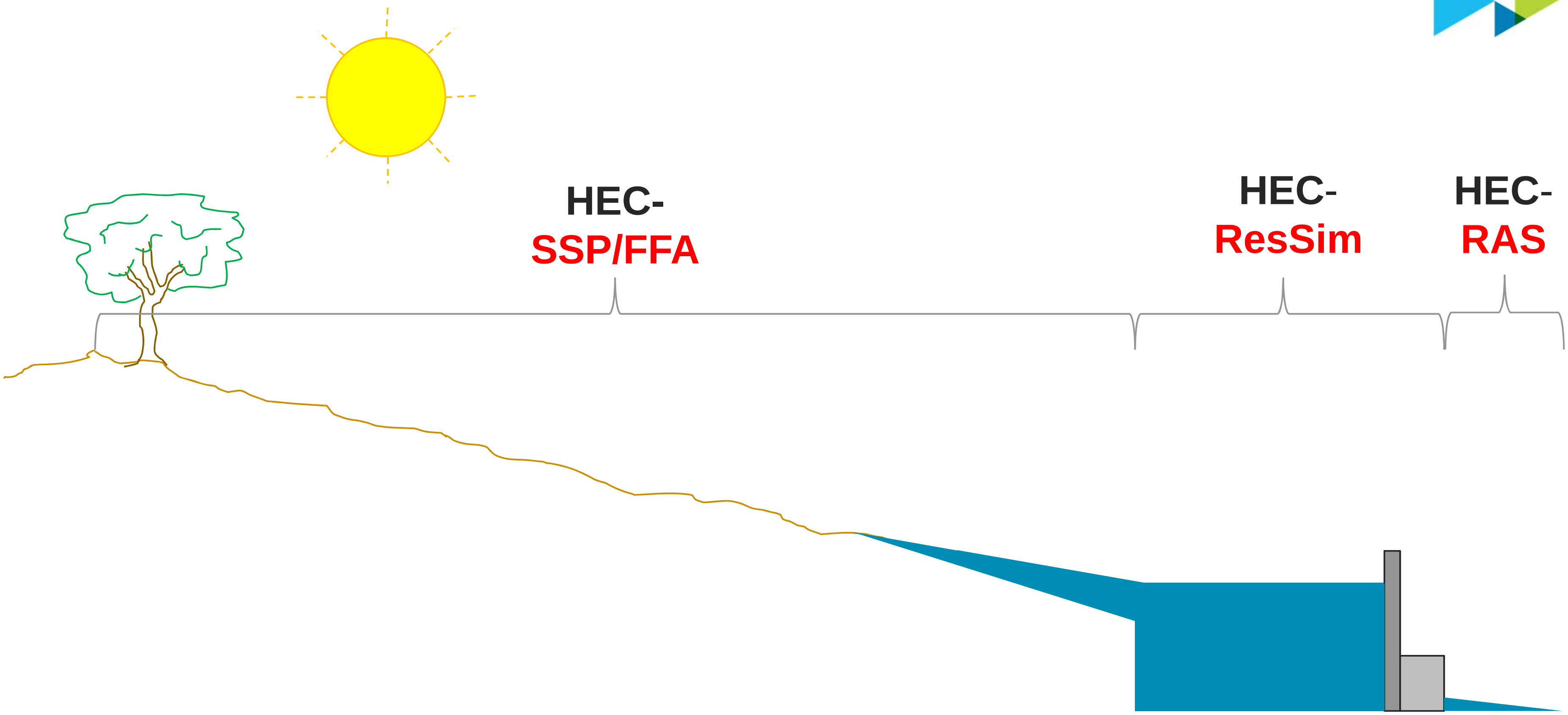
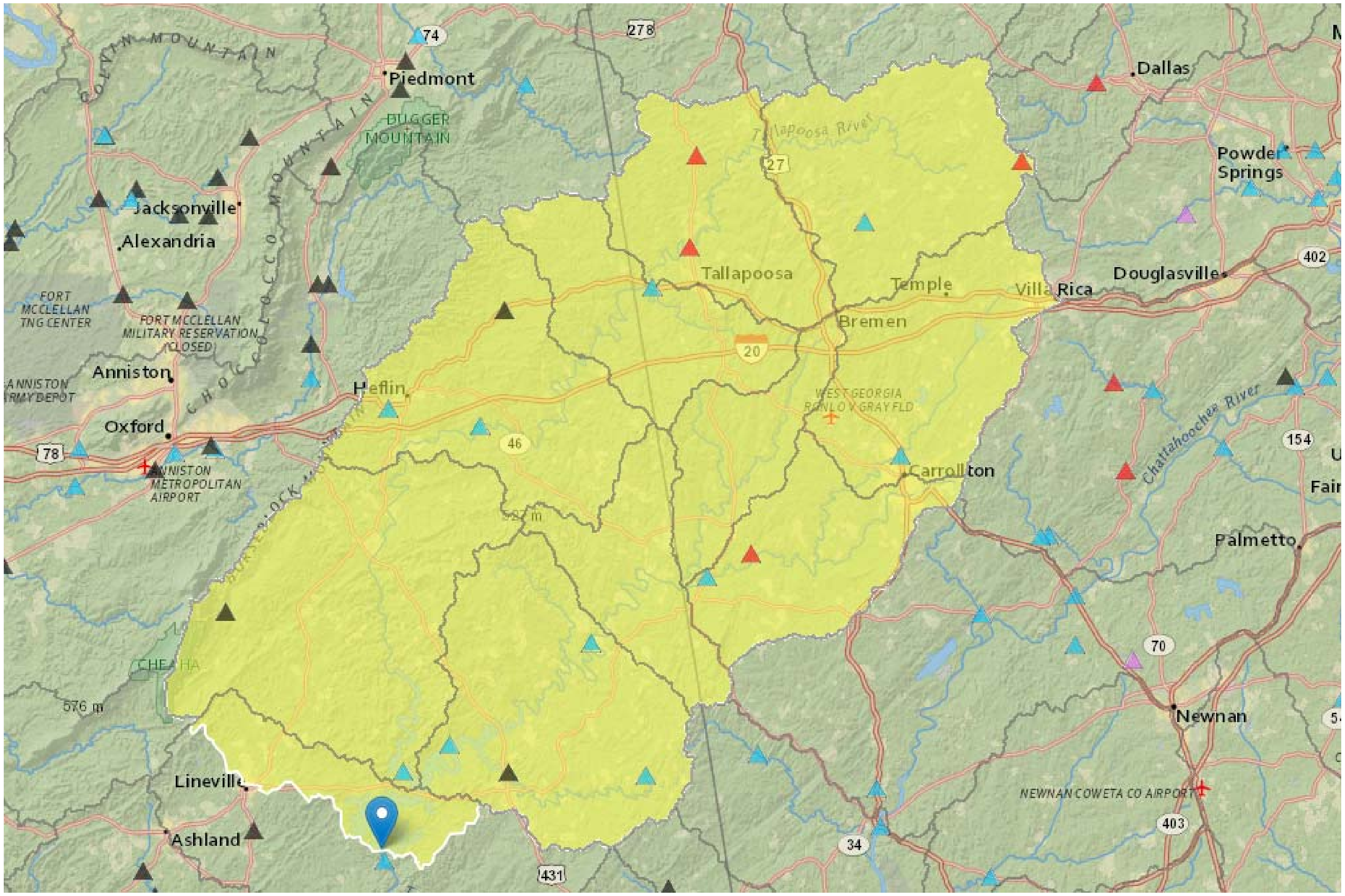
1 Foot
2 Foot
3 Foot
4 Foot
HEC-RAS
Harris Forebay WQ Model
Downstream Flooding Effects
Forebay WQ Effects

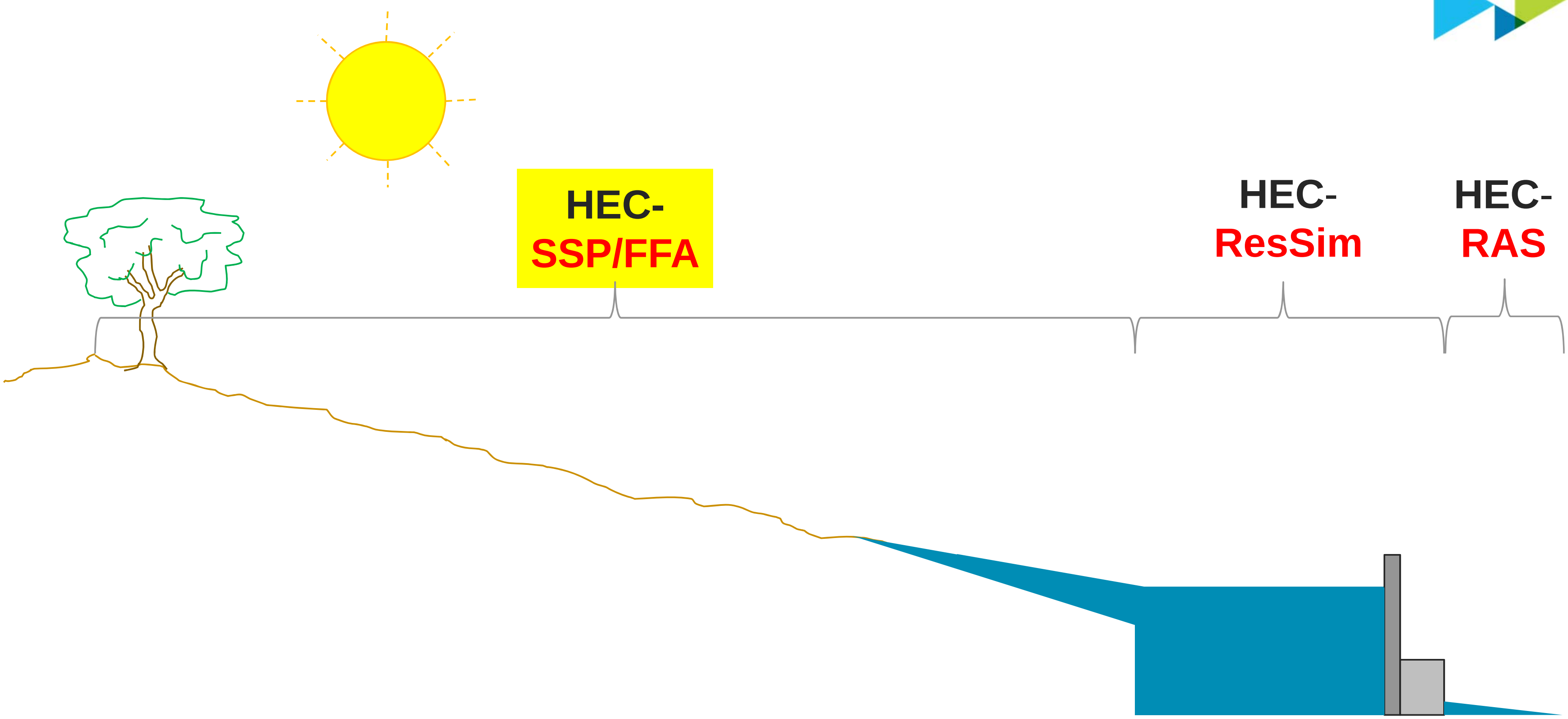
Where the models are used…



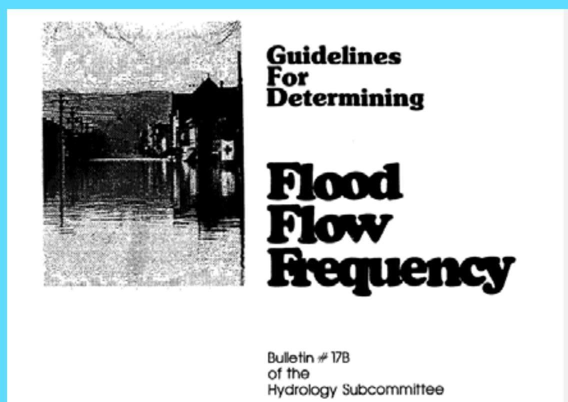
Harris Watershed Boundary



Where the models are used…



HEC-**SSP** (**S**tatistical **S**oftware **P**ackage)


Guidelines For Determining

Flood Flow Frequency

Bulletin # 17B
of the
Hydrology Subcommittee

FFA

Flood Frequency Analysis
for the Coosa and
Tallapoosa Rivers

100-year flood

Why the 100-year flood?

- U.S. Government in the 1960’s decided the 100-year flood would be the basis for the National Flood Insurance Program, and it has been the standard since
- This makes the 100-year flood event the base of what MUST be studied

Exactly what do you mean by the “100-year” flood event?

- **It is a high streamflow event that has a 1-percent chance of being equaled or exceeded in any year.**
- The keyword here is “chance”
- Consider the following: if we had 1000 years of annual streamflow data, we would expect to see ten 100-year floods (1-percent chance floods) over the 1000-year record. These ten events could occur at any time during the 1000-year period.

Let’s play a game of “chance.” Pick a number. One card has a dollar sign under it. What are your chances of picking the right one?

1	2	3
4	5	6

Let’s play a game of “chance.” Pick a number. One card has a dollar sign under it. What are your chances of picking the right one?

What if we turned the cards back over and shuffled the dollar sign to randomly land on any card and then I, once again, ask you to pick a number?

How many would pick the 4-Card again? Why or Why not?

1	**2**	**3**
4	**5**	**6**

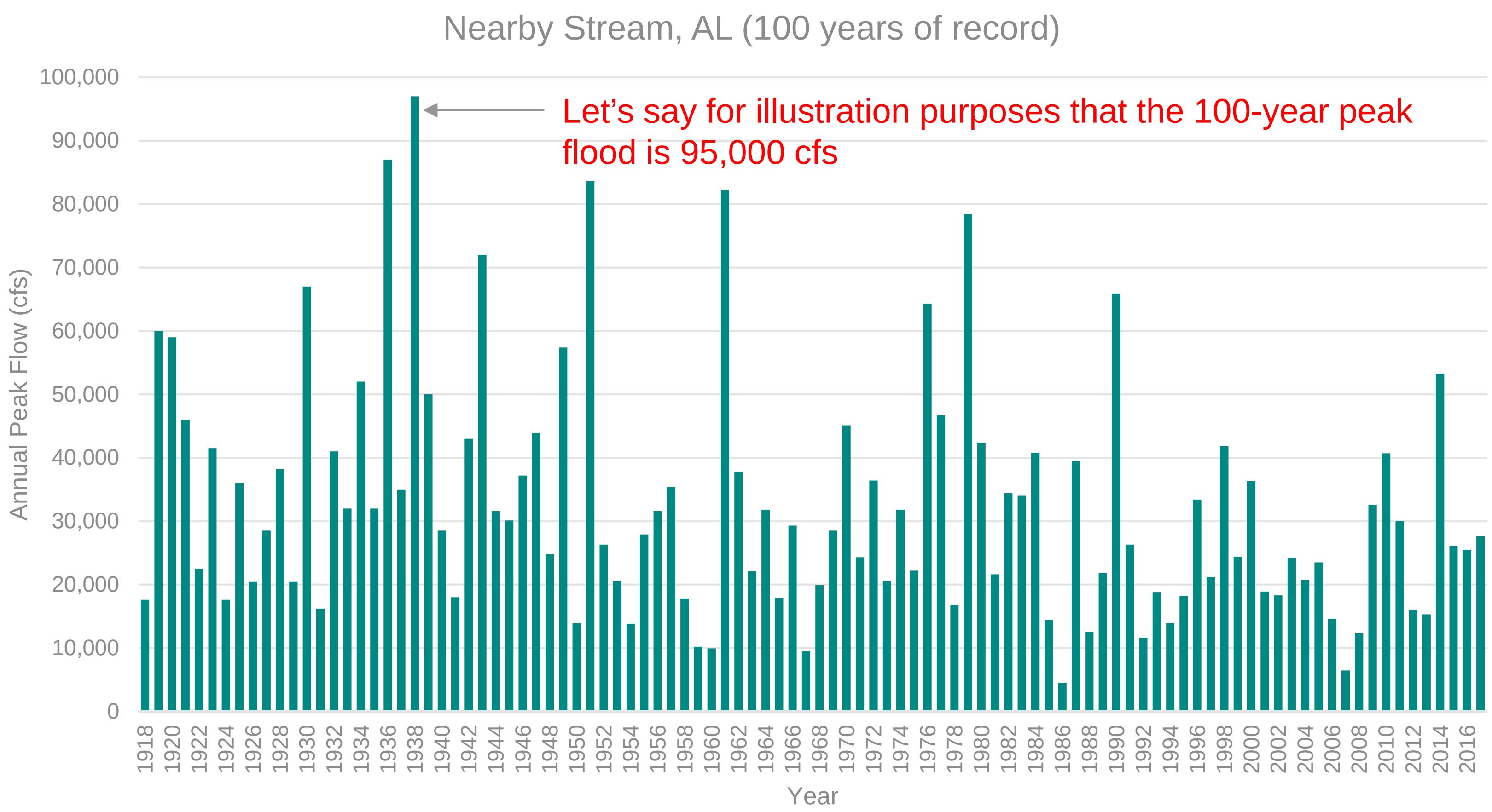
How many would pick a different card because you think that 1, 2, 3, 5, and 6 will have the $ before it can come back around to the 4-Card?

Very Common Misconception

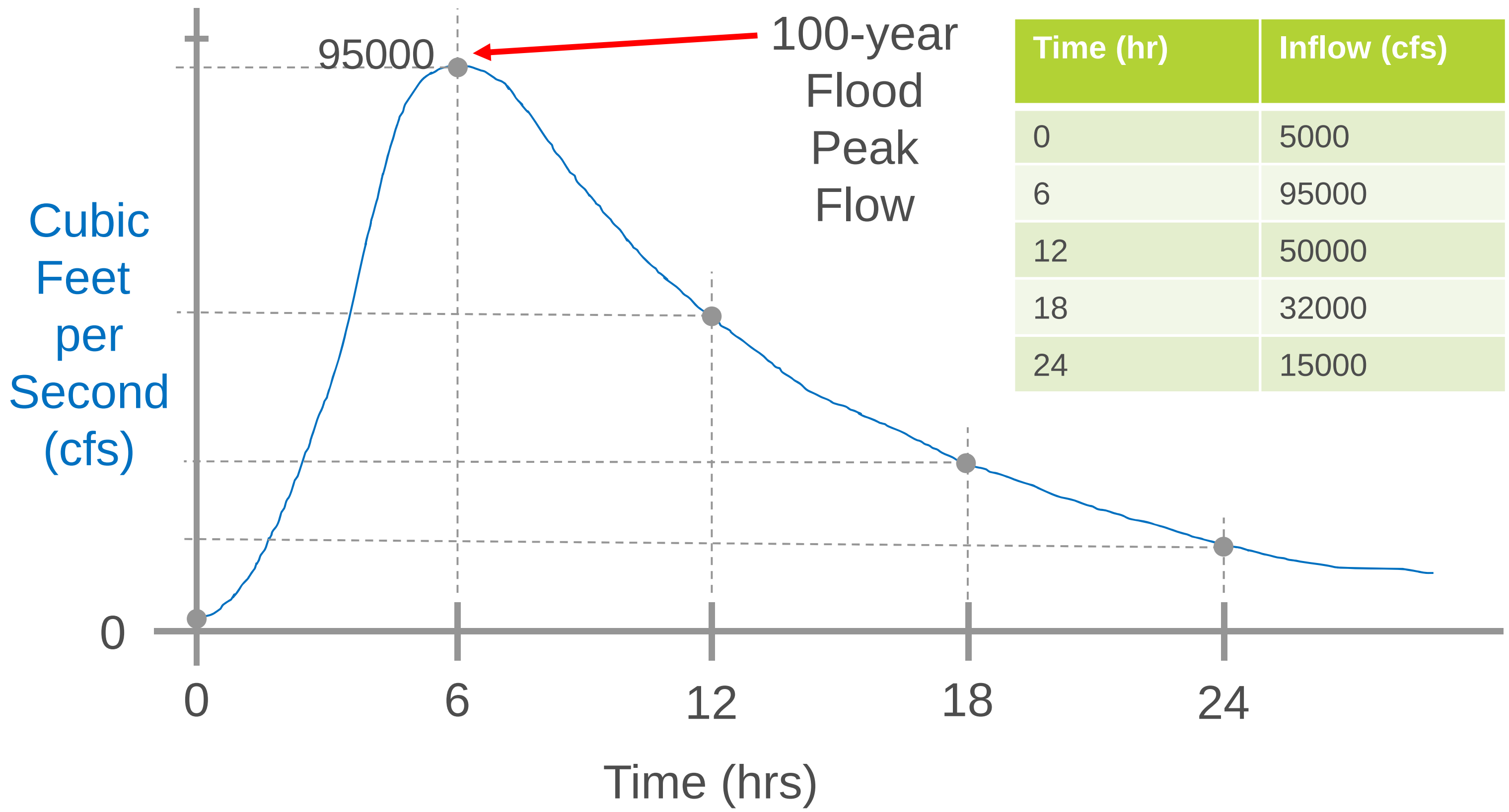
“If the 100-year flood just occurred, then we don’t have to worry about another flood like that for the next 99 years.”

WRONG!!!

(For Illustration Purposes Only)

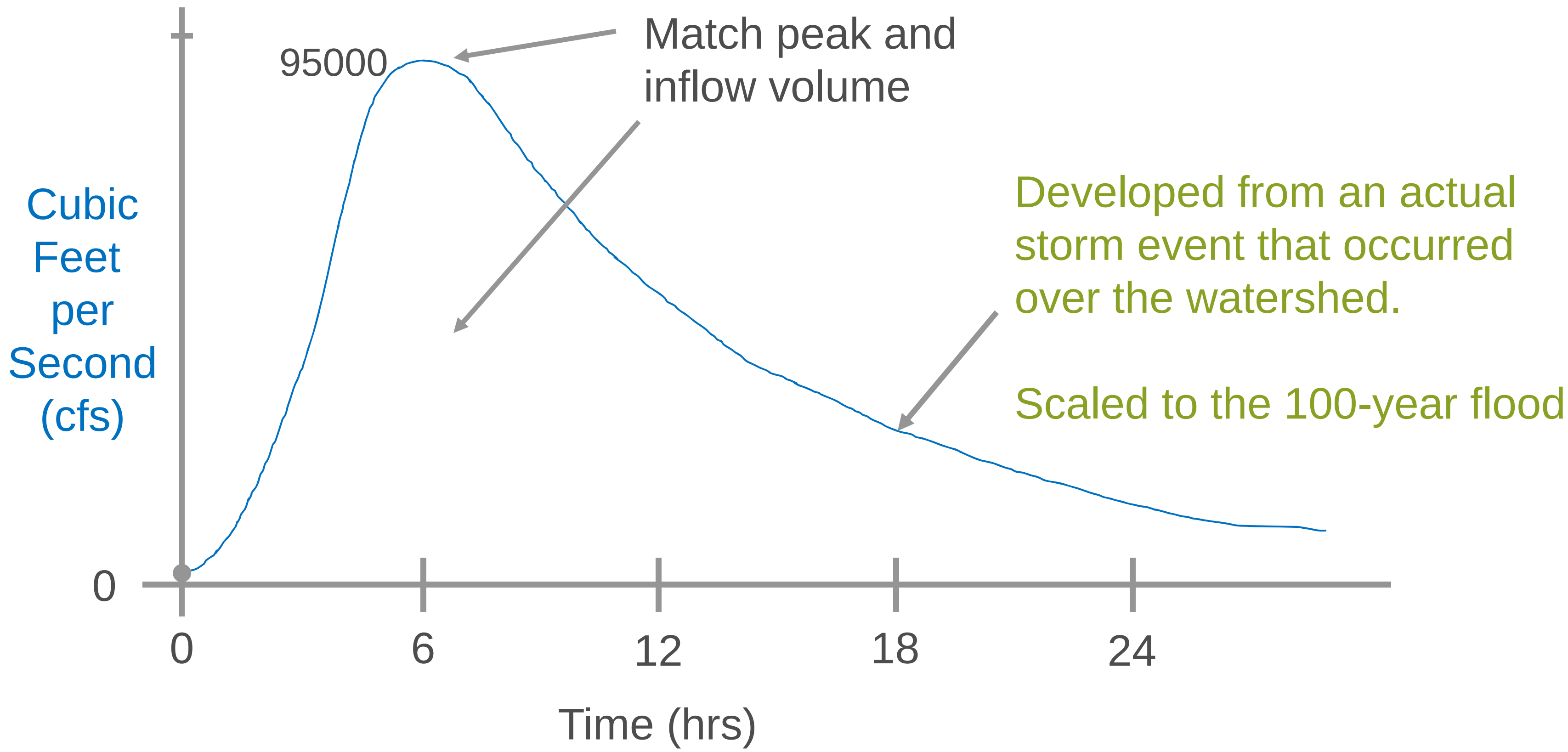


Inflow Hydrograph for Nearby Stream, AL
(**For Illustration Purposes Only)**

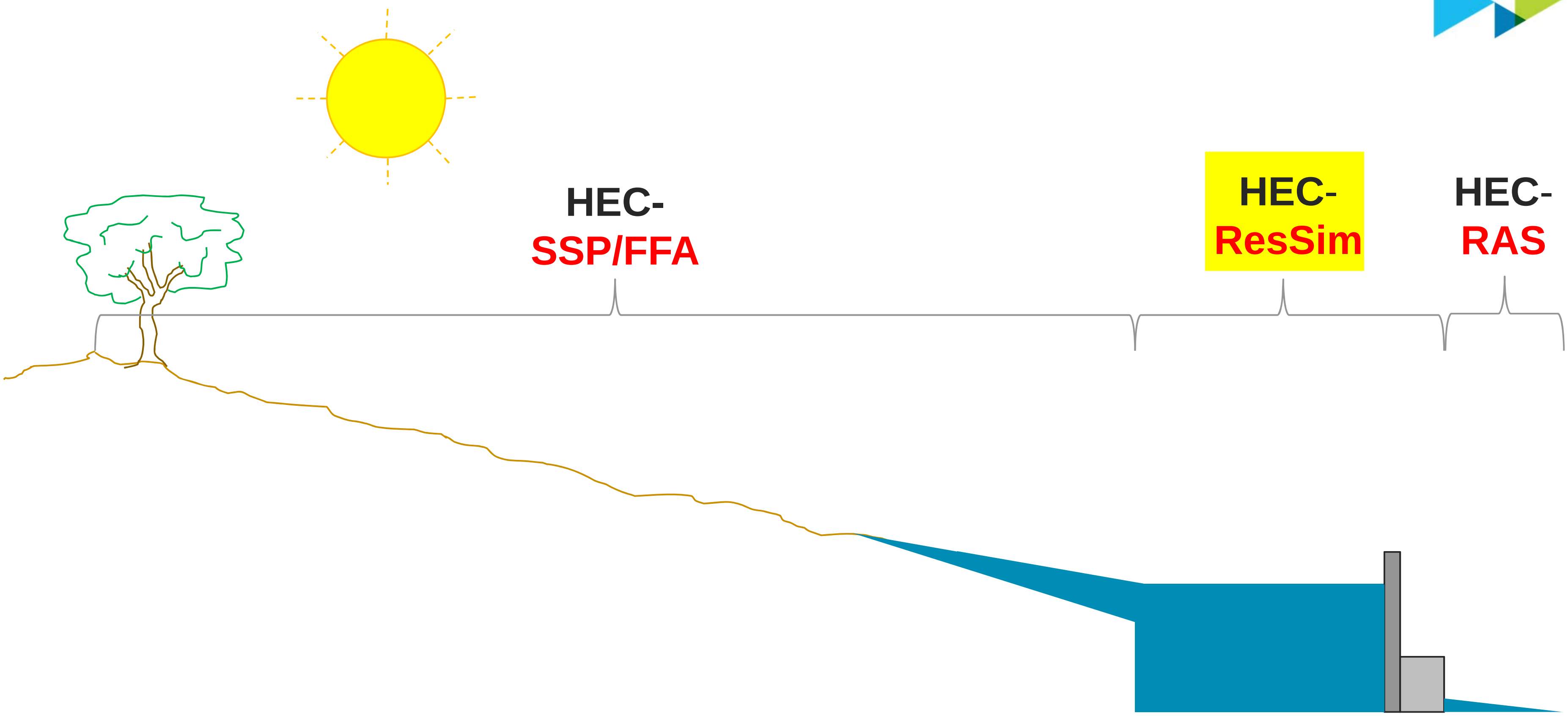


Time (hr)	Inflow (cfs)
0	5000
6	95000
12	50000
18	32000
24	15000

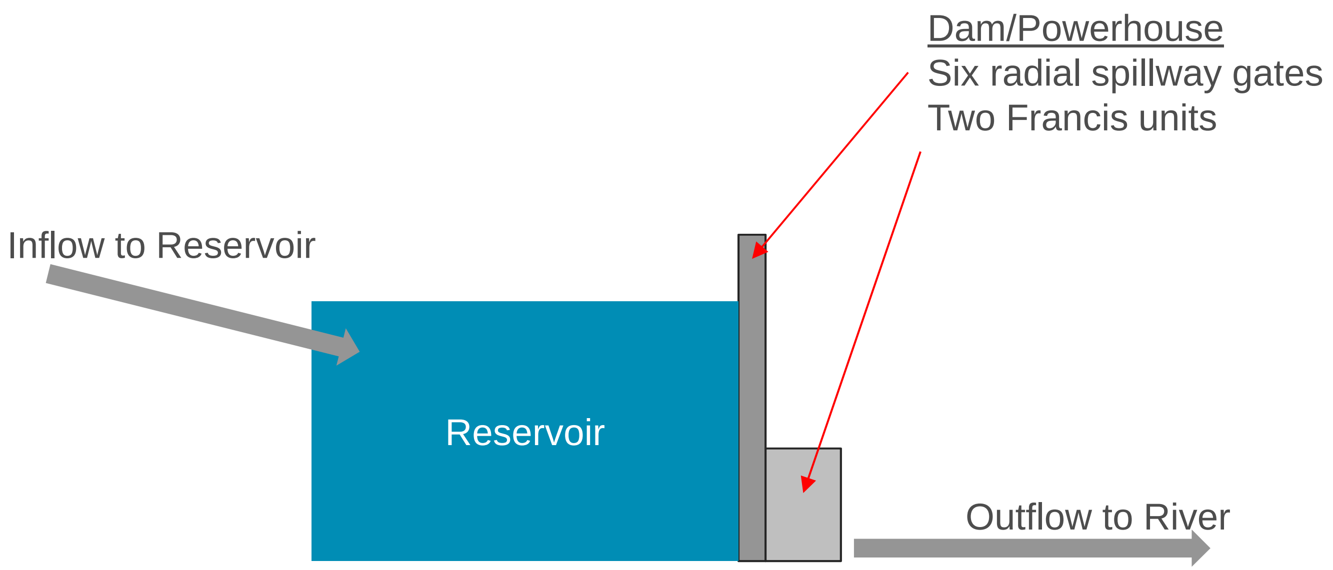
Inflow Hydrograph for Nearby Stream, AL **(For Illustration Purposes Only)**



Where the models are used…

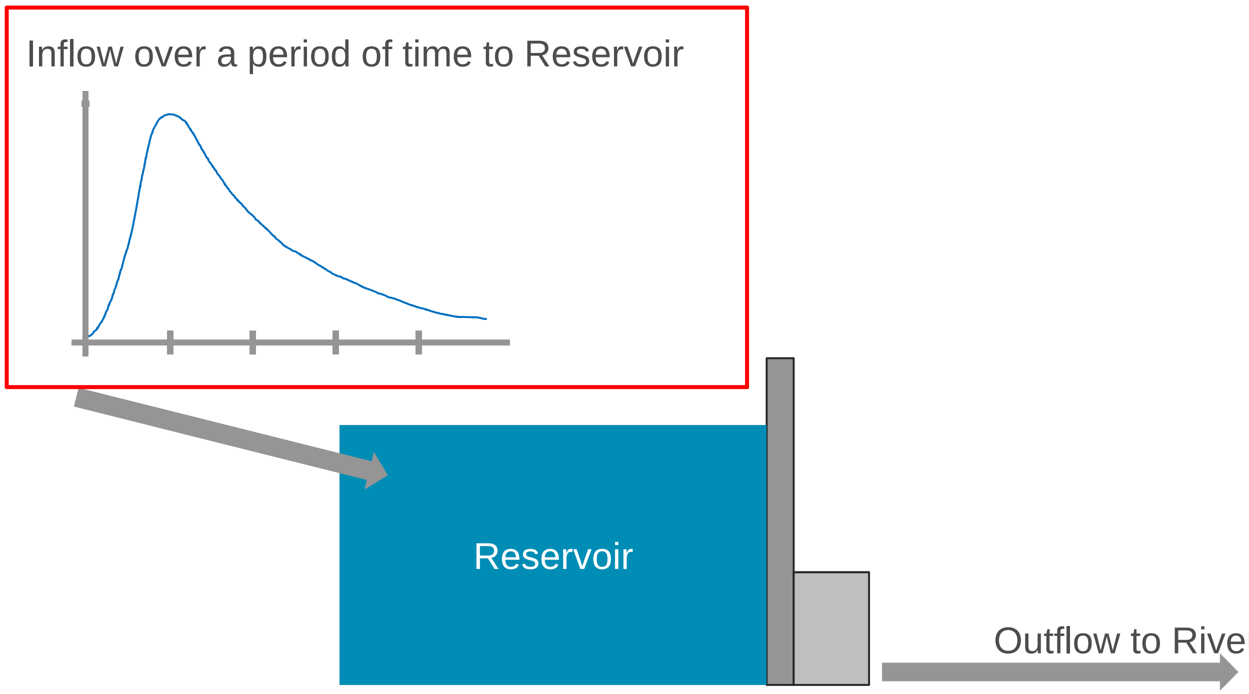


Schematic used to discuss HEC-ResSim



How **HEC-ResSim** sees the Reservoir

1. FFA and ”scaled” actual event

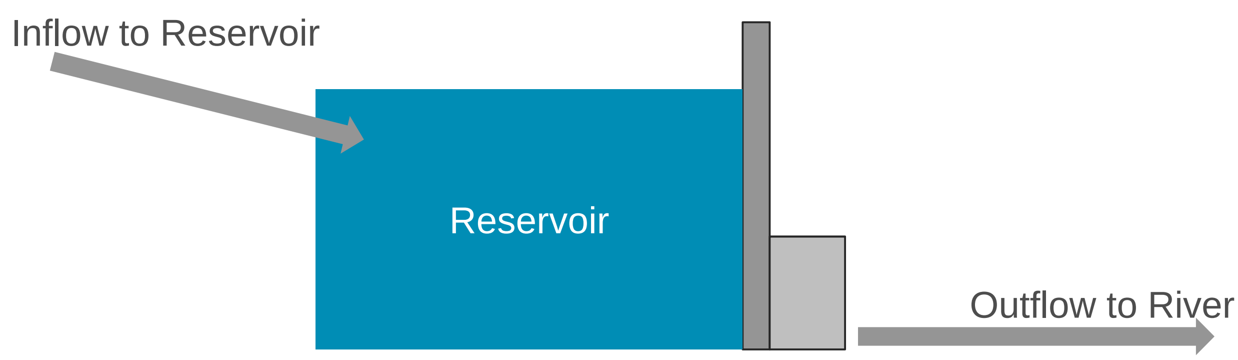


HEC-ResSim

2.

Elevation-Volume Table

Res. Elevation	Volume (ac-ft)
790	394724
791	404840
792	415170
793	425721
794	436495



HEC-ResSim

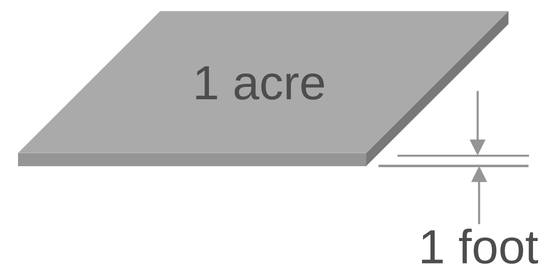
2.

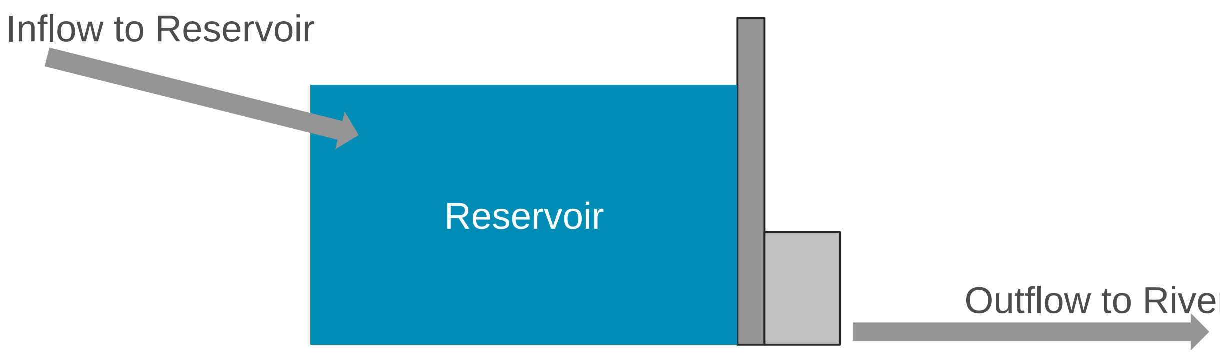
Elevation-Volume Table

Res. Elevation	Volume (ac-ft)
790	394724
791	404840
792	415170
793	425721
794	436495

What is an ac-ft (or acre-foot)?

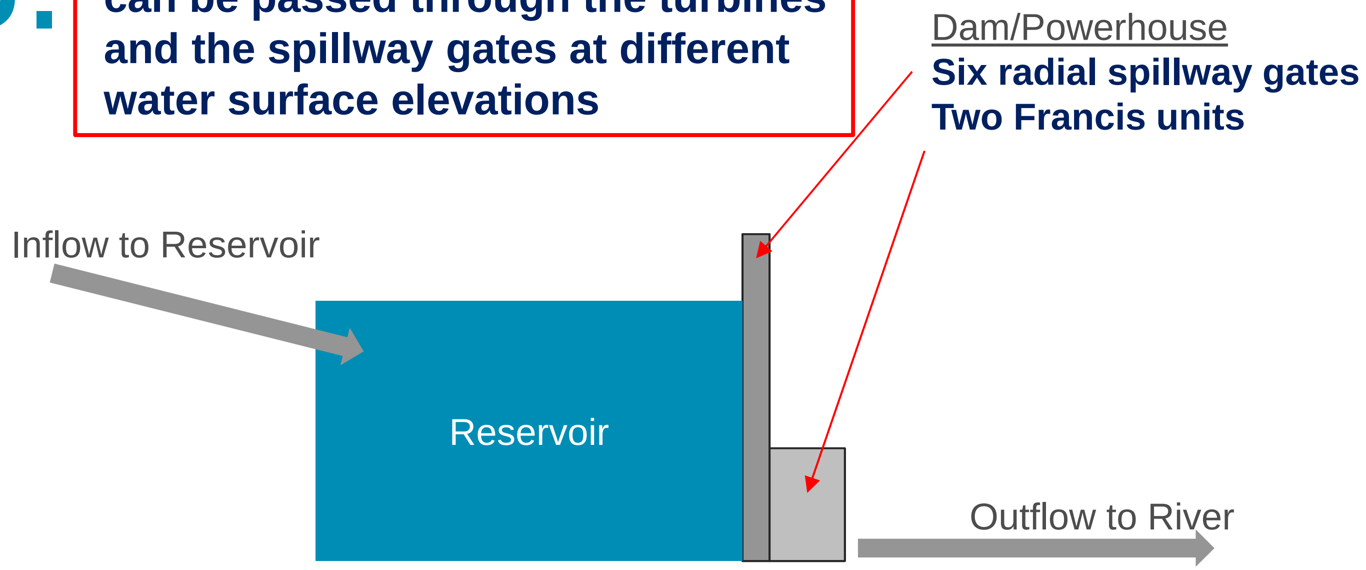
It is a measure of volume where one acre-foot is an area of one acre covered with one foot of water





HEC-ResSim

3. **Information about how much water can be passed through the turbines and the spillway gates at different water surface elevations**



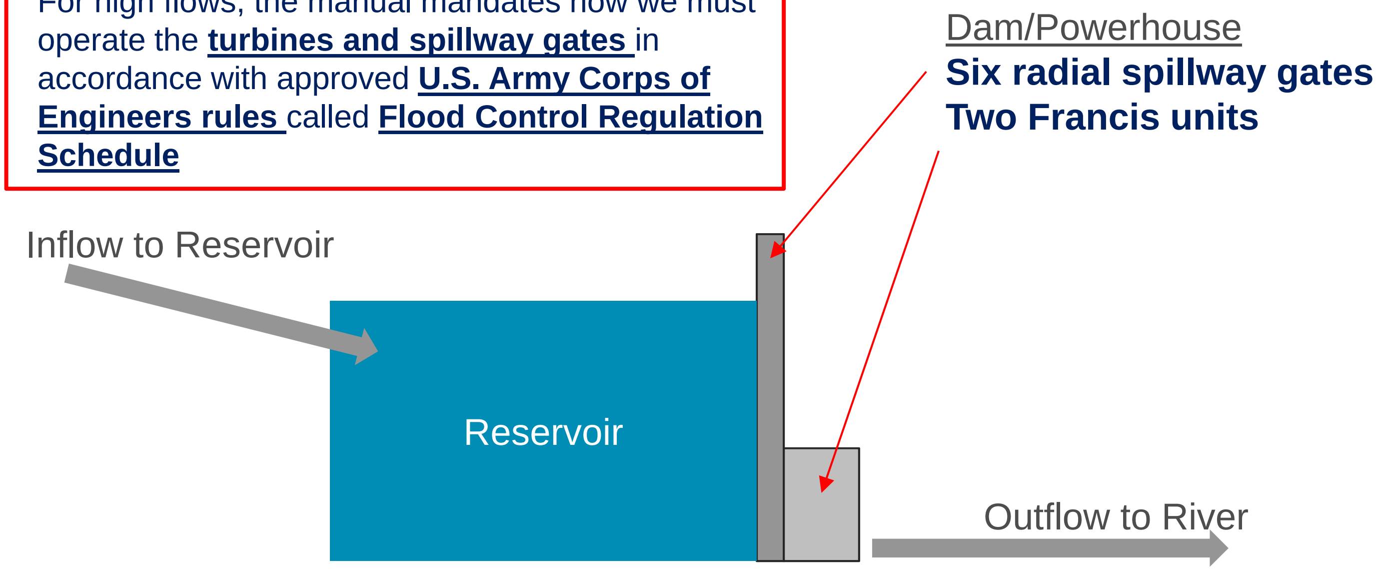
HEC-ResSim

4.

Reservoir Regulation Manual

This tells us how the reservoir must be operated.

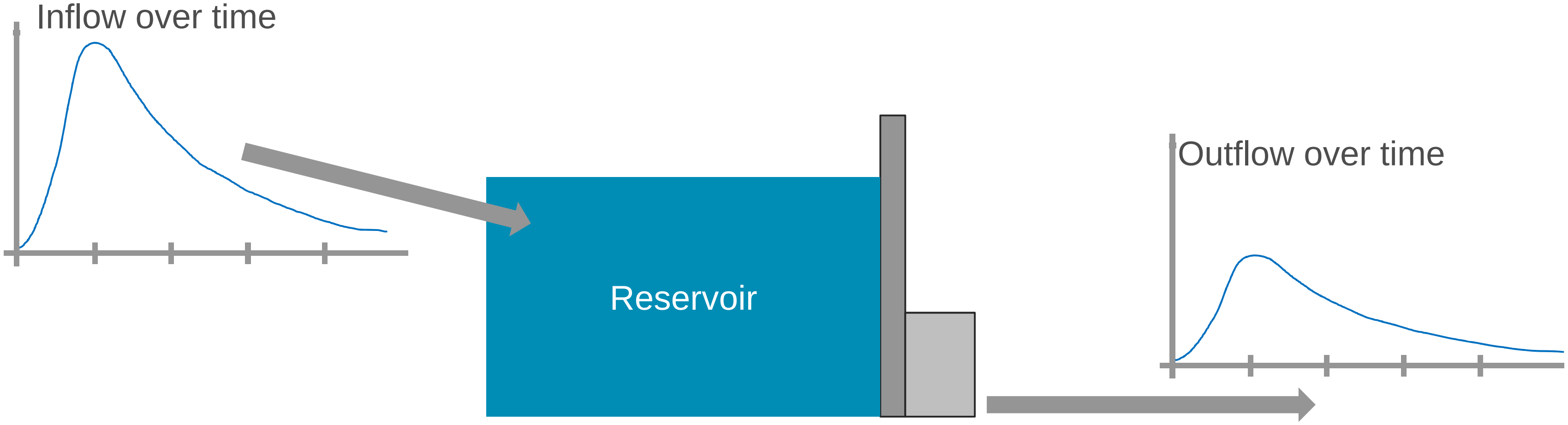
For high flows, the manual mandates how we must operate the **turbines and spillway gates** in accordance with approved **U.S. Army Corps of Engineers rules** called **Flood Control Regulation Schedule**

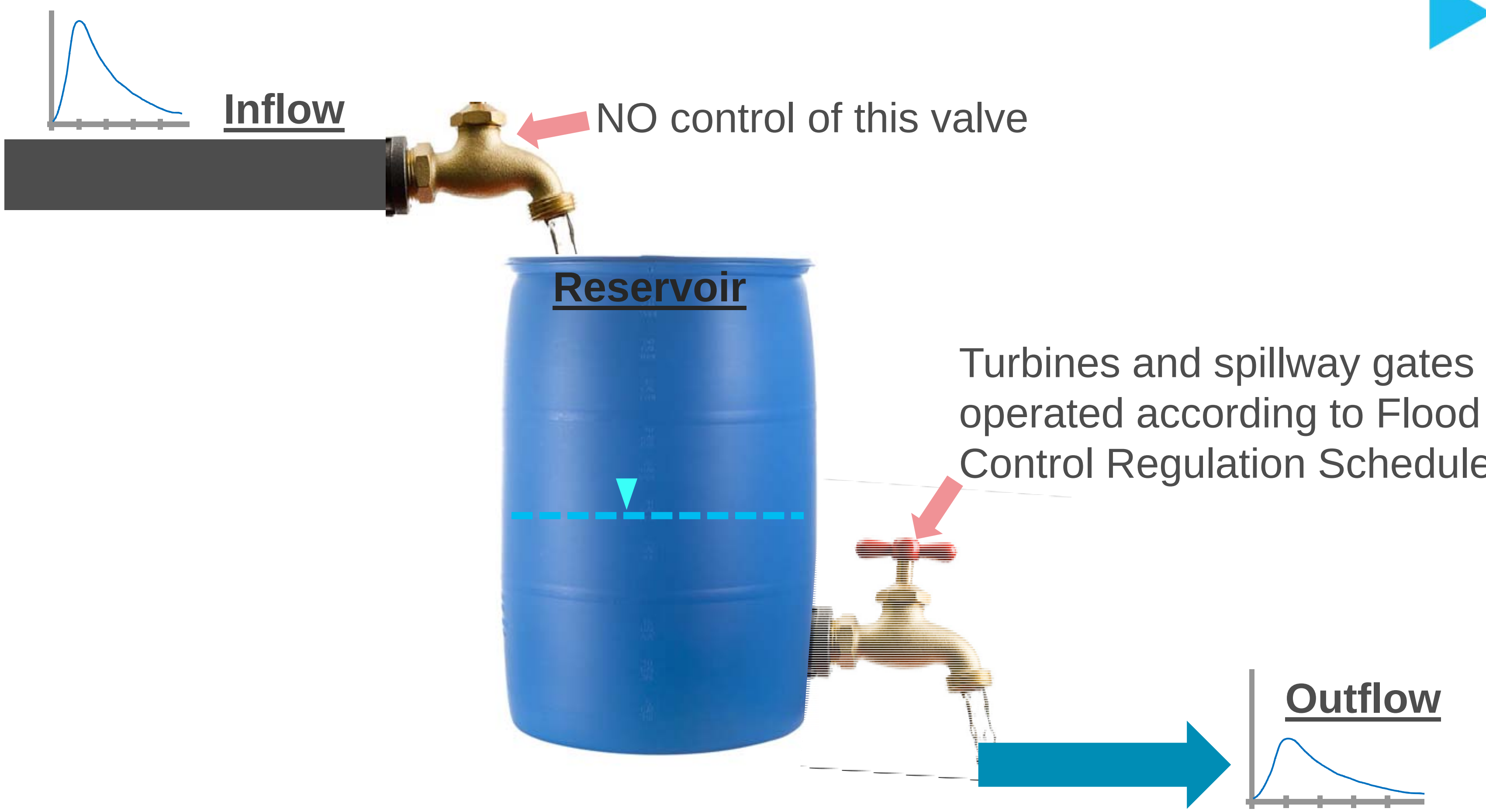


If **INFLOW** is higher than **OUTFLOW**: ELEVATION ⬆

If **INFLOW** is less than **OUTFLOW**: ELEVATION ⬇

If **INFLOW** is equal to **OUTFLOW**: No Change in ELEVATION




Inflow
NO control of this valve
Reservoir
Turbines and spillway gates operated according to Flood Control Regulation Schedule
Outflow

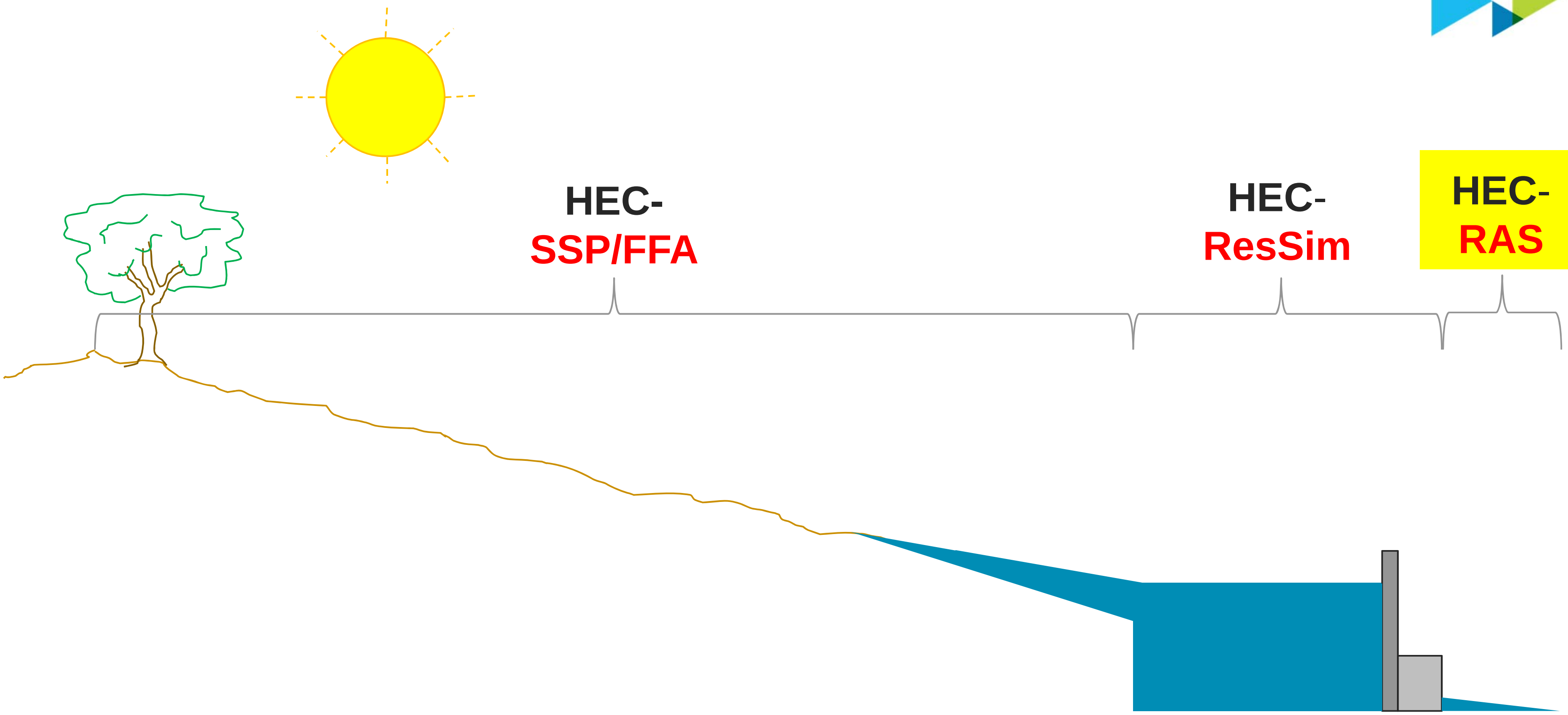
Outputs from HEC-ResSim

- How the reservoir elevation changes over time during a flood event

- The outflow hydrograph (turbines + spillway) to be used in **HEC-RAS**

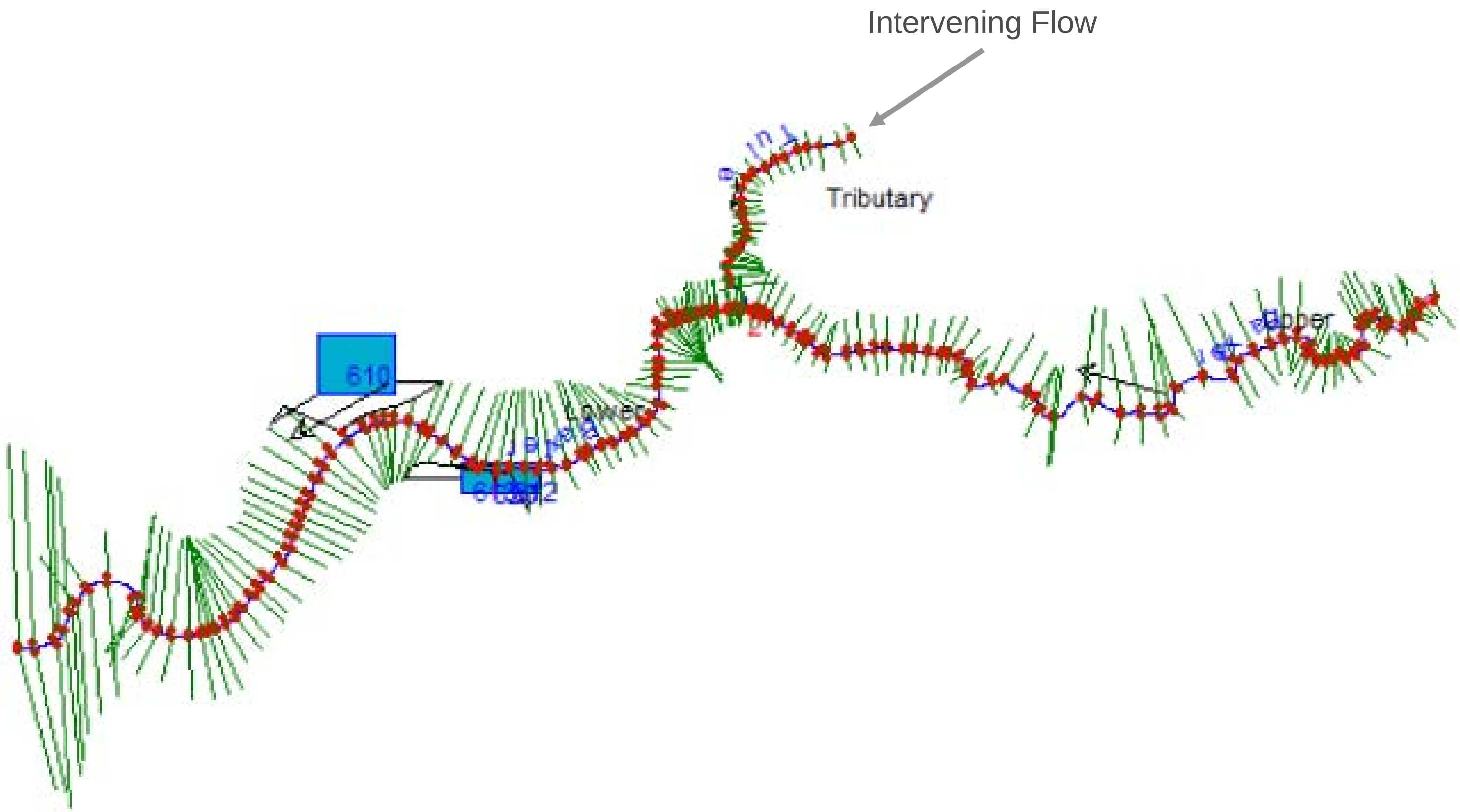
***Both controlled by the Flood Control Regulation Schedule**

Where the models are used…



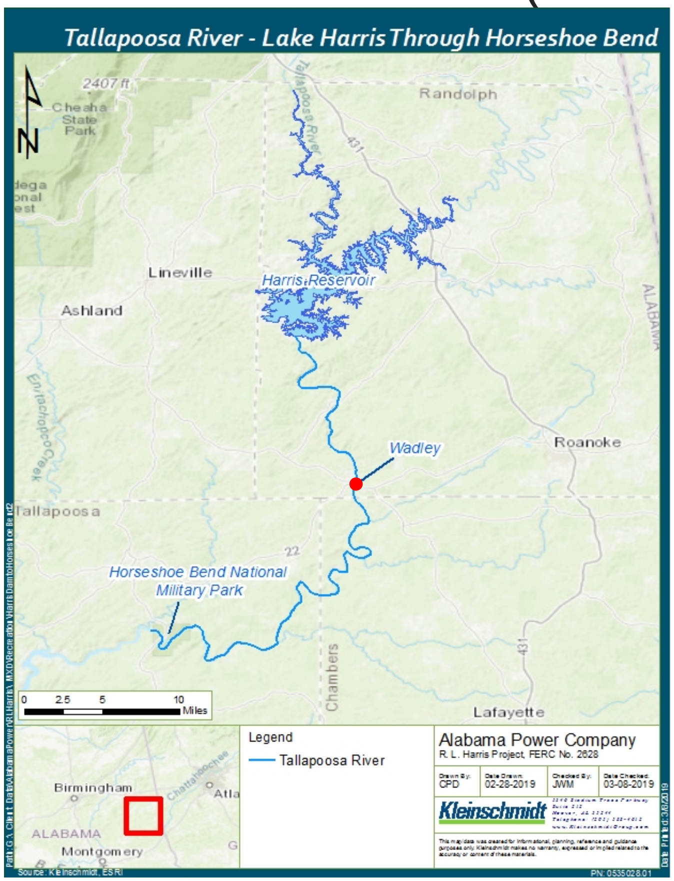
HEC-RAS cross-sections on a river

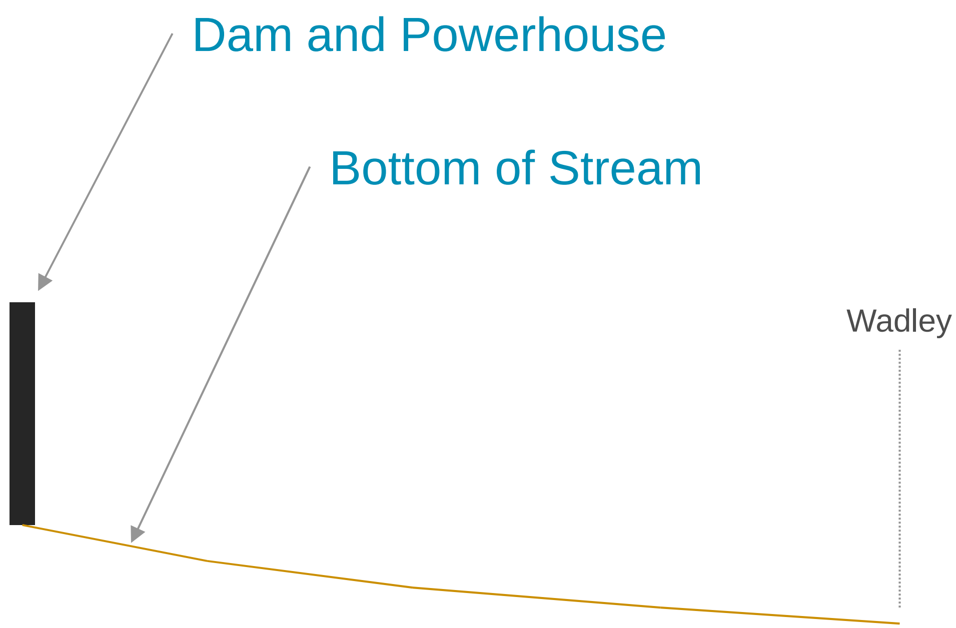
(For Illustration Purposes Only)



Schematic used to discuss HEC-RAS

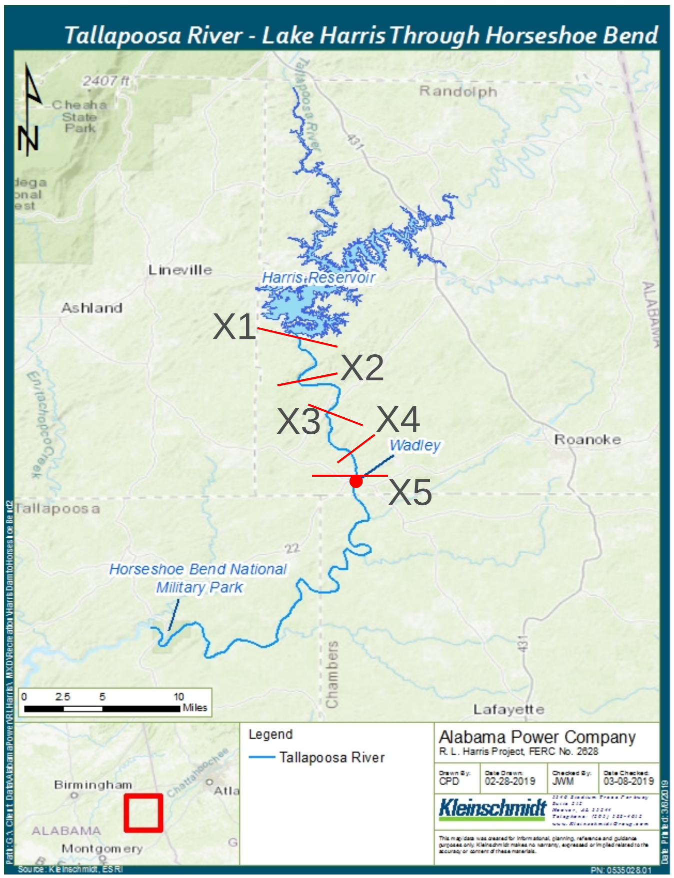
(For Illustrations Purpose Only)



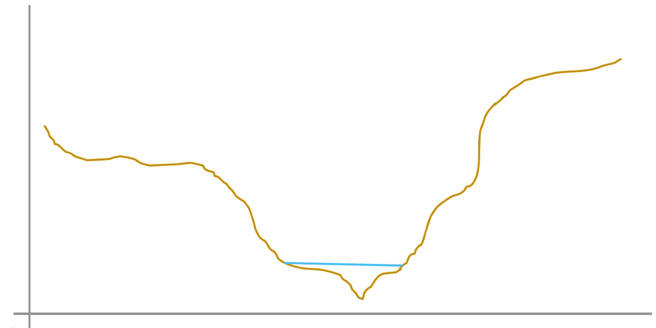


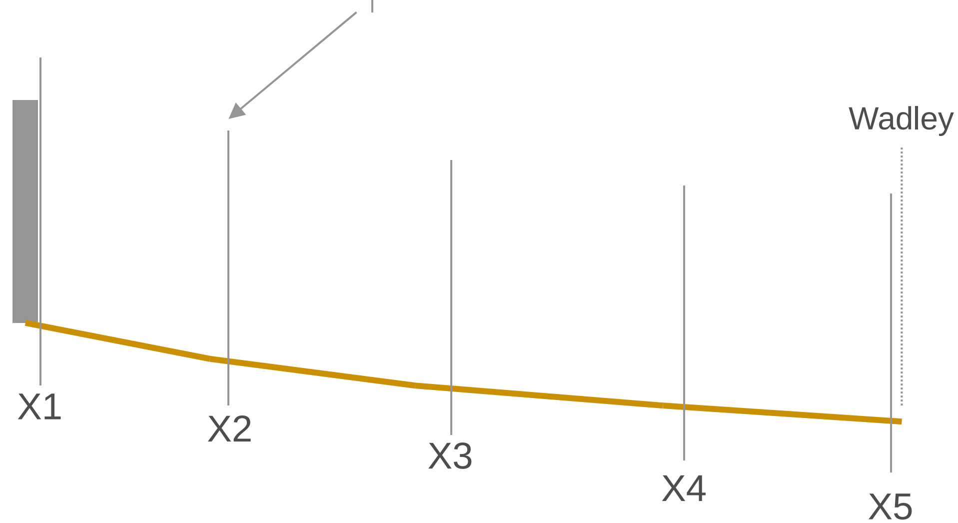
HEC-RAS Stream Cross Sections

(For Illustration Purposes Only)

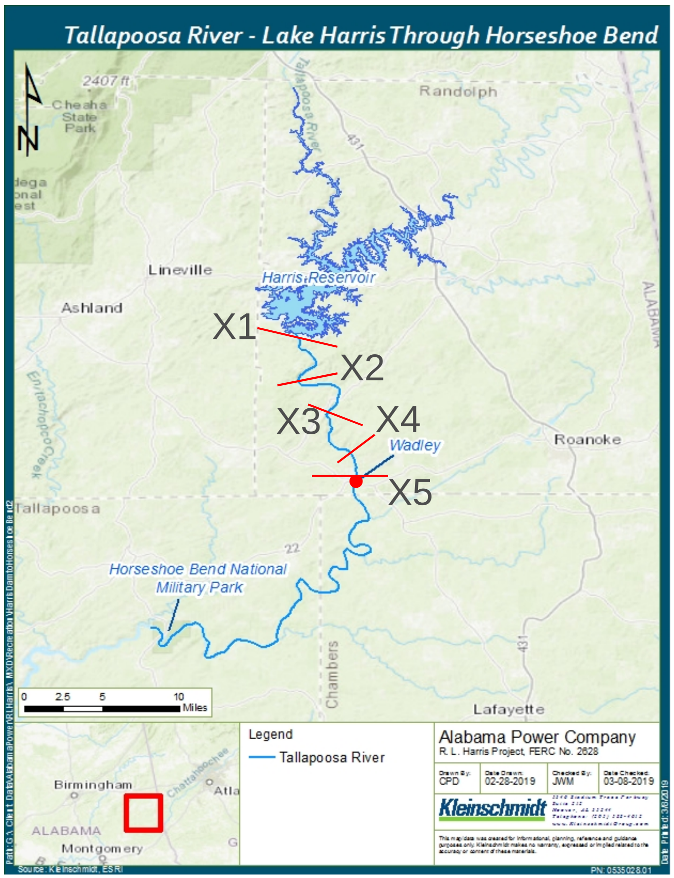


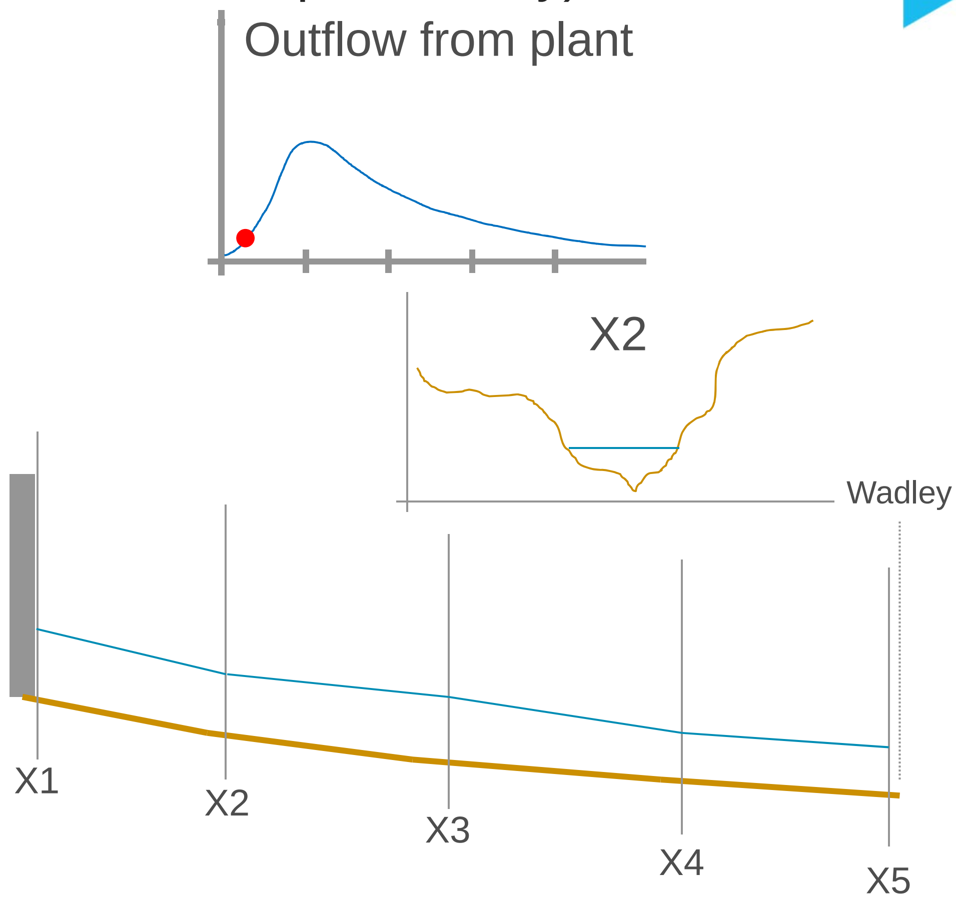
What is a cross section?



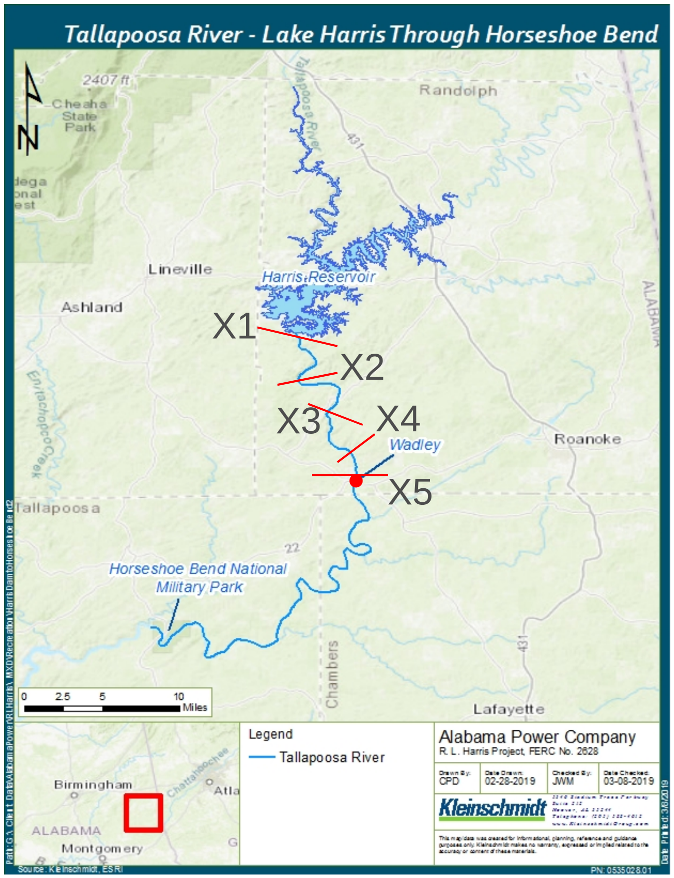


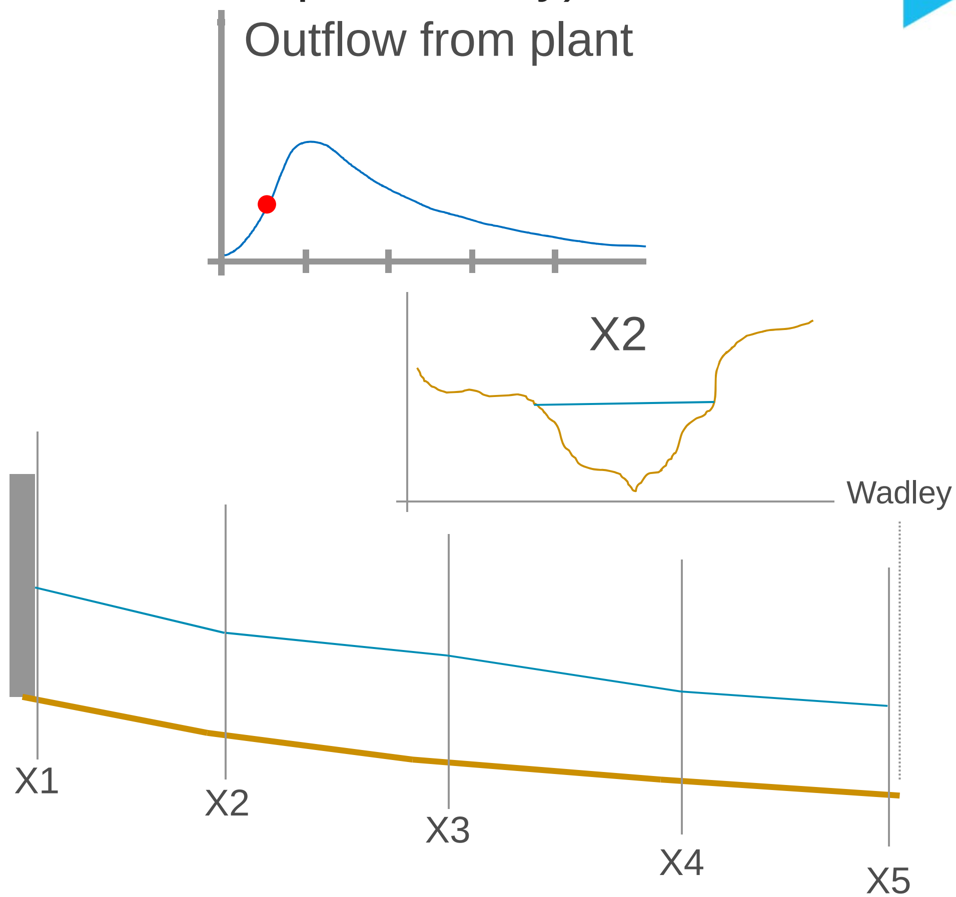
HEC-RAS (For Illustration Purposes Only)



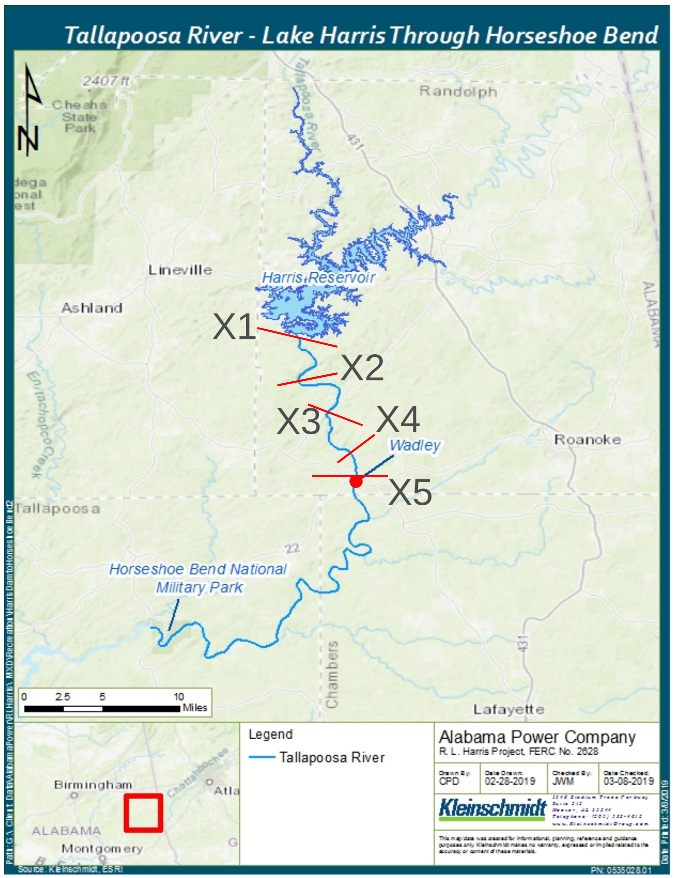


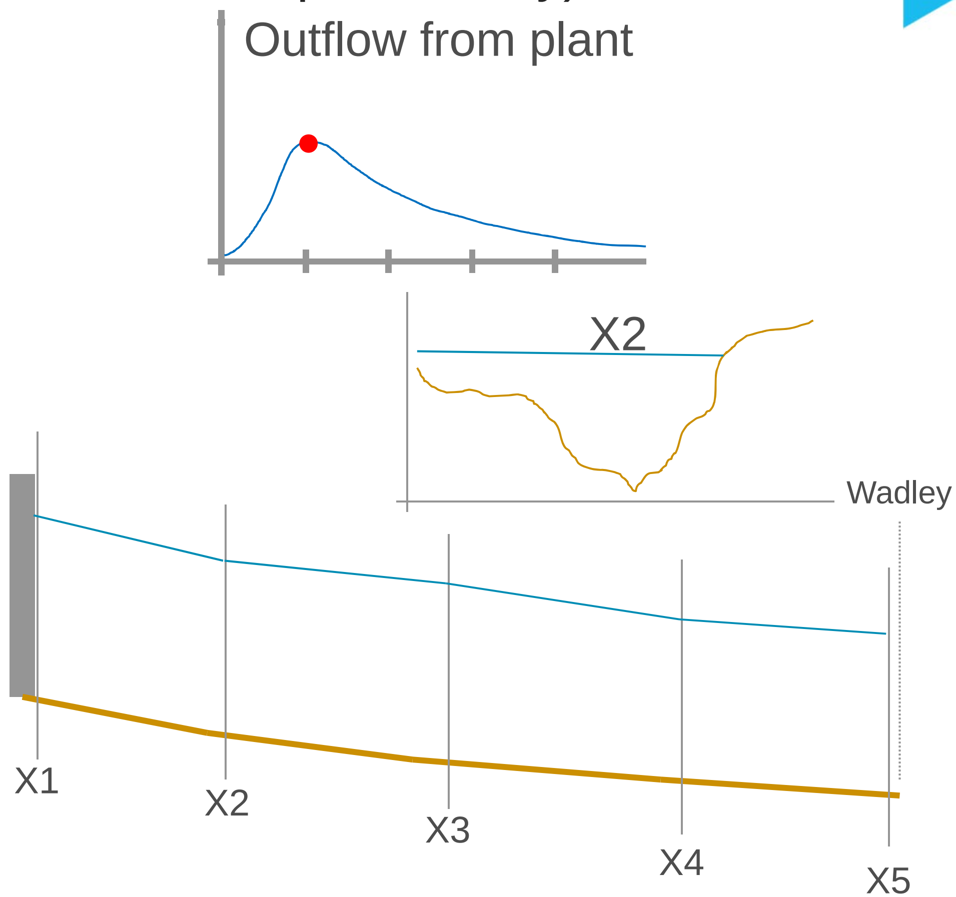
HEC-RAS (For Illustration Purposes Only)



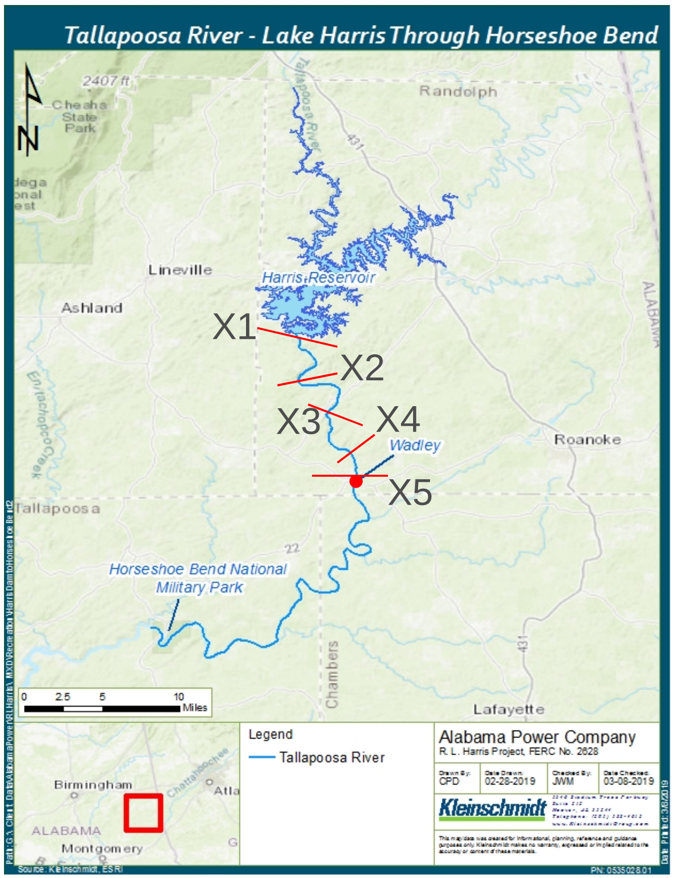


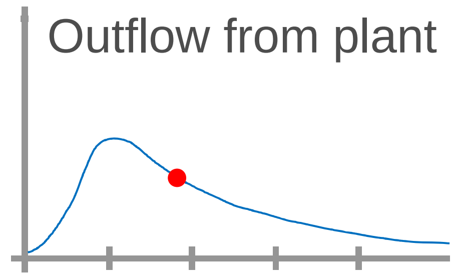
HEC-RAS (For Illustration Purposes Only)

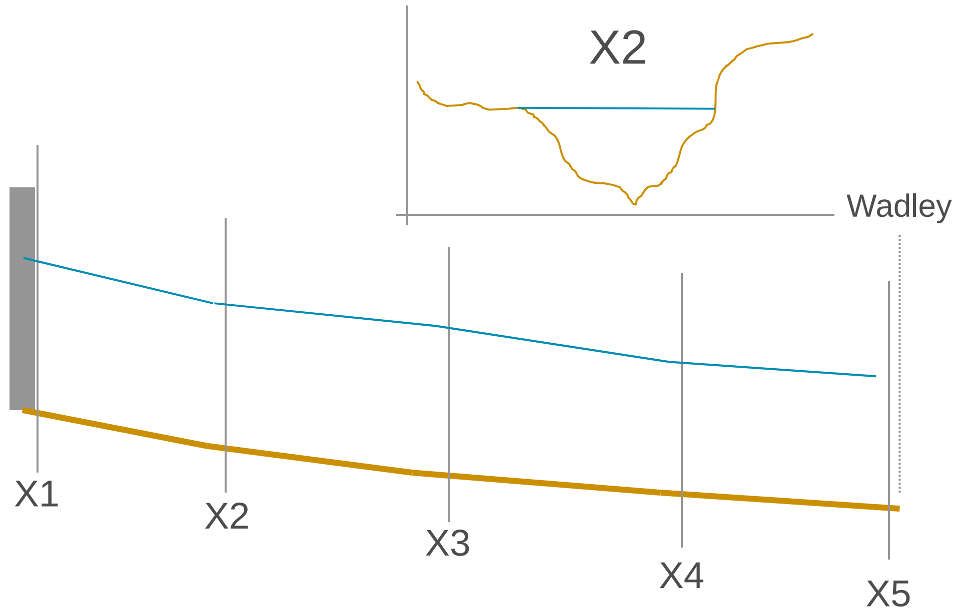




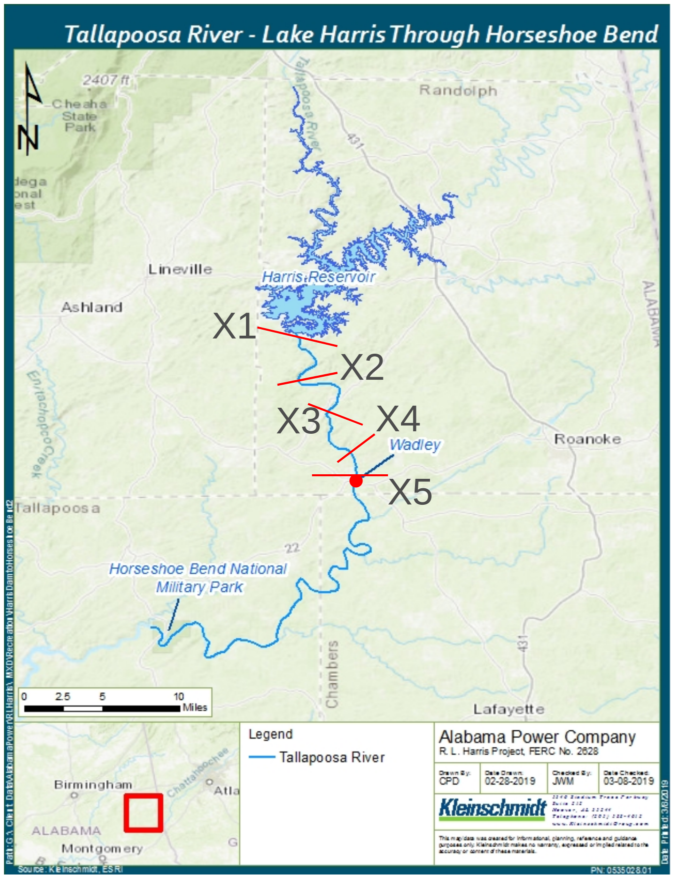
HEC-RAS (For Illustration Purposes Only)

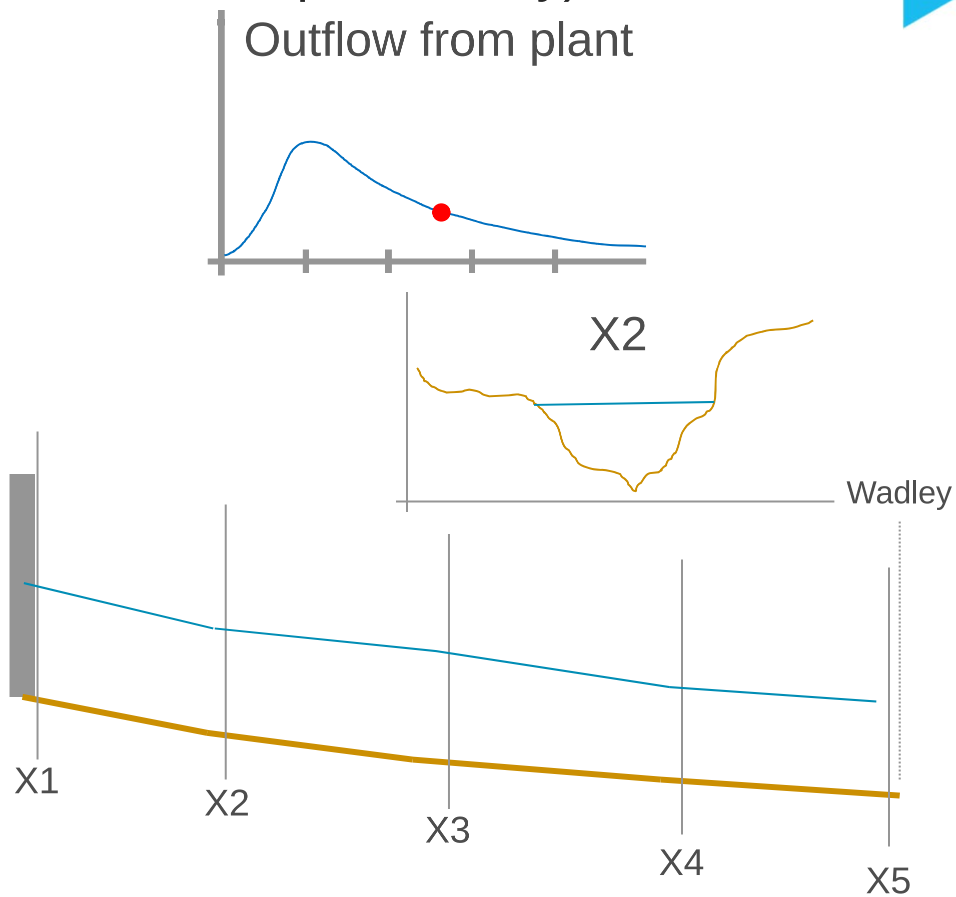




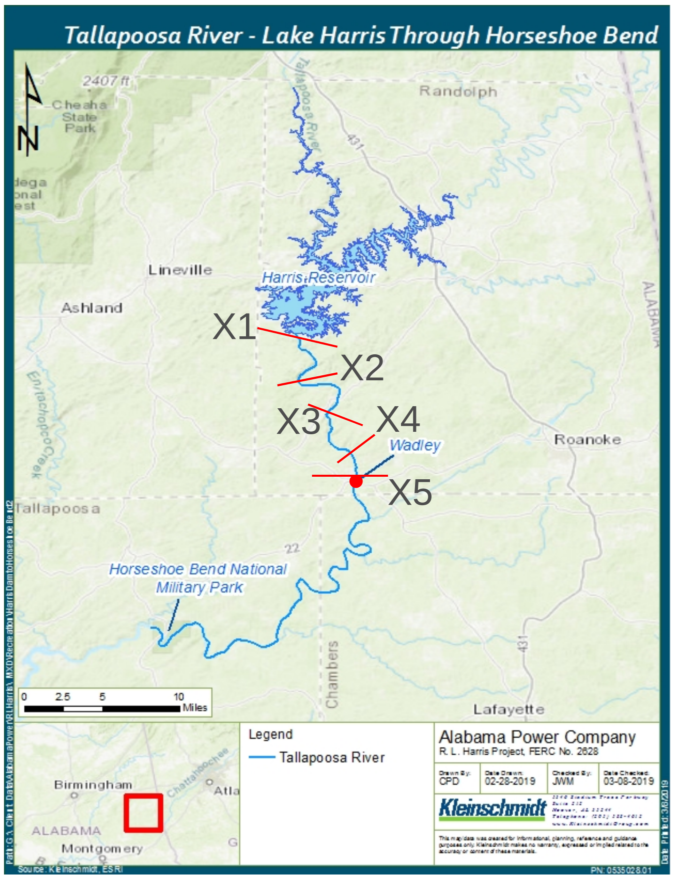


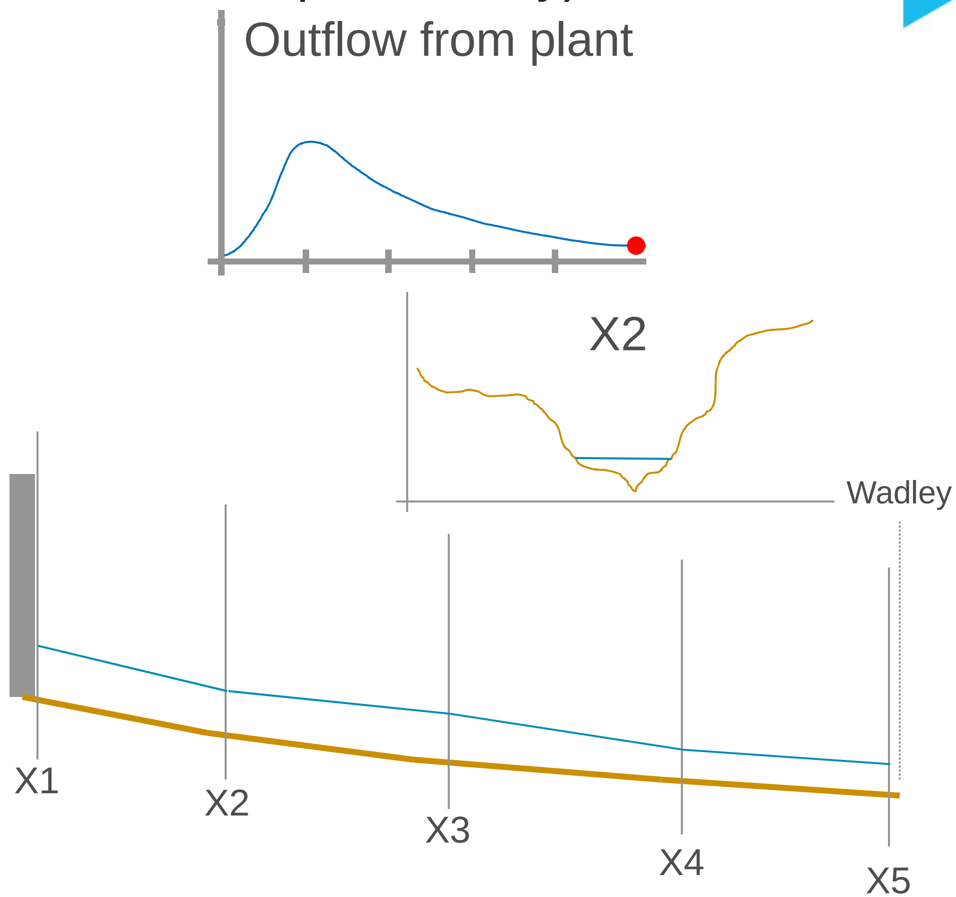
HEC-RAS (For Illustration Purposes Only)



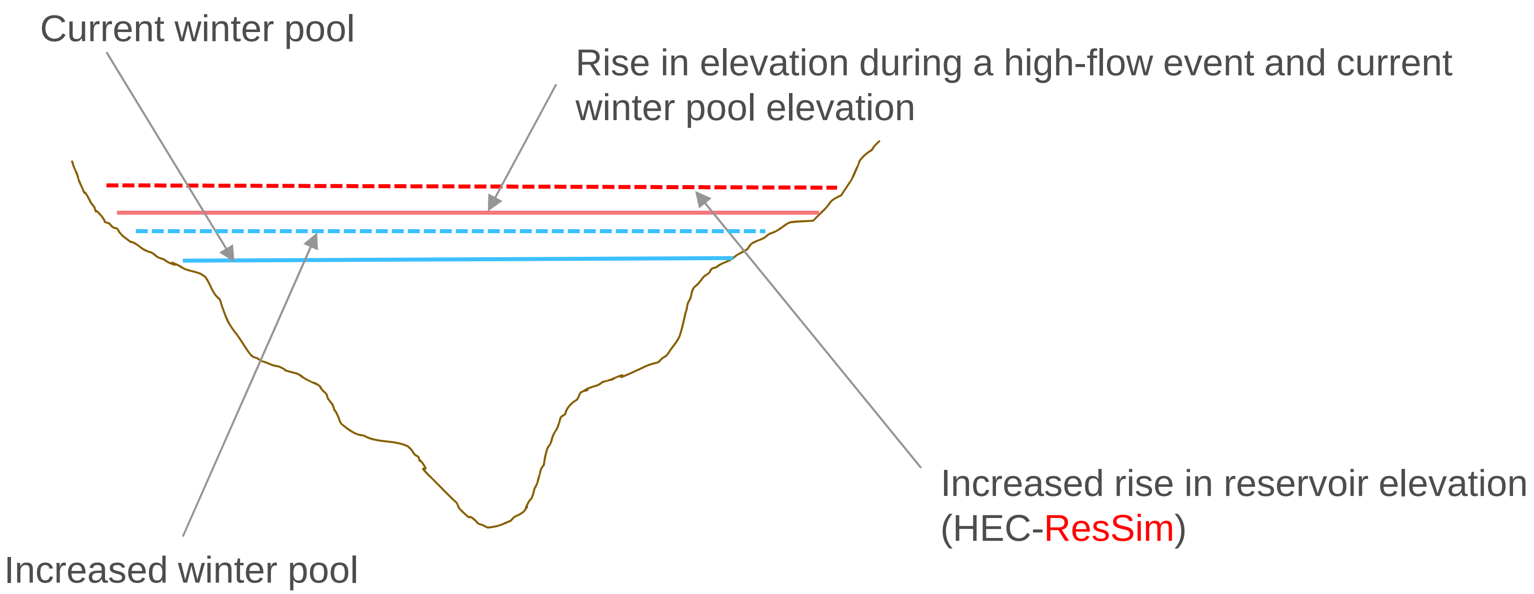


HEC-RAS (For Illustration Purposes Only)





If the winter pool is increased, what happens during a high-flow event?



AND…

What happens when more water is released?
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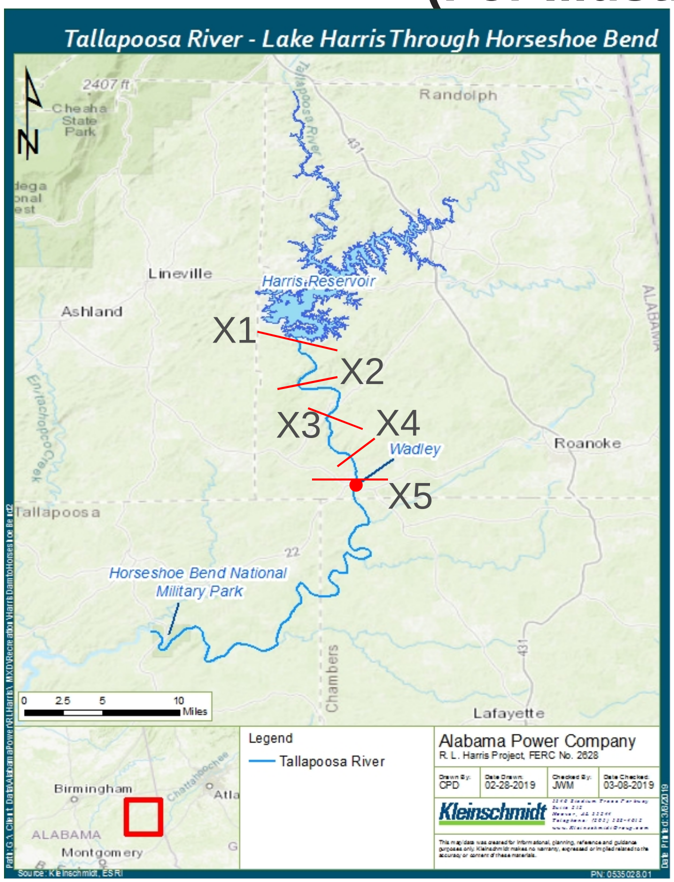
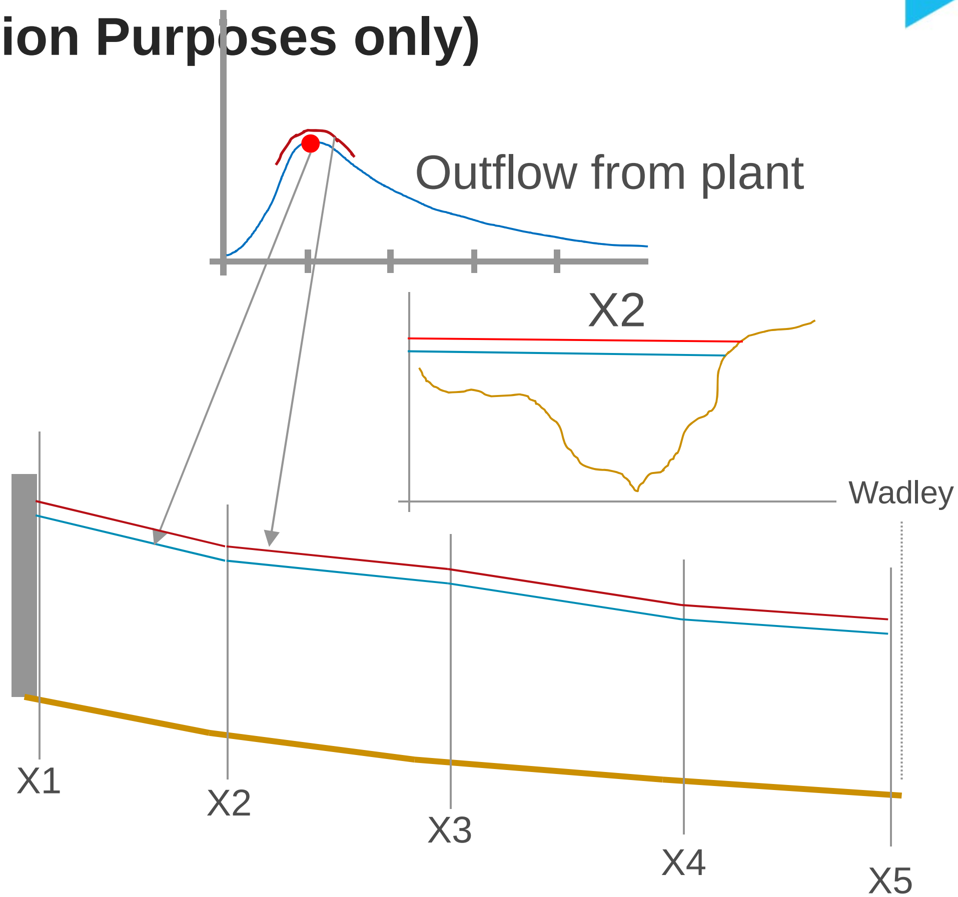
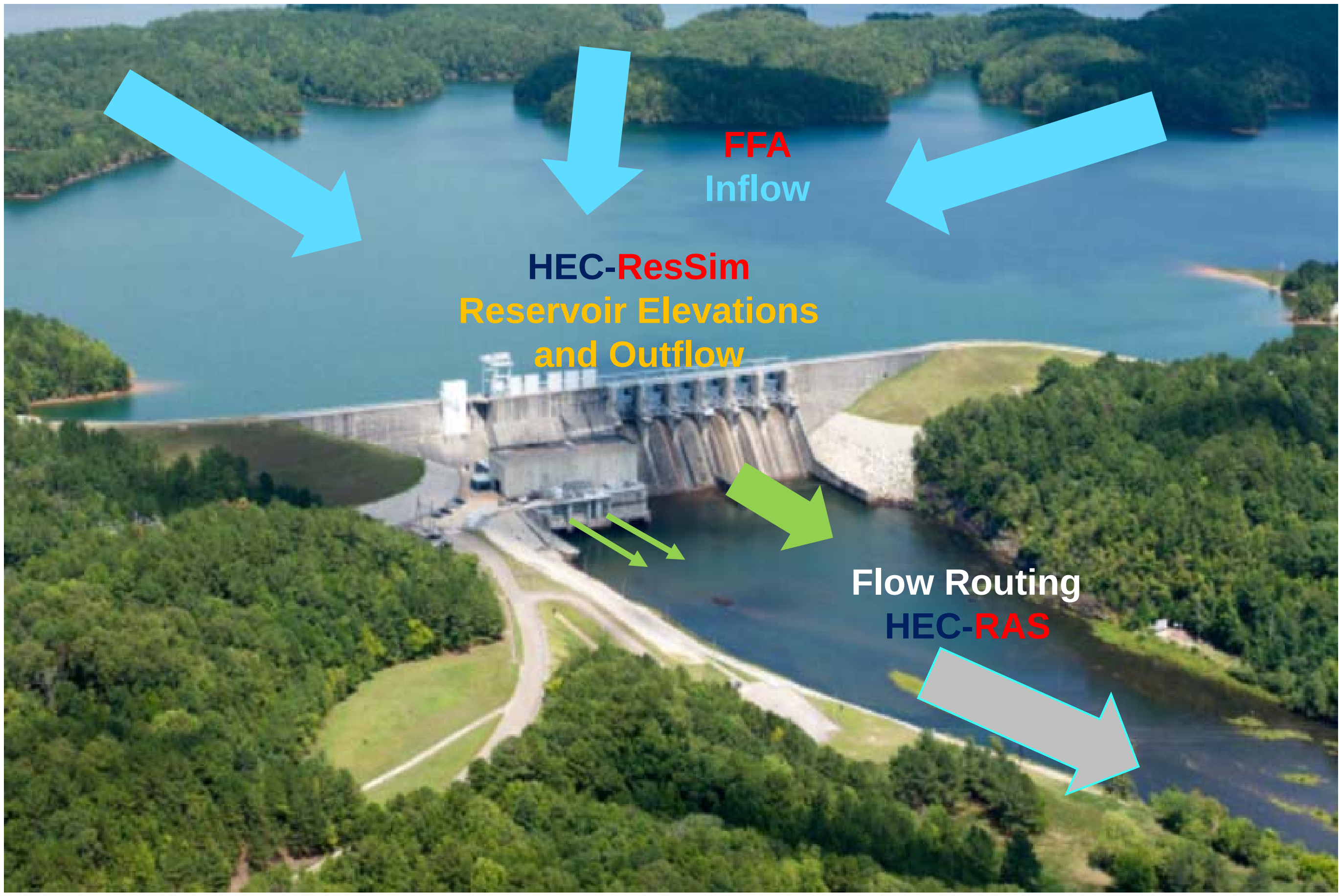
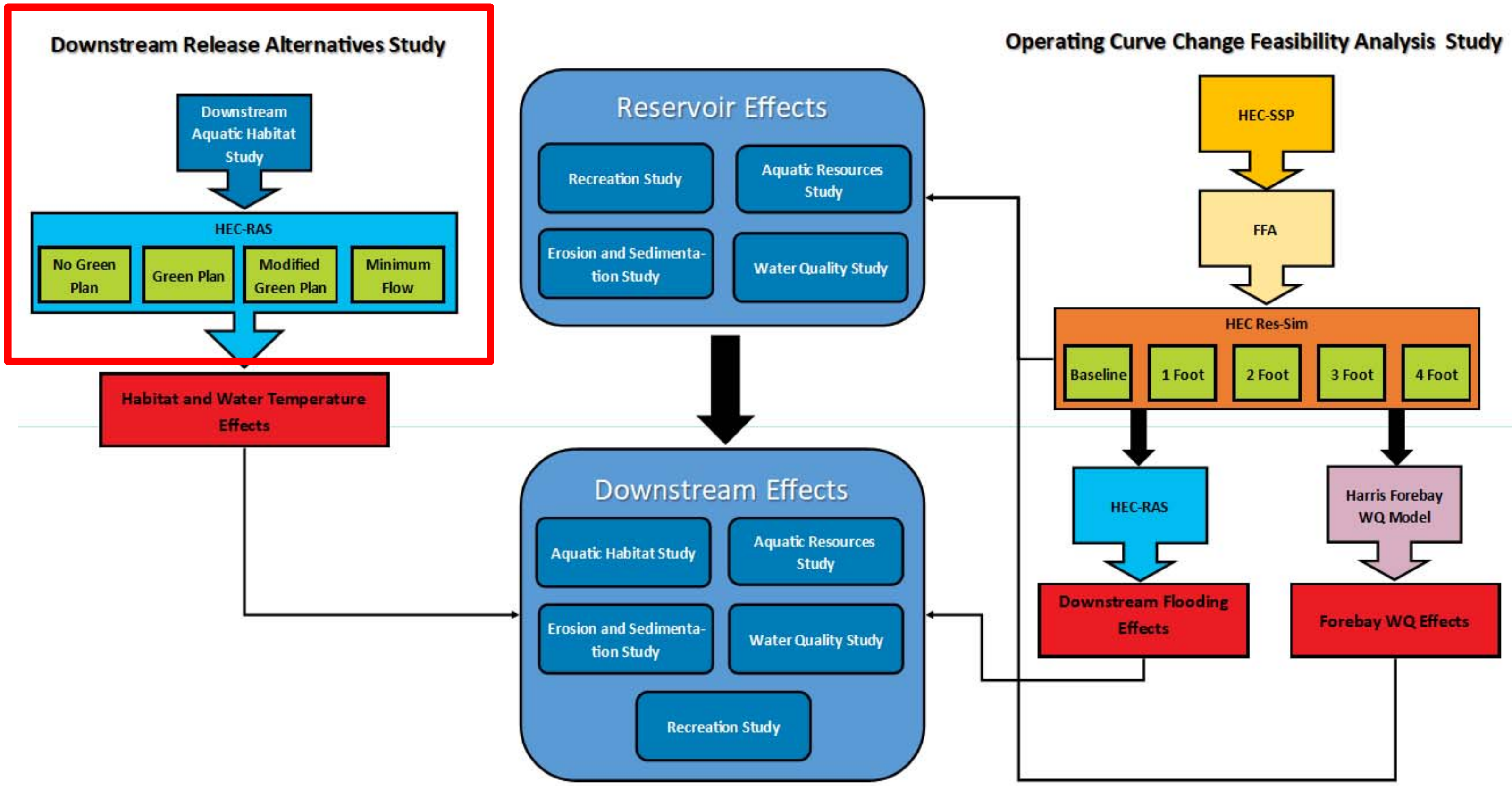




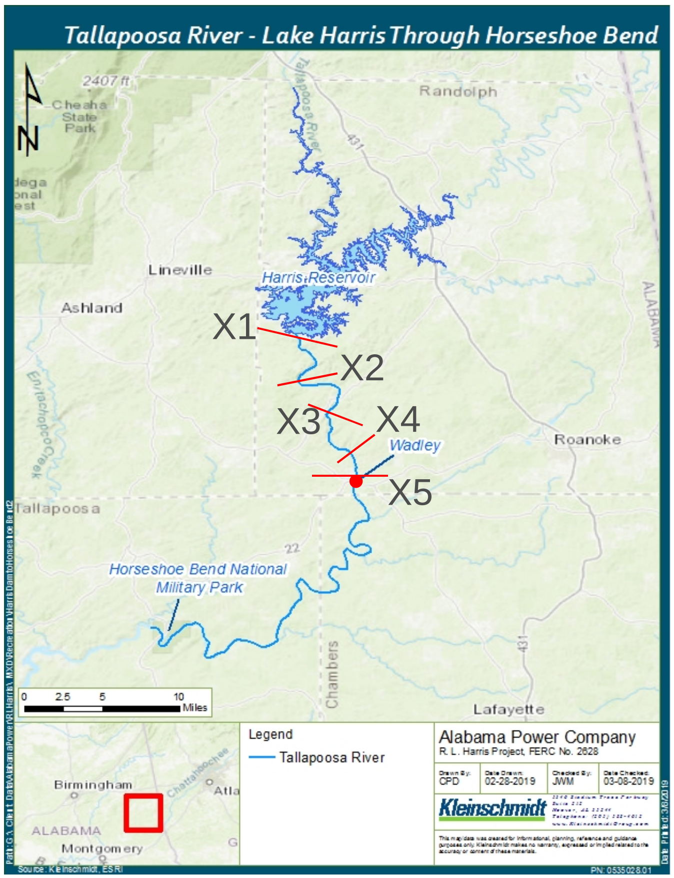
To summarize with a picture…




Downstream Release Alternatives Study
Downstream Aquatic Habitat Study
HEC-RAS
No Green Plan
Green Plan
Modified Green Plan
Minimum Flow
Habitat and Water Temperature Effects
Reservoir Effects
Recreation Study
Aquatic Resources Study
Erosion and Sedimenta-tion Study
Water Quality Study
Downstream Effects
Aquatic Habitat Study
Aquatic Resources Study
Erosion and Sedimenta-tion Study
Water Quality Study
Recreation Study
Operating Curve Change Feasibility Analysis Study
HEC-SSP
FFA
HEC Res-Sim
Baseline
1 Foot
2 Foot
3 Foot
4 Foot
HEC-RAS
Harris Forebay WQ Model
Downstream Flooding Effects
Forebay WQ Effects

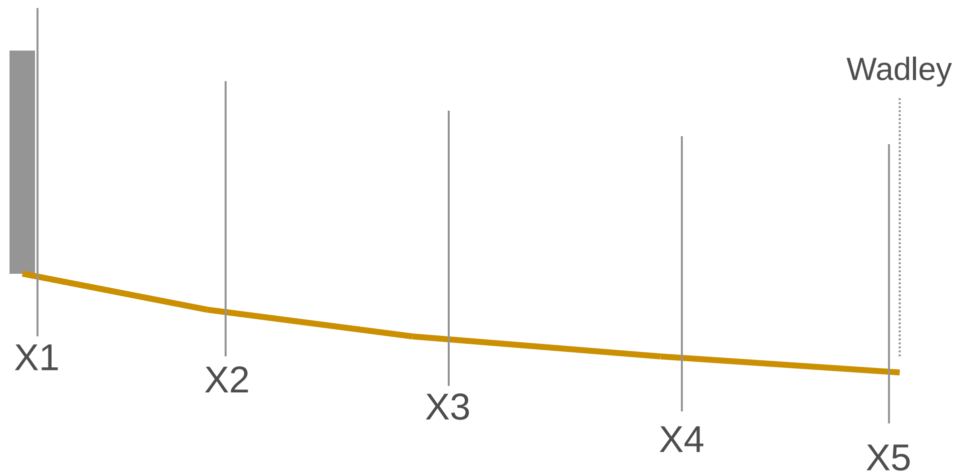
Downstream Release Alternatives Study

HEC-RAS model



Alternatives Studied

- Green Plan
- No Green Plan
- Modified Green Plan
- 150 cfs continuous minimum flow

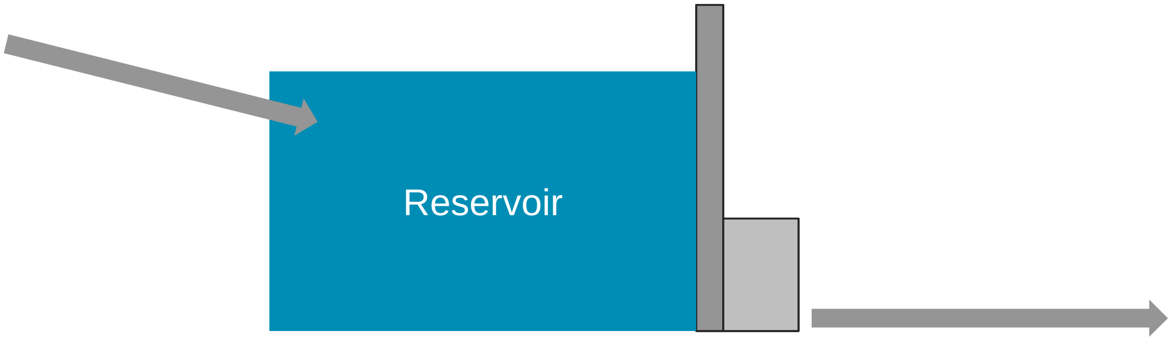


Downstream Release Alternatives Study

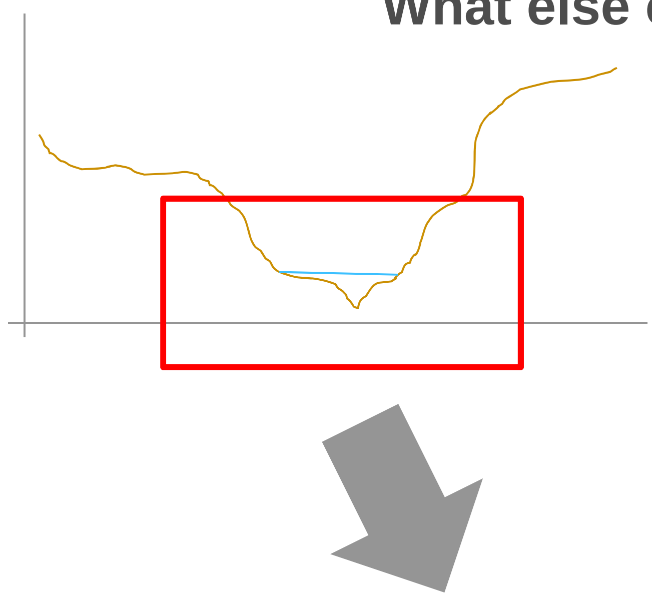
HEC-ResSim model

Alternatives Studied

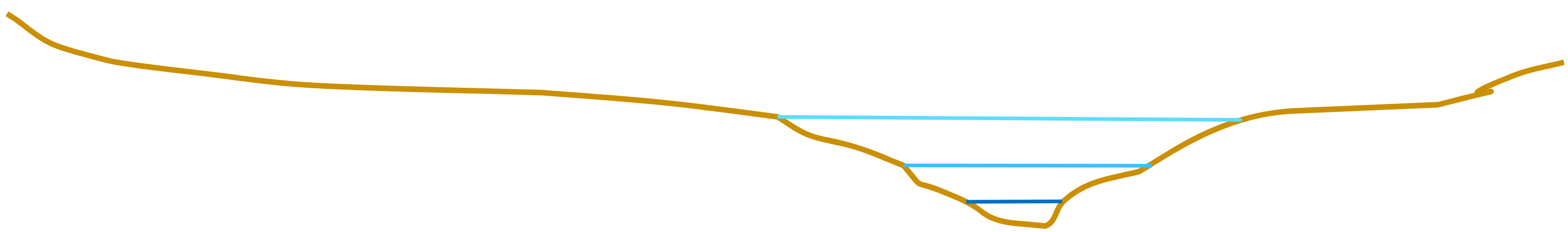
- Green Plan
- No Green Plan
- Modified Green Plan
- 150 cfs continuous minimum flow



What else can HEC-RAS be used for?

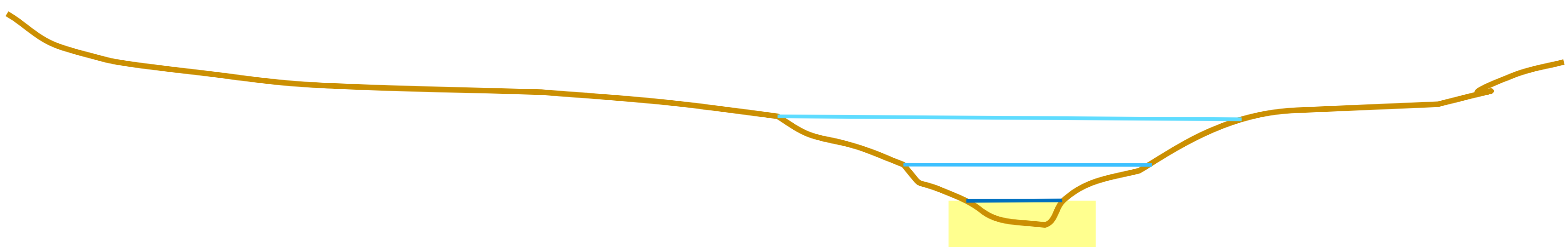


Downstream release alternatives
Water quality
Water Use
Erosion
Aquatic Resources
Wildlife and Terrestrial Resources
Recreation Resources
Cultural Resources



What else can HEC-RAS be used for?

Measure wetted perimeter during low flow scenarios



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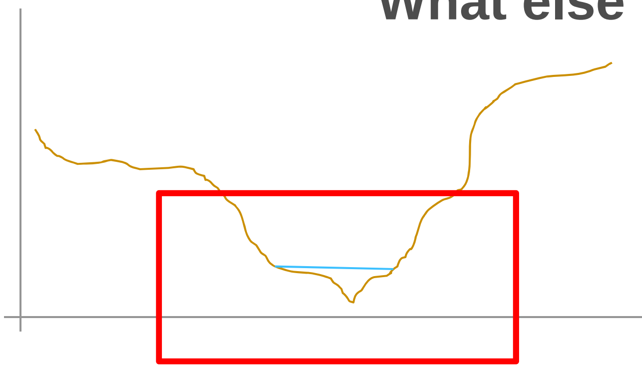

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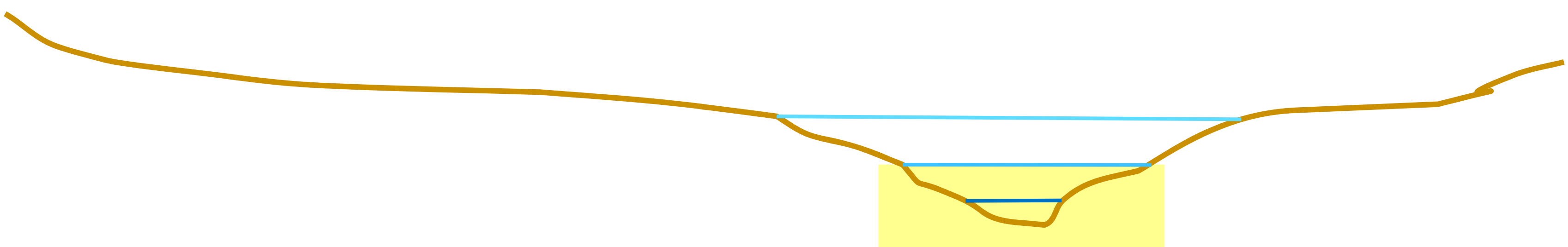

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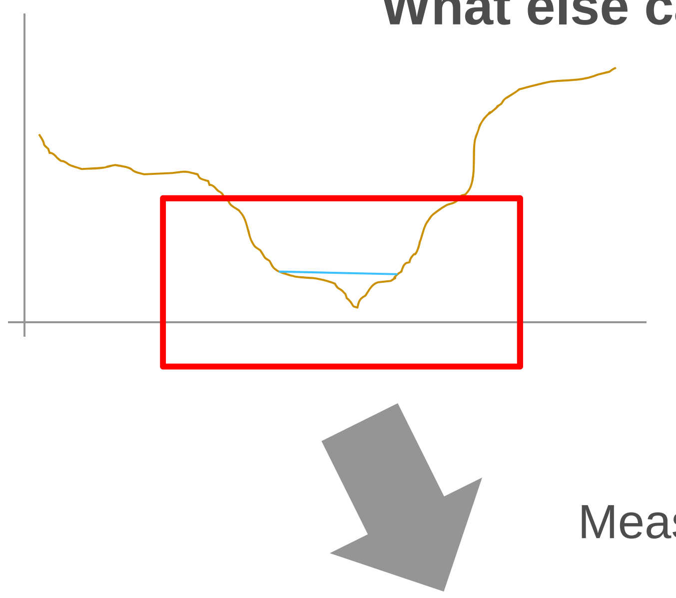
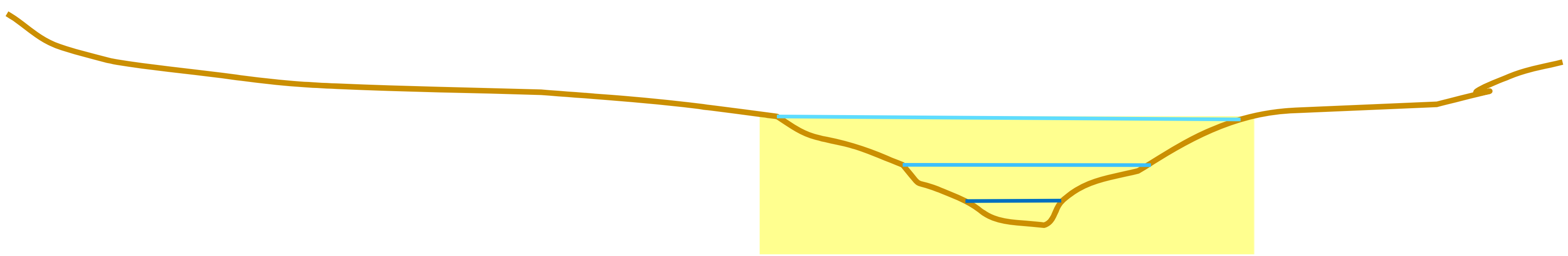
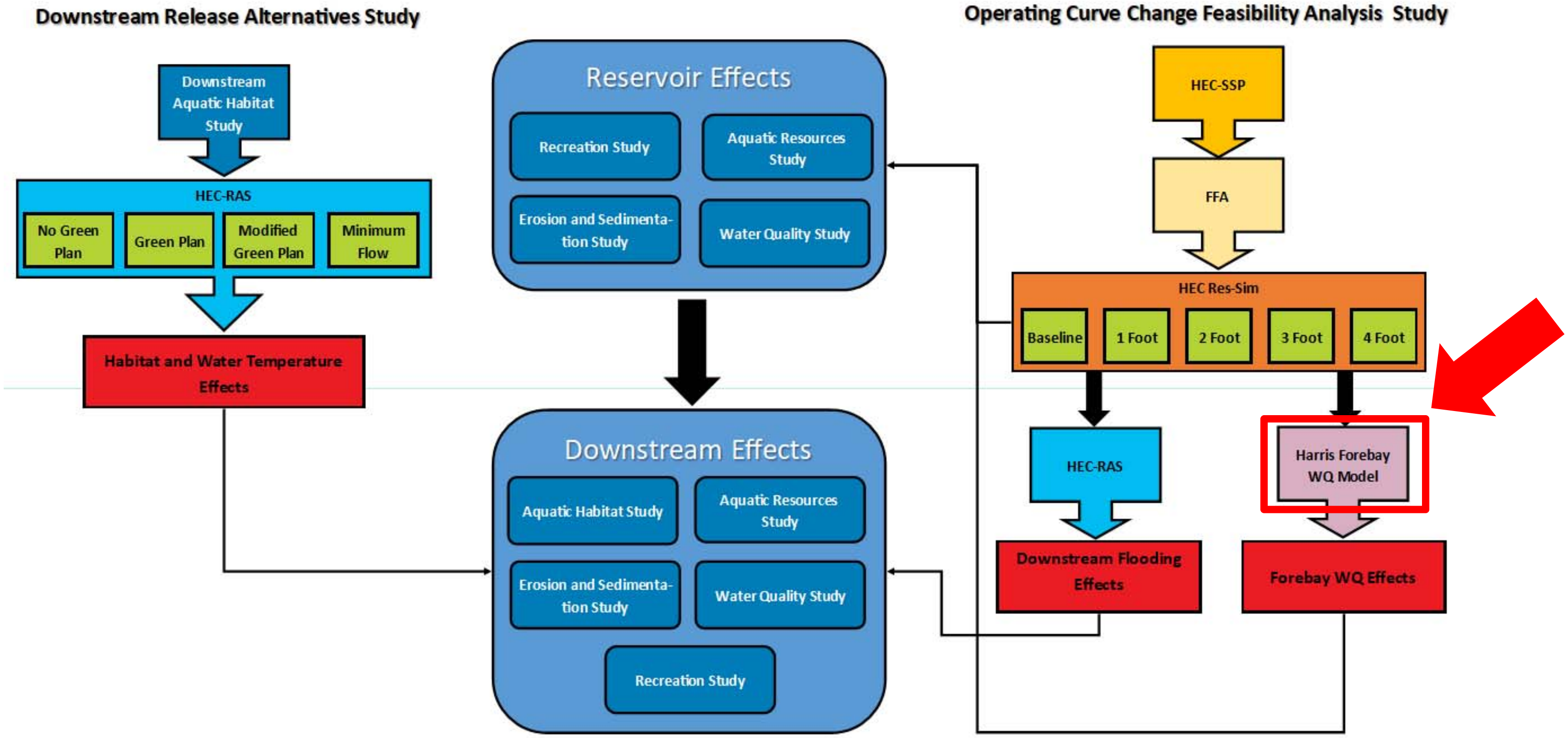


Measure wetted perimeter during low flow scenarios

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Environmental Fluid Dynamics Code (EFDC)

- Introduction
- Audience
- Abstract
- Applications and Possible Uses
- Model History
- Technical Support and Training
- Quality Assurance and Quality Control
- Related Sites
- References
- EFDC Model Download

From:	APC Harris Relicensing
To:	"harrisrelicensing@southernco.com"
Bcc:	damon.abernethy@dcnr.alabama.gov; steve.bryant@dcnr.alabama.gov; stan.cook@dcnr.alabama.gov; taconya.goar@dcnr.alabama.gov; chris.greene@dcnr.alabama.gov; keith.henderson@dcnr.alabama.gov; mike.holley@dcnr.alabama.gov; evan.lawrence@dcnr.alabama.gov; brian.atkins@adeca.alabama.gov; tom.littlepage@adeca.alabama.gov; jhaslbauer@adem.alabama.gov; cljohnson@adem.alabama.gov; mlen@adem.alabama.gov; fal@adem.alabama.gov; djmoore@adem.alabama.gov; arsegars@southernco.com; dkanders@southernco.com; jefbaker@southernco.com; jcarlee@southernco.com; kechandl@southernco.com; mcoker@southernco.com; cggoodma@southernco.com; sgraham@southernco.com; ammcvica@southernco.com; tlmills@southernco.com; cmnix@southernco.com; kodom@southernco.com; alpeeple@southernco.com; dpreston@southernco.com; scsmith@southernco.com; twstjohn@southernco.com; cchaffin@alabamarivers.org; clowry@alabamarivers.org; gjobsis@americanrivers.org; kmo0025@auburn.edu; devridr@auburn.edu; irwiner@auburn.edu; wrighr2@aces.edu; lgallen@balch.com; jhancock@balch.com; allan.creamer@ferc.gov; rachel.mcnamara@ferc.gov; sarah.salazar@ferc.gov; monte.terhaar@ferc.gov; gene@wedoweelakehomes.com; kate.cosnahan@kleinschmidtgroup.com; colin.dinken@kleinschmidtgroup.com; amanda.fleming@kleinschmidtgroup.com; chris.goodell@kleinschmidtgroup.com; henry.mealing@kleinschmidtgroup.com; jason.moak@kleinschmidtgroup.com; kelly.schaeffer@kleinschmidtgroup.com; jessecunningham@msn.com; mdollar48@gmail.com; drheinzen@charter.net; sforehand@russelllands.com; 1942jthompson420@gmail.com; nancyburnes@centurylink.net; sandnfrench@gmail.com; lgarland68@aol.com; rbmorris222@gmail.com; Ira Parsons (irapar@centurytel.net); mitchell.reid@tnc.org; richardburnes3@gmail.com; eilandfarm@aol.com; athall@fujifilm.com; ebt.drt@numail.org; georgettraylor@centurylink.net; beckyrainwater1@yahoo.com; dbronson@charter.net; wmcampbell218@gmail.com; jec22641@aol.com; sonjaholloman@gmail.com; butchjackson60@gmail.com; donnamat@aol.com; goxford@centurylink.net; mhpwedowee@gmail.com; jerrelshell@gmail.com; bsmith0253@gmail.com; inspector_003@yahoo.com; paul.trudine@gmail.com; lindastone2012@gmail.com; granddadth@windstream.net; trayjim@bellsouth.net; straylor426@bellsouth.net; robert.a.allen@usace.army.mil; randall.b.harvey@usace.army.mil; james.e.hathorn.jr@sam.usace.army.mil; lewis.c.sumner@usace.army.mil; jonas.white@usace.army.mil; gordon.lisa-perras@epa.gov; holliman.daniel@epa.gov; jennifer_grunewald@fws.gov; jeff_powell@fws.gov; jeff_duncan@nps.gov
Subject:	HAT 1 - September 11 meeting notes
Date:	Tuesday, October 1, 2019 1:04:00 PM

HAT 1,

The meeting notes and materials from the HAT 1 meeting held September 11, 2019 can be found on the Harris relicensing website (www.harrisrelicensing.com) under HAT 1 – Project Operations.

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

Level logger information

APC Harris Relicensing

Mon 10/14/2019 6:34 PM

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Good afternoon,

There have several questions at recent HAT meetings about the location of the level loggers that are collecting elevation and temperature data that will be used in several of the relicensing studies. For your information, here is a link to a map that shows the locations of the 20 level logger monitors: Level Logger Locations. This link will also be placed under HATs 1 and 3 on the Harris relicensing website, www.harrisrelicensing.com.

Thanks,

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Harris Relicensing Progress Update

APC Harris Relicensing

Wed 10/30/2019 5:39 PM

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monte.terhaar@ferc.gov <monte.terhaar@ferc.gov>; mooretn@auburn.edu <mooretn@auburn.edu>; mprandolph@gmail.com <mprandolph@gmail.com>; nancyburnes@centurylink.net <nancyburnes@centurylink.net>; nanferebee@juno.com <nanferebee@juno.com>; orr.chauncey@epa.gov <orr.chauncey@epa.gov>; pace.wilber@noaa.gov <pace.wilber@noaa.gov>; partnersinfo@wwfus.org <partnersinfo@wwfus.org>; patti.powell@dcnr.alabama.gov <patti.powell@dcnr.alabama.gov>; patty@ten-o.com <patty@ten-o.com>; paul.trudine@gmail.com <paul.trudine@gmail.com>; ptrammell@reddyice.com <ptrammell@reddyice.com>; publicaffairs@doc.gov <publicaffairs@doc.gov>; rachel.mcnamara@ferc.gov <rachel.mcnamara@ferc.gov>; RaeLynn Butler <raebutler@mcn-nsn.gov>; rancococ@teleclipse.net <rancococ@teleclipse.net>; randall.b.harvey@usace.army.mil <randall.b.harvey@usace.army.mil>; randy@randyrogerslaw.com <randy@randyrogerslaw.com>; randy@wedoweemarine.com <randy@wedoweemarine.com>; rbmorris222@gmail.com <rbmorris222@gmail.com>; rcodydeal@hotmail.com <rcodydeal@hotmail.com>; reuteem@auburn.edu <reuteem@auburn.edu>; richardburnes3@gmail.com <richardburnes3@gmail.com>; rick.oates@forestry.alabama.gov <rick.oates@forestry.alabama.gov>; rickmcwhorter723@icloud.com <rickmcwhorter723@icloud.com>; rifraft2@aol.com <rifraft2@aol.com>; rjdavis8346@gmail.com <rjdavis8346@gmail.com>; robert.a.allen@usace.army.mil <robert.a.allen@usace.army.mil>; roger.mcneil@noaa.gov <roger.mcneil@noaa.gov>; ron@lakewedowee.org <ron@lakewedowee.org>; rosoweka@mcn-nsn.gov <rosoweka@mcn-nsn.gov>; russtown@nc-cherokee.com <russtown@nc-cherokee.com>; ryan.prince@forestry.alabama.gov <ryan.prince@forestry.alabama.gov>; sabrinawood@live.com <sabrinawood@live.com>; sandnfrench@gmail.com <sandnfrench@gmail.com>; sarah.salazar@ferc.gov <sarah.salazar@ferc.gov>; sbryan@pci-nsn.gov <sbryan@pci-nsn.gov>; Smith, Sheila C. <SCSMITH@southernco.com>; section106@mcn-nsn.gov <section106@mcn-nsn.gov>; sforehand@russelllands.com <sforehand@russelllands.com>; Graham, Stacey A. <SGRAHAM@SOUTHERNCO.COM>; sherry.bradley@adph.state.al.us <sherry.bradley@adph.state.al.us>; sidney.hare@gmail.com <sidney.hare@gmail.com>; simsthe@aces.edu <simsthe@aces.edu>; snelson@nelsonandco.com <snelson@nelsonandco.com>; sonjaholloman@gmail.com <sonjaholloman@gmail.com>; stan.cook@dcnr.alabama.gov <stan.cook@dcnr.alabama.gov>; steve.bryant@dcnr.alabama.gov <steve.bryant@dcnr.alabama.gov>; stewartjack12@bellsouth.net <stewartjack12@bellsouth.net>; straylor426@bellsouth.net <straylor426@bellsouth.net>; sueagnew52@yahoo.com <sueagnew52@yahoo.com>; taconya.goar@dcnr.alabama.gov <taconya.goar@dcnr.alabama.gov>; tcjabattise@actribe.org <tcjabattise@actribe.org>; tdadunaway@gmail.com <tdadunaway@gmail.com>; thpo@pci-nsn.gov <thpo@pci-nsn.gov>; thpo@tttown.org <thpo@tttown.org>; timguffie@jcch.net <timguffie@jcch.net>; tlamberth@russelllands.com <tlamberth@russelllands.com>; Mills, Tina L. <tlmills@southernco.com>; tom.diggs@ung.edu <tom.diggs@ung.edu>; tom.lettieri47@gmail.com <tom.lettieri47@gmail.com>; tom.littlepage@adeca.alabama.gov <tom.littlepage@adeca.alabama.gov>; Freeman, Tina P. <TPFREEMA@southernco.com>; trayjim@bellsouth.net <trayjim@bellsouth.net>; triciastearns@gmail.com <triciastearns@gmail.com>; St. John, Thomas W. <TWSTJOHN@southernco.com>; variscom506@gmail.com <variscom506@gmail.com>; walker.mary@epa.gov <walker.mary@epa.gov>; william.puckett@swcc.alabama.gov <william.puckett@swcc.alabama.gov>; wmcampbell218@gmail.com <wmcampbell218@gmail.com>; wrighr2@aces.edu <wrighr2@aces.edu>; Gardner, William S. <WSGARDNE@southernco.com>; Anderson, Wesley Taylor <WTANDERS@SOUTHERNCO.COM>

Harris Relicensing stakeholders,

In the Harris Project Final Study Plans, filed with FERC on May 13, 2019, Alabama Power agreed to file voluntary Progress Updates with FERC in October 2019 and October 2020. The purpose of the Progress Update is to ensure that stakeholders and FERC can review the study progress to date and plan for future reports, meetings, and overall relicensing activities. This is a voluntary action that is not required under the ILP. Alabama Power has filed the October 2019 Progress Update with FERC and posted it to the Harris Project relicensing website: www.harrisrelicensing.com [harrisrelicensing.com] (in the Relicensing Documents folder).

Thanks,

Angie Anderegg

Hydro Services
(205)257-2251
arsegars@southernco.com

Alabama Power

600 North 18th Street
Hydro Services 16N-8180
Birmingham, AL 35203
205 257 2251 tel
arsegars@southernco.com

October 30, 2019

VIA ELECTRONIC FILING

Project No. 2628-065
R.L. Harris Hydroelectric Project
Progress Update

Ms. Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street N.
Washington, DC 20426

Dear Secretary Bose,

Alabama Power Company (Alabama Power) is the Federal Energy Regulatory Commission (FERC) licensee for the R.L. Harris Hydroelectric Project (Harris Project) (FERC No. 2628). On March 13, 2019, Alabama Power filed 10 study plans for FERC approval as part of the Integrated Licensing Process for the Harris Project. On April 12, 2019, FERC approved Alabama Power's study plans with FERC modifications. Alabama Power filed the Final Study Plans with FERC on May 13, 2019 and posted the Final Study Plans to the Harris Project relicensing website at www.harrisrelicensing.com.

As part of the May 13, 2019 filing, Alabama Power recognized the complexity of tracking the 10 relicensing studies and committed to filing a voluntary Progress Update with FERC in October 2019 and October 2020. The purpose of this Progress Update (Attachment A) is to ensure that stakeholders and FERC can review the study progress to date and plan for future reports, meetings, and overall relicensing activities. This is a voluntary action that is not required under the ILP. Alabama Power will post this Progress Update to the Harris Project relicensing website. The Harris Action Team distribution lists are included as Attachment B.

If there are any questions concerning this filing, please contact me at arsegars@southernco.com or 205-257-2251.

Sincerely,

Angela Anderegg

Angie Anderegg
Harris Relicensing Project Manager

Attachments (2)

cc: Harris Stakeholder List

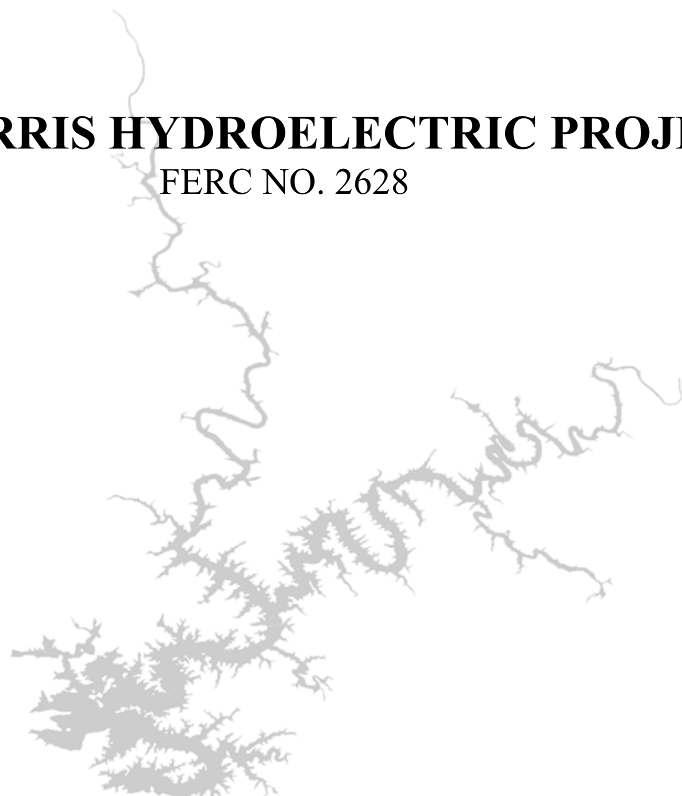
Attachment A
October 2019 Harris Project Progress Update

HARRIS DAM
RELICENSING

PROGRESS UPDATE

R. L. HARRIS HYDROELECTRIC PROJECT

FERC NO. 2628



Prepared by:

ALABAMA POWER COMPANY
BIRMINGHAM, ALABAMA

Alabama Power

October 2019

ALABAMA POWER COMPANY
BIRMINGHAM, ALABAMA

R. L. HARRIS HYDROELECTRIC PROJECT
FERC NO. 2628

PROGRESS UPDATE

TABLE OF CONTENTS

ALABAMA POWER COMPANY
BIRMINGHAM, ALABAMA

R. L. HARRIS HYDROELECTRIC PROJECT
FERC NO. 2628

PROGRESS UPDATE

1.0 INTRODUCTION

Alabama Power Company (Alabama Power) is the Federal Energy Regulatory Commission (FERC) licensee for the R.L. Harris Hydroelectric Project (Harris Project) (FERC No. 2628). On June 1, 2018, Alabama Power filed a Pre-Application Document and began the Integrated Licensing Process (ILP) for the Harris Project[1].

On November 13, 2018, Alabama Power filed ten proposed study plans for the Harris Project. FERC issued a Study Plan Determination on April 12, 2019, which included FERC staff recommendations. Alabama Power incorporated FERC's recommendations and filed the Final Study Plans with FERC on May 13, 2019[2]. Based upon FERC's prior comments and as part of the Final Study Plans, Alabama Power incorporated within each study plan's schedule a milestone to file a voluntary Progress Update in October 2019 and October 2020. This Progress Update is designed to inform stakeholders and FERC of the study progress, future reports, Harris Action Team (HAT) meetings, and overall relicensing activities. A summary of the Harris Project relicensing activities follows in Section 2 to Section 7 of this report.

[1] Accession No. 20180601-5125

[2] Accession No. 20190513-5093

2.0 HAT 1 – PROJECT OPERATIONS

2.1 DOWNSTREAM RELEASE ALTERNATIVES STUDY PLAN

- Alabama Power deployed 20 level loggers and has collected bathymetry data in the Tallapoosa River needed for the HEC-RAS modeling.
- Alabama Power held a HAT 1 meeting on September 11, 2019, to discuss the models used in the Downstream Release Alternatives Study Plan and status of the modeling analysis.
- Alabama Power posted the September 11, 2019 HAT 1 meeting summary on the Harris Relicensing website at www.harrisrelicensing.com.
- Beginning in November 2019, Alabama Power will download the level logger data and complete the HEC-RAS model.
- In accordance with the FERC approved study plan, Alabama Power will host a HAT 1 meeting to present initial model results in February/March 2020.

2.2 OPERATING CURVE CHANGE FEASIBILITY ANALYSIS STUDY PLAN

- Alabama Power hosted a HAT 1 meeting on September 11, 2019, to discuss the models, methods, and model inputs and outputs (how the model will be used) for the Operating Curve Change Feasibility Analysis.
- Alabama Power posted the September 11, 2019 HAT 1 meeting summary on the Harris Relicensing website at www.harrisrelicensing.com.
- Alabama Power is in the process of modeling the four alternative winter operating curve elevations and will evaluate the effects on flood control, navigation, generation, drought operations, and Green Plan operations.
- In accordance with the FERC approved study plan, Alabama Power will host a HAT 1 meeting to present initial model results in February/March 2020.

3.0 HAT 2 – WATER QUALITY AND USE

3.1 EROSION AND SEDIMENTATION STUDY PLAN

- Alabama Power distributed an email on May 1, 2019 to HAT 2 members requesting any locations of additional areas of erosion and sedimentation concerns on Lake Harris and in the Tallapoosa River downstream of Harris Dam. Alabama Power did not receive any comments from stakeholders regarding additional areas of erosion and sedimentation concern.
- Alabama Power held a HAT 2 meeting on September 11, 2019, where it presented GIS overlays and maps of the erosion and sedimentation sites that will be assessed when the reservoir level is at winter pool elevation.
- Alabama Power posted the September 11th HAT 2 meeting summary and meeting materials, as well as a link to an online map with the locations of the identified erosion and sedimentation study sites, on the Harris Relicensing website at www.harrisrelicensing.com.
- Following the September 11 HAT 2 meeting, a stakeholder requested, and Alabama Power agreed, to include one additional erosion site in the field assessment.
- Trutta Environmental Solutions conducted a bank erosion susceptibility survey on the Tallapoosa River from the Harris Dam through Horseshoe Bend. Trutta Environmental Solutions is in the process of analyzing the data and preparing a report.
- In November/December, Alabama Power will conduct the field assessment of the erosion and sedimentation areas.
- In accordance with the FERC-approved study plan, Alabama Power will prepare and distribute a Draft Erosion and Sedimentation Study Report to HAT 2 in March 2020.

3.2 WATER QUALITY STUDY PLAN

- Alabama Power distributed an email on May 1, 2019, to HAT 2 members requesting locations of any additional areas of water quality concerns on Lake Harris. Alabama Power did not receive any comments from stakeholders regarding additional areas of water quality concern.
- Alabama Power held a HAT 2 meeting on September 11, 2019, to provide an update on the Water Quality Study Plan.
- Alabama Power posted the September 1, 2019 HAT 2 meeting summary on the Harris Relicensing website at www.harrisrelicensing.com.
- Alabama Power is continuing to monitor temperature and dissolved oxygen in the tailrace and at a monitoring location approximately ½ mile downstream of Harris Dam through October 31, 2019. Additionally, Alabama Power will continue to collect monthly vertical water quality profiles in the forebay through October 31, 2019.
- In accordance with the FERC-approved study plan, Alabama Power will distribute a Draft Water Quality Study Report to HAT 2 in March 2020.

4.0 HAT 3 – FISH AND WILDLIFE

4.1 AQUATIC RESOURCES STUDY PLAN

- Alabama Power is developing the desktop assessment of aquatic resources, per Task 4.1 of the approved study plan.
- Auburn University has identified several sources of existing information, per Task 4.2.1 of the approved study plan. Where information is not available for a particular species, data for similar (surrogate species) may be used.
- Auburn University has analyzed Pre and post Green Plan temperature data from the regulated reaches, per Task 4.2.2 of the approved study plan. Preliminary results of this analysis were presented to HAT 3 members on March 20, 2019.
- Auburn University is collecting additional temperature data and analyzing all available temperature data on a sub-daily basis.
- Alabama Power posted the March 20, 2019 HAT 3 meeting summary on the Harris Relicensing website at www.harrisrelicensing.com.
- Auburn University has collected electrofishing samples in April, July, and September 2019, per Task 4.2.3 of the approved study plan. Additional methods to increase catch rates for some target species are being explored.
- Auburn University is performing analyses of age/growth and diet of target species collected during electrofishing, per Task 4.2.4 of the approved study plan. Individuals from target species collected during electrofishing are undergoing swim performance tests to determine active metabolic rates and static respirometry tests to assess to determine resting metabolic rates.
- In accordance with the FERC approved study plan, Alabama Power will host a HAT 3 meeting on progress to date in March 2020.

4.2 DOWNSTREAM AQUATIC HABITAT STUDY PLAN

- Alabama Power held a HAT 3 meeting on March 20, 2019, regarding the Downstream Aquatic Habitat Study Plan.
- Alabama Power posted the March 20, 2019 HAT 3 meeting summary on the Harris Relicensing website at www.harrisrelicensing.com.
- Alabama Power has deployed 20 level loggers and has collected approximately 90 percent of the bathymetry data needed for modeling.
- Alabama Power has completed the mesohabitat analysis for the study area.
- In the next few months, Alabama Power will collect the remaining bathymetry data and download data (i.e., elevation and temperature) collected by level loggers.
- Alabama Power will complete the HEC-RAS modeling for habitat in Q4 2019 and Q1 2020.

- In accordance with the FERC approved study plan, Alabama Power will host HAT 3 progress meetings in November/December 2019 and February/March 2020.

4.3 THREATENED AND ENDANGERED (T&E) SPECIES STUDY PLAN

- Alabama Power held a HAT 3 meeting on August 27, 2019 regarding the T&E Species Study Plan.
- Alabama Power posted the August 27, 2019 HAT 3 meeting summary on the Harris Relicensing website at www.harrisrelicensing.com.
- Alabama Power developed GIS overlays of habitat information and developed maps to determine possible areas in the FERC-approved geographic scope where T&E species may occur.
- Alabama Power is working with USFWS to determine where field verification surveys may be needed. These surveys are tentatively scheduled to be conducted in Fall 2019.
- In accordance with the FERC-approved study plan, Alabama Power will distribute a Draft T&E Study Report to HAT 3 in February 2020.

5.0 HAT 4 – PROJECT LANDS

5.1 PROJECT LANDS EVALUATION STUDY PLAN

- Alabama Power held a HAT 4 meeting on September 11, 2019, to review proposed land use changes, including lands to be added to the Project Boundary, lands to be removed from the Project Boundary, and proposed changes in land use classifications of existing Project lands. Alabama Power presented the proposed changes in GIS overlays.
- Alabama Power posted the September 11, 2019 HAT 4 meeting summary on the Harris Relicensing website at www.harrisrelicensing.com.
- Following the September 11, 2019 HAT 4 meeting, Alabama Power solicited feedback from HAT 4 on the Project Lands proposal. All stakeholder feedback will be considered in developing the final proposal.
- During the spring and fall 2019, Samford University conducted a botanical inventory at Flat Rock Park.
- In the next few months, Alabama Power will evaluate the Skyline property for Bobwhite quail habitat.

6.0 HAT 5 – RECREATION

6.1 RECREATION EVALUATION STUDY PLAN

- Alabama Power began collecting recreation use data on Lake Harris in March 2019 and downstream in the Tallapoosa River in May 2019. Alabama Power will continue collecting recreation use information through October 31 (downstream) and December 2019 (Lake Harris). Data analysis will occur in Q1 2020.
- Alabama Power is estimating the percent of usable shoreline structures at current operations and at each winter pool alternative using light detection and ranging (LiDAR) data of the shoreline and GPS coordinates of each shoreline structure. This information will be presented to HAT 5 in the Draft Recreation Report in June 2020.
- Alabama Power conducted a Project recreation site inventory and condition assessment in October 2019.
- Alabama Power will be conducting a downstream landowner survey in January 2020.
- Alabama Power will host a HAT 5 meeting in March 2020 to provide an update on recreation data collection.

7.0 HAT 6 – CULTURAL RESOURCES

7.1 CULTURAL RESOURCES PROGRAMMATIC AGREEMENT AND HISTORIC PROPERTIES MANAGEMENT PLAN STUDY PLAN

- Alabama Power conducted HAT 6 meetings May 22 and July 9, 2019.
- Alabama Power posted meeting summaries on the Harris relicensing website at www.harrisrelicensing.com
- Alabama Power distributed Archeological Survey Reports and Alabama Historical Commission concurrence letters for surveys in the Harris Project Boundary, Harris Project Boundary shapefiles, and other relevant cultural resources information to participating tribes and the State Historic Preservation Office (SHPO) (May 2019).
- In August 2019, Alabama Power distributed reports and images related to fish weirs in the Harris Project Boundary. Much of this information is sensitive in nature; therefore, Alabama Power limited the distribution to federal agencies and tribes.
- Alabama Power posted July 9, 2019 meeting notes to the Harris Relicensing website at www.harrisrelicensing.com.
- Alabama Power proposed a draft Historic Properties Management Plan outline (HPMP) to HAT 6 members on May 22, 2019.
- Alabama Power is working to define the Area of Potential Effects (APE) and proposes that the APE include lands in the R.L. Harris FERC Project Boundary (Lake Harris and Skyline). In addition, Alabama Power is evaluating the area below Harris Dam through Horseshoe Bend to determine any effects of **Project Operations** on Cultural Resources[3].
- The next HAT 6 meeting will be held on November 6, 2019. The information to be discussed in this meeting is sensitive in nature; therefore, Alabama Power is limiting the participation to applicable state and federal agencies, and applicable tribes. At this meeting, Alabama Power plans to confirm the final determination of Lake Harris sites for further evaluation and review and confirm survey methods for additional cultural resources evaluations on Lake Harris and Skyline. In addition, Alabama Power will continue discussions on the HPMP and propose an Inadvertent Discovery Plan and Traditional Cultural Properties (TCP) Identification Plan outline.

[3] While not included in the Harris Project APE, the geographic scope of the Cultural Resources Programmatic Agreement and Historic Properties Management Plan Study Plan extends to Horseshoe Bend.

Attachment B
Harris Action Team Distribution Lists

HAT 1 - Project Operations

Name	Company
Damon Abernethy	Alabama Department of Conservation and Natural Resources
Bob Allen	U.S. Army Corps of Engineers
Brian Atkins	Alabama Department of Economic and Community Affairs
Richard Bronson	Stakeholder
Steve Bryant	Alabama Department of Conservation and Natural Resources
Nancy Burnes	Lake Wedowee Property Owners Association
Richard Burnes	Property Owner
Matt and Ann Campbell	Stakeholder
Curt Chaffin	Alabama Rivers Alliance
Kristie Coffman	Auburn University
Stan Cook	Alabama Department of Conservation and Natural Resources
Allan Creamer	Federal Energy Regulatory Commission
Doug & Jan Crisp	Stakeholder
Gene Crouch	Keller Williams Realty Group; Lake Wedowee
Jesse Cunningham	Lake Martin HOBO
Dennis Devries	Auburn University
Mike Dollar	Lake Martin HOBO
Jeff Duncan	U.S. National Park Service
Albert Eiland	Property Owner
Steve Forehand	Lake Martin Resource Association
Sylvia French	Lake Wedowee Property Owners Association
Tom Garland	Lake Wedowee Property Owners Association
Taconya Goar	Alabama Department of Conservation and Natural Resources
Lisa Gordon	U.S. Environmental Protection Agency
Chris Greene	Alabama Department of Conservation and Natural Resources
Jennifer Grunewald	U.S. Fish and Wildlife
Andrew Hall	Property Owner
Randall Harvey	U.S. Army Corps of Engineers
Jennifer Haslbauer	Alabama Department of Environmental Management
James Hathorn	U.S. Army Corps of Engineers
Dave Heinzen	Lake Martin HOBO
Keith Henderson	Alabama Department of Conservation and Natural Resources
Mike Holley	Alabama Department of Conservation and Natural Resources
Dan Holliman	U.S. Environmental Protection Agency
Sonja Holloman	Stakeholder
Elise Irwin	Auburn University
Butch Jackson	Stakeholder
Gerrit Jobsis	American Rivers
Chris Johnson	Alabama Department of Environmental Management
Evan Lawrence	Alabama Department of Conservation and Natural Resources
Michael Len	Alabama Department of Environmental Management
Fred Leslie	Alabama Department of Environmental Management
Tom Littlepage	Alabama Department of Economic and Community Affairs
Cindy Lowry	Alabama Rivers Alliance
Donna Matthews	Stakeholder
Rachel McNamara	Federal Energy Regulatory Commission

HAT 1 - Project Operations

Name	Company
David Moore	Alabama Department of Environmental Management
Barry Morris	Lake Wedowee Property Owners Association
Ginny Oxford	Stakeholder
Mellie Parrish	Stakeholder
Ira Parsons	Lake Wedowee Property Owners Association
Jeff Powell	U.S. Fish and Wildlife
Becky Rainwater	ReMax Lakefront
Mitch Reid	Nature Conservancy
Sarah Salazar	Federal Energy Regulatory Commission
Jerrel Shell	Stakeholder
Barry Smith	Stakeholder
Paul Smith	Stakeholder
David Smith	Stakeholder
Linda Stone	Stakeholder
Chuck Sumner	U.S. Army Corps of Engineers
Monte Terhaar	Federal Energy Regulatory Commission
David Thomas	Stakeholder
John Thompson	Lake Martin Resource Association
David Thompson	Property Owner
George Traylor	Property Owner
Steve Traylor	Stakeholder
Jimmy Traylor	Stakeholder
Jonas White	U.S. Army Corps of Engineers
Russell Wright	Auburn University

HAT 2 - Water Quality and Use

Name	Company
Damon Abernethy	Alabama Department of Conservation and Natural Resources
Steve Bryant	Alabama Department of Conservation and Natural Resources
Nancy Burnes	Lake Wedowee Property Owners Association
Richard Burnes	Property Owner
Matt and Ann Campbell	Stakeholder
Curt Chaffin	Alabama Rivers Alliance
Maria Clark	U.S. Environmental Proection Agency
Kristie Coffman	Auburn University
Stan Cook	Alabama Department of Conservation and Natural Resources
Allan Creamer	Federal Energy Regulatory Commission
Jan and Crisp	Stakeholder
Jesse Cunningham	Lake Martin HOBO
Chris Decker	U.S. Environmental Proection Agency
Chuck Denman	Stakeholder
Jeff Duncan	U.S. National Park Service
Albert Eiland	Property Owner
Steve Forehand	Lake Martin Resource Association
Tom Garland	Lake Wedowee Property Owners Association
Taconya Goar	Alabama Department of Conservation and Natural Resources
Lisa Gordon	U.S. Environmental Proection Agency
Chris Greene	Alabama Department of Conservation and Natural Resources
Evelyn Hammrick	Property Owner
Jennifer Haslbauer	Alabama Department of Environmental Management
Keith Henderson	Alabama Department of Conservation and Natural Resources
Mike Holley	Alabama Department of Conservation and Natural Resources
Dan Holliman	U.S. Environmental Proection Agency
Elise Irwin	Auburn University
Gerrit Jobsis	American Rivers
Chris Johnson	Alabama Department of Environmental Management
Carol Knight	Stakeholder
Michael Len	Alabama Department of Environmental Management
Fred Leslie	Alabama Department of Environmental Management
Cindy Lowry	Alabama Rivers Alliance
Donna Matthews	Stakeholder
Rachel McNamara	Federal Energy Regulatory Commission
Harry Merrill	Stakeholder
David Moore	Alabama Department of Environmental Management
Barry Morris	Lake Wedowee Property Owners Association
Mellie Parrish	Stakeholder
Jerry & Mary Poss	Stakeholder
Mitch Reid	Nature Conservancy
Eric Reutebuch	Auburn University
Sarah Salazar	Federal Energy Regulatory Commission
Amy Silvano	Alabama Department of Conservation and Natural Resources
David Smith	Stakeholder
Monte Terhaar	Federal Energy Regulatory Commission

HAT 2 - Water Quality and Use

Name	Company
John Thompson	Lake Martin Resource Association

HAT 3 - Fish and Wildlife

Name	Company
Damon Abernethy	Alabama Department of Conservation and Natural Resources
Steve Bryant	Alabama Department of Conservation and Natural Resources
Matt and Ann Campbell	Stakeholder
Curt Chaffin	Alabama Rivers Alliance
Kristie Coffman	Auburn University
Evan Collins	U.S. Fish and Wildlife
Stan Cook	Alabama Department of Conservation and Natural Resources
Allan Creamer	Federal Energy Regulatory Commission
Chris Decker	U.S. Environmental Protection Agency
Dennis Devries	Auburn University
Jeff Duncan	U.S. National Park Service
Steve Forehand	Lake Martin Resource Association
Tom Garland	Lake Wedowee Property Owners Association
Taconya Goar	Alabama Department of Conservation and Natural Resources
Chris Greene	Alabama Department of Conservation and Natural Resources
Jennifer Grunewald	U.S. Fish and Wildlife
Keith Henderson	Alabama Department of Conservation and Natural Resources
Mike Holley	Alabama Department of Conservation and Natural Resources
Dan Holliman	U.S. Environmental Protection Agency
Elise Irwin	Auburn University
Gerrit Jobsis	American Rivers
Evan Lawrence	Alabama Department of Conservation and Natural Resources
Cindy Lowry	Alabama Rivers Alliance
Donna Matthews	Stakeholder
Rachel McNamara	Federal Energy Regulatory Commission
Chris Oberholster	Birmingham Audubon
Mellie Parrish	Stakeholder
Bill Pearsons	U.S. Fish and Wildlife
Jeff Powell	U.S. Fish and Wildlife
Mitch Reid	Nature Conservancy
Sarah Salazar	Federal Energy Regulatory Commission
Amy Silvano	Alabama Department of Conservation and Natural Resources
Tricia Stearns	Stakeholder
Monte Terhaar	Federal Energy Regulatory Commission
Steve Traylor	Stakeholder
Jimmy Traylor	Stakeholder
Pace Wilber	National Oceanic and Atmospheric Administration
Ken Wills	Alabama Glade Conservation Coalition
Russell Wright	Auburn University

HAT 4 - Project Lands

Name	Company
Damon Abernethy	Alabama Department of Conservation and Natural Resources
Matt Brooks	Alabama Law Enforcement Agency
Coty Brown	Alabama Law Enforcement Agency
Steve Bryant	Alabama Department of Conservation and Natural Resources
Matt and Ann Campbell	Stakeholder
Curt Chaffin	Alabama Rivers Alliance
Kristie Coffman	Auburn University
Evan Collins	U.S. Fish and Wildlife
Allan Creamer	Federal Energy Regulatory Commission
Gene Crouch	Keller Williams Realty Group; Lake Wedowee
Steve Forehand	Lake Martin Resource Association
Tom Garland	Lake Wedowee Property Owners Association
Keith Gauldin	Alabama Department of Conservation and Natural Resources
Taconya Goar	Alabama Department of Conservation and Natural Resources
Chris Greene	Alabama Department of Conservation and Natural Resources
Jennifer Grunewald	U.S. Fish and Wildlife
Keith Henderson	Alabama Department of Conservation and Natural Resources
Mike Holley	Alabama Department of Conservation and Natural Resources
Elise Irwin	Auburn University
Gerrit Jobsis	American Rivers
Evan Lawrence	Alabama Department of Conservation and Natural Resources
Cindy Lowry	Alabama Rivers Alliance
Diane Lunsford	Lake Wedowee Property Owners Association
Donna Matthews	Stakeholder
Allison McCartney	U.S. Bureau of Land Management
Rachel McNamara	Federal Energy Regulatory Commission
Harry Merrill	Stakeholder
Brad Mitchell	Lake Wedowee Property Owners Association
Stan Nelson	Nelson and Company
Chris Oberholster	Birmingham Audubon
Mellie Parrish	Stakeholder
Jerry & Mary Poss	Stakeholder
Jeff Powell	U.S. Fish and Wildlife
Mark Prestridge	Randolph County Water Authority
Mitch Reid	Nature Conservancy
Sarah Salazar	Federal Energy Regulatory Commission
Amy Silvano	Alabama Department of Conservation and Natural Resources
Chris Smith	Alabama Department of Conservation and Natural Resources
Glenell Smith	Stakeholder
David Smith	Stakeholder
Paul Smith	Stakeholder
John Sullivan	U.S. Bureau of Land Management
Monte Terhaar	Federal Energy Regulatory Commission
John Thompson	Stakeholder
Ken Wills	Alabama Glade Conservation Coalition

HAT 5 - Recreation

Name	Company
Damon Abernethy	Alabama Department of Conservation and Natural Resources
Matt Brooks	Alabama Law Enforcement Agency
Coty Brown	Alabama Law Enforcement Agency
Matt and Ann Campbell	Stakeholder
Curt Chaffin	Alabama Rivers Alliance
Kristie Coffman	Auburn University
Allan Creamer	Federal Energy Regulatory Commission
Jesse Cunningham	Lake Martin HOBO
Mike Dollar	Lake Martin HOBO
Jeff Duncan	U.S. National Park service
Steve Forehand	Lake Martin Resource Association
Sylvia French	Stakeholder
Tom Garland	Stakeholder
Keith Gauldin	Alabama Department of Conservation and Natural Resources
Taconya Goar	Alabama Department of Conservation and Natural Resources
Chris Greene	Alabama Department of Conservation and Natural Resources
Dave Heinzen	Lake Martin HOBO
Keith Henderson	Alabama Department of Conservation and Natural Resources
Mike Holley	Alabama Department of Conservation and Natural Resources
Sonja Hollomon	Stakeholder
Elise Irwin	Auburn University
Butch Jackson	Property Owner
Gerrit Jobsis	American Rivers
Gerry Knight	Stakeholder
Evan Lawrence	Alabama Department of Conservation and Natural Resources
Cindy Lowry	Alabama Rivers Alliance
Donna Matthews	Stakeholder
Rachel McNamara	Federal Energy Regulatory Commission
Harry Merrill	Stakeholder
Brad Mitchell	Lake Wedowee Property Owners Association
Chris Oberholster	Birmingham Audubon
Ginny Oxford	Stakeholder
Mellie Parrish	Stakeholder
Ira Parsons	Lake Wedowee Property Owners Association
Jerry and Mary Poss	Stakeholder
Mitch Reid	Nature Conservancy
Sarah Salazar	Federal Energy Regulatory Commission
Chris Smith	Alabama Department of Conservation and Natural Resources
Paul Smith	Stakeholder
Jim Sparrow	Alabama Bass Federation
Tricia Stearns	Stakeholder
Monte Terhaar	Federal Energy Regulatory Commission
Bryant Whaley	Randolph County Economic / Industrial Development

HAT 6 - Cultural Resources

Name	Company
Steve Bryant	Alabama Department of Conservation and Natural Resources
Nancy Burnes	Lake Wedowee Property Owners Association
RaeLynn Butler	Muscogee (Creek) Nation of Oklahoma
Bryant Celestine	Alabama-Coushatta Tribe of Texas
Kristie Coffman	Auburn University
Allan Creamer	Federal Energy Regulatory Commission
Jeff Duncan	U.S. National Park Service
Taconya Goar	Alabama Department of Conservation and Natural Resources
Larry Haikey	Poarch Band of Creek Indians
Evelyn Hamrick	Property Owner
Mike Holley	Alabama Department of Conservation and Natural Resources
Gerrit Jobsis	American Rivers Alliance
Linda Langley	Coushatta Tribe of Louisiana
Janice Lowe	Alabama Quassarte Tribe
Donna Matthews	Stakeholder
Janet Maylen	Thlopthlocco Tribal Town
Amanda McBride	Alabama Historical Commission
Allison McCartney	U.S. Bureau of Land Management
Rachel McNamara	Federal Energy Regulatory Commission
Karen Pritchett	United Keetoowah Band of Cherokee Indians
Mitch Reid	Nature Conservancy
Sarah Salazar	Federal Energy Regulatory Commission
Eric Sipes	Alabama Historical Commission
Barry Smith	Stakeholder
Robin Soweka	Muscogee (Creek) Nation of Oklahoma
John Sullivan	U.S. Bureau of Land Management
Monte Terhaar	Federal Energy Regulatory Commission
Elizabeth Toombs	Tribal Historic Preservation Office Cherokee Nation
Russ Townsend	Eastern Band of Cherokee Indians

From: Cindy Lowry
To: Anderegg, Angela Segars
Subject: Re: Question about Harris dam operations
Date: Wednesday, February 12, 2020 2:57:58 PM

EXTERNAL MAIL: Caution Opening Links or Files

Yes, I have told Martha that y'alls operations are pretty much prescribed in your license and operations manuals from the ACoE. I didn't know for sure if there was anything new in light of the significant rainfall we have seen lately. I will pass along this link as a reminder. If there are more specifics that this doesn't answer, I'll let you know. Thanks!
Cindy

On Wed, Feb 12, 2020 at 2:32 PM Anderegg, Angela Segars <ARSEGARS@southernco.com> wrote:

> Hi Cindy
>
> As always in high flow events, we are just following our prescribed flood control procedures from the USACE. What people are seeing now is no different than what they have seen historically. We've discussed flood control operations at a few of the relicensing meetings to-date, but one in particular that may be helpful is the Operations presentation from January 31, 2018. There is a ppt and a video on our website: http://www.harrisrelicensing.com/_layouts/15/start.aspx#/HAT%201%20%20Project%20Operations/Forms/AllItems.aspx [harrisrelicensing.com].
>
> Can you give me a list of what the specific concerns are, I can certainly ask our water management folks to respond.
>
> Thanks,
>
> **Angie Anderegg**
>
> Hydro Services
>
> (205)257-2251
>
> arsegars@southernco.com
>
> **From:** Cindy Lowry <clowry@alabamarivers.org>
> **Sent:** Wednesday, February 12, 2020 12:38 PM
> **To:** Anderegg, Angela Segars <ARSEGARS@southernco.com>
> **Cc:** Martha Hunter (mhunter@alabamarivers.org) <mhunter@alabamarivers.org>
> **Subject:** Question about Harris dam operations
>
> **EXTERNAL MAIL: Caution Opening Links or Files**
>
> Hi Angie,
>
> We are getting called about concerns from the downstream landowners regarding flooding issues coming from Harris dam. They are very concerned with all the recent rains that the lake levels/dam releases, etc...is not being done as well as it could be to help manage downstream flooding problems. Would you be willing to talk with us and perhaps some downstream landowners about this issue to explain the operations currently? Obviously, we will be talking about this as we go through the relicensing process, but if there is anything you can do to help us better understand and give the

> downstream landowners some relief, that would be appreciated.
>
> Thank you,
>
> Cindy
>
> --
>
> Cindy Lowry, MPA
>
> Executive Director
>
> Alabama Rivers Alliance
>
> 2014 6th Ave N, Suite 200
>
> Birmingham, AL 35203
>
> 205-322-6395 ext. 106
>
> www.alabamarivers.org [alabamarivers.org]
>
> ***Celebrating more than 20 years of protecting Alabama's 132,000 miles of rivers and streams!***

--
Cindy Lowry, MPA
Executive Director
Alabama Rivers Alliance
2014 6th Ave N, Suite 200
Birmingham, AL 35203
205-322-6395 ext. 106
www.alabamarivers.org [alabamarivers.org]

Celebrating more than 20 years of protecting Alabama's 132,000 miles of rivers and streams!

From:	Anderegg, Angela Segars
To:	james traylor
Subject:	RE: Tallapoosa River Flooding
Date:	Thursday, February 13, 2020 2:42:04 PM

Hey Jimmy, I've asked our water management folk to give you a call.

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

-----Original Message-----
From: james traylor <trayjim@bellsouth.net>
Sent: Thursday, February 13, 2020 1:18 PM
To: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Subject: Re: Tallapoosa River Flooding

EXTERNAL MAIL: Caution Opening Links or Files

____

I'll review the presentation and let you know. As of now APC has opened a flood gate and we are under water within 10 minutes of the water reaching us. The reason I asked the question was for a warning. Why can't APC give advanced warning?

Jimmy Traylor
Sent from iPhone

> On Feb 13, 2020, at 12:54 PM, Anderegg, Angela Segars <ARSEGARS@southernco.com> wrote:
>
> Hi Jimmy,
>
> We've discussed flood control operations at a few of the relicensing meetings to-date, but one in particular that may be most helpful in understanding the flood operations is the Operations presentation from January 31, 2018. There is a ppt and a video on our website: https://urldefense.proofpoint.com/v2/url?u=http-3A__www.harrisrelicensing.com_-5Flayouts_15_start.aspx-23_HAT-25201-2520-2520Project-2520Operations_Forms_AllItems.aspx&d=DwIFaQ&c=AgWC6Nl7Slwpc9jE7UoQH1_Cvyci3SsTNfdLP4V1RCg&r=3qWv32MayddUzrbqJnBFwNmttMUUbdCuXZrVDKTC5gg&m=h5_aBVHbDHM0rPAGqe5H9oF-QBys5ibVUggXnd59vAk&s=lgZvsDPWw6AK7r3H9VW2GDhehdcGJyDvNnh42SsihXY&e= .
>
> If you have some specific questions, I can ask our water management folks to get in touch with you.
>
> Angie Anderegg
> Hydro Services
> (205)257-2251
> arsegars@southernco.com
>
> -----Original Message-----
> From: James Traylor <trayjim@bellsouth.net>
> Sent: Thursday, February 13, 2020 9:47 AM
> To: Anderegg, Angela Segars <ARSEGARS@southernco.com>
> Subject: Tallapoosa River Flooding
>
> EXTERNAL MAIL: Caution Opening Links or Files
>
> ________________________________
>
> Angela,
>
> In reference to flooding on the Tallapoosa River below Harris Dam, Can you please tell us what the criteria is for flood gate operations? Before the dam, the river was predictable. We always knew after "x" amount of rain what to expect. Since the dam, when the flood gates open, there is no time to prepare. The river will rise 10-12 feet in a half of an hour. The flooding is very rapid and violent.
>
> Thanks,
>
> Jimmy Traylor
>
>
> Sent from my iPad

From:	APC Harris Relicensing
To:	"harrisrelicensing@southernco.com"
Bcc:	damon.abernethy@dcnr.alabama.gov; steve.bryant@dcnr.alabama.gov; todd.fobian@dcnr.alabama.gov; chris.greene@dcnr.alabama.gov; keith.henderson@dcnr.alabama.gov; mike.holley@dcnr.alabama.gov; evan.lawrence@dcnr.alabama.gov; matthew.marshall@dcnr.alabama.gov; brian.atkins@adeca.alabama.gov; tom.littlepage@adeca.alabama.gov; jhaslbauer@adem.alabama.gov; cljohnson@adem.alabama.gov; mlen@adem.alabama.gov; fal@adem.alabama.gov; djmoore@adem.alabama.gov; arsegars@southernco.com; dkanders@southernco.com; jefbaker@southernco.com; jcarlee@southernco.com; kechandl@southernco.com; mcoker@southernco.com; cggoodma@southernco.com; sgraham@southernco.com; ammcvica@southernco.com; tlmills@southernco.com; cmnix@southernco.com; kodom@southernco.com; alpeeple@southernco.com; scsmith@southernco.com; twstjohn@southernco.com; wtanders@southernco.com; Rasberry, Jennifer S.; mhunter@alabamarivers.org; clowry@alabamarivers.org; gjobsis@americanrivers.org; kmo0025@auburn.edu; devridr@auburn.edu; irwiner@auburn.edu; wrighr2@aces.edu; lgallen@balch.com; jhancock@balch.com; allan.creamer@ferc.gov; rachel.mcnamara@ferc.gov; sarah.salazar@ferc.gov; monte.terhaar@ferc.gov; gene@wedoweelakehomes.com; kate.cosnahan@kleinschmidtgroup.com; colin.dinken@kleinschmidtgroup.com; amanda.fleming@kleinschmidtgroup.com; chris.goodell@kleinschmidtgroup.com; henry.mealing@kleinschmidtgroup.com; jason.moak@kleinschmidtgroup.com; kelly.schaeffer@kleinschmidtgroup.com; jessecunningham@msn.com; mdollar48@gmail.com; drheinzen@charter.net; sforehand@russelllands.com; 1942jthompson420@gmail.com; nancyburnes@centurylink.net; sandnfrench@gmail.com; lgarland68@aol.com; rbmorris222@gmail.com; Ira Parsons (irapar@centurytel.net); mitchell.reid@tnc.org; richardburnes3@gmail.com; eilandfarm@aol.com; athall@fujifilm.com; ebt.drt@numail.org; georgettraylor@centurylink.net; beckyrainwater1@yahoo.com; dbronson@charter.net; wmcampbell218@gmail.com; jec22641@aol.com; sonjaholloman@gmail.com; butchjackson60@gmail.com; donnamat@aol.com; goxford@centurylink.net; mhpwedowee@gmail.com; jerrelshell@gmail.com; bsmith0253@gmail.com; inspector_003@yahoo.com; paul.trudine@gmail.com; lindastone2012@gmail.com; granddadth@windstream.net; trayjim@bellsouth.net; straylor426@bellsouth.net; robert.a.allen@usace.army.mil; randall.b.harvey@usace.army.mil; james.e.hathorn.jr@sam.usace.army.mil; lewis.c.sumner@usace.army.mil; jonas.white@usace.army.mil; gordon.lisa-perras@epa.gov; holliman.daniel@epa.gov; jennifer_grunewald@fws.gov; jeff_powell@fws.gov; jeff_duncan@nps.gov
Subject:	Harris relicensing - March 19th HAT 1 meeting
Date:	Friday, February 21, 2020 12:40:41 PM
Attachments:	2020-03-19 HAT Meeting Agenda.doc

HAT 1,

Alabama Power Company will be hosting a series of HAT meetings on **Thursday, March 19, 2020 at the Oxford Civic Center,** 401 McCullars Ln, Oxford, AL 36203. The HAT 1 meeting will be from **9:00 to 12:45 (see attached agenda)**. The purpose of the HAT 1 meeting is to review initial results and progress to date for the Operating Curve Change Feasibility Analysis and the Downstream Release Alternatives studies.

Please RSVP by Friday, March 13, 2020. Lunch will be provided (~11:15) so please indicate any food allergies or vegetarian preferences on or before March 13, 2020. I encourage everyone to attend in person. If this is not feasible, we are also offering a Skype option (info below). It would be ideal to join on your computer as we will be viewing presentations.

If you have any questions about the agenda or meeting, please email or call me at ARSEGARS@southernco.com or (205) 257-2251.

Join Skype Meeting

+1 (205) 257-2663

Conference ID: 3660816

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

Meeting Agenda
March 19, 2020
9:00 AM – 3:30 PM
Oxford Civic Center: 401 McCullars Lane, Oxford, AL 36203

Meeting Purpose: Update stakeholders on Harris Action Teams' (HATs) progress on Project Operations (HAT 1), Recreation (HAT 5), and Fish and Wildlife (HAT 3).

9:00 AM	**Welcome, Safety Message, and Meeting Purpose**
9:15 AM	**HAT 1: Project Operations** Operating Curve Feasibility Analysis Downstream Release Alternatives
11:15 AM	Lunch
12:00 PM	**HAT 1 Phase 2: Qualitative and Quantitative Evaluations of the Effect(s) of an Operating Curve Change on Resources** Recreation Structure Usability at Winter Pool Alternatives
12:45 PM	**HAT 5: Recreation** Recreation Evaluation
1:30 PM	**HAT 3: Fish and Wildlife** Threatened and Endangered Species Downstream Aquatic Habitat Aquatic Resources
3:30 PM	**Wrap-up, Questions, and Adjourn**

From:	APC Harris Relicensing
To:	"harrisrelicensing@southernco.com"
Bcc:	damon.abernethy@dcnr.alabama.gov; nathan.aycock@dcnr.alabama.gov; steve.bryant@dcnr.alabama.gov; todd.fobian@dcnr.alabama.gov; chris.greene@dcnr.alabama.gov; keith.henderson@dcnr.alabama.gov; mike.holley@dcnr.alabama.gov; evan.lawrence@dcnr.alabama.gov; matthew.marshall@dcnr.alabama.gov; brian.atkins@adeca.alabama.gov; tom.littlepage@adeca.alabama.gov; jhaslbauer@adem.alabama.gov; cljohnson@adem.alabama.gov; mlen@adem.alabama.gov; fal@adem.alabama.gov; djmoore@adem.alabama.gov; arsegars@southernco.com; dkanders@southernco.com; wtanders@southernco.com; jefbaker@southernco.com; jcarlee@southernco.com; kechandl@southernco.com; mcoker@southernco.com; cggoodma@southernco.com; sgraham@southernco.com; ammcvica@southernco.com; tlmills@southernco.com; cmnix@southernco.com; kodom@southernco.com; alpeeple@southernco.com; scsmith@southernco.com; twstjohn@southernco.com; Rasberry, Jennifer S.; mhunter@alabamarivers.org; clowry@alabamarivers.org; jwest@alabamarivers.org; gjobsis@americanrivers.org; kmo0025@auburn.edu; devridr@auburn.edu; irwiner@auburn.edu; wrighr2@aces.edu; lgallen@balch.com; jhancock@balch.com; allan.creamer@ferc.gov; rachel.mcnamara@ferc.gov; sarah.salazar@ferc.gov; monte.terhaar@ferc.gov; gene@wedoweelakehomes.com; kate.cosnahan@kleinschmidtgroup.com; colin.dinken@kleinschmidtgroup.com; amanda.fleming@kleinschmidtgroup.com; chris.goodell@kleinschmidtgroup.com; henry.mealing@kleinschmidtgroup.com; jason.moak@kleinschmidtgroup.com; kelly.schaeffer@kleinschmidtgroup.com; jessecunningham@msn.com; mdollar48@gmail.com; drheinzen@charter.net; sforehand@russelllands.com; 1942jthompson420@gmail.com; nancyburnes@centurylink.net; sandnfrench@gmail.com; lgarland68@aol.com; rbmorris222@gmail.com; irapar@centurytel.net; mitchell.reid@tnc.org; richardburnes3@gmail.com; eilandfarm@aol.com; athall@fujifilm.com; ebt.drt@numail.org; georgettraylor@centurylink.net; beckyrainwater1@yahoo.com; dbronson@charter.net; wmcampbell218@gmail.com; jec22641@aol.com; sonjahollomon@gmail.com; butchjackson60@gmail.com; donnamat@aol.com; goxford@centurylink.net; mhpwedowee@gmail.com; jerrelshell@gmail.com; bsmith0253@gmail.com; inspector_003@yahoo.com; paul.trudine@gmail.com; lindastone2012@gmail.com; granddadth@windstream.net; trayjim@bellsouth.net; straylor426@bellsouth.net; robert.a.allen@usace.army.mil; randall.b.harvey@usace.army.mil; james.e.hathorn.jr@sam.usace.army.mil; lewis.c.sumner@usace.army.mil; jonas.white@usace.army.mil; gordon.lisa-perras@epa.gov; holliman.daniel@epa.gov; jennifer_grunewald@fws.gov; jeff_powell@fws.gov; jeff_duncan@nps.gov
Subject:	UPDATE - Harris relicensing - HAT 1 meeting
Date:	Friday, March 13, 2020 12:52:47 PM
Attachments:	2020-03-19 HAT Meeting Agenda.doc
Importance:	High

HAT 1,

Due to the ongoing situation with the spread of COVID-19 (the "coronavirus"), Southern Company has directed its employees to use virtual meetings, when possible. Therefore, the HAT 1 meeting scheduled for Thursday, March 19th will **only be held via the Skype link below and call-in number below**. If you are able to join via Skype, we will be sharing the presentation. If you are not, we will provide the presentation in a PDF document the morning of the meeting and the presenter will help you follow along with the slides.

The Skype link will be available beginning at 8:30 am. I suggest you join early to make sure that your computer is capable of joining (has all the necessary software). We will be muting and unmuting the phones from the control center, so please don't worry about announcing that you joined. **At 9 am, the meeting will begin**, and we will conduct a roll call to make sure we have a record of who attended the meeting. Also, if you use your computer's microphone and speaker to join the call, there is no need to use the phone number.

If you have any questions, please let me know.

From: APC Harris Relicensing
Sent: Friday, February 21, 2020 12:41 PM
To: 'harrisrelicensing@southernco.com' <harrisrelicensing@southernco.com>
Subject: Harris relicensing - March 19th HAT 1 meeting

HAT 1,

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If you have any questions about the agenda or meeting, please email or call me at ARSEGARS@southernco.com or (205) 257-2251.

Join Skype Meeting

+1 (205) 257-2663

Conference ID: 3660816

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From: APC Harris Relicensing
To: APC Harris Relicensing
Bcc: "damon.abernethy@dcnr.alabama.gov"; nathan.aycock@dcnr.alabama.gov; "steve.bryant@dcnr.alabama.gov"; todd.fobian@dcnr.alabama.gov; "chris.greene@dcnr.alabama.gov"; "keith.henderson@dcnr.alabama.gov"; "mike.holley@dcnr.alabama.gov"; "evan.lawrence@dcnr.alabama.gov"; "matthew.marshall@dcnr.alabama.gov"; "brian.atkins@adeca.alabama.gov"; "tom.littlepage@adeca.alabama.gov"; "jhaslbauer@adem.alabama.gov"; "cljohnson@adem.alabama.gov"; "mlen@adem.alabama.gov"; "fal@adem.alabama.gov"; "djmoore@adem.alabama.gov"; Anderegg, Angela Segars; Anderson, Dave; Anderson, Wesley Taylor; Baker, Jeffery L.; Carlee, Jason; Chandler, Keith Edward; Coker, Mary Paulette; Goodman, Chris G.; Graham, Stacey A.; McVicar, Ashley M; Mills, Tina L.; Nix, Christy M.; Odom, Kenneth; Peeples, Alan L.; Smith, Sheila C.; St. John, Thomas W.; Rasberry, Jennifer S.; "mhunter@alabamarivers.org"; "clowry@alabamarivers.org"; jwest@alabamarivers.org; "gjobsis@americanrivers.org"; "kmo0025@auburn.edu"; "devridr@auburn.edu"; "irwiner@auburn.edu"; "wrighr2@aces.edu"; Allen, Leslie G. (Balch); Hancock, Jim (Balch); allan.creamer@ferc.gov; rachel.mcnamara@ferc.gov; "sarah.salazar@ferc.gov"; monte.terhaar@ferc.gov; "gene@wedoweelakehomes.com"; "kate.cosnahan@kleinschmidtgroup.com"; "colin.dinken@kleinschmidtgroup.com"; "amanda.fleming@kleinschmidtgroup.com"; "chris.goodell@kleinschmidtgroup.com"; "henry.mealing@kleinschmidtgroup.com"; "jason.moak@kleinschmidtgroup.com"; "kelly.schaeffer@kleinschmidtgroup.com"; "jessecunningham@msn.com"; "mdollar48@gmail.com"; "drheinzen@charter.net"; "sforehand@russelllands.com"; "1942jthompson420@gmail.com"; "nancyburnes@centurylink.net"; "sandnfrench@gmail.com"; "lgarland68@aol.com"; "rbmorris222@gmail.com"; "irapar@centurytel.net"; "mitchell.reid@tnc.org"; "richardburnes3@gmail.com"; eilandfarm@aol.com; "athall@fujifilm.com"; "ebt.drt@numail.org"; "georgettraylor@centurylink.net"; "beckyrainwater1@yahoo.com"; "dbronson@charter.net"; wmcampbell218@gmail.com; "jec22641@aol.com"; sonjahollomon@gmail.com; "butchjackson60@gmail.com"; "donnamat@aol.com"; "goxford@centurylink.net"; "mhpwedowee@gmail.com"; "jerrelshell@gmail.com"; "bsmith0253@gmail.com"; "inspector_003@yahoo.com"; "paul.trudine@gmail.com"; "lindastone2012@gmail.com"; "granddadth@windstream.net"; "trayjim@bellsouth.net"; "straylor426@bellsouth.net"; "robert.a.allen@usace.army.mil"; "randall.b.harvey@usace.army.mil"; "james.e.hathorn.jr@sam.usace.army.mil"; "lewis.c.sumner@usace.army.mil"; "jonas.white@usace.army.mil"; "gordon.lisa-perras@epa.gov"; "holliman.daniel@epa.gov"; "jennifer_grunewald@fws.gov"; "jeff_powell@fws.gov"; "jeff_duncan@nps.gov"
Subject: CANCELLED - Harris relicensing - HAT 1 meeting
Date: Monday, March 16, 2020 12:51:10 PM

HAT 1,

First, I apologize for the multiple emails regarding this week's meeting and I appreciate you bearing with us. Because we are all in such a state of flux with schools closing and more and more of us being asked to telecommute, and the uncertainty of how well our technology is going to work when we're all trying to use it at once, we have decided to cancel this Thursday's stakeholder meeting. The information we were going to cover will be included in the Initial Study Report filing, along with several draft reports, in April.

Again, thank you for bearing with us. Stay well!

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From: APC Harris Relicensing
To: "harrisrelicensing@southernco.com"
Bcc: Robin Crockett; "Lydia Mayo"; 1942jthompson420@gmail.com; 9sling@charter.net; alcondir@aol.com; allan.creamer@ferc.gov; alpeeple@southernco.com; amanda.fleming@kleinschmidtgroup.com; amanda.mcbride@ahc.alabama.gov; amccartn@blm.gov; ammcvica@southernco.com; amy.silvano@dcnr.alabama.gov; andrew.nix@dcnr.alabama.gov; arsegars@southernco.com; athall@fujifilm.com; aubie84@yahoo.com; awhorton@corblu.com; bart_roby@msn.com; baxterchip@yahoo.com; bboozer6@gmail.com; bdavis081942@gmail.com; beckyrainwater1@yahoo.com; bill_pearson@fws.gov; blacklake20@gmail.com; blm_es_inquiries@blm.gov; bob.stone@smimail.net; bradandsue795@gmail.com; bradfordt71@gmail.com; brian.atkins@adeca.alabama.gov; bruce.bradford@forestry.alabama.gov; bsmith0253@gmail.com; butchjackson60@gmail.com; bwhaley@randolphcountyeda.com; carolbuggknight@hotmail.com; celestine.bryant@actribe.org; cengstrom@centurytel.net; ceo@jcchamber.com; cggoodma@southernco.com; cgnav@uscg.mil; chad@cleburnecountychamber.com; chandlermary937@gmail.com; chiefknight2002@yahoo.com; chimneycove@gmail.com; chris.goodell@kleinschmidtgroup.com; chris.greene@dcnr.alabama.gov; chris.smith@dcnr.alabama.gov; chris@alaudubon.org; chuckdenman@hotmail.com; clark.maria@epa.gov; claychamber@gmail.com; clint.lloyd@auburn.edu; cljohnson@adem.alabama.gov; clowry@alabamarivers.org; cmnix@southernco.com; coetim@aol.com; colin.dinken@kleinschmidtgroup.com; cooper.jamal@epa.gov; coty.brown@alea.gov; craig.litteken@usace.army.mil; crystal.davis@adeca.alabama.gov; crystal.lakewedoweedocks@gmail.com; crystal@hunterbend.com; dalerose120@yahoo.com; damon.abernethy@dcnr.alabama.gov; dbronson@charter.net; dcnr.wffdirector@dcnr.alabama.gov; decker.chris@epa.gov; devridr@auburn.edu; dfarr@randolphcountyalabama.gov; dhayba@usgs.gov; djmoore@adem.alabama.gov; dkanders@southernco.com; dolmoore@southernco.com; donnamat@aol.com; doug.deaton@dcnr.alabama.gov; dpreston@southernco.com; drheinzen@charter.net; ebt.drt@numail.org; eilandfarm@aol.com; el.brannon@yahoo.com; elizabeth-toombs@cherokee.org; emathews@aces.edu; eric.sipes@ahc.alabama.gov; evan.lawrence@dcnr.alabama.gov; evan_collins@fws.gov; eveham75@gmail.com; fal@adem.alabama.gov; fredcanoes@aol.com; gardenergirl04@yahoo.com; garyprice@centurytel.net; gene@wedoweelakehomes.com; georgettraylor@centurylink.net; gerryknight77@gmail.com; gfhorn@southernco.com; gjobsis@americanrivers.org; gld@adem.alabama.gov; glea@wgsarrell.com; gordon.lisa-perras@epa.gov; goxford@centurylink.net; granddadth@windstream.net; harry.merrill47@gmail.com; helen.greer@att.net; henry.mealing@kleinschmidtgroup.com; holliman.daniel@epa.gov; info@aeconline.com; info@tunica.org; inspector_003@yahoo.com; irapar@centurytel.net; irwiner@auburn.edu; j35sullivan@blm.gov; james.e.hathorn.jr@sam.usace.army.mil; jason.moak@kleinschmidtgroup.com; jcandler7@yahoo.com; jcarlee@southernco.com; jec22641@aol.com; jeddins@achp.gov; jefbaker@southernco.com; jeff_duncan@nps.gov; jeff_powell@fws.gov; jennifer.l.jacobson@usace.army.mil; jennifer_grunewald@fws.gov; jerrelshell@gmail.com; jessecunningham@msn.com; jfcrew@southernco.com; jhancock@balch.com; jharjo@alabama-quassarte.org; jhaslbauer@adem.alabama.gov; jhouser@osiny.org; jkwdurham@gmail.com; jlowe@alabama-quassarte.org; jnyerby@southernco.com; joan.e.zehrt@usace.army.mil; john.free@psc.alabama.gov; johndiane@sbcglobal.net; jonas.white@usace.army.mil; josh.benefield@forestry.alabama.gov; jpsparrow@att.net; jsrasber@southernco.com; jthacker@southernco.com; jthroneberry@tnc.org; judymcrealtor@gmail.com; jwest@alabamarivers.org; kajumba.ntale@epa.gov; karen.brunso@chickasaw.net; kate.cosnahan@kleinschmidtgroup.com; kcarleton@choctaw.org; kechandl@southernco.com; keith.gauldin@dcnr.alabama.gov; keith.henderson@dcnr.alabama.gov; kelly.schaeffer@kleinschmidtgroup.com; ken.wills@jcdh.org; kenbarnes01@yahoo.com; kenneth.boswell@adeca.alabama.gov; kmhunt@maxxsouth.net; kmo0025@auburn.edu; kodom@southernco.com; kpritchett@ukb-nsn.gov; kristina.mullins@usace.army.mil; lakewedoweedocks@gmail.com; leeanne.wofford@ahc.alabama.gov; leon.m.cromartie@usace.army.mil; leopoldo_miranda@fws.gov; lewis.c.sumner@usace.army.mil; lgallen@balch.com; lgarland68@aol.com; lindastone2012@gmail.com; llangley@coushattatribela.org; lovvornt@randolphcountyalabama.gov; lswinsto@southernco.com; lth0002@auburn.edu; mark@americanwhitewater.org; matt.brooks@alea.gov; matthew.marshall@dcnr.alabama.gov; mayo.lydia@epa.gov; mcoker@southernco.com; mcw0061@aces.edu; mdollar48@gmail.com; meredith.h.ladart@usace.army.mil; mhpwedowee@gmail.com; mhunter@alabamarivers.org; michael.w.creswell@usace.army.mil; midwaytreasures@bellsouth.net; mike.holley@dcnr.alabama.gov; mitchell.reid@tnc.org; mlen@adem.alabama.gov; mnedd@blm.gov; monte.terhaar@ferc.gov; mooretn@auburn.edu; mprandolph@gmail.com; nancyburnes@centurylink.net; nanferebee@juno.com; nathan.aycock@dcnr.alabama.gov; orr.chauncey@epa.gov; pace.wilber@noaa.gov; partnersinfo@wwfus.org; patti.powell@dcnr.alabama.gov; patty@ten-o.com; paul.trudine@gmail.com; ptrammell@reddyice.com; publicaffairs@doc.gov; rachel.mcnamara@ferc.gov; raebutler@mcn-nsn.gov; rancococ@teleclipse.net; randall.b.harvey@usace.army.mil; randy@randyrogerslaw.com; randy@wedoweemarine.com; rbmorris222@gmail.com; rcodydeal@hotmail.com; reuteem@auburn.edu; richardburnes3@gmail.com; rick.oates@forestry.alabama.gov; rickmcwhorter723@icloud.com; rifraft2@aol.com; rjdavis8346@gmail.com; robert.a.allen@usace.army.mil; roger.mcneil@noaa.gov; ron@lakewedowee.org; rosoweka@mcn-nsn.gov; russtown@nc-cherokee.com; ryan.prince@forestry.alabama.gov; sabrinawood@live.com; sandnfrench@gmail.com; sarah.salazar@ferc.gov; sbryan@pci-nsn.gov; scsmith@southernco.com; section106@mcn-nsn.gov; sforehand@russelllands.com; sgraham@southernco.com; sherry.bradley@adph.state.al.us; sidney.hare@gmail.com; simsthe@aces.edu; snelson@nelsonandco.com; sonjahollomon@gmail.com; steve.bryant@dcnr.alabama.gov; stewartjack12@bellsouth.net; straylor426@bellsouth.net; sueagnew52@yahoo.com; taconya.goar@dcnr.alabama.gov; tdadunaway@gmail.com; thpo@pci-nsn.gov; thpo@tttown.org; timguffey@jcch.net; tlamberth@russelllands.com; tlmills@southernco.com; todd.fobian@dcnr.alabama.gov; tom.diggs@ung.edu; tom.lettieri47@gmail.com; tom.littlepage@adeca.alabama.gov; tpfreema@southernco.com; trayjim@bellsouth.net; triciastearns@gmail.com; twstjohn@southernco.com; variscom506@gmail.com; walker.mary@epa.gov; william.puckett@swcc.alabama.gov; wmcampbell218@gmail.com; wrighr2@aces.edu; wsgardne@southernco.com; wtanders@southernco.com

Subject: UPDATE - Harris Relicensing - Initial Study Report meeting
Date: Friday, March 20, 2020 2:11:32 PM

Harris relicensing stakeholders,

Due to concerns with COVID-19, Alabama Power has asked employees to not have public meetings through the end of April. Therefore, our Initial Study Report meeting will need to be held via conference call. We will share presentations beforehand in order for everyone to be able to follow along during the call. Also, in order to give stakeholders more time to review the Initial Study Report, we are moving the meeting to **April 27th**. Please hold this date from 9:00 am to 4:00 pm central time. I will also send out call in information and an agenda ahead of time.

Thank you,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From: APC Harris Relicensing <g2apchr@southernco.com>
Sent: Friday, February 21, 2020 1:00 PM
To: APC Harris Relicensing <g2apchr@southernco.com>
Subject: Harris Relicensing - Initial Study Report meeting

Harris relicensing stakeholders,

Please save-the-date for the Initial Study Report meeting on **April 21, 2020 from 9:00 am to 4:00 pm at the Oxford Civic Center**, 401 McCullars Lane, Oxford, AL 36203. I will send additional details, including call-in information for those who need it, closer to date (although I do encourage attendance in person). Because this is one of the Integrated Licensing Process milestones and we will be covering a lot that day, I wanted to go ahead and get it on your radar.

If you have any questions, please email or call me at ARSEGARS@southernco.com or (205) 257-2251.

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From: Anderegg, Angela Segars
To: APC Harris Relicensing
Bcc: Robin Crockett; "Lydia Mayo"; 1942jthompson420@gmail.com; 9sling@charter.net; alcondir@aol.com; allan.creamer@ferc.gov; alpeeple@southernco.com; amanda.fleming@kleinschmidtgroup.com; amanda.mcbride@ahc.alabama.gov; amccartn@blm.gov; ammcvica@southernco.com; amy.silvano@dcnr.alabama.gov; andrew.nix@dcnr.alabama.gov; arsegars@southernco.com; athall@fujifilm.com; aubie84@yahoo.com; awhorton@corblu.com; bart_roby@msn.com; baxterchip@yahoo.com; bboozer6@gmail.com; bdavis081942@gmail.com; beckyrainwater1@yahoo.com; bill_pearson@fws.gov; blacklake20@gmail.com; blm_es_inquiries@blm.gov; bob.stone@smimail.net; bradandsue795@gmail.com; bradfordt71@gmail.com; brian.atkins@adeca.alabama.gov; bruce.bradford@forestry.alabama.gov; bsmith0253@gmail.com; butchjackson60@gmail.com; bwhaley@randolphcountyeda.com; carolbuggknight@hotmail.com; celestine.bryant@actribe.org; cengstrom@centurytel.net; ceo@jcchamber.com; cggoodma@southernco.com; cgnav@uscg.mil; chad@cleburnecountychamber.com; chandlermary937@gmail.com; chiefknight2002@yahoo.com; chimneycove@gmail.com; chris.goodell@kleinschmidtgroup.com; chris.greene@dcnr.alabama.gov; chris.smith@dcnr.alabama.gov; chris@alaudubon.org; chuckdenman@hotmail.com; clark.maria@epa.gov; claychamber@gmail.com; clint.lloyd@auburn.edu; cljohnson@adem.alabama.gov; clowry@alabamarivers.org; cmnix@southernco.com; coetim@aol.com; colin.dinken@kleinschmidtgroup.com; cooper.jamal@epa.gov; coty.brown@alea.gov; craig.litteken@usace.army.mil; crystal.davis@adeca.alabama.gov; crystal.lakewedoweedocks@gmail.com; crystal@hunterbend.com; dalerose120@yahoo.com; damon.abernethy@dcnr.alabama.gov; dbronson@charter.net; dcnr.wffdirector@dcnr.alabama.gov; decker.chris@epa.gov; devridr@auburn.edu; dfarr@randolphcountyalabama.gov; dhayba@usgs.gov; djmoore@adem.alabama.gov; dkanders@southernco.com; dolmoore@southernco.com; donnamat@aol.com; doug.deaton@dcnr.alabama.gov; dpreston@southernco.com; drheinzen@charter.net; ebt.drt@numail.org; eilandfarm@aol.com; el.brannon@yahoo.com; elizabeth-toombs@cherokee.org; emathews@aces.edu; eric.sipes@ahc.alabama.gov; evan.lawrence@dcnr.alabama.gov; evan_collins@fws.gov; eveham75@gmail.com; fal@adem.alabama.gov; fredcanoes@aol.com; gardenergirl04@yahoo.com; garyprice@centurytel.net; gene@wedoweelakehomes.com; georgettraylor@centurylink.net; gerryknight77@gmail.com; gfhorn@southernco.com; gjobsis@americanrivers.org; gld@adem.alabama.gov; glea@wgsarrell.com; gordon.lisa-perras@epa.gov; goxford@centurylink.net; granddadth@windstream.net; harry.merrill47@gmail.com; helen.greer@att.net; henry.mealing@kleinschmidtgroup.com; holliman.daniel@epa.gov; info@aeconline.com; info@tunica.org; inspector_003@yahoo.com; irapar@centurytel.net; irwiner@auburn.edu; j35sullivan@blm.gov; james.e.hathorn.jr@sam.usace.army.mil; jason.moak@kleinschmidtgroup.com; jcandler7@yahoo.com; jcarlee@southernco.com; jec22641@aol.com; jeddins@achp.gov; jefbaker@southernco.com; jeff_duncan@nps.gov; jeff_powell@fws.gov; jennifer.l.jacobson@usace.army.mil; jennifer_grunewald@fws.gov; jerrelshell@gmail.com; jessecunningham@msn.com; jfcrew@southernco.com; jhancock@balch.com; jharjo@alabama-quassarte.org; jhaslbauer@adem.alabama.gov; jhouser@osiny.org; jkwdurham@gmail.com; jlowe@alabama-quassarte.org; jnyerby@southernco.com; joan.e.zehrt@usace.army.mil; john.free@psc.alabama.gov; johndiane@sbcglobal.net; jonas.white@usace.army.mil; josh.benefield@forestry.alabama.gov; jpsparrow@att.net; jsrasber@southernco.com; jthacker@southernco.com; jthroneberry@tnc.org; judymcrealtor@gmail.com; jwest@alabamarivers.org; kajumba.ntale@epa.gov; karen.brunso@chickasaw.net; kate.cosnahan@kleinschmidtgroup.com; kcarleton@choctaw.org; kechandl@southernco.com; keith.gauldin@dcnr.alabama.gov; keith.henderson@dcnr.alabama.gov; kelly.schaeffer@kleinschmidtgroup.com; ken.wills@jcdh.org; kenbarnes01@yahoo.com; kenneth.boswell@adeca.alabama.gov; kmhunt@maxxsouth.net; kmo0025@auburn.edu; kodom@southernco.com; kpritchett@ukb-nsn.gov; kristina.mullins@usace.army.mil; lakewedoweedocks@gmail.com; leeanne.wofford@ahc.alabama.gov; leon.m.cromartie@usace.army.mil; leopoldo_miranda@fws.gov; lewis.c.sumner@usace.army.mil; lgallen@balch.com; lgarland68@aol.com; lindastone2012@gmail.com; llangley@coushattatribela.org; lovvornt@randolphcountyalabama.gov; lswinsto@southernco.com; lth0002@auburn.edu; mark@americanwhitewater.org; matt.brooks@alea.gov; matthew.marshall@dcnr.alabama.gov; mayo.lydia@epa.gov; mcoker@southernco.com; mcw0061@aces.edu; mdollar48@gmail.com; meredith.h.ladart@usace.army.mil; mhpwedowee@gmail.com; mhunter@alabamarivers.org; michael.w.creswell@usace.army.mil; midwaytreasures@bellsouth.net; mike.holley@dcnr.alabama.gov; mitchell.reid@tnc.org; mlen@adem.alabama.gov; mnedd@blm.gov; monte.terhaar@ferc.gov; mooretn@auburn.edu; mprandolph@gmail.com; nancyburnes@centurylink.net; nanferebee@juno.com; nathan.aycock@dcnr.alabama.gov; orr.chauncey@epa.gov; pace.wilber@noaa.gov; partnersinfo@wwfus.org; patti.powell@dcnr.alabama.gov; patty@ten-o.com; paul.trudine@gmail.com; ptrammell@reddyice.com; publicaffairs@doc.gov; rachel.mcnamara@ferc.gov; raebutler@mcn-nsn.gov; rancococ@teleclipse.net; randall.b.harvey@usace.army.mil; randy@randyrogerslaw.com; randy@wedoweemarine.com; rbmorris222@gmail.com; rcodydeal@hotmail.com; reuteem@auburn.edu; richardburnes3@gmail.com; rick.oates@forestry.alabama.gov; rickmcwhorter723@icloud.com; rifraft2@aol.com; rjdavis8346@gmail.com; robert.a.allen@usace.army.mil; roger.mcneil@noaa.gov; ron@lakewedowee.org; rosoweka@mcn-nsn.gov; russtown@nc-cherokee.com; ryan.prince@forestry.alabama.gov; sabrinawood@live.com; sandnfrench@gmail.com; sarah.salazar@ferc.gov; sbryan@pci-nsn.gov; scsmith@southernco.com; section106@mcn-nsn.gov; sforehand@russelllands.com; sgraham@southernco.com; sherry.bradley@adph.state.al.us; sidney.hare@gmail.com; simsthe@aces.edu; snelson@nelsonandco.com; sonjahollomon@gmail.com; steve.bryant@dcnr.alabama.gov; stewartjack12@bellsouth.net; straylor426@bellsouth.net; sueagnew52@yahoo.com; tdadunaway@gmail.com; thpo@pci-nsn.gov; thpo@tttown.org; timguffey@jcch.net; tlamberth@russelllands.com; tlmills@southernco.com; todd.fobian@dcnr.alabama.gov; tom.diggs@ung.edu; tom.lettieri47@gmail.com; tom.littlepage@adeca.alabama.gov; tpfreema@southernco.com; trayjim@bellsouth.net; triciastearns@gmail.com; twstjohn@southernco.com; variscom506@gmail.com; walker.mary@epa.gov; william.puckett@swcc.alabama.gov; wmcampbell218@gmail.com; wrighr2@aces.edu; wsgardne@southernco.com; wtanders@southernco.com

Subject: NEW UPDATE - Harris Relicensing - Initial Study Report meeting
Date: Thursday, March 26, 2020 1:42:38 PM
Importance: High

Harris relicensing stakeholders,

It has been brought to our attention that April 27th is a state holiday and several of our state agency offices will be closed. Therefore, in order to ensure state agencies can participate in the Initial Study Report meeting and to provide adequate time for your review and preparation, the Initial Study Report meeting will be held on **April 28th**. Please hold this date from 9:00 am to 4:00 pm central time. I will send out call in information and an agenda ahead of time.

Thank you for your understanding,

Angie

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From: APC Harris Relicensing <g2apchr@southernco.com>
Sent: Friday, March 20, 2020 2:13 PM
To: APC Harris Relicensing <g2apchr@southernco.com>
Subject: UPDATE - Harris Relicensing - Initial Study Report meeting

Harris relicensing stakeholders,

Due to concerns with COVID-19, Alabama Power has asked employees to not have public meetings through the end of April. Therefore, our Initial Study Report meeting will need to be held via conference call. We will share presentations beforehand in order for everyone to be able to follow along during the call. Also, in order to give stakeholders more time to review the Initial Study Report, we are moving the meeting to **April 27th**. Please hold this date from 9:00 am to 4:00 pm central time. I will also send out call in information and an agenda ahead of time.

Thank you,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From: APC Harris Relicensing <g2apchr@southernco.com>
Sent: Friday, February 21, 2020 1:00 PM
To: APC Harris Relicensing <g2apchr@southernco.com>
Subject: Harris Relicensing - Initial Study Report meeting

Harris relicensing stakeholders,

Please save-the-date for the Initial Study Report meeting on **April 21, 2020 from 9:00 am to 4:00 pm at the Oxford Civic Center**, 401 McCullars Lane, Oxford, AL 36203. I will send additional details, including call-in information for those who need it, closer to date (although I do encourage attendance in person). Because this is one of the Integrated Licensing Process milestones and we will be covering a lot that day, I wanted to go ahead and get it on your radar.

If you have any questions, please email or call me at ARSEGARS@southernco.com or (205) 257-2251.

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From: Colin Dinken <Colin.Dinken@Kleinschmidtgroup.com>
Sent: Wednesday, April 1, 2020 1:45 PM
To: Mize, Todd
Subject: RE: Lake Harris public ramps

No problem at all. I must be getting conversations mixed up. I'll get in touch with Keith. Thanks!

From: Mize, Todd <Todd.Mize@dcnr.alabama.gov>
Sent: Wednesday, April 1, 2020 1:43 PM
To: Colin Dinken <Colin.Dinken@Kleinschmidtgroup.com>
Subject: RE: Lake Harris public ramps

Colin,

I know you and I talked about the construction requirements and all, but you must have talked with someone else about which ramps are unusable at low pool. I don't have any knowledge of that. Keith Henderson, ADCNR boating access coordinator, might have that information. Sorry man.

Keith.henderson@dcnr.alabama.gov

Sincerely,

B. Todd Mize, PE
Department of Conservation and Natural Resources
Wildlife and Freshwater Fisheries - Engineering
64 North Union St., Room 551
Montgomery, AL 36130

Office (334) 353-8596
Cell Phone (334) 201-2994
Todd.Mize@dcnr.alabama.gov

From: Colin Dinken <Colin.Dinken@Kleinschmidtgroup.com>
Sent: Wednesday, April 1, 2020 10:52 AM
To: Mize, Todd <Todd.Mize@dcnr.alabama.gov>
Subject: Lake Harris public ramps

Hey Todd,

Hope you're staying sane and healthy during this global pandemic. I talked to you a few months ago about the standards y'all use for ramp construction on Lake Harris, and you mentioned that most ramps on Harris can be used to launch up to a 26 foot boat at low pool. I believe you said a couple were not usable at low pool and I think I wrote those ramps down, but have no idea where I left that scratch piece of paper. If you have that info on hand would you mind sending it to me in an email so I will not lose it this time? I have everything else about the 15% slope, 4.5 feet of depth at the end of the ramp, etc., just can't remember which ramps aren't usable at low pool. Think it's Lee's Bridge and one or two others.

Thanks for your help!

Colin Dinken
Associate Scientist
Kleinschmidt
Office: 205-588-4613
www.KleinschmidtGroup.com

Alabama Power

600 North 18th Street
Hydro Services 16N-8180
Birmingham, AL 35203
205 257 2251 tel
arsegars@southernco.com

April 10, 2020

VIA ELECTRONIC FILING

Project No. 2628-065
R.L. Harris Hydroelectric Project
Transmittal of the Initial Study Report

Ms. Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street N.
Washington, DC 20426

Dear Secretary Bose,

Alabama Power Company (Alabama Power) is the Federal Energy Regulatory Commission (FERC or Commission) licensee for the R.L. Harris Hydroelectric Project (Harris Project) (FERC No. 2628-065). On April 12, 2019, FERC issued its Study Plan Determination (SPD)[1] for the Harris Project, approving Alabama Power's ten relicensing studies with FERC modifications. On May 13, 2019, Alabama Power filed Final Study Plans to incorporate FERC's modifications and posted the Final Study Plans on the Harris relicensing website at www.harrisrelicensing.com. In the Final Study Plans, Alabama Power proposed a schedule for each study that included filing a voluntary Progress Update in October 2019 and October 2020. Alabama Power filed the first of two Progress Updates on October 31, 2019.[2]

Pursuant to the Commission's Integrated Licensing Process (ILP) and 18 CFR § 5.15(c), Alabama Power is filing herein the Harris Project Initial Study Report (ISR) (Attachment). The enclosed ISR describes Alabama Power's overall progress to-date in implementing the study plan and schedule, a summary of the data, and any variances from the study plan and schedule. The ISR also includes modifications, if applicable, to ongoing studies. Alabama Power is not proposing any new studies.

Concurrent with this ISR filing, Alabama Power is filing six study reports and two cultural resources documents, including the consultation record for each of these six reports, which includes correspondence from May 2019 through March 2020. Table 1 outlines each study, the respective Harris Action Team (HAT), and the status of the study report. For those studies where a Draft Study Report is not due at the time of filing this ISR, the draft study report due date is noted.

[1] Accession Number 20190412-3000

[2] Accession Number 20191030-5053

Table 1 – Summary of the Harris Studies and Study Reports Filed with FERC Concurrent with the ISR

Study Name	Harris Action Team (HAT)	Draft Study Report Filed Concurrent with ISR (YES/NO)
Operating Curve Change Feasibility Analysis	HAT 1	YES – Draft Report with consultation filed with FERC
Downstream Release Alternatives Study	HAT 1	YES – Draft Report with consultation filed with FERC
Erosion and Sedimentation Study	HAT 2	YES – Draft Report with consultation filed with FERC
Water Quality Study	HAT 2	YES – Draft Report with consultation filed with FERC
Aquatic Resources Study	HAT 3	NO – Draft Report due July 2020
Downstream Aquatic Habitat Study	HAT 3	NO – Draft Report due June 2020
Threatened and Endangered Species Study	HAT 3	YES – Draft Desktop Assessment with consultation filed with FERC
Project Lands Evaluation	HAT 4	YES – Draft Phase 1 Study Report with consultation filed with FERC
Recreation Evaluation Study	HAT 5	NO – Draft Report due June 2020 (requesting variance to August 2020)
Cultural Resources Programmatic Agreement and Historic Properties Management Plan Study	HAT 6	YES – Inadvertent Discovery Plan; Traditional Cultural Properties Identification Plan; consultation filed with FERC; No – Area of Potential Effect (due April 2020; requesting variance to June 2020)

The SPD schedule for the HAT 1, HAT 3, and HAT 5 studies included hosting HAT meetings in March 2020. Due to COVID-19 and related travel and public gathering restrictions, and statewide office closures, Alabama Power did not host these HAT meetings.

Alabama Power is requesting a schedule variance for the following studies:

1) Water Quality Study – Alabama Power stated that it would submit a Section 401 Water Quality Certification (WQC) to ADEM in 2020; however, following discussions with ADEM, Alabama Power intends to submit the 401 WQC application to ADEM in April 2021.

2) Draft Recreation Evaluation Study Report - Alabama Power added the Tallapoosa River Downstream Landowner Survey and the Tallapoosa River Recreation User Survey in 2020[3]. Due to the additional study elements and extended deadline for landowners and the public to participate in the surveys, Alabama Power will file the Draft Recreation Evaluation Study Report in August 2020 rather than June

[3] Accession Number 20191219-5186

2020. Alabama Power is not requesting a schedule variance for the Final Recreation Evaluation Study Report due November 2020.

3) The Area of Potential Effect (APE) – Alabama Power is continuing consultation with the Alabama Historical Commission to finalize the APE as part of the Cultural Resources Study; therefore, Alabama Power will file the APE and associated consultation in June 2020.

Pursuant to 18 CFR §5.15(c)(2), Alabama Power will host the Initial Study Report Meeting (Meeting) with stakeholders and FERC on April 28, 2020 by conference call ([205] 257-2663 **or** [404] 460-0605, conference ID 489472). Note that Alabama Power consulted with FERC staff on hosting this Meeting one day later than the date required by the ILP schedule due to a state holiday on April 27, 2020, and to provide stakeholders adequate time to review the ISR prior to the Meeting. The Meeting will begin at 9:00 AM and conclude by 4:00 PM. The purpose of the Meeting is to provide an opportunity to review the contents of the ISR and to discuss the study results and proposals to modify the study plan, if any, in light of the progress of the studies and data collected.

Alabama Power will file the Initial Study Report Meeting Summary by May 12, 2020. Stakeholders will have until June 11, 2020, to file comments on the ISR and Meeting Summary with FERC.

Stakeholders may access the ISR and the individual study reports on FERC's website (http://www.ferc.gov) by going to the "eLibrary" link and entering the docket number (P-2628). The ISR and study reports are also available on the Project relicensing website at https://harrisrelicensing.com.

If there are any questions concerning this filing, please contact me at arsegars@southernco.com or 205-257-2251.

Sincerely,

Angie Anderegg

Angie Anderegg
Harris Relicensing Project Manager

Attachment – Initial Study Report

cc: Harris Stakeholder List

Attachment
Initial Study Report

HARRIS DAM
RELICENSING

INITIAL STUDY REPORT

R. L. HARRIS PROJECT
FERC NO. 2628

Prepared by:

ALABAMA POWER COMPANY
BIRMINGHAM, ALABAMA

Alabama Power

APRIL 2020

INITIAL STUDY REPORT

R. L. HARRIS PROJECT
FERC NO. 2628

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INITIAL STUDY REPORT

R. L. HARRIS PROJECT
FERC NO. 2628

1.0 INTRODUCTION

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

[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).

by, the State of Alabama for wildlife management and public hunting and are part of the Skyline WMA.

For the purposes of this report, “Lake Harris” refers to the 9,870-acre reservoir, the 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.

Commonly used acronyms and abbreviations that may appear in this Initial Study Report (ISR) are included in Appendix A.

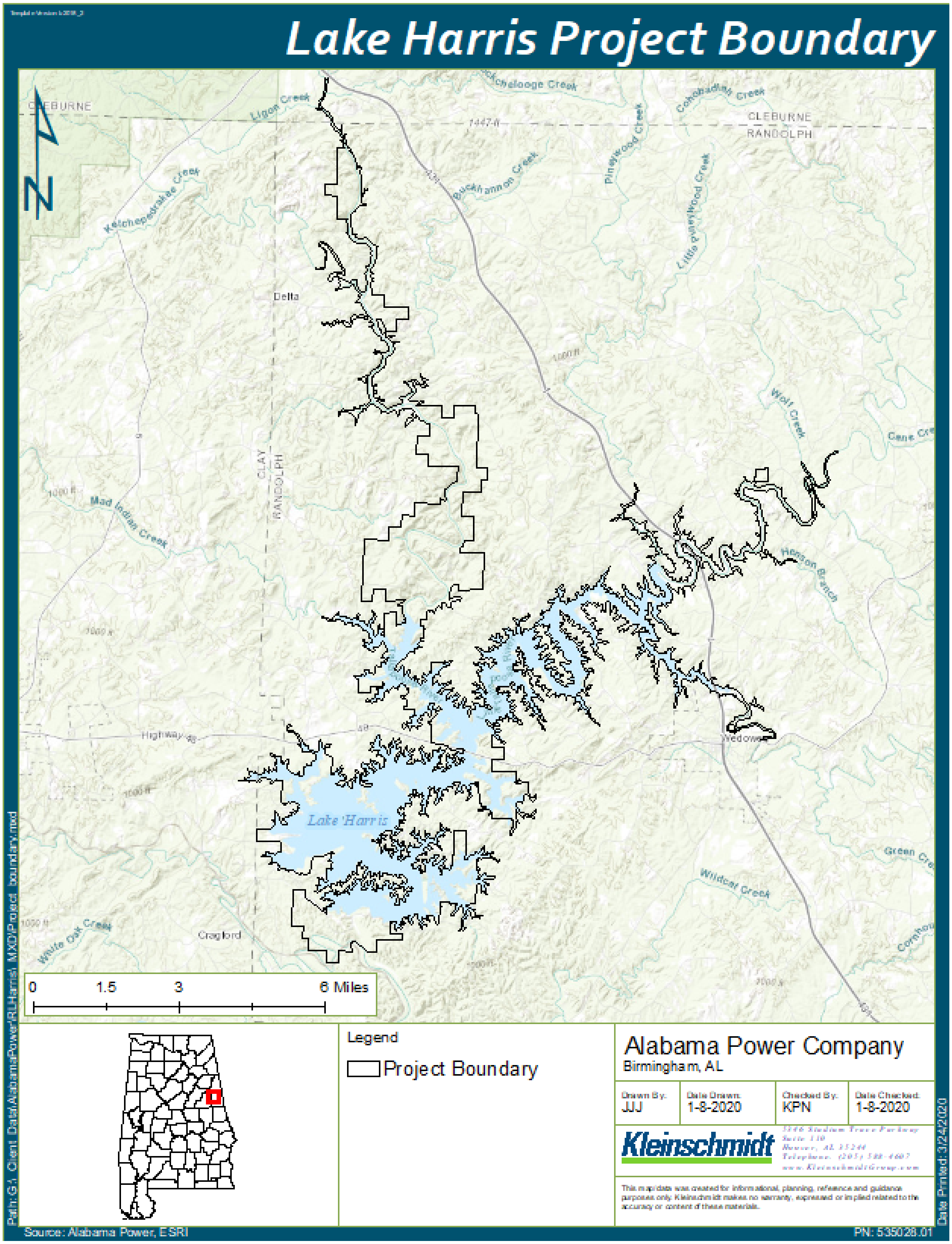

FIGURE 1 **LAKE HARRIS PROJECT BOUNDARY**

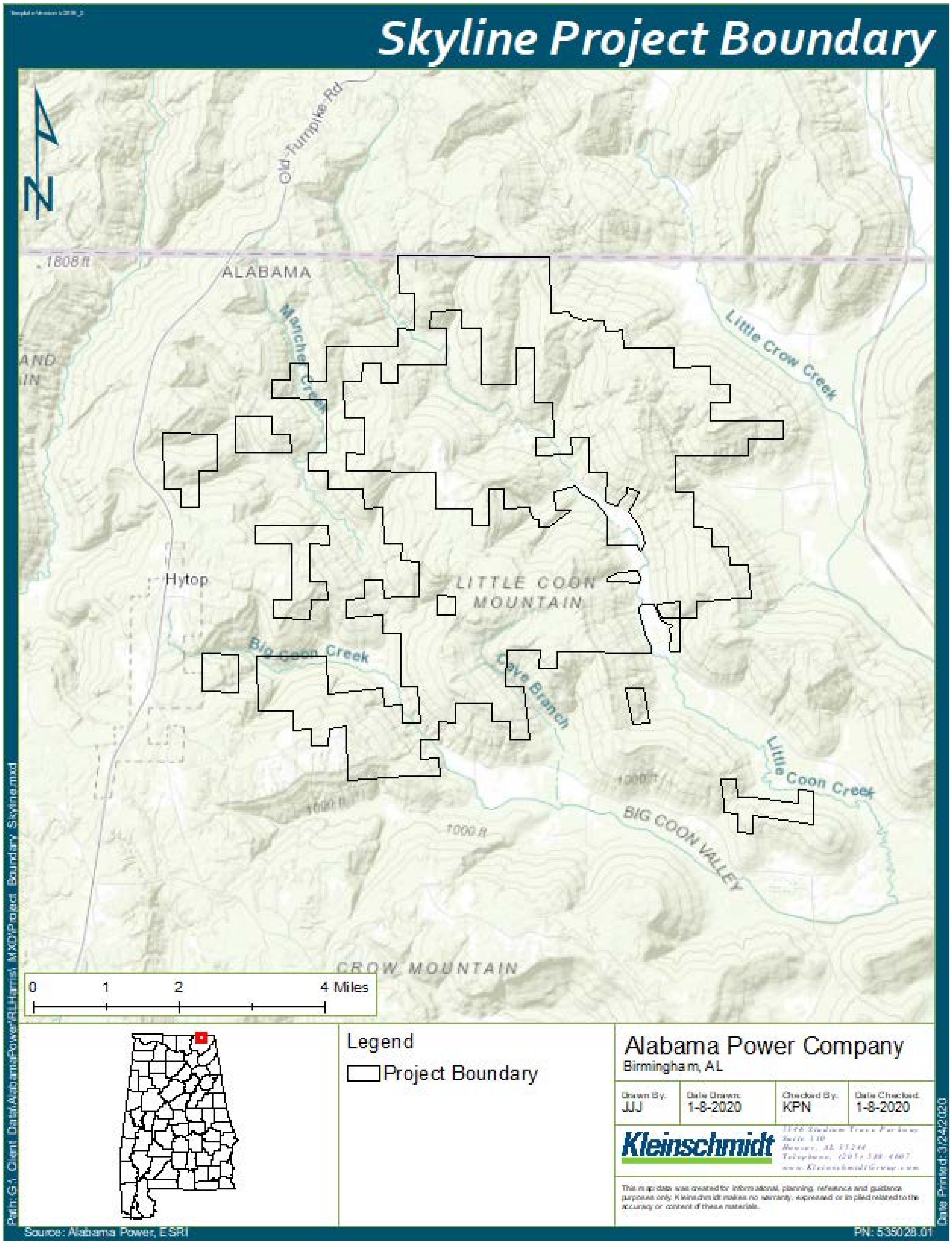

FIGURE 2 SKYLINE PROJECT BOUNDARY

2.0 HARRIS STUDY PLAN OVERVIEW

During the October 19, 2017 Issue Identification Workshop, stakeholders provided information on resources that may be affected by the Harris Project. On August 28 and 29, 2018, FERC held Harris Project Scoping Meetings[2] to provide additional opportunities for stakeholders and the public to present and discuss any issues related to the Harris Project relicensing. On November 13, 2018, Alabama Power filed the following 10 proposed study plans for the Harris Project.

- Operating Curve Change Feasibility Analysis Study
- Downstream Release Alternatives Study
- Erosion and Sedimentation Study
- Water Quality Study
- Aquatic Resources Study
- Downstream Aquatic Habitat Study
- Threatened and Endangered (T&E) Species Study
- Project Lands Evaluation Study
- Recreation Evaluation Study
- Cultural Resources Programmatic Agreement and Historic Properties Management Plan Study

Based on comments filed by stakeholders, Alabama Power filed revised study plans on March 13, 2019. FERC issued a Study Plan Determination (SPD)[3] on April 12, 2019, which approved Alabama Power's study plans and included FERC staff recommendations. Alabama Power incorporated FERC's recommendations and filed the Final Study Plans with FERC on May 13, 2019[4]. According to the FERC's process plan and schedule for the Harris Project, Alabama Power's ISR is due to FERC on or before April 12, 2020.

Alabama Power formed the Harris Action Teams (HATs) to provide stakeholders an opportunity to work on the issues of most importance to them and, in the case of federal and state agencies, those issues where it has regulatory or statutory responsibility. The HATs include:

- HAT 1 – Project Operations
- HAT 2 – Water Quality and Use

[2] Accession Nos. 20181010-4002 and 20181010-4003
[3] Accession No. 20190412-3000
[4] Accession No. 20190513-5093

- HAT 3 – Fish and Wildlife
- HAT 4 – Project Lands
- HAT 5 – Recreation
- HAT 6 – Cultural Resources

The HATs met throughout 2019 and into 2020 to discuss the various studies and to provide input regarding the study process.

Pursuant to FERC's SPD, Alabama Power is filing six draft study reports and two cultural resources documents concurrently with the ISR filing. These include:

- Draft Operating Curve Change Feasibility Analysis Phase 1 Report
- Draft Downstream Release Alternatives Phase 1 Report
- Draft Erosion and Sedimentation Study Report
- Draft Water Quality Report
- Draft Threatened and Endangered Species Desktop Assessment
- Draft Phase 1 Project Lands Evaluation Study Report
- Inadvertent Discovery Plan (IDP)
- Traditional Cultural Properties (TCP) Identification Plan

The filings containing the draft study reports and the cultural resources documents include HAT meeting summaries and presentations, and documentation of consultation between May 2019 through March 2020. Alabama Power will file with FERC the study reports for the Aquatic Resources and Downstream Aquatic Habitat studies according to the due date in the FERC SPD. Alabama Power will file the Draft Recreation Evaluation study report in August 2020[5]. The filing containing these draft study reports will include documentation of consultation from May 2019 to the date the respective study reports are filed with FERC.

Sections 3 through 12 of this ISR summarize the 10 FERC-approved studies in accordance with 18 Code of Federal Regulations (CFR), Section 5.15, including 1) the purpose of the study and summary of methods; 2) the study progress, including data collected; 3) any variance from the

[5] This is a variance in the schedule from the June 2020 date in the FERC SPD.

FERC SPD and schedule; and 4) remaining activities and any modifications to the existing study or new studies proposed by Alabama Power.

3.0 OPERATING CURVE CHANGE FEASIBILITY ANALYSIS STUDY

3.1 STUDY PURPOSE AND SUMMARY OF METHODS

The Operating Curve Change Feasibility Analysis Study evaluates, in increments of 1 foot from 786 feet msl to 789 feet msl (i.e., 786, 787, 788, and 789 feet msl; collectively "winter pool alternatives" or "alternatives"), Alabama Power's ability to increase the winter pool elevation and continue to meet Project purposes. Any changes to the Harris Project operating curve could have the potential to impact downstream communities and, therefore, downstream impacts must be identified in the analysis.

This study is divided into two phases: During Phase 1, Alabama Power performed extensive modeling and analysis of the hydrologic record and baseline information for the Project to identify potential impacts of a winter operating curve change on hydropower generation, flood control, navigation, drought operations, Green Plan flows,[6] and downstream release alternatives. In Phase 2, Alabama Power will conduct qualitative and quantitative evaluations of potential resource impacts (water quality; water use; erosion and sedimentation, including invasive species; aquatic resources; wildlife, threatened and endangered species; terrestrial wetlands; recreation; and cultural resources).

Phase 1 study methods included using existing data (hydrologic record and baseline information) to develop the appropriate simulation models to evaluate, in increments of 1 foot from 786 feet msl to 789 feet msl, Alabama Power's ability to increase the winter pool elevation and continue to meet Project purposes. The simulation models developed as part of this study provided the tools needed to identify impacts to operational parameters and resources.

The study methods also included calibrating the models and defining the model boundaries. These methods and models are described in detail in Sections 1 through 4 of the Draft Operating Curve Change Feasibility Phase 1 Report.

[6] See Section 4.2.1.1 of the Draft Operating Curve Change Feasibility Analysis Phase 1 Report for discussion of the Green Plan.

3.2 STUDY PROGRESS

Alabama Power formed HAT 1 to provide stakeholders an opportunity to participate in issues related to Project operations. Alabama Power presented the models and assumptions to HAT 1 on September 11, 2019. As noted in Section 2.0, the Draft Operating Curve Change Feasibility Analysis Phase 1 Report is being filed concurrently with the ISR and the filing contains the relevant HAT 1 meeting summaries, presentations, and documentation of consultation. The Phase 1 draft report presents results for seven operational parameters: hydropower generation, flood control, navigation, drought operations, Green Plan flows, Harris Reservoir levels, and downstream release alternatives.

The Phase 1 Hydrologic Engineering Center-River Analysis System (HEC-RAS) modeling using the Hydrologic Engineering Center-Reservoir System Simulation (HEC-ResSim) model output indicates that any increase in the winter pool elevation at the Harris Dam will result in increased area, depth, and duration of flooding at points downstream of Harris Dam. Due to the natural channel geometry, for long stretches of the Tallapoosa River there is not significantly more area affected by increases in the winter pool; however, there are increases in the areas affected by flooding where tributary streams with low lying floodplains enter the Tallapoosa River. The proposed operating curve changes not only increase inundation areas but also increase the depth of flooding.

The Green Plan minimum releases from Harris were met or exceeded for the period of record for all alternatives. No changes were found in the ability to pass Green Plan flows from Harris Dam due to an increase in the winter pool. With the discharge target based on flows upstream of the reservoir at Heflin, the required releases were the same for all alternatives.

Using the HydroBudget model, Alabama Power determined that each of the four operating curve alternatives resulted in a loss in hydropower generation. While the greatest annual economic loss occurs in the + 4-foot (789-feet msl) winter pool alternative, this loss represents a relatively small decrease in hydropower generation for the Alabama Power hydroelectric system as a whole.

The four alternatives had no effect, compared to baseline, on Alabama Power’s ability to maintain the Harris Reservoir levels, implement drought operations, or support navigation downstream. Finally, the four alternatives did not affect Alabama Power's ability to release the downstream release alternatives being evaluated in the Downstream Release Alternatives Study Plan.

3.3 VARIANCE FROM THE STUDY PLAN AND SCHEDULE

Alabama Power conducted the Operating Curve Change Feasibility Analysis Phase 1 Study in full conformance with FERC's SPD; however, Alabama Power's schedule included hosting a HAT 1 meeting in March 2020. Due to COVID-19 and related travel and public gathering restrictions, and statewide office closures, Alabama Power did not host this meeting.

3.4 REMAINING ACTIVITIES/MODIFICATIONS OR OTHER PROPOSED STUDIES

Alabama Power does not propose any additional studies beyond those in the FERC SPD.

Remaining activities include:

- Review comments on the Draft Operating Curve Change Feasibility Analysis Phase 1 Report and modify the Final Report, as appropriate. For any comments not addressed in the Final Report, Alabama Power will provide an explanation of why these comments were not incorporated.
- Alabama Power will use the information in the Phase 1 Final Report along with FERC-approved relicensing study results and existing information to conduct the Phase 2 analysis to determine potential resource impacts on water quality, water use, erosion and sedimentation (including invasive species), aquatic resources, wildlife, T&E species, terrestrial wetlands, recreation resources, and cultural resources.
- In Phase 2, Alabama Power will analyze how the proposed operating curve alternatives could potentially affect existing structures (houses, barns, sheds, etc.) downstream of Harris Dam during flood events. Analysis will include identifying structures inundated under the various alternatives, including depth of inundation and duration.
- The modeling results combined with other environmental study analyses will result in a final recommendation from Alabama Power on any change in the operating curve at Harris.

4.0 DOWNSTREAM RELEASE ALTERNATIVES STUDY

4.1 STUDY PURPOSE AND SUMMARY OF METHODS

The Downstream Release Alternatives Study evaluates the effects of pre- and post-implementation of the Green Plan operations, a continuous minimum flow of 150 cfs (which is roughly the equivalent daily volume of three ten-minute pulses), and an alternative/modified Green Plan operation[7] (i.e., changing the time of day in which Green Plan pulses are released) on Project resources.

This study is being conducted in two phases. In Phase 1, Alabama Power used models developed in other Harris Project FERC-approved studies and conducted modeling simulations using specific methods, tools, and processes (as described in the FERC-approved Study Plan) to evaluate impacts to existing operational parameters, including reservoir levels, hydropower generation, flood control, navigation, and drought operations. In Phase 2, Alabama Power will analyze the effects of the downstream release alternatives on other resources, including water quality, water use, erosion and sedimentation (including invasive species), downstream aquatic resources (temperature and habitat), wildlife and terrestrial resources, T&E species, recreation, and cultural resources.

Study methods included using existing data (hydrologic record and baseline information) to develop the appropriate simulation models to conduct the analysis of the downstream release alternatives. The primary tool for this study is HEC-RAS; however, Alabama Power used other HEC models to address the effects of downstream release alternatives. Tools included: 1) Alabama-Coosa-Tallapoosa (ACT) unimpaired flow database and other U.S. Geological Survey (USGS), U.S. Army Corps of Engineers (USACE), and Alabama Power records; 2) HEC-RAS; HEC-ResSim; Hydrologic Engineering Center- Data Storage System and Viewer (HEC-DSSVue); and Alabama Power's HydroBudget. These models are described in detail in Section 4 of the Draft Downstream Release Alternatives Phase 1 Report.

Impacts to the Harris Project were evaluated by modeling the current operations combined with each downstream release alternative through the daily HEC Res-Sim for the ACT Basin. During

[7] The alternative/modified Green Plan operation downstream release alternative will be evaluated as part of Phase 2. Results from the other three scenarios as well as from the Aquatic Resources Study are needed to design the alternative to be studied.

Phase 2 of this study, the outflow hydrographs from HEC-ResSim will be routed downstream using HEC-RAS to assess effects on alternative release scenarios on Project resources.

4.2 STUDY PROGRESS

Alabama Power formed HAT 1 to provide stakeholders an opportunity to participate in issues related to Project operations. Alabama Power presented the Phase 1 Downstream Release Alternatives models and assumptions to HAT 1 on September 11, 2019. As noted in Section 2.0, the Draft Downstream Release Alternatives Study Phase 1 Report is being filed concurrently with the ISR and the filing contains the relevant HAT 1 meeting summaries, presentations, and documentation of consultation.

The Phase 1 HEC-RAS modeling using the HEC-ResSim output indicates that Pre-Green Plan, Green Plan, and 150 cfs continuous minimum flow have no effect on Harris Reservoir levels, flood control, navigation, or drought operations. Comparing the Pre-Green Plan and Green Plan using HydroBudget shows that returning to Pre-Green Plan operations would result in an annual economic gain to Alabama Power customers from a hydropower generation perspective because all hydropower generation would occur during peak times rather than a portion of generation occurring during off-peak pulsing operations. In evaluating the 150 cfs minimum flow alternative, there are too many unknowns at this time to generate reliable/accurate HydroBudget results; however, if the 150 cfs minimum flow is provided through a non-generation mechanism, the impact to hydropower generation will be the same or slightly worse than the impact from Green Plan operations. The capital and operation and maintenance costs associated with a generating or non-generating mechanism for providing a 150 cfs minimum flow will be considered in other economic analyses required by the relicensing process if it is part of Alabama Power's proposal.

4.3 VARIANCE FROM THE STUDY PLAN AND SCHEDULE

Alabama Power conducted the Downstream Release Alternatives Study in full conformance with FERC's SPD; however, Alabama Power's schedule included hosting a HAT 1 meeting in March 2020. Due to COVID-19 and related travel and public gathering restrictions, and statewide office closures, Alabama Power did not host this meeting.

4.4 REMAINING ACTIVITIES/MODIFICATIONS OR OTHER PROPOSED STUDIES

Alabama Power does not propose any additional studies beyond those in the FERC SPD**.**

Remaining Activities include:

- Review comments on the Draft Downstream Release Alternatives Study Phase 1 Report and modify the Final Report, as applicable. For any comments not addressed in the Final Report, Alabama Power will provide an explanation why these comments were not incorporated.
- Alabama Power will use the information in the Phase 1 Final Report along with FERC-approved relicensing study results and existing information to conduct the Phase 2 analysis to determine potential resource impacts on water quality, water use, downstream erosion, aquatic resources, wildlife, terrestrial, and T&E resources, recreation, and cultural resources.
- The modeling results combined with other environmental study analyses will result in a final recommendation from Alabama Power on any downstream release at Harris.

5.0 WATER QUALITY STUDY

5.1 STUDY PURPOSE AND SUMMARY OF METHODS

The Draft Water Quality Study Report supplements information included in the 2016 Baseline Water Quality Report. Data sources include Alabama Power, Alabama Department of Environmental Management (ADEM), and Alabama Water Watch (AWW). AWW data was not available to Alabama Power to include in the 2016 Baseline Water Quality Report. Therefore, this study report summarizes data collected from 2017 through 2019 with the exception of AWW data which also includes years prior to 2017. No additional data than what was included in the 2016 Baseline Water Quality Report were available for streams at Skyline. Because the current 303(d) list includes a section of Little Coon Creek at Skyline as impaired due to siltation, it is addressed in the Draft Erosion and Sedimentation Report.

In an effort to support obtaining the required 401 Water Quality Certification (WQC), Alabama Power conducted dissolved oxygen and temperature monitoring in the tailrace at a location previously approved by ADEM, approximately 800-feet-downstream of the Harris Dam on the west bank of the river, from June 1 through October 31 (2017 through 2019). Measurements of dissolved oxygen and temperature were recorded continuously at 15-minute intervals during generation. Alabama Power also collected monthly vertical profiles of temperature and dissolved oxygen in the Harris Reservoir forebay between March and October of 2018 and 2019 for comparison to historic profiles.

In addition to the monitoring to support the 401 WQC, Alabama Power monitored dissolved oxygen and temperature approximately 0.5 mile downstream of Harris Dam. Data were recorded continuously at 15-minute intervals beginning March 1 through October 31, 2019. Alabama Power provided discharge data during the March 1 through October 31 monitoring period to allow for data comparison.

Additionally, Alabama Power worked with HAT 2 participants to identify areas of water quality concern (areas believed to have degraded water quality conditions) and determined if identified areas warrant further examination as well as compiled available water quality information for those areas.

5.2 STUDY PROGRESS

Alabama Power developed HAT 2 to provide stakeholders an opportunity to participate in issues related to water quality. Alabama Power held a HAT 2 meeting on September 11, 2019 and distributed the Draft Water Quality Study Report to HAT 2 participants on March 9, 2020. The Draft Water Quality Report presented results on water quality parameters in the Harris Reservoir as well as in the Tallapoosa River downstream of the Harris Dam. As noted in Section 2.0, the Draft Water Quality Study Report is being filed concurrently with the ISR and the filing contains the relevant HAT 2 meeting summaries, presentations, and documentation of consultation.

Alabama Power collected dissolved oxygen and temperature data as described in the study methods at two locations downstream of the dam, in addition to the monthly vertical profiles collected in the Harris Reservoir forebay.

HAT 2 stakeholders identified one location, the Foster’s Bridge area at Lake Harris, as an area of water quality concern with regard to potential nutrient enrichment and associated impacts. Alabama Power used existing and historical data to assess the Foster’s Bridge area.

Data collected during generation immediately downstream of Harris Dam in 2018 and 2019 indicated dissolved oxygen was greater than 5 milligrams per liter (mg/L) for 94 percent of all measurements (91 percent in 2018 and 99.6 percent in 2019). Data from the continuous monitoring station that recorded data during both generation and non-generation in 2019 indicated dissolved oxygen levels were greater than 5 mg/L for 99.9 percent of all measurements. Monitoring data collected by Alabama Power in 2017 showed numerous events where dissolved oxygen was less than 5 mg/L. The low dissolved oxygen events in 2017 may be attributed to conditions in the Harris Reservoir that were impacted by severe drought in the summer and fall of 2016, where inflows to the lake were at historic lows. A variance that allowed for the lake to be filled two feet above the normal rule curve earlier in the year was likely another contributing factor. Harris Reservoir became more strongly stratified earlier in the year compared to other years. Dissolved oxygen levels at depths below 20 feet in the lake were hypoxic/anoxic from June through October 2017.

Data collected by ADEM on the Tallapoosa River at Harris Dam, Wadley, and Horseshoe Bend showed dissolved oxygen levels were well above 5 mg/L during each of their sampling events.

Data from the recently installed continuous monitor at Malone indicated that dissolved oxygen levels were greater than 5 mg/L for 99 percent of the monitoring period.

5.3 VARIANCE FROM THE STUDY PLAN AND SCHEDULE

Alabama Power conducted the Water Quality Study in full conformance with FERC's SPD; however, following discussions with ADEM, Alabama Power intends to submit an application to ADEM for the 401 WQC in April 2021, not in April 2020 as noted in the FERC SPD.

5.4 REMAINING ACTIVITIES/MODIFICATIONS OR OTHER PROPOSED STUDIES

Alabama Power does not propose any additional studies beyond that in FERC's SPD.

Remaining Activities include:

- Review comments on the Draft Water Quality Study Report and modify the Final Report, as applicable. For any comments not addressed in the Final Report, Alabama Power will provide an explanation why these comments were not incorporated.
- Alabama Power will prepare the 401 WQC application and submit to ADEM in April 2021.

6.0 EROSION AND SEDIMENTATION STUDY

6.1 STUDY PURPOSE AND SUMMARY OF METHODS

The Erosion and Sedimentation Study identified problematic erosion sites and sedimentation areas at the Harris Project and downstream of Harris Dam to Horseshoe Bend and determined the likely causes. Erosion and sedimentation sites were solicited from HAT 2 participants.

Methods for evaluating erosion sites on Lake Harris and the Tallapoosa River downstream of Harris Dam included photographing, georeferencing, and examining each site identified by HAT 2 participants, either in the field or via aerial imagery analysis, to determine the cause of the erosion (i.e., Harris Project operations, land disturbance [development], or natural processes). Additionally, a High Definition Stream Survey (HDSS) was conducted to evaluate streambank conditions on the Tallapoosa River downstream of Harris Dam to Horseshoe Bend. Regarding sedimentation areas, light, detection and ranging (LIDAR) and available satellite imagery/aerial photography were used to examine identified areas. The analysis of both erosion and sedimentation areas was supported by field observations. The identified sedimentation areas will be surveyed for nuisance aquatic vegetation.

Little Coon Creek, which flows through portions of the Project Boundary at Skyline, is currently listed as impaired by ADEM due to siltation. The sources of this impairment include non-irrigated crop production and pasture grazing. Study methods included a GIS analysis of land use classifications within the Project Boundary at Skyline to assess the impact of agriculture on Little Coon Creek. Land use data was provided by the multi-resolution land characteristics (MRLC) consortium.

6.2 STUDY PROGRESS

Alabama Power developed HAT 2 to provide stakeholders an opportunity to participate in issues related to erosion and sedimentation. During the October 19, 2017 issue identification workshop, several stakeholders noted the location of possible erosion and sedimentation areas. Alabama Power distributed an email on May 1, 2019 to HAT 2 participants providing maps of erosion and sedimentation areas previously identified for evaluation and requesting identification of additional areas of erosion and sedimentation concerns. Alabama Power held a HAT 2 meeting on September 11, 2019 where it presented geographic information system (GIS) overlays and maps of erosion and sedimentation sites that would be included in the field assessment. Following the September 11, 2019 HAT 2 meeting, a stakeholder requested, and Alabama Power agreed, to include an additional erosion site in the field assessment. On March 17, 2020, Alabama Power distributed the Draft Erosion and Sedimentation Study Report to HAT 2. As noted in Section 2.0, the Draft Erosion and Sedimentation Study Report is being filed concurrently with the ISR and the filing contains the relevant HAT 2 meeting summaries, presentations, and documentation of consultation.

6.2.1 LAKE HARRIS

Twenty-four erosion sites were identified for field assessment; field assessments were conducted in December 2019 during the winter drawdown when the sites were dewatered and could be fully assessed. Each site was photographed and examined to determine the cause of erosion. No significant signs of active erosion were present at 8 of the 24 sites.

Nine sedimentation areas were identified by stakeholders and by examining available satellite imagery/aerial photography and LIDAR data using GIS. The identified sedimentation areas were limited to areas exposed during the winter pool drawdown due to limitations of LIDAR in measuring below water surfaces. Therefore, approximate surface area for each identified sedimentation area was measured using contours established in a 2015 LIDAR survey of the lake during the drawdown. Limited aerial imagery of the lake during winter draw down and historic LIDAR data for the reservoir did not allow for a comparison to historic conditions. On December 4, 2019, Alabama Power visited all sedimentation areas that were accessible via boat to conduct field verification.

Sedimentation areas on Lake Harris are primarily concentrated in the Little Tallapoosa arm where riverine flows enter the impoundment zone created by Lake Harris. To assess potential causes for sediment introduction to the system, land use classifications were analyzed for the Little Tallapoosa River Basin in 2001 and compared to 2016. Twenty-five percent of the Little Tallapoosa River Basin has been converted to hay/pasture fields. Land clearing and conversion to agricultural fields is a significant contributing factor of sedimentation in the Little Tallapoosa arm of Lake Harris.

6.2.2 TALLAPOOSA RIVER DOWNSTREAM OF HARRIS DAM

Streambank condition point data collected during the downstream HDSS was averaged into 0.1-mile segments to help facilitate finding any failing streambank areas. Using these data, a ranking system was developed to understand specific areas of failing streambanks on the Tallapoosa River and to identify any significantly impaired areas. Notably, only one area scored as impaired to non-functional (located on the right bank between river mile [RM] 16.3 to 16.9).

The downstream HDSS results were also used to assess the condition of identified erosion sites 22 and 23. These sites were assessed using the same criteria as the erosion sites located within Lake Harris. Both sites were confirmed to have areas of erosion primarily caused by adjacent land use/clearing and natural riverine processes.

6.2.3 SKYLINE

A GIS analysis of land use classifications within the Project Boundary at Skyline was used to assess the impact of agriculture on Little Coon Creek. A comparison of land use within the watershed boundary of Little Coon Creek was conducted using the earliest available MRLC landcover dataset (2001) and the most recent (2016). This analysis indicated that 8.8 percent of the land within the watershed is used for agriculture (i.e. cultivated crops and hay/pasture), increasing from 2001 to 2016. The proximity of these areas to Little Coon Creek more easily allows for soils loosened due to tilling or other agricultural practices to be washed into Little Coon Creek, resulting in sedimentation of the creek bottom.

6.3 VARIANCE FROM THE STUDY PLAN AND SCHEDULE

There are no variances from the study plan or schedule.

Alabama Power conducted the Erosion and Sedimentation Study in full conformance with FERC's SPD.

6.4 REMAINING ACTIVITIES/MODIFICATIONS OR OTHER PROPOSED STUDIES

Alabama Power does not propose any additional studies beyond that in FERC's SPD.

Remaining Activities include:

- Alabama Power will perform additional reconnaissance at identified sedimentation sites on Lake Harris during full (summer) pool conditions to determine if any nuisance aquatic vegetation is present and provide the results of that assessment to HAT 2 in the form of a technical memorandum.
- Review comments on the Draft Erosion and Sedimentation Study Report and modify the Final Report, as applicable. For any comments not addressed in the Final Report, Alabama Power will provide an explanation why these comments were not incorporated.

7.0 AQUATIC RESOURCES STUDY

7.1 STUDY PURPOSE AND SUMMARY OF METHODS

The Aquatic Resources Study evaluates the effects of the Harris Project on aquatic resources. Monitoring conducted since the initiation of the Green Plan[8] indicated a positive fish community response and increased shoal habitat availability; however, little information exists characterizing the extent that the Green Plan enhanced the aquatic habitat from Harris Dam downstream through Horseshoe Bend. Furthermore, the Alabama Department of Conservation and Natural Resources (ADCNR) noted the abundance of some species is below expected levels, which could be due to several factors including sampling methodologies, thermal regime, flow regime, and/or nutrient availability.

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. 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.

Questions have also been raised regarding potential effects the Harris Project may have on other aquatic fauna within the Project Area, including macroinvertebrates such as mollusks and crayfish. Alabama Power is investigating the effects of the Harris Project on these aquatic species and is performing an assessment of the Harris Project's potential effects on species mobility and population health.

These study tasks are being accomplished through desktop assessments, field studies, and laboratory studies. Alabama Power has been compiling and summarizing data from existing information sources to provide a comprehensive characterization of aquatic resources within the Project Area. Alabama Power is also working with Auburn University to conduct field and

[8] Generally, the Green Plan specifies short (10 to 30 minute) pulses from Harris Dam, with the pulse duration determined by conditions at a gage on an unregulated section of the Tallapoosa River upstream of Harris Reservoir. The purpose of the Green Plan was to reduce the effects of peaking operations on the aquatic community downstream.

laboratory studies of the fish populations in the Tallapoosa River downstream of Harris Dam through Horseshoe Bend to determine how Harris Dam may be affecting the fish community in this reach.

7.2 Study Progress

Alabama Power developed HAT 3 to provide stakeholders an opportunity to participate in issues related to fish and wildlife resources. Alabama Power is performing a desktop assessment summarizing relevant current and historic information characterizing aquatic resources at the Harris Project. Sources of information include 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.

Currently, Alabama Power is finalizing this desktop assessment and will include it in the Draft Aquatic Study Report to be filed with FERC in July 2020.

A literature review of temperature requirements of target species (Redbreast Sunfish, Channel Catfish, Tallapoosa Bass, and Alabama Bass) is being conducted by Auburn University. Because the Alabama Bass is recently described, there is little information on its temperature requirements; therefore, temperature data for the spotted bass, a closely related species, is being used. Alabama Power and USGS have provided Auburn University with historic temperature data to incorporate into its analysis.

Auburn University has been sampling the fish community at four sites: Horseshoe Bend, Wadley, Lee’s Bridge (control site), and the Harris Dam tailrace. Sampling was conducted in April, May, July, September, November 2019, and January 2020, with six, 10-minute sampling transects occurring each sampling day. Individual fish were weighed, measured, sexed, had gonads removed and weighed, had diets removed from stomachs and preserved, and had otoliths removed and stored to be evaluated. To date, all diets have been quantified, all prey items identified, and a subsample measured, and all diet data have been entered into a databank for evaluation.

Representative specimens of the target fish collected at the four sites are being used in intermittent flow static respirometry tests to assess their baseline, or resting, metabolic rates under multiple temperatures. The metabolic rates will be used in bioenergetics models for each target species at each of the four sites. Swimming respirometry is also being used to quantify both performance capabilities of fish and their active metabolic rates. Diet, size distributions, and growth rates are currently being estimated for bioenergetics model simulations.

As noted in Section 2.0, Alabama Power will file the Draft Aquatic Resources Study Report with consultation documentation in July 2020.

7.3 VARIANCE FROM THE STUDY PLAN AND SCHEDULE

To date, Alabama Power has conducted the Aquatic Resources Study in full conformance with FERC's SPD; however, Alabama Power's schedule included hosting a HAT 3 meeting in March 2020. Due to COVID-19 and related travel and public gathering restrictions, and statewide office closures, Alabama Power did not host this meeting.

Auburn University is exploring alternatives to electromyogram radio tags because of their limited ability to quantify fish swimming energetic costs and the relatively large size of these tags. Acoustic/radio (CART) tags are being considered, and the study plan will be revised if needed, to track the activity of individual fish from small watercraft and to detect their position.

7.4 REMAINING ACTIVITIES/MODIFICATIONS OR OTHER PROPOSED STUDIES

Alabama Power does not propose any additional studies beyond that in FERC's SPD.

Remaining tasks include**:**

- Incorporate the Aquatic Resources Desktop Assessment into the Draft Aquatic Resources Study Report.
- Obtain temperature data at the USGS and Alabama Power monitors and the 20 temperature and level loggers stationed downstream of Harris Dam (recording through July 2020 or later). Temperatures recorded from 2019 and 2020 will be consolidated with historical data.
- Gather and review literature and any available information on temperature tolerances, preferences, or optima for target species.
- Continue fish sampling at each site every other month, conditions permitting, through November 2020.
- Consider an alternative "control" site upstream of the reservoir because the flow regime at the current upstream site (Lee's Bridge) appears to be more closely affected by dam operations than expected.

- Tag and track fish with CART tags during summer of 2020.
- Continue static respirometry tests and complete at both 10 degrees Centigrade (10ºC) and 21°C in 2020.
- Continue to measure active metabolic rates using a combination of increasing water velocity and decreasing water temperature.
- Incorporate the necessary physiological parameters into the bioenergetics model to conduct simulations needed to test potential influence of water temperature and flow on growth rates of fishes below Harris Dam. Auburn University will estimate annual growth of the target fish species using temperature regimes and diets observed in upstream control sites compared to downstream treatment sites along more impacted sections of the Tallapoosa River.
- Alabama Power will distribute the Draft Aquatic Resources Study Report and file with FERC in July 2020. Alabama Power will review comments on the Draft Aquatic Resources Study Report and modify the Final Report, as applicable. For any comments not addressed in the Final Report, Alabama Power will provide an explanation why these comments were not incorporated.

8.0 DOWNSTREAM AQUATIC HABITAT STUDY

8.1 STUDY PURPOSE AND SUMMARY OF METHODS

The Downstream Aquatic Habitat Study describes the relationship between Project operations and aquatic habitat in the Tallapoosa River from Harris Dam through Horseshoe Bend. This study includes the following:

- **Mesohabitat Analysis** - A desktop analysis of the types of available habitat in the Tallapoosa River using GIS, aerial imagery, and visual observations.
- **Hydrologic Data Collection and Analysis –** Collection and analysis of water level, river channel, and water temperature data.
- **Modeling –** Development of a HEC-RAS model to evaluate the effect of current operations on the amount and persistence of wetted aquatic habitat, especially shoal/shallow-water habitat.

8.2 STUDY PROGRESS

Alabama Power developed HAT 3 to provide stakeholders an opportunity to participate in issues related to fish and wildlife resources. Alabama Power held a HAT 3 meeting on December 11, 2019, to review methods for calculating the habitat types using HEC-RAS. Due to low attendance in December 2019, Alabama Power held an additional HAT 3 meeting on February 20, 2020. Alabama Power will file the Draft Downstream Aquatic Habitat Study Report, along with the relevant documentation of consultation, with FERC in June 2020.

The desktop mesohabitat analysis concluded that the 47-mile reach of the Tallapoosa River below Harris Dam is comprised of approximately 46 percent pool habitat, 44 percent riffle habitat, and 10 percent run habitat with current operations. The analysis indicated these habitat types are relatively evenly distributed along the reach, except for a reach between 7 miles and 14 miles downstream of Harris Dam where the amount of riffle habitat per mile is nearly twice that of other reaches.

Water level loggers installed at twenty locations in the Tallapoosa River below Harris Dam began recording water level and water temperature at 15-minute intervals in April 2019 and will continue through June 2020. During deployment and subsequent visits to perform maintenance and download logger data, technicians performed bathymetric surveys at approximately 200 cross-sections to acquire accurate riverbed elevation data for use in the hydraulic model.

The existing HEC-RAS model[9] terrain was updated using newly collected riverbed elevation and LIDAR data. Based on the USACE's unimpaired flow data set for the Tallapoosa River, 2001 was selected as an "average" water year for modeling purposes. Alabama Power ran simulations using hydrographs created with Harris Dam operations data for 2001. Alabama Power is currently analyzing the results to determine the effects on downstream aquatic habitat.

8.3 VARIANCE FROM THE STUDY PLAN AND SCHEDULE

To date, Alabama Power has conducted the Downstream Aquatic Habitat Study in full conformance with FERC's SPD; however, Alabama Power's schedule included hosting a HAT 3 meeting in March 2020. Due to COVID-19 and related travel and public gathering restrictions, and statewide office closures, Alabama Power did not host this meeting.

8.4 REMAINING ACTIVITIES/MODIFICATIONS OR OTHER PROPOSED STUDIES

Alabama Power does not propose any additional studies beyond that in FERC's SPD.

Remaining activities include:

- Continue analyzing the results of Green Plan model simulations based on input and recommendations. Note that effects on downstream aquatic habitat from modifications to current operations are addressed in the Phase 2 of the Downstream Release Alternatives Study.
- Continue collecting level logger data through June 2020.
- Alabama Power will distribute a Draft Downstream Aquatic Habitat Report in June 2020. Alabama Power will review comments on the Draft Aquatic Resources Study Report and modify the Final Report, as applicable. For any comments not addressed in the Final Report, Alabama Power will provide an explanation why these comments were not incorporated.

[9] The HEC-RAS model developed for the Operating Curve Change Feasibility Analysis and the Downstream Release Alternatives Study was used for this downstream aquatic habitat study.

9.0 THREATENED AND ENDANGERED SPECIES STUDY

9.1 STUDY PURPOSE AND SUMMARY OF METHODS

The Threatened and Endangered Species Study assesses the probability of populations of currently listed federal and/or state protected species and/or their critical habitat occurring within the Harris Project Boundary or Project Area and determine if there are Project related impacts.

The study methods include conducting a desktop analysis of habitat information and maps, compiling a list of federally and state protected T&E species, and identifying critical habitats that occur within the Harris Project Vicinity and the downstream reach of the Tallapoosa River from the Harris Dam through Horseshoe Bend. This study includes reviewing habitat requirements and range of existing and extirpated species and identifying environmental factors potentially affecting each species.

9.2 STUDY PROGRESS

Alabama Power developed HAT 3 to provide stakeholders an opportunity to participate in issues related to fish and wildlife resources. Alabama Power held a HAT 3 meeting on August 27, 2019 to discuss the T&E Species Study Plan and methods. Alabama Power and the USFWS met on November 21, 2019 to survey for fine-lined pocketbook on an approximate 3.75-mile stretch of the Tallapoosa River starting from the County 36 bridge and extending to the shoal below the Highway 431 bridge. The USFWS and Alabama Power agreed to conduct additional surveys on the fine-lined pocketbook in Spring 2020.[10]

Alabama Power distributed the Draft Threatened and Endangered Species Desktop Assessment to stakeholders on February 21, 2020. As noted in Section 2.0, the Draft Threatened and Endangered Species Desktop Assessment is being filed concurrently with the ISR and the filing contains the relevant HAT 3 meeting summaries, presentations, and consultation records.

The draft desktop assessment determined the probability of populations of currently listed T&E species and/or their critical habitat occurring within the Harris Project Boundary or Project Area. A list of species potentially occurring in Alabama counties in the Project Vicinity was compiled

[10] The date of survey may be modified due to COVID-19 restrictions. Alabama Power will consult with the USFWS on survey dates.

from the T&E species list using ADCNR, USFWS, and Alabama Natural Heritage Program databases.

Results and maps were obtained and summarized from USFWS Recovery Plans and 5-Year Reviews, the Federal Register Listings and Critical Habitat Designations, and USFWS Environmental Conservation Online System (ECOS). Maps depicting current species ranges and critical habitats were developed using GIS data available on the USFWS' ECOS online system. This information was used to determine whether further assessments of identified species and habitat are necessary.

The Alabama counties in the vicinity of the Harris Project overlap with the habitat range, critical habitat, and extant populations of 20 federal and state protected T&E species. Nine of these species have habitat ranges intersecting with the Project Boundaries, five of which have a range occurring in the Project Boundary at Skyline, and six of which have a range occurring in the Project Boundary at Lake Harris. Additionally, the USFWS has designated critical habitat for 6 of the 20 total species identified (finelined pocketbook, Indiana bat, rabbitsfoot, slabside pearlymussel, southern pigtoe, and spotfin chub). In addition to critical habitat ranges, specific extant populations were identified for ten species. Seven of the ten listed mussels (Alabama lampmussel, fine-rayed pigtoe, pale lilliput, rabbitsfoot, snuffbox, shiny pigtoe, and slabside pearlymussel), and one of the two listed fish (palezone shiner) have extant populations in the Paint Rock River, which is located 3.9 linear miles from the closest Project Boundary at Skyline. The desktop review of federally listed species and their habitats identified potential habitat for three bat species, two mussels species, two plant species, and a bird that may have habitat within the Project Boundary at Lake Harris and Skyline.

9.3 VARIANCE FROM THE STUDY PLAN AND SCHEDULE

To date, Alabama Power has conducted the Threatened & Endangered Species Study in full conformance with FERC's SPD; however, Alabama Power's schedule included hosting a HAT 3 meeting in March 2020. Due to COVID-19 and related travel and public gathering restrictions, and statewide office closures, Alabama Power did not host this meeting.

9.4 REMAINING ACTIVITIES/MODIFICATIONS OR OTHER PROPOSED STUDIES

Alabama Power does not propose any additional studies beyond that in FERC's SPD.

Remaining Activities include:

- Review comments on the Draft Threatened and Endangered Species Desktop Assessment and modify the Final Assessment, as applicable. For any comments not included in the Final Assessment, Alabama Power will provide an explanation why these comments were not incorporated.
- Alabama Power will continue working with USFWS to complete field surveys at Harris and Skyline WMA to determine if T&E species are located within the Harris Project Boundary. Species to be surveyed in Spring/Summer 2020[11] include: the palezone shiner at Skyline WMA and the fine-lined pocketbook mussel upstream of Harris Dam.
- The Final T&E Species Study Report will include the Desktop Assessment, the results of all field investigations, and other tasks described in the FERC SPD T&E Species Study Plan.

[11] The date of survey may be modified due to COVID-19 restrictions. Alabama Power will consult with the USFWS on survey dates.

10.0 PROJECT LANDS EVALUATION STUDY

10.1 STUDY PURPOSE AND SUMMARY OF METHODS

The Harris Project Lands Evaluation identifies lands around Lake Harris and at Skyline that are needed for Harris Project purposes and classifies these lands based upon use. Alabama Power evaluated the land use classifications for the Harris Project and determined changes needed to conform to Alabama Power's current land classification system and other Alabama Power FERC-approved Shoreline Management Plans (SMP). This Phase 1 portion of the study identified lands to be added to, or removed from, the current Harris Project Boundary and/or be reclassified. Phase 2 will use the results of Phase 1 and other Harris relicensing studies to develop a Wildlife Management Program (WMP) and a SMP.

The process and methods for Phase 1 included: meeting with HAT 4 members to discuss potential changes to the Harris Project lands (add, delete, or reclassify); a desktop analysis utilizing GIS data such as T&E species, wetlands, and cultural resources (i.e., "Sensitive Areas"), timber management tracts and current practices, and ADEM's data on impaired waters; and developing a draft map using GIS to show all proposed changes to Harris Project lands.

Phase 2 includes development of a SMP (Phase 2A) and a WMP (Phase 2B) to file with the final license application. In addition to the results from the Phase 1 Project Lands Evaluation, Alabama Power will incorporate information collected during other relicensing studies (e.g., T&E, water quality, and recreation studies), as appropriate, to the SMP and WMP. Specific activities for developing the SMP and WMP are included in FERC's SPD.

10.2 STUDY PROGRESS

Alabama Power developed HAT 4 to provide stakeholders an opportunity to participate in issues related to Project lands, the WMP, and SMP. Alabama Power held a HAT 4 meeting on September 11, 2019, to review proposed land use changes, including lands to be added to the Project Boundary, lands to be removed from the Project Boundary, and proposed changes in land use classifications of existing Project lands. Alabama Power presented the proposed changes in GIS overlays. Following the September 11, 2019 HAT 4 meeting, Alabama Power solicited feedback from HAT 4 regarding the Project Lands proposal. As noted in Section 2.0, the Draft Phase 1 Project Lands Evaluation Study Report is being filed concurrently with the ISR and the filing contains the relevant HAT 4 meeting summaries, presentations, and documentation of consultation.

Alabama Power identified lands around Lake Harris and at Skyline that are needed for Harris Project purposes and classified these lands based upon use. In addition, Alabama Power evaluated acreage at Skyline to determine availability of suitable bobwhite quail habitat and prepared the Draft Phase 1 Project Lands Evaluation Study Report. Finally, Samford University conducted a botanical inventory of a 20-acre parcel at Flat Rock Park.

10.3 VARIANCE FROM THE STUDY PLAN AND SCHEDULE

There are no variances from the study plan or schedule.

Alabama Power conducted the Project Lands Evaluation in full conformance with FERC's SPD.

10.4 REMAINING ACTIVITIES/MODIFICATIONS OR OTHER PROPOSED STUDIES

Alabama Power does not propose any additional studies beyond that in FERC's SPD.

Remaining activities include:

- Alabama Power will review comments on the Draft Phase 1 Project Lands Evaluation Study Report and modify the Final Report, as applicable. For any comments not addressed in the Final Report, Alabama Power will provide an explanation of why these comments were not incorporated.
- Samford University will conduct a botanical survey on an additional 21 acres of land adjacent to the previously surveyed area.
- Complete the Project Lands Evaluation Study Plan methods for Phase 2 SMP and WMP.

11.0 RECREATION EVALUATION STUDY

11.1 STUDY PURPOSE AND SUMMARY OF METHODS

The Harris Recreation Evaluation Study Plan and subsequent relevant FERC filings contain several components to determine potential recreational impact of the Harris Project: 1) recreational use of the Harris Project (Lake Harris Public Access); 2) recreational use of the Tallapoosa River below Harris Dam (Tallapoosa River User); and, 3) as introduced in the December 19, 2019 FERC filing, the Tallapoosa River Landowner Survey Research Plan[12].

The Lake Harris Public Access component includes gathering baseline information on existing Project recreation facilities, existing Project recreational use and capacity, and estimated future demand and needs at the Harris Project. For this component, Alabama Power has completed the following:

- Reviewed existing information and inventoried and mapped (using GIS) existing Project recreation sites and access areas within the Project Boundary;
- Summarized who owns, operates, and maintains each Project recreation site;
- Evaluated the condition of the Harris Project recreation sites and facilities within the Project Boundary; and
- Estimated current recreation use and the current and projected use capacity at Harris Project recreation sites[13].

To determine how flows in the Tallapoosa River downstream of Harris Dam affect recreational users and their activity, Alabama Power has completed the following:

- Calculated total visitation (effort) and daily effort levels by user groups during the study period (May 1, 2019 to October 31, 2019);
- Measured user attitudes/perceptions about instream flow and trip satisfaction on the day they were intercepted during this period;
- Obtained catch information from anglers intercepted during this period; and

[12] Accession No. 20191219-5186.
[13] Alabama Power worked with Southwick Associates on this component of the study and as of April 2020, this information is still preliminary and will be presented to stakeholders in the Draft Recreation Evaluation Report.

- Determined how instream flow affected a) overall effort, b) daily effort by each user group, c) perception of instream flow and trip satisfaction by user group, and d) species of fish targeted, caught, and retained[14].

Alabama Power is also surveying landowners downstream of Harris Dam[15] as well as recreational users of the Tallapoosa River regarding their recreation use of the Tallapoosa River. Alabama Power:

- Reviewed county tax records to identify residential, vacation, forestry, agricultural, or vacant land adjacent to the Tallapoosa River in Randolph, Chambers, or Tallapoosa Counties that could be used for river-related recreation and obtained their mailing address;
- Developed a survey instrument to collect information from downstream landowners on their recreational use of the Tallapoosa River, use by others they may provide access to on their property, landowner perception of instream flow, and their attitudes about recreation and other resource issues on the Tallapoosa River downstream of Harris Dam to Jaybird Landing Boat Ramp; and
- Sent landowners an introductory pre-survey letter via first-class mail informing them of the study, followed one week later with a first-class mailing with a request to participate in study. This mailing included a paper copy of the survey, including a self-addressed stamped envelope for return, and also provided directions to fill out the survey online.

11.2 Study Progress

Alabama Power developed HAT 5 to provide stakeholders an opportunity to participate in issues related to recreation. Alabama Power held a HAT 5 meeting on December 11, 2019, to discuss the Tallapoosa River Landowner Survey Research Plan. Alabama Power will file the Draft Downstream Recreation Evaluation Study Report, along with the relevant documentation of consultation, with FERC in August 2020.

Alabama Power conducted Lake Harris Public Access questionnaires and counts from March to December 2019 (counts were conducted almost daily and employed nine recreation clerks who conducted 1,357 questionnaires) [16]. Alabama Power also conducted Tallapoosa River User Surveys and counts from May to October 2019 (40 count days with approximately 200 surveys).

[14] Alabama Power worked with Dr. Kevin Hunt on this component of the survey and as of April 2020, this information is still preliminary and will be presented to stakeholders in the Draft Recreation Evaluation Report.
[15] As described in the December 19, 2019 Tallapoosa River Landowner Survey Research Plan.
[16] The start date for the counts was March 11, 2019. The survey questionnaire started on May 10, 2019. The last date for both was December 15, 2019.

Additionally, ADCNR provided data on recreation use at the Skyline WMA (man-days hunted and harvest estimates were conveyed in August 2019). In October 2019, Alabama Power inventoried recreation facilities at the Lake Harris Public Access sites (12 Harris Project Recreation sites[17], Lakeside Marina, and Wedowee Marine).

At the conclusion of the Tallapoosa River User Survey, researchers noted a lack of information from downstream landowners. To supplement data collected at public recreation sites on the Tallapoosa River downstream of the Project, Alabama Power developed a survey for downstream landowners regarding river-related recreation. Alabama Power facilitated a HAT 5 meeting on December 11, 2019, to provide stakeholders the opportunity to comment on the proposed Tallapoosa River Downstream Landowner Survey. Alabama Power incorporated several comments from HAT 5 members into the Tallapoosa River Landowner Survey Research Plan (including distributing a paper copy of the survey and delaying the start of the survey). Per stakeholder suggestions at the December 2019 HAT meeting, Alabama Power added an anonymous internet survey (Tallapoosa River Recreation User Survey) for river users to express opinions regarding their recreation experience on the Tallapoosa River. Initially, Alabama Power was only assessing landowners who owned residential, vacation, agricultural land that may be used as a residence, or non-industrial vacant land that was tied to an individual landowner. Alabama Power expanded the landowner categories to include forest landowners (known businesses in this category were removed so that only private individuals remained) and extended the response deadline for the Tallapoosa River Downstream Landowner Survey to April 15, 2020 (original deadline was March 31, 2020).

11.3 VARIANCE FROM THE STUDY PLAN AND SCHEDULE

To date, Alabama Power conducted the Recreation Evaluation Study in full accordance with the methods and schedule described in the FERC SPD with the exception of the following variances:

- Alabama Power added the Tallapoosa River Downstream Landowner Survey and Tallapoosa River Recreation User Survey described above.
- Alabama Power will file the Draft Harris Project Recreation Evaluation report in August 2020 (rather than June 2020) due to the additional study elements and extended

[17] Lee's Bridge Boat Ramp; Foster's Bridge Boat Ramp; Swagg Boat Ramp; Lonnie White Boat Ramp; Crescent Crest Boat Ramp; Highway 48 Bridge Boat Ramp; Wedowee Marine South Marina; Little Fox Creek Boat Ramp Big Fox Creek Boat Ramp; Flat Rock Park Day Use Park; R. L. Harris Management Area; and Harris Tailrace Fishing Platform.

participation deadlines. Alabama Power will keep with the schedule and file the Final Harris Project Recreation Evaluation report in November 2020.

Alabama Power's schedule included hosting a HAT 5 meeting in March 2020. Due to COVID-19 and related travel and public gathering restrictions, and statewide office closures, Alabama Power did not host this meeting.

11.4 REMAINING ACTIVITIES/MODIFICATIONS OR OTHER PROPOSED STUDIES

Alabama Power does not propose any additional studies beyond that in FERC's SPD.

Due to the additional surveys and subsequent processing and analysis of the data, Alabama Power will file the Draft Recreation Evaluation Study Report in August 2020 rather than in June 2020. Alabama Power is not proposing to change the Final Report due date in November 2020.

Remaining activities include:

- Use information collected from the Tallapoosa River Downstream Landowner Survey and Tallapoosa River Recreation User Survey to characterize use of the Tallapoosa River downstream of Harris Dam to Jaybird Landing Boat Ramp.
- Use information on river flow to determine how instream flow affects landowner recreational use and satisfaction on the Tallapoosa River downstream of Harris Dam.
- Combine Tallapoosa River Downstream Landowner Survey and Tallapoosa River Recreation User Survey with data gathered at public recreation sites in 2019.
- In August 2020, Alabama Power will distribute a Draft Recreation Evaluation Study Report. Alabama Power will review comments on the Draft Recreation Evaluation Study Report and modify the Final Report, as applicable. For any comments not addressed in the Final Report, Alabama Power will provide an explanation why these comments were not incorporated.

12.0 CULTURAL RESOURCES STUDY

12.1 STUDY PURPOSE AND SUMMARY OF METHODS

The Harris Project Cultural Resources[18] Programmatic Agreement and Historic Properties Management Plan Study Plan involves collecting and summarizing existing cultural resources baseline information and developing a plan to assess cultural resources identified in the Harris Project Area of Potential Effect (APE).

Alabama Power will develop a Historic Properties Management Plan (HPMP) for the Harris Project. The HPMP will describe the Harris Project, APE, anticipated effects, and Alabama Power's proposed measures to protect historic properties.

As part of this study, Alabama Power will determine the need for, and if required, develop a draft Programmatic Agreement (PA) (among FERC, the State Historic Preservation Office [SHPO], Alabama Power, and applicable federally recognized tribes[19]) for managing historic properties that may be affected by a new license issued to Alabama Power for the continued operation of the Harris Project. FERC will issue the draft PA with any draft National Environmental Policy Act (NEPA) documents (Environmental Assessment or Environmental Impact Statement) and then issue the final PA with the final NEPA analysis.

12.2 STUDY PROGRESS

Alabama Power formed HAT 6 to provide stakeholders an opportunity to participate in issues related to cultural resources. Alabama Power has conducted several HAT 6 meetings in 2019 and 2020. These meetings covered numerous topics, summarized below:

- May 22, 2019 - Sites Selected for Further Evaluation, TCP Identification Plan, APE, HPMP outline
- July 9, 2019 - Sites Selected for Further Evaluation

[18] FERC has the responsibility to consult with the Advisory Council on Historic Preservation (Advisory Council) and the Alabama Historical Commission (AHC or State Historic Preservation Office [SHPO]) pursuant to the Advisory Council's regulations (36 U.S. Code of Federal Regulation [C.F.R.] part 800) implementing the National Historic Preservation Act (NHPA) (54 U.S. States Code [U.S.C.] 306108; hereinafter, "Section 106".

[19] Applicable tribes as of March 2019- Cherokee Nation, Eastern Band of Cherokee Indians, United Keetoowah Band of Cherokee Indians in Oklahoma, Alabama-Coushatta Tribe of Texas, Alabama-Quassarte Tribal Town, Coushatta Tribe of Louisiana, Kialegee Tribal Town, Muscogee (Creek) Nation, Poarch Band of Creek Indians, and Thlopthlocco Tribal Town.

- November 6, 2019 - Muscogee August 19, 2019 Letter, Fish Weir Information, Final Determination of Lake Harris Sites for Further Evaluation, Lake Harris Survey Schedule, Lake Harris Site Evaluation Methods, Skyline Site Selection and Evaluation Methods, HPMP, IDP, and TCP Identification Plan outline discussion
- March 2, 2020 - Draft IDP, Draft TCP Identification Plan, Proposed APE

Alabama Power and the Office of Archeological Research (OAR) reviewed existing information on the 330 previously recorded archeological sites and identified sites for further evaluation. Of the 96 sites identified for preliminary archeological assessments, 79 were identified through OAR research and 17 additional sites were requested by the Muscogee (Creek) Nation[20]. Per the OAR, the preliminary archaeological assessment was intended to determine the general disposition of previously recorded archaeological sites selected in concert with consulting parties that were considered potentially significant cultural resources. The preliminary archeological assessment was conducted to determine the location, setting, and general condition of the sites. It involved both a literature/records search and, if needed, an on-site field reconnaissance. In addition, Alabama Power and OAR performed cultural resources assessments[21] at several sites at Skyline (previous surveys identified 141 sites as Undetermined in regard to their National Register of Historic Places [National Register] status in the Alabama State Site File). Finally, Alabama Power and OAR evaluated a sample of the 236 known caves recorded in Skyline (13 caves were investigated by using digital photography, mapping rock art locations, and documenting other utilization)[22].

The FERC SPD specified that "Alabama Power should also include both a written description of the APE, a map clearly identifying the APE and its relationship to the Harris Project Boundary, and concurrence from, the Alabama SHPO on the APE prior to conducting fieldwork (5.9(b)(6)." Beginning in May 2019, Alabama Power consulted with stakeholders to establish the Harris Project APE and Alabama Power is continuing to work with Alabama SHPO to finalize the APE.

[20] Filed on August 16, 2019.
[21] Cultural Resource Assessments conducted at Skyline and those to be conducted around Lake Harris comply with the Alabama SHPO guidelines. Methods for both the preliminary archeological assessments and cultural resources assessments were shared with appropriate HAT 6 members following the November 6, 2019 meeting.
[22] These investigations were led by Scott Shaw. Scott did the initial assessment of the caves and bat populations prior to field crews entering to conduct documentation. Scott made efforts to avoid large hibernating populations and record any bat species encountered within each visited cave. This information was shared with Alabama Power for dissemination as appropriate to USFWS and ADCNR.

In addition, Alabama Power worked with HAT 6 to develop the IDP and the TCP Identification Plan.

Per section 304 of the National Historic Preservation Act (NHPA), as amended, and 36 CFR 800.11(c), Alabama Power will "withhold any information about the location, character, or ownership of a historic property from public disclosure when disclosure may cause a significant invasion of privacy, risk harm to the historic property, or impede the use of a traditional religious site by practitioners." Alabama Power will file all such information collected to date as "privileged."

As noted in Section 2.0, the cultural documents filed concurrently with this ISR contain HAT 6 meeting summaries, presentations, and documentation of consultation.

12.3 VARIANCE FROM THE STUDY PLAN AND SCHEDULE

Alabama Power conducted the Cultural Resources Programmatic Agreement and Historic Properties Management Plan Study in full conformance with FERC's SPD.

Alabama Power continues to work with the Alabama SHPO for concurrence regarding the Harris APE and plans to file the final APE (with maps) by June 30, 2020.

12.4 REMAINING ACTIVITIES/MODIFICATIONS OR OTHER PROPOSED STUDIES

Alabama Power does not propose any additional studies beyond that in FERC's SPD.

Remaining Activities include:

- Alabama Power will complete consultation and determine the final Harris APE.
- Alabama Power will complete survey work and TCP identification by February 2021 and complete eligibility assessments for known cultural resources by July 2021.
- Alabama Power will conduct a cultural resources assessment for the sites identified during the Lake Harris preliminary archeological assessment.
- Alabama Power will begin drafting an HPMP, which will include provisions for future National Register eligibility evaluation of the Harris Project facilities in 2033, when the Project would reach an age of 50 years.
- Alabama Power will continue to determine and document the presence of cultural resources within the Project's APE; evaluate any known cultural resources for National Register eligibility (including the piers at Miller Covered Bridge); and determine if

authorized use of the Harris Project, including any proposed changes in Project operation proposed under a new license, would cause changes in the character or use of historic properties, if such properties exist.

APPENDIX A

ACRONYMS AND ABBREVIATIONS

ACRONYMS AND ABBREVIATIONS

A

A&I	Agricultural and Industrial
ACFWRU	Alabama Cooperative Fish and Wildlife Research Unit
ACF	Apalachicola-Chattahoochee-Flint (River Basin)
ACT	Alabama-Coosa-Tallapoosa (River Basin)
ADCNR	Alabama Department of Conservation and Natural Resources
ADECA	Alabama Department of Economic and Community Affairs
ADEM	Alabama Department of Environmental Management
ADROP	Alabama-ACT Drought Response Operations Plan
AHC	Alabama Historical Commission
Alabama Power	Alabama Power Company
AMP	Adaptive Management Plan
ALNHP	Alabama Natural Heritage Program
APE	Area of Potential Effects
ARA	Alabama Rivers Alliance
ASSF	Alabama State Site File
ATV	All-Terrain Vehicle
AWIC	Alabama Water Improvement Commission
AWW	Alabama Water Watch

B

BA	Biological Assessment
B.A.S.S.	Bass Anglers Sportsmen Society
BCC	Birds of Conservation Concern
BLM	U.S. Bureau of Land Management
BOD	Biological Oxygen Demand

C

°C	Degrees Celsius or Centrigrade
CEII	Critical Energy Infrastructure Information
CFR	Code of Federal Regulation
cfs	Cubic Feet per Second
cfu	Colony Forming Unit
CLEAR	Community Livability for the East Alabama Region
CPUE	Catch-per-unit-effort
CWA	Clean Water Act

D

DEM	Digital Elevation Model
DIL	Drought Intensity Level
DO	Dissolved Oxygen
dsf	day-second-feet

E

EAP	Emergency Action Plan
ECOS	Environmental Conservation Online System
EFDC	Environmental Fluid Dynamics Code
EFH	Essential Fish Habitat
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act

F

°F	Degrees Fahrenheit
ft	Feet
F&W	Fish and Wildlife
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FNU	Formazin Nephelometric Unit
FOIA	Freedom of Information Act
FPA	Federal Power Act

G

GCN	Greatest Conservation Need
GIS	Geographic Information System
GNSS	Global Navigation Satellite System
GPS	Global Positioning Systems
GSA	Geological Survey of Alabama

H

Harris Project	R.L. Harris Hydroelectric Project
HAT	Harris Action Team
HEC	Hydrologic Engineering Center
HEC-DSSVue	HEC-Data Storage System and Viewer
HEC-FFA	HEC-Flood Frequency Analysis
HEC-RAS	HEC-River Analysis System
HEC-ResSim	HEC-Reservoir System Simulation Model
HEC-SSP	HEC-Statistical Software Package

HDSS	High Definition Stream Survey
hp	Horsepower
HPMP	Historic Properties Management Plan
HPUE	Harvest-per-unit-effort
HSB	Horseshoe Bend National Military Park

I

IBI	Index of Biological Integrity
IDP	Inadvertent Discovery Plan
IIC	Intercompany Interchange Contract
IVM	Integrated Vegetation Management
ILP	Integrated Licensing Process
IPaC	Information Planning and Conservation
ISR	Initial Study Report

J

JTU	Jackson Turbidity Units

K

kV	Kilovolt
kva	Kilovolt-amp
kHz	Kilohertz

L

LIDAR	Light Detection and Ranging
LWF	Limited Warm-water Fishery
LWPOA	Lake Wedowee Property Owners' Association

M

m	Meter
m^3	Cubic Meter
M&I	Municipal and Industrial
mg/L	Milligrams per liter
ml	Milliliter
mgd	Million Gallons per Day
µg/L	Microgram per liter
µs/cm	Microsiemens per centimeter
mi^2	Square Miles
MOU	Memorandum of Understanding

MPN	Most Probable Number
MRLC	Multi-Resolution Land Characteristics
msl	Mean Sea Level
MW	Megawatt
MWh	Megawatt Hour

N

n	Number of Samples
NEPA	National Environmental Policy Act
NGO	Non-governmental Organization
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanographic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NTU	Nephelometric Turbidity Unit
NWI	National Wetlands Inventory

O

OAR	Office of Archaeological Resources
OAW	Outstanding Alabama Water
ORV	Off-road Vehicle
OWR	Office of Water Resources

P

PA	Programmatic Agreement
PAD	Pre-Application Document
PDF	Portable Document Format
pH	Potential of Hydrogen
PID	Preliminary Information Document
PLP	Preliminary Licensing Proposal
Project	R.L. Harris Hydroelectric Project
PUB	Palustrine Unconsolidated Bottom
PURPA	Public Utility Regulatory Policies Act
PWC	Personal Watercraft
PWS	Public Water Supply

Q

QA/QC	Quality Assurance/Quality Control

R

RM	River Mile
RTE	Rare, Threatened and Endangered
RV	Recreational Vehicle

S

S	Swimming
SCORP	State Comprehensive Outdoor Recreation Plan
SCP	Shoreline Compliance Program
SD1	Scoping Document 1
SH	Shellfish Harvesting
SHPO	State Historic Preservation Office
Skyline WMA	James D. Martin-Skyline Wildlife Management Area
SMP	Shoreline Management Plan
SU	Standard Units

T

T&E	Threatened and Endangered
TCP	Traditional Cultural Properties
TMDL	Total Maximum Daily Load
TNC	The Nature Conservancy
TRB	Tallapoosa River Basin
TSI	Trophic State Index
TSS	Total Suspended Soils
TVA	Tennessee Valley Authority

U

USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

W

WCM	Water Control Manual
WMA	Wildlife Management Area
WMP	Wildlife Management Plan
WQC	Water Quality Certification

From: APC Harris Relicensing
To: "harrisrelicensing@southernco.com"
Bcc: 1942jthompson420@gmail.com; 9sling@charter.net; alcondir@aol.com; allan.creamer@ferc.gov; alpeeple@southernco.com; amanda.fleming@kleinschmidtgroup.com; amanda.mcbride@ahc.alabama.gov; amccartn@blm.gov; ammcvica@southernco.com; amy.silvano@dcnr.alabama.gov; andrew.nix@dcnr.alabama.gov; arsegars@southernco.com; athall@fujifilm.com; aubie84@yahoo.com; awhorton@corblu.com; bart_roby@msn.com; baxterchip@yahoo.com; bboozer6@gmail.com; bdavis081942@gmail.com; beckyrainwater1@yahoo.com; bill_pearson@fws.gov; blacklake20@gmail.com; blm_es_inquiries@blm.gov; bob.stone@smimail.net; bradandsue795@gmail.com; bradfordt71@gmail.com; brian.atkins@adeca.alabama.gov; bruce.bradford@forestry.alabama.gov; bsmith0253@gmail.com; butchjackson60@gmail.com; bwhaley@randolphcountyeda.com; carolbuggknight@hotmail.com; celestine.bryant@actribe.org; cengstrom@centurytel.net; ceo@jcchamber.com; cggoodma@southernco.com; cgnav@uscg.mil; chad@cleburnecountychamber.com; chandlermary937@gmail.com; chiefknight2002@yahoo.com; chimneycove@gmail.com; chris.goodell@kleinschmidtgroup.com; chris.greene@dcnr.alabama.gov; chris.smith@dcnr.alabama.gov; chris@alaudubon.org; chuckdenman@hotmail.com; clark.maria@epa.gov; claychamber@gmail.com; clint.lloyd@auburn.edu; cljohnson@adem.alabama.gov; clowry@alabamarivers.org; cmnix@southernco.com; coetim@aol.com; colin.dinken@kleinschmidtgroup.com; cooper.jamal@epa.gov; coty.brown@alea.gov; craig.litteken@usace.army.mil; crystal.davis@adeca.alabama.gov; crystal.lakewedoweedocks@gmail.com; crystal@hunterbend.com; dalerose120@yahoo.com; damon.abernethy@dcnr.alabama.gov; dbronson@charter.net; dcnr.wffdirector@dcnr.alabama.gov; decker.chris@epa.gov; devridr@auburn.edu; dfarr@randolphcountyalabama.gov; dhayba@usgs.gov; djmoore@adem.alabama.gov; dkanders@southernco.com; dolmoore@southernco.com; donnamat@aol.com; doug.deaton@dcnr.alabama.gov; dpreston@southernco.com; drheinzen@charter.net; ebt.drt@numail.org; eilandfarm@aol.com; el.brannon@yahoo.com; elizabeth-toombs@cherokee.org; emathews@aces.edu; eric.sipes@ahc.alabama.gov; evan.lawrence@dcnr.alabama.gov; evan_collins@fws.gov; eveham75@gmail.com; fal@adem.alabama.gov; fredcanoes@aol.com; gardenergirl04@yahoo.com; garyprice@centurytel.net; gene@wedoweelakehomes.com; georgettraylor@centurylink.net; gerryknight77@gmail.com; gfhorn@southernco.com; gjobsis@americanrivers.org; gld@adem.alabama.gov; glea@wgsarrell.com; gordon.lisa-perras@epa.gov; goxford@centurylink.net; granddadth@windstream.net; harry.merrill47@gmail.com; helen.greer@att.net; henry.mealing@kleinschmidtgroup.com; holliman.daniel@epa.gov; info@aeconline.com; info@tunica.org; inspector_003@yahoo.com; irapar@centurytel.net; irwiner@auburn.edu; j35sullivan@blm.gov; james.e.hathorn.jr@sam.usace.army.mil; jason.moak@kleinschmidtgroup.com; jcandler7@yahoo.com; jcarlee@southernco.com; jec22641@aol.com; jeddins@achp.gov; jefbaker@southernco.com; jeff_duncan@nps.gov; jeff_powell@fws.gov; jennifer.l.jacobson@usace.army.mil; jennifer_grunewald@fws.gov; jerrelshell@gmail.com; jessecunningham@msn.com; jfcrew@southernco.com; jhancock@balch.com; jharjo@alabama-quassarte.org; jhaslbauer@adem.alabama.gov; jhouser@osiny.org; jkwdurham@gmail.com; jlowe@alabama-quassarte.org; jnyerby@southernco.com; joan.e.zehrt@usace.army.mil; john.free@psc.alabama.gov; johndiane@sbcglobal.net; jonas.white@usace.army.mil; josh.benefield@forestry.alabama.gov; jpsparrow@att.net; jsrasber@southernco.com; jthacker@southernco.com; jthroneberry@tnc.org; judymcrealtor@gmail.com; jwest@alabamarivers.org; kajumba.ntale@epa.gov; karen.brunso@chickasaw.net; kate.cosnahan@kleinschmidtgroup.com; kcarleton@choctaw.org; kechandl@southernco.com; keith.gauldin@dcnr.alabama.gov; keith.henderson@dcnr.alabama.gov; kelly.schaeffer@kleinschmidtgroup.com; ken.wills@jcdh.org; kenbarnes01@yahoo.com; kenneth.boswell@adeca.alabama.gov; kmhunt@maxxsouth.net; kmo0025@auburn.edu; kodom@southernco.com; kpritchett@ukb-nsn.gov; kristina.mullins@usace.army.mil; lakewedoweedocks@gmail.com; leeanne.wofford@ahc.alabama.gov; leon.m.cromartie@usace.army.mil; leopoldo_miranda@fws.gov; lewis.c.sumner@usace.army.mil; lgallen@balch.com; lgarland68@aol.com; lindastone2012@gmail.com; llangley@coushattatribela.org; lovvornt@randolphcountyalabama.gov; lswinsto@southernco.com; lth0002@auburn.edu; mark@americanwhitewater.org; matt.brooks@alea.gov; matthew.marshall@dcnr.alabama.gov; mayo.lydia@epa.gov; mcoker@southernco.com; mcw0061@aces.edu; mdollar48@gmail.com; meredith.h.ladart@usace.army.mil; mhpwedowee@gmail.com; mhunter@alabamarivers.org; michael.w.creswell@usace.army.mil; midwaytreasures@bellsouth.net; mike.holley@dcnr.alabama.gov; mitchell.reid@tnc.org; mlen@adem.alabama.gov; mnedd@blm.gov; monte.terhaar@ferc.gov; mooretn@auburn.edu; mprandolphwater@gmail.com; nancyburnes@centurylink.net; nanferebee@juno.com; nathan.aycock@dcnr.alabama.gov; orr.chauncey@epa.gov; pace.wilber@noaa.gov; partnersinfo@wwfus.org; patti.powell@dcnr.alabama.gov; patty@ten-o.com; paul.trudine@gmail.com; ptrammell@reddyice.com; publicaffairs@doc.gov; rachel.mcnamara@ferc.gov; raebutler@mcn-nsn.gov; rancococ@teleclipse.net; randall.b.harvey@usace.army.mil; randy@randyrogerslaw.com; randy@wedoweemarine.com; rbmorris222@gmail.com; rcodydeal@hotmail.com; reuteem@auburn.edu; richardburnes3@gmail.com; rick.oates@forestry.alabama.gov; rickmcwhorter723@icloud.com; rifraft2@aol.com; rjdavis8346@gmail.com; robert.a.allen@usace.army.mil; roger.mcneil@noaa.gov; ron@lakewedowee.org; rosoweka@mcn-nsn.gov; russtown@nc-cherokee.com; ryan.prince@forestry.alabama.gov; sabrinawood@live.com; sandnfrench@gmail.com; sarah.salazar@ferc.gov; sbryan@pci-nsn.gov; scsmith@southernco.com; section106@mcn-nsn.gov; sforehand@russelllands.com; sgraham@southernco.com; sherry.bradley@adph.state.al.us; sidney.hare@gmail.com; simsthe@aces.edu; snelson@nelsonandco.com; sonjahollomon@gmail.com; steve.bryant@dcnr.alabama.gov; stewartjack12@bellsouth.net; straylor426@bellsouth.net; sueagnew52@yahoo.com; tdadunaway@gmail.com; thpo@pci-nsn.gov; thpo@tttown.org; timguffey@jcch.net; tlamberth@russelllands.com; tlmills@southernco.com; todd.fobian@dcnr.alabama.gov; tom.diggs@ung.edu; tom.lettieri47@gmail.com; tom.littlepage@adeca.alabama.gov; tpfreema@southernco.com; trayjim@bellsouth.net; triciastearns@gmail.com; twstjohn@southernco.com; variscom506@gmail.com; walker.mary@epa.gov; william.puckett@swcc.alabama.gov; wmcampbell218@gmail.com; wrighr2@aces.edu; wsgardne@southernco.com; wtanders@southernco.com

Subject: Harris Relicensing - Initial Study Report
Date: Friday, April 10, 2020 2:59:07 PM

Harris relicensing stakeholders,

Pursuant to FERC's Integrated Licensing Process, Alabama Power filed its Harris Project Initial Study Report (ISR) today. Concurrent with the ISR filing, Alabama Power filed six draft study reports and two cultural resources documents, including consultation records for each. Stakeholders may access the ISR and the draft study reports on FERC's website (http://www.ferc.gov) by going to the "eLibrary" link and entering the docket number (P-2628). The ISR and study reports are also available on the Project relicensing website at https://harrisrelicensing.com.

The Initial Study Report meeting will be held on **April 28, 2020**. Please hold this date from 9:00 am to 4:00 pm central time. A few days before the meeting I will send final call-in information and instructions, the agenda, and the presentations we will be reviewing during the meeting.

Alabama Power will file a summary of the ISR meeting by **May 12, 2020**. Comments on the ISR and ISR meeting summary should be submitted to FERC by **June 11, 2020**.

Comments on the draft study reports should be submitted to Alabama Power at harrisrelicensing@southernco.com by **June 11, 2020**.

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From:	Anderegg, Angela Segars
To:	Hathorn, James E Jr SAM
Cc:	Peeples, Alan L.; Odom, Kenneth; Graham, Stacey A.
Subject:	FW: Corps presentation
Date:	Tuesday, April 14, 2020 10:54:12 AM
Attachments:	Harris Relicensing Corps Meeting Res-Sim results 2020-03-17 final.pptx

Hi James,

Attached is the presentation from our March 17th conference call. The Initial Study Report for Harris relicensing, along with the draft Operating Curve Change Feasibility Analysis Report was filed with FERC last Friday. The Initial Study Report meeting is coming up on April 28th. Hope you can join us.

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

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Thanks,

Angie Anderegg
Hydro Services

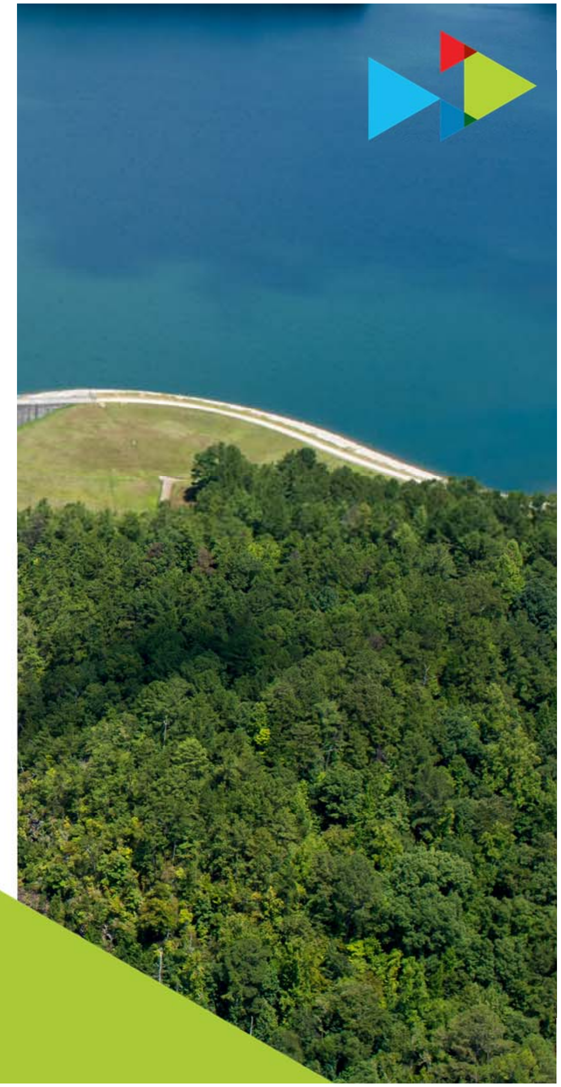
(205)257-2251
arsegars@southernco.com

Alabama Power

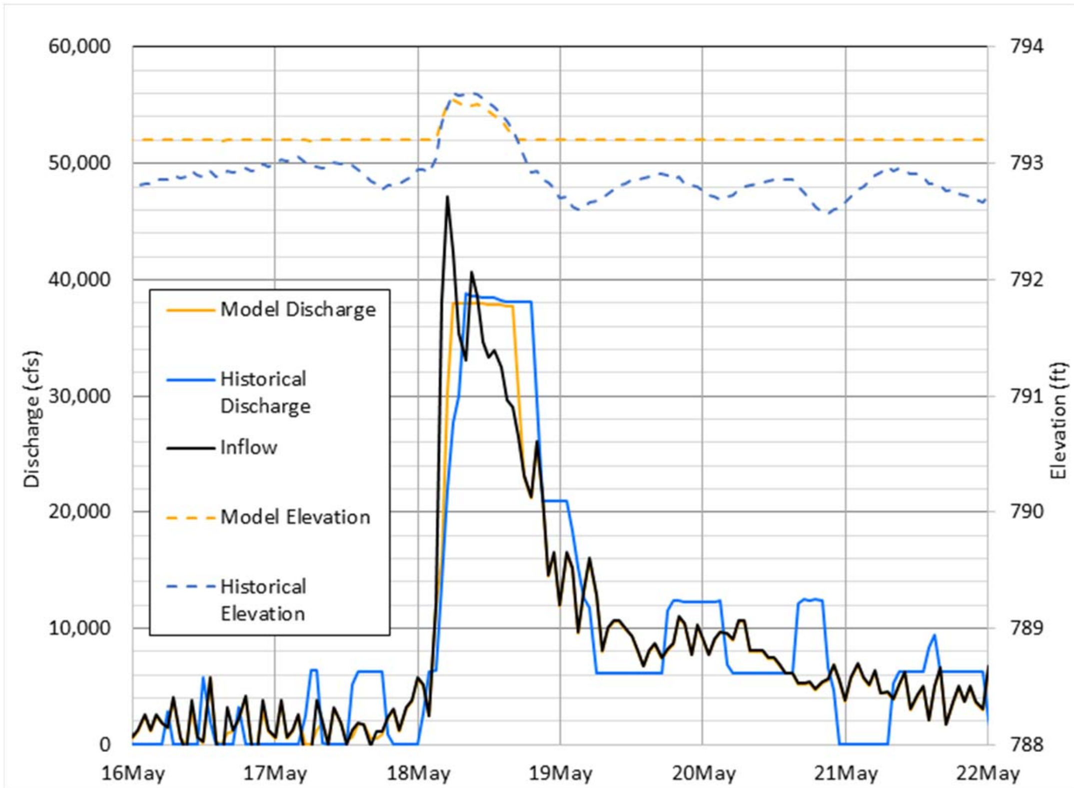
Harris Dam Relicensing

Project Operations – HAT 1

Res-Sim Results



Res-Sim Calibration



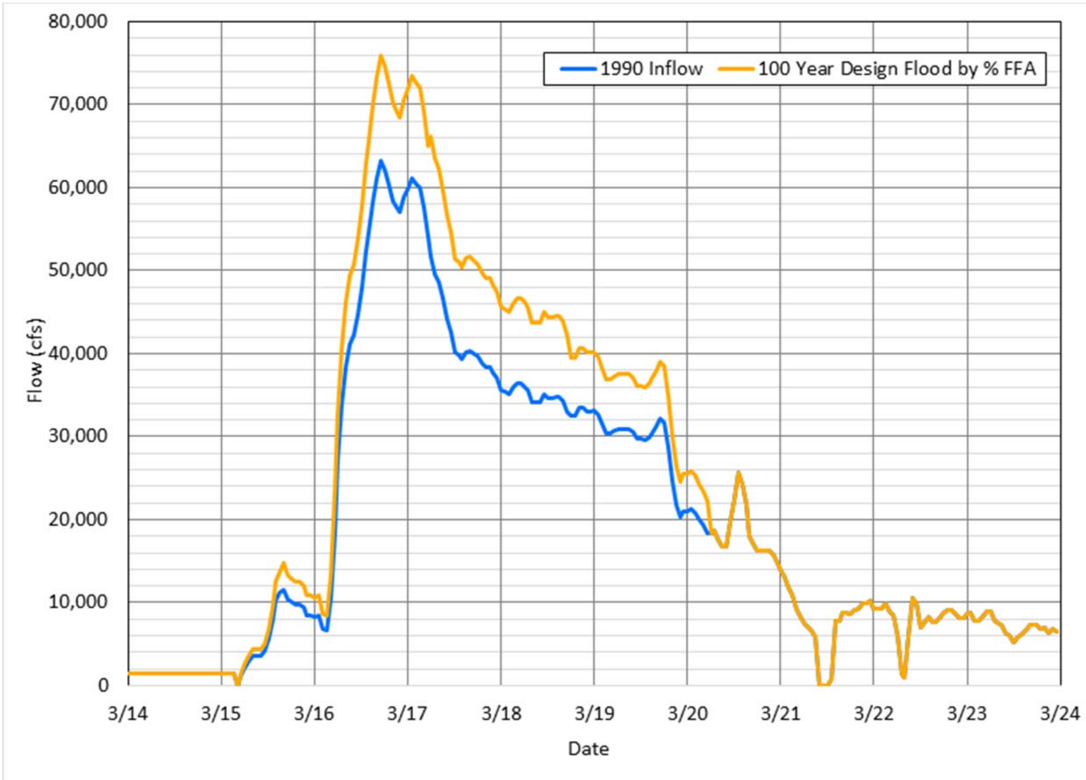
Hydrograph Results for 100-yr Design Flood for Harris Dam

AVERAGE FLOW (days)	SCALE FACTOR	1990 FLOOD (cfs)	1% FFA (cfs)	DESIGN FLOOD (cfs)
1-day	1.20	51,531	61,900	61,961
3-days	1.28	38,170	48,900	47,489
5-days	1.21	32,110	39,000	39,702

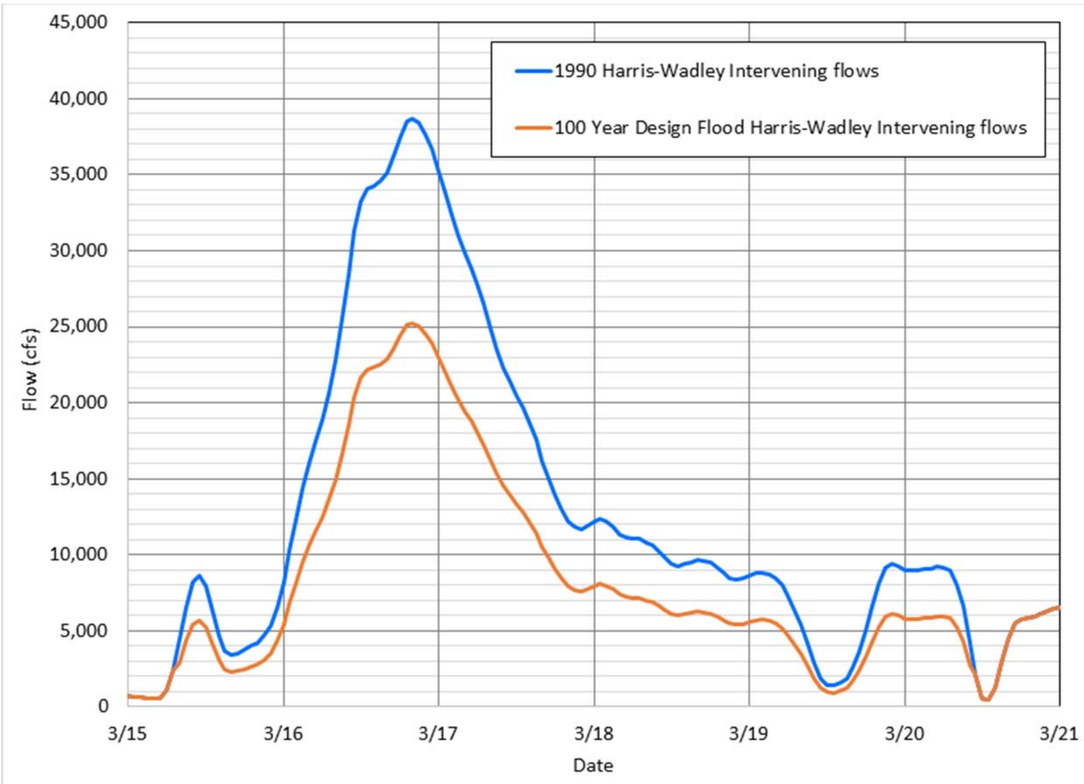
Hydrograph Results for 100-yr Design Flood Intervening Flows for Harris-Wadley Reach

AVERAGE FLOW (days)	SCALE FACTOR	1990 FLOOD (cfs)	1% FFA (cfs)	DESIGN FLOOD (cfs)
1-day	0.6513	32,858	21,400	21,400
3-days	0.6613	18,889	12,500	12,332
5-days	0.6477	14,358	9,300	9,358

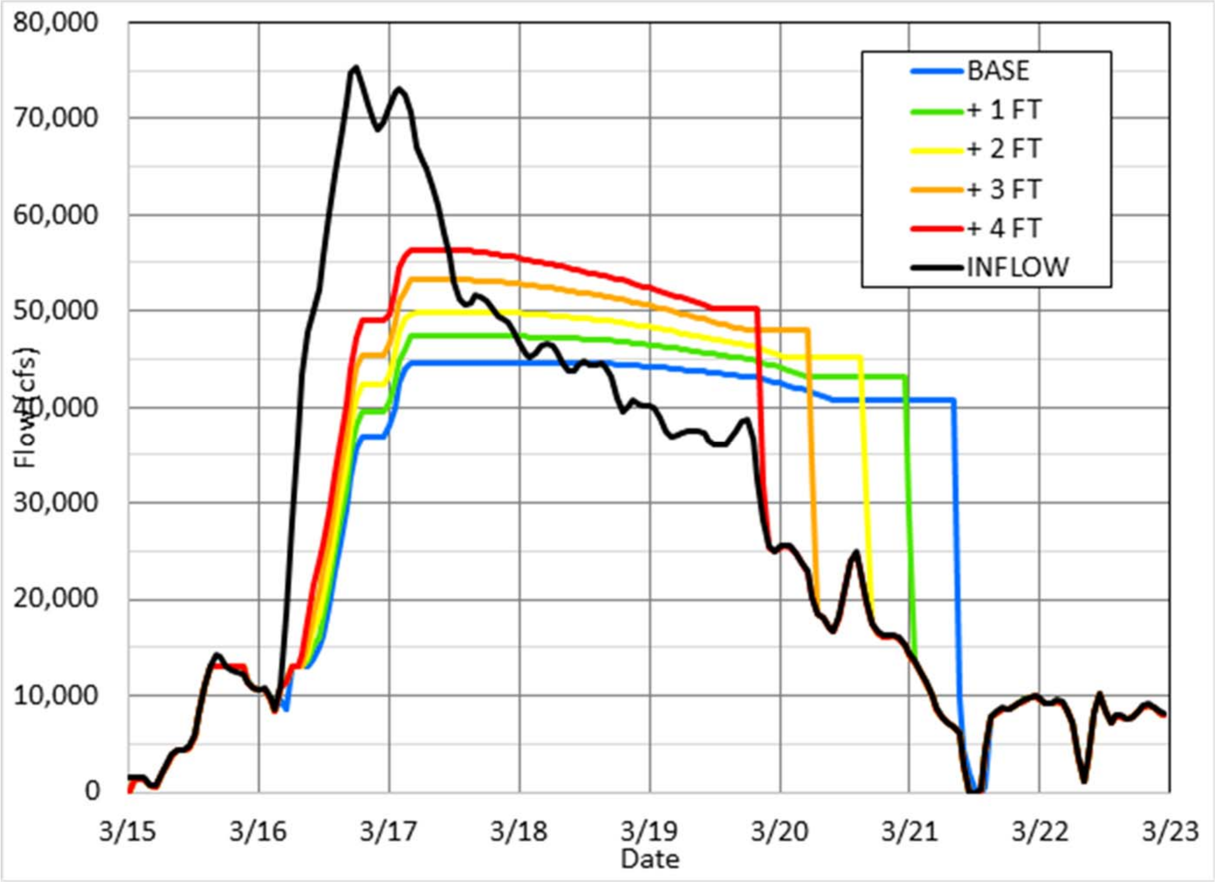
Inflows at Harris Reservoir for 100-yr Design Flood for Harris Dam



Intervening Flows at Wadley for 100-yr Design Flood for Harris Dam



100-year Design Flood Outflows



Downstream Results Locations

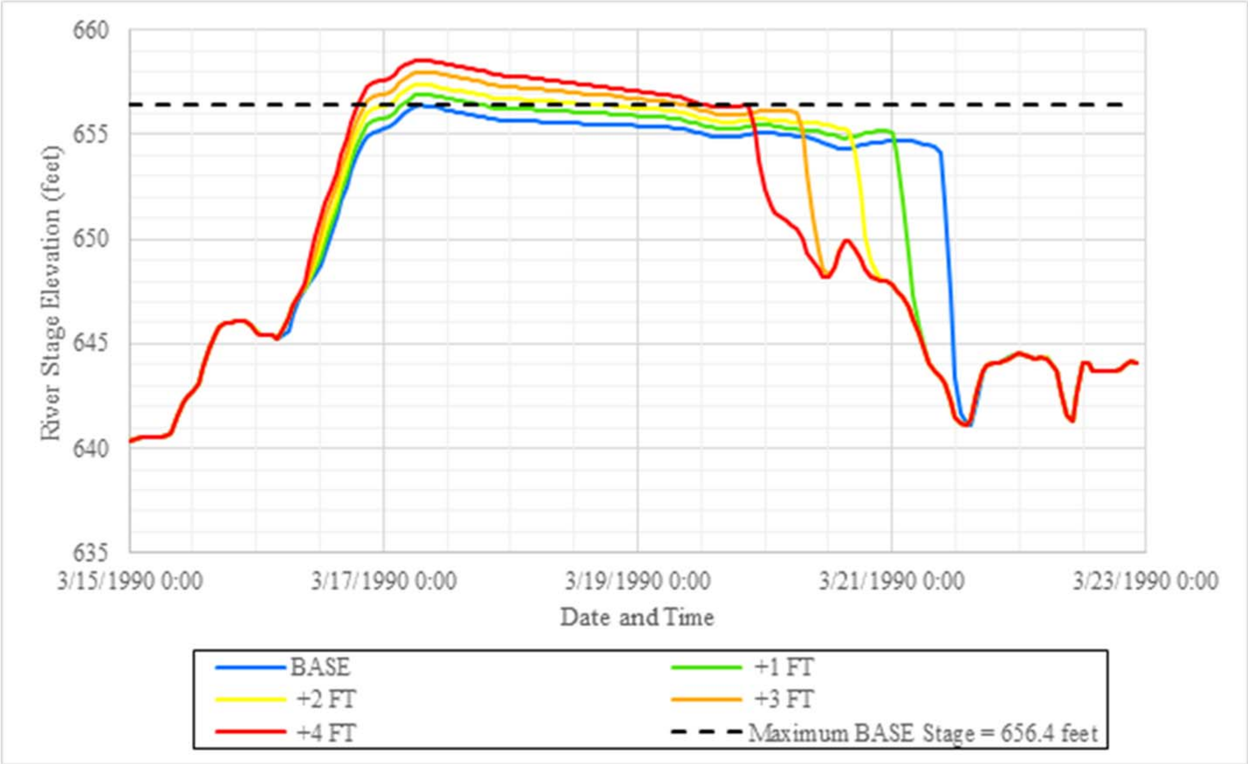
Changes in Water Surface Elevation

Location	Distance from Dam (miles)	Max Water Surface Rise (feet)			
		+ 1 foot	+ 2 feet	+ 3 feet	+ 4 feet
RM 129.7 (Malone, AL)	7	0.5	1.0	1.6	2.2
RM 122.7 (Wadley, AL)	14	0.5	1.1	1.7	2.4
RM 115.7	21	0.6	1.1	1.8	2.5
RM 108.7	28	0.5	1.0	1.6	2.2
RM 101.7	35	0.4	0.7	1.1	1.4
RM 93.7 (Horseshoe Bend)	43	0.3	0.7	1.0	1.4

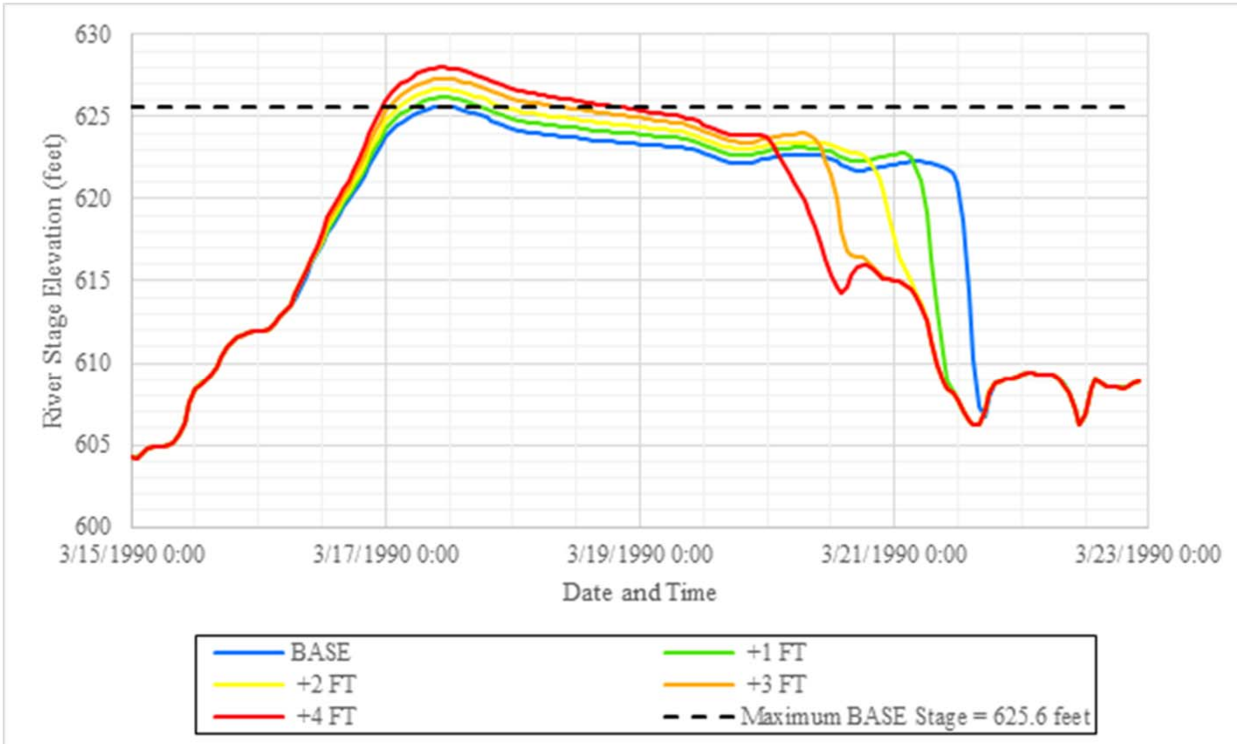
Changes in Flood Duration

Location	Distance from Dam (miles)	Duration above Baseline Condition Max Elevation (hours)			
		+ 1 foot	+ 2 feet	+ 3 feet	+ 4 feet
RM 129.7 (Malone, AL)	7	15	43	61	67
RM 122.7 (Wadley, AL)	14	12	19	32	43
RM 115.7	21	13	21	34	46
RM 108.7	28	14	26	38	48
RM 101.7	35	17	27	40	48
RM 93.7 (Horseshoe Bend)	43	18	29	39	47

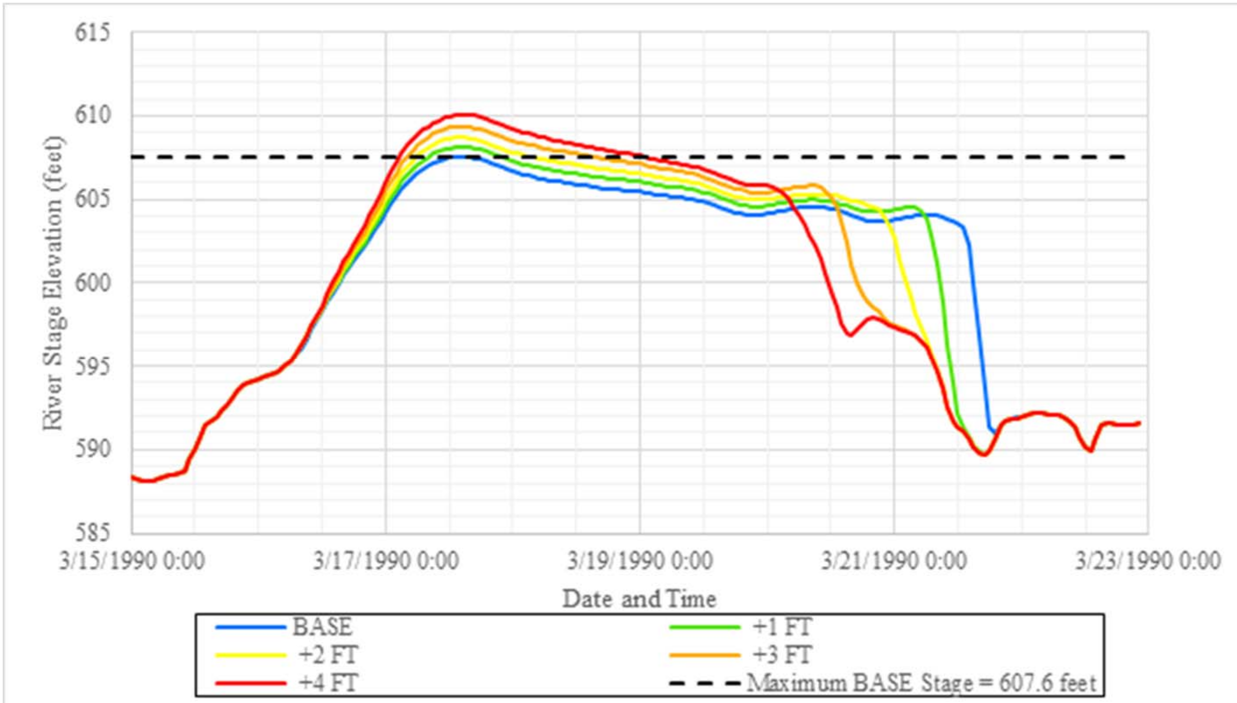
Malone (RM 129.7)



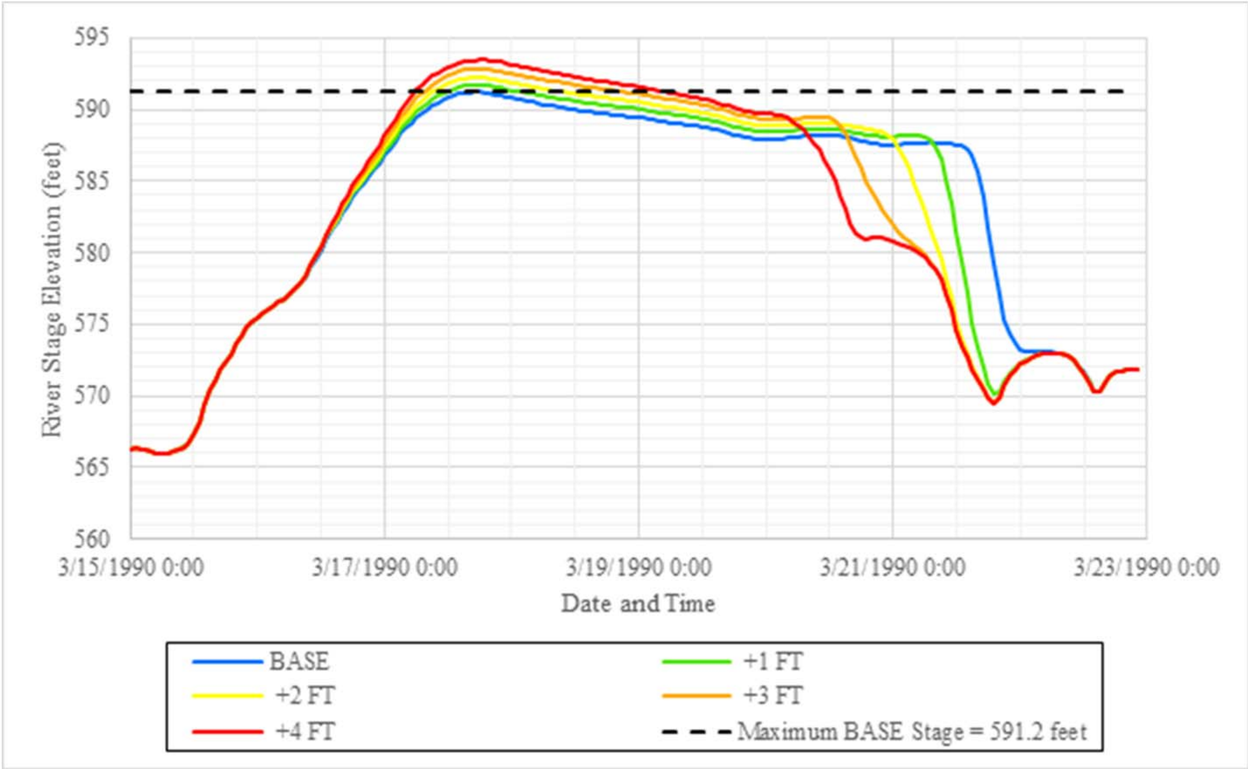
Wadley (RM 122.7)



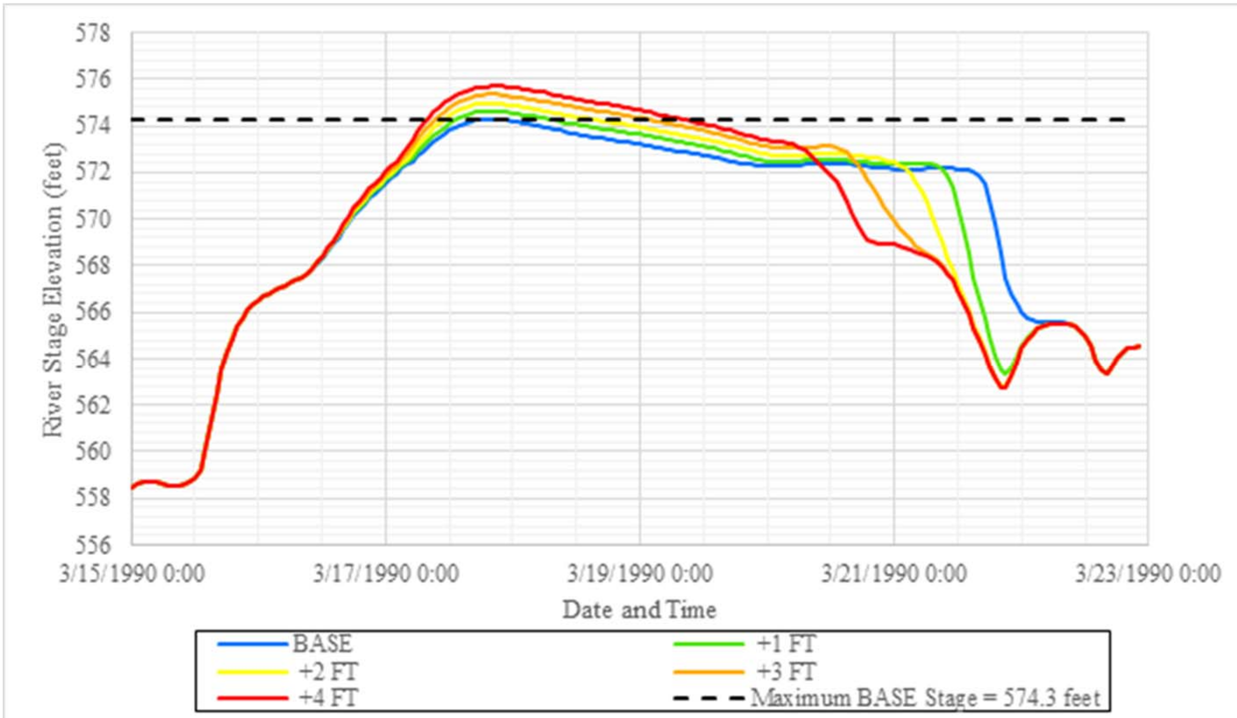
Between Wadley and Horseshoe Bend (RM 115.7)



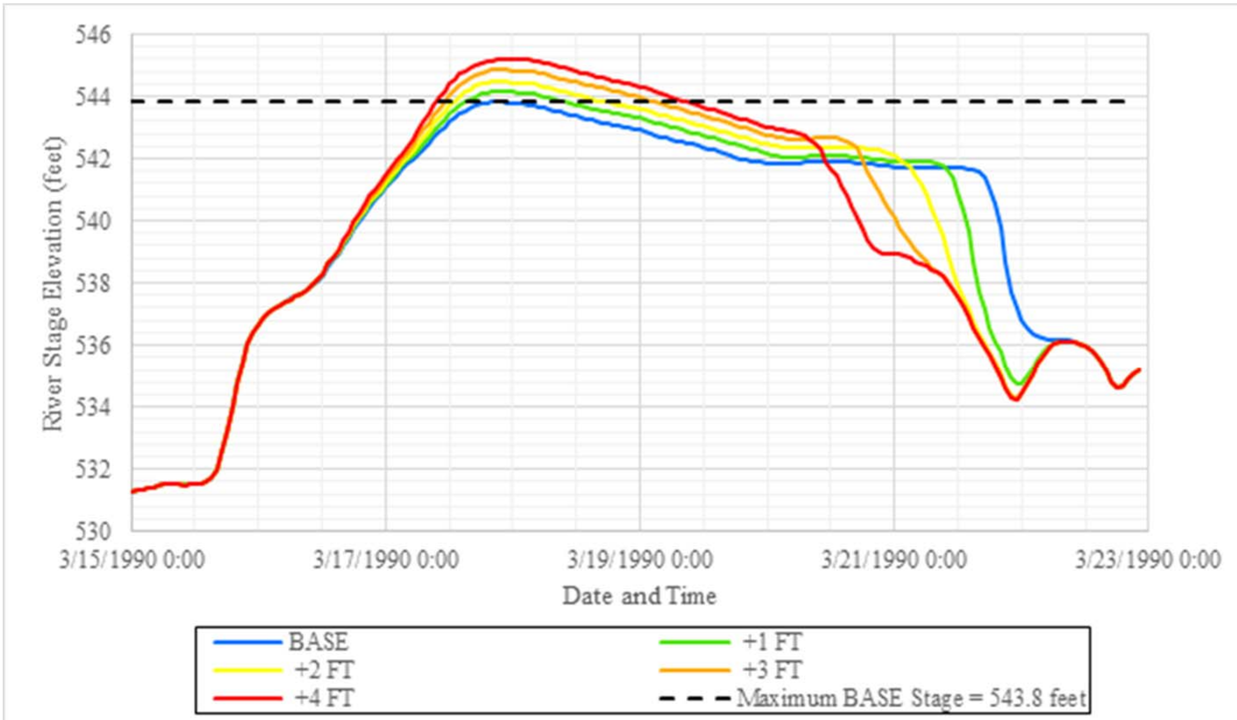
Between Wadley and Horseshoe Bend (RM108.7)



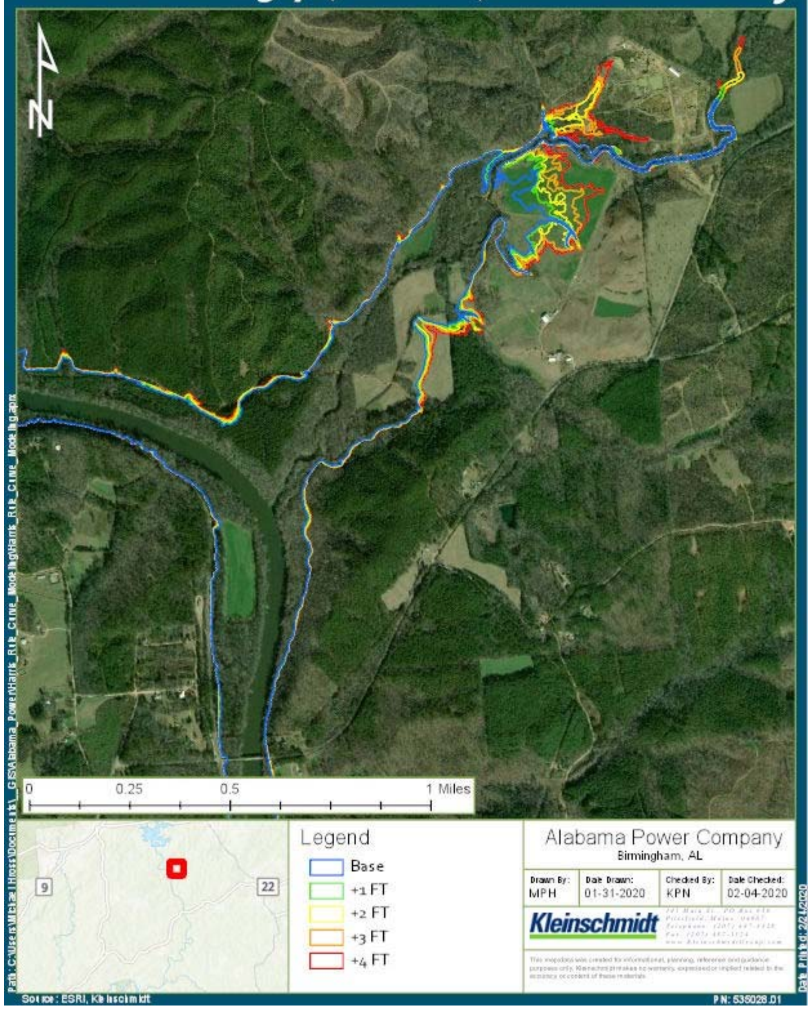
Between Wadley and Horseshoe Bend (RM 101.7)



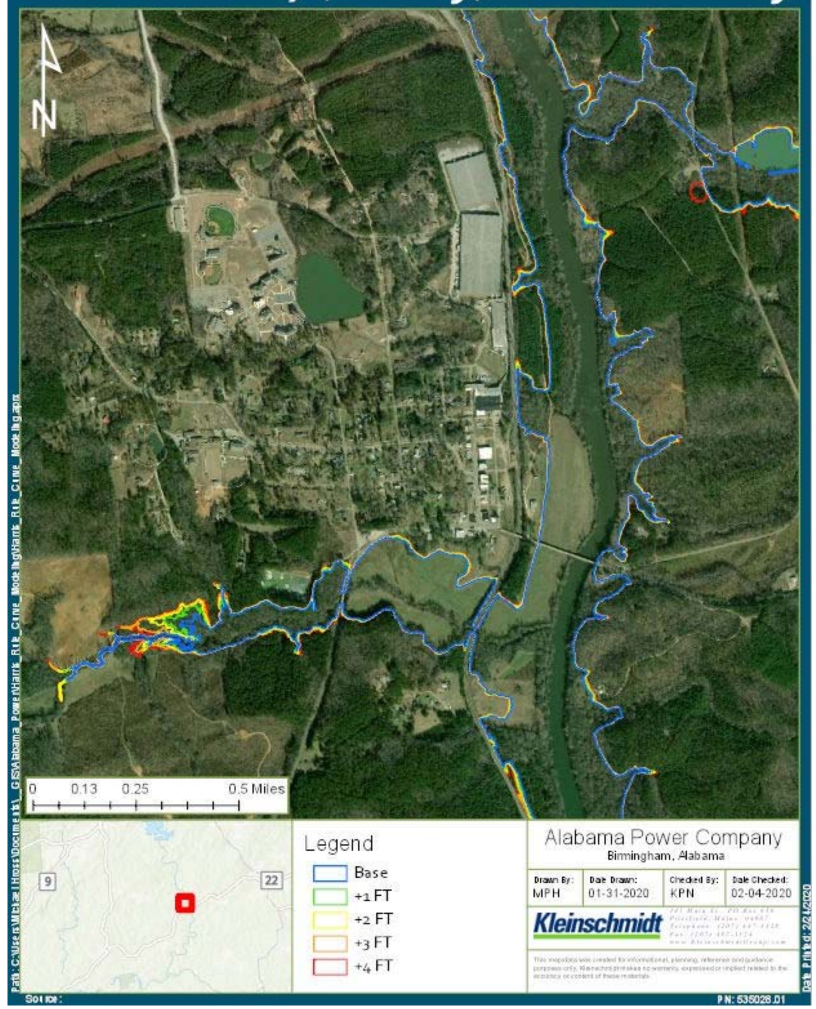
Horseshoe Bend (RM 93.7)

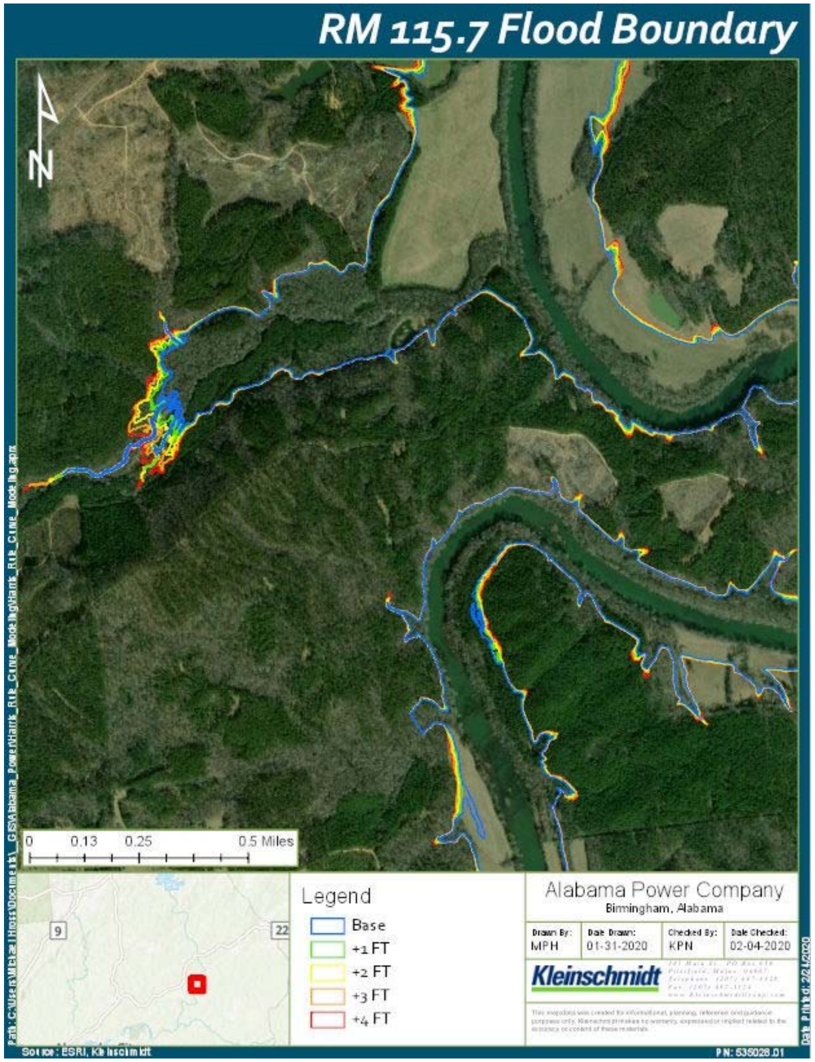


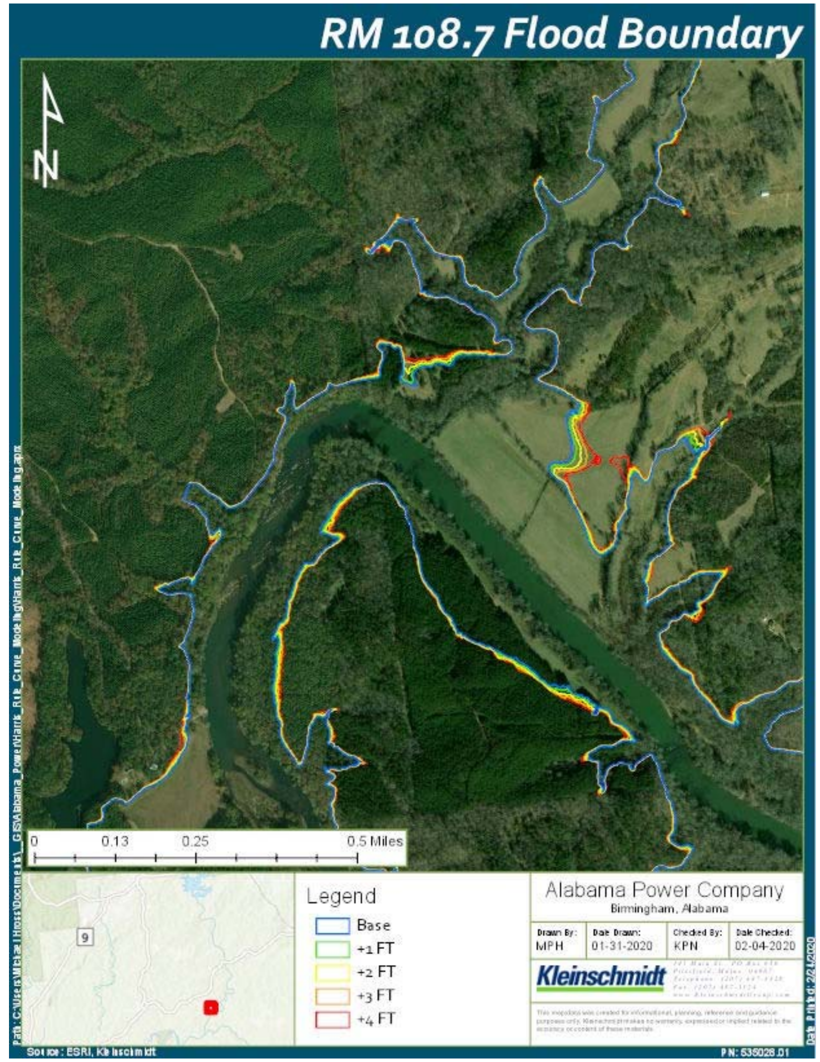
RM 129.7 (Malone) Flood Boundary



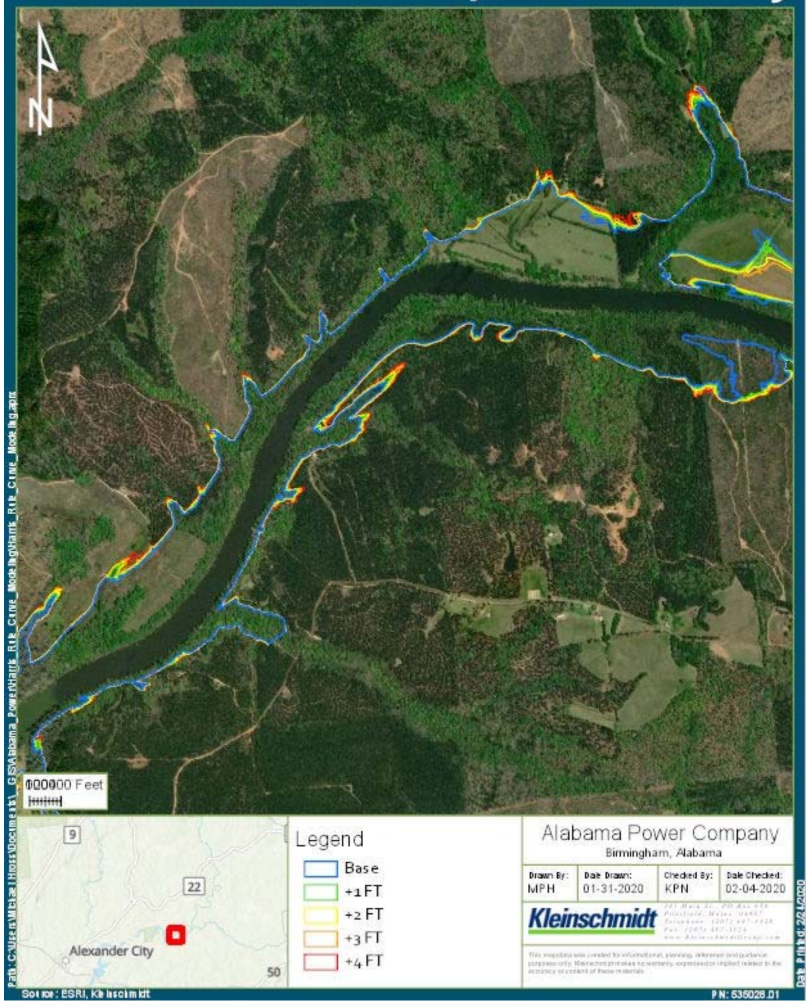
RM 122.7 (Wadley) Flood Boundary



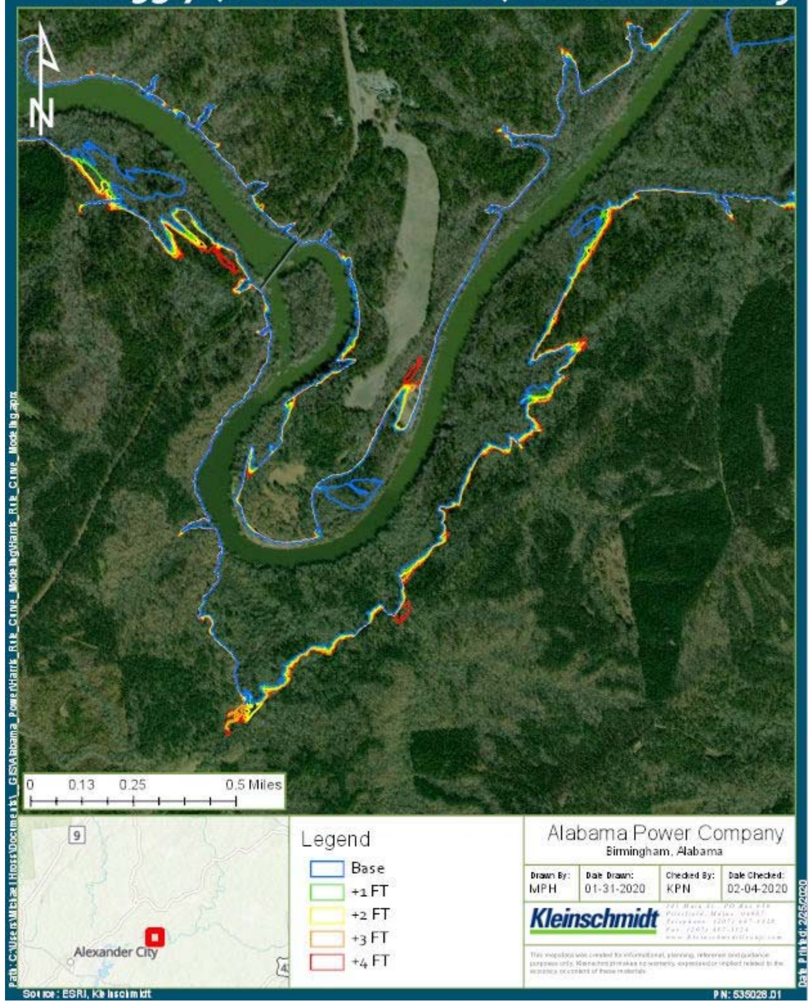

RM 115.7 Flood Boundary
N
0 0.13 0.25 0.5 Miles
9
22
Legend
Base
+1 FT
+2 FT
+3 FT
+4 FT
Alabama Power Company
Birmingham, Alabama
Drawn By: MPH
Date Drawn: 01-31-2020
Checked By: KPN
Date Checked: 02-04-2020
Kleinschmidt
Source: ESRI, Kleinschmidt
PN: 535028.01


RM 108.7 Flood Boundary
N
0 0.13 0.25 0.5 Miles
9
Legend
Base
+1 FT
+2 FT
+3 FT
+4 FT
Alabama Power Company
Birmingham, Alabama
Drawn By: MPH
Date Drawn: 01-31-2020
Checked By: KPN
Date Checked: 02-04-2020
Kleinschmidt
Source: ESRI, Kleinschmidt
PN: 535028.01

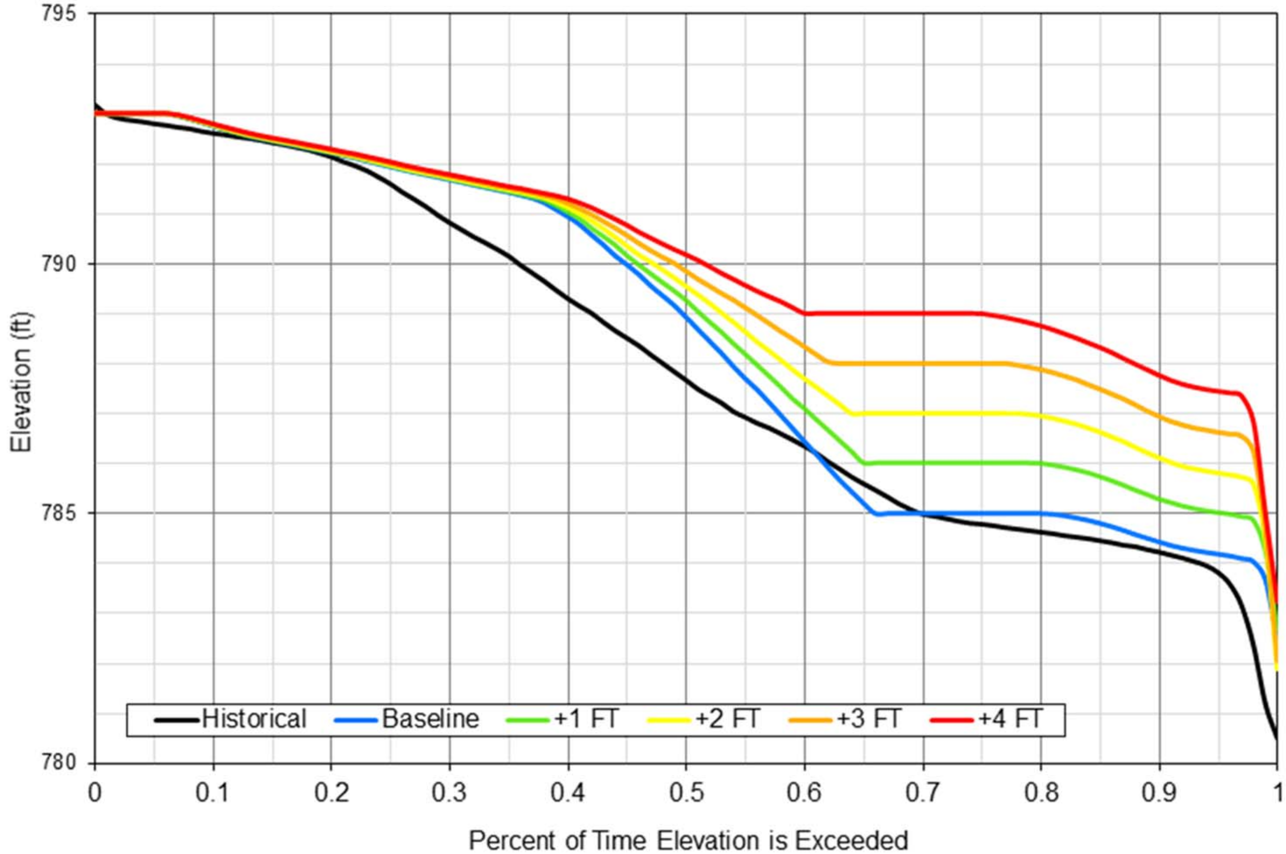
RM 101.7 Flood Boundary



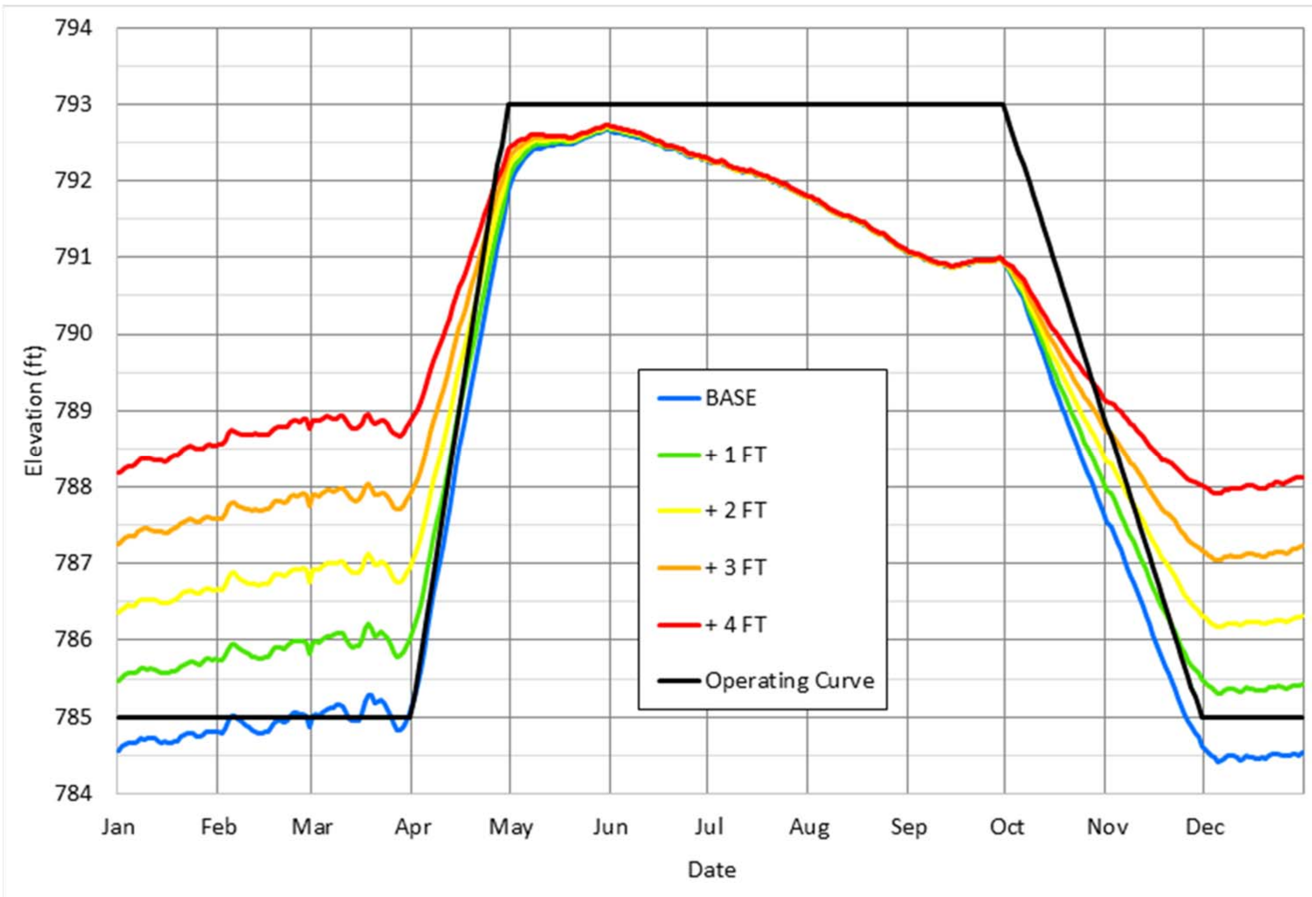
RM 93.7 (Horseshoe Bend) Flood Boundary



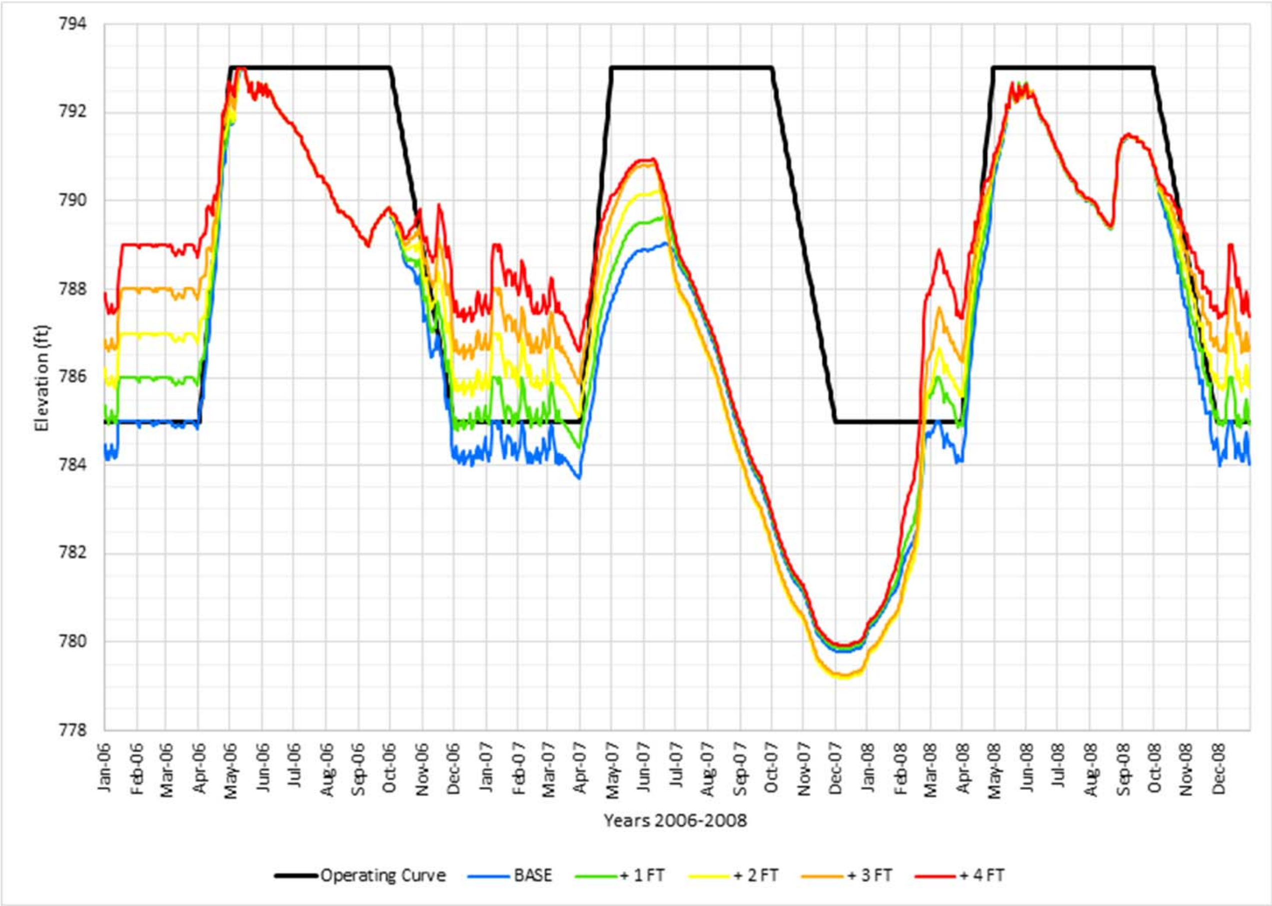
Annual stage duration-frequency curve



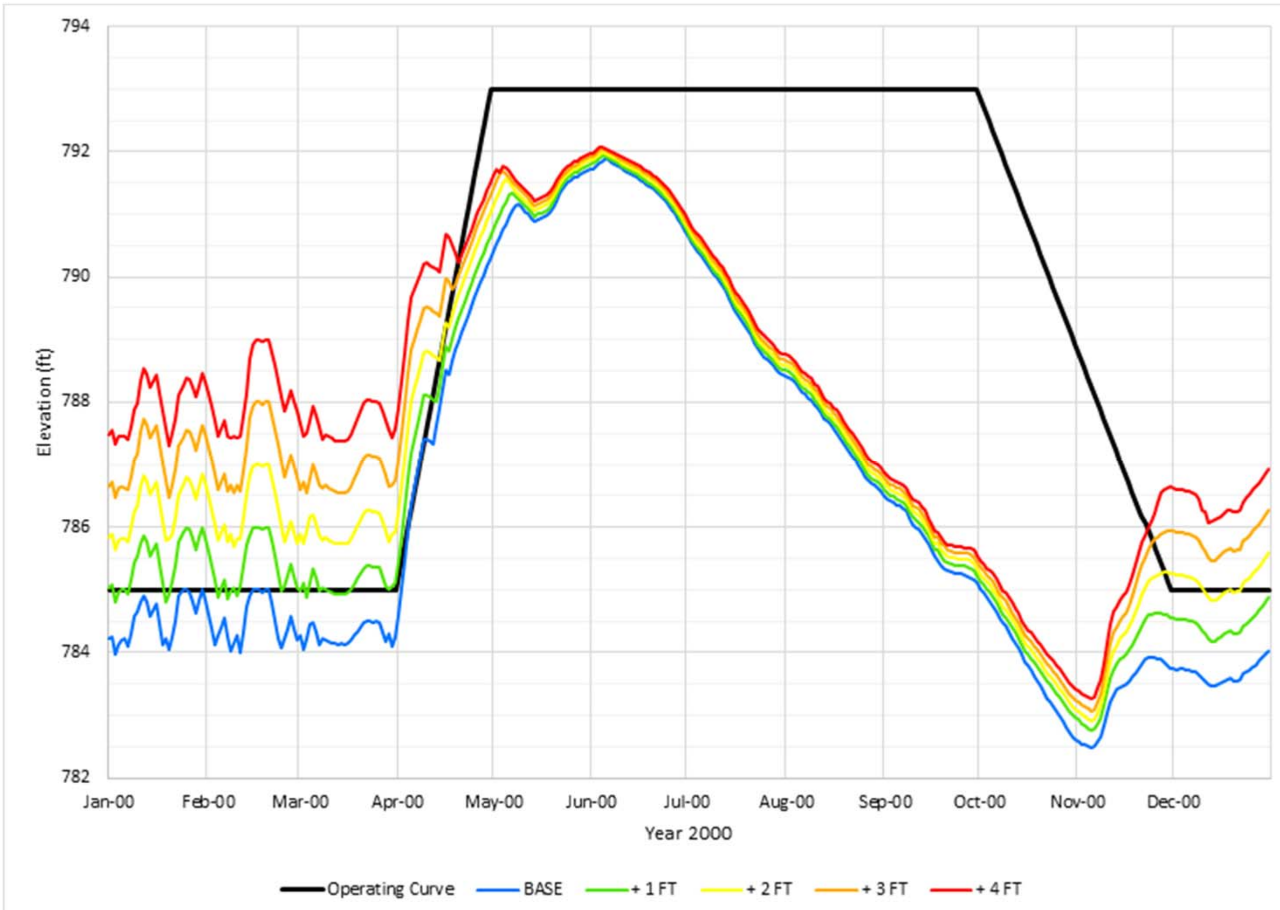
Average Daily Elevations



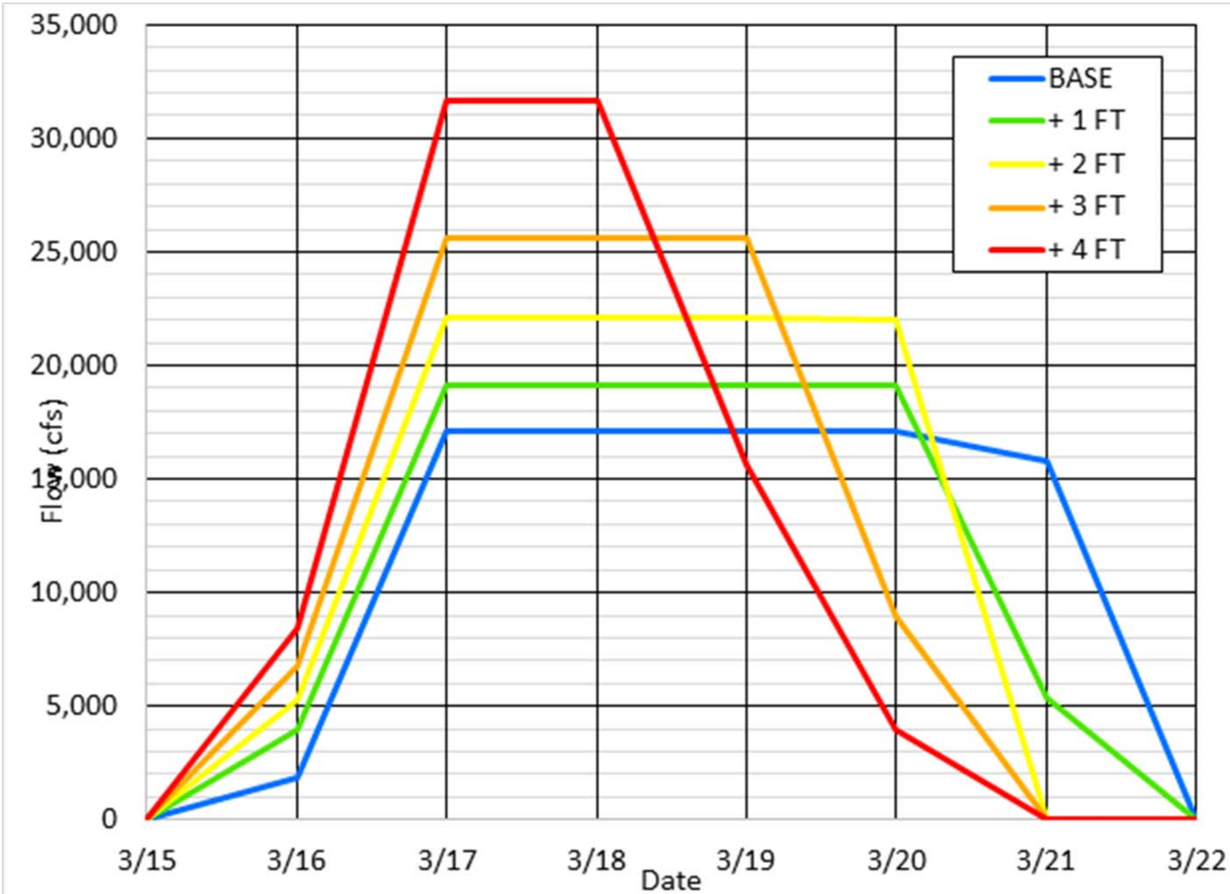
?????? (still working on this one) Drought



Effects of winter pool increases in 2000



Change in magnitude and duration of release for modeled 1990 spill event



Effects on Navigation

PERCENTAGE OF TIME IN EACH NAVIGATION LEVEL					
Navigation Channel Depth	**Baseline (785 ft msl)**	**+1 foot**	**+2 feet**	**+3 feet**	**+4 feet**
9.0 ft	73%	73%	73%	73%	73%
7.5 ft	6%	6%	6%	6%	6%
None	21%	21%	21%	21%	21%

Effects on Drought Operations

PERCENT OF TIME IN EACH DROUGHT INTENSITY LEVEL (DIL)					
DIL	**Baseline (785 ft msl)**	**+ 1 foot**	**+ 2 feet**	**+ 3 feet**	**+ 4 feet**
0	81%	81%	81%	81%	81%
1	13%	13%	13%	13%	14%
2	4%	4%	4%	4%	4%
3	1%	1%	1%	1%	1%

Effects on Downstream Release and Green Plan Flows

-- changes are negligible

Alabama Power

From:	Hathorn, James E Jr CIV USARMY CESAM (US)
To:	Anderegg, Angela Segars
Cc:	Peeples, Alan L.; Odom, Kenneth; Graham, Stacey A.; Harvey, Randall B CIV USARMY CESAM (USA)
Subject:	RE: Corps presentation
Date:	Thursday, April 16, 2020 1:59:33 PM

EXTERNAL MAIL: Caution Opening Links or Files

Hey Angie,

Thank you for the responses and additional information. I will let you know if I have any follow-up questions or data request.

Have a great day!

James

From: Anderegg, Angela Segars [mailto:ARSEGARS@southernco.com]
Sent: Thursday, April 16, 2020 1:05 PM
To: Hathorn, James E Jr CIV USARMY CESAM (US) <James.E.Hathorn.Jr@usace.army.mil>
Cc: Peeples, Alan L. <ALPEEPLE@southernco.com>; Odom, Kenneth <KODOM@SOUTHERNCO.COM>; Graham, Stacey A. <SGRAHAM@SOUTHERNCO.COM>; Harvey, Randall B CIV USARMY CESAM (USA) <Randall.B.Harvey@usace.army.mil>
Subject: [Non-DoD Source] RE: Corps presentation

Hi James,

Below are answers for your questions. Please let me know if you have anything else.

Thanks!

Slide 2 – What is the year of the calibration? This is from the May 2013 event.

Slide 16, 17, 18 – Is it possible to add APC flowage easement and the FEMA 100yr & 500yr FIRM mapping layers? Alabama Power does not have any easements or flowage rights below Harris Dam (not until you get to the top of Martin). The 100-year flood elevation downstream of Harris Dam is an approximation. No hydraulic study has been performed and no base flood elevations or flood depths are shown on the FEMA maps. There is also no defined 500-year flood elevation downstream of Harris to include in the mapping layers.

Will USACE have an opportunity to review the ResSim/RAS hourly and daily models along with the output? Yes, the models and output will be made available to all stakeholders.

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From: Hathorn, James E Jr CIV USARMY CESAM (US) <James.E.Hathorn.Jr@usace.army.mil>
Sent: Tuesday, April 14, 2020 6:41 PM
To: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Cc: Peeples, Alan L. <ALPEEPLE@southernco.com>; Odom, Kenneth <KODOM@SOUTHERNCO.COM>; Graham, Stacey A. <SGRAHAM@SOUTHERNCO.COM>; Harvey, Randall B CIV USARMY CESAM (USA) <Randall.B.Harvey@usace.army.mil>
Subject: RE: Corps presentation

EXTERNAL MAIL: Caution Opening Links or Files

Hey Angie,

I have a few questions regarding the presentation.

Slide 2 – What is the year of the calibration?
Slide 16, 17, 18 – Is it possible to add APC flowage easement and the FEMA 100yr & 500yr FIRM mapping layers?

Will USACE have an opportunity to review the ResSim/RAS hourly and daily models along with the output?

James Hathorn, Jr
Chief, Water Management Section
US Army Corps of Engineers, Mobile District
Office: 251-690-2730
Cell: 251-509-5368
Email: james.e.hathorn.jr@usace.army.mil
Web: Blockedwww.sam.usace.army.mil [sam.usace.army.mil]

Essayons!

From: Anderegg, Angela Segars [mailto:ARSEGARS@southernco.com]
Sent: Tuesday, April 14, 2020 10:54 AM
To: Hathorn, James E Jr CIV USARMY CESAM (US) <James.E.Hathorn.Jr@usace.army.mil>
Cc: Peeples, Alan L. <ALPEEPLE@southernco.com>; Odom, Kenneth <KODOM@SOUTHERNCO.COM>; Graham, Stacey A. <SGRAHAM@SOUTHERNCO.COM>
Subject: [Non-DoD Source] FW: Corps presentation

Hi James,

Attached is the presentation from our March 17th conference call. The Initial Study Report for Harris relicensing, along with the draft Operating Curve Change Feasibility Analysis Report was filed with FERC last Friday. The Initial Study Report meeting is coming up on April 28th. Hope you can join us.

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

Harris relicensing stakeholders,

Pursuant to FERC's Integrated Licensing Process, Alabama Power filed its Harris Project Initial Study Report (ISR) today. Concurrent with the ISR filing, Alabama Power filed six draft study reports and two cultural resources documents, including consultation records for each. Stakeholders may access the ISR and the draft study reports on FERC's website (BlockedBlockedhttp://www.ferc.gov) by going to the "eLibrary" link and entering the docket number (P-2628). The ISR and study reports are also available on the Project relicensing website at BlockedBlockedhttps://harrisrelicensing.com.

The Initial Study Report meeting will be held on **April 28, 2020**. Please hold this date from 9:00 am to 4:00 pm central time. A few days before the meeting I will send final call-in information and instructions, the agenda, and the presentations we will be reviewing during the meeting.

Alabama Power will file a summary of the ISR meeting by **May 12, 2020**. Comments on the ISR and ISR meeting summary should be submitted to FERC by **June 11, 2020**.

Comments on the draft study reports should be submitted to Alabama Power at harrisrelicensing@southernco.com by **June 11, 2020**.

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From: APC Harris Relicensing
To: "harrisrelicensing@southernco.com"
Bcc: 1942jthompson420@gmail.com; 9sling@charter.net; alcondir@aol.com; allan.creamer@ferc.gov; alpeeple@southernco.com; amanda.fleming@kleinschmidtgroup.com; amanda.mcbride@ahc.alabama.gov; amccartn@blm.gov; ammcvica@southernco.com; amy.silvano@dcnr.alabama.gov; andrew.nix@dcnr.alabama.gov; arsegars@southernco.com; athall@fujifilm.com; aubie84@yahoo.com; awhorton@corblu.com; bart_roby@msn.com; baxterchip@yahoo.com; bboozer6@gmail.com; bdavis081942@gmail.com; beckyrainwater1@yahoo.com; bill_pearson@fws.gov; blacklake20@gmail.com; blm_es_inquiries@blm.gov; bob.stone@smimail.net; bradandsue795@gmail.com; bradfordt71@gmail.com; brian.atkins@adeca.alabama.gov; bruce.bradford@forestry.alabama.gov; bsmith0253@gmail.com; butchjackson60@gmail.com; bwhaley@randolphcountyeda.com; carolbuggknight@hotmail.com; celestine.bryant@actribe.org; cengstrom@centurytel.net; ceo@jcchamber.com; cggoodma@southernco.com; cgnav@uscg.mil; chad@cleburnecountychamber.com; chandlermary937@gmail.com; chiefknight2002@yahoo.com; chimneycove@gmail.com; chris.goodell@kleinschmidtgroup.com; chris.greene@dcnr.alabama.gov; chris.smith@dcnr.alabama.gov; chris@alaudubon.org; chuckdenman@hotmail.com; clark.maria@epa.gov; claychamber@gmail.com; clint.lloyd@auburn.edu; cljohnson@adem.alabama.gov; clowry@alabamarivers.org; cmnix@southernco.com; coetim@aol.com; colin.dinken@kleinschmidtgroup.com; cooper.jamal@epa.gov; coty.brown@alea.gov; craig.litteken@usace.army.mil; crystal.davis@adeca.alabama.gov; crystal.lakewedoweedocks@gmail.com; crystal@hunterbend.com; dalerose120@yahoo.com; damon.abernethy@dcnr.alabama.gov; dbronson@charter.net; dcnr.wffdirector@dcnr.alabama.gov; decker.chris@epa.gov; devridr@auburn.edu; dfarr@randolphcountyalabama.gov; dhayba@usgs.gov; djmoore@adem.alabama.gov; dkanders@southernco.com; dolmoore@southernco.com; donnamat@aol.com; doug.deaton@dcnr.alabama.gov; dpreston@southernco.com; drheinzen@charter.net; ebt.drt@numail.org; eilandfarm@aol.com; el.brannon@yahoo.com; elizabeth-toombs@cherokee.org; emathews@aces.edu; eric.sipes@ahc.alabama.gov; evan.lawrence@dcnr.alabama.gov; evan_collins@fws.gov; eveham75@gmail.com; fal@adem.alabama.gov; fredcanoes@aol.com; gardenergirl04@yahoo.com; garyprice@centurytel.net; gene@wedoweelakehomes.com; georgettraylor@centurylink.net; gerryknight77@gmail.com; gfhorn@southernco.com; gjobsis@americanrivers.org; gld@adem.alabama.gov; glea@wgsarrell.com; gordon.lisa-perras@epa.gov; goxford@centurylink.net; granddadth@windstream.net; harry.merrill47@gmail.com; helen.greer@att.net; henry.mealing@kleinschmidtgroup.com; holliman.daniel@epa.gov; info@aeconline.com; info@tunica.org; inspector_003@yahoo.com; irapar@centurytel.net; irwiner@auburn.edu; j35sullivan@blm.gov; james.e.hathorn.jr@sam.usace.army.mil; jason.moak@kleinschmidtgroup.com; jcandler7@yahoo.com; jcarlee@southernco.com; jec22641@aol.com; jeddins@achp.gov; jefbaker@southernco.com; jeff_duncan@nps.gov; jeff_powell@fws.gov; jennifer.l.jacobson@usace.army.mil; jennifer_grunewald@fws.gov; jerrelshell@gmail.com; jessecunningham@msn.com; jfcrew@southernco.com; jhancock@balch.com; jharjo@alabama-quassarte.org; jhaslbauer@adem.alabama.gov; jhouser@osiny.org; jkwdurham@gmail.com; jlowe@alabama-quassarte.org; jnyerby@southernco.com; joan.e.zehrt@usace.army.mil; john.free@psc.alabama.gov; johndiane@sbcglobal.net; jonas.white@usace.army.mil; josh.benefield@forestry.alabama.gov; jpsparrow@att.net; jsrasber@southernco.com; jthacker@southernco.com; jthroneberry@tnc.org; judymcrealtor@gmail.com; jwest@alabamarivers.org; kajumba.ntale@epa.gov; karen.brunso@chickasaw.net; kate.cosnahan@kleinschmidtgroup.com; kcarleton@choctaw.org; kechandl@southernco.com; keith.gauldin@dcnr.alabama.gov; keith.henderson@dcnr.alabama.gov; kelly.schaeffer@kleinschmidtgroup.com; ken.wills@jcdh.org; kenbarnes01@yahoo.com; kenneth.boswell@adeca.alabama.gov; kmhunt@maxxsouth.net; kmo0025@auburn.edu; kodom@southernco.com; kpritchett@ukb-nsn.gov; kristina.mullins@usace.army.mil; lakewedoweedocks@gmail.com; leeanne.wofford@ahc.alabama.gov; leon.m.cromartie@usace.army.mil; leopoldo_miranda@fws.gov; lewis.c.sumner@usace.army.mil; lgallen@balch.com; lgarland68@aol.com; lindastone2012@gmail.com; llangley@coushattatribela.org; lovvornt@randolphcountyalabama.gov; lswinsto@southernco.com; lth0002@auburn.edu; mark@americanwhitewater.org; matt.brooks@alea.gov; matthew.marshall@dcnr.alabama.gov; mayo.lydia@epa.gov; mcoker@southernco.com; mcw0061@aces.edu; mdollar48@gmail.com; meredith.h.ladart@usace.army.mil; mhpwedowee@gmail.com; mhunter@alabamarivers.org; michael.w.creswell@usace.army.mil; midwaytreasures@bellsouth.net; mike.holley@dcnr.alabama.gov; mitchell.reid@tnc.org; mlen@adem.alabama.gov; mnedd@blm.gov; monte.terhaar@ferc.gov; mooretn@auburn.edu; mprandolphwater@gmail.com; nancyburnes@centurylink.net; nanferebee@juno.com; nathan.aycock@dcnr.alabama.gov; orr.chauncey@epa.gov; pace.wilber@noaa.gov; partnersinfo@wwfus.org; patti.powell@dcnr.alabama.gov; patty@ten-o.com; paul.trudine@gmail.com; ptrammell@reddyice.com; publicaffairs@doc.gov; rachel.mcnamara@ferc.gov; raebutler@mcn-nsn.gov; rancococ@teleclipse.net; randall.b.harvey@usace.army.mil; randy@randyrogerslaw.com; randy@wedoweemarine.com; rbmorris222@gmail.com; rcodydeal@hotmail.com; reuteem@auburn.edu; richardburnes3@gmail.com; rick.oates@forestry.alabama.gov; rickmcwhorter723@icloud.com; rifraft2@aol.com; rjdavis8346@gmail.com; robert.a.allen@usace.army.mil; robinwaldrep@yahoo.com; roger.mcneil@noaa.gov; ron@lakewedowee.org; rosoweka@mcn-nsn.gov; russtown@nc-cherokee.com; ryan.prince@forestry.alabama.gov; sabrinawood@live.com; sandnfrench@gmail.com; sarah.salazar@ferc.gov; sbryan@pci-nsn.gov; scsmith@southernco.com; section106@mcn-nsn.gov; sforehand@russelllands.com; sgraham@southernco.com; sherry.bradley@adph.state.al.us; sidney.hare@gmail.com; simsthe@aces.edu; snelson@nelsonandco.com; sonjahollomon@gmail.com; steve.bryant@dcnr.alabama.gov; stewartjack12@bellsouth.net; straylor426@bellsouth.net; sueagnew52@yahoo.com; tdadunaway@gmail.com; thpo@pci-nsn.gov; thpo@tttown.org; timguffey@jcch.net; tlamberth@russelllands.com; tlmills@southernco.com; todd.fobian@dcnr.alabama.gov; tom.diggs@ung.edu; tom.lettieri47@gmail.com; tom.littlepage@adeca.alabama.gov; tpfreema@southernco.com; trayjim@bellsouth.net; triciastearns@gmail.com; twstjohn@southernco.com; variscom506@gmail.com; walker.mary@epa.gov; william.puckett@swcc.alabama.gov; wmcampbell218@gmail.com; wrighr2@aces.edu; wsgardne@southernco.com; wtanders@southernco.com

Subject: Harris Relicensing - Initial Study Report meeting agenda and call-in details
Date: Friday, April 24, 2020 10:23:13 AM
Attachments: 2020-04-28 ISR Meeting Agenda.doc

Good morning

Please join us for the Initial Study Report (ISR) meeting on **April 28, 2020**, **starting at 9 am central time**. The agenda for the meeting is attached. On Monday April 27th, the presentation will be made available on our website (www.harrisrelicensing.com [harrisrelicensing.com]) and distributed to stakeholders as a pdf.

If you have questions regarding the ISR that you would like Alabama Power to address during the meeting, please send your questions to harrisrelicensing@southernco.com by 4 pm on April 27th. There will also be an opportunity to ask questions during the meeting.

Below is the Skype link and call in instructions. Participating via the Skype link is preferred in order to reduce audio issues. However, if you don't have access to Skype, you can call the number below and follow along with the presentation we'll send out on April 27th.

Join Skype Meeting

To join the ISR Meeting via phone, please call (205) 257-2663 OR (404) 460-0605. At the prompt, enter conference ID 489472 followed by the pound (#) sign.

When you join the call, you will be in the virtual lobby and directed that you are waiting on the leader to admit you. As you are admitted, you will be instructed that you are now joining the meeting and that the meeting has been locked. As soon as everyone has joined, we will conduct a roll call of attendees by organization (for example, I will ask who is on the call from the Alabama Department of Conservation and Natural Resources, etc.). If you do not belong to an organization, you will be given a chance at the end of the roll call to state your name and affiliation. Once the roll call is over, your phone will be muted and the first presentation will begin. As noted above, Alabama Power will take questions following each study review and will unmute participants during that time. Once the phones are unmuted, you will have to press star 6 (*6) in order to be heard.

Please let me know if you have any questions.

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

Meeting Agenda
April 28, 2020
9:00 AM
Skype Meeting

Meeting Purpose: Review the information presented in the Initial Study Report (ISR) filed with FERC on April 10, 2020.

Welcome, Roll Call, Safety, and Agenda

HAT 6: Cultural Resources

HAT 5: Recreation Evaluation

HAT 4: Project Lands

HAT 1: Project Operations

Operating Curve Feasibility Analysis

Downstream Release Alternatives

HAT 2: Water Quality and Use

Water Quality

Erosion and Sedimentation

HAT 3: Fish and Wildlife

Threatened and Endangered Species

Downstream Aquatic Habitat

Aquatic Resources

Next Steps and Questions

From: APC Harris Relicensing
To: "harrisrelicensing@southernco.com"
Bcc: 1942jthompson420@gmail.com; 9sling@charter.net; alcondir@aol.com; allan.creamer@ferc.gov; alpeeple@southernco.com; amanda.fleming@kleinschmidtgroup.com; amanda.mcbride@ahc.alabama.gov; amccartn@blm.gov; ammcvica@southernco.com; amy.silvano@dcnr.alabama.gov; andrew.nix@dcnr.alabama.gov; arsegars@southernco.com; athall@fujifilm.com; aubie84@yahoo.com; awhorton@corblu.com; bart_roby@msn.com; baxterchip@yahoo.com; bboozer6@gmail.com; bdavis081942@gmail.com; beckyrainwater1@yahoo.com; bill_pearson@fws.gov; blacklake20@gmail.com; blm_es_inquiries@blm.gov; bob.stone@smimail.net; bradandsue795@gmail.com; bradfordt71@gmail.com; brian.atkins@adeca.alabama.gov; bruce.bradford@forestry.alabama.gov; bsmith0253@gmail.com; butchjackson60@gmail.com; bwhaley@randolphcountyeda.com; carolbuggknight@hotmail.com; celestine.bryant@actribe.org; cengstrom@centurytel.net; ceo@jcchamber.com; cggoodma@southernco.com; cgnav@uscg.mil; chad@cleburnecountychamber.com; chandlermary937@gmail.com; chiefknight2002@yahoo.com; chimneycove@gmail.com; chris.goodell@kleinschmidtgroup.com; chris.greene@dcnr.alabama.gov; chris.smith@dcnr.alabama.gov; chris@alaudubon.org; chuckdenman@hotmail.com; clark.maria@epa.gov; claychamber@gmail.com; clint.lloyd@auburn.edu; cljohnson@adem.alabama.gov; clowry@alabamarivers.org; cmnix@southernco.com; coetim@aol.com; colin.dinken@kleinschmidtgroup.com; cooper.jamal@epa.gov; coty.brown@alea.gov; craig.litteken@usace.army.mil; crystal.davis@adeca.alabama.gov; crystal.lakewedoweedocks@gmail.com; crystal@hunterbend.com; dalerose120@yahoo.com; damon.abernethy@dcnr.alabama.gov; dbronson@charter.net; dcnr.wffdirector@dcnr.alabama.gov; decker.chris@epa.gov; devridr@auburn.edu; dfarr@randolphcountyalabama.gov; dhayba@usgs.gov; djmoore@adem.alabama.gov; dkanders@southernco.com; dolmoore@southernco.com; donnamat@aol.com; doug.deaton@dcnr.alabama.gov; dpreston@southernco.com; drheinzen@charter.net; ebt.drt@numail.org; eilandfarm@aol.com; el.brannon@yahoo.com; elizabeth-toombs@cherokee.org; emathews@aces.edu; eric.sipes@ahc.alabama.gov; evan.lawrence@dcnr.alabama.gov; evan_collins@fws.gov; eveham75@gmail.com; fal@adem.alabama.gov; fredcanoes@aol.com; gardenergirl04@yahoo.com; garyprice@centurytel.net; gene@wedoweelakehomes.com; georgettraylor@centurylink.net; gerryknight77@gmail.com; gfhorn@southernco.com; gjobsis@americanrivers.org; gld@adem.alabama.gov; glea@wgsarrell.com; gordon.lisa-perras@epa.gov; goxford@centurylink.net; granddadth@windstream.net; harry.merrill47@gmail.com; helen.greer@att.net; henry.mealing@kleinschmidtgroup.com; holliman.daniel@epa.gov; info@aeconline.com; info@tunica.org; inspector_003@yahoo.com; irapar@centurytel.net; irwiner@auburn.edu; j35sullivan@blm.gov; james.e.hathorn.jr@sam.usace.army.mil; jason.moak@kleinschmidtgroup.com; jcandler7@yahoo.com; jcarlee@southernco.com; jec22641@aol.com; jeddins@achp.gov; jefbaker@southernco.com; jeff_duncan@nps.gov; jeff_powell@fws.gov; jennifer.l.jacobson@usace.army.mil; jennifer_grunewald@fws.gov; jerrelshell@gmail.com; jessecunningham@msn.com; jfcrew@southernco.com; jhancock@balch.com; jharjo@alabama-quassarte.org; jhaslbauer@adem.alabama.gov; jhouser@osiny.org; jkwdurham@gmail.com; jlowe@alabama-quassarte.org; jnyerby@southernco.com; joan.e.zehrt@usace.army.mil; john.free@psc.alabama.gov; johndiane@sbcglobal.net; jonas.white@usace.army.mil; josh.benefield@forestry.alabama.gov; jpsparrow@att.net; jsrasber@southernco.com; jthacker@southernco.com; jthroneberry@tnc.org; judymcrealtor@gmail.com; jwest@alabamarivers.org; kajumba.ntale@epa.gov; karen.brunso@chickasaw.net; kate.cosnahan@kleinschmidtgroup.com; kcarleton@choctaw.org; kechandl@southernco.com; keith.gauldin@dcnr.alabama.gov; keith.henderson@dcnr.alabama.gov; kelly.schaeffer@kleinschmidtgroup.com; ken.wills@jcdh.org; kenbarnes01@yahoo.com; kenneth.boswell@adeca.alabama.gov; kmhunt@maxxsouth.net; kmo0025@auburn.edu; kodom@southernco.com; kpritchett@ukb-nsn.gov; kristina.mullins@usace.army.mil; lakewedoweedocks@gmail.com; leeanne.wofford@ahc.alabama.gov; leon.m.cromartie@usace.army.mil; leopoldo_miranda@fws.gov; lewis.c.sumner@usace.army.mil; lgallen@balch.com; lgarland68@aol.com; lindastone2012@gmail.com; llangley@coushattatribela.org; lovvornt@randolphcountyalabama.gov; lswinsto@southernco.com; lth0002@auburn.edu; mark@americanwhitewater.org; matt.brooks@alea.gov; matthew.marshall@dcnr.alabama.gov; mayo.lydia@epa.gov; mcoker@southernco.com; mcw0061@aces.edu; mdollar48@gmail.com; meredith.h.ladart@usace.army.mil; mhpwedowee@gmail.com; mhunter@alabamarivers.org; michael.w.creswell@usace.army.mil; midwaytreasures@bellsouth.net; mike.holley@dcnr.alabama.gov; mitchell.reid@tnc.org; mlen@adem.alabama.gov; mnedd@blm.gov; monte.terhaar@ferc.gov; mooretn@auburn.edu; mprandolphwater@gmail.com; nancyburnes@centurylink.net; nanferebee@juno.com; nathan.aycock@dcnr.alabama.gov; orr.chauncey@epa.gov; pace.wilber@noaa.gov; partnersinfo@wwfus.org; patti.powell@dcnr.alabama.gov; patty@ten-o.com; paul.trudine@gmail.com; ptrammell@reddyice.com; publicaffairs@doc.gov; rachel.mcnamara@ferc.gov; raebutler@mcn-nsn.gov; rancococ@teleclipse.net; randall.b.harvey@usace.army.mil; randy@randyrogerslaw.com; randy@wedoweemarine.com; rbmorris222@gmail.com; rcodydeal@hotmail.com; reuteem@auburn.edu; richardburnes3@gmail.com; rick.oates@forestry.alabama.gov; rickmcwhorter723@icloud.com; rifraft2@aol.com; rjdavis8346@gmail.com; robert.a.allen@usace.army.mil; robinwaldrep@yahoo.com; roger.mcneil@noaa.gov; ron@lakewedowee.org; rosoweka@mcn-nsn.gov; russtown@nc-cherokee.com; ryan.prince@forestry.alabama.gov; sabrinawood@live.com; sandnfrench@gmail.com; sarah.salazar@ferc.gov; sbryan@pci-nsn.gov; scsmith@southernco.com; section106@mcn-nsn.gov; sforehand@russelllands.com; sgraham@southernco.com; sherry.bradley@adph.state.al.us; sidney.hare@gmail.com; simsthe@aces.edu; snelson@nelsonandco.com; sonjahollomon@gmail.com; steve.bryant@dcnr.alabama.gov; stewartjack12@bellsouth.net; straylor426@bellsouth.net; sueagnew52@yahoo.com; tdadunaway@gmail.com; thpo@pci-nsn.gov; thpo@tttown.org; timguffey@jcch.net; tlamberth@russelllands.com; tlmills@southernco.com; todd.fobian@dcnr.alabama.gov; tom.diggs@ung.edu; tom.lettieri47@gmail.com; tom.littlepage@adeca.alabama.gov; tpfreema@southernco.com; trayjim@bellsouth.net; triciastearns@gmail.com; twstjohn@southernco.com; variscom506@gmail.com; walker.mary@epa.gov; william.puckett@swcc.alabama.gov; wmcampbell218@gmail.com; wrighr2@aces.edu; wsgardne@southernco.com; wtanders@southernco.com

Subject: FW: Harris Relicensing - Initial Study Report meeting agenda and call-in details
Date: Monday, April 27, 2020 9:50:21 AM
Attachments: 2020-04-28 ISR Meeting Agenda.doc
2020-4-28 Harris Relicensing - Initial Study Report Meeting presentation.pdf

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Good morning,

Attached is the presentation for tomorrow's Initial Study Report meeting. This presentation can also be found on the relicensing website: www.harrisrelicensing.com.

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From: APC Harris Relicensing
Sent: Friday, April 24, 2020 10:24 AM
To: 'harrisrelicensing@southernco.com' <harrisrelicensing@southernco.com>
Subject: Harris Relicensing - Initial Study Report meeting agenda and call-in details

Good morning

Please join us for the Initial Study Report (ISR) meeting on **April 28, 2020**, **starting at 9 am central time**. The agenda for the meeting is attached. On Monday April 27th, the presentation will be made available on our website (www.harrisrelicensing.com [harrisrelicensing.com]) and distributed to stakeholders as a pdf.

If you have questions regarding the ISR that you would like Alabama Power to address during the meeting, please send your questions to harrisrelicensing@southernco.com by 4 pm on April 27th. There will also be an opportunity to ask questions during the meeting.

Below is the Skype link and call in instructions. Participating via the Skype link is preferred in order to reduce audio issues. However, if you don't have access to Skype, you can call the number below and follow along with the presentation we'll send out on April 27th.

Join Skype Meeting

To join the ISR Meeting via phone, please call (205) 257-2663 OR (404) 460-0605. At the prompt, enter conference ID 489472 followed by the pound (#) sign.

When you join the call, you will be in the virtual lobby and directed that you are waiting on the leader to admit you. As you are admitted, you will be instructed that you are now joining the meeting and that the meeting has been locked. As soon as everyone has joined, we will conduct a roll call of attendees by organization (for example, I will ask who is on the call from the Alabama Department of Conservation and Natural Resources, etc.). If you do not belong to an organization, you will be given a chance at the end of the roll call to state your name and affiliation. Once the roll call is over, your phone will be muted and the first presentation will begin. As noted above, Alabama Power will take questions following each study review and will unmute participants during that time. Once the phones are unmuted, you will have to press star 6 (*6) in order to be heard.

Please let me know if you have any questions.

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From:	Sarah Salazar
To:	Anderegg, Angela Segars
Cc:	Allan Creamer; Rachel McNamara; Monte Terhaar (CTR)
Subject:	RE: Harris Relicensing - Initial Study Report meeting agenda and call-in details
Date:	Monday, April 27, 2020 5:21:04 PM
Attachments:	FERC-prelim-ISR-Comments+Questions_4-27-20.docx

EXTERNAL MAIL: Caution Opening Links or Files

Hi Angie,

Thanks for the information below about the Skype option for the meeting and for the call back today. As I mentioned, I'm forwarding the attached list of some preliminary (informal) questions we put together for the ISR mtg. tomorrow. We didn't label whose questions they were, but they are generally grouped by study report/topic. So for the most part the questions originate from our team member who is covering that resource area during relicensing. Feel free to call me tomorrow before the meeting if you have any follow-up questions or concerns.

Thanks again,

Sarah L. Salazar ✧ *Environmental Biologist* ✧ *Federal Energy Regulatory Commission* ✧ *888 First St, NE, Washington, DC 20426* ✧ *(202) 502-6863* **Please consider the environment before printing this email.**

From: APC Harris Relicensing <g2apchr@southernco.com>
Sent: Monday, April 27, 2020 10:51 AM
To: APC Harris Relicensing <g2apchr@southernco.com>
Subject: FW: Harris Relicensing - Initial Study Report meeting agenda and call-in details

Good morning,

Attached is the presentation for tomorrow's Initial Study Report meeting. This presentation can also be found on the relicensing website: www.harrisrelicensing.com [harrisrelicensing.com].

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From: APC Harris Relicensing
Sent: Friday, April 24, 2020 10:24 AM
To: 'harrisrelicensing@southernco.com' <harrisrelicensing@southernco.com>
Subject: Harris Relicensing - Initial Study Report meeting agenda and call-in details

Good morning

Please join us for the Initial Study Report (ISR) meeting on **April 28, 2020, starting at 9 am central time**. The agenda for the meeting is attached. On Monday April 27th, the presentation will be made available on our website (www.harrisrelicensing.com [harrisrelicensing.com]) and distributed to stakeholders as a pdf.

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Please let me know if you have any questions.

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

4/27/20

R.L. Harris Initial Study Report (ISR):

FERC Licensing Team's Preliminary Comments and Questions

General Comments and Questions:

1. Comments on all the studies should be filed with the Commission by 6/11/20, as stated in the cover letter of the ISR, and not (solely) sent directly to Alabama Power via email, as stated in the cover letters of the Draft Downstream Release Alternatives Phase 1 Report, Draft Operating Curve Change Feasibility Analysis Phase 1 Report, Draft Erosion and Sedimentation Study Report, Draft Water Quality Study Report, Draft T&E Species Assessment, Draft Phase 1 Project Lands Evaluation Study Report, and the Traditional Cultural Properties Identification Plan and Inadvertent Discovery Plan.

2. Several of the studies reference the use of Geographic Information System (GIS) data. To facilitate stakeholder review and analysis of the study results it would be helpful if all GIS data collected or developed as part of the studies is filed with the study reports.

3. Please describe whether you have experienced or anticipate any delays to studies as a result of COVID-19 related closures or social distancing measures.

Draft Operating Curve Change Feasibility Analysis (Phase 1) Report:

1. As we understand it, downstream effects with regard to flooding were assessed for a 100-year design flood. However, the relationship between the downstream flow alternative analysis and the Harris Reservoir winter flood pool analysis is not clear under alternative flood scenarios. What would happen in a scenario other that a 100-year flood? Would operations at Harris Dam under the alternative flood scenario, including different flow release scenarios, have any impact on the Harris Reservoir winter pool analysis, or vice versa?

2. Table 5-2, page 51 of the report…What is it about RM 115.7 that appears to create a hydraulic control, such that the maximum increase in depth under any winter pool elevation scenario occur about mid-way down the Tallapoosa River?

3. Figures 5-20 and 5-21 appear incomplete, as they only show the results for one alternative…baseline (? based on color). Please address this apparent omission.

Draft Downstream Release Alternatives (Phase 1) Report:

1. Modeling scenarios…as it stands now, the report presents the results for three downstream release alternatives: Pre-Green Plan operation, Green Plan operation, and Pre-Green Plan operation with a 150 cfs continuous minimum flow. Why was modelling of minimum flow limited to 150 cfs? Also, have you considered modeling Green Plan releases with continuous minimum flow scenarios? On what basis did you choose not to do so?

Draft Erosion and Sedimentation Report:

1. Section 5.0, Discussion and Conclusions states that at some sites, "land clearing and landscaping, and other construction activities affecting runoff towards the reservoir" cause erosion. Is it possible to provide areal images showing the areas of active erosion in relation to the project boundary as part of the final study report?

2. Appendix D – photos…it would be helpful if the captions for the photos included better location descriptors (e.g., Harris Reservoir, Harris Reservoir-?? Embayment, Harris Reservoir-?? River Arm, Tallapoosa River, etc.). For the Harris Reservoir sites, it would be helpful if the contours within which peaking operations occur (lake fluctuation zone) could be identified.

3. Could you make the video footage that was collected as part of this study available for stakeholders to view?

4. Will the nuisance aquatic vegetation surveys still be possible to conduct in Lake Harris this summer?

5. On page 24, in section 3.2, the report includes the following statement: "A total of 20 sites, rather than 15 sites, were provided for the left bank segments as many segments were tied with a score of (slightly impaired)." Please explain what is meant by many of the streambank segments being "tied with a score of (slightly impaired" and clarify the relationship between the number of streambank segments/sites and the bank condition score.

6. On page 25, in Table 3-2, shouldn't the heading/label of the first column of the table be "Site Number" instead of "Rank" given that the rank options are only 1 through 5 (according to Table 3-1) and there appear to be 20 sites?

7. On page 11, of the Tallapoosa River High Definition Stream Survey Final Report (Appendix E of the Erosion and Sedimentation Study Report), it states that prior to the survey, flows were monitored to ensure relatively normal flow conditions

during the survey. For clarity, what were the “relatively normal flow conditions” during the survey? Were they slightly higher or lower than average?

8. In Figures 13 and 16 of the Tallapoosa River High Definition Stream Survey Final Report, the scale is small and so it appears that most of the riverbanks are unmodified and the modified banks identified on the individual site surveys are not visible. It would be helpful if the figures in the report showed labeled points for the erosion/sedimentation sites that are identified in the report.

9. Page 20 of Tallapoosa River High Definition Stream Survey Final Report states that a confidence rating was used to indicate the clarity of the streambanks in the video and figures 14 and 17 of that report show areas where the video clarity was impaired and therefore the confidence in the accuracy of the streambank conditions/classifications is lower. As stated above, it would be helpful if the figures in the report showed labeled points for the erosion/sedimentation sites that are identified in the report. Do any of the areas with impaired video clarity coincide with areas that stakeholders identified as erosion/sedimentation sites or other sites that Alabama Power identified as part of this study? Do you intend to take any steps to deal with the impaired clarity data? Is so, how?

10. In Figure 18 of the Tallapoosa River High Definition Stream Survey Final Report, there appears to be a missing ranking at river mile 37 for the right streambank. Could you explain this gap in the ranking?

11. For Figures 20 through 23 of the Tallapoosa River High Definition Stream Survey Final Report, please label the river mile ranges on the maps to help reviewers understand the starting and ending points of the study area and which segments of river are included.

12. In Figure 26 of the Tallapoosa River High Definition Stream Survey Final Report, please move the scale bar and sources so that they are not covering the river segment and bank conditions at the bottom of the map.

13. Can you identify where peaking pulses are attenuated downstream from Harris Dam under the current operating regime and volume of typical downstream releases? If so, are there any patterns in the downstream streambank conditions and observed levels of erosion along the segments of streambanks within the attenuation zone? Where are the identified erosion sites in relation to the length of the attenuation zone?

Draft Water Quality Report:

1. Page 18…figure 3-8…please explain what is happening with the vertical DO profiles where DO increases in May, June, July, and August, where otherwise the DO should be declining.

2. Page 23 discusses Alabama DEM monitoring data for the Harris Dam tailrace (i.e., immediately downstream from Harris Dam). Was this data collected during generation, or does it also reflect non-generation periods?

3. Pages 39-41 present DO and temperature data for downstream continuous water quality monitoring station. On page 16 of the ISR, Alabama Power is not proposing any additional monitoring beyond what was approved in the Commission's SPD. Why is there not a second year of monitoring for the downstream continuous monitoring station? How confident are Alabama Power and the HAT2 members that 1 year of monitoring at the downstream station includes a worst-case scenario?

Draft T&E Species Report:

1. Have the GIS overlays of T&E species habitat information and maps been completed (i.e., the map figures in Appendix B of the draft T&E species study report)? Or are there still steps to complete this component of the study?

   We suggest including project features, recreation areas, and other managed areas (e.g., timber harvest areas, wildlife management areas, etc.) on the T&E species maps in order to help determine the proximity of species ranges/habitats to project-related activities and identify the need for species-specific field surveys.

2. While the draft T&E species study report indicates that additional field surveys for the fine-lined pocketbook freshwater mussel are planned for May 2020, the report does not include a description of the criteria used to determine which of the species on FWS's official (IPaC) list of T&E species would be surveyed in the field. Please describe which species will be surveyed in the field and explain how and why they were selected. In addition, please describe any correspondence Alabama Power has had with FWS and state agencies regarding the T&E species selected for additional field surveys.

3. Page 7 lists the sources for the ESA species information. The sources included FWS's Environmental Conservation Online System (ECOS) but did not include IPaC. The official list is obtained through the IPaC report. Has an IPaC report been downloaded or are you using the IPaC report filed to the record by FERC staff?

4. Page 8 states that the existing land use data is not specific enough to determine if the 3,068 acres of coniferous forest within the project boundary at Lake Harris would be suitable for red cockaded woodpecker. How do you propose assess the suitability for red cockaded woodpecker?

5. On pages 3, 10, and 26 there is mention of additional fieldwork planned for two mussel species (i.e., fine-lined pocketbook and Southern pigtoe) for May 2020. Please elaborate on the details of the additional survey work (e.g., survey location(s), sampling protocols and methodologies employed, and clarify which species will be included in the May 2020 assessment, etc.).

6. The descriptions of Alabama lampmussel and rabbitsfoot mussel on pages 11, 13, and 14 do not provide these species' host fish species. Are the host fish species currently unknown, or was this an inadvertent omission?

7. There appears to be a typo on page 16, in the description of southern pigtoe mussel. The middle of the first paragraph refers to the glochidia of the finelined pocketbook mussel. Is this sentence misplaced, or does the information pertain to the southern pigtoe mussel (the subject of section 3.12)? Please clarify.

8. On page 19, in the first paragraph about the northern long-eared bat (NLEB), it is unclear why the discussion includes the statement about a low occurrence of this species in the "…southwestern region of Alabama" given that the project areas are located in the northeastern and mid-eastern portions of Alabama. Please clarify or correct this statement.

9. The draft T&E species study report states that there are no known NLEB hibernacula or maternity roost trees *within the project boundary*. However, it does not include information on known NLEB hibernacula *within 0.25 mile of the project boundary* and known NLEB maternity roosts *within 150 feet of the project boundary* (i.e., at Harris Lake and Skyline). In addition, the report mentions a couple of best management practices (BMPs), protective of some bat species, that Alabama Power implements during timber harvest activities and states that the BMPs have been expanded but not incorporated in the existing license. However, the report does not include the locations of Alabama Power's timber harvesting and other tree removal activities, or detailed descriptions of timber harvesting protocols and BMPs currently implemented within the project boundary. This information is important to understanding the affected environment for Indiana bat, NLEB, and/or other T&E species. This information could also be used for the streamlined consultation option for analyzing the potential project effects on NLEB (including within the buffer areas for hibernacula and maternity roost trees).

Please complete the FWS's NLEB streamlined consultation form and include it in the final T&E species study report. This form can be found at: https://www.fws.gov/southeast/pdf/guidelines/northern-long-eared-bat-streamlined-checklist.pdf. We recommend using FWS's definition of "tree removal" to guide your responses on the form (i.e., "cutting down, harvesting, destroying, trimming, or manipulating in any other way the trees, saplings, snags, or any other form of woody vegetation likely to be used by northern long-eared bats").[1]

Also, please update figures 3.14-1, 3.14-2, 3.14-3, 3.15-1, 3.15-2, and 3.15-3 which currently show "forested area" or "karst landscape" in relation to NLEB and Indiana bat habitats, to show Alabama Power's timber management areas within the project boundary, and other proposed managed areas (e.g., new/improved recreation areas, new quail management areas). This type of information is needed to meet another component of this study (i.e., "determine if [T&E species habitat at the project] are potentially impacted by Harris Project operations", as described on slide 5 of the Aug. 27, 2019, HAT 3 meeting).

10. On page 21 and 22, in section 3.17, the discussion mentions an occurrence of little amphianthus within the project boundary at Lake Harris (Flat Rock Park) that was documented in 1995 and may be extirpated. Did the botanical surveys in that area of the project target that species? The top of page 22, states that "Vernal pools were not identified due to a lack of available data." Did the botanical surveys identify vernal pools in this area?

11. On page 22, in section 3.18, the report states that the National Wetland Inventory data is not detailed enough to identify wetlands within the project area that contain white fringeless orchid's unique wetland habitat characteristics. Do you propose collecting more data on this subject?

12. On page 23, in section 3.19, the report states that the 16 extant populations of Prices' potato bean in Jackson County, occur on Sauta Cave National Wildlife Refuge, and near Little Coon Creek in the Skyline WMA. Please clarify whether or not any of the 16 populations occur within the project boundary at Skyline WMA.

13. In Appendix B, figure 3.19, showing Price's potato-bean habitat range, there is a 100-foot Stream Buffer within the Limestone Landscape layer shown on the map and legend. Please explain the significance of this buffer, including any regulatory

[1] 81 Fed. Reg. 1902 (January 14, 2016).

requirements associated with this buffer. Please include this information in the final T&E species study report.

14. In the August 27, 2019, HAT 3 meeting summary, please clarify the following:
    a. How does Alabama Power define terms such as "sensitive time periods" in the context of timber harvesting?
    b. Evan Collins, of FWS, stated that the palezone shiner may be present in some of the lower reaches of the Tennessee River tributaries. Please clarify where these tributaries are located in relation to the project boundary.

Draft Lands Evaluation (Phase 1) Report:

1. On page 9, the proposed definition for the "Recreation" classification includes a reference to permitting processes for various types of recreations activities. Will the permitting processes be updated as part of the revised SMP?

2. On page 9, the proposed definition of the "Hunting" classification includes a reference to the existing Harris Project Wildlife Mitigation Plan. How do you envision the existing Project Wildlife Mitigation Plan relating to the proposed Wildlife Management Plan that is to be developed as part of Phase 2 of the Lands Evaluation?

3. On page 9, the proposed definition of the "Natural/Undeveloped" classification mentions that one of the allowable uses would be "normal forestry management practices." Please clarify what these practices would include.

4. On page 10, there are descriptions of two new proposed land use classifications, including "Flood Storage" which would include lands between the 793 ft and 795 ft msl contours, and "Scenic Buffer Zone" which would include lands between the 795 ft and 800 ft msl contours. Would these classifications overlap with other land use classifications? Also, are there any buildings/structures currently within these elevation bands around Lake Harris?

5. Page 11 discusses the results of the desktop evaluation and site visit to identify any suitable bobwhite quail habitat within the project boundary at Skyline WMA. Could you elaborate on the methods for evaluating the availability of bobwhite quail habitat and how it was determined that no suitable habitat occurred within the project boundary at Skyline WMA? Also, could the report include a figure showing a map of the 7 locations in the Skyline WMA where Alabama DCNR conducts spring/fall quail call surveys, and has documented quails, relative to the project boundary at Skyline WMA?

6. Appendix B provides maps and general descriptions of proposed changes in land use classifications at Lake Harris that were also discussed during the 9/11/19 HAT 4 meeting. It would be helpful if the maps of the proposed changes in land use classifications included legends to identify the various classifications, as well as north arrows and scale bars to facilitate orientation and review.

   In addition, during the 9/11/19 HAT 4 meeting, we (FERC staff) asked if terrestrial and cultural resource surveys were being conducted on lands proposed for removal from the project boundary and Alabama Power staff responded that they were. Could you provide descriptions of the terrestrial and riparian habitat types for areas that you are proposing to remove from the project boundary. Could you also describe the terrestrial and riparian habitat types for area "RC4" that you propose to reclassify from "Recreation" to "Commercial Recreation"? Do these areas contain suitable habitat for any of the T&E species that may occur at the Harris Lake portion of the project? What were the results of the cultural resource surveys for areas proposed to be removed from the project boundary?

   Also, it would be helpful if the map of area A6 included the existing birding trail and the proposed extension of the trail.

7. Appendix C provides the Anniston Museum of Natural History's Flat Rock Botanical Inventory (inventory) report and the consultation record includes the Anniston Museum of Natural History's letter transmitting the report, Ken Wills' (Coordinator of the Alabama Glade Conservation Coalition) emails, along with several additional observations and recommendations from them.

   Approximately 365 plant species, including some rare species were documented at the site during the botanical inventory. The surveyors, Ken Wills, and FERC staff observed damages caused by vehicles traversing the site (SUV observed by surveyors; ATVs tire marks on granite outcrops observed by Ken Wills and FERC staff during scoping/environmental site review). The consultation record for this study includes recommendations from Anniston Museum of Natural History and Ken Wills' to manage/preserve/restore the site. The proposed definition of the "Natural/Undeveloped" classification, proposed for the rare plant site, does not indicate what types of recreation activities/vehicle access would be prohibited or how Alabama Power would manage such a site. Considering all of this, do you think that Alabama Power's proposed definition of "Natural/Undeveloped" would be effective in protecting this site? Could the definition of this classification be expanded/more detailed, or would you consider another, more protective land use classification type/designation for this site?

   Also, what has Alabama Power done to protect the rare plants that were identified during the inventory and were subsequently damaged by ongoing ATV use observed by Ken Wills? Can vehicles be excluded from these sensitive areas to protect rare plants while the relicensing process proceeds?

8. Has the request from Randolph County regarding the proposed water treatment intake/plant been resolved/processed?

Draft Inadvertent Discovery Protocol (IDP)

1. Section 2.3.1 of the IDP includes provisions for previously unidentified human remains and or historic properties.

    a. Staff recommend changing the term "historic properties" to "cultural resources" because at the time a previously-undocumented resource is discovered, it has not been assessed for eligibility for the National Register of Historic Places, and cannot, by definition, be considered a "historic property" until its eligibility is determined.

    b. Item 2.3.1(b) seems to indicate that at some point after discovery, an evaluation of eligibility for a newly discovered cultural resource will occur. The process for determining National Register-eligibility should be outlined in the plan.

Draft Traditional Cultural Property Identification Plan

2. No specific comments.

Alabama Power

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May 12, 2020

VIA ELECTRONIC FILING

Project No. 2628-065
R.L. Harris Hydroelectric Project
Initial Study Report Meeting Summary

Ms. Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street N.
Washington, DC 20426

Dear Secretary Bose,

Alabama Power Company (Alabama Power) is utilizing the Federal Energy Regulatory Commission's (FERC) Integrated Licensing Process (ILP) to complete the relicensing process for the Harris Hydroelectric Project (FERC No. 2628-065). On April 28, 2020, Alabama Power held an Initial Study Report Meeting pursuant to 18 C.F.R. Section 5.15 (c) of the ILP. Due to concerns with COVID-19, Alabama Power held the Initial Study Report meeting via conference call.

The meeting summary, including a list of attendees and the meeting presentation, is attached.

If there are any questions concerning this filing, please contact me at arsegars@southernco.com or 205-257-2251.

Sincerely,

Angela Anderegg

Angie Anderegg
Harris Relicensing Project Manager

Attachment - Initial Study Report Meeting Summary

cc: Harris Stakeholder List

Meeting Summary

Initial Study Report Meeting via Conference Call

April 28, 2020 ~ 9:00 AM to 4 PM

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APPENDICES

1 OVERVIEW

Angie Anderegg (Alabama Power) opened the Harris Project (FERC No. 2628) (Project) Initial Study Report (ISR) meeting and reviewed the ISR meeting purpose. Angie conducted a roll call, reviewed phone etiquette, and presented a safety moment. A list of participants is included in Appendix A[1]. Alabama Power presented information on the progress of each study, which included applicable study results, requested variances, and any additional studies or requested study modifications. The ISR presentation was made available to all participants on the Harris Relicensing website (www.harrisrelicensing.com) prior to the meeting and is included in this report as Appendix B.

In this ISR Meeting Summary, Alabama Power presents the questions and comments that were provided prior to and during the ISR meeting[2]. Each question or comment is followed by Alabama Power's responses and discussion in **bold** text. FERC staff as well as three stakeholders submitted written questions/comments in advance of the ISR meeting via email. Where appropriate, Alabama Power provides a full response. However, many responses to the questions will be addressed in the applicable Final Study Reports and in additional analyses (Phase 2) to be conducted in 2020/2021.

FERC staff raised three general questions in its April 27, 2020 email to Alabama Power. Alabama Power's responses to FERC's general questions are provided below.

1.1 FERC's Questions submitted in advance of the meeting

- Q1 - Comments on all the studies should be filed with the Commission by 6/11/20, as stated in the cover letter of the ISR, and not (solely) sent directly to Alabama Power via email, as stated in the cover letters of the Draft Downstream Release Alternatives Phase 1 Report, Draft Operating Curve Change Feasibility Analysis Phase 1 Report, Draft Erosion and Sedimentation Study Report, Draft Water Quality Study Report, Draft T&E Species Assessment, Draft Phase 1 Project Lands Evaluation Study Report, and the Traditional Cultural Properties Identification Plan and Inadvertent Discovery Plan.

  Alabama Power emphasized that all stakeholders should file comments with FERC on the Harris Project (P-2628-065) on or before June 11, 2020. Alabama Power also noted that if any stakeholder has a question about filing comments with FERC, they could email those questions to harrisrelicensing@southernco.com.

- Q2 - Several of the studies reference the use of Geographic Information System (GIS) data. To facilitate stakeholder review and analysis of the study results it would be helpful if all GIS data collected or developed as part of the studies is filed with the study reports.

[1] Because this meeting was conducted over Skype, there may be participants who joined after the roll call and are not listed in Appendix A.

[2] These notes summarize the major items discussed during the meeting and are not intended to be a transcript or analysis of the meeting.

Alabama Power will file GIS data, as applicable, with the Final Study reports.

- Q3 - Please describe whether you have experienced or anticipate any delays to studies as a result of COVID-19 related closures or social distancing measures.

  Alabama Power has experienced delays conducting field work and meeting with the Harris Action Teams (HATs) due to COVID-19 closures and restrictions. Alabama Power anticipates that it may be months before HATs can meet in person. However, meetings can still occur using teleconferencing.

2 CULTURAL RESOURCES PROGRAMMATIC AGREEMENT AND HISTORIC PROPERTIES MANAGEMENT PLAN STUDY

Amanda Fleming (Kleinschmidt) presented the Cultural Resources documents that were filed with the ISR: the Inadvertent Discovery Plan (IDP) and the Traditional Cultural Properties (TCP) Identification Plan. Amanda reviewed the study purpose, data collection to date, initial results, and a variance request to file the Area of Potential Effects (APE) in June 2020.

2.1 FERC's Questions submitted in advance of the meeting

- Q1 - Staff recommend changing the term "historic properties" to "cultural resources" because at the time a previously-undocumented resource is discovered, it has not been assessed for eligibility for the National Register of Historic Places, and cannot, by definition, be considered a "historic property" until its eligibility is determined.

  Alabama Power will make adjustments to the term "historic properties" and will include both the Inadvertent Discovery Plan (IDP) and Traditional Cultural Properties (TCP) Identification Plan as appendices to the Historic Properties Management Plan (HPMP).

- Q2 - Item 2.3.1(b) seems to indicate that at some point after discovery, an evaluation of eligibility for a newly discovered cultural resource will occur. The process for determining National Register-eligibility should be outlined in the plan.

  Alabama Power will add this process to the IDP. The National Register-eligibility process will also be addressed in the Historic Properties Management Plan (HPMP) being developed by Alabama Power.

- Q3 - Rachel McNamara asked about defining the area of potential effects (APE) and the possibility of extending the APE downstream. Rachel stated there is a need for more discussion.

  Alabama Power noted that it intends to schedule a Harris Action Team (HAT) 6 meeting in May to further discuss the APE.

2.2 Carol Knight's Questions submitted in advance of the meeting

- Q4 - How far down river from the dam does Alabama Power have responsibility for the river?

  Alabama Power's responsibility downstream of Harris dam is the Harris Project Boundary below the dam.

- Q5 - How far up each side of the bank does Alabama Power have below the dam?

The State of Alabama owns the river channel, and the riverbanks are private property.

- Q6 - How do they (Alabama Power) enforce their responsibilities?

  Alabama Power follows all guidelines and regulations for lands and waters within the Harris Project Boundary.

- Q7 - Are they [Alabama Power] aware of archaeological sites that are endangered below the dam? That each time they open the flood gates, erosion occurs washing away cultural remains?

  Alabama Power is reviewing potential effects of Harris Project operations on cultural resources downstream of the dam in the Tallapoosa River. However, Alabama Power cannot enforce preservation policies on private lands. If a landowner encounters a burial site, they should report it immediately to the State Historic Preservation Officer (SHPO)/Alabama Historical Commission (AHC). The SHPO or AHC can provide additional details on regulations and authority regarding archaeological properties or cultural remains.

- Q8 - Are they [Alabama Power] aware of the destruction of the fish weirs down river?

  Alabama Power is reviewing potential effects of Harris Project operations on cultural resources downstream of the dam in the Tallapoosa River. In addition, Alabama Power may work with stakeholders to develop best management practices related to cultural resources.

2.3 Participant Questions

- Q9 - Elizabeth Toombs (Cherokee Nation) **–** Do the HPMP, TCP Identification Plan, and IDP documents apply to the Skyline portion of the Project or is this limited to the reservoir?

  Yes, all of the cultural resources documents and procedures apply to all lands within the Harris Project Boundary.

3 RECREATION EVALUATION STUDY

Amanda Fleming (Kleinschmidt) presented the Recreation Evaluation Study progress. Amanda reviewed the study purpose, data collection to date, initial results, and a variance request to file the draft Recreation Evaluation Study Report in August 2020 instead of June 2020.

3.1 Donna Matthews' Questions submitted in advance of the meeting

- Q1 - Increased downstream, Alabama Power managed, public access. An impediment to public use of the river to swim, fish or float is lack of access. What plans are underway to correct this omission?

  Alabama Power is evaluating downstream use as part of the recreation study, and any additional access needs will be discussed with HAT 5 and addressed in the licensing proposal.

- Q2 - Safety from Rapid Water Level Rises. Over the last 40 years, even locals have been dissuaded from using their river because of erratic and dramatic variations in water levels. Completely aside from the issue of how unnaturally the river is distended from pre-dam normals on an hour by hour basis remains the unaddressed danger to humans recreating in/on the river during episodes of rapid water level rise. The potential threat is created by water release at the dam. APC must alert downstream subscribers of planned and imminent water release. Current cell phone technology is well suited to send safety alerts.

  Alabama Power is evaluating downstream flows and recreation use as part of the recreation evaluation study as well as gathering information/input from public access sites, downstream landowners, and Tallapoosa River users.

  Alabama Power uses the Smart Lakes App and the Alabama Power website to inform stakeholders of water releases. There are times, however, that system demands require a change in the generation schedule. Prior to any generation releases, Alabama Power sounds a notification siren. The generating units will not load unless the siren activates.

3.2 Participant Questions

- Q3 - Ken Wills (Alabama Glade Conservation Coalition) - Why was the operating schedule reduced for Flat Rock and will the operating schedule be modified in 2020 due to COVID-19?

  The operating schedule in August 2019 was condensed based on low attendance. Last year's schedule is not indicative of the 2020 summer schedule. Currently, no changes from the normal operating schedule are proposed, and the goal is to open

by Memorial Day. Alabama Power will follow all state and federal guidelines related to COVID-19.

- Q4 - Several questions and comments were raised by participants about flood control operations and water releases downstream.

  Alabama Power addresses operational questions in Section 6 of this meeting summary.

- Q5 - Keith Henderson, Alabama Department of Conservation and Natural Resources (ADCNR) - Why did the Lake Harris questionnaires start in May 2019 (rather than March 2019) and what were the four survey questions?

  In its April 2019 Study Plan Determination, FERC requested that Alabama Power add the Lake Harris questionnaire. Therefore, Alabama Power started those surveys in May 2019. The study questions are listed in Appendix C to the Recreation Evaluation Study Plan, which can be found at www.harrisrelicensing.com.

4 PROJECT LANDS EVALUATION STUDY

Kelly Schaeffer (Kleinschmidt) presented the Project Lands Phase 1 Evaluation Study Report progress. Kelly reviewed the study purpose and data collection to date, which included the development of maps showing Alabama Power's proposal to add, remove, or modify lands in the Project Boundary. Kelly also reviewed the remaining activities in this study, which include the use of other relicensing studies to develop the Phase 2 Wildlife Management Program (WMP) and the Shoreline Management Plan (SMP). Kelly noted that no variances to this study plan are requested. Alabama Power distributed the Draft Phase 1 Project Lands Evaluation Report to stakeholders in April 2020, concurrently with filing the ISR.

4.1 FERC's Questions submitted in advance of the meeting

- Q1 - On page 9, the proposed definition for the "Recreation" classification includes a reference to permitting processes for various types of recreations activities. Will the permitting processes be updated as part of the revised Shoreline Management Plan (SMP)?

  Alabama Power will review the existing permitting processes during development of the SMP and determine if any updates are needed.

- Q2 - On page 9, the proposed definition of the "Hunting" classification includes a reference to the existing Harris Project Wildlife Mitigation Plan. How do you envision the existing Project Wildlife Mitigation Plan relating to the proposed Wildlife Management Plan that is to be developed as part of Phase 2 of the Lands Evaluation?

  Any existing information (i.e., the existing Wildlife Mitigation Plan) will be reviewed to determine if any portion of the plan might apply to the new WMP, which would be implemented in the next license term.

- Q3 - On page 9, the proposed definition of the "Natural/Undeveloped" classification mentions that one of the allowable uses would be "normal forestry management practices." Please clarify what these practices would include.

  All forestry practices that would be allowable in the Natural/Undeveloped land use classification will be included in the WMP, which will be filed with the final license proposal.

- Q4 - Rachel McNamara (FERC) - Some lands classified as "Recreation" are proposed to be changed to "Natural/Undeveloped". She noted that it may be helpful in the final report for Alabama Power to be very clear about the project purpose in retaining those lands rather than removing from the project boundary.

  Alabama Power intends to clearly state the project purpose of all lands proposed to be reclassified in the Final Licensing Proposal.

- Q5 - On page 10, there are descriptions of two new proposed land use classifications, including "Flood Storage" which would include lands between the 793 ft and 795 ft msl contours, and "Scenic Buffer Zone" which would include lands between the 795 ft and 800 ft msl contours. Would these classifications overlap with other land use classifications? Also, are there any buildings/structures currently within these elevation bands around Lake Harris?

The land use classifications will not overlap. In areas where the lands above the 800 ft msl contour (i.e. "back acreage") are project lands, the project lands below the 800 ft msl contour would be classified to match the back acreage. In areas where the lands above the 800 ft msl contour are non-project lands, the lands below the 800 ft msl contour would consist of these two classifications. However, the classifications would not overlap but would be adjacent (one band in front of the other). Alabama Power could not confirm at the meeting whether any buildings or structures currently exist within those contours, but current permitting practices allow property owners to build piers, etc. in these bands.

- Q6 - Page 11 discusses the results of the desktop evaluation and site visit to identify any suitable bobwhite quail habitat within the project boundary at Skyline WMA. Could you elaborate on the methods for evaluating the availability of bobwhite quail habitat and how it was determined that no suitable habitat occurred within the project boundary at Skyline WMA? Also, could the report include a figure showing a map of the 7 locations in the Skyline WMA where Alabama DCNR conducts spring/fall quail call surveys, and has documented quail, relative to the project boundary at Skyline WMA?

  The Final Phase 1 Project Lands Evaluation Report will contain detailed methods for the evaluation of suitable bobwhite quail habitat at Skyline. Alabama Power will also include a figure showing the ADCNR's quail call survey locations.

- Q7 - Appendix B provides maps and general descriptions of proposed changes in land use classifications at Lake Harris that were also discussed during the 9/11/19 HAT 4 meeting. It would be helpful if the maps of the proposed changes in land use classifications included legends to identify the various classifications, as well as north arrows and scale bars to facilitate orientation and review.

  Alabama Power will add a legend, north arrows, and a scale bar to the final maps in the Final Phase 1 Project Lands Evaluation Report.

- Q8 - In addition, during the 9/11/19 HAT 4 meeting, we (FERC staff) asked if terrestrial and cultural resource surveys were being conducted on lands proposed for removal from the project boundary and Alabama Power staff responded that they were. Could you provide descriptions of the terrestrial and riparian habitat types for areas that you are proposing to remove from the project boundary. Could you also describe the terrestrial and riparian habitat types for area "RC4" that you propose to reclassify from "Recreation" to "Commercial Recreation"? Do these areas contain suitable habitat for any of the T&E species that may occur at the Harris Lake portion of the project? What were the results of the cultural resource surveys for areas proposed to be removed from the project boundary?

Many other resource studies are being conducted concurrently with the development of the Project lands proposal. Alabama Power intends to use information from other relicensing studies to inform the final decision on the Project lands proposal, which will be included in the final licensing proposal. Additionally, Alabama Power will include within its final licensing proposal descriptions of the terrestrial and riparian habitat types for all areas proposed to be removed from the Project as well as the area "RC4" proposed to be reclassified to "Commercial Recreation".

- Q9 - Sarah Salazar (FERC) - Alabama Power needs to be sure to get information on the record so that FERC can use that information to inform their decision on the project related effects. The Final Phase 1 Project Lands Evaluation should explain the rationale for adding, removing or reclassifying lands in the Project Boundary. Also, it would be helpful if the map of area A6 included the existing birding trail and the proposed extension of the trail.

  The project purpose for the lands to be removed, added, or reclassified will be included in the final licensing proposal. Alabama Power will also add the birding trail and trail extension on the respective map as included in the Final Phase 1 Project Lands Evaluation Report.

- Q10 - Appendix C provides the Anniston Museum of Natural History's Flat Rock Botanical Inventory (inventory) report and the consultation record includes the Anniston Museum of Natural History's letter transmitting the report, Ken Wills' (Coordinator of the Alabama Glade Conservation Coalition) emails, along with several additional observations and recommendations from them.

  Approximately 365 plant species, including some rare species were documented at the site during the botanical inventory. The surveyors, Ken Wills, and FERC staff observed damages caused by vehicles traversing the site (SUV observed by surveyors; ATVs tire marks on granite outcrops observed by Ken Wills and FERC staff during scoping/environmental site review). The consultation record for this study includes recommendations from Anniston Museum of Natural History and Ken Wills' to manage/preserve/restore the site. The proposed definition of the "Natural/Undeveloped" classification, proposed for the rare plant site, does not indicate what types of recreation activities/vehicle access would be prohibited or how Alabama Power would manage such a site. Considering all of this, do you think that Alabama Power's proposed definition of "Natural/Undeveloped" would be effective in protecting this site? Could the definition of this classification be expanded/more detailed, or would you consider another, more protective land use classification type/designation for this site?

  Also, what has Alabama Power done to protect the rare plants that were identified during the inventory and were subsequently damaged by ongoing ATV use observed by Ken Wills? Can vehicles be excluded from these sensitive areas to protect rare plants while the relicensing process proceeds?

Alabama Power noted that that it has SMPs for its other projects that contain different classifications because of unique areas and circumstances. Therefore, the Natural/Undeveloped land use classification may need to be modified to address the rare plants at Flat Rock Park. Alabama Power will work with the HAT on reviewing the classifications and their definitions.

Sheila Smith (Alabama Power) noted that Alabama Power has been working with a contractor to barricade the area to prevent vehicle traffic. The barricade work has been completed. Alabama Power plans to continue monitoring the site to discourage vehicle and all-terrain vehicle (ATV) access.

- Q11 - Sarah Salazar (FERC) asked if the area also gets a lot of mountain bike use?

  Ken Wills (AGCA) noted that vehicles are the primary issue in that area and that mountain biking would not likely cause the effects they are seeing. He also noted that in the rural areas, ATVs were much more common.

- Q12 - Has the request from Randolph County regarding the proposed water treatment intake/plant been resolved/processed?

  Alabama Power is working with Randolph County to find an acceptable site that is similar to their original request. Alabama Power intends to file a land use variance request with FERC's Division of Hydropower Administration and Compliance, and, therefore, this request would not be a part of the relicensing process.

4.2 Participant Questions

- Q13 - Maria Clarke (EPA): It was my understanding there was a court case that involved Skyline Property. What happened? Why was the Skyline property reduced? Is this case closed?

  Alabama Power filed an application with FERC to amend its current Harris Project Boundary at Skyline (Accession No. 20200302-5424), which would add 13.1 acres of land and remove 62.2 acres of land, all within the approximately 15,063 acres of the Harris Project Boundary at Skyline.

5 OPERATING CURVE CHANGE FEASIBILITY ANALYSIS STUDY

Kelly Schaeffer (Kleinschmidt) presented the Operating Curve Change Feasibility Analysis Phase 1 Report progress. Kelly reviewed the study purpose and data collected to date, which included the development of models and the initial modeling results. Kelly also reviewed the remaining activities for this study, including the use of other relicensing studies to conduct the Phase 2 analyses. Kelly noted that no variances to this study plan are requested. Alabama Power distributed the Draft Operating Curve Change Feasibility Analysis Phase 1 Report to stakeholders in April 2020, concurrently with filing the ISR.

5.1 FERC's Questions submitted in advance of the meeting

- Q1 - As we understand it, downstream effects with regard to flooding were assessed for a 100-year design flood. However, the relationship between the downstream flow alternative analysis and the Harris Reservoir winter flood pool analysis is not clear under alternative flood scenarios. What would happen in a scenario other that a 100-year flood? Would operations at Harris Dam under the alternative flood scenario, including different flow release scenarios, have any impact on the Harris Reservoir winter pool analysis, or vice versa?

  The "100-year flood" scenario used for modeling is based on an actual local storm event in the Tallapoosa River basin that is scaled up to equal a 100-year flood event. Other flood flow scenarios would likely have downstream flooding effects but at a smaller amount and duration. Alabama Power evaluated the effects of the 100-year flood, because FEMA uses the 100-year flood for its analysis and is the "gold standard". This is also consistent with modeling efforts that Alabama Power has conducted in previous relicensing processes. Kenneth Odom (Alabama Power) explained that if a 50-year flood scenario is used, there will still be downstream flooding. It will just result in less of an impact than the 100-year scenario. If Alabama Power used a 25-year flood, there would be fewer impacts than the 50-year flood scenario. Ultimately, reducing the flood frequency interval reduces the total amount of flow. However, there is no way to determine the differences in the total amount of flow downstream without modeling.

- Q2 - Table 5-2, page 51 of the report…What is it about RM 115.7 that appears to create a hydraulic control, such that the maximum increase in depth under any winter pool elevation scenario occur about mid-way down the Tallapoosa River?

  The surveyed bathymetric transects of the river indicate that the channel bottom rises at RM 113.63 and RM 114.5, constricting the channel area and creating a hydraulic control. Examination of aerial imagery shows what appears to be a shoal across the river at RM 114.5 and a shoal and island complex at RM 113.63.

- Q3 - Figures 5-20 and 5-21 appear incomplete, as they only show the results for one alternative…baseline (? based on color). Please address this apparent omission.

These figures are complete. However, Alabama Power will review them to determine if the information can be presented with more clarity. The Y axis shows the different winter curve change alternative elevations (+1 is 786 ft, +2 is 787 ft, etc.). For example, at the 786 ft msl winter pool elevation, there are 12 additional days of spill over baseline. Figure 5-21 is similar but includes the additional days of capacity operations for each alternative.

5.2 Participant Questions

- Q4 - Jimmy Traylor, Donna Matthews, and Albert Eiland (Downstream Landowners) expressed concern regarding how Alabama Power is operating the Harris Project, particularly during high flow events. All expressed that flood control has been worse since the dam has been in place. There were specific comments regarding various dates where flow conditions were a concern including February 6, 11, and 13, 2020. There were also questions regarding operations and use of flood gates on April 9, 2020. This discussion on operations during high flow events transitioned to comments and questions on the efficiency of the turbines at Harris and whether Alabama Power ever evaluated the efficiency of the turbines. Does raising the winter pool help with the generation efficiency, or are there any studies ongoing to improve the efficiency of generation for the dam? What about the dam turbines or equipment upgrades?

  Alabama Power operates Harris in accordance with U.S. Army Corps of Engineers flood control procedures provided in the Harris Reservoir Regulation Manual. Alabama Power follows these procedures and cannot evacuate water in anticipation of a high flow event. Kenneth Odom (Alabama Power) explained that raising the winter pool to the levels being evaluated in this study does not appreciably affect the efficiency of generation. Turbine or powerhouse equipment upgrades have a much greater impact on efficiency. However, the order of magnitude for total generation capacity for Harris would remain the same regardless of any equipment upgrades. Kenneth noted that the efficiency of the turbines is addressed during a turbine upgrade, which typically occurs at the end of the useful life of the turbine. There are no planned turbine upgrades during this relicensing.

  Additionally, Kenneth Odom reviewed the reservoir levels that were raised by a stakeholder earlier in the meeting. He noted that on February 6, 2020, the reservoir level was 785 ft msl. A large rain event had occurred, and both units were generating at best gate. The reservoir's elevation rose to 790 ft msl (5 feet above winter curve) on February 11, 2020 and both units began operating at full gate. The reservoir continued to rise. On February 13, 2020, the Harris reservoir was 6.5 feet above the winter curve elevation of 785 ft msl. In accordance with Harris flood control procedures, Alabama Power opened flood gates. Kenneth further confirmed that Alabama Power was not using any flood gates to pass water downstream of Harris Dam on April 9, 2020.

- Q5 - Donna Matthews (Downstream Landowner): Is the public ever involved in discussions regarding turbine or equipment upgrades; why not consider using the HEC-RAS modeling to redesign the turbines? Could you find the optimal solution to turbine design and flow scenarios to solve those issues? How do we know what to ask for if all the possible solutions aren't offered for us to consider?

Angie Anderegg (Alabama Power) stated that the public is not usually involved with discussions on equipment upgrades. She noted that there seemed to be confusion between the turbine design/efficiency versus the downstream flow scenarios. The two existing turbines have a specific capacity and generate a finite number of megawatts with the amount of water that passes through them, which is inherent in the design of the turbines. When it is time to upgrade, Alabama Power desires to achieve more power with less water, creating an increase in efficiency. It is not possible to completely redesign the turbines, because the Harris Project was originally designed to generate a certain number of megawatts using a certain amount of water at specific times (i.e., peak) to support system operations. Angie gave an example of the system peak that happens during a hot summer afternoon and how hydropower is used to meet the system demand. As part of the downstream release alternatives study, the benefit or impact of providing a continuous minimum flow are being analyzed (a continuous minimum flow would also ideally produce power). Angie reiterated that the results from this study, as well as the other studies, will be analyzed together to develop the best proposal.

Kenneth Odom (Alabama Power) added that a redesign of the turbines or new "runners" would focus on improving the efficiency but deliver the same general number of megawatts.

FERC staff stated that, if a licensee determines that upgrades are necessary, it must file a license amendment application with FERC. She explained that license amendment applications are subject to the NEPA process, and depending on the potential for environmental effects, FERC would issue a public notice and solicit public input.

- Q6 - Donna Matthews: Who controls the amount of number of megawatts generated? What if the number of megawatts is too much for the river? Why can't you change it?

  The number of megawatts that a project is authorized to generate is set by FERC, as described in the original license order. Changing the generating capacity would affect the energy grid beyond Harris, because Alabama Power is required to supply a certain amount of power across the entire system. There is a reliability factor from the Harris Project that supports the entire power grid.

- Q7 - Question from Instant Messenger, Martha Hunter (Alabama Rivers Alliance): Wasn't there a turbine upgrade a few years ago?

  No, a turbine upgrade has not been completed at the Harris Project.

- Q8 - James Hathorn (USACE): How were the intervening flows considered in the Harris model?

The intervening flow hydrograph for the contributions to the Tallapoosa River from the drainage area between Harris and Wadley was calculated by Alabama Power, as described in Section 4.4 of the study report. The hydrograph was included in the model as a uniform lateral hydrograph entering the river between RM 136.6 and 122.97. Kleinschmidt developed an intervening flow hydrograph for the contributions to the river from the drainage area between Wadley and Horseshoe Bend by comparing the daily flood hydrographs from the Wadley and Horseshoe Bend gages for the March 1990 event. A comparison of the daily average flow hydrographs gages showed a similar shape for both gages. The hourly hydrograph for the Wadley intervening flow, calculated by Alabama Power, was adjusted by multiplying each hourly ordinate of the hydrograph by a ratio of the Horseshoe Bend to Wadley gages. The data was then adjusted to subtract out the flow from the Wadley gage so that the lateral inflow was only equal to the flow intervening between the two gages. The hydrograph was included as a uniform lateral inflow between RM 122.97 and RM 93.66. The development of the hydrograph is described in Section 4.5.3 of the report.

- Q9 - James Hathorn: What types of structures will be analyzed in the phase 2 structure study? Will there be any crop/farmland analysis?

  Alabama Power has not conducted a full economic analysis of each structure, land type, or property type. Crop or farmland analysis is not currently in the FERC-approved methodology.

- Q10- James Hathorn: For the HEC-RAS modeling, it only uses a 100-year design flood, or different types of storms?

  Alabama Power has not proposed to model other storm events. However, if FERC needs this information for its analysis, Alabama Power can model other storm events.

  Angie Anderegg (Alabama Power) explained that the 100-year flood has been used as the standard by FEMA. To move forward with other flood scenarios, Alabama Power will need to know exactly which additional floods need to be modeled.

  Sarah Salazar (FERC) reiterated that the process is in the information gathering stage, and no decisions are being made right now. However, we do want to know all of the alternatives that are possible moving forward in order to make the best decision later. She encouraged all stakeholders to file comments on or before June 11, 2020.

- Q11 - Alan Creamer (FERC) - Regarding the flood design, what would the downstream flows look like using a 50-year or 25-year flood scenario? I know the worst-case scenario is the 100-year flood. I'm wondering if it would present as a straight line, or a curve in terms of how it presents downstream? Maybe the 100-year flood isn't the end–all.

Kelly Schaeffer (Kleinschmidt) asked if FERC was requesting that Alabama Power add specific flood events other than the 100-year flood to the study plan (the 25 and 50-year flood scenarios).

Alan Creamer (FERC) answered that he thought it would be helpful to see how the flows would work under different scenarios.

Kelly Schaeffer responded that if there are additional modeling requests, Alabama Power would need to know those scenarios as soon as possible to avoid getting to December 2020 (after completing the majority of the Phase 2 analysis) and have to re-run the model for additional flood events and revisit the Phase 2 analyses.

Kenneth Odom (Alabama Power) explained that the "100-year flood" scenario that Alabama Power uses for modeling is based on a local storm event in the Tallapoosa River basin, but it is scaled up to equal a 100-year flood event. If it is a 50-year flood scenario, downstream flooding will still occur. It is just less impact than the 100-year scenario. If Alabama Power used a 25-year flood, there would be fewer impacts than the 50-year flood scenario. FEMA bases its flood maps on the 100-year flood. Other storms can be examined, but ultimately, reducing the flood frequency interval reduces the total amount of flow. However, there is no way to determine what the differences would be in the total amount of flow downstream without modeling.

Angie Anderegg (Alabama Power) commented that Alabama Power's intent is to use the 100-year flood to determine whether it will propose a lake level change.

- Q12 - Regarding the 100-year flood, are they taking climate change into account when they're looking at these scenarios? Martha Hunter also added that along with additional rains we are seeing we need to anticipate the different droughts that are coming and wants that to be part of the decision for how the river is operated in the next 50 years.

  Alan Creamer (FERC) stated that he did not recall that climate change was part of the study design or approved study plan.

- Q13 - Maria Clark (EPA) noted that that the EPA, U.S. Geological Survey, and FEMA have been working together to address data shortfalls on climate information. She noted that the 100-year event may not be appropriate at this point or if Alabama Power does use the 100-year, they should also supplement with local events. Maria plans to pass along this information from EPA.

  Kelly Schaeffer (Kleinschmidt) asked if Maria could include that information or provide a reference in its comments on the ISR. Kenneth Odom (Alabama Power) also noted that the 100-year design flood used in the Harris modeling was based on an actual storm event that was scaled up to equal a 100-year event.

- Q14 – Charles Denman via email following the meeting: I believe a comparison of historical (pre-dam) and recent flooding downstream of the dam would help stakeholders understand the effectiveness of the Dam for flood control. Also include a model with same parameters (land use, storm intensity and duration, etc.) but without the dam attenuation. This would help downstream stakeholders understand what effects the Dam has on flooding downstream. Are the original studies and permitting materials available for stakeholders to review?

The Harris Project, as it exists today, is considered baseline with regard to FERC analyses and is used in FERC's decision whether to issue a new operating license and under what conditions. Alabama Power structured this study to review and analyze flood conditions with the Harris Dam in place, consistent with FERC's guidance on existing projects and the evaluation of pre-project conditions. FERC approved this study plan in April 2019. All Harris Relicensing study plans, meeting documentation, and other permitting materials are available to stakeholders at www.harrisrelicensing.com. These documents may also be provided upon request if needed.

6 DOWNSTREAM RELEASE ALTERNATIVES STUDY

Kelly Schaeffer (Kleinschmidt) presented the Draft Downstream Release Alternatives Phase 1 Study Report progress. Kelly reviewed the study purpose and the data collected to date, which included the development of models and initial modeling results. Kelly also reviewed the remaining activities for this study, including the use of other relicensing studies to conduct the Phase 2 analyses. Kelly noted that no variances to this study plan are requested. Alabama Power distributed the Draft Downstream Release Alternatives Phase 1 Report to stakeholders in April 2020, concurrently with filing the ISR.

6.1 FERC's Questions submitted in advance of the meeting

- Q1 - Modeling scenarios…as it stands now, the report presents the results for three downstream release alternatives: Pre-Green Plan operation, Green Plan operation, and Pre-Green Plan operation with a 150 cfs continuous minimum flow. Why was modelling of minimum flow limited to 150 cfs? Also, have you considered modeling Green Plan releases with continuous minimum flow scenarios? On what basis did you choose not to do so?

  Alabama Power proposed these three modeling scenarios for downstream releases in the study plan. These scenarios have been discussed for at least 18 months with stakeholders and were developed in the study plan process and approved by FERC in its April 12, 2019 Study Plan Determination.

6.2 Alabama Rivers Alliance's Questions submitted in advance of the meeting

- Q2 - Why is the only continuous minimum flow regime being studied a 150 cfs flow? Why was this particular value chosen? Previous commenters have encouraged the study of a wide variety of flow conditions and operational scenarios. Does Alabama Power plan to study a broader range of continuous minimum flows?

  As noted above, the various flow scenarios were determined in the development of the study plan. The 150 cfs minimum flow is equal to the same daily volume as three 10-minute Green Plan pulses. If stakeholders desire additional flow conditions and operational scenarios, they need to request additional modeling per the FERC study plan modification process. Kelly Schaeffer (Kleinschmidt) explained that the modeling is resource intensive and while the HEC-RAS model is built and functioning, the process to review other flow scenarios is resource intensive.

- Q3 - The study report states that with full power storage available, Harris is programmed to generate 3.84 hours per day. Is all of that peaking generation, or is some percentage of the programmed operation for non-peaking generation?

  Yes, that number is in the daily Res-SIM model. It is really an average of all the plants in Alabama Power's system at full pool. That number is not connected to peaking operations.

- Q4 - In the Green Plan Release Criteria attached as Exhibit B, item 4 concerns Spawning Windows and states that "Spring and Fall spawning windows will be scheduled as conditions permit. The operational criteria during spawning windows will supersede the above criteria." Can you elaborate on when "conditions permit" for scheduling spawning windows?

  It is dependent on where the reservoir elevation is in relation to its rule curve and what flows are coming into the reservoir to provide stable operations. Keith Chandler (Alabama Power) gave an example: Alabama Power tried to hold a spawning window and only ran 10-minute pulses to see what it would do downstream. By going by the criteria (three 10-minute pulses) Alabama Power wanted to see if it would create a spawning window for the downstream fishery.

- Q5 - Jack West (Alabama Rivers Alliance) asked if Alabama Power had data that permitted for the spawning windows.

  There is some data. Alabama Power's Reservoir Management group has summaries of each year, and the effort in the most recent year is summarized in the baseline report included with the Pre-Application Document (PAD). A portion of this analysis is being done as part of the aquatic resources study and will be detailed in the Draft Aquatic Resources Report.

6.3 Participant Questions

- Q6 - Lisa Gordon (EPA) asked if she could be directed to the 3 downstream release alternative scenarios to find the document where the analysis occurred to model 150 cfs continuous minimum flow. So continuous minimum flow means there is no pulsing?

  Correct; there will not be pulsing with a continuous minimum flow. The flow scenarios are documented in the meeting summaries from December 2018, as well as meetings and filings in 2019 prior to the FERC Study Plan Determination (April 12, 2019). Angie Anderegg (Alabama Power) noted that all the meeting summaries and presentations (from PAD to present) are available on the Harris relicensing website.

- Q7 - Lisa Gordon asked if flows would be adaptively managed. Would these be set, locked in flows, or would there be modified flows when needed?

  Alabama Power is evaluating a continuous minimum flow with no variations or modifications; however, Alabama Power is currently in the data gathering and analysis phase. With this information, a decision about flows can be made. What Alabama Power has been doing in the years leading up to relicensing is an adaptive management process. Alabama Power also has another project that flows are being adaptively managed in a bypassed reach.

- Q8 - Sarah Salazar recalls during the study plan meeting that we discussed alternatives and the stakeholders generally didn't feel comfortable proposing alternatives at that point but said they would once they saw results from the three modeled scenarios included in

Alabama Power's study plan. The information gathering stage does not last forever so now is the time to propose other flow scenarios for modeling. Alabama Power needs those flow scenarios now.

- Q9 - Alan Creamer (FERC) said he agreed with Sarah's summary. Alan would like to see an operating scenario that includes the Green Plan with minimum flows. Alan acknowledged that the fisheries studies have not been completed, so stakeholders do not currently have that information. Once all the studies are complete and reports are available, Alan noted that there should be another opportunity for stakeholders to revisit phase 1 in terms of modeling and not simply go to phase 2 once all the information is presented to stakeholders. Also, what does the 150 cfs represent in terms of percentage of average annual flow? Where does it fall on flow duration curve?

  Alabama Power is in the process of getting that additional information by conducting the FERC approved studies. However, Alabama Power needs to hear from stakeholders now—based on the extensive amount of data currently available on the project—regarding alternative flow scenarios. Any additional scenarios are needed now. Once the phase 2 portions of the operations studies begin, any need to come back to modeling various flow scenarios may result in delays and an incomplete application, which is not acceptable to Alabama Power. There is a lot of data on the Harris Project that has been compiled and presented, and Alabama Power wants stakeholders to meet halfway with regard to putting forward additional flow alternatives to analyze.

- Q10 - Alan Creamer agreed but also reiterated that he doesn't believe we have complete information and that stakeholders should have the opportunity to modify the study plan after receiving and reviewing the study results. Alan noted that there are three studies that are not complete, and FERC and Alabama Power will have to work through this issue so that there is an additional opportunity. Normally at an ISR, Alan stated that all the first-year studies are done. In this case, there are still outstanding studies. He indicated that he doesn't think there is adequate information for stakeholders to make suggestions on alternative flow scenarios.

  The due dates in the studies were approved by FERC. Alabama Power and FERC discussed the draft study reports that were not scheduled to be included in the ISR and discussed the two studies for which Alabama Power is requesting a variance. Angie Anderegg (Alabama Power) noted that the Recreation Evaluation Draft Report is delayed, because Alabama Power incorporated a stakeholder request for an additional survey, which was just completed in April. However, the original due date approved by FERC for the Draft Recreation Evaluation Report was June 2020. Alabama Power stated that there are some reports that were not scheduled to be filed as part of the ISR. The ILP may anticipate that studies will be completed in one year and reports filed as part of the ISR, but that is not a requirement of the ILP or the ISR.

- Q11 - Sarah said that in Alabama Power's proposed and revised study plan that the schedule listed the ISR as a milestone and FERC interpreted that to mean that all the first phases of the study would be complete by then. Any other milestone that went beyond that phase would be a follow up of that report. FERC sets up the study seasons for one year. There are usually two study seasons in each ILP, and she noted that perhaps this accounts for the disparity between FERC and Alabama Power's understanding of where we should be at this moment. Maybe we need to have another discussion.

Six study reports are available for review and comment. If there is disagreement after stakeholder review and comment of the remaining three reports and cultural documents, Alabama Power would enlist FERC for a dispute resolution. Alabama Power desires that everyone has the opportunity to comment on these study reports. Angie Anderegg (Alabama Power) referred to the study schedule and noted that Alabama Power has met the ILP obligations and, where necessary, Alabama Power has asked for a variance on two studies (Recreation and Cultural APE document).

- Q12 - Rachel McNamara agreed with Alabama Power's characterization of the Recreation Evaluation and understood the rationale for modifying the schedule. For the Recreation Evaluation Draft Report, Rachel emphasized that there's need for adequate time for stakeholders to comment on the draft report and that all comments be filed with FERC. There are ways we [FERC] can handle the comment period and I think FERC staff needs to discuss that and figure out the best strategy to address comments and study plan modifications.

  Angie Anderegg (Alabama Power) assured the participants that they would have ample time to comment on the remaining draft study reports (Recreation, Aquatic Resources, Downstream Aquatic Habitat, and the Cultural APE document).

- Q13 - Jimmy Traylor raised the issue of the downstream temperature and the relationship with the minimum flow. He noted that the Tallapoosa River below Harris Dam is not supposed to be a cold-water fishery. If Alabama Power is going to release a 150 cfs continuous minimum flow, it has to be at a temperature that more like that of a warm water fishery.

  Angie Anderegg (Alabama Power) indicated that temperature would be addressed in the aquatic resources' studies (HAT 3) and requested that this question be addressed later in the meeting.

- Q14 - Barry Morris (LWPOA) asked if he was right in assuming these alternative releases would have no impacts on the lake level. Barry asked if 150 cfs was equivalent to the Green Plan flow, would it be twice as much water?

  Based on the model, a 150 cfs minimum flow would not affect the lake level. However, a larger continuous minimum flow could impact lake levels. Regarding the amount of water, Kenneth Odom (Alabama Power) stated that in response to Barry's second question, no, it is not twice as much water. Kenneth stated that the part of generation that is now used solely for Green Plan flows would be replaced by 150 cfs continuous flow. Alabama Power would not pass a continuous minimum flow and continue to pulse.

- Q15 - Rachel asked if you are generating with minimum flow.

  Yes, ideally the minimum flow would be generating, not spill. Chris Goodman (Alabama Power) said that a 150 cfs minimum flow would not affect lake levels but would constrain Alabama Power's ability to peak with the same flexibility as they currently have.

- Q16 - Maria Clark (EPA) encouraged Alabama Power to review their March 2019 comments on this issue. She asked why 2001 was selected as an average year.

  2001 was an average or normal water year determined by the Flood Frequency Analysis study for the Tallapoosa. Additionally, 2001 was pre-Green Plan, which provided pre-Green Plan operations and hourly data to run through HEC-RAS model.

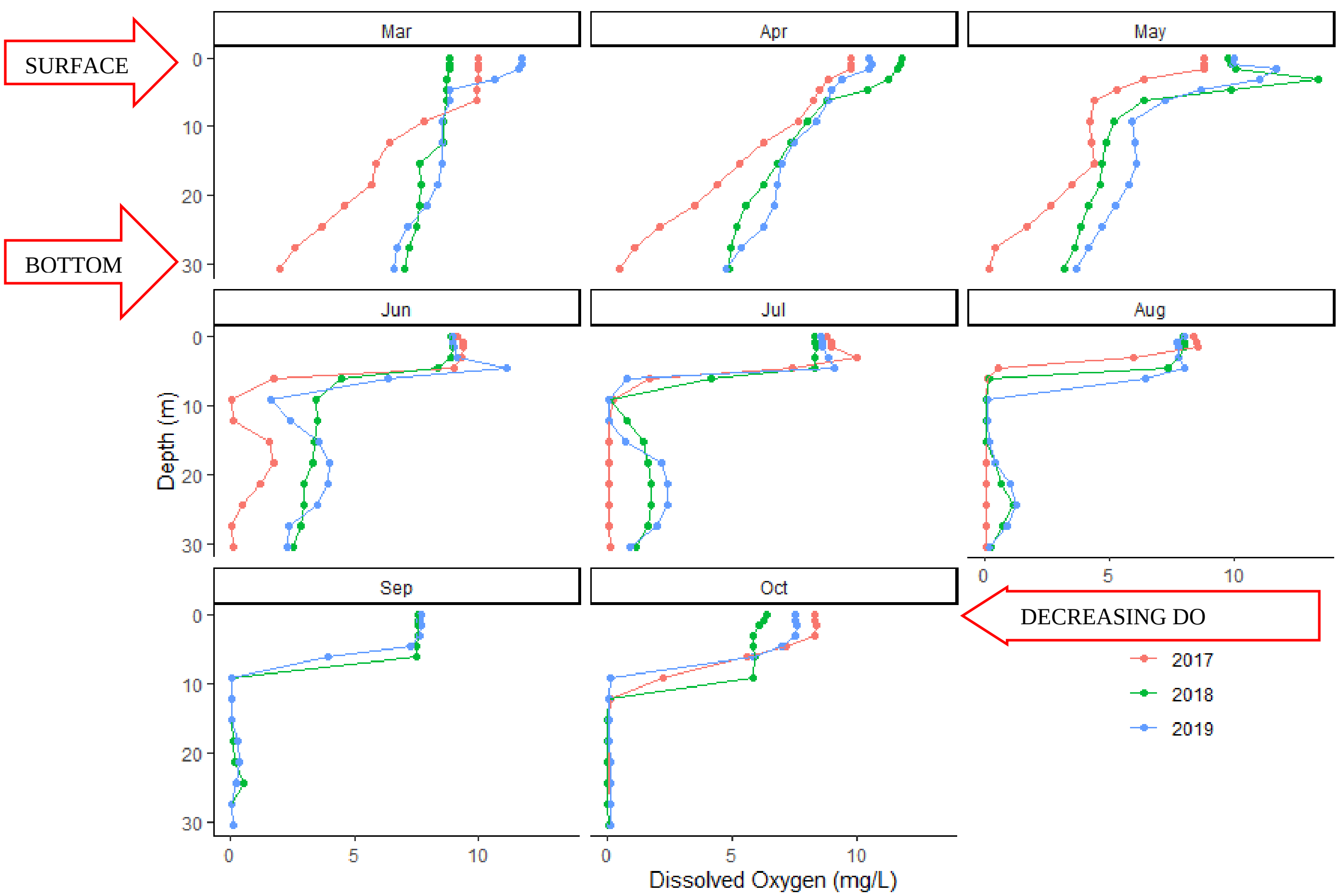
7 WATER QUALITY STUDY

Jason Moak (Kleinschmidt) presented the progress on the Draft Water Quality Study, which included the study purpose, data and activities collected to date, and remaining activities. Jason noted that no variances to this study plan are requested. However, the schedule has been updated to reflect Alabama Power's plan to file the 401 Water Quality Certification application in April 2021. Alabama Power distributed the Draft Water Quality Study report to stakeholders on March 9, 2020, and also in April 2020, concurrently with filing the ISR.

7.1 <u>FERC's Questions submitted in advance of the meeting</u>

- Q1 - Page 18…figure 3-8…please explain what is happening with the vertical DO profiles where DO increases in May, June, July, and August, where otherwise the DO should be declining.

  Jason Moak (Kleinschmidt) said it could be how the graphs are interpreted. The data shows the reservoir stratifying as expected in a reservoir during the warmer months of the year. Jason recommended an offline discussion but stated that Alabama Power will also try to clarify in the Final Water Quality Study Report.



- Q2 - Page 23 discusses Alabama DEM monitoring data for the Harris Dam tailrace (i.e., immediately downstream from Harris Dam). Was this data collected during generation, or does it also reflect non-generation periods?

  These were events when ADEM went out monthly and took a grab sample. All samples were completed during non-generation. Alabama Power will clarify this in the Final Water Quality Study Report.

- Q3 - Pages 39-41 present DO and temperature data for downstream continuous water quality monitoring station. On page 16 of the ISR, Alabama Power is not proposing any additional monitoring beyond what was approved in the Commission's SPD. Why is there not a second year of monitoring for the downstream continuous monitoring station? How confident are Alabama Power and the HAT 2 members that 1 year of monitoring at the downstream station includes a worst-case scenario?

  A second year of monitoring was not included in the FERC-approved study plan. Alabama Power is confident in the data collected thus far. Regarding a worst-case scenario, Alabama Power could monitor for 5 years and may not see a worst-case scenario. Although 2017 may have been a bad year, Alabama Power missed that opportunity to collect a continuous data set at the approved location in the study plan.

7.2 <u>Alabama Rivers Alliance's Questions submitted in advance of the meeting</u>

- Q4 - Previous data from 2017-2019 mentioned in Table 1-1 is not continuous, year-round data. Is Alabama Power now collecting continuous, year-round data at multiple locations?

  No. The study plan approved collecting continuous data at the downstream monitor during 2019.

- Q5 - The Alabama Power data listed on Table 1-1 shows monitoring during generation only. Is data during non-generation periods available prior to 2019?

  No.

- Q6 - The report states that a continuous monitor was "recently installed" at Malone. Was it installed on March 12, 2019 corresponding to the "Downstream Monitor 2019" tab of the WQ data excel spreadsheet?

  The monitor at Malone is owned and operated by ADEM. Data from the Malone monitor was not included in the spreadsheet. However, Alabama Power can add it to the Final Water Quality Report.

- Q7 - Is there only the one continuous monitoring station downstream from Harris Dam at Malone?

  Yes.

- Q8 - The Draft Water Quality Study Report contains significant water temperature data, but the discussion and conclusions focus almost exclusively on dissolved oxygen levels, and do not discuss temperature. Will the effects of temperature be discussed in the final report or reported on in the Aquatic Habitat or Aquatic Resources study reports?

  The effects of temperature on aquatic resources will be addressed in the Aquatic Resources Report.

- Q9 - Is Alabama Power studying, or planning to study, methods to account for low water temperatures, including using an alternative intake structure that would allow for mixing of warmer and cooler water to raise average temperatures or withdrawing water from a higher depth in the reservoir to allow for warmer releases?

  Alabama Power intends to study technologies that can address temperature, as needed, once a temperature issue has been determined and defined through on-going study and data analyses.

7.3 Participant Questions

- Q10 - Alan Creamer (FERC) noted that there was only one year of continuous monitoring data. How confident is Alabama Power that the data represents what could be a worst-case drought or is truly reflective of the worst water quality could be? Also, Alan asked why Alabama Power couldn't get more than one year of continuous data? If stakeholders want to look at this and want to know how confident Alabama Power is in this data and that it truly represents a drought period.

  Jason Moak (Kleinschmidt) said he does not think 2019 was a worst-case scenario and that it is not known if 2020 would be either. Angie Anderegg (Alabama Power) said that Alabama Power proposed one year of monitoring in the study plan, which was approved. Angie also noted that it is time consuming and expensive to service the continuous monitor but that will not prevent further monitoring should it be required.

  Alan stated that when FERC approved the Water Quality Study Plan, it was with the intent that collectively, we would use year one data to determine if additional data were needed. Angie Anderegg (Alabama Power) asked if FERC sees a need for an additional year. Alan said there are instances where we drop below what we are trying to achieve, so if this is not the worst-case scenario, you could have more years where the DO drops below that criteria. Alan further stated that it is hard to make decisions on just one year. Alan also pointed out that the one year included in the report was not one that could be considered a drought, so in a drought Alabama Power may only meet water quality criteria 90% of the time. Angie noted that because Alabama Power is filing the 401 application in 2021, Alabama Power is collecting data at the tailrace monitor in 2020, resulting in an additional year of data. Alan Creamer noted that the tailrace monitor is only capturing generation. He indicated that FERC wants to know what happens to water quality during both generation and non-generation.

Keith Chandler (Alabama Power) noted that 2019 was not a drought year, but it was a hot year and that ADEM is continuing to collect data downstream. Keith further said Alabama Power ran only green plan flows a lot of the time during the monitoring season.

Alan Creamer said the most important part of this is what is happening right below Harris Dam or less than half a mile downstream. The other gages further downstream are also accounting for other influence. In reading this report Alabama Power met the criteria near 100% of the time but that may not be reflective of what's happening closer to the dam.

- Q11 - Jimmy Traylor (Downstream Landowner) asked if anyone has identified the sulfur smell in released water? Jimmy said he noticed it in the summer especially during the first 45 minutes or so of generation. Near Malone you get a foul smell. Seems to go hand-in-hand with drought conditions. As you get further into the summer months, it worsens.

  Alabama Power is not aware of a sulfur smell in the water. Jason Moak (Kleinschmidt) asked if there was a time of year that the smell is worse. Jason said he has noticed that smell at other hydro projects and said it probably had something to do with natural lake stratification and biological processes that occur on the lake bottom.

- Q12 - Sarah Salazar (FERC) asked if the Draft Water Quality Report covered where in the water column that Alabama Power is drawing water from in Lake Harris? This would be helpful to include in the report.

  The intake at Harris has a movable sill. Alabama Power will add this information to the Final Water Quality Report.

- Q13 - Albert Eiland (Downstream Landowner) asked to please summarize the conversation between him and Jason Moak about mercury. Has the content changed in the reservoir? How bad is it in the lake?

  Jason Moak (Kleinschmidt) said he was not sure. It could be coming from atmospheric deposition in the lake. Jason noted it is a widespread issue among reservoirs all over the country and an issue with large bodies of water and fish.

- Q14 - Maria Clark mentioned a Georgia Project where they do maintenance in the intake because a lot of debris accumulates, and they let the water run which causes the debris to mix into the water that is being released. Clearing that helped alleviate the smell. This was a smaller dam.

  Jason Moak (Kleinschmidt) said there is not much of a debris issue due to the size of the Harris Dam.

8 EROSION AND SEDIMENTATION STUDY

Jason Moak (Kleinschmidt) presented the progress on the Draft Erosion and Sedimentation Study, which included the study purpose, data and activities collected to date, and remaining activities. Jason noted that no variances to this study plan are requested. Alabama Power distributed the Draft Study report to stakeholders on March 17, 2020, and also in April 2020, concurrently with filing the ISR.

8.1 FERC's Questions submitted in advance of the meeting

- Q1 - Section 5.0, Discussion and Conclusions states that at some sites, "land clearing and landscaping, and other construction activities affecting runoff towards the reservoir" cause erosion. Is it possible to provide areal images showing the areas of active erosion in relation to the project boundary as part of the final study report?

  Yes. Alabama Power will add aerial photos showing the project boundary, winter pool, and summer pool contours.

- Q2 - Appendix D – photos…it would be helpful if the captions for the photos included better location descriptors (e.g., Harris Reservoir, Harris Reservoir-?? Embayment, Harris Reservoir-?? River Arm, Tallapoosa River, etc.). For the Harris Reservoir sites, it would be helpful if the contours within which peaking operations occur (lake fluctuation zone) could be identified.

  Alabama Power will add captions with location descriptors to the photos in Appendix D. Because Harris is a storage reservoir, there are no daily fluctuations in reservoir level, only seasonal fluctuations in accordance with the operating curve.

- Q3 - Could you make the video footage that was collected as part of this study available for stakeholders to view?

  Yes, Alabama Power is investigating how to make the video footage available.

- Q4 - Will the nuisance aquatic vegetation surveys still be possible to conduct in Lake Harris this summer?

  Yes, the nuisance aquatic vegetation surveys are scheduled for summer 2020.

- Q5 - On page 24, in section 3.2, the report includes the following statement: "A total of 20 sites, rather than 15 sites, were provided for the left bank segments as many segments were tied with a score of (slightly impaired)." Please explain what is meant by many of the streambank segments being "tied with a score of slightly impaired" and clarify the relationship between the number of streambank segments/sites and the bank condition score.

Alabama Power will edit the text to make this section clearer. All assessed streambank segments (each 0.1 mi of the study reach) were sorted based on their condition score, from lowest to highest. Sites with the 15 worst scores (i.e., ranked 1 through 15) were presented in Table 3-2. Since 14 of the left bank segments in the list had the same score for condition (3.0), they were included in the list.

- Q6 - On page 25, in Table 3-2, shouldn't the heading/label of the first column of the table be "Site Number" instead of "Rank" given that the rank options are only 1 through 5 (according to Table 3-1) and there appear to be 20 sites?

  Please see the response to Q5 above. Alabama Power understands that this table is confusing and will rework it to make the results clearer in the Final Erosion and Sedimentation Study Report.

- Q7 - On page 11, of the Tallapoosa River High Definition Stream Survey Final Report (Appendix E of the Erosion and Sedimentation Study Report), it states that prior to the survey, flows were monitored to ensure relatively normal flow conditions during the survey. For clarity, what were the "relatively normal flow conditions" during the survey? Were they slightly higher or lower than average?

  As seen in the graphs of discharge on page 12 of Appendix E, flows during the study were very close to the long-term median value.

- Q8 - In Figures 13 and 16 of the Tallapoosa River High Definition Stream Survey Final Report, the scale is small and so it appears that most of the riverbanks are unmodified and the modified banks identified on the individual site surveys are not visible. It would be helpful if the figures in the report showed labeled points for the erosion/sedimentation sites that are identified in the report.

  Alabama Power will provide figures with a larger scale and with labeled erosion sites in the Final Report.

- Q9 - Page 20 of Tallapoosa River High Definition Stream Survey Final Report states that a confidence rating was used to indicate the clarity of the streambanks in the video and figures 14 and 17 of that report show areas where the video clarity was impaired and therefore the confidence in the accuracy of the streambank conditions/classifications is lower. As stated above, it would be helpful if the figures in the report showed labeled points for the erosion/sedimentation sites that are identified in the report. Do any of the areas with impaired video clarity coincide with areas that stakeholders identified as erosion/sedimentation sites or other sites that Alabama Power identified as part of this study? Do you intend to take any steps to deal with the impaired clarity data? Is so, how?

  Alabama Power will reexamine these areas to determine if sites with lower confidence coincided with identified erosion sites. If so, we will perform targeted surveys of these areas and update the Final Report accordingly.

- Q10 - In Figure 18 of the Tallapoosa River High Definition Stream Survey Final Report, there appears to be a missing ranking at river mile 37 for the right streambank. Could you explain this gap in the ranking?

  Alabama Power is reexamining this area and will include rankings in the Final Report.

- Q11 - For Figures 20 through 23 of the Tallapoosa River High Definition Stream Survey Final Report, please label the river mile ranges on the maps to help reviewers understand the starting and ending points of the study area and which segments of river are included.

  In Figure 26 of the Tallapoosa River High Definition Stream Survey Final Report, please move the scale bar and sources so that they are not covering the river segment and bank conditions at the bottom of the map.

  Alabama Power will revise this figure accordingly.

- Q12 - Can you identify where peaking pulses are attenuated downstream from Harris Dam under the current operating regime and volume of typical downstream releases? If so, are there any patterns in the downstream streambank conditions and observed levels of erosion along the segments of streambanks within the attenuation zone? Where are the identified erosion sites in relation to the length of the attenuation zone?

  Alabama Power will incorporate a discussion of water level fluctuations and any potential correlations with streambank erosion into the discussion section of the Final Report.

8.2 Alabama Rivers Alliance's Questions submitted in advance of the meeting

- Q13 - Will we have access to the High Definition Stream Survey video created by Trutta Environmental Solution as part of the Downstream Bank Stability Report?

  Yes, Alabama Power is investigating how to make the video footage available.

- Q14 - Table 3-2 shows streambank scored for the 15 most impaired areas downstream of Harris Dam. How was the Average Combination Bank Condition score (final column) computed? It does not appear to be an average of the "Average Left Bank Condition" and "Average Right Bank Condition" scores, which would yield a lower average scored. The averages showing for the left and right banks are mostly 3.0 or higher while the average combined bank condition scores are mostly below 3.0.

  Jason Moak (Kleinschmidt) noted that one column looks only at left bank and the other the only right bank. Every tenth mile those scores were averaged and ranked. Jack West (Alabama Rivers Alliance) said it still doesn't make sense why you have larger averages on both sides, and they are reduced in combination. Sarah Salazar (FERC) said that part of the table was confusing as well, and she is not certain that last column is informative. Jason said he agrees and was thinking that it may only make sense when there are impacts on both sides, like a transmission line crossing.

- Q15 - The report concludes in Section 5.0 that "None of the erosion sites surveyed were the result of fluctuations due to project operations." This conclusion seems in conflict with the assessment in the HDSS that impairment areas "were due to the fluctuating flows eroding the streambank within a few feet of the water surface and streambank interface." (Pg. 43 of Trutta Report).

  This statement refers to the reservoir. Because Harris is a storage reservoir, most of the erosion occurring in the reservoir is due to wave action from boats or winds.

- Q16 - Is Alabama Power completing a total suspended sediment analysis during the pre-pulse, pulse, and post-pulse time periods to see what sediment is getting moved from and to various locations?

  No, Alabama Power is not completing a total suspended sediment analysis.

- Q17 - Is Alabama Power conducting a historical, cumulative effects study of erosion since the dam's construction?

  Alabama Power is not performing a cumulative effects study.

- Q18 - Is Alabama Power assessing whether having a continuous minimum flow downstream may help with erosion and sedimentation problems?

  Yes. Alabama Power will use the model outputs to assess the difference in water level fluctuations.

- Q19 - Jack West asked why it seems that none of the erosion sites are due to operations.

  Most of the erosion issues downstream are not due exclusively to operations. For example, areas where trees and vegetation are being cleared are not due exclusively to operations, but water fluctuations could exacerbate erosion.

8.3 Donna Matthews' Questions submitted in advance of the meeting

- Q20 - Better Visualization of Erosion over the Past 50 Years: Do the erosion studies conducted during this permitting period compare pre-dam (baseline) river shape/contour with the current status of the river? Pre-dam analog photographs exist for comparison to current satellite imagery.

  Alabama Power has not compared pre-dam conditions to current conditions. Historical photographs may provide useful information for the cumulative impacts section of the license application and for FERC's use.

8.4 Participant Questions

- Q21 - Jimmy Traylor (Downstream Landowner) said he has no trees on the bank at his property and has little bank remaining. He asked Jason what he would consider that? Mr. Traylor noted that his trees have been falling in and steps that his grandfather built are disappearing since the dam was built and operation.

Jason Moak said he would locate Mr. Traylor's property on the data file to see how that area was scored. Jimmy Traylor responded that the Draft Erosion and Sedimentation Report says, "not much erosion" at his property. Mr. Traylor also noted that there is significant sedimentation in areas like Cornhouse Creek and No Business Creek where the water backs up during generation. He characterized it as "a mud pit" and this has significantly affected these tributaries. He believes Alabama Power is missing the mark on erosion. Mr. Traylor also noted that since the inception of the Green Plan, erosion has decreased. He noted that a continuous minimum flow would also help reduce erosion. Jack West (ARA) asked about data Alabama Power may have regarding bank conditions and erosion from the 1980s (pre-project and just after project was constructed), 1990s, and in the 2000s to do a cumulative effects study. If there is data, he asked that Alabama Power make it available so we can assess the impacts on a larger scale.

Carol Knight concurs with Jimmy Traylor and Albert Eiland can give anecdotal evidence of how the banks have eroded. Carol indicated that she has old maps from 40s and 50s of conditions during that time to compare what it is now. Those trees weren't necessarily clear cut. People downstream know what it used to be, and they know what it is now. She noted that they are having a hard time reconciling these things. There is significant erosion. It is not just because somebody is cutting trees or that they are letting cows access the river.

Jason Moak (Kleinschmidt) explained that he was not suggesting that where erosion occurs it is the landowners' fault. Jason emphasized that it is very important for downstream property owners to comment on any areas that downstream property owners believe the Draft Erosion and Sedimentation Report has mischaracterized the erosion and source of the erosion.

Maria Clark wanted to know why not do a GIS study. We have a lot of data, including the areas that are impaired. We have pictures. What I can see by following the data you have looks like the erosion is mostly in the river bends. With other projects, we have seen landowners have a lot to do with it by cutting trees for their river view. If we analyze with GIS what happened when the dam was built and 50 years later, we will be able to see the development. It is important to bring this information out for Alabama Power to show more clearly these project impacts using GIS.

Donna Matthews said she's been playing with maps and someone took old aerial photos and coordinates from landowners when they came to a meeting and shared erosion hot spots. One set is from 1964 and one set is from the 1940s. Donna indicated that if anyone is interested, they can overlay the google earth pictures. There are certain markers that local people have put together.

Jimmy Traylor said that his land is undeveloped except for maybe 200 yards and said they have never cut the timber, one of the last virgin hardwood bottoms around. Losing trees and losing bank. That is erosion.

Albert Eiland noted he lives about 2 miles below Jimmy Traylor and is on the outside of a natural curve, which will experience more damage than an inside curve. Mr. Eiland noted that historically there were 7-8 islands in the Tallapoosa River. Those old maps will show that. There is only one island left. Jimmy asked if it's Hodge's island. Albert said the island is on an inside curve, that's why it's still there. In spring of 2017 we experienced a lot of flooding. I lost 2 big trees. Has been losing trees and the bank. We have hauled a lot of rocks in there to keep it from washing away. Would be eroded away without the rocks.

Relevant to this discussion, Carol Knight submitted a comment via IM from a participant that had to drop off the meeting conference call. Her issue is that there are serious erosion issue and has gotten worse this year with all the rain and the river fluctuating up and down. Several places have large holes in the banks and many of the trees have washed away. She indicated that the water is extremely high even if there isn't a scheduled release.

- Q29 - Lake Watch: Has there been assessment/consideration of sedimentation in the Tallapoosa where it enters Lake Martin, where the bulk of the sediment settles out as the river current declines, as seen by large sediment bars that have formed below where Hillabee Creek enters the river?

  An assessment has not been done in that area. The Study Area extends through Horseshoe Bend. It is likely that bedload sediment naturally transported down Hillabee Creek settles out as it enters the upper reaches of Lake Martin, similar to what happens in the Little Tallapoosa River at the headwaters of Lake Harris.

- Q30 - Rachel asked about erosion areas on the lake that are anthropogenically attributed: She recommended that Alabama Power include in the Final Study Report the shoreline management classifications in the area where it appears erosion is occurring. Rachel noted that FERC identified erosion and sedimentation as something they would analyze for cumulative effects. There is a sense that the license application will need information on cumulative effects. Some of this will be anecdotal and this information may go into the analysis. FERC does look at cumulative effects, but it may not be something addressed directly by study report.

  Summer and winter pool contours would also be helpful for cumulative effects analysis, and Alabama Power will add the suggested information to the Final Report.

- Q31 – Charles Denman via email following the meeting: I agree with other participants that a comparison of historical photos with current conditions of the river would help to understand the flushing effects operations of the dam have on downstream erosion.

9 THREATENED AND ENDANGERED SPECIES STUDY

Jason Moak (Kleinschmidt) presented the progress on the Draft Threatened and Endangered Species study, which included the study purpose, data and activities collected to date, and remaining activities. Additional fieldwork is planned for summer 2020 for this study. Jason noted that no variances to this study plan are requested. Alabama Power distributed the Draft Desktop Assessment Report to stakeholders in April 2020, concurrently with filing the ISR.

9.1 FERC's questions submitted in advance of the meeting

- Q1 - Have the GIS overlays of T&E species habitat information and maps been completed (i.e., the map figures in Appendix B of the draft T&E species study report)? Or are there still steps to complete this component of the study? We suggest including project features, recreation areas, and other managed areas (e.g., timber harvest areas, wildlife management areas, etc.) on the T&E species maps in order to help determine the proximity of species ranges/habitats to project-related activities and identify the need for species-specific field surveys.

  Those maps are completed. Alabama Power will consider making the suggested additions.

- Q2 - While the draft T&E species study report indicates that additional field surveys for the fine-lined pocketbook freshwater mussel are planned for May 2020, the report does not include a description of the criteria used to determine which of the species on USFWS's official (IPaC) list of T&E species would be surveyed in the field. Please describe which species will be surveyed in the field and explain how and why they were selected. In addition, please describe any correspondence Alabama Power has had with FWS and state agencies regarding the T&E species selected for additional field surveys.

  Alabama Power is consulting with USFWS to determine which species have known historical occurrences or critical habitat intersecting the Project boundary or could reasonably be found within the Project boundary. Surveys will be performed for the palezone shiner due to information from USFWS regarding the possibility of existence in some tributaries within Skyline. Surveys of fine-lined pocketbook are being performed due to existing critical habitat in the upper Tallapoosa River above Lake Harris. Correspondence between Alabama Power and USFWS and state agencies as of the ISR filing is included as Attachment 2 of the Draft Threatened and Endangered Species Desktop Assessment.

- Q3 - Page 7 lists the sources for the ESA species information. The sources included USFWS's Environmental Conservation Online System (ECOS) but did not include IPaC. The official list is obtained through the IPaC report. Has an IPaC report been downloaded or are you using the IPaC report filed to the record by FERC staff?

The ECOS website was used as a source for life history, habitat, and range information in preparation of the desktop assessment. The IPaC list was used to identify species to include in the desktop assessment and potential field surveys.

- Q4 - Page 8 states that the existing land use data is not specific enough to determine if the 3,068 acres of coniferous forest within the Project Boundary at Lake Harris would be suitable for red-cockaded woodpecker. How do you propose to assess the suitability for red-cockaded woodpecker?

  Field observation at these coniferous forests could determine whether these areas contain suitable habitat. Specifically, Alabama Power would look for areas with little or no hardwood mid-story and over-story trees. Alabama Power would also look for larger, older longleaf pines, which make ideal cavity trees for this species in areas that were lacking hardwood mid-story and over-story. Alabama Power will perform this field observation if USFWS deems it necessary.

- Q5 - On pages 3, 10, and 26 there is mention of additional fieldwork planned for two mussel species (i.e., fine-lined pocketbook and Southern pigtoe) for May 2020. Please elaborate on the details of the additional survey work (e.g., survey location(s), sampling protocols and methodologies employed, and clarify which species will be included in the May 2020 assessment, etc.).

  In November 2019, surveys were conducted for fine-lined pocketbook on a 3.75 mile stretch of the Tallapoosa River where critical habitat is known to occur from the County 36 bridge to a shoal below the Highway 431 bridge. This endpoint was chosen, because only pool habitat was available another half mile downstream of this bridge. Six surveyors including USFWS, Alabama Power, and Kleinschmidt searched for the target species in 20-minute to one-hour segments at areas containing critical habitat and searched for additional areas with suitable habitat. Silty areas and piles of shells left by muskrats and raccoons were also searched. The introduced *Corbicula fluminea* (Asian clam) was the only bi-valve species observed in these piles. Because high water impeded the search in some areas and the cold weather may have caused mussels to burrow out of site, USFWS suggested another effort be made in the spring. Surveyors will search for fine-lined pocketbook and suitable habitat again in late spring/summer 2020, pending any COVID-19 restrictions. Southern pigtoe is not a species that we would reasonably expect to find in the Project boundary. It is known to occur in Cleburne County, which overlaps the Project boundary. However, documented historical range in that county exists exclusively in the Coosa River drainage basin. The Lake Harris Project Area does not contain any critical habitat areas for Southern pigtoe identified by the USFWS.

- Q6 - The descriptions of Alabama lampmussel and rabbitsfoot mussel on pages 11, 13, and 14 do not provide these species' host fish species. Are the host fish species currently unknown, or was this an inadvertent omission?

  The host fish species are currently unknown. Suitable hosts for rabbitsfoot populations west of the Mississippi River are shiner species such as blacktail shiner, cardinal shiner, red shiner, spotfin shiner, and bluntface shiner. There is not much

available information about rabbitsfoot host fishes east of the Mississippi River. Research has shown that lampmussels can successfully utilize rock bass, green sunfish, bluegill, smallmouth bass, spotted bass, largemouth bass, and redeye bass as host fish. It has also been reported that banded sculpin are potential host fish for lampmussels.

- Q7 - There appears to be a typo on page 16, in the description of Southern pigtoe mussel. The middle of the first paragraph refers to the glochidia of the finelined pocketbook mussel. Is this sentence misplaced, or does the information pertain to the southern pigtoe mussel (the subject of section 3.12)? Please clarify.

  This is a typo, and the information refers to the Southern pigtoe. The host fishes are accurate.

- Q8 - On page 19, in the first paragraph about the northern long-eared bat (NLEB), it is unclear why the discussion includes the statement about a low occurrence of this species in the "…southwestern region of Alabama" given that the project areas are located in the northeastern and mid-eastern portions of Alabama. Please clarify or correct this statement.

  This information is correct. The sentence is intended to describe the general distribution of the species in Alabama.

- Q9 - The draft T&E species study report states that there are no known NLEB hibernacula or maternity roost trees *within the Project Boundary*. However, it does not include information on known NLEB hibernacula *within 0.25 mile of the Project Boundary* and known NLEB maternity roosts *within 150 feet of the Project Boundary* (i.e., at Harris Lake and Skyline). In addition, the report mentions a couple of best management practices (BMPs), protective of some bat species, that Alabama Power implements during timber harvest activities and states that the BMPs have been expanded but not incorporated in the existing license. However, the report does not include the locations of Alabama Power's timber harvesting and other tree removal activities, or detailed descriptions of timber harvesting protocols and BMPs currently implemented within the Project Boundary. This information is important to understanding the affected environment for Indiana bat, NLEB, and/or other T&E species. This information could also be used for the streamlined consultation option for analyzing the potential project effects on NLEB (including within the buffer areas for hibernacula and maternity roost trees).

  Please complete the USFWS's NLEB streamlined consultation form and include it in the final T&E species study report. This form can be found at: https://www.fws.gov/southeast/pdf/guidelines/northern-long-eared-bat-streamlined-checklist.pdf. We recommend using FWS's definition of "tree removal" to guide your responses on the form (i.e., "cutting down, harvesting, destroying, trimming, or manipulating in any other way the trees, saplings, snags, or any other form of woody vegetation likely to be used by northern long-eared bats").[3]

Also, please update figures 3.14-1, 3.14-2, 3.14-3, 3.15-1, 3.15-2, and 3.15-3 which currently show "forested area" or "karst landscape" in relation to NLEB and Indiana bat habitats, to show Alabama Power's timber management areas within the Project Boundary, and other proposed managed areas (e.g., new/improved recreation areas, new quail management areas). This type of information is needed to meet another component of this study (i.e., "determine if [T&E species habitat at the project] are potentially impacted by Harris Project operations", as described on slide 5 of the Aug. 27, 2019, HAT 3 meeting).

Alabama Power will complete the NLEB streamlined consultation form to be included in the Final T&E Species Report and update the requested figures.

- Q10 - On page 21 and 22, in section 3.17, the discussion mentions an occurrence of little amphianthus within the Project Boundary at Lake Harris (Flat Rock Park) that was documented in 1995 and may be extirpated. Did the botanical surveys in that area of the project target that species? The top of page 22, states that "Vernal pools were not identified due to a lack of available data." Did the botanical surveys identify vernal pools in this area?

  The botanical inventory targeted all plant species existing within the Inventory Area, which is defined as the Blake's Ferry Pluton and is located adjacent to Flat Rock Park. Of the 365 plant species documented in the Inventory Area. Vernal pools were observed during surveys performed in 2019, however little amphianthus was not found in any of the pools.

- Q11 - On page 22, in section 3.18, the report states that the National Wetland Inventory data is not detailed enough to identify wetlands within the project area that contain white fringeless orchid's unique wetland habitat characteristics. Do you propose collecting more data on this subject?

  Alabama Power is consulting with USFWS and Alabama Natural Heritage Program experts to determine if these habitats are present within the Project Boundary.

- Q12 - On page 23, in section 3.19, the report states that the 16 extant populations of Prices' potato bean in Jackson County, occur on Sauta Cave National Wildlife Refuge, and near Little Coon Creek in the Skyline WMA. Please clarify whether or not any of the 16 populations occur within the Project Boundary at Skyline WMA.

  One extant population intersects the Project Boundary at Skyline and comprises 11 percent of the extant population occurring at Little Coon Creek. However, 89 percent of this single population occurs outside of the Project Boundary.

[3] 81 Fed. Reg. 1902 (January 14, 2016).

- Q13 - In Appendix B, figure 3.19, showing Price's potato bean habitat range, there is a 100-foot Stream Buffer within the Limestone Landscape layer shown on the map and legend. Please explain the significance of this buffer, including any regulatory requirements associated with this buffer. Please include this information in the Final T&E Species Study Report.

  Price's potato bean is known to exist in Little Coon Creek. This species seems to prefer low areas along near or along the banks of streams and rivers. The buffer indicated on the figure is not regulatory. It is meant to depict areas where this species could potentially occur based on known habitat preferences. We will include this information in the final report.

- Q14 - In the August 27, 2019, HAT 3 meeting summary, please clarify the following: How does Alabama Power define terms such as "sensitive time periods" in the context of timber harvesting? Evan Collins, of FWS, stated that the palezone shiner may be present in some of the lower reaches of the Tennessee River tributaries. Please clarify where these tributaries are located in relation to the Project Boundary.

  Alabama Power will include its timber harvesting BMPs as an appendix to the Final T&E species study report. Alabama Power is consulting with USFWS to perform an assessment to determine if palezone shiner are present in Little Coon Creek, which flows through portions of the Project Boundary at Skyline.

9.2 Alabama Rivers Alliance's Questions submitted in advance of the meeting

- Q15 - Is the additional fieldwork to identify mussels scheduled for May being pushed back or proceeding on schedule?

  The mussel identification fieldwork is proceeding on schedule; however, fieldwork dates are subject to change due to COVID-19 restrictions. Alabama Power will proceed with fieldwork at the earliest possible date during the spring/summer 2020.

9.3 Participant Questions

- Q16 - Ken Wills (Alabama Glade Conservation Association) - Are the 138.4 acres of granite geology west of the Project Boundary on Alabama Power land, other private land, or public land? How much is public and private land and how much is Flat Rock?

  There are private property outcroppings in that area. The Flat Rock Park itself is approximately 25 acres.

- Q17 - Jimmy Traylor asked why there are no [Threatened and Endangered Species] studies below the dam and how Skyline effects water below the dam.

  Based on consultation with USFWS, no threatened or endangered species have been identified below the dam. Skyline does not affect the water below the dam.

- Q18 - Sarah Salazar (Federal Energy Regulatory Commission (FERC) asked if Alabama Power could elaborate on how they decided which species to perform field surveys for. How was the list of species being surveyed narrowed down with USFWS?

  Determining which species to search for in the field is an ongoing process. The consultation details will be in the final report. This desktop assessment is being used as an initial step toward determining which species to focus on in the field.

- Q19 - Sarah asked if IPaC was being used to determine which threatened or endangered species were in the Project Boundary. If USFWS makes any changes to the inventory of listed species in the Project Boundary, that needs to be considered.

  The ECOS website was used as a source for life history, habitat, and range information in preparation of the desktop assessment. The IPaC list was used to identify species to include in the desktop assessment and potential field surveys.

- Q20 - Sarah said that additional information is needed for a streamlined consultation on the Northern long-eared bat. The buffer zones, which are within 0.25 miles of a hibernaculum at any time or within 150 feet of a known occupied maternity roost tree from June through July, were not included in the report. The report seems to be focused on what has been reported in the Project Boundary, but the effects of tree removal need to be analyzed.

  Consultation on the Northern long-eared bat is ongoing.

- Q21 - Evan Collins (USFWS) said he does not have a copy of the best management practices for consultation on bats and that information would be beneficial to mapping the buffer zone.

  Alabama Power has this information and will provide it to Evan Collins.

- Q22 - Jimmy Traylor asked why no federally listed species below the dam are being studied.

  No listed species have been documented in the Tallapoosa River below the Harris Dam.

10 DOWNSTREAM AQUATIC HABITAT STUDY

Jason Moak (Kleinschmidt) presented the progress on the Downstream Aquatic Habitat Study, which included the study purpose, data and activities collected to date, and remaining activities. Jason noted that no variances to this study plan are requested, and the Draft Study Report will be distributed to stakeholders in June 2020.

10.1 Participant Questions

- Q1 - Jimmy Traylor (Downstream Landowner) asked if the temperature component would be included in the draft report? Jimmy commented that 3 months of data will not provide enough information.

  Depending upon the timeframe for date processing, Alabama Power may be able to include the temperature component in the draft report. Jason Moak (Kleinschmidt) clarified that the level loggers have been operational since June 2019 and will continue to gather data through June 2020.

- Q2 - Alan Creamer (FERC) stated that only a limited number of alternatives are being tested and that there may be additional scenarios that stakeholders would like to see modeled based on the outcomes of these studies. Alan suggested that FERC may need to meet with Alabama Power to decide how best to approach this study and decide whether a modified study plan is needed.

  Jason Moak (Kleinschmidt) indicated that once the model is complete, it would be possible to run different operational scenarios.

- Q3 - Donna Matthews asked if the completed model could analyze optimal conditions, or what would be needed to achieve optimal conditions. Could the model be adjusted to see the effects of change on the outputs?

  Alan Creamer (FERC) suggested that FERC may need to meet with Alabama Power to decide how best to approach this study and decide whether a modified study plan is needed.

- Q4 - Jimmy Traylor (Downstream Landowner) asked if Elise Irwin's studies are being considered.

  The previous studies conducted by Elise Irwin are being used in the Aquatic Resources study and in the desktop assessment.

11 AQUATIC RESOURCES STUDY

Jason Moak (Kleinschmidt) presented the progress on the Aquatic Resources Study, which included the study purpose, data and activities collected to date, and remaining activities. Auburn University has a primary role in conducting this study, which includes fieldwork and laboratory testing (i.e., bioenergetics). Jason noted that no variances to this study plan are requested, and the Draft Study Report will be distributed to stakeholders in July 2020.

11.1 Participant Questions

- Q1 - Ken Wills asked if there were any dates set for our next electronic meeting.

  Angie Anderegg said meetings have not been scheduled to-date, but Alabama Power will let the HAT participants know as soon as dates are selected.

12 NEXT STEPS IN THE ILP

Kelly Schaeffer reviewed the next steps in the ILP. She noted that participants should file their comments on the ISR meeting summary and the draft study reports with FERC no later than June 11, 2020.

- Q1 - Maria Clark asked if the questions or comments would be posted on the website?

  Alabama Power will file the ISR meeting summary with FERC on May 12, 2020, and the document will also be posted on the Harris relicensing website (www.harrisrelicensing.com).

APPENDIX A

ISR Meeting Participants

Harris Relicensing Initial Study Report Meeting
April 28, 2020

Attendees:

Alabama Department of Conservation and Natural Resources
Damon Abernethy
Todd Fobian
Keith Gauldin
Keith Henderson
Matt Marshall
Amy Silvano
Chris Smith

Alabama Department of Economic and Community Affairs, Office of Water Resources
Brian Atkins
Dow Johnston

Alabama Department of Environmental Management
Jennifer Haslbauer
Fred Leslie
David Moore

Alabama Glade Conservation Coalition
Ken Wills

Alabama Historical Commission
Amanda McBride
Eric Sipes

Alabama Power
Angie Anderegg
Dave Anderson
Wes Anderson
Jeff Baker
Jason Carlee
Keith Chandler
Jim Crew
William Gardner
Mike Godfrey
Chris Goodman
Stacey Graham
Rodger Jennings
Ashley McVicar
Tina Mills

Alabama Power (continued)
Kenneth Odom
Courtenay O'Mara (Georgia Power)
Alan Peeples
Jennifer Rasberry
Shelia Smith
Thomas St. John

Alabama Rivers Alliance
Martha Hunter
Jack West

Auburn University
Dennis Devries
Ehlana Stell
Rusty Wright

Cherokee Nation
Elizabeth Toombs

Downstream Property Owners
David Chandler, Historian
Albert Eiland, Wadley
Carol Knight, Wadley
Donna Matthews, Wedowee
Jimmy Traylor, Malone
Melissa Willis, Clay County Extension

Environmental Protection Agency
Maria Clark
Lisa Perras Gordon
Lydia Mayo

Federal Energy Regulatory Commission
Allan Creamer
Danielle Elefritz
Rachel McNamara
Sarah Salazar
Monte Terhaar

General Stakeholders
Charles Denman
Matthew Stryker

Kleinschmidt
Kate Cosnahan
Colin Dinken
Amanda Fleming
Mike Hross
Jason Moak
Kevin Nebiolo
Kelly Schaeffer
Dr. Kevin Hunt - Recreation Subconsultant

Lake Martin Resource Association
Steve Forehand
John Thompson

Lake Wedowee Property Owners Association
Barry Morris

Muscogee (Creek) Nation
RaeLynn Butler
Turner Hunt
LeeAnn Wendt

National Park Service
Jeff Duncan

U.S. Army Corps of Engineers
Cindy Donald
James Hathorn

U.S. Fish and Wildlife Service
Evan Collins

U.S. Geological Survey
Elise Irwin

APPENDIX B

ISR Meeting Presentation

R.L. Harris Dam Relicensing
FERC No. 2628

Initial Study Report Meeting
April 28, 2020

HARRIS DAM
RELICENSING

Welcome and Roll Call

Roll Call by Organization

HARRIS DAM
RELICENSING

Phone Etiquette

- ❑Be patient with any technology issues
- ❑Follow the facilitator's instructions
- ❑Phones will be muted during presentations
- ❑Follow along with PDF of presentations
- ❑Write down any questions you have for the designated question section
- ❑Clearly state name and organization when asking questions
- ❑Facilitator will ask for participant questions following each section of the presentation

HARRIS DAM
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Agenda

- 9 AM Introduction/Roll Call/Safety Moment
- Initial Study Report Overview
  - Cultural Resources (HAT 6)
  - Recreation Evaluation (HAT 5)
  - Project Lands Evaluation (HAT 4)
  - Operating Curve Feasibility Analysis and Downstream Release Alternatives (HAT 1)
  - Water Quality and Erosion and Sedimentation (HAT 2)
  - Threatened and Endangered Species; Downstream Aquatic Habitat; Aquatic Resources (HAT 3)
- Next Steps in the FERC Process

HARRIS DAM RELICENSING

HAT 6 Cultural Resources

Cultural Resources Programmatic Agreement and Historic Properties Management Plan

Study Purpose and Methods Summary

- Develop Historic Properties Management Plan and Programmatic Agreement.

Study Progress

- Identify Sites for Further Evaluation and Initial Evaluation Methods
- Propose Historic Properties Management Plan Outline
- Five HAT Meetings, including one Site Visit
- Inadvertent Discovery Plan, Traditional Cultural Properties Identification Plan Filed in April 2020

Cultural Resources Programmatic Agreement and Historic Properties Management Plan

Variance from Study Plan and Schedule

- ❑ Alabama Power continues to work with the Alabama SHPO for concurrence regarding the Harris APE
- ❑ File the final APE (with maps) by June 30, 2020

Remaining Activities /Modifications/Other Proposed Studies

- ❑ Survey of Sites Identified for Further Evaluation (96 sites)
- ❑ Finalize Area of Potential Effects (June 2020)
- ❑ Continue developing Historic Properties Management Plan
- ❑ Complete survey work and TCP identification (February 2021)
- ❑ Complete eligibility assessments for known cultural resources (July 2021)
- ❑ Issue determination of effect on historic properties (July 2021)
- ❑ Draft HPMP (July 2021)
- ❑ No additional studies have been proposed beyond that in FERC's SPD

HARRIS DAM
RELICENSING

QUESTIONS?

HAT 5 Recreation Evaluation

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RECREATION EVALUATION

Study Purpose and Summary of Methods

❑Evaluate baseline recreation at the Harris Project and downstream

- Gather baseline information on existing Project recreation facilities, existing Project recreational use and capacity, and estimated future demand and needs at the Harris Project
- Determine how flows in the Tallapoosa River downstream of Harris Dam affect recreational users and their activity

Study Progress

❑ Lake Harris Public Access User Counts – March to December 2019

❑ Lake Harris Public Access Questionnaires – May to December 2019

❑ Tallapoosa River User and Surveys – May to October 2019

❑ Skyline Use Data from ADCNR – August 2019

❑ Recreation Facilities Inventory – October 2019

❑ HAT 5 Meeting to discuss Tallapoosa River Landowner Survey Research Plan (Research Plan) - December 11, 2019

❑ Downstream Landowner and Anonymous User Surveys – February – April 2020

Recreation Evaluation –Details of Lake Harris Public Access, User Counts

- 1,368 Shifts
- Paper Forms Vehicle and Activity Counts
- “Instantaneous Count”
- Reduced Flat Rock Park Schedule
- Daylight Savings Time
- Data Cleaning
- Data Analysis

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Recreation Evaluation – Details of Lake Harris Public Access, Questionnaires

- 1,357 Completed
- Majority Collected at Highway 48, Flat Rock Park, and Big Fox Creek
- Four Questions
- Intercept Technique
- Paper Forms

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RECREATION EVALUATION – TALLAPOOSA RIVER USER, METHODS

- ❑ Calculated Total Visitation (Effort) and Daily Use
- ❑ Measured User Attitudes/Perceptions About Instream Flow and Trip Satisfaction
- ❑ Obtained Catch Information from Anglers
- ❑ Determined How Instream Flow Affected Effort, Perception of Instream Flow and Trip Satisfaction, and Species of Fish Targeted, Caught, and Retained

HARRIS DAM
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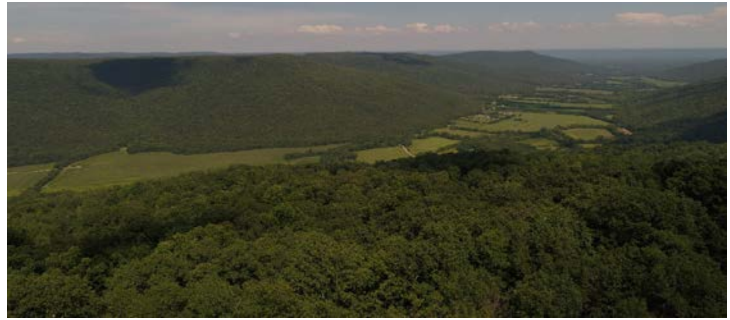
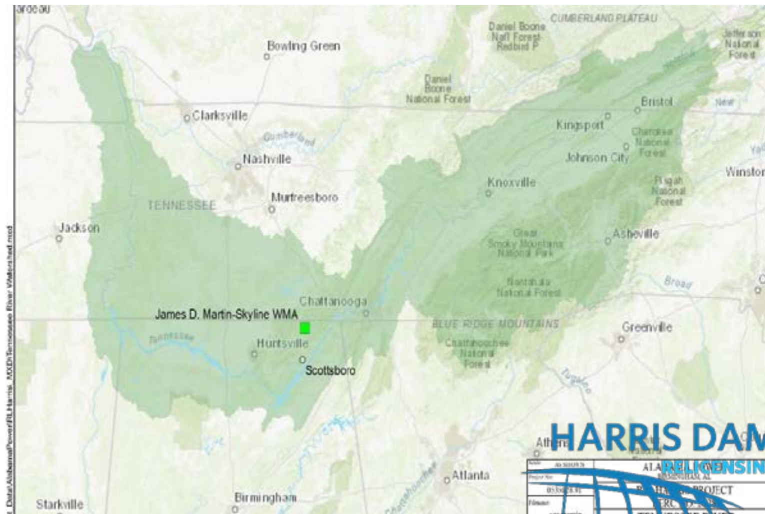
Recreation Evaluation- Skyline Use Data (ADCNR)





Recreation Evaluation –Details of Lake Harris Public Access, Inventory

- Inventoried and Mapped
- Summarized Who Owns, Operates, and Manages
- Evaluated the Condition of the Recreation Sites and Facilities
  - Opportunities for Persons with Disabilities to Participate in Recreation, Where Feasible
  - Public Safety Features

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Recreation Evaluation – Tallapoosa River Landowners Survey Research Plan

- ❑ Downstream Landowners
- ❑ Recreational Users
- ❑ December 11, 2019 HAT 5 Meeting
- ❑ December 19, 2019 Tallapoosa River Landowner Survey Research Plan

HARRIS DAM RELICENSING

Preview- Draft Recreation Evaluation Report

- Introduction
- Background
- Methods
  - Data Collection
  - Analysis
- Results
  - Existing Use
  - Future Use
  - Needs
- Conclusions
- References
- Appendices

HARRIS DAM RELICENSING

Recreation Evaluation

Variance from the Study Plan and Schedule

- Added the Tallapoosa River Downstream Landowner Survey and Tallapoosa River Recreation User Survey
- File the Draft Harris Project Recreation Evaluation report in August 2020 (rather than June 2020)
- March 2020 HAT 1 meeting cancelled due to COVID-19

Remaining Activities/Modifications/Other Proposed Studies

- Recreation Data Reports from Subcontractors
- Draft Recreation Evaluation Study Report
- No additional studies have been proposed beyond that in FERC's SPD

HARRIS DAM
RELICENSING

QUESTIONS?

HAT 4 Project Lands Evaluation

PROJECT LANDS EVALUATION

Study Purpose and Methods Summary

- **Phase I**: Identified lands to be added to, removed from, or reclassified within the current Harris Project Boundary.
  - HAT 4 meeting, desktop analysis, draft map of changes
- **Phase II**: develop a Wildlife Management Program (WMP) and a Shoreline Management Plan (SMP) to be filed with License Application.
  - Utilizes results from Phase I evaluation, incorporation of study data

Study Progress

- Presented proposed land changes, including tract by tract description and maps
- HAT 4 meeting to discuss proposed changes (09/11/2019)
- Requested feedback from HAT 4 regarding the Project Lands proposal
- Evaluated acreage at Skyline to determine suitability for bobwhite quail habitat
- Prepared Draft Phase 1 Project Lands Evaluation Study Report
- Conducted a botanical inventory of a 20-acre parcel at Flat Rock (field work & final report complete)

PROJECT LANDS EVALUATION

Variance from the Study Plan and Schedule

- ❑ No variance from the study plan or schedule.

Remaining Activities/Modification/Other Proposed Studies

- ❑ Review comments on Draft Phase 1 Project Lands Study Report and modify Final Report, as applicable
- ❑ Conduct the botanical inventory survey on additional 21 acres adjacent to previously surveyed area at Flat Rock Park (Spring and Fall 2020; report in January 2021)
- ❑ Complete Phase 2 methods and develop draft Wildlife Management Plan and Shoreline Management Plan
- ❑ No additional studies have been proposed beyond that in FERC's SPD

QUESTIONS?

HARRIS DAM
RELICENSING

HAT 1 Project Operations

- ❑Operating Curve Change Feasibility Analysis
- ❑Downstream Release Alternatives

HARRIS DAM
RELICENSING

Operating Curve Change Feasibility Analysis

Study Purpose and Methods Summary

- To evaluate, in increments of 1 foot, from 786 feet msl to 789 feet msl, Alabama Power's ability to increase the winter pool elevation and continue to meet Project purposes

Study Progress

- RES-Sim outflow hydrographs developed
- HEC-RAS model complete; all four winter curve changes have been modeled with design flood
- Navigation, ADROP and Hydrobudget analyses
- Flood frequency analysis
- Draft report distributed to stakeholders

HARRIS DAM
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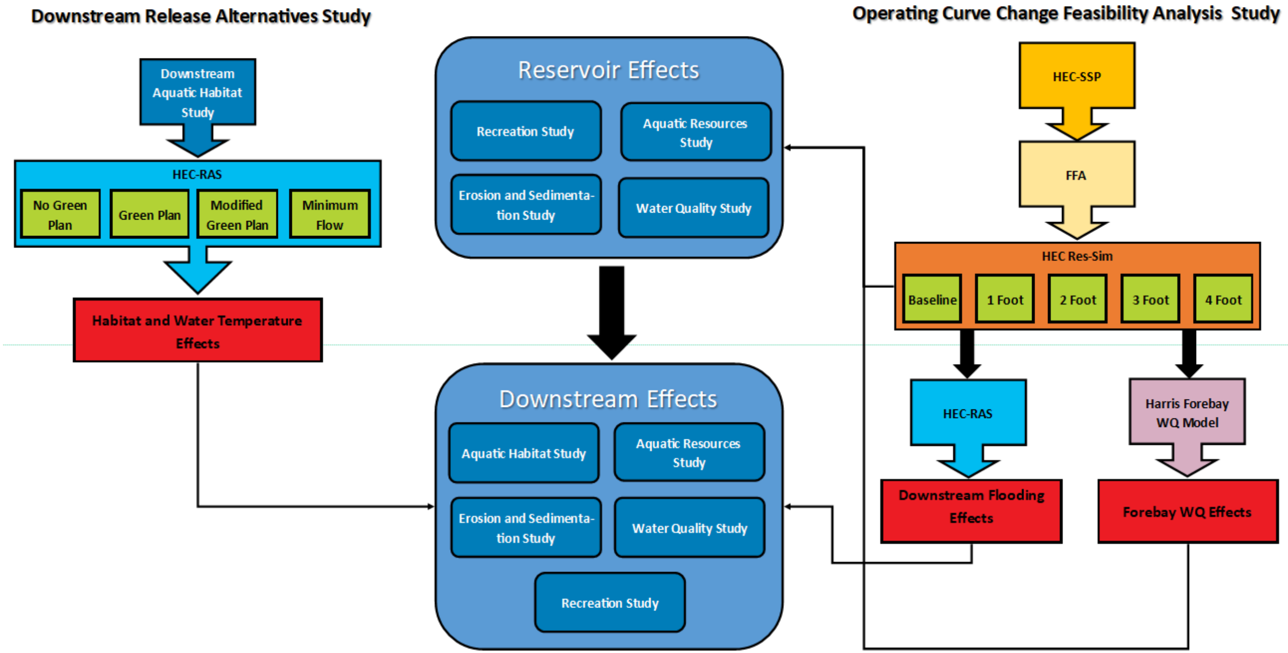
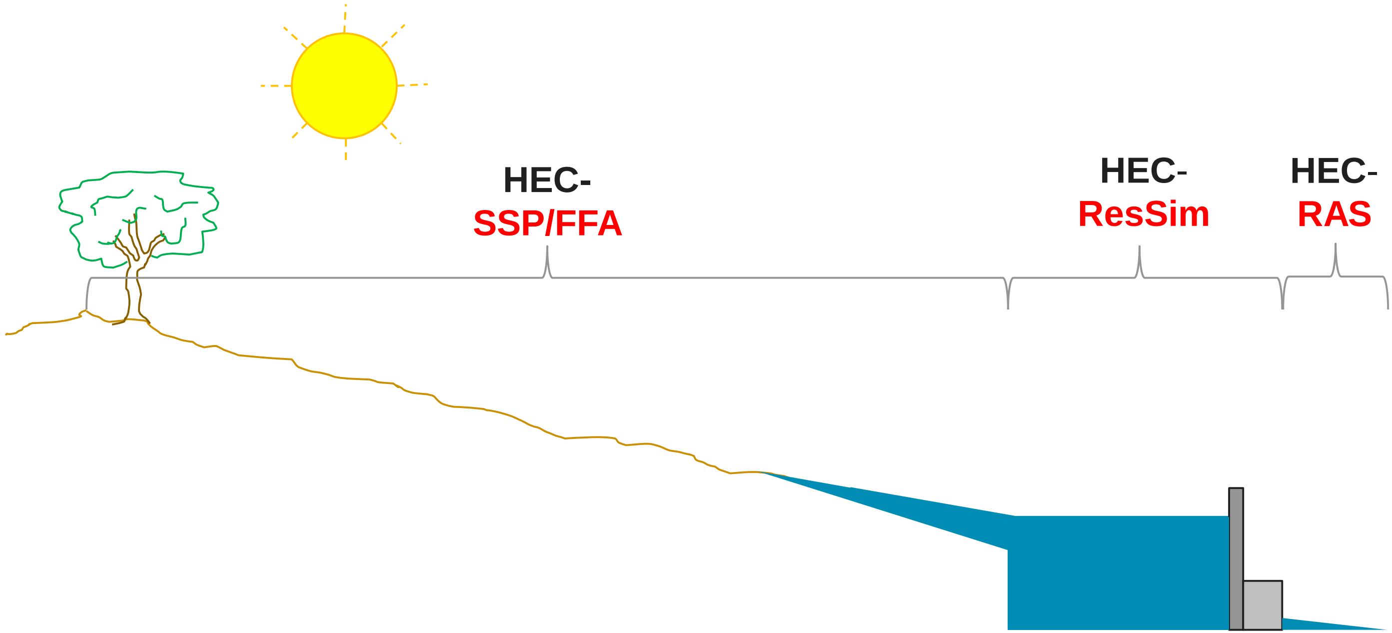


HARRIS DAM RELICENSING

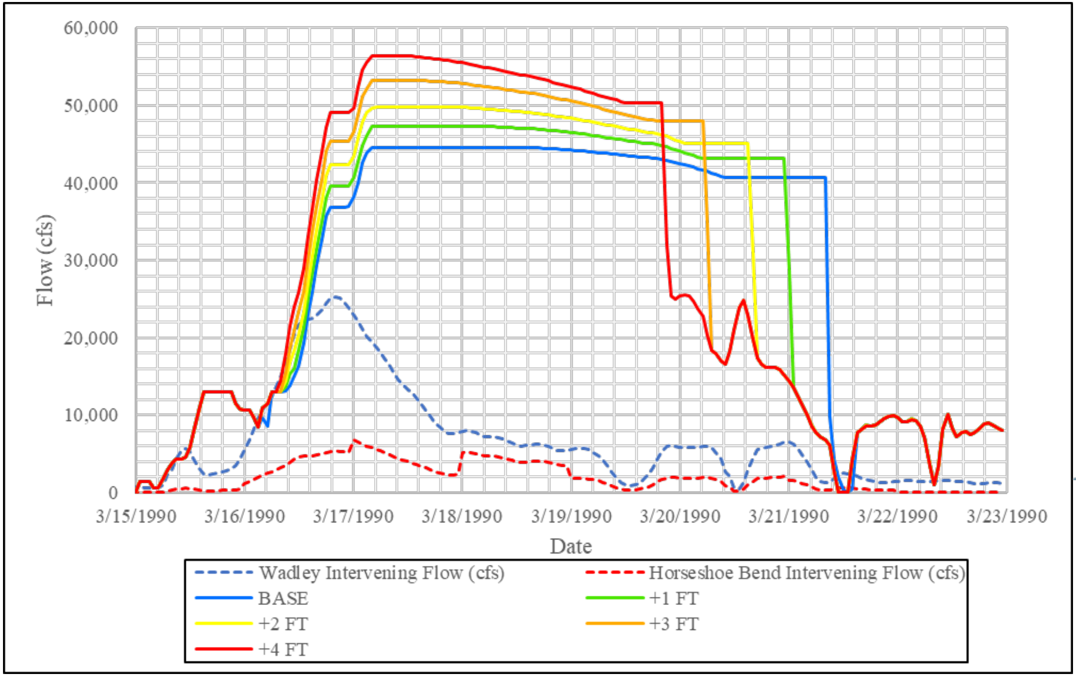
Where the models are used…



HARRIS DAM
RELICENSING

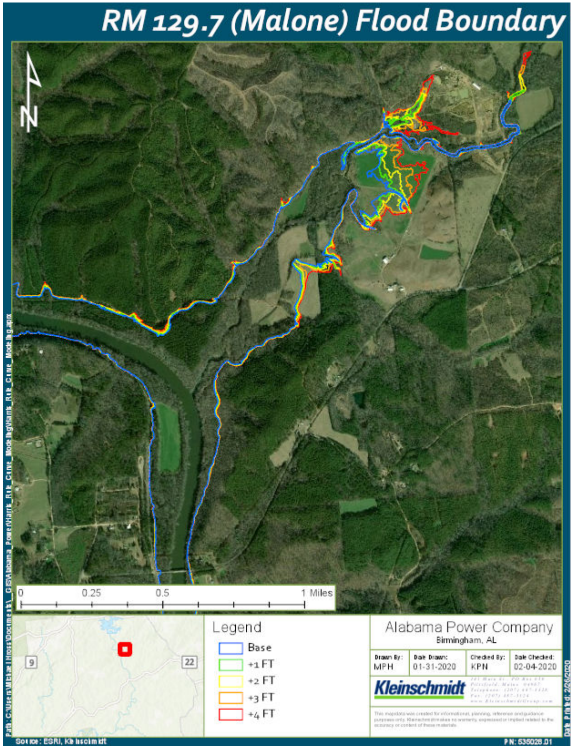
HEC-RAS – MODELED FLOWS

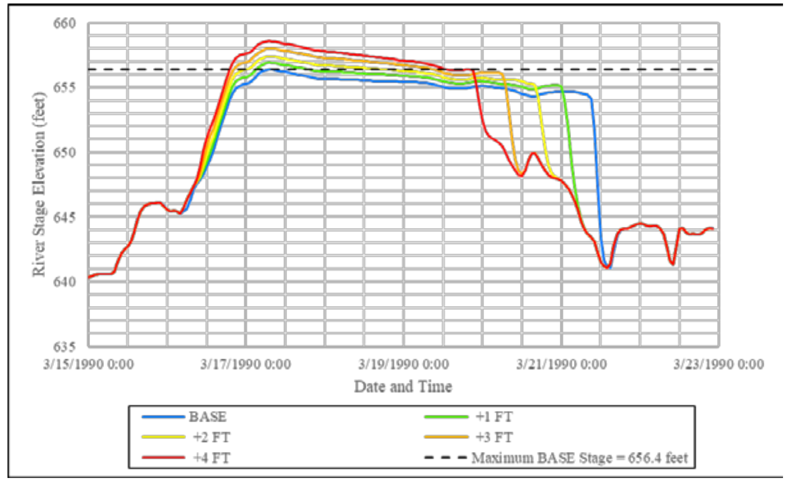
- Base scenario (i.e., existing) and 4 rule curve simulations
  - +1 ft, +2 ft, +3 ft, +4ft
- Intervening flows included in model
  - Flows contributed to river by watershed downstream of the dam
  - Between Harris Dam and Wadley, AL
  - Between Wadley, AL and Horseshoe Bend



HARRIS DAM RELICENSING

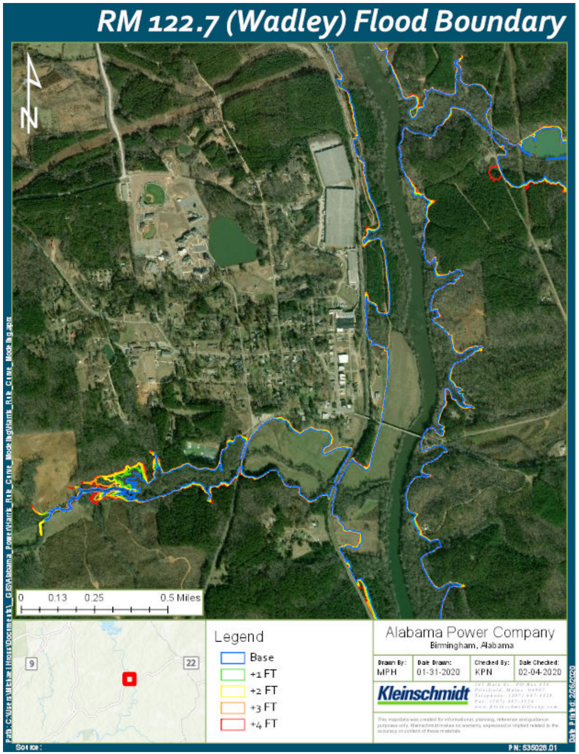
HEC-RAS – MODELING RESULTS

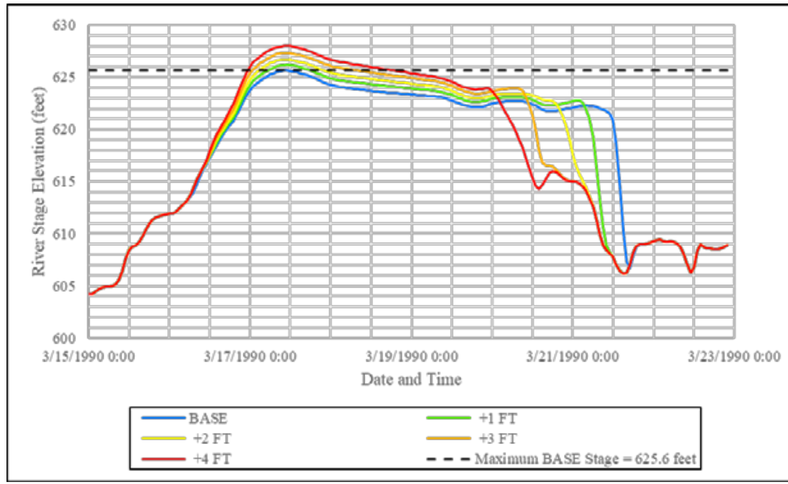




HARRIS DAM
RELICENSING

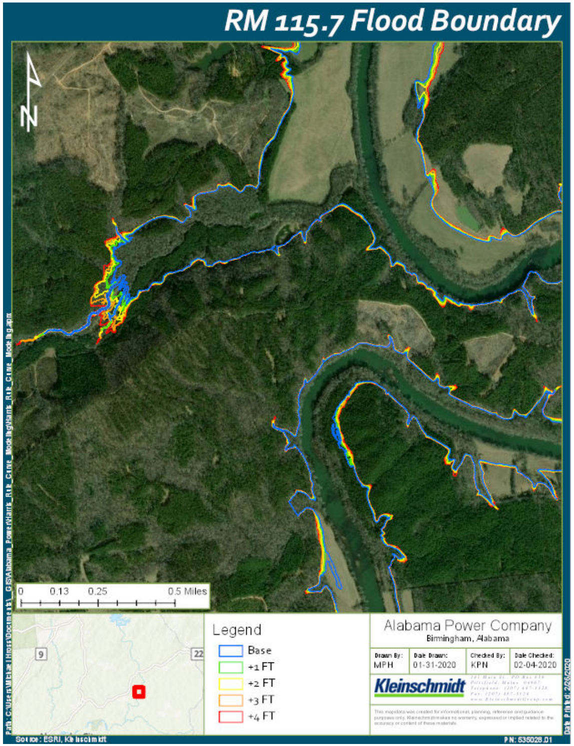
HEC-RAS – MODELING RESULTS

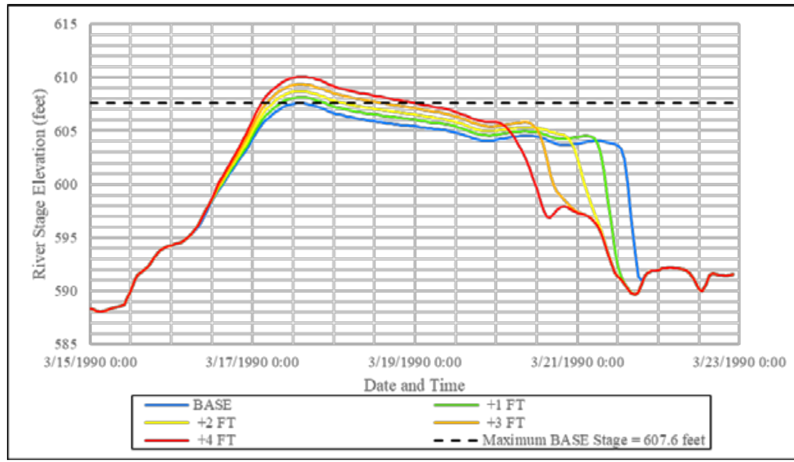




HARRIS DAM RELICENSING

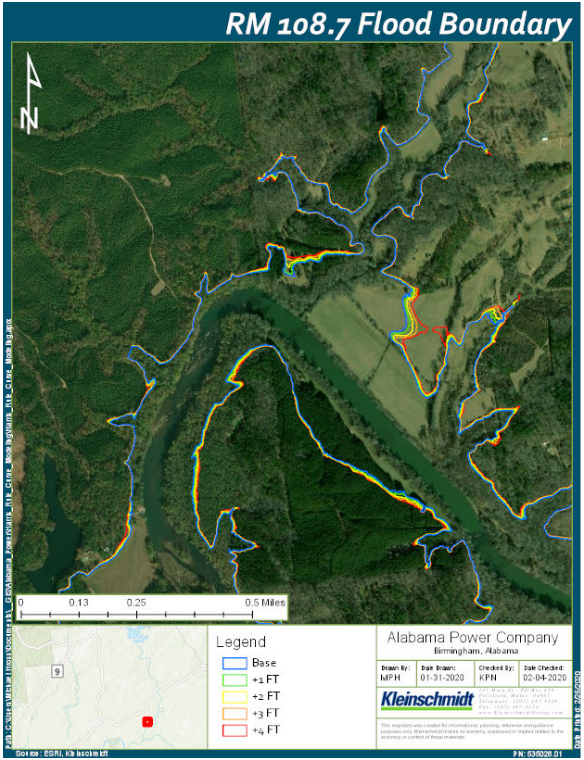
HEC-RAS – MODELING RESULTS

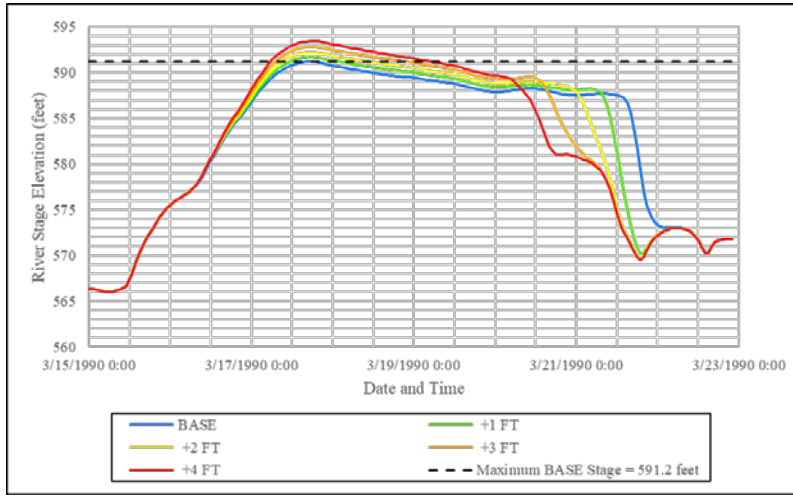




HARRIS DAM
RELICENSING

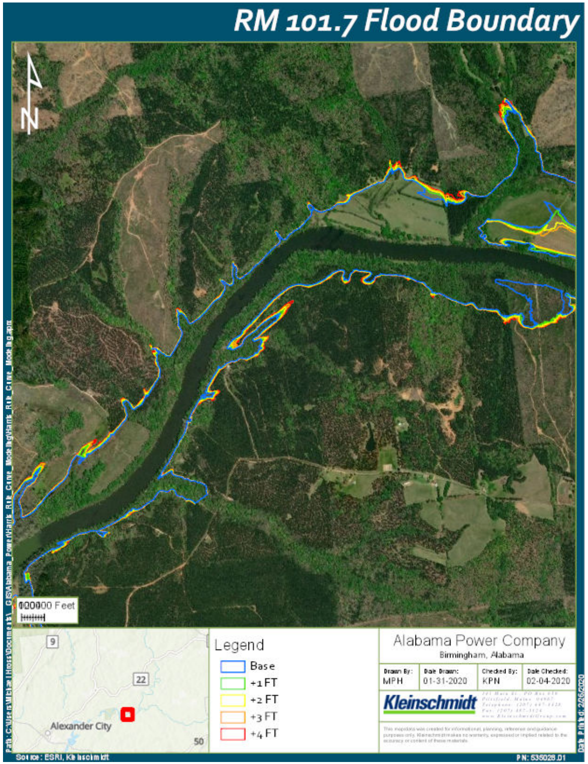
HEC-RAS – MODELING RESULTS

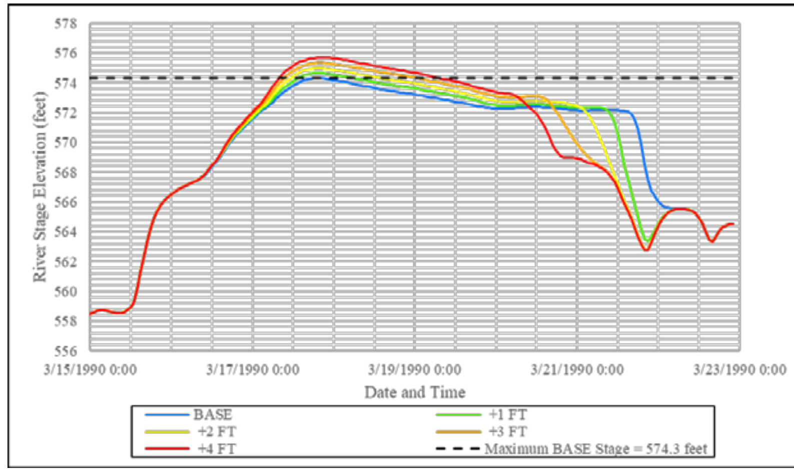




HARRIS DAM RELICENSING

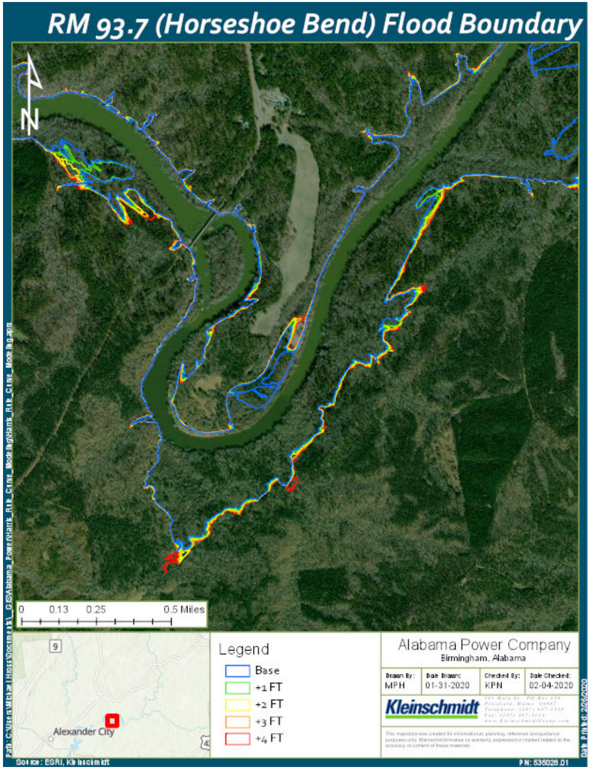
HEC-RAS – MODELING RESULTS

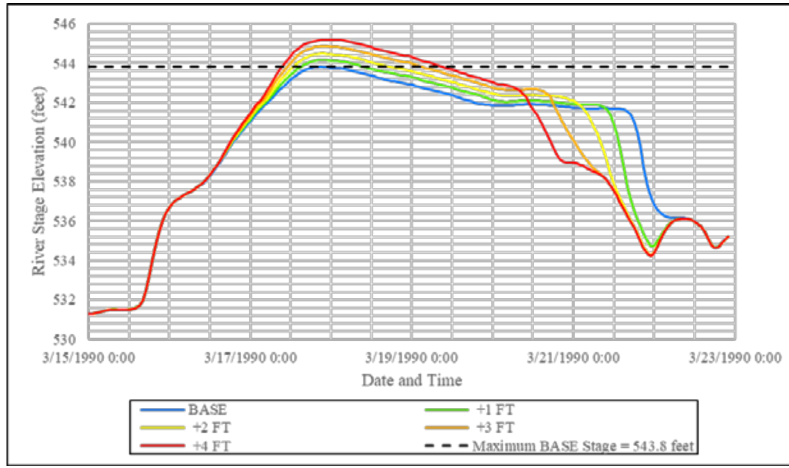




HARRIS DAM
RELICENSING

HEC-RAS – MODELING RESULTS





HARRIS DAM RELICENSING

HEC-RAS – MODEL RESULTS

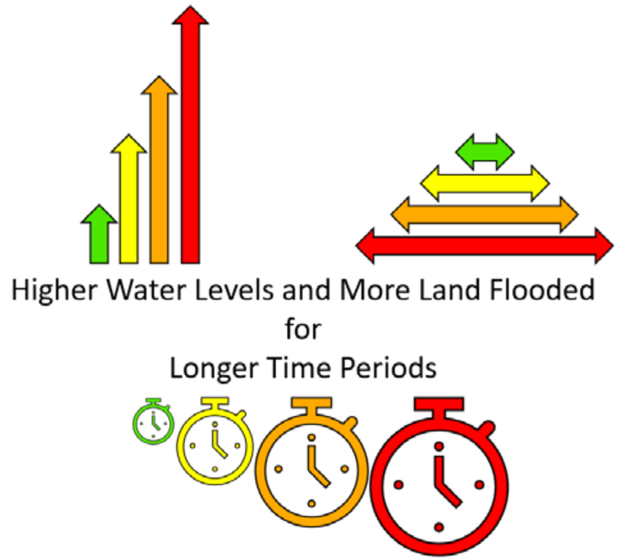
Location	Distance from Dam (miles)	Max Water Surface Rise (feet)			
		+ 1 foot	+ 2 feet	+ 3 feet	+ 4 feet
RM 129.7 (Malone, AL)	7	0.5	1.0	1.6	2.2
RM 122.7 (Wadley, AL)	14	0.5	1.1	1.7	2.4
RM 115.7	21	0.6	1.1	1.8	2.5
RM 108.7	28	0.5	1.0	1.6	2.2
RM 101.7	35	0.4	0.7	1.1	1.4
RM 93.7 (Horseshoe Bend)	43	0.3	0.7	1.0	1.4

Location	Distance from Dam (miles)	Duration above Baseline Condition Max Elevation (hours)			
		+ 1 foot	+ 2 feet	+ 3 feet	+ 4 feet
RM 129.7 (Malone, AL)	7	15	43	61	67
RM 122.7 (Wadley, AL)	14	12	19	32	43
RM 115.7	21	13	21	34	46
RM 108.7	28	14	26	38	48
RM 101.7	35	17	27	40	48
RM 93.7 (Horseshoe Bend)	43	18	29	39	47

HARRIS DAM
RELICENSING

HEC-RAS - SUMMARY

- ❑Any change in the operating curve causes:
  - ❑ increased maximum stage
  - ❑ increase in inundation,
  - ❑ increase in duration
- ❑ Most flooding occurs where tributaries enter Tallapoosa River
- ❑ Will need to evaluate effects on downstream structures



HARRIS DAM
RELICENSING

OPERATING CURVE CHANGE FEASIBILITY ANALYSIS

Variance from Study Plan and Schedule

- ❑ March 2020 HAT 1 meeting cancelled due to COVID-19

Remaining Activities/Modification/Other Proposed Studies

- ❑ Draft Phase 1 study report comments due June 11, 2020
- ❑ Begin Phase 2 analysis on effects of winter operating curve on other resources
- ❑ Present methods for the Lake Recreation Structure Usability at Winter Pool Alternatives phase 2 analysis to HAT 1 and HAT 5
- ❑ Present methods for evaluating effects on inundated structures downstream of Harris Dam
- ❑ No additional studies have been proposed beyond that in FERC's SPD

QUESTIONS?

HARRIS DAM
RELICENSING

DOWNSTREAM RELEASE ALTERNATIVES

Study Purpose and Methods Summary

- To evaluate the effects of pre- and post- implementation of Green Plan operations, a continuous minimum flow of 150 cfs, and an alternative/modified Green Plan operation on Project resources.

Study Progress

- RES-Sim outflow hydrographs developed
- HEC-RAS model complete;
- Navigation, ADROP and Hydrobudget analyses
- Draft report distributed to stakeholders

HARRIS DAM RELICENSING

HEC-RAS – MODELED SCENARIOS

- 3 Downstream Release Alternative Plans
  - Pre-Green
  - Green Plan
  - 150 cfs Continuous Minimum Flow
- 2001 Selected as an average year
  - Intervening flows included in model
    - Flows contributed to river by watershed downstream of the dam
    - Between Harris Dam and Wadley, AL
    - Between Wadley, AL and Horseshoe Bend
  - Intervening flow data from USGS gages at Wadley, 02414500 and near Horseshoe Bend, 02414715

HARRIS DAM RELICENSING

PHASE 1 MODELING RESULTS

- Lake Level Impacts: none
- Generation Impacts
  - Pre-Green Plan: + $357,000 per year
  - Green Plan: none (current operation mode)
  - 150 cfs Continuous Minimum Flow: undetermined
- Flood Control Impacts: none
- Navigation Impacts: none
- Drought Operation Impacts: none

HARRIS DAM
RELICENSING

DOWNSTREAM RELEASE ALTERNATIVES

Variance from Study Plan and Schedule

- March 2020 HAT 1 meeting cancelled due to COVID-19

Remaining Activities/Modification/Other Proposed Studies

- Draft Phase 1 study report comments due June 11, 2020
- Begin Phase 2 analysis on effects of downstream release alternatives on other resources
- No additional studies have been proposed beyond that in FERC's SPD

QUESTIONS?

HARRIS DAM RELICENSING

HAT 2 Water Quality and Use

- ❑ Water Quality Study
- ❑ Erosion and Sedimentation Study

HARRIS DAM
RELICENSING

WATER QUALITY

Study Purpose and Methods Summary

- Summarizes data collected from 2017 through 2019 from Alabama Power, Alabama Department of Environmental Management (ADEM), and Alabama Water Watch (AWW)
- Supports the required 401 Water Quality Certification by conducting dissolved oxygen and water temperature monitoring in the tailrace and Harris Reservoir forebay
- Identifies any possible areas of water quality concern by HAT 2 participants

Study Progress

- Held HAT 2 meeting on September 11, 2019
- HAT 2 stakeholders identified one location of water quality concern: the Foster's Bridge area at Lake Harris
- Distributed Draft Water Quality Report March 9, 2020
- Collected dissolved oxygen (DO) and temperature data at two locations downstream of the dam and monthly vertical profiles in the Harris Reservoir forebay

HARRIS DAM RELICENSING

WATER QUALITY

Data Collection Results

- ❑ Generation data immediately downstream of Harris Dam in 2018 and 2019 had dissolved oxygen (DO) readings greater than 5 milligrams per liter (mg/L) for 94 percent of all measurements
- ❑Continuous monitoring for generation and non-generation in 2019 had DO levels greater than 5 mg/L for 99.9 percent of all measurements
- ❑Several low DO level readings in 2017 can be attributed to severe drought that impacted the Harris Reservoir in the summer and fall of 2016, where inflows to the lake were at historic lows, causing stronger stratification of Lake Harris
- ❑Data collected by ADEM at Harris Dam, Wadley, and Horseshoe Bend had DO levels above 5 mg/L at each sampling event
- ❑Continuous monitoring at Malone indicated that the DO levels were greater than 5 mg/L for 99 percent of the monitoring period

HARRIS DAM RELICENSING

WATER QUALITY

Variance from the Study Plan and Schedule

- ❑Alabama Power intends to submit an application to ADEM for the 401 Water Quality Certification in April 2021, not in April 2020 as noted in the FERC SPD.

Remaining Activities/Modification/Other Proposed Studies

- ❑Comments on Draft Water Quality Study Report due June 11, 2020
- ❑Review comments on the Draft Water Quality Study Report and modify the Final Report, as applicable
- ❑ Prepare the 401 WQC application and submit to ADEM in April 2021
- ❑ No additional studies have been proposed beyond that in FERC's SPD

QUESTIONS?

HARRIS DAM
RELICENSING

Erosion and Sedimentation

Study Purpose and Methods Summary

- ❑Identify any problematic erosion sites and sedimentation areas and determine the likely causes
  - Identify erosion and sedimentation sites
  - Assess lake erosion sites using a qualified Erosion and Sediment Control Professional
  - Assess bank erosion susceptibility in Tallapoosa River from Harris Dam through Horseshoe Bend
  - Assess sedimentation sites by examining available lake photography and data (LIDAR) and analyzing with Geographic Information System (GIS)

Study Progress

- ❑May 1, 2019 email to HAT 2 members distributed maps of sites identified for assessment and requested additional sites
- ❑September 11, 2019 HAT 2 meeting – Reviewed study plan and last call for erosion and sedimentation sites
- ❑Lake erosion site assessments performed in December 2019
- ❑Bank erosion susceptibility assessment performed in May 2019
- ❑Draft Erosion and Sedimentation Study Report distributed to HAT 2 on March 17, 2020

HARRIS DAM RELICENSING

Erosion and Sedimentation

Lake Harris Erosion Assessment

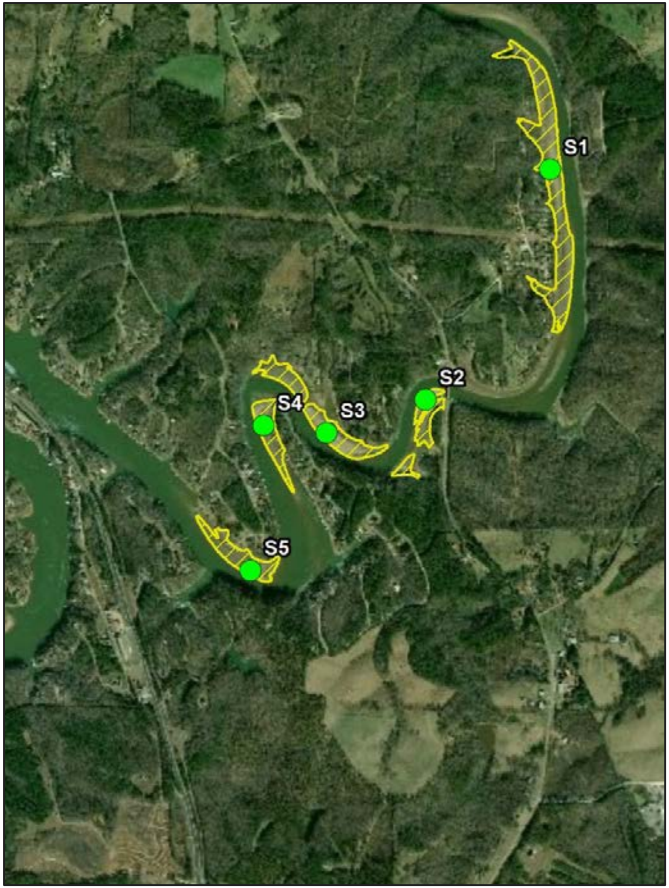
- 24 sites assessed
  - 8 sites – no erosion
  - 16 sites with erosion due to land use (12), anthropogenic (6), and/or natural factors independent of Project operations (8).

HARRIS DAM
RELICENSING

EROSION AND SEDIMENTATION

Lake Harris Sedimentation Assessment

- ❑9 sites assessed – most in Little Tallapoosa arm
- ❑GIS analysis estimated 120 acres
- ❑25% of Little Tallapoosa River basin is hay/pasture fields



Erosion and Sedimentation

Tallapoosa River Assessment

- ❑High Definition Stream Survey (HDSS)
- ❑Left and right banks scored independently
- ❑Only one area was impaired to non-functional

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

HARRIS DAM RELICENSING

Erosion and Sedimentation


1 –Fully Functional


4 – Impaired

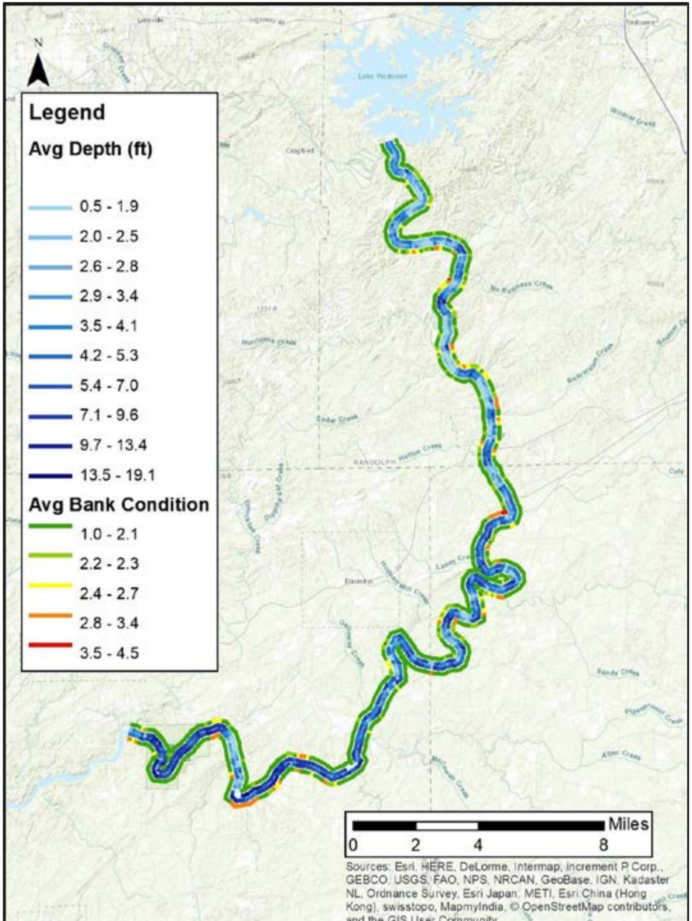

2 –Functional


5 – Non-Functional


3 – Slightly Impaired

HARRIS DAM RELICENSING

Erosion and Sedimentation



Erosion and Sedimentation

Variance from the Study Plan and Schedule

- ❑ No variance from the study plan or schedule.

Remaining Activities/Modification/Other Proposed Studies

- ❑ Draft Erosion and Sedimentation Study Report comments due June 11, 2020
- ❑ Additional reconnaissance at Lake Harris sedimentation site during full (summer) pool conditions to determine if any nuisance aquatic vegetation is present
- ❑ No additional studies have been proposed beyond that in FERC's SPD

QUESTIONS?

HARRIS DAM
RELICENSING

HAT 3 Fish and Wildlife

- ❑Threatened and Endangered Species Study
- ❑Downstream Aquatic Habitat Study
- ❑ Aquatic Resources Study

HARRIS DAM
RELICENSING

THREATENED & ENDANGERED SPECIES

Study Purpose and Methods Summary

- ❑Determine if listed species occur in the Project Area and identify potential project impacts
  - Compile a list of T&E species and critical habitats
  - Review literature of agreed upon species to gather habitat requirement data and describe historical range.
  - Identify factors affecting the status of each species.
  - Use GIS to map habitat information to determine possible areas in the geographic scope that T&E species may utilize.
  - Summarize collected data of areas within the geographic scope that provide habitat requirements for T&E species.
  - Determine if these areas are potentially impacted by Harris Project operations.
  - Perform field surveys, as appropriate

Study Progress

- ❑August 27, 2019 – Reviewed Study Plan and discussed need for field surveys
- ❑Surveyed for fine-lined pocketbook (mussel) in Tallapoosa River (November 2019)
- ❑Draft Threatened and Endangered Species Desktop Assessment complete

HARRIS DAM RELICENSING

THREATENED & ENDANGERED DESKTOP STUDY

Federally Threatened and Endangered Species Potentially Occurring in AL Counties within Project Vicinity

- 20 species: 7 threatened, 13 endangered
  - Harris – 7 species
    - Red-cockaded woodpecker
    - Southern pigtoe and fine-lined pocketbook
    - Indiana bat and northern long-eared bat
    - Little amphianthus and white fringeless orchid
  - Skyline – 16 species
    - Palezone shiner and spotfin chub
    - 8 mussel species
    - Indiana bat, northern long-eared bat, and gray bat
    - White fringeless orchid, Price’s potato bean, Morefield’s leather flower

THREATENED & ENDANGERED DESKTOP STUDY

	Habitat Occurrence	
Species	**Skyline**	**Lake Harris**
Fine-lined pocketbook		✓
Southern pigtoe		✓
Gray bat	✓	
Indiana bat	✓	✓
Northern long-eared bat	✓	✓
Little amphianthus		✓
Price’s potato bean	✓	
White fringeless orchid	✓	✓
Red-cockaded woodpecker		✓

HARRIS DAM RELICENSING

Threatened & Endangered Desktop Study

USFWS Designated Critical Habitat

- ❑Fine-lined pocketbook
- ❑Indiana bat
- ❑Rabbitsfoot
- ❑Slabside pearlymussel
- ❑Southern pigtoe
- ❑Spotfin chub

HARRIS DAM RELICENSING

THREATENED & ENDANGERED SPECIES

Variance from the Study Plan and Schedule

- March 2020 HAT 3 meeting was cancelled due to COVID-19

Remaining Activities/Modifications/Other Proposed Studies

- Comments on Draft Threatened and Endangered Species Desktop Assessment due June 11, 2020
- Additional consultation with USFWS as needed
- Additional surveys in spring/summer 2020: palezone shiner and fine-lined pocketbook
- No additional studies have been proposed beyond that in FERC's SPD

QUESTIONS?

DOWNSTREAM AQUATIC HABITAT

Study Purpose and Methods Summary

- ❑To develop a model that describes the relationship between Green Plan operations and aquatic habitat.

Study Progress

- ❑Use HEC-RAS to evaluate the effect of current operations on the amount and persistence of wetted aquatic habitat, especially shoal/shallow-water habitat.
  - Model runs of Green Plan vs Pre-Green Plan operations
- ❑Mesohabitat analysis (classified as riffle, run, or pool) complete
- ❑20 Level/temperature loggers deployed in 2019
- ❑HAT 3 March 20, 2019 Meeting – Reviewed Study Plan and draft mesohabitat analysis
- ❑HAT 3 December 11, 2019 – Reviewed study progress and proposed methodology for analyzing results from HEC-RAS
- ❑February 20, 2020 – HAT 3 Meeting to review proposed analysis methodology and initial results of wetted perimeter analysis

HARRIS DAM RELICENSING

DOWNSTREAM AQUATIC HABITAT

Variance from the Study Plan and Schedule

❑March 2020 HAT 3 meeting was cancelled due to COVID-19

Remaining Activities/Modifications/Other Proposed Studies

❑Level loggers continue to collect data through June 2020

❑Analysis of HEC-RAS results

❑Develop temperature component of HEC-RAS model (spring 2020)

❑Draft Report in June 2020

❑No additional studies have been proposed beyond that in FERC's SPD

QUESTIONS?

HARRIS DAM
RELICENSING

AQUATIC RESOURCES

Study Purpose and Methods Summary

❑Evaluate the effects of the Harris Project on aquatic resources.

Study Progress

❑Desktop Assessment of Aquatic Resources (Kleinschmidt)

❑Downstream Fish Population Research (Auburn)

- Fish Temperature Requirements
- Assessment of Temperature Data from Regulated and Unregulated Reaches
- Fish Community Surveys
  - Wadeable standardized (30+2) sampling
  - Boat Electrofishing
- Bioenergetics Modeling

HARRIS DAM
RELICENSING

Downstream Fish Population Research

- Literature review of temperature requirements of target species: Redbreast Sunfish, Channel Catfish, Tallapoosa Bass, and Alabama Bass
  - Spotted Bass temperature review will be used in place of Alabama Bass
- Fish sampling at Horseshoe Bend, Wadley, Lee’s Bridge (control site), and Harris Dam tailrace
  - Sampling in April, May, July, September, November 2019 and January and March 2020
  - Individual fish weighed, measured, sexed, had gonads removed and weighed, had diets removed from stomachs and preserved, and had otoliths removed and stored to be evaluated
  - To date, all diets quantified, all prey items identified, and all diet data entered into databank
- Target species specimens being used in respirometry tests
  - Intermittent flow static respirometry tests: data will be used in bioenergetics models
  - Swimming respirometry to quantify performance capabilities of fish

HARRIS DAM RELICENSING

AQUATIC RESOURCES

Variance from Study Plan and Schedule

- ❑March 2020 HAT 3 meeting was cancelled due to COVID-19
- ❑Auburn University exploring alternatives to electromyogram radio tags

Remaining Activities/Modifications/Other Proposed Studies

- ❑Desktop Assessment of Aquatic Resources
- ❑Downstream Fish Population Research
  - Fish Temperature Requirements
  - Assessment of Temperature Data from Regulated and Unregulated Reaches
  - Fish Community Surveys
    - Wadeable standardized (30+2) sampling
    - Boat Electrofishing
  - Bioenergetics Modeling
  - Consider Alternative “Control” Site Upstream of Reservoir
  - Tag and Track Fish During Summer 2020
  - Continue Static Respirometry Tests at 10 and 21°C
  - Continue Measuring Active Metabolic Rates (Combination of Increasing Water Velocity and Decreasing Water Temperature)
- ❑Draft Aquatic Resources Study Report in July 2020
- ❑No additional studies have been proposed beyond that in FERC’s SPD

HARRIS DAM RELICENSING

QUESTIONS?

Next Steps

Next Steps

- ❑ Alabama Power will file a summary of the ISR meeting on **May 12, 2020**
- ❑ Comments on the ISR and ISR meeting summary should be submitted to FERC by **June 11, 2020**
- ❑ Any requests for modifying the FERC approved study plan must follow 18 CFR Section 5.15 (d) and (e)
- ❑ Comments on the draft study reports should be submitted to Alabama Power at harrisrelicensing@southernco.com by **June 11, 2020**

HARRIS DAM
RELICENSING

Next Steps in Relicensing Process

- ❑Additional HAT meetings (2020-2021)
- ❑Second Study Season/Phase II (2020/2021)
- ❑Progress Update (10/2020)
- ❑File Updated Study Report (4/12/2021)
- ❑ File Updated Study Report Meeting Summary (4/27/2021)
- ❑File Preliminary Licensing Proposal (PLP) (by 7/3/2021)
- ❑Comments on Preliminary Licensing Proposal, Additional Information Request (if necessary) (90 days from issuance of PLP or by 10/1/2021)
- ❑File Final License Application (11/30/2021)

Questions?

HARRIS DAM
RELICENSING

HARRIS DAM

RELICENSING

Alabama Power

From: APC Harris Relicensing
To: "harrisrelicensing@southernco.com"
Bcc: eddieplemons@charter.net; 1942jthompson420@gmail.com; 9sling@charter.net; alcondir@aol.com; allan.creamer@ferc.gov; alpeeple@southernco.com; amanda.fleming@kleinschmidtgroup.com; amanda.mcbride@ahc.alabama.gov; amccartn@blm.gov; ammcvica@southernco.com; amy.silvano@dcnr.alabama.gov; andrew.nix@dcnr.alabama.gov; arsegars@southernco.com; athall@fujifilm.com; aubie84@yahoo.com; awhorton@corblu.com; bart_roby@msn.com; baxterchip@yahoo.com; bboozer6@gmail.com; bdavis081942@gmail.com; beckyrainwater1@yahoo.com; bill_pearson@fws.gov; blacklake20@gmail.com; blm_es_inquiries@blm.gov; bob.stone@smimail.net; bradandsue795@gmail.com; bradfordt71@gmail.com; brian.atkins@adeca.alabama.gov; bruce.bradford@forestry.alabama.gov; bsmith0253@gmail.com; butchjackson60@gmail.com; bwhaley@randolphcountyeda.com; carolbuggknight@hotmail.com; celestine.bryant@actribe.org; cengstrom@centurytel.net; ceo@jcchamber.com; cggoodma@southernco.com; cgnav@uscg.mil; chad@cleburnecountychamber.com; chandlermary937@gmail.com; chiefknight2002@yahoo.com; chimneycove@gmail.com; chris.goodell@kleinschmidtgroup.com; chris.greene@dcnr.alabama.gov; chris.smith@dcnr.alabama.gov; chris@alaudubon.org; chuckdenman@hotmail.com; clark.maria@epa.gov; claychamber@gmail.com; clint.lloyd@auburn.edu; cljohnson@adem.alabama.gov; clowry@alabamarivers.org; cmnix@southernco.com; coetim@aol.com; colin.dinken@kleinschmidtgroup.com; cooper.jamal@epa.gov; coty.brown@alea.gov; craig.litteken@usace.army.mil; crystal.davis@adeca.alabama.gov; crystal.lakewedoweedocks@gmail.com; crystal@hunterbend.com; dalerose120@yahoo.com; damon.abernethy@dcnr.alabama.gov; dbronson@charter.net; dcnr.wffdirector@dcnr.alabama.gov; decker.chris@epa.gov; devridr@auburn.edu; dfarr@randolphcountyalabama.gov; dhayba@usgs.gov; djmoore@adem.alabama.gov; dkanders@southernco.com; dolmoore@southernco.com; donnamat@aol.com; doug.deaton@dcnr.alabama.gov; dpreston@southernco.com; drheinzen@charter.net; ebt.drt@numail.org; eilandfarm@aol.com; el.brannon@yahoo.com; elizabeth-toombs@cherokee.org; emathews@aces.edu; eric.sipes@ahc.alabama.gov; evan.lawrence@dcnr.alabama.gov; evan_collins@fws.gov; eveham75@gmail.com; fal@adem.alabama.gov; fredcanoes@aol.com; gardenergirl04@yahoo.com; garyprice@centurytel.net; gene@wedoweelakehomes.com; georgettraylor@centurylink.net; gerryknight77@gmail.com; gfhorn@southernco.com; gjobsis@americanrivers.org; gld@adem.alabama.gov; glea@wgsarrell.com; gordon.lisa-perras@epa.gov; goxford@centurylink.net; granddadth@windstream.net; harry.merrill47@gmail.com; helen.greer@att.net; henry.mealing@kleinschmidtgroup.com; holliman.daniel@epa.gov; info@aeconline.com; info@tunica.org; inspector_003@yahoo.com; irapar@centurytel.net; irwiner@auburn.edu; j35sullivan@blm.gov; james.e.hathorn.jr@sam.usace.army.mil; jason.moak@kleinschmidtgroup.com; jcandler7@yahoo.com; jcarlee@southernco.com; jec22641@aol.com; jeddins@achp.gov; jefbaker@southernco.com; jeff_duncan@nps.gov; jeff_powell@fws.gov; jennifer.l.jacobson@usace.army.mil; jennifer_grunewald@fws.gov; jerrelshell@gmail.com; jessecunningham@msn.com; jfcrew@southernco.com; jhancock@balch.com; jharjo@alabama-quassarte.org; jhaslbauer@adem.alabama.gov; jhouser@osiny.org; jkwdurham@gmail.com; jlowe@alabama-quassarte.org; jnyerby@southernco.com; joan.e.zehrt@usace.army.mil; john.free@psc.alabama.gov; johndiane@sbcglobal.net; jonas.white@usace.army.mil; josh.benefield@forestry.alabama.gov; jpsparrow@att.net; jsrasber@southernco.com; jthacker@southernco.com; jthroneberry@tnc.org; judymcrealtor@gmail.com; jwest@alabamarivers.org; kajumba.ntale@epa.gov; karen.brunso@chickasaw.net; kate.cosnahan@kleinschmidtgroup.com; kcarleton@choctaw.org; kechandl@southernco.com; keith.gauldin@dcnr.alabama.gov; keith.henderson@dcnr.alabama.gov; kelly.schaeffer@kleinschmidtgroup.com; ken.wills@jcdh.org; kenbarnes01@yahoo.com; kenneth.boswell@adeca.alabama.gov; kmhunt@maxxsouth.net; kmo0025@auburn.edu; kodom@southernco.com; kpritchett@ukb-nsn.gov; kristina.mullins@usace.army.mil; lakewedoweedocks@gmail.com; leeanne.wofford@ahc.alabama.gov; leon.m.cromartie@usace.army.mil; leopoldo_miranda@fws.gov; lewis.c.sumner@usace.army.mil; lgallen@balch.com; lgarland68@aol.com; lindastone2012@gmail.com; llangley@coushattatribela.org; lovvornt@randolphcountyalabama.gov; lswinsto@southernco.com; lth0002@auburn.edu; mark@americanwhitewater.org; matt.brooks@alea.gov; matthew.marshall@dcnr.alabama.gov; mayo.lydia@epa.gov; mcoker@southernco.com; mcw0061@aces.edu; mdollar48@gmail.com; meredith.h.ladart@usace.army.mil; mhpwedowee@gmail.com; mhunter@alabamarivers.org; michael.w.creswell@usace.army.mil; midwaytreasures@bellsouth.net; mike.holley@dcnr.alabama.gov; mitchell.reid@tnc.org; mlen@adem.alabama.gov; mnedd@blm.gov; monte.terhaar@ferc.gov; mooretn@auburn.edu; mprandolphwater@gmail.com; nancyburnes@centurylink.net; nanferebee@juno.com; nathan.aycock@dcnr.alabama.gov; orr.chauncey@epa.gov; pace.wilber@noaa.gov; partnersinfo@wwfus.org; patti.powell@dcnr.alabama.gov; patty@ten-o.com; paul.trudine@gmail.com; ptrammell@reddyice.com; publicaffairs@doc.gov; rachel.mcnamara@ferc.gov; raebutler@mcn-nsn.gov; rancococ@teleclipse.net; randall.b.harvey@usace.army.mil; randy@randyrogerslaw.com; randy@wedoweemarine.com; rbmorris222@gmail.com; rcodydeal@hotmail.com; reuteem@auburn.edu; richardburnes3@gmail.com; rick.oates@forestry.alabama.gov; rickmcwhorter723@icloud.com; rifraft2@aol.com; rjdavis8346@gmail.com; robert.a.allen@usace.army.mil; robinwaldrep@yahoo.com; roger.mcneil@noaa.gov; ron@lakewedowee.org; rosoweka@mcn-nsn.gov; russtown@nc-cherokee.com; ryan.prince@forestry.alabama.gov; sabrinawood@live.com; sandnfrench@gmail.com; sarah.salazar@ferc.gov; sbryan@pci-nsn.gov; scsmith@southernco.com; section106@mcn-nsn.gov; sforehand@russelllands.com; sgraham@southernco.com; sherry.bradley@adph.state.al.us; sidney.hare@gmail.com; simsthe@aces.edu; snelson@nelsonandco.com; sonjahollomon@gmail.com; steve.bryant@dcnr.alabama.gov; stewartjack12@bellsouth.net; straylor426@bellsouth.net; sueagnew52@yahoo.com; tdadunaway@gmail.com; thpo@pci-nsn.gov; thpo@tttown.org; timguffey@jcch.net; tlamberth@russelllands.com; tlmills@southernco.com; todd.fobian@dcnr.alabama.gov; tom.diggs@ung.edu; tom.lettieri47@gmail.com; tom.littlepage@adeca.alabama.gov; tpfreema@southernco.com; trayjim@bellsouth.net; triciastearns@gmail.com; twstjohn@southernco.com; variscom506@gmail.com; walker.mary@epa.gov; william.puckett@swcc.alabama.gov; wmcampbell218@gmail.com; wrighr2@aces.edu; wsgardne@southernco.com; wtanders@southernco.com

Subject: Harris Relicensing - Initial Study Report Meeting Summary
Date: Tuesday, May 12, 2020 12:16:34 PM
Attachments: 2020-05-12 ISR Meeting Summary.pdf

Harris relicensing stakeholders,

The meeting summary from the April 28th Initial Study Report meeting, including a list of attendees and the meeting presentation, was filed with FERC today. The meeting summary is attached and can also be found at www.harrisrelicensing.com.

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

HAT 1 and HAT 5 meeting - June 4

APC Harris Relicensing <g2apchr@southernco.com>

Wed 5/20/2020 6:45 PM

To: 'harrisrelicensing@southernco.com' <harrisrelicensing@southernco.com>
Bcc: damon.abernethy@dcnr.alabama.gov <damon.abernethy@dcnr.alabama.gov>; nathan.aycock@dcnr.alabama.gov <nathan.aycock@dcnr.alabama.gov>; steve.bryant@dcnr.alabama.gov <steve.bryant@dcnr.alabama.gov>; todd.fobian@dcnr.alabama.gov <todd.fobian@dcnr.alabama.gov>; chris.greene@dcnr.alabama.gov <chris.greene@dcnr.alabama.gov>; keith.henderson@dcnr.alabama.gov <keith.henderson@dcnr.alabama.gov>; mike.holley@dcnr.alabama.gov <mike.holley@dcnr.alabama.gov>; evan.lawrence@dcnr.alabama.gov <evan.lawrence@dcnr.alabama.gov>; matthew.marshall@dcnr.alabama.gov <matthew.marshall@dcnr.alabama.gov>; brian.atkins@adeca.alabama.gov <brian.atkins@adeca.alabama.gov>; tom.littlepage@adeca.alabama.gov <tom.littlepage@adeca.alabama.gov>; jhaslbauer@adem.alabama.gov <jhaslbauer@adem.alabama.gov>; cljohnson@adem.alabama.gov <cljohnson@adem.alabama.gov>; mlen@adem.alabama.gov <mlen@adem.alabama.gov>; fal@adem.alabama.gov <fal@adem.alabama.gov>; djmoore@adem.alabama.gov <djmoore@adem.alabama.gov>; arsegars@southernco.com <arsegars@southernco.com>; dkanders@southernco.com <dkanders@southernco.com>; wtanders@southernco.com <wtanders@southernco.com>; jefbaker@southernco.com <jefbaker@southernco.com>

Please join us for a HAT 1 and HAT 5 meeting on Thursday, June 4, 2020 from 9 AM-11 AM. This meeting will be a combined HAT meeting because one of the analyses pertains to both the Operations HAT and the Recreation HAT. The two methodologies we will present include:

1. Methodology for analyzing downstream structures that would be affected by increased flooding downstream of Harris Dam as a result of raising the winter operating curve 1-4 feet higher than existing conditions. This analysis will be part of Phase 2 of the Operating Curve Change Feasibility Analysis Study.
2. Methodology for evaluating the private and public structures (i.e., boat ramps, boat docks/courtesy piers, etc.) on Lake Harris that would be useable at each of the four winter operating curve elevations. This analysis is referred to in both the Recreation Evaluation Study and the Operating Curve Change Feasibility Analysis Study.

Participants will have an opportunity to ask questions and comment on these methods.

Join Skype Meeting

Trouble Joining? Try Skype Web App

Join by phone

+1 (205) 257-2663

Conference ID: 3264749

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

HAT 1 and 5 meeting - tomorrow

APC Harris Relicensing <g2apchr@southernco.com>

Wed 6/3/2020 8:14 PM

To: 'harrisrelicensing@southernco.com' <harrisrelicensing@southernco.com>
Bcc: damon.abernethy@dcnr.alabama.gov <damon.abernethy@dcnr.alabama.gov>; nathan.aycock@dcnr.alabama.gov <nathan.aycock@dcnr.alabama.gov>; steve.bryant@dcnr.alabama.gov <steve.bryant@dcnr.alabama.gov>; todd.fobian@dcnr.alabama.gov <todd.fobian@dcnr.alabama.gov>; chris.greene@dcnr.alabama.gov <chris.greene@dcnr.alabama.gov>; keith.henderson@dcnr.alabama.gov <keith.henderson@dcnr.alabama.gov>; mike.holley@dcnr.alabama.gov <mike.holley@dcnr.alabama.gov>; evan.lawrence@dcnr.alabama.gov <evan.lawrence@dcnr.alabama.gov>; matthew.marshall@dcnr.alabama.gov <matthew.marshall@dcnr.alabama.gov>; brian.atkins@adeca.alabama.gov <brian.atkins@adeca.alabama.gov>; tom.littlepage@adeca.alabama.gov <tom.littlepage@adeca.alabama.gov>; jhaslbauer@adem.alabama.gov <jhaslbauer@adem.alabama.gov>; cljohnson@adem.alabama.gov <cljohnson@adem.alabama.gov>; mlen@adem.alabama.gov <mlen@adem.alabama.gov>; fal@adem.alabama.gov <fal@adem.alabama.gov>; djmoore@adem.alabama.gov <djmoore@adem.alabama.gov>; arsegars@southernco.com <arsegars@southernco.com>; dkanders@southernco.com <dkanders@southernco.com>; wtanders@southernco.com <wtanders@southernco.com>; jefbaker@southernco.com <jefbaker@southernco.com>

2 attachments (2 MB)

2020-6-4 HAT 1 and 5 meeting - Phase 2 structure analysis.pdf; 2020-6-4 HAT 1 and 5 meeting - downstream structure survey.pdf;

Attached are the presentations for tomorrow's HAT 1 and 5 meeting.

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

Please join us for a HAT 1 and HAT 5 meeting on Thursday, June 4, 2020 from 9 AM-11 AM. This meeting will be a combined HAT meeting because one of the analyses pertains to both the Operations HAT and the Recreation HAT. The two methodologies we will present include:

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Participants will have an opportunity to ask questions and comment on these methods.

Join Skype Meeting

Trouble Joining? Try Skype Web App

Join by phone

+1 (205) 257-2663
Conference ID: 3264749

Thanks,

R.L. Harris Dam Relicensing
FERC No. 2628

HAT 1 Meeting
June 4, 2020

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Operating Curve Change Feasibility Analysis

Phase II Downstream Structure Survey

Phone Etiquette

- ❑Be patient with any technology issues
- ❑Follow the facilitator’s instructions
- ❑Phones will be muted during presentations
- ❑Follow along with PDF of presentations
- ❑Write down any questions you have for the designated question section
- ❑Clearly state name and organization when asking questions
- ❑Facilitator will ask for participant questions following each section of the presentation

HARRIS DAM RELICENSING

Harris Downstream Structure Survey

- An operating curve change may affect areas downstream of Harris Dam
  - Effects are associated with flooding

- Phase 2 of the Operating Curve Change Feasibility Analysis will include:
  - Identifying affected structures
  - # of structures
  - Location
  - Depth & duration of inundation

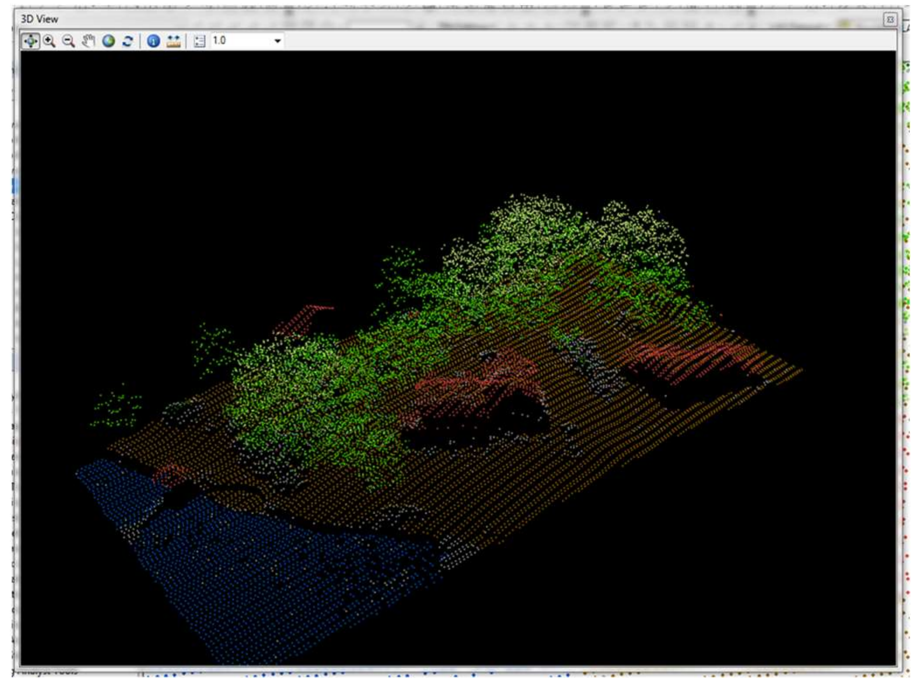
- Identifying structures is no small task

Methods: Remote Sensing

- LiDAR – 4 points per m^2

- 1 m USDA NAIP 4 band image (R, G, B, NiR)

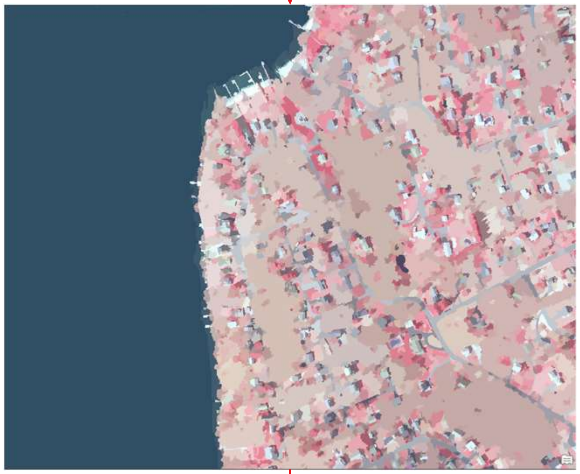
- Classification Workflow:
    - Data management
    - Create training data
    - Classify image pixels
    - QAQC – Confusion Matrix



Methods: OBIA

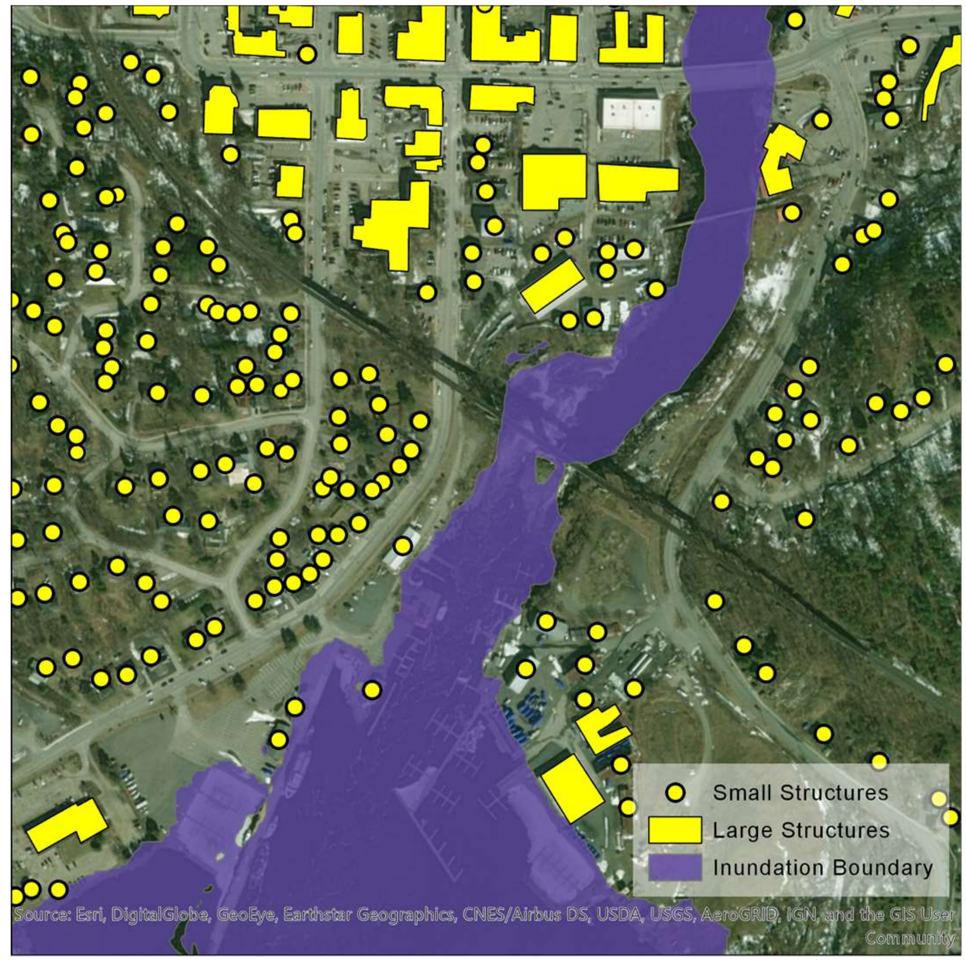
- Object Based Image Analysis in ArcGIS Pro Image Analyst

1. Group pixels into objects - segmentation
2. Create training data
3. Classify Image
4. Assess quality with Confusion Matrix
5. Heads up digitizing
6. Spatial intersection & summarize



Anticipated Output

- Once identified – we will use a GIS to find structures impacted with a spatial intersection
- Series of maps showing location of all structures with symbols for flooded vs. not flooded
- Summary statistics in report
  - # of structures affected by rule curve
  - Min., Avg., Max. depth of inundation
  - Min., Avg., Max. duration of inundation
- Results will be in Phase II Report



R.L. Harris Dam Relicensing
FERC No. 2628

HAT 1 & 5 Meetings
June 4, 2020

HARRIS DAM
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Operating Curve Change Feasibility Analysis

Phase II Lake Recreation Structure Usability at Winter Pool Alternatives

Phone Etiquette

- ❑Be patient with any technology issues
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- ❑Follow along with PDF of presentations
- ❑Write down any questions you have for the designated question section
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- ❑Facilitator will ask for participant questions following each section of the presentation

Recreation Structure Usability at Winter Pool Alternatives

Objectives Described in the Study Plan

- Evaluate "…the number of private docks usable during the current winter drawdown and the lowest possible elevation that public boat ramps can be used."
- Private docks defined as boathouses, floats, piers, wet slips, and boardwalks
- Will "…compare the number of access points (both private docks and public boat ramps) available at each 1-foot increment change…"

Methods

- LiDAR used to measure elevation (785, 786, 787, 788, 789 ft msl contours)
- Elevation data used to calculate depth at point
- Depth for points beyond the 785 ft msl contour will be estimated by slope analysis

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Recreation Structure Usability at Winter Pool Alternatives

Boathouses

- Point moved to the back of each of these structures
- Structure considered usable with 2 ft of water at the back edge

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Recreation Structure Usability at Winter Pool Alternatives

Floats

- Point moved to the back of each of these structures
- Structure considered usable with 2 ft of water at the back edge

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Recreation Structure Usability at Winter Pool Alternatives

Piers

- Classified into 3 subcategories:
  - Platform (*bottom left*):
    - Piers with a square-shaped platform on the end
    - Point moved to back edge of the platform
    - Analyzed similarly to floats
  - Mooring (*bottom right*):
    - Straight piers > 30 ft
    - Point moved 30 ft back from front edge
  - Fishing (*right*):
    - Straight piers ≤ 30 ft
    - Point moved halfway back from the front edge
- Depth of 2 ft to be usable

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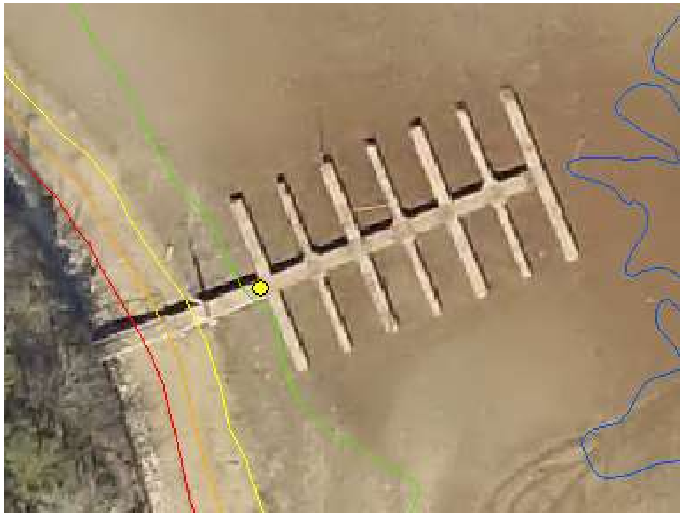
Recreation Structure Usability at Winter Pool Alternatives

Wet Slips

- Some oriented parallel to the bank (*bottom left*) and some perpendicular (*bottom right*)
- The back edge is always the outside edge facing the bank
- Wet slips with multiple slips (*right*) will be considered usable when all slips are usable
- Depth of 2 ft to be usable



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Recreation Structure Usability at Winter Pool Alternatives

Boardwalks

- Point moved to front of structure
- Objective is aesthetics
- Depth of 1 ft at point

Recreation Structure Usability at Winter Pool Alternatives

Public Boat Ramps

- ADCNR typically uses the following criteria for public ramps at low pool:
  - 15% grade at bottom portion of ramp
  - Depth of 4.5 ft at the end of the ramp
  - Able to launch up to 26 ft boat at low pool

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Recreation Structure Usability at Winter Pool Alternatives

Public Boat Ramps

- Highway 48 Bridge:
  - Built using ADCNR standards
  - Usable at 785 ft msl

Recreation Structure Usability at Winter Pool Alternatives

Public Boat Ramps

- Lee's Bridge:
  - Bottom of ramp is ~785.5 ft msl
  - Use a slope analysis to determine the grade
  - Possibly usable ~790.0 ft msl

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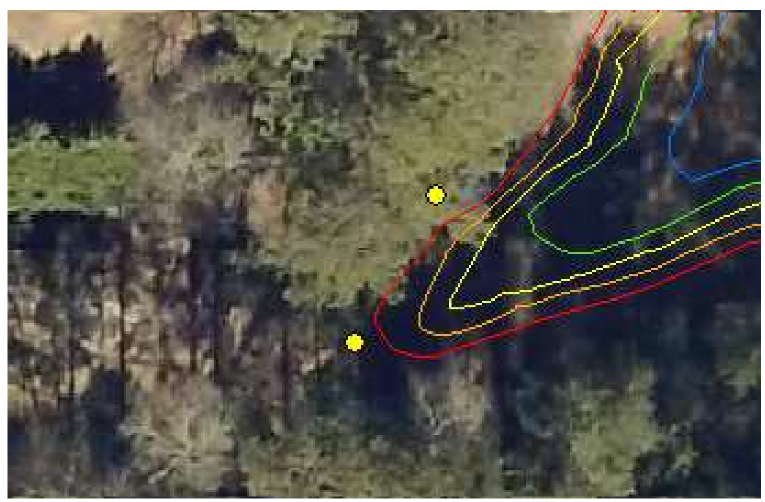
Recreation Structure Usability at Winter Pool Alternatives

Field Observations

- No imagery (*left*):
  - Imagery predates structures
  - ~10.0% of structures
- Not visible (right):
  - Structure obscured by foliage or shadow
  - ~2.5% of structures



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Recreation Structure Usability at Winter Pool Alternatives

Presentation of Data: All Structures

The number and percentage of all usable structures at each winter pool alternative

Winter Pool Elevation (feet msl)	Number of Usable Structures	Percent Usable Structures
785		
786		
787		
788		
789		
>789		

HARRIS DAM RELICENSING

Recreation Structure Usability at Winter Pool Alternatives

Presentation of Data: By Structure

The number and percentage of usable structures by type at each winter pool alternative

Winter Pool Elevation (feet msl)	Number of Usable Structures	Percent Usable Structures
Boardwalks		
785		
786		
787		
788		
789		
>789		
Boathouses		
785		
786		
787		
788		
789		
>789		
Floats		
785		
786		
787		
788		
789		
>789		

HARRIS DAM RELICENSING

Questions?

HARRIS DAM
RELICENSING

Alabama Power

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426
June 10, 2020

OFFICE OF ENERGY PROJECTS

Project No. 2628-065 – Alabama
R.L. Harris Hydroelectric Project
Alabama Power Company

VIA FERC Service

Ms. Angie Anderegg
Harris Relicensing Project Manager
Alabama Power Company
600 North 18th Street Birmingham,
AL 35203

Subject: Staff Comments on the Initial Study Report and Initial Study Report Meeting Summary for the R.L. Harris Hydroelectric Project

Dear Ms. Anderegg:

Staff have reviewed Alabama Power Company's (Alabama Power) Initial Study Report (ISR) and associated draft study reports for the R.L. Harris Hydroelectric Project (Harris Project) filed on April 10, 2020, attended the ISR Meeting held via teleconference on April 28, 2020, and reviewed the ISR Meeting Summary filed on May 12, 2020. Alabama Power filed its ISR two days earlier than the published deadline of April 12, 2020. However, staff is maintaining the original deadline posted in previously issued process plans, June 11, 2020, for filing: comments on the ISR and draft study reports; comments on the ISR Meeting summary; requests for modifications to the approved study plan; and proposals for new studies.

Any stakeholder requests for study plan modifications or new studies should follow the Commission's regulations at 18 C.F.R. § 5.9(b) and 5.15 (2019), which are attached for stakeholder convenience (Attachment B). A copy of the Commission's Integrated Licensing Process (ILP) schedule for the Harris Project pre-filing milestones is attached as a reminder (Attachment C).

Based on a review of the ISR, associated draft study reports, discussions at the ISR Meeting, and a review of the ISR Meeting Summary, staff provide comments and recommended updates on Alabama Power's filings in Attachment A. Unless otherwise noted, please address the comments in Attachment A in the Updated Study Report or the preliminary licensing proposal and license application, as appropriate. Alabama Power's requests for variances to their approved schedules for the Water Quality Study, the Draft Recreation Evaluation Study Report, and the Cultural Resources Study[1] will be addressed after the close of the ISR comment period.

If you have questions please contact Sarah Salazar at (202) 502-6863, or at sarah.salazar@ferc.gov.

Sincerely,

Allan E. Creamer

for Stephen Bowler, Chief
South Branch
Division of Hydropower Licensing

Enclosures: Attachment A
Attachment B
Attachment C

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[1] Alabama Power intends to submit its Clean Water Act section 401 Water Quality Certification application to the Alabama Department of Environmental Management in April 2021 instead of in 2020, as originally proposed. Alabama Power proposes to file its Draft Recreation Evaluation Study Report in August 2020 instead of June 2020 to allow time to complete two new recreation surveys, the Tallapoosa River Downstream Landowner Survey and the Tallapoosa River Recreation User Survey. Alabama Power also proposes to finalize the Area of Potential Effect (APE) for its Cultural Resources Study and file it with documentation of consultation in June 2020.

Attachment A

Staff comments on the Initial Study Report (ISR) and Initial Study Report Meeting Summary

Draft Operating Curve Change Feasibility Analysis (Phase 1) Study Report

1. Figure 5-3, on page 39 of the Draft Operating Curve Change Feasibility Analysis (Phase 1) Study Report, shows how changing the winter pool elevation from the current project operating curve to the +1, +2, +3, and +4-foot winter operating curves could affect reservoir elevations in Lake Harris throughout the year. Moreover, the figure documents the interaction between higher winter pool levels and low-inflow periods. During the period between 2006 and 2008, which encompasses two low-flow periods, the model showed that increasing the winter pool elevation can result in higher reservoir elevations during low-flow years, compared to the existing operating curve. However, Figure 5-3 shows that from about July 2007 through mid-February 2008, modeled reservoir levels for the +2 and +3-foot winter pool curve alternatives were lower than that of the other operating curve alternatives for the same operating period. Please explain what appears to be an anomaly in the modeling result in the final report.

Draft Downstream Release Alternatives (Phase 1) Study Report

2. During the ISR Meeting, Alabama Power requested that stakeholders provide downstream flow alternatives for evaluation in the models developed during Phase 1 of the Downstream Release Alternatives Study. Stakeholders expressed concerns about their ability to propose flow alternatives without having the draft reports for the Aquatic Resources and Downstream Aquatic Habitat Studies, which are scheduled to be available in July 2020 and June 2020, respectively. It is our understanding that during Phase 2 of this study, Alabama Power would run stakeholder-proposed flow alternatives that may be provided with ISR comments, as well as additional flow alternatives that stakeholders may propose after the results for the Aquatic Resources and Downstream Aquatic Habitat Studies are available. Please clarify your intent by July 11, 2020, as part of your response to stakeholder comments on the ISR.

3. According to the approved study plan, the goal of the Downstream Release Alternatives Study is to evaluate the effects of four downstream flow release alternatives on project resources. The four release alternatives are: (1) the Green Plan, or Alabama Power's current pulsing operation; (2) the Pre-Green Plan, or Alabama Power's historic peaking operation; (3) the Pre-Green Plan with a continuous baseflow of 150 cubic feet per second (cfs); and (4) a modified Green Plan. The Phase 1 Report, filed on April 10, 2020, presented complete results for Pre-Green Plan operation and Green Plan operation, partial results for the Pre-Green Plan with a 150-cfs baseflow, and no results for the modified Green-Plan alternative.

During the ISR Meeting, Alabama Power requested that stakeholders identify and propose downstream flow release alternatives so that the proposed alternative's effects on environmental resources can be assessed during Phase 2 of the study. To facilitate modelling of downstream flow release alternatives, we recommend that Alabama Power run base flows of 150 cfs, 350 cfs, 600 cfs, and 800 cfs through its model for each of the three release scenarios (i.e., the Pre-Green Plan, the Green Plan, and the modified Green Plan flow release approach). The low-end flow of 150 cfs was proposed by Alabama Power as equivalent to the daily volume of three 10-minute Green Plan pulses. This flow also is about 15 percent of the average annual flow at the United States Geological Survey's flow gage (#02414500) on the Tallapoosa River at Wadley, Alabama, and represents "poor" to "fair" habitat conditions.[1] We recommend 800 cfs as the upper end of the base flow modeling range because it represents "good" to "excellent" habitat,[2] and is nearly equivalent to the U.S. Fish and Wildlife Service's Aquatic Base Flow guideline for the Tallapoosa River at the Wadley gage.[3] The proposed base flows of 350 cfs and 600 cfs cover the range between 150 cfs and 800 cfs.

In addition, we recommend that the modeling for Alabama Power's Aquatic Resources Study and Downstream Aquatic Habitat Study,[4] as well as any Phase 2

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[1] *See* Tennant, D.L. 1976. Instream flow regimens for fish, wildlife, recreation, and related environmental resources. in Instream flow needs, Volume II: Boise, ID, Proceedings of the symposium and specialty conference on instream flow needs, May 3-6, American Fisheries Society, p. 359-373. Tennant (1976) defines habitat quality (measured by average depth and velocity of flow) as a percentage of the average annual flow. Poor habitat is represented by 0.1 (10 percent of the average annual flow), fair habitat is represented by 0.1 to 0.3 (10 to 30 percent of the average annual flow), and good habitat is represented by 0.3 to 0.4 (30 to 40 percent of the average annual flow), depending on season.

[2] *Id.*

[3] For purposes of this analysis, we assumed an aquatic base flow of 0.5 cubic feet per second per square mile (or cfsm) of drainage area (1,675 square miles at the Wadley gage). *See* U.S. Fish and Wildlife Service. 1981. Interim Regional Policy for New England Streams Flow Recommendations. Region 5. Boston, Massachusetts.

[4] The Aquatic Resources Study involves the use of a bioenergetics model to conduct simulations needed to test potential influence of water temperature and flow on growth rates of fish species downstream from Harris Dam. The Downstream Aquatic Habitat Study involves using a HEC-RAS model to evaluate the effect of alternative operations on the amount and persistence of wetted aquatic habitat in the Tallapoosa River downstream from Harris Dam.

assessment(s) include all the downstream flow release alternatives identified and evaluated as part of the Downstream Flow Release Alternatives Study. The results of all the modeling for the Aquatic Resources Study and Downstream Aquatic Habitat Study should be included in the final study reports and filed with the Updated Study Report, due by April 12, 2021.

4. The Draft Downstream Release Alternatives (Phase 1) Study Report refers to data sets (e.g., topographic and geometric data on pages 12-13 and 17-19) that were used to develop the models. To assist us in interpreting the models, we recommend including in the final study report a table and/or figure that summarizes all of the data sets used in the models and identifies their spatial extents in terms such as watershed segments, river miles (RMs), and square miles covered by each dataset (as appropriate), with reference to other geographic landmarks (e.g., nearest city, dam, bridge, etc.). Please incorporate into the table and/or figure, the stakeholder- and Alabama Power-identified erosion areas of concern. In addition, please provide the metadata for each data set used.

5. Page 14 of the Draft Downstream Release Alternatives (Phase 1) Study Report includes a description of the HEC-ResSim model that was developed for the project. Harris Dam was modeled in HEC-ResSim with both a minimum release requirement and maximum constraint at the downstream gage at Wadley. The draft report states that the minimum release requirement is based on the flow at the upstream Heflin gage, which is located on the Tallapoosa River arm of Harris Reservoir and has 68 years of discharge records. Page 5 of the draft report indicates that there is also a gage (Newell) on the Little Tallapoosa River Arm of the reservoir, which has 45 years of discharge records. It appears that only the Heflin gage was used in developing the minimum release requirement. As part of your response to stakeholder comments on the ISR, please explain the rationale for basing the minimum releases in the HEC-ResSim model only on the flows at the Heflin gage and not also on the flows at the Newell gage.

6. Pages 15 and 16 of the Draft Downstream Release Alternatives (Phase 1) Study Report, state that the drought indicator thresholds, or triggers, are only evaluated on the 1st and the 15th of every month in the model and that once a drought operation is triggered, the drought intensity level can only recover from drought condition at a rate of one level per "period." Please clarify in the final report if one "period" is equal to 15 days (i.e., the interval for evaluating drought triggers) and if this protocol is used for managing reservoir operations currently, or if it is only a parameter used in the model.

Draft Erosion and Sedimentation Study Report

7. The Erosion and Sedimentation Study in the approved study plan states that Alabama Power would analyze its existing lake photography and Light Detection and Ranging (LIDAR) data using a geographic information system (GIS) to identify elevation or contour changes around the reservoir from historic conditions and quantify changes in

lake surface area to estimate sedimentation rates and volumes within the reservoir. In addition, the approved study plan states that Alabama Power will verify and survey sedimentation areas for nuisance aquatic vegetation. According to the study schedule, Alabama Power will prepare the GIS overlay and maps from June through July 2019 and conduct field verification from fall 2019 through winter 2020.

The Draft Erosion and Sedimentation Study Report does not include a comparison of reservoir contour changes from past conditions or the results of nuisance aquatic vegetation surveys. The report states that limited aerial imagery of the lake during winter draw down and historic LIDAR data for the reservoir did not allow for comparison to historic conditions and that Alabama Power will conduct nuisance aquatic vegetation surveys during the 2020 growing season.

It is unclear why the existing aerial imagery and Alabama Power's LIDAR[5] data did not allow for comparison with past conditions or why the nuisance aquatic vegetation surveys will be conducted during the 2020 growing season instead of during the approved field verifications from fall 2019 to winter 2020. As part of your response to stakeholder comments on the ISR, please clarify what existing aerial imagery and LIDAR data was used and why it was not suitable for comparison with past conditions. Also, please explain the change in timing for conducting the nuisance aquatic vegetation surveys.

Draft Water Quality Report

8. Figure 3-8, on page 18 of the Draft Water Quality Study Report shows dissolved oxygen (DO) profiles for the Harris Project forebay. While much of the data is typical of the DO stratification pattern in a southern reservoir, the figure also shows that in June, July, and August of 2017 and 2019, there was a 2.0 to 3.0 milligram per liter increase in DO concentration at a depth of about 20 to 25 meters in Lake Harris, which is uncommon in such reservoirs. Please include Alabama Power's interpretation of this DO anomaly in the final Water Quality Study Report.

Draft Threatened and Endangered (T&E) Species Study Report

9. The goals of Alabama Power's T&E Species Study are to assess the probability of T&E species populations and/or their critical habitat occurring within the Harris Project boundary or project area and determine if there are project related impacts (i.e., lake fluctuations, downstream flows, recreation and shoreline management activities, timber

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[5] During the June 4, 2020 Harris Action Team #1 and #5 meeting, Alabama Power stated it has LIDAR data sets from different years and would check its records to confirm the number of LIDAR data sets, and for which years the LIDAR data were collected.

management, etc.) to those species and critical habitats. According to the study schedule, Alabama Power would develop the GIS overlays and maps from April through July 2019, and conduct field verifications, if required, from October 2019 through September 2020.

The Draft T&E Species Study Report does not provide information on the presence or absence of potentially suitable habitat within the project boundary for all of the T&E species (e.g., red cockaded woodpecker,[6] northern long-eared bat,[7] pool sprite,[8] and white fringeless orchid[9]) on the official species list for the project.[10] Therefore, Alabama Power was unable to determine whether or not these species are likely to occur within the project boundary or identify a complete list of T&E species that require field surveys.

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[6] Page 8 the report states that land use data is not specific enough to determine if the 3,068 acres of coniferous forest in the project boundary at Lake Harris has the specific habitat characteristics suitable for red-cockaded woodpeckers.

[7] Page 19 of the report states that the Lake Harris and Skyline project boundaries fall within the range of the northern long eared bat and that there are no known hibernacula or summer roost trees within the project boundaries. However, as discussed in the ISR meeting, the report does not state whether any known northern long-eared bat hibernacula occur within a 0.25-mile radius of the project boundaries, or whether known summer roost trees occur within a 150-foot radius of the project boundaries. The report also does not provide information about timber/vegetation management practices within the project boundary. This information is needed in order to determine known occurrences of northern long-eared bats within or adjacent to the project boundaries and to determine potential project effects to this species.

[8] Page 21 of the reports states that pool sprite was documented at Lake Harris in Flat Rock Park in 1995. While subsequent surveys have not detected pool sprite, the report indicates that there are 138.4 acres of granite geology within the project boundary at Lake Harris. However, this species' vernal pool habitat was not identified at the project due to "a lack of available data."

[9] Page 22 the report states that National Wetland Inventory data is not detailed enough to identify potentially suitable habitat for white fringeless orchid within the project boundary.

[10] See FWS's official lists of T&E species within the Harris Project boundaries (i.e., at Lake Harris and Skyline) that were accessed on July 27, 2018, by staff using the FWS's Information for Planning and Conservation website (https://ecos.fws.gov/ipac/) and filed on July 30, 2018.

As part of your response to stakeholder comments on the ISR, please provide: (1) the maps and assessment of the availability of potentially suitable habitat within the project boundary for all of the T&E species on the official species list for the project; (2) documentation of consultation with FWS regarding the species-specific criteria for determining which T&E species on the official species list will be surveyed in the field; (3) a complete list of T&E species that will be surveyed during the 2nd study season as part of the T&E Species Study; and (4) confirmation that Alabama Power will complete the field verification scheduled by September 2020.

Draft Project Lands Evaluation (Phase 1) Report

10. The goals of the Project Lands Evaluation include: (1) identifying and classifying lands at the project that are needed for Harris Project purposes; (2) evaluating existing land use classifications at Lake Harris and determining if any changes are needed to conform to Alabama Power's current land classification system and other Alabama Power Shoreline Management Plans; and (3) identifying lands to be added to, or removed from the current project boundary.

Appendix B of the Draft Project Lands Evaluation (Phase 1) Report includes a small scale map of Lake Harris and the existing shoreline classifications, as well as larger scale maps showing parcels of land within the project boundary for which Alabama Power is considering either changing the existing land use classification, adding parcels to the project boundary, or removing parcels from the project boundary. However, the report does not include large scale maps showing the land use classifications for all of the existing shoreline. To facilitate review of the existing shoreline land use classifications, please file larger scale maps of all the shoreline areas as a supplement to the Draft Project Lands Evaluation Report, as part of your response to stakeholder comments on the ISR. Please include land use classifications on the maps. In addition, if available, please file the GIS data layers of the existing and proposed shoreline land use classifications.

Attachment B

Excerpt from 18 C.F.R. § 5.15

(d) *Criteria for modification of approved study*. Any proposal to modify an ongoing study . . . must be accompanied by a showing of good cause why the proposal should be approved, and must include, as appropriate to the facts of the case, a demonstration that:
- (1) Approved studies were not conducted as provided for in the approved study plan; or
- (2) The study was conducted under anomalous environmental conditions or that environmental conditions have changed in a material way.

(e) *Criteria for new study*. Any proposal for new information gathering or studies . . . must be accompanied by a showing of good cause why the proposal should be approved, and must include, as appropriate to the facts of the case, a statement explaining:
- (1) Any material changes in the law or regulations applicable to the information request;
- (2) Why the goals and objectives of any approved study could not be met with the approved study methodology;
- (3) Why the request was not made earlier;
- (4) Significant changes in the project proposal or that significant new information material to the study objectives has become available; and
- (5) Why the new study request satisfies the study criteria in § 5.9(b).

Excerpt from 18 C.F.R. § 5.9(b)

(b) *Content of study request*. Any information or study request must:
- (1) Describe the goals and objectives of each study proposal and the information to be obtained;
- (2) If applicable, explain the relevant resource management goals of the agencies or Indian tribes with jurisdiction over the resource to be studied;
- (3) If the requester is not a resource agency, explain any relevant public interest considerations in regard to the proposed study;
- (4) Describe existing information concerning the subject of the study proposal, and the need for additional information;
- (5) Explain any nexus between project operations and effects (direct, indirect, and/or cumulative) on the resource to be studied, and how

the study results would inform the development of license requirements;

(6) Explain how any proposed study methodology (including any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate filed season(s) and the duration) is consistent with generally accepted practice in the scientific community or, as appropriate, considers relevant tribal values and knowledge; and

(7) Describe considerations of level of effort and cost, as applicable, and why proposed alternative studies would not be sufficient to meet the stated information needs.

Attachment C

R.L. Harris Process Plan and Schedule for the Integrated Licensing Process (ILP)

(shaded milestones are unnecessary if there are no study disputes; if due date falls on a weekend or holiday, the due date is the following business day)

18 C.F.R.	Lead	Activity	Timeframe	Deadline
§ 5.5(a)	Alabama Power	Filing of NOI and PAD	Actual filing date	6/1/2018
§ 5.7	FERC	Initial Tribal Consultation Meeting	No later than 30 days from NOI and PAD	7/1/2018
§5.8	FERC	FERC Issues Notice of Commencement of Proceeding and Scoping Document (SD1)	Within 60 days of NOI and PAD	7/31/2018
§5.8 (b)(3)(viii)	FERC/ Stakeholders	Public Scoping Meetings and Environmental Site Review	Within 30 days of NOI and PAD notice and issuance of SD1	8/28/2018 - 8/29/2018
§ 5.9	Stakeholders/ FERC	File Comments on PAD, SD1, and Study Requests	Within 60 days of NOI and PAD notice and issuance of SD1	9/29/2018
§5.10	FERC	FERC Issues Scoping Document 2 (SD2), if necessary	Within 45 days of deadline for filing comments on SD1	11/13/2018
§5.11(a)	Alabama Power	File Proposed Study Plans	Within 45 days of deadline for filing comments on SD1	11/13/2018
§5.11(e)	Alabama Power/ Stakeholders	Study Plan Meetings	Within 30 days of deadline for filing proposed Study Plans	12/13/2018
§5.12	Stakeholders	File Comments on Proposed Study Plan	Within 90 days after proposed study plan is filed	2/11/2019
§5.13(a)	Alabama Power	File Revised Study Plan	Within 30 days following the deadline for filing comments on proposed Study Plan	3/13/2019
§5.13(b)	Stakeholders	File Comments on Revised Study Plan (if necessary)	Within 15 days following Revised Study Plan	3/28/2019
§5.13(c)	FERC	FERC Issues Study Plan Determination	Within 30 days following Revised Study Plan	4/12/2019
§5.14(a)	Mandatory Conditioning Agencies	Notice of Formal Study Dispute (if necessary)	Within 20 days of Study Plan determination	5/2/2019
§5.14(l)	FERC	Study Dispute Determination	Within 70 days of notice of formal study dispute	7/11/2019
§5.15(a)	Alabama Power	Conduct First Season Field Studies	Spring/Summer 2019	

18 C.F.R.	Lead	Activity	Timeframe	Deadline
§5.15(c)(1)	Alabama Power	File Initial Study Reports	No later than one year from Study Plan approval	4/12/2020
§5.15(c)(2)	Alabama Power	Initial Study Results Meeting	Within 15 days of Initial Study Report	4/28/2020
§5.15(c)(3)	Alabama Power	File Study Results Meeting Summary	Within 15 days of Study Results Meeting	5/12/2020
§5.15(c)(4)	Stakeholders/ FERC	File Meeting Summary Disagreements/Modifications to Study/Requests for New Studies	Within 30 days of filing Meeting Summary	6/11/2020
§5.15(c)(5)	Alabama Power	File Responses to Disagreements/Modifications/ New Study Requests	Within 30 days of disputes	7/11/2020
§5.15(c)(6)	FERC	Resolution of Disagreements/ Study Plan Determination (if necessary)	Within 30 days of filing responses to disputes	8/10/2020
§5.15	Alabama Power	Conduct Second Season Field Studies	Spring/Summer 2020	
§5.15 (f)	Alabama Power	File Updated Study Reports	No later than two years from Study Plan approval	4/12/2021
§5.15(c)(2)	Alabama Power	Second Study Results Meeting	Within 15 days of Updated Study Report	4/27/2021
§5.15(c)(3)	Alabama Power	File Study Results Meeting Summary	With 15 days of Study Results Meeting	5/12/2021
§5.15(c)(4)	Stakeholders/ FERC	File Meeting Summary Disagreements/ Modifications to Study Requests/Requests for New Studies	Within 30 days of filing Meeting Summary	6/11/2021
§5.15(c)(5)	Alabama Power/ Stakeholders	File Responses to Disagreements/Modifications/ New Study Requests	Within 30 days of disputes	7/11/2021
§5.15(c)(6)	FERC	Resolution of Disagreements/ Study Plan Determination (if necessary)	Within 30 days of filing responses to disagreements	8/10/2021
§5.16(a)	Alabama Power	File Preliminary Licensing Proposal (or Draft License Application) with the FERC and distribute to Stakeholders	Not later than 150 days before final application is filed	7/3/2021
§5.16 (e)	FERC/ Stakeholders	Comments on Alabama Power's Preliminary Licensing Proposal, Additional Information Request (if necessary)	Within 90 days of filing Preliminary Licensing Proposal (or Draft License Application)	10/1/2021
§5.17 (a)	Alabama Power	License Application Filed		11/30/2021

STATE OF ALABAMA
DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
WILDLIFE AND FRESHWATER FISHERIES DIVISION

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The mission of the Wildlife and Freshwater Fisheries Division is to manage, protect, conserve, and enhance the wildlife and aquatic resources of Alabama for the sustainable benefit of the people of Alabama.

CHARLES F. "CHUCK" SYKES
DIRECTOR

FRED R. HARDERS
ASSISTANT DIRECTOR

June 11, 2020

Ms. Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, DC 20426

RE: Comments on the Harris Project Initial Study Report (ISR) including Project Lands Evaluation, Operating Curve Change Feasibility, Downstream Release Alternatives Study, Water Quality Study, Erosion and Sedimentation Study, Threatened and Endangered Species Desktop Assessment, Cultural Resources Programmatic Agreement and Historic Properties, Management Plan Study, Area of Potential Effects (APE) and Harris Relicensing Initial Study Report Meeting April 28, 2020 for the R. L. Harris Hydroelectric Project (FERC No. 2628).

Dear Ms. Bose:

The Alabama Department of Natural Resources (ADCNR) Division of Wildlife and Freshwater Fisheries (WFF), has reviewed the filed Harris Project Initial Study Report (ISR) in regards to the relicensing of R.L. Harris Hydroelectric Project No. 2628 and submits the following comments and recommendations for your consideration:

Initial Study Report (ISR)

- On page 11, section 4.1 of Initial Study Report, "*i.e.*" ("that is") should be changed to "*e.g.*" ("for example"). The alternative/modified Green Plan operation downstream release alternative will be evaluated as part of Phase 2. Results from the other three scenarios as well as from the Aquatic Resources Study are needed to design the alternative to be studied. Downstream Aquatic Habitat Study and Recreational Evaluation Study results should be included in footnotes in order to fully evaluate and recommend an alternative Green Plan to be modeled and evaluated as a downstream release alternative. Without the ability to fully evaluate the Aquatic Resources Study, Downstream Aquatic Habitat Study and Recreational Evaluation Study results at this time, ADCNR recommends multiple base flow scenarios calculated from available aquatic inflow and base flow records and guidelines representative for the tailwaters downstream to the Horseshoe Bend with Pre-Green Plan, Green Plan and Modified Green Plan be modeled during the evaluation process. All operational changes to downstream releases should evaluate methods for how these flows could be provided while maintaining state dissolved oxygen guidelines and a natural temperature regime, at all times for the sustainable benefit of aquatic resources.

- On page 12, section 4.2 of Initial Study Report, remove the descriptive words "slight" and "worse" when detailing if alternatives will increase or decrease average annual economic costs to Alabama Power customers and provide estimated amount ranges for each alternative. If, "there are currently too many unknowns at this time to generate accurate and reliable Hydro Budget results", please explain how an assumption of whether it will be "same" or "worse" can be made. For comparisons of alternatives, additional details are recommended to provide how a Pre-Green Plan peaking operation with a 150 cfs continuous minimum flow regardless of generation or no generation to produce the minimum flow would not be a significant economic gain, if not evaluating capital and O&M costs into the equation.

- On page 15, section 5.2 of Initial Study Report, remove "well' in statement, "showed dissolved oxygen levels were well above 5 mg/L during each of their sampling events."

- On page 15, section 5.2 of Initial Study Report, additional data, evidence or other alternatives should be provided to make the statement that "The low dissolved oxygen events in 2017 may be attributed to conditions in the Harris Reservoir that were impacted by severe drought in the summer and fall of 2016, where inflows to the lake were at historic lows." On page 17, Figure 3-7 of the Water Quality Study does not indicate that temperature stratification occurred differently in 2017 verses 2018 or 2019. Year 2017 data, on page 37, Figure 4-4, and downstream water quality data on page 46, Figure 6-1 of the Water Quality Study disputes the theory that conditions were caused by previous year conditions. Inflows were above average during 2017, which means discharge was higher. This is another reason low dissolved oxygen could have been more pronounced in 2017. This same scenario has been observed in Lake Martin, where higher spring/summer rainfall leads to increased discharge, which leads to poorer water quality below the thermocline (Sammons and Glover, 2013). If a dam is drawing from the hypolimnion under these conditions, it can lead to a discharge of lower oxygenated water during a high precipitation spring/summer. In addition to evaluating potential causes of the 2017 low dissolved oxygen events, changes and improvements that can be made to detect, adjust and improve operations to prevent another 2017 event from occurring again should be considered and evaluated for the sustained benefit of downstream aquatic resources.

- On page 17, section 6.1 of Initial Study Report delete "likely" and insert, "potential" prior to cause(s).

- On page 18, section 6.2.1 of Initial Study Report, include additional details of how causes of erosion were determined. Methods primarily cover how sites of erosion were identified, not caused.

- On page 18, section 6.2.1 of Initial Study Report, verify and confirm accuracy of statement "Twenty-five percent of the Little Tallapoosa River basin has been converted to hay/pasture fields (MRLC 2019)". Table 2-3, of the Erosion and Sedimentation Study, indicate a net loss of Hay/Pasture in the Little Tallapoosa River Basin of -8,815.1 acres from 2001 to 2016. These two statements appear to be contradictory.

- On page 19, section 6.2.2 of Initial Study Report, it states "Notably, only one area scored as impaired to non-functional (located on the right bank between river mile [RM] 16.3 to 16.9)." On page 33, Figure 21 of Appendix E Downstream Bank Stability Study Report of the Erosion and Sedimentation Study, a red section is downstream of No Business Creek within the 3.5-5 range appears present. Explain and verify that this area is not considered a second impaired site.

- On page 19, section 6.2.2 of Initial Study Report, "primarily caused" should be changed to "potentially caused". Remove "natural riverine processes" and replace with "regulated riverine processes" or define how natural riverine processes are defined in this context and occur below a controlled and regulated tailrace.

- On page 19 section 6.2.2. of Initial Study Report. Providing the dissolved oxygen percent of measurements greater than 5 milligrams per liter is correct but misleading in regards to aquatic resources protection. It is important to note when presenting this data that it only takes a single incident of depleted dissolved oxygen to cause an aquatic species kill event. A caveat or footnote is recommended to address this fact.

- On page 19, section 6.2.2 of Initial Study Report, it states, "Questions have also been raised regarding potential effects the Harris Project may have on other aquatic fauna within the Project Area, including macroinvertebrates such as mollusks and crayfish. Alabama Power is investigating the effects of the Harris

Project on these aquatic species and is performing an assessment of the Harris Project's potential effects on species mobility and population health." There are currently records of mussel species Under Review for federal listing with substantial 90-day findings that occur and occurred historically in the Tallapoosa River and its tributaries. Alabama Spike (*Elliptio arca*) and Delicate Spike (*Ellipto arctata*) are currently state protected species and Under Review by United States Fish and Wildlife Service (USFWS) with a substantial 90-day finding. Threatened and Endangered Species study plan states in the methods that additional species of concern may be added at the request of USFWS and/or ADCNR if determined to be appropriate. Please provide details on what specific mollusks and crayfish species will be evaluated. A list of state protected species currently being evaluated during the relicensing process is recommended.

- Page 27, section 9.1 of Initial Study Report, there are additional state protected species that are not T&E. The final report may not address all state protected species and a statement should be included to clarify. The Initial Study Report plan used the term "and/or".

Draft Phase 1 Project Lands Evaluation Study Report

- Appendix B includes Figure of Maps and Supporting Information of Proposed Changes of the Project Lands Evaluation Study Report. These maps indicate there are several recreational properties which are being re-classified away from recreation (net loss of 600 acres- page 14, Table 6-1). In addition to the acreages provided, it would be beneficial to provide and understand the amount of linear feet of shoreline for each parcel being proposed for addition, re-classification or removal. Undisturbed natural shorelines and shorelines designated for recreational use benefit wildlife and aquatic resources and also provide recreational opportunities for anglers and hunters. Impacts to shoreline habitat in Lake Harris can negatively impact aquatic, semi-aquatic, and terrestrial species. Studies have shown that undeveloped shoreline areas provide the most suitable habitat for maintaining abundance, diversity, and species richness of aquatic, semi-aquatic, and terrestrial species. We recommend that natural vegetated shorelines remain undisturbed as much as possible when evaluating land classifications and future shoreline land use. When evaluating classification changes, linear lake front footage would be a useful metric to provide. ADCNR would like to ensure a suitable site(s) is(are) identified and reserved for future construction of an appropriately sized boating access facility(ies). Future boating demand on Lake Harris is currently unknown for the entire duration of the license, therefore ADCNR continues to request consultation with Alabama Power in the selection of future recreational sites to safeguard they are located in suitable areas for anglers and boaters. The sites need to be large enough to suit any future demand of boaters and anglers and the sites need to meet the engineering requirements for an appropriately sized facility. We recommend any suitable identified property continue to be classified as recreational. The distribution of public boat ramps in the lake should be fully evaluated when considering reclassifying recreation zoned areas. In areas of the lake with few public boating access points or high boat ramp usage, there should be recreational zoned properties for future boat ramp additions available to meet angler demand.

- Appendix B, Figures R1-R6 of the Project Lands Evaluation Study Report, indicates that these acreages are not suitable for recreation due to their location within areas of the lake with limited demand for public recreation opportunities. ADCNR requests the opportunity to evaluate the results from the Recreation Evaluation Study prior to this determination for these zoning reclassifications.

- On page 9, of the Project Lands Evaluation Study Report, the third bullet named Project Operations (formerly titled Prohibited Access) states "For security, the allowable uses in this classification are primarily restricted to Alabama Power personnel; however, in some cases, such as guided public tours, limited public access is available." ADCNR recommends that bank fishing be included in the "some cases" exemptions statement for these areas. Canoe or kayak access points should also be evaluated in these areas during the relicensing process, since they are currently nonexistent.

Draft Operating Curve Change Feasibility Analysis Phase1 Report

- On page 6, section 2.1.1.5 Lower Tallapoosa River of the Operation Curve Change Feasibility Analysis Study discusses downstream gages. Include years of discharge and stage data for these gages, similar to previous gages years of discharge and stage data discussed and included in the document.

- On pages 45-50, Figures 5-7 through 5-12 of the Operation Curve Change Feasibility Analysis Study visually indicate inundation boundaries for the baseline of four winter pool alternatives. Include a Table with calculated totals of inundated acreages for the baseline and four winter pool increase alternatives to assist with the quantitative evaluation of inundation effects downstream of the dam.

Draft Downstream Release Alternatives Phase 1 Report

- The Downstream Release Alternatives Study as is, presents the results for three downstream release alternatives: Pre-Green Plan operation, Green Plan operation, and Pre-Green Plan operation with a 150 cfs continuous minimum flow. Throughout the document the "Pre-Green Plan operation with a 150 cfs continuous minimum flow", is often referenced as "continuous minimum flow of 150 cfs". When referencing this downstream release alternative in the document it would be helpful to use the full "Pre-Green Plan operation with a 150 cfs continuous minimum flow" to clarify and fully identify the alternative. If a modified Green Plan, details pending, is evaluated with a continuous minimum flow, the addition will assist in differentiating the alternatives.

- A fourth Modified Green Plan downstream release alternative was included to be evaluated in the initial Study Plan for the Downstream Release Alternatives Study. ADCNR maintains its recommendation for a fourth alternative Modified Green Plan be fully evaluated. Details and design of a Modified Green Plan alternative are pending results from the Aquatic Resources Study. For a complete Downstream Release Alternative Study comparing four release alternatives, the Modified Green Plan alternative should be completed and included in this study or Phase 2. ADCNR requests the opportunity to provide specific recommendations for the Modified Green Plan alternative after assessing all of the planned study reports. ADCNR has consistently stated and provided published peer reviewed references that support recommendations for downstream flows to mimic a natural flow regime with an adaptive management of flows that follows state dissolved oxygen guidelines and provides natural temperature regimes, at all times for the sustained long term benefit and conservation of aquatic species (See *ADCNR*, P-2628-005 FERC ¶ 20181002-5006).

- On page 1, section 1.0 of the Downstream Release Alternatives Study, replace "However, some stakeholders noted that the temperature of the turbine releases could have potential effects on aquatic resources in the Tallapoosa River below Harris Dam." with "However, some stakeholders noted that the temperature of the turbine releases has documented negative impacts on aquatic resources in the Tallapoosa River below Harris Dam." (See *ADCNR*, P-2628-005 FERC ¶ 20181002-5006).

- On page 2, section 1.1, of the Downstream Release Alternatives Study, change "*i.e.*" to "*e.g.*" It should be "for example" not "that is" if an Aquatic Resources Study is required to evaluate and design the alternative to be studied as stated in footnote of the page. Downstream Aquatic Habitat Study and Recreational Evaluation Study results should be considered as inclusions in the footnote as prerequisites to fully evaluate and recommend an alternative Modified Green Plan to be modeled and evaluated as a downstream release alternative.

- On page 21, section 4.3.3 Model Flow Data of the Downstream Release Alternatives Study, ADCNR recommends re-stating that the Modified Green Plan alternative is not included in this model section pending results from additional studies and will be evaluated in Phase 2. This section states why 2001 data was used and presented but does not specify why the date range of 1/1/01-1/31/01 was specifically selected from the entire year data. ADCNR recommends including why this month was selected and providing additional figures similar to Fig. 4-3. showing a months' worth of data at four 1-month intervals covering spring, summer and fall sample portions of hydrographs to fully illustrate model flow data throughout the year.

- On page 25, section 5.2 of the Downstream Release Alternatives Study, remove the descriptive words "slight" and "worse" when detailing if alternatives will increase or decrease average annual economic costs to Alabama Power customers and provide estimated amount ranges for each alternative. If, "there are currently too many unknowns at this time to generate accurate and reliable Hydro Budget results", please explain how an assumption of whether it will be "same" or "worse" can be made. For comparisons of alternatives, additional details should be provided describing how a Pre-Green Plan peaking operation with a 150 cfs continuous minimum flow, regardless of generation or no generation to produce the minimum flow, would not be a significant economic gain, if not evaluating capital and O&M costs into the equation.

- On page 27, section 6.0 Conclusions of the Downstream Release Alternatives Study, a space between "results indicate" should be included.

<u>Draft Water Quality Study Report</u>

- On pages ii-iv., Table of Contents, of the Water Quality Study, some of the page numbering does not coincide with the document contents. For example, Lake Levels and Hydrology page 7 of Table of Contents is on page 8.

- On page 3, section 1.1, of the Water Quality Study, after "A summary of data sources for this report is provided in" a large space creates and extra page that appears to be unnecessary and should be removed.

- On page 8, section 2.0, of the Water Quality Study "October of 2107" should be changed to 2017.

- On page 9, Figure 2-2 of the Water Quality Study, specify if the 1987-2016 data is a monthly average or long-term average in the figure key or label.

- On page 22, Table 3-2 of the Water Quality Study, include minimum and maximum ranges of data to this Table, if available.

- On page 25, Figure 4-1 of the Water Quality Study, provide major tributary names and periodic river mile markings to aid in location descriptions.

- On page 27, Table 4-3 of the Water Quality Study, include minimum and maximum ranges of data to this Table, if available.

- On page 39, of the Water Quality Study, "Error! Reference source not found?" should be removed or corrected.

- On page 42, Table 4-11 of the Water Quality Study, if available, separate and provide this data into Pre-Green Plan and Post-Green Plan implementation year groupings to further examine if operational differences affect water quality.

- On page 46, section 6.2 of the Water Quality Study, additional data, evidence or other alternatives should be provided to make the statement that "The low dissolved oxygen events in 2017 may be attributed to conditions in Harris Reservoir that were impacted by severe drought in the summer and fall of 2016, where inflows to the lake were at historic lows (Figure 6-1)" On page 17, Figure 3-7 of the Water Quality Study does not indicate that temperature stratification occurred differently in 2017 versus 2018 or 2019. Year 2017 data, on page 37, Figure 4-4, and downstream water quality data on page 46, Figure 6-1 of the Water Quality Study disputes the theory that conditions were caused by previous year conditions. Inflows were above average during 2017, which means discharge was higher. This is another reason low dissolved oxygen could have been more pronounced in 2017. This same scenario has been observed in Lake Martin, where higher spring/summer rainfall leads to increased discharge, which leads to poorer water quality below the thermocline (Sammons and Glover 2013). If a dam is drawing from the hypolimnion under these conditions, it can lead to a discharge of lower oxygenated water during a high precipitation spring/summer. In addition to evaluating potential causes of the 2017 low dissolved oxygen events, changes and improvements that can be made to detect, adjust and improve operations to prevent another 2017 event from occurring again should be considered and evaluated for the sustained benefit of downstream aquatic resources.

<u>Draft Erosion and Sedimentation Study Report</u>

- Throughout the Erosion and Sedimentation Study when referencing "cause of erosion" change to "potential cause(s) of erosion/sedimentation." On page 2, section 2.0 Goals and Objectives in the Erosion and Sedimentation Study Plan it states, "The goals of this study are to identify any problematic erosion sites and sedimentation areas and determine the likely causes." "Once areas are identified, Alabama Power will perform assessments and collect additional information, as necessary, to describe and categorize each area according to its severity and potential cause(s)."

- On page 6, section 2.0 Lake Harris, 2.1 Methods in the Erosion and Sedimentation Study, replace, "determine the cause of erosion:" with "determine areas of erosion and potential cause(s):" For the potential cause(s) categories considered, provide a definition of each and additional details into the methods utilized to characterize how each cause was determined and differentiated. The methods described appear to detail how areas of erosion were identified but do not detail how potential cause(s) were determined. A reference to the Erosion and Sedimentation Study Plan Study Plan methods or inclusion of section 4.1 study plan methods should be provided.

- On page 12, section 2.2 Results, 2.2.1 Erosion Survey in the Erosion and Sedimentation Study insert "potential cause(s)" into "Each site was photographed and examined to determine the cause of erosion."

- On page 20, section, of the Erosion and Sedimentation Study, verify and confirm accuracy that Table 2-3 indicates a net loss of Hay/Pasture in the Little Tallapoosa River Basin of -8,815.1 acres from 2001 to 2016. Text indicates a "Twenty-five percent of the Little Tallapoosa River basin has been converted to hay/pasture fields (MRLC 2019)" These two statements appear to be contradictory.

- On page 24, section 3.2 Results of the Erosion and Sedimentation Study, change "primarily caused" to "potentially caused". Remove "natural riverine processes" and replace with "regulated riverine processes" or define how natural riverine processes are defined in this context and occur below a controlled and regulated tailrace.

- On page 25, Table 3-2 of the Erosion and Sedimentation Study, add score ranges (minimum and maximum scores) in addition to the means. If previous sites E22 and E23 are included in this Table, provide an asterisk and footnote specifying which ones they are. Include in discussion section how this scoring method compared to the method used at sites E22 and E23.

- On page 26, Figure 3-1 of the Erosion and Sedimentation Study, include site numbers from Table 3-2 into this map or provide incremental river mile markers.

- On page, Table 4-1 of the Erosion and Sedimentation Study indicates a 592.1 acreage increase in deciduous forest. Deciduous forest stream buffers have been shown to reduce nitrogen, phosphorous and sedimentation from surface water runoff into streams, lakes and estuaries. This could be included in the discussion section as a positive observed land use trend in the area (Klapproth and Johnson 2009; Roy *et al.* 2006).

- On page 31, Section 5.0 Discussion and Conclusions of the Erosion and Sedimentation Study, provide additional information on definitions and methodology in how cause(s) were determined before the conclusion that erosion was a result of anthropogenic and/or natural processes independent of project operations. As is, the use of the word "potential" should be included. Provide the current definition of "project operations" for this study and include it prior to other document "project operations" statements. If referring to "fluctuations" from project operations, this should be clearly stated throughout Erosion and Sedimentation Study. Among Study plans there appears to be variations in the provided definition of "Project operations" and "project related impacts". For example, on page 4 the Erosion and Sedimentation Study Plan states "Project operations" as "(*i.e.*, water level fluctuations or construction/maintenance activities on/at Project facilities or lands)", but on page 2 of the Threatened and Endangered Species Study Plan it states "project related impacts" as "(*i.e.*, lake fluctuations, downstream flows, recreation and shoreline management activities, timber management, etc.)". Providing consistency of these definitions among studies would be beneficial during the relicensing evaluation process. In addition, including "etc." which indicates that "further, similar items are included" after using "*i.e.*" or "that is" is a contradictory use of the terms.

- On page 31, section 5.0 Discussion and Conclusions of the Erosion and Sedimentation Study, replace "extremely small" with "relatively small".

- On page 31, section 5.0 Discussion and Conclusions of the Erosion and Sedimentation Study, insert "potentially" prior to "affected"

- On page 31, section 5.0 Discussion and Conclusions of the Erosion and Sedimentation Study, insert "potentially" prior to "clear-cut". Reword sentence to read: "The observed erosion at the these sites is the potential result of adjacent land use and clearing of riparian plant cover destabilizing soils along the affected banks, although erosion at these sites may have been initially caused or exacerbated as result of altered flow releases from Harris Dam."

- On page 31, section 5.0 Discussion and Conclusions of the Erosion and Sedimentation Study, insert "in the reservoir" after decrease in "Sedimentation in Lake Harris is most pronounced in the Little Tallapoosa River arm where sediment transported from upstream settles out of the water column as water velocities decrease" statement.

- In Appendix E Downstream Bank Stability Study Report of the Erosion and Sedimentation Study, include periodic river mile markers and corresponding segment numbers in figures of the study.

- On page 33, Figure 21 of Appendix E Downstream Bank Stability Study Report of the Erosion and Sedimentation Study, a red section in downstream of No Business Creek within the 3.5-5 range appears present. In results or discussion explain how this area is not included as a second impaired site.

- On page 34, Table 3 of Appendix E Downstream Bank Stability Study Report of the Erosion and Sedimentation Study, if available, include ranges (minimum and maximum scores) with segment data.

- On page 43, Conclusions section of Appendix E Downstream Bank Stability Study Report of the Erosion and Sedimentation Study include a definition and discussion about the potential for head cutting in tributaries due to main river channel operations. Head cutting is a process by which the upstream portion of a stream channel becomes destabilized and erodes progressively in an upstream direction. Accelerated velocities can lead to an increase in head cutting upstream from affected areas (Annear *et al.* 2002).

<u>Draft Threatened and Endangered Species Desktop Assessment</u>

- Throughout the Threatened and Endangered Species Desktop Assessment, capitalize species common names. When a species is first used in the document, include the scientific name in parentheses. The common name can then be used in the remaining sections of the document.

- Range Figures included in the Threatened and Endangered Species Desktop Assessment illustrating aquatic species habitat ranges, include the tributaries and streams names on the maps.

- On page 6, Table 1-1 of the Threatened and Endangered Species Desktop Assessment in Scientific names column change "*Villosa trabalis*" to "*Venustaconcha trabalis*", "*Quadrula cylindrica*" to "*Theliderma cylindrica*". Correct error for scientific name of Shiny Pigtoe to "*Fusconaia cor*" (Williams *et al.* 2017).

- On page 6, Table 1-1 of the Threatened and Endangered Species Desktop Assessment all of the species listed in this table are now State Protected, see Alabama Regulations relating to game, fish and furbearing animals. 2019-2020. Alabama Department of Conservation and Natural Resources, with the exception of the plant species listed, Little Amphianthus, White Fringeless Orchid, Price's Potato-bean and Morefield's Leather Flower.

- On page 6, Table 1-1 of the Threatened and Endangered Species Desktop Assessment change column heading "Occurrence" column to "Recent Documented Occurrence in Harris Project Boundary". Within the document "Recent" should be defined, for example, "In this report any documented occurrence within the past 25 years will be classified as a Recent Documented Occurrence".

- On page 6, Table 1-1 of the Threatened and Endangered Species Desktop Assessment, Williams *et al.* (2008) is cited but this resource is not utilized anywhere else in the document. Recommend including the most up to date resources in the following species descriptions.

- On Page 9, 3.2 Palezone Shiner section of the Threatened and Endangered Species Desktop Assessment if an updated survey is proposed for this species suggest including and discussing or note that it will be included in an additional Phase 2 study report.

- On page 10, 3.4 Finelined Pocketbook section of the Threatened and Endangered Species Desktop Assessment, include "primarily" in the statement, "this mussel lives in large to small streams in habitats "primarily" above the fall line." See Williams *et al.* 2008 distribution map and distribution descriptions.

- On page 10, 3.4 Finelined Pocketbook section of the Threatened and Endangered Species Desktop Assessment, include, if any, the last mussel survey completed in the Tallapoosa Harris Tailrace and tributaries. Include a statement indicating if a mollusk tailrace study has been considered in the study plan development process and why it was not deemed necessary for this species.

- On page 10, 3.4 Finelined Pocketbook section of the Threatened and Endangered Species Desktop Assessment, a statement should be included notifying that ADCNR and USFWS are currently reintroducing the Finelined Pocketbook into suitable historical habitats within the state (USFWS 2019).

- On page 10, 3.4 Finelined Pocketbook section of the Threatened and Endangered Species Desktop Assessment, the reasons for decline could be updated and improved by summarizing statements from USFWS (2019), Nine Mobile River Basin mussels (Finelined Pocketbook (*Hamiota (=Lampsilis) altilis*), Orangenacre Mucket (*Hamiota (=Lampsilis) perovalis*), Alabama Moccasinshell, (*Medionidus acutissimus*), Coosa Moccasinshell (*Medionidus parvulus*), Southern Clubshell (*Pleurobema decisum*), Dark Pigtoe *(Pleurobema furvum*), Southern Pigtoe (*Pleurobema georgianum*), Ovate Clubshell (*Pleurobema perovatum*), Triangular Kidneyshell (*Ptychobranchus greenii*)) 5-year review. This review states that suitable habitats and water quality, free of excessive sedimentation and other pollutants, are required for Finelined Pocketbook. The primary cause of curtailment of range and fragmentation of habitat for these mussel species has been contributed to the historic construction of dams and impoundment of large reaches of major river channels (Federal Register 58 FR 14330). Although most of these actions took place in the past, the impacted conditions and habitat continue to affect the species. In recent years, some improvements have been made to improve riverine conditions. For example, flow improvements have been made below Weiss Dam on the Coosa River that benefit existing populations of Southern Clubshell. Watershed-specific threats continue to negatively impact the species. These threats include: 1) coal mining activities 2) oil and gas exploration 3) water withdrawal 4) hypolimnetic discharges 5) poor water quality due to insufficient releases from dams 6) instream aggregate mining 7) navigation channel maintenance activities (8) agricultural practices that degrade water quality by increasing nutrients, herbicide/surfactant compounds, and hormones in surface waters; (9) hydropeaking dams that alter downstream flow conditions, water temperatures, and dissolved oxygen (10) increasing urban development that degrades water quality and stream geomorphology; and (11) climate change, which is expected to result in more frequent and extreme dry and wet years in the Southeast over the next century.

- On page 10, 3.4 Finelined Pocketbook section of the Threatened and Endangered Species Desktop Assessment, change statement "No populations were identified within the Project Boundary at Lake Harris, but future surveys have been proposed by Alabama Power." to "To date, no populations were identified within the Project Boundary at Lake Harris, but surveys focused on the 3.75 mile stretch of the Tallapoosa River where critical habitat is known to occur from the County 36 bridge to a shoal below the Highway 431 bridge are currently being conducted by Alabama Power and USFWS."

- On page 11, 3.5 Alabama Lampmussel section of the Threatened and Endangered Species Desktop Assessment, a statement should be included notifying that ADCNR and USFWS is currently reintroducing the Alabama Lampmussel into suitable historical habitats within the state (USFWS 2012).

- On page 11, 3.5 Alabama Lampmussel section of the Threatened and Endangered Species Desktop Assessment, reasons for imperilment should be updated and improved summarizing statements from USFWS released a Five-Year Review for the species (USFWS 2012).

- On page 11, 3.5 Alabama Lampmussel section of the Threatened and Endangered Species Desktop Assessment, include that in laboratory trials Alabama Lampmussel glochidia have been found to utilize Rock Bass (*Ambloplites rupestris*), Green Sunfish (*Lepomis cyanellus*), Bluegill (*Lepomis macrochirus*), Smallmouth Bass (*Micropterus dolomieu*), Spotted Bass (*Micropterus punctulatus*), Largemouth Bass (*Micropterus salmoides*), and Redeye Bass (*Micropterus coosae*) as host fish and that Banded Sculpin (Cottus carolinae) appear to be marginal hosts (Williams et. Al. 2008).

- On page 12, 3.6 Cumberland Bean section of the Threatened and Endangered Species Desktop Assessment, a statement should be included notifying that ADCNR and USFWS is currently reintroducing the Cumberland Bean into suitable historical habitats within the state (USFWS 2020).

- On page 12, 3.6 Cumberland Bean section of the Threatened and Endangered Species Desktop Assessment, reasons for imperilment should be updated and improved summarizing statements from USFWS released a Five-Year Review for the species (USFWS 2020).

- On page 12, 3.7 Fine-Rayed Pigtoe section of the Threatened and Endangered Species Desktop Assessment, reasons for species decline should be updated and improved summarizing statements from USFWS released a Five-Year Review for the species (USFWS 2013b).

- On page 13, 3.8 Pale Lilliput section of the Threatened and Endangered Species Desktop Assessment, a statement should be included notifying that ADCNR and USFWS is currently reintroducing the Pale Lilliput Mussel into suitable historical habitats within the state (USFWS 2011).

- On page 13, 3.8 Pale Lilliput section of the Threatened and Endangered Species Desktop Assessment, reasons for imperilment should be updated and improved summarizing statements from USFWS released a Five-Year Review for the species (USFWS 2011).

- On page 13, 3.8 Pale Lilliput section of the Threatened and Endangered Species Desktop Assessment, include, in laboratory trials by ADCNR, Pale Lilliput glochidia have been found to utilize Northern Studfish (*Fundulus catenatus*), Blackspotted Topminnow (*Fundulus olivaceus*) and Blackstripe Topminnow (*Fundulus notatus*) as primary hosts. (Fobian *et al.* 2015)

- On page 13, 3.9 Rabbitsfoot section of the Threatened and Endangered Species Desktop Assessment, a statement should be included notifying that ADCNR and USFWS is currently reintroducing the Rabbitsfoot into suitable historical habitats statewide.

- On page 13, 3.9 Rabbitsfoot section of the Threatened and Endangered Species Desktop Assessment, include, suitable fish hosts for Rabbitsfoot populations west of the Mississippi River include Blacktail Shiner (*Cyprinella venusta*) from the Black and Little rivers and Cardinal Shiner (*Luxilus cardinalis*), Red Shiner (*Cyprinella lutrensis*), Spotfin Shiner (*Cyprinella spiloptera*), and Bluntface Shiner (*Cyprinella camura*) from the Spring River, but host suitability information is lacking for most of the eastern range (Fobian 2007). A host study by ADCNR in 2011, found Scarlet Shiner (*Lythrurus fasciolari*), Whitetail Shiner (*Cyprinella galactura*) and Striped Shiner (*Luxilus chrysocephalus*) to be sympatric hosts with Rabbitsfoot from Paint Rock River, AL. Marginal minnow hosts from studies have included Central Stoneroller (*Campostoma anomalum*), Emerald Shiner (*Notropis atherinoides*), Rosyface Shiner (*Notropis rubellus*), Bullhead Minnow (*Pimephales vigilax*) and Rainbow Darter (*Etheostoma caeruleum*), but not in all stream populations tested (Fobian 2007, Watters *et al.* 2005).

- On page 14, 3.10 Snuffbox section of the Threatened and Endangered Species Desktop Assessment, update and include that in 2019, USFWS released a Five-Year Review for the species (USFWS 2019b). Reasons for imperilment could be added and improved summarizing statements from this document as well.

- On page 15, 3.11 Shiny Pigtoe Mussel section of the Threatened and Endangered Species Desktop Assessment, reasons for imperilment should be updated and improved summarizing statements from USFWS released a Five-Year Review for the species (USFWS 2013c).

- On page 16, 3.12 Southern Pigtoe section of the Threatened and Endangered Species Desktop Assessment, change “finelined pocketbook mussel” to “Southern Pigtoe”.

- On page 16, 3.12 Southern Pigtoe section of the Threatened and Endangered Species Desktop Assessment, the reasons for decline could be updated and improved by summarizing statements from USFWS (2019), Nine Mobile River Basin mussels (Finelined Pocketbook (*Hamiota (=Lampsilis) altilis*), Orangenacre Mucket (*Hamiota (=Lampsilis) perovalis*), Alabama Moccasinshell, (*Medionidus acutissimus*), Coosa Moccasinshell (*Medionidus parvulus*), Southern Clubshell (*Pleurobema decisum*), Dark Pigtoe *(Pleurobema furvum*), Southern Pigtoe (*Pleurobema georgianum*), Ovate Clubshell (*Pleurobema perovatum*), Triangular Kidneyshell (*Ptychobranchus greenii*)) 5-year review. This review states that suitable habitats and water quality, free of excessive sedimentation and other pollutants, are required for Southern Pigtoe. The primary cause of curtailment of range and fragmentation of habitat for mussel species has been contributed to the historic construction of dams and impoundment of large reaches of major river channels (Federal Register 58 FR 14330). Although most of these actions took place in the past, the impacted conditions and habitat continue to affect the species. In recent years, some improvements have been made to improve riverine conditions. For example, flow improvements have been made below Weiss Dam on the Coosa River that benefit existing populations of Southern Clubshell. Watershed-specific threats continue to negatively impact the species. These threats include: 1) coal mining activities 2) oil and gas exploration 3) water withdrawal 4) hypolimnetic discharges 5) poor water quality due to insufficient releases from dams 6) instream aggregate mining 7) navigation channel maintenance activities (8) agricultural practices that degrade water quality by increasing nutrients, herbicide/surfactant compounds, and hormones in surface waters; (9) hydropeaking dams that alter downstream flow conditions, water temperatures, and dissolved oxygen (10) increasing urban development that degrades water quality and stream geomorphology; and (11) climate change, which is expected to result in more frequent and extreme dry and wet years in the Southeast over the next century.

- On page 17, 3.13 Slabside Pearlymussel section of the Threatened and Endangered Species Desktop Assessment, include that in 2013, USFWS designated critical habitat for the species (Federal Register 78:59555-59620). A statement similar to the Rabbitsfoot section could be included for consistency.

- On page 25, Discussion and Conclusions: section of the Threatened and Endangered Species Desktop Assessment, include a caveat statement or footnote reiterating that this is a desktop assessment and that to be certain of species occurrence, surveys should be conducted by qualified biologists to determine if a sensitive species occurs within a project area. Species not listed for a specific area does not imply that they do not occur there, only that their occurrence there is as yet unrecorded by state or federal agencies. This assessment is currently under review and reflects only our current understanding of species distributions.

- On page 25, Discussion and Conclusions: section of the Threatened and Endangered Species Desktop Assessment, change “…extant populations of 20 federal and state protected T&E species (Appendix B).” to “….extant populations of 20 federally T&E species of which 16 are state protected (Appendix B).”

- Appendix B Species Habitat Range Maps of the Threatened and Endangered Species Desktop Assessment, all figures with “extant population” shown. change to “Recent Documented Occurrence”. In addition, make sure “Current Range” and “Documented Historic Range” terminology is defined in the assessment. As is, all Figure Titles in Appendix B should have “Current” inserted before Habitat Range and after the Species name.

- Figure 3.12-1 Appendix B of the Threatened and Endangered Species Desktop Assessment, Southern Pigtoe does not occur in the Tennessee River system. It does not have critical habitat in the Paint Rock River system. This map appears to be inaccurate and should be deleted.

- Figure 3.13-1 Appendix B of the Threatened and Endangered Species Desktop Assessment, The Paint Rock River has designated critical habitat for this species. See Federal Register 78:59555-59620 for critical habitat details that should be included.

<u>Cultural Resources Programmatic Agreement and Historic Properties, Management Plan Study</u>

- ADCNR has no comments or recommendations at this time.

<u>Area of Potential Effects (APE)</u>

- ADCNR has no comments or recommendations at this time.

<u>Harris Relicensing Initial Study Report Meeting April 28, 2020</u>

- Recreational Evaluation Study discussion. Recreation use data was collected at recreational facilities from March to December 2019, however questionnaires were only filled out from May to December 2019. The Questionnaires missed an active time for anglers. ADCNR is concerned that recreational anglers may not be adequately represented in this data. ADCNR would like to make sure that anglers are adequately represented in the survey since it asks specific questions about specific facilities.

- Downstream Release Alternatives Study discussion. A fourth alternative is proposed in the study plan. It was to be a Modified Green Plan. Aquatic Resources Study is required to evaluate and design the alternative to be studied as stated in the footnotes.

- Erosion and Sedimentation Study discussion. ADCNR recommends including the APC response statement "Most of the erosion issues downstream are not due exclusively to operations. For example, areas where trees and vegetation are being cleared are not due exclusively to operations, but water fluctuations could exacerbate erosion." into the discussion section of the study.

- Threatened and Endangered Species Desktop Assessment discussion. APC stated that "No listed species have been documented in the Tallapoosa River below the Harris Dam." Should be changed to "No listed species have recently been documented in the Tallapoosa River between Harris Dam and Lake Martin." The Documented Historic Range for Finelined Pocketbook includes the Tallapoosa River.

Thank you for the opportunity to comment on the R.L. Harris Hydroelectric Project relicensing filed Harris Project Initial Study Report (ISR). We look forward to continuing our cooperative efforts with the Federal Energy Regulatory Commission, Alabama Power, and other stakeholders during this process.

If you have any questions regarding these comments, please contact me at (334-353-7484) or Todd.Fobian@dcnr.alabama.gov.

Sincerely,

Todd Fobian

Environmental Affairs Supervisor

<u>References:</u>

Alabama Department of Conservation and Natural Resources Comment under P-2628-005. Washington, United States. Federal Energy Regulatory Commission, FERC ¶ 20181002-5006, October 2, 2018. 8pp.

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U.S. Fish and Wildlife Service. 2013c. Shiny Pigtoe (*Fusconaia cor*), 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service, Asheville, North Carolina. 22 pp.

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Chuck Denman
1810 Oak Grove Road
Titusville Florida
32796

Regarding:Alabama Power Company relicensing for the Harris Hydroelectric Project (FERC No. 2628-065).

Harris Dam additional studies suggested

A general review of historical materials ie newspapers, and other records dealing with the proposals for constructing the Dam. Including comments and conditions provided in initial permitting. With the goal being to determine if the dam has achieved the original benefits expected. Perhaps a score card.

A pre vs post Dam analysis of down stream impacts. Including flooding,erosion and habitat changes to flora and fauna.

1. Flooding :storm runoff model comparing 25,50 and 100 year 24 hour storm events.
2. Erosion : utilizing available remote sensing materials to compare river channel and islands size and shape today and pre dam.
3. Plants: utilize remote sensing materials to map flag grass and invasive plant communities to compare changes from pre Dam.
4. Fisheries: review available materials from locals in the community, fish and game and other resources to determine what effect the Dam has had on down stream fish types and numbers.

June 11,2020

Dear Secretary Bose,

HAT 1.

PROPOSED MODIFICATION TO OPERATING CURVE AND DOWNSTREAM FLOW STUDIES

18 CFR 5.15
For studies using 100 year climate data to model outcomes,

(d) I propose additional modelling based on predictive data from the studies of climate change. It is my understanding Federal Dams do additional modelling to take effects of climate change into account when undergoing licensing. This would include climate change considerations of Operating Curve Rules among others.

This idea was previously presented to FERC in 2019 comments by Maria Clark from the EPA.

Given the long life of the permit, the measurable manifestations of climate change and the Southern Company's goal to shift power generation away from fossil fuels, it seems prudent to take advantage of modelling in preparation to be best able to deal with unexpected situations such as greater reliance on hydro power by APC.

1. To my knowledge climate alternative data has not been modelled
2. Modelling is a very cost effective way to prepare for future events.

P-2628 HAT 2 Comments

Submitted separately are landowner forms reproduced from the study report and completed by landowning downstream stakeholders.They are reporting on erosion at their property sites. They represent lay attempts to recognize and monitor riverfront erosion. Whether or not each geo-located individual completed and submitted a form, each has taken their time to attend at least one meeting to express their grievance with downstream management over the life of the dam.

Also submitted is a screen shot of pinned landowner locations. Additionally, submitted is a page from the Trutta report locating erosion sites. There are correlations with landowner reported erosion and the study map. The Trutta float-the-river erosion survey is baseline information. It is a current day 'snapshot'. It may provide useful data for prospective study. Not being conversant in reading sonar / lidar data, I seek reassurance that riverbank video taken when the river channel is full does not dampen / downplay the classification of erosion sites.
The river's edges evaluated - as landowners experience it - when the water is low may expose more severe erosion than shown on the Trutta video.

Notable is the omission from the report of log/lat data for the sites identified in Figure 3-1 and Table 3-2. (Long/lat data was provided in Table 2-1 Summary of Lake Harris Erosion & Sedimentation)

#1 Request for long/data data for Figure 3-1 and Table 3-2 of the Trutta Report and Request greater resolution image of Figure 3-1

Of major concern to all Harris Project Stakeholders is the Erosion Issue. Foundational to taking steps going forward is looking back to what has been. The University of Alabama maintains an aerial photographic library including images of the Harris Project area beginning in 1942. In existence are digitized prints for 1942, 1950, 1954, 1964, 1973. These are housed at www.alabamamaps.ua.edu. Attached is a mosaic of a portion of the project area as it appeared in 1942. The full sized map is rendered and georeferenced.

#2 Proposed: A New Study of the downstream river using historic images overlaid onto current imagery

18 CFR 5.15 (e)

1. Erosion is a significant and persistent concern. Erosion is problematic for landowners and flora & fauna in and around the river.
2. To my knowledge, this type of GIS comparison using historic data to impact effects of release effects downriver have not been done.
3. At the initial licensing there was no post dam data to compare to compare to the historic data.
4. This is a simple and inexpensive study, using readily available data

18 CFR 5.0(b)

1. The study should look at and provide change analysis for:

a. Analysis of the river bank contour along its length through time. Free flowing rivers are elastic, moving silt and sedimentation from side to side and down its length. A river serving as a channel should show deviations from historic patterns.

b. Any changes in river bank elevation

c. Provide image overlays of historic data onto current imagery with the intent to discover what the data show about the effects of a dam on the downstream river and can be a tool to evaluate effect of future changes made to flow patterns.

d. Begin construction of a detailed GIS map with information relating fish populations, (and a whole host of other parameters) in 3D. That is, not only presence/absence of species along the river length, but presence (where data are available) of species during different decades in time. There are numerous possibilities.

e. APC can gather additional, (say scaled to 1:6000 or the highest resolution feasible) imagery to overlay on the historic public images available at 1:20000. This would provide a baseline for future studies. At our fingertips are 80 years of data.

2. This GIS modeling tool can also be applied to provide opportunity for interagency contribution towards building the most accurate picture of aquatic and other life of the Tallapoosa.

3. Creating the realization of and expounding upon the treasures of the Tallapoosa River is something all parties (APC and stakeholders above/below the dam) can rightly be proud of.

P-2628 HAT5 Comments

#1 Re: NOTIFICATION TO DOWNSTREAM USERS OF WATER RELEASE FROM HARRIS DAM

Downstream rivers users 'don't know what they can't know', They cannot know the mind of market forces determining when the turbines will run. APC and the dam managers have an obligation and responsibility, not to make the river safe for downstream users, but to provide users with accurate, timely and transparent information so users can make informed decisions regarding their own safety. APC must develop an effective way to 'push' dam operation realtime change notifications to those who opt in. Increased river usage as described by riverside landowners, reinforces the need-to-know for downstream users, especially those not already familiar with river level irregularities.

It appears FERC in Atlanta has approved the status quo notification system currently used by APC. The current system provides outdated and insufficient information for downstream users.

Accession Number:	20200317-3033
Description:	Letter order to Alabama Power Company accepting the automated downstream notification system for the Tallapoosa River Projects et al under P-349 et al.

If this issue is not part of the HAT 5 relicensing process, we need to know. When is the proper time to address this recreation / safety issue? Please have APC advise us of the process we need to pursue regarding revamping and modernizing the notification of release operations. This is an important issue, impacting below dam river use at each of APC dam projects.

And…... if this has been addressed and I missed it, I apologize.

PS a copy of the FERC Atlanta office correspondence with APC is sent as a separate PDF.

#2 RE: IMPROVED BELOW THE DAM RIVER ACCESS

As I understand it, part of the initial rational for the APC dam system included a 'give back to the public' component. This is easily realized on the impoundments created by dam construction.

Requiring more effort and thought are ways APC 'gives back' to below-dam river users. The below-the-dam efforts to provide access / ramps are as inherent in the mandate as are the creation of put-ins on the impoundment. To date, I have not seen any APC ideas or proposals put forth regarding downstream access. This is a real public/private partnership opportunity. forIf this is not a relicensing issue, please advise so we can pursue the proper channels. Again, I apologize in advance if I have missed APC correspondence.

Sincerely,
Donna Matthews
Box 1054
105 Woodland Ave E
Wedowee, AL 3278

June 4th HAT 1 and 5 meeting summary

APC Harris Relicensing <g2apchr@southernco.com>

Thu 6/18/2020 10:51 PM

To: 'harrisrelicensing@southernco.com' <harrisrelicensing@southernco.com>
Bcc: damon.abernethy@dcnr.alabama.gov <damon.abernethy@dcnr.alabama.gov>; nathan.aycock@dcnr.alabama.gov <nathan.aycock@dcnr.alabama.gov>; steve.bryant@dcnr.alabama.gov <steve.bryant@dcnr.alabama.gov>; todd.fobian@dcnr.alabama.gov <todd.fobian@dcnr.alabama.gov>; chris.greene@dcnr.alabama.gov <chris.greene@dcnr.alabama.gov>; keith.henderson@dcnr.alabama.gov <keith.henderson@dcnr.alabama.gov>; mike.holley@dcnr.alabama.gov <mike.holley@dcnr.alabama.gov>; evan.lawrence@dcnr.alabama.gov <evan.lawrence@dcnr.alabama.gov>; matthew.marshall@dcnr.alabama.gov <matthew.marshall@dcnr.alabama.gov>; brian.atkins@adeca.alabama.gov <brian.atkins@adeca.alabama.gov>; tom.littlepage@adeca.alabama.gov <tom.littlepage@adeca.alabama.gov>; jhaslbauer@adem.alabama.gov <jhaslbauer@adem.alabama.gov>; cljohnson@adem.alabama.gov <cljohnson@adem.alabama.gov>; mlen@adem.alabama.gov <mlen@adem.alabama.gov>; fal@adem.alabama.gov <fal@adem.alabama.gov>; djmoore@adem.alabama.gov <djmoore@adem.alabama.gov>; arsegars@southernco.com <arsegars@southernco.com>; dkanders@southernco.com <dkanders@southernco.com>; wtanders@southernco.com <wtanders@southernco.com>; jefbaker@southernco.com <jefbaker@southernco.com>

1 attachments (3 MB)

2020-06-04 HAT 1 and 5 Meeting Notes and Presentation.pdf;

HATs 1 and 5,

Attached is a summary, along with the presentation, from our meeting on June 4th. This summary is also on our website: www.harrisrelicensing.com.

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

Harris Action Teams 1 & 5 Meeting Summary
June 4, 2020
9:00 am to 11:00 am
Conference Call

Participants:
See Attachment A

Action Items:
- Alabama Power determine what historic LiDAR data are available and provide the information to FERC via email.
- Kevin Nebiolo will revise figures so that inundated and non-inundated structures will be differentiated on the figures and these figures will also include the winter pool level (i.e., 1 ft, 2 ft, etc.).

Meeting Summary:
Angie Anderegg (Alabama Power Company (Alabama Power)) opened the meeting by introducing everyone and stated the purpose of the meeting: 1) to present the methodology for analyzing the number of usable recreation structures on Lake Harris at the current winter operating curve and the winter operating curve alternatives; and 2) to present the methodology for analyzing how structures located downstream of Harris Dam might be affected by a change in the winter operating curve during a 100-year flood event.

Colin Dinken (Kleinschmidt Associates (Kleinschmidt)) presented the methods for analyzing recreation structure (i.e., boat dock, pier, etc.) usability at current winter pool and the proposed operating curve change alternatives. Light detection and ranging (LiDAR) was used to gather elevation data around the reservoir. The elevation data will be used to measure the depth of water at each recreation structure at each of the proposed winter operating curve elevations. Field observations will occur during full pool (summer 2020) to verify a subset of structures on Lake Harris, namely those that are not visible on the aerial imagery used for this analysis.

Barry Morris (Lake Wedowee Property Owners Association) asked if the usability of sloughs at the winter operating curve change alternatives was being assessed or was this analysis only for structures. Colin said he was not looking into the usability of the sloughs and Angie emphasized that slough usability at the winter operating curve alternatives is not in the overall study plan.

Keith Henderson (Alabama Department of Conservation of Natural Resources (ADCNR)) stated that ADCNR was not involved in the construction of all public ramps on the Harris reservoir, so it cannot be assumed that every ramp has a 15 percent grade at the bottom. Colin noted he can generate a slope analysis on any ramp to determine the grade.

Sarah Salazar (Federal Energy Regulatory Commission (FERC)) asked what the collection year is for the LiDAR data used for this analysis and if there was historical LiDAR data for comparison. Jason Moak (Kleinschmidt) said the LiDAR data was from 2015 and that it covers all of the surrounding banks of the Harris reservoir but nothing beneath the water's surface. Sarah asked if there was historical LiDAR to be used for sedimentation analysis. Angie said

Alabama Power will determine what historic LiDAR data are available and provide the year information to FERC and stakeholders.

Albert Eiland (Downstream Property Owner) expressed concern that raising the winter operating curve would result in additional water released downstream and subsequent flooding. He noted that for every foot the lake is raised it would increase inundation of downstream property. Colin explained that Kevin Nebiolo (Kleinschmidt) would present the proposed methods for analyzing how an increase in the winter operating curve would affect downstream structures.

James Hathorn (United States Army Corps of Engineers (USACE)) asked if there would be an analysis on the percent of time structures are useable. Kelly Schaeffer (Kleinschmidt) stated this study is determining structure usability during winter pool.

Kevin presented the methods to evaluate how an increase in the winter operating curve could affect downstream structure inundation.

David Bishop (Downstream River User) asked if this analysis was related to the lake or just downstream. Angie replied that this methodology focuses on the structures downstream of Harris Dam. David asked about the accuracy of the generation schedule. Angie noted that this issue has been brought to Alabama Power's attention and they are looking into the best way to address it.

Sarah asked if different types of structures will be differentiated in this analysis. Kevin said this analysis is for any type of structure, habitable or not. Land use data could potentially be differentiated. Sarah said that some landowners have expressed concern about structures such as stairways. Kevin explained the LiDAR provides four points per square meter, which is accurate enough to detect a shed but not necessarily stairs.

James asked if this downstream structure analysis would extend downstream of Martin. Kevin replied that it is extending to Jaybird Landing, the uppermost hydraulic point for Lake Martin.

Sarah asked if there would be maps showing the location of inundated structures for both the lake and downstream. Angie said Alabama Power is only evaluating impacts downstream for a change in the winter pool; therefore, the impact is limited to inundation during a flood event where Alabama Power would be operating under flood control procedures. Kelly stated that for the Operating Curve Change Feasibility Analysis study, Alabama Power is modeling the 100-year design flood to analyze the effect of that flow on downstream structures IF the Harris reservoir is operating one to four feet higher than existing conditions. Sarah commented that hopefully there will be some additional suggested downstream releases to review. The Downstream Release Alternatives study is separate from the Operating Curve Change Feasibility Study, and those downstream release alternatives in that study are not affected by the 100-year flood. Mike Hross (Kleinschmidt) stated that the range of minimum flows in the Downstream Release Alternatives study would likely have a negligible effect on inundation downstream compared to the flood flow. The HEC-ResSim model could evaluate normal and flood control operations at Harris Dam with other minimum flow alternatives to determine any downstream effects on structures.

James asked if any other high flow events (i.e., 10, 15, 25, 50-year flood events) other than the 100-year flood would be analyzed. Angie explained that the 100-year flood event scenario is used by the Federal Emergency Management Agency (FEMA) and Alabama Power will be using that flood event scenario to make decisions regarding changes in Harris Project operations. If FERC requires additional high flow events for their analysis, Alabama Power will model those additional high flow events. Sarah stated if the USACE or other stakeholders have a high flow event scenario they want Alabama Power to analyze, this request should be filed with comments on the Initial Study Report (ISR) by June 11, 2020. Kelly stated that any requests for additional analysis and/or additional studies need to follow FERC regulations. Sarah agreed and said that if anyone wants to request additional studies or request additional analyses that were not incorporated into the April 12, 2019 FERC-approved study plan, stakeholders should follow 18 CFR §5.15.

Martha Hunter (Alabama Rivers Alliance (ARA)) asked if the 100-year flood was happening more often. Kenneth Odom (Alabama Power) said the 100-year storm is a design storm based on an actual event that was scaled to reflect a 100-year event. Stacey Graham (Alabama Power) noted that the 2003 flood event was closest to a 100-year event during the 60 years of data in the flood frequency analysis. Stacey explained that there was enough data from both dry and wet years in the flood frequency analysis to be confident in the 100-year design flood. James stated the USACE will likely submit comments to analyze other high flow scenarios but may have to wait until an operating curve change is selected. Monte Terhaar (FERC) noted that now is the time to state and evaluate any other modeling scenarios.

Sarah asked about the induced surcharge function and storage areas and if these areas are where erosion is occurring. Mike said the location of storage areas (backwater areas and tributaries) will be defined in the Final Operating Curve Change Feasibility Analysis study report and it is possible to overlay those areas with areas that are of concern with regard to erosion.
Charles Denman (Downstream Property Owner) asked about the duration of the 100-year storm event and whether a map showing the contours, flooded land, and structures would be developed. Stacey noted that both the beginning and the end of an event were captured and Mike explained there was no actual hydrologic simulation, just flow analysis. Kenneth stated Alabama Power uses the duration of the actual storm event rather than a set duration. Angie stated that this information is further described in the Phase 1 Draft Operating Curve Change Feasibility Analysis Report. Kevin noted that during this Phase 2 analysis, Alabama Power will provide maps showing the contours and inundated structures.

Jack West (ARA) asked about the primary benefits of raising the winter operating curve. Angie explained that the primary reason for assessing the winter operating curve change is the potential for increased recreation opportunities during the winter. An operating curve change was requested by stakeholders during 2017 discussions. Alabama Power is evaluating both beneficial and adverse effects of raising the winter operating curve in Phase 2 of this study.

Albert asked how raising the winter pool would affect areas downstream. Kenneth explained that using a 100-year design storm, a one to four-foot increase in winter pool would increase the water surface elevation downstream from the increased releases from Harris Dam. Kelly emphasized that Alabama Power is still gathering information and data from other relicensing studies and that they have not proposed any changes in Harris Project operations at this time.

Linda Allen (Downstream Property Owner) stated that most of the acreage her family owns is an island called Price Island (~19 acres) and asked if it would be evaluated. Angie and Sarah emphasized that the scope of the study is from Harris Dam downstream through Horseshoe Bend.

David asked if there are any studies detailing the difference between a 50-year flood and a 100-year flood. He also asked how similar downstream conditions are (in terms of elevation and inundation) to a 100-year flood when both generators are operating. There is no comparison since normal operations is far less than a 100-year flood event. Angie explained that Alabama Power is assessing modifications to current Harris Project operations, not pre-dam conditions. David asked if Alabama Power was prepared for a 100-year flood event and asked how the project would operate. Angie noted that detailed information on how the project operates and the models used for these studies can be found on the project website (www.harrisrelicensing.com). One meeting that may be particularly helpful to review is the HAT 1 meeting from September 11, 2019. Kenneth added that a 100-year flood basically has a 1 percent chance of occurring in any given year and Alabama Power operates according to flood control guidelines developed and approved by the USACE. Monte stated that in most cases, FERC uses the 100-year flood scenario as their standard, but that does not exclude the analysis of other flood events. Kenneth concluded that Alabama Power works with the National Weather Service and USACE on Harris Project operations during flood events.

Donna Matthews (Downstream Property Owner) asked if basing the model on a 100-year flood potentially reduces the overall impact on downstream resources compared to effects from more frequent but lesser storm events. Kenneth said the 100-year flood analysis does not decrease the effect of smaller events and that smaller events have not been modeled.

Albert mentioned the gage at Wadley and a high flow event in early 2020. Angie stated that this particular question was addressed during the ISR meeting and a response provided in the ISR meeting summary.

Sarah commented that the maps shown in Kevin's presentation identify all structures using the same color regardless of whether they were within the inundation boundary and requested that the final analysis display inundated structures with a different color than non-inundated structures. Kevin said that inundated and non-inundated structures will be differentiated on the figures and these figures will also include the winter pool level (i.e., 1 ft, 2 ft, etc.).

David asked if FERC had ever denied a license for a project as large as Harris. Sarah was not familiar with any but encouraged David to send her an email so she could contact him with that information.

Sarah reviewed the relicensing schedule, reminding everyone the information gathering process is ongoing and Alabama Power's draft proposal for Harris Project operations will be presented in the Preliminary Licensing Proposal. Alabama Power will file their Final License Application in November 2021. The schedule is available in the November 16, 2018 Scoping Document 2. Sarah encouraged everyone to read that document and contact her with any questions.

Angie concluded that the meeting notes will be posted to harrisrelciensing.com and reiterated that comments on the ISR are due June 11, 2020 and should be filed with FERC.

ATTACHMENT A
HARRIS ACTION TEAMS 1 AND 5 MEETING ATTENDEES

Linda Allen – Downstream Property Owner
Angie Anderegg – Alabama Power Company (Alabama Power)
Dave Anderson – Alabama Power
Jeff Baker – Alabama Power
David Bishop – Downstream Property Owner
Allan Creamer – Federal Energy Regulatory Commission (FERC)
Charles Denman – Downstream Property Owner
Colin Dinken – Kleinschmidt Associates (Kleinschmidt)
Albert Eiland – Downstream Property Owner
Amanda Fleming – Kleinschmidt
Todd Fobian – Alabama Department of Conservation of Natural Resources (ADCNR)
Tina Freeman – Alabama Power
Chris Goodman – Alabama Power
Stacey Graham – Alabama Power
James Hathorn – United States Army Corps of Engineers (USACE)
Keith Henderson – ADCNR
Martha Hunter – Alabama Rivers Alliance (ARA)
Mike Hross – Kleinschmidt
Carol Knight – Downstream Property Owner
Fred Leslie – Alabama Department of Environmental Management (ADEM)
Matthew Marshall – ADCNR
Donna Matthews – Downstream Property Owner
Rachel McNamara – FERC
Tina Mills – Alabama Power
Jason Moak – Kleinschmidt
Barry Morris – Lake Wedowee Property Owners Association
Kevin Nebiolo – Kleinschmidt
Kenneth Odom – Alabama Power
Jennifer Rasberry – Alabama Power
Sarah Salazar – FERC
Kelly Schaeffer – Kleinschmidt
Chris Smith – ADCNR
Sheila Smith – Alabama Power
Thomas St. John – Alabama Power
Monte Terhaar – FERC
Jack West – ARA

R.L. Harris Dam Relicensing
FERC No. 2628

HAT 1 & 5 Meetings
June 4, 2020

HARRIS DAM
RELICENSING

Operating Curve Change Feasibility Analysis

Phase II Lake Recreation Structure Usability at Winter Pool Alternatives

HARRIS DAM
RELICENSING

Phone Etiquette

- ❑Be patient with any technology issues
- ❑Follow the facilitator's instructions
- ❑Phones will be muted during presentations
- ❑Follow along with PDF of presentations
- ❑Write down any questions you have for the designated question section
- ❑Clearly state name and organization when asking questions
- ❑Facilitator will ask for participant questions following each section of the presentation

HARRIS DAM RELICENSING

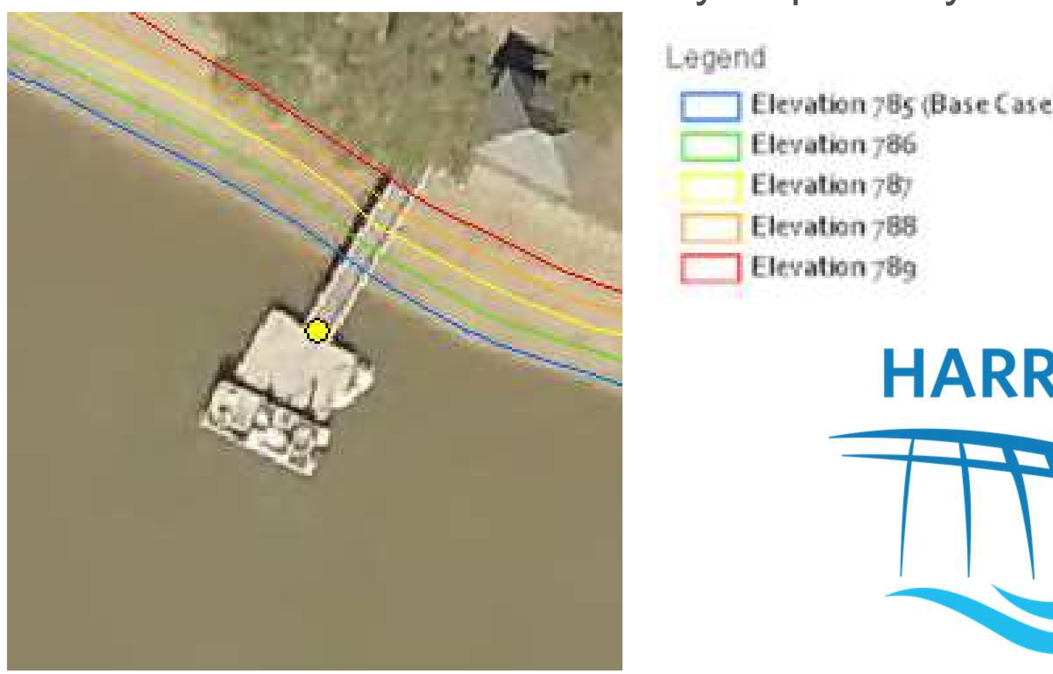
Recreation Structure Usability at Winter Pool Alternatives

<u>Objectives Described in the Study Plan</u>

- Evaluate "…the number of <u>private docks</u> usable during the current winter drawdown and the lowest possible elevation that <u>public boat ramps</u> can be used."
- Private docks defined as <u>boathouses, floats, piers, wet slips, and boardwalks</u>
- Will "…compare the number of access points (both private docks and public boat ramps) available at each 1-foot increment change…"

<u>Methods</u>

- LiDAR used to measure elevation (785, 786, 787, 788, 789 ft msl contours)
- Elevation data used to calculate depth at point
- Depth for points beyond the 785 ft msl contour will be estimated by slope analysis



Recreation Structure Usability at Winter Pool Alternatives

Boathouses

- Point moved to the back of each of these structures
- Structure considered usable with 2 ft of water at the back edge

HARRIS DAM
RELICENSING

Recreation Structure Usability at Winter Pool Alternatives

Floats

- Point moved to the back of each of these structures
- Structure considered usable with 2 ft of water at the back edge

HARRIS DAM RELICENSING

Recreation Structure Usability at Winter Pool Alternatives

Piers

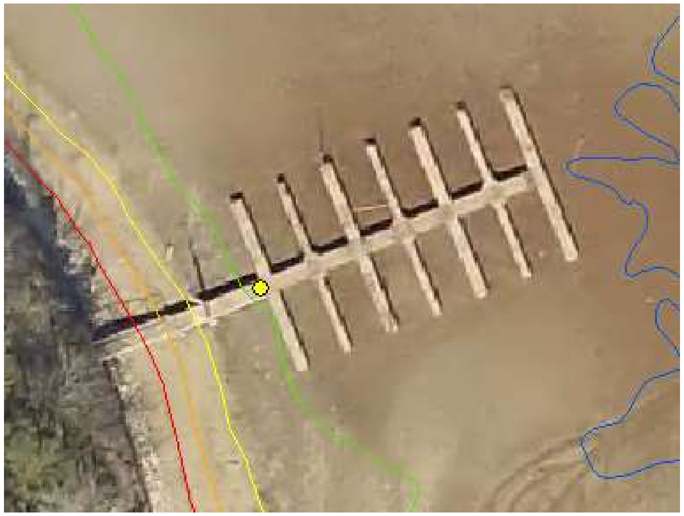
- Classified into 3 subcategories:
  - Platform (*bottom left*):
    - Piers with a square-shaped platform on the end
    - Point moved to back edge of the platform
    - Analyzed similarly to floats
  - Mooring (*bottom right*):
    - Straight piers > 30 ft
    - Point moved 30 ft back from front edge
  - Fishing (*right*):
    - Straight piers ≤ 30 ft
    - Point moved halfway back from the front edge
- Depth of 2 ft to be usable

HARRIS DAM RELICENSING

Recreation Structure Usability at Winter Pool Alternatives

Wet Slips

- Some oriented parallel to the bank (*bottom left*) and some perpendicular (*bottom right*)
- The back edge is always the outside edge facing the bank
- Wet slips with multiple slips (*right*) will be considered usable when all slips are usable
- Depth of 2 ft to be usable



HARRIS DAM RELICENSING

Recreation Structure Usability at Winter Pool Alternatives

Boardwalks

- Point moved to front of structure
- Objective is aesthetics
- Depth of 1 ft at point

Recreation Structure Usability at Winter Pool Alternatives

Public Boat Ramps

- ADCNR typically uses the following criteria for public ramps at low pool:
  - 15% grade at bottom portion of ramp
  - Depth of 4.5 ft at the end of the ramp
  - Able to launch up to 26 ft boat at low pool

HARRIS DAM RELICENSING

Recreation Structure Usability at Winter Pool Alternatives

Public Boat Ramps

- Highway 48 Bridge:
  - Built using ADCNR standards
  - Usable at 785 ft msl

HARRIS DAM RELICENSING

Recreation Structure Usability at Winter Pool Alternatives

Public Boat Ramps

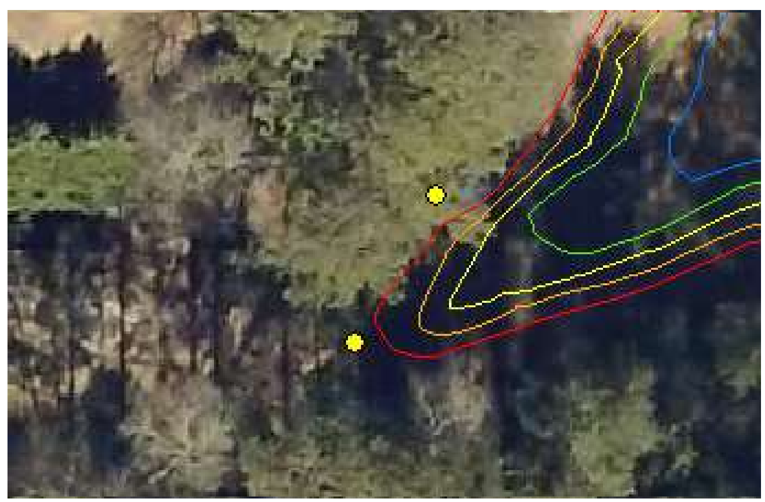
- Lee's Bridge:
  - Bottom of ramp is ~785.5 ft msl
  - Use a slope analysis to determine the grade
  - Possibly usable ~790.0 ft msl

HARRIS DAM RELICENSING

Recreation Structure Usability at Winter Pool Alternatives

Field Observations

- No imagery (*left*):
  - Imagery predates structures
  - ~10.0% of structures
- Not visible (right):
  - Structure obscured by foliage or shadow
  - ~2.5% of structures



HARRIS DAM RELICENSING

Recreation Structure Usability at Winter Pool Alternatives

Presentation of Data: All Structures

The number and percentage of all usable structures at each winter pool alternative

Winter Pool Elevation (feet msl)	Number of Usable Structures	Percent Usable Structures
785		
786		
787		
788		
789		
>789		

HARRIS DAM
RELICENSING

Recreation Structure Usability at Winter Pool Alternatives

Presentation of Data: By Structure

The number and percentage of usable structures by type at each winter pool alternative

Winter Pool Elevation (feet msl)	Number of Usable Structures	Percent Usable Structures
Boardwalks		
785		
786		
787		
788		
789		
>789		
Boathouses		
785		
786		
787		
788		
789		
>789		
Floats		
785		
786		
787		
788		
789		
>789		

HARRIS DAM RELICENSING

Questions?

HARRIS DAM
RELICENSING

Alabama Power

R.L. Harris Dam Relicensing
FERC No. 2628

HAT 1 Meeting
June 4, 2020

HARRIS DAM
RELICENSING

Operating Curve Change Feasibility Analysis

Phase II Downstream Structure Survey

Phone Etiquette

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- Facilitator will ask for participant questions following each section of the presentation

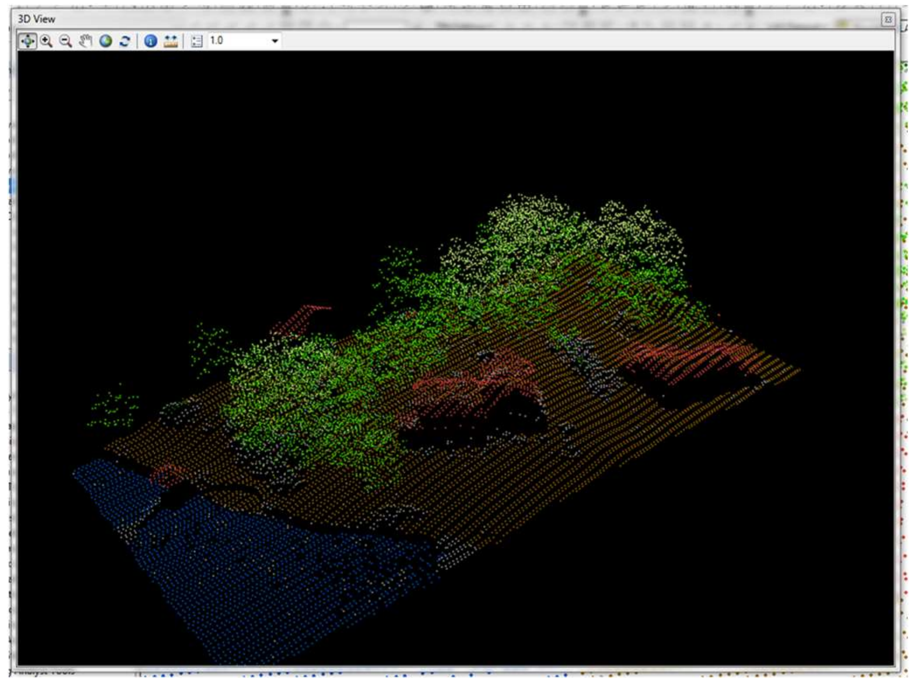
HARRIS DAM
RELICENSING

Harris Downstream Structure Survey

- An operating curve change may affect areas downstream of Harris Dam
  - Effects are associated with flooding
- Phase 2 of the Operating Curve Change Feasibility Analysis will include:
  - Identifying affected structures
  - # of structures
  - Location
  - Depth & duration of inundation
- Identifying structures is no small task

Methods: Remote Sensing

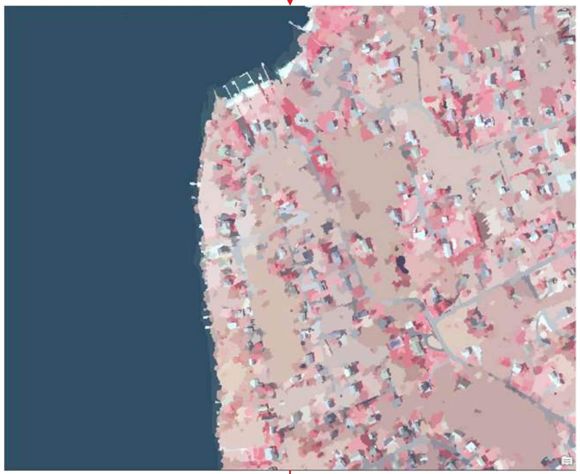
- LiDAR – 4 points per m^2
- 1 m USDA NAIP 4 band image (R, G, B, NiR)
- Classification Workflow:
  - Data management
  - Create training data
  - Classify image pixels
  - QAQC – Confusion Matrix



Methods: OBIA

- Object Based Image Analysis in ArcGIS Pro Image Analyst

1. Group pixels into objects - segmentation
2. Create training data
3. Classify Image
4. Assess quality with Confusion Matrix
5. Heads up digitizing
6. Spatial intersection & summarize



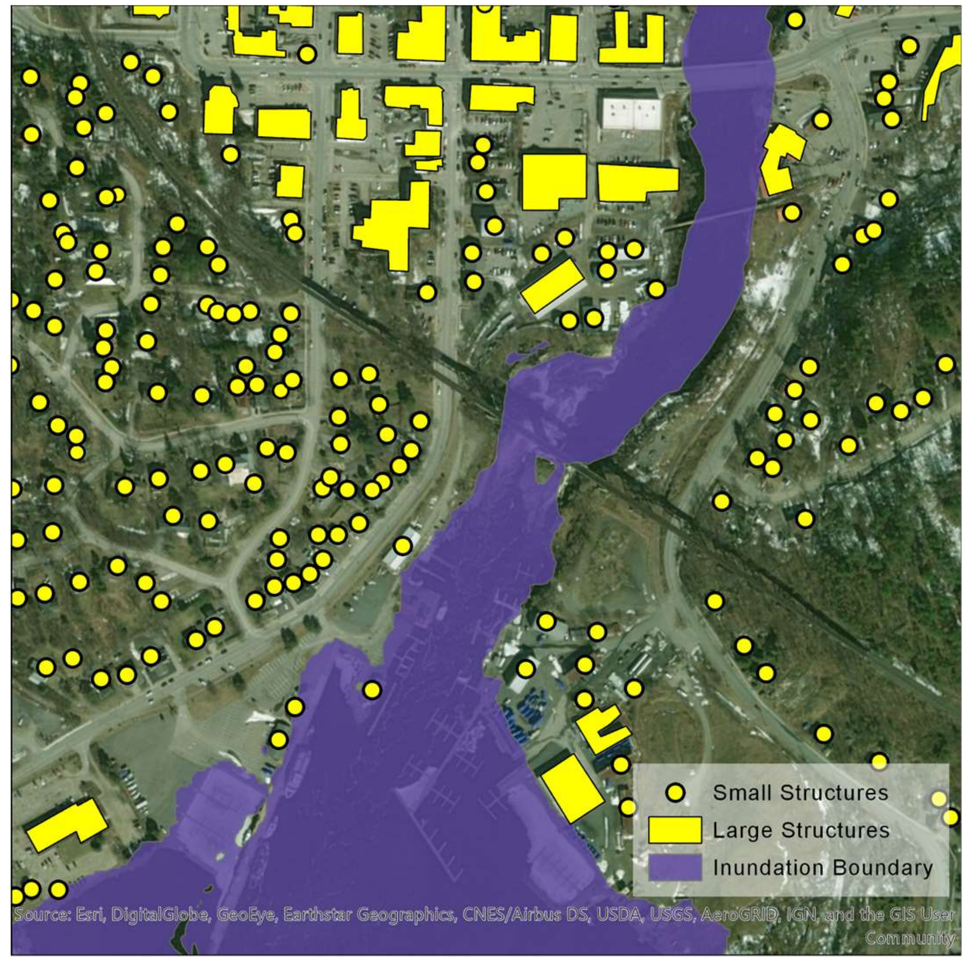
Anticipated Output

- Once identified – we will use a GIS to find structures impacted with a spatial intersection

- Series of maps showing location of all structures with symbols for flooded vs. not flooded

- Summary statistics in report
  - # of structures affected by rule curve
  - Min., Avg., Max. depth of inundation
  - Min., Avg., Max. duration of inundation

- Results will be in Phase II Report



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Birmingham, AL 35203
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July 10, 2020

VIA ELECTRONIC FILING

Project No. 2628-065
R.L. Harris Hydroelectric Project
Response to Initial Study Report (ISR) Disputes or Requests for Modifications of Study Plan

Ms. Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street N.
Washington, DC 20426

Dear Secretary Bose,

Alabama Power Company (Alabama Power) is the Federal Energy Regulatory Commission (FERC) licensee for the R.L. Harris Hydroelectric Project (Harris Project) (FERC No. 2628). On April 10, 2020, Alabama Power filed the Initial Study Report (ISR) along with six Draft Study Reports and two cultural resources documents. Alabama Power held the ISR Meeting with stakeholders and FERC on April 28, 2020. On May 12, 2020, Alabama Power filed the ISR Meeting Summary. Comments on the ISR, draft reports, and ISR Meeting Summary were due on June 11, 2020.

On June 10, 2020, FERC staff provided comments on the ISR and the ISR Meeting Summary.[1] FERC requested that Alabama Power respond to specific comments by July 11, 2020. Attachment A of this filing includes Alabama Power's responses to those questions for which FERC requested a July 11 response.

Stakeholders and FERC provided three Additional Study Requests and two study modifications as part of comments on the ISR and ISR Meeting Summary. Two of the requested studies do not meet the criteria outlined in FERC's regulations at 18 C.F.R. § 5.9(b) and 5.15 and/or address pre-project conditions. Although, the other study request meets FERC's criteria, Alabama Power is not incorporating the study request into the relicensing process for the Harris Project. The complete response to these study requests is in Attachment B.

FERC staff, Alabama Rivers Alliance (ARA)[2], and the U.S. Environmental Protection Agency (EPA)[3] also requested the inclusion of additional downstream flow release alternatives as modifications to Alabama

[1] Accession No. 20200610-3059.

[2] Accession No. 20200611-5114.

[3] Accession Nos. 20200612-5025 and 20200612-5079.

Power's existing Downstream Release Alternatives Study. Alabama Power's response to the recommended modifications is also provided in Attachment B.

Within preliminary comments on the Draft Water Quality Study Report as well as during the ISR Meeting and within comments on the ISR and ISR Meeting Summary, multiple stakeholders requested that Alabama Power continue monitoring water quality downstream of Harris Dam in 2020 and 2021. To collect dissolved oxygen and water temperature data in 2020, Alabama Power installed the continuous monitor on May 4, following the ISR meeting. The generation monitor was installed on June 1 to align with the monitoring season start date in the Water Quality Study Plan. Alabama Power also agrees to collect water quality data at both locations in 2021 (from March 1 – June 30, 2021 at the continuous monitor and June 1 – June 30, 2021 at the generation monitor) to include in the final license application.

The EPA recommended inclusion of water quality monitoring data with the Water Quality report. Alabama Power notes that the Draft Water Quality Study Report contains an appendix with the 2017 – 2019 water quality monitoring data, and the Final Water Quality Study Report will contain a similar appendix with the complete set of water quality monitoring data (including 2020). Any data collected in 2021 and after the Final Water Quality Study Report is provided will be included within the Final Licensing Proposal.

Alabama Power reviewed FERC and stakeholder comments on the ISR and Draft Study Reports and will address all other comments in any Final Study Reports (filed in 2020 and 2021), the Updated Study Report (USR) (due April 10, 2021), or the Preliminary Licensing Proposal (PLP) (due on or before July 3, 2021).

If there are any questions concerning this filing, please contact me at arsegars@southernco.com or 205-257-2251.

Sincerely,

Angela Anderegg

Angie Anderegg
Harris Relicensing Project Manager

Attachment A: Alabama Power's Response to FERC's June 10, 2020 Staff Comments on the Initial Study Report and Initial Study Report Meeting Summary for the R.L. Harris Hydroelectric Project
Attachment B: Alabama Power's Response to Study Modifications and Additional Study Requests Following the May 12, 2020 Initial Study Report and Initial Study Report Meeting Summary for the R.L. Harris Hydroelectric Project

cc: Harris Stakeholder List

Attachment A

Alabama Power's Response to FERC's June 10, 2020 Staff Comments on the Initial Study Report and Initial Study Report Meeting Summary for the R.L. Harris Hydroelectric Project

FERC questions are presented in italic text and the specific information requested is highlighted in yellow; Alabama Power's response follows.

Draft Downstream Release Alternatives (Phase 1) Study Report

Question #2: During the ISR Meeting, Alabama Power requested that stakeholders provide downstream flow alternatives for evaluation in the models developed during Phase 1 of the Downstream Release Alternatives Study. Stakeholders expressed concerns about their ability to propose flow alternatives without having the draft reports for the Aquatic Resources and Downstream Aquatic Habitat Studies, which are scheduled to be available in July 2020 and June 2020, respectively. It is our understanding that during Phase 2 of this study, Alabama Power would run stakeholder-proposed flow alternatives that may be provided with ISR comments, as well as additional flow alternatives that stakeholders may propose after the results for the Aquatic Resources and Downstream Aquatic Habitat Studies are available. Please clarify your intent by July 11, 2020, as part of your response to stakeholder comments on the ISR.

Alabama Power Response:

Alabama Power's response to evaluating additional flow alternatives is discussed in Attachment B.

Regarding the Aquatic Resources and Downstream Aquatic Habitat Studies, it is Alabama Power's intent to provide stakeholders 30 days to review, provide comments, and recommend any additional flow analyses based on the information in the draft reports. It is also Alabama Power's intent to meet with the Harris Action Teams (HATs) between Fall 2020 and Spring 2021 to present preliminary results, including the bioenergetics modeling, and obtain stakeholder input on additional analyses.

Question #5: Page 14 of the Draft Downstream Release Alternatives (Phase 1) Study Report includes a description of the HEC-ResSim model that was developed for the project. Harris Dam was modeled in HEC-ResSim with both a minimum release requirement and maximum constraint at the downstream gage at Wadley. The draft report states that the minimum release requirement is based on the flow at the upstream Heflin gage, which is located on the Tallapoosa River arm of Harris Reservoir and has 68 years of discharge records. Page 5 of the draft report indicates that there is also a gage (Newell) on the Little Tallapoosa River Arm of the reservoir, which has 45 years of discharge records. It appears that only the Heflin gage was used in developing the minimum release requirement. As part of your response to stakeholder comments on the ISR, please explain the rationale for basing the minimum releases in the HEC-ResSim model only on the flows at the Heflin gage and not also on the flows at the Newell gage.

Alabama Power Response:

The HEC-ResSim model bases the releases on the Green Plan, which specifies the use of the Heflin gage. During development of the Green Plan, the Heflin gage was considered the gage that best mimicked the unregulated, natural flow of the Tallapoosa River. Based on available information from stakeholder meetings in early 2000, the Newell gage was not considered. Stakeholders involved in the Green Plan development process did acknowledge that the Heflin gage excluded the flow from Little Tallapoosa River.

Below is a brief summary of the recorded stakeholder discussions that reference the use of the Heflin gage.

- 5/21/2003 Stakeholder Meeting: Stan Cook (Alabama Department of Conservation and Natural Resources (ADCNR)) stated that the Heflin gage is being used to mimic natural events and that the “Big” Tallapoosa River better reflects a larger scale drainage.
- 8/4/2003 Stakeholder Meeting: Elise Irwin presents findings on the models indicate that the Heflin gage is a promising location.
- 11/3/2003 Stakeholder Meeting: Alabama Rivers Alliance (ARA) stated they wanted Alabama Power to evaluate use of a house turbine that would provide capabilities to duplicate the Heflin gage flows. During this meeting, it was mentioned that the Heflin gage does not include flows from the Little Tallapoosa River, and no one stated opposition to use of the Heflin gage.
- 1/1/2006 Stakeholder Meeting: Stakeholders commented that mimicking Heflin flows would allow for some natural variability of flow in the regulated part of the river.

<u>Draft Erosion and Sedimentation Study Report</u>

Question #7: The Erosion and Sedimentation Study in the approved study plan states that Alabama Power would analyze its existing lake photography and Light Detection and Ranging (LIDAR) data using a geographic information system (GIS) to identify elevation or contour changes around the reservoir from historic conditions and quantify changes in lake surface area to estimate sedimentation rates and volumes within the reservoir. In addition, the approved study plan states that Alabama Power will verify and survey sedimentation areas for nuisance aquatic vegetation. According to the study schedule, Alabama Power will prepare the GIS overlay and maps from June through July 2019 and conduct field verification from fall 2019 through winter 2020.

The Draft Erosion and Sedimentation Study Report does not include a comparison of reservoir contour changes from past conditions or the results of nuisance aquatic vegetation surveys. The report states that limited aerial imagery of the lake during winter draw down and historic LIDAR data for the reservoir did not allow for comparison to historic conditions and that Alabama Power will conduct nuisance aquatic vegetation surveys during the 2020 growing season. It is unclear why the existing aerial imagery and Alabama Power's LIDAR data did not allow for comparison with past conditions or why the nuisance aquatic vegetation surveys will be conducted during the 2020 growing season instead of during the approved field verifications from fall 2019 to winter 2020. As part of your response to stakeholder comments on the ISR, please clarify what existing aerial imagery and LIDAR data was used and why it was not suitable for comparison with past conditions.

<u>Alabama Power Response:</u>

Alabama Power has 2007 and 2015 Light Detection and Ranging (LiDAR) data for Lake Harris that it will use to develop a comparison for the Final Erosion and Sedimentation Study Report.

Ms. Donna Matthews proposed a new study of the Tallapoosa River downstream of Harris Dam to use historic images overlaid on current imagery to evaluate changes in the Tallapoosa River.[1] Alabama Power's response to this study request is addressed in Attachment B; however, Ms. Matthews noted in the ISR Meeting that she would share various images of the Tallapoosa River pre-Harris Dam and after construction. Alabama Power intends to facilitate obtaining copies of these images to provide to FERC for its use in addressing cumulative effects, as noted in FERC's November 16, 2018 Scoping Document 2.[2]

Regarding the nuisance aquatic vegetation component of the Erosion and Sedimentation study, the growing season is late spring into summer, which did not correspond with the fall 2019 to winter 2020 in the FERC-approved study plan schedule. Therefore, Alabama Power plans to conduct the nuisance aquatic vegetation survey in summer 2020. These results will be provided to HAT 2 participants as a technical memo to supplement the Draft Erosion and Sedimentation Study Report.

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[1] Accession No. 20200612-5018.

[2] Accession No. 20181116-3065.

Question #9: (comment provided below includes only the information requested by FERC) As part of your response to stakeholder comments on the ISR, please provide:

1) *the maps and assessment of the availability of potentially suitable habitat within the project boundary for all of the T&E species on the official species list for the project;*
2) *documentation of consultation with FWS regarding the species-specific criteria for determining which T&E species on the official species list will be surveyed in the field;*
3) *a complete list of T&E species that will be surveyed during the 2nd study season as part of the T&E Species Study; and*
4) *confirmation that Alabama Power will complete the field verification scheduled by September 2020.*

Alabama Power Response:

1) The maps and assessment of the availability of potentially suitable habitat within the Harris Project Boundary were included in the draft Threatened and Endangered Species Desktop Assessment Report and were prepared based on available sources of information. Any maps and assessments of habitat suitability that could not be resolved in the desktop assessment will be included in the Final Threatened and Endangered Species Study Report. Alabama Power is actively consulting with U.S. Fish and Wildlife Service (USFWS) regarding Threatened and Endangered Species (T&E species) where existing information is insufficient to determine their presence/absence and habitat suitability. Alabama Power plans to continue to work with USFWS and the Alabama Natural Heritage Program (ANHP) to resolve questions about the species and perform field surveys as deemed appropriate.

2) Alabama Power met with HAT 3 participants on August 27, 2019 to discuss species included in the Threatened and Endangered Species Study Plan. As a result of that meeting and based on recommendations from USFWS, Alabama Power conducted surveys for Finelined Pocketbook in the Tallapoosa River and Palezone Shiner in Little Coon Creek. Additional surveys for Finelined Pocketbook in tributaries to Lake Harris are ongoing and should be completed in Summer 2020. Alabama Power is consulting with the USFWS and ANHP to determine the need for additional surveys. If requested, Alabama Power may perform surveys for additional species and/or assessments to determine suitability of habitat that could not be resolved in the Threatened and Endangered Species Desktop Assessment. All consultation regarding this process will be included as an appendix to the Final Threatened and Endangered Species Study Report.

3) Alabama Power plans to conduct additional surveys for Finelined Pocketbook in Summer 2020. Based on ongoing consultation with USFWS and with input from ANHP, Alabama Power may perform surveys for Price's Potato Bean, White Fringeless Orchid, and Little Amphianthus (pool sprite) as well as assessments to determine if suitable habitat exists for Red-cockaded Woodpecker and Little Amphianthus.

4) Alabama Power plans to complete field verifications by September 2020.

Question #10: To facilitate review of the existing shoreline land use classifications, please file larger scale maps of all the shoreline areas as a supplement to the Draft Project Lands Evaluation Report, as part of your response to stakeholder comments on the ISR. Please include land use classifications on the maps. In addition, if available, please file the GIS data layers of the existing and proposed shoreline land use classifications.

Alabama Power Response:

Included with this filing are the larger scale maps, including land classifications, and the GIS files of the existing and proposed shoreline land use classifications.

Attachment B

Alabama Power's Response to Study Modifications and Additional Study Requests Following the May 12, 2020 Initial Study Report and Initial Study Report Meeting Summary for the R.L. Harris Hydroelectric Project

Alabama Power received two recommendations to modify the existing FERC-approved studies and three Additional Study Requests. Alabama Power's response to the study modifications and Additional Study Requests is discussed below.

A. Modifications to Existing Studies

1) FERC Question #3:[1] "To facilitate modelling of downstream flow release alternatives, we recommend that Alabama Power run base flows of 150 cfs, 350 cfs, 600 cfs, and 800 cfs through its model for each of the three release scenarios (i.e., the Pre-Green Plan, the Green Plan, and the modified Green Plan flow release approach). The low-end flow of 150 cfs was proposed by Alabama Power as equivalent to the daily volume of three 10-minute Green Plan pulses. This flow also is about 15 percent of the average annual flow at the United States Geological Survey's flow gage (#02414500) on the Tallapoosa River at Wadley, Alabama, and represents "poor" to "fair" habitat conditions. We recommend 800 cfs as the upper end of the base flow modeling range because it represents "good" to "excellent" habitat and is nearly equivalent to the U.S. Fish and Wildlife Service's Aquatic Base Flow guideline for the Tallapoosa River at the Wadley gage. The proposed base flows of 350 cfs and 600 cfs cover the range between 150 cfs and 800 cfs."

2) ARA's June 11, 2020 comments:[2] "While reserving the right to request other release alternatives be considered once more information is made available to stakeholders, ARA proposes the following study modification request pursuant to 18 C.F.R. § 5.15(d) for additional flow scenarios be analyzed as part of the Downstream Release Alternatives Study:

    (i) A variation of the existing Green Plan where the Daily Volume Release is 100% of the prior day's flow at the USGS Heflin stream gage, rather than the current 75%;

    (ii) A hybrid Green Plan that incorporates both a base minimum flow of 150 cfs and the pulsing laid out in the existing Green Plan release criteria;

    (iii) A constant but variable release that matches the flow at the USGS Wadley stream gage to the UGSG Heflin stream gage to mimic natural flow variability, and

    (iv) 300 cfs and 600 cfs minimum flows.

    Some of these flows, particularly items (iii) and (iv) may have been modeled internally by Licensee as part of the original adaptive management process; however, those models are not currently available as part of this relicensing. Studying a wider range of potential flows during the ILP could result in improved diversity and abundance of aquatic life and habitat, more recreation opportunities, decreased erosion and sedimentation, and gains in water quality."

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[1] Accession No. 20200610-3059.

[2] Accession No. 20200611-5114.

3) In its June 11, 2020 comments[3], EPA "requests that the flow scenarios include the evaluation of an option including both the pulses of the Green Plan with a minimum flow, and a higher minimum flow.

Alabama Power's Response:

Based on FERC, ARA, and EPA's recommendation to modify the Downstream Release Alternatives study, Alabama Power will model the following additional downstream flow scenarios:

- A variation of the existing Green Plan where the Daily Volume Release is 100% of the prior day's flow at the USGS Heflin stream gage, rather than the current 75%;
- A hybrid Green Plan that incorporates both a base minimum flow of 150 cfs and the pulsing laid out in the existing Green Plan release criteria;
- 300 cfs continuous minimum flow;
- 600 cfs continuous minimum flow; and a
- 800 cfs continuous minimum flow.

These recommended flow release alternatives are in addition to Alabama Power's release alternatives in the FERC-approved Study Plan that include:

- Pre-Green Plan (peaking only; no pulsing or continuous minimum flow);
- Green Plan (existing condition);
- Modified Green Plan (changing the time of day in which the Green Plan pulses are released); and
- 150 cfs continuous minimum flow.

Alabama Power has not included ARA's recommended "constant but variable release that matches the flow at the USGS Wadley streamgage to the UGSG Heflin streamgage to mimic natural flow variability", as an alternative to model. This alternative would eliminate peaking operations, which would significantly reduce or eliminate use of the Harris Project for voltage support and system reliability, including black start operations. Alabama Power regards this alternative as a complete change in Project operations (from peaking to run-of-river) that is not consistent with Project purposes.[4]

Furthermore, the units are not capable of adjusting to the extent of simulating natural river flows. The flow through the Harris units varies only to the extent of changes in gross head (the difference between the forebay elevation and tailwater elevation) and the wicket gate opening. Small wicket gate openings lead to excessive pressure drops, which is the primary driver of cavitation[5] initiation. The best way to minimize cavitation and its associated detrimental vibrations is to quickly move the wickets gates from a closed position to the best gate setting. The best gate setting is a permanent setting on the governor system to ensure that the control system will force a fast movement of the wicket gates through the "rough zone" to the best gate position thereby minimizing the time spent in the rough zone. The rough zone is an area on the operating curve where flows that are less than efficient gate cause increased vibrations in the turbine

[3] Accession Nos. 20200612-5025 and 20200612-5079.

[4] For additional explanation, see Alabama Power's March 13, 2019 letter to FERC (Accession No. 20190313-5060).

[5] Cavitation is a phenomenon in which rapid changes of pressure in a liquid lead to the formation of small vapor-filled cavities in places where the pressure is relatively low.

and cavitation along the low-pressure surfaces of the turbine runner. For these reasons, this is not a viable alternative.

Alabama Power also declines FERC's recommendation to study all of the continuous minimum flows combined with the Pre-Green Plan, Green Plan, and Modified Green Plan. Alabama Power asserts that modeling one combination of a continuous minimum flow AND pulsing (the hybrid Green Plan listed above) is adequate to determine the effect of this downstream release alternative on Project operations and other resources. The eight alternatives Alabama Power will model will provide sufficient information to evaluate the resources of interest, determine any downstream release proposal, and determine protection, mitigation, and enhancement (PM&E) measures to be incorporated into the new license for the Project.

B. <u>Proposed Additional Studies</u>

1) ARA proposed a new study for "Battery Storage Feasibility Study to Retain Full Peaking Capabilities While Mitigating Hydropeaking Impacts".

<u>Alabama Power's Response:</u>

While ARA's additional study request appears to conform to FERC's regulations and criteria for additional study requests, Alabama Power respectfully declines to complete this study for the Harris Project relicensing. Our reasons are provided below:

a. ARA notes that there is a data gap around Project ramping rates. The Harris Project units are not capable of ramping; rather they were designed as peaking units to quickly react to electrical grid needs, and as such, the turbines were not designed to operate in a gradually loaded state—or restricted ramping rate—over an extended period of time. In fact, restricted ramping is avoided to prevent damage to hydroturbine machinery. When transitioning from spinning mode to generating mode, the wicket gates are opened over a period of approximately 45 seconds. One reason for this method of operating is so the turbine spends a minimal amount of time in the rough zone.

b. The goal of this study, as outlined by ARA, is to determine whether a battery energy storage system (BESS) could be economically integrated at Harris. This technology is very new and there is no established methodology for integrating BESS at hydropower facilities. The cost of a BESS system with restricted hydraulic ramping is concerning because the cost must include not only the battery but also the cost of replacing both turbine runners and determining the extent of the effect on the balance of plant. Each unit at Harris makes approximately 60 megawatts (MW) at efficient gate. For an example, a 60 MW/60-megawatt hour (MWhr), 1-hour duration, standalone battery including construction and installation, is estimated to cost $36M dollars.[6] This battery would need to be sized to produce up to 60 MW for one hour so that the full capacity of the turbine could be supplemented from battery power. The battery would need this capacity because ramping would essentially begin at zero MWs with a very small wicket gate opening and then gradually open over the period of one hour. A smaller MW battery would not be large enough to make up the lost MWs in a full ramping scenario. For example, if a 5 MW battery

[6] Fu, Remo and Margolis, "2018 U.S. Utility-Scale Photovoltaics-Plus-Energy Storage System Costs Benchmark", National Renewable Energy Laboratory, NREL/TP-6A20-71714.

were used, the unit would have to ramp very quickly, within 30 to 45 seconds, to an output of 55 MW. The 5 MW battery would then make up for the remaining power to reach the original power output of 60 MW. To be clear, a battery smaller than the unit's power at efficient gate does not allow for full ramping because the unit must quickly be brought up to a point where the unit's power plus the battery's power equals 60 MW.

The cost of $36M would be doubled to $72M since there are two units at Harris Dam and peaking requires the availability of both units. Additionally, this is a one-hour battery, so the unit(s) must be at efficient gate at one hour past the start of generation. If a longer ramping rate was desired, the battery would likely need to be even larger. The cost to upgrade the turbine runners in order to have a much wider operating range would also need to be considered. It is also important to note that it is undetermined, due to the site-specific conditions and the geometry of the water passages in the powerhouse, if a suitable turbine runner with a wide operating range can even be produced.

c. While information and access to battery storage technology is increasing, as ARA notes, integrating BESS at hydropower projects is a relatively new field with no established methodology. This is especially true for the size of BESS needed to replace the full megawatt capacity at Harris. Furthermore, full-scale redesign of the existing turbines is not being considered by Alabama Power during this relicensing.

For these reasons, Alabama Power declines this study proposal and contends that the downstream release alternatives study will provide information for Alabama Power and the stakeholders to effectively evaluate effects of downstream releases on Project resources (both on Lake Harris and in the Tallapoosa River below Harris Dam) and for Alabama Power to propose an operating scenario for the next license term.

2) Pre-and Post-Dam Analysis of Downstream Impacts, including flooding, erosion, and habitat changes to flora and fauna.

<u>**Alabama Power's Response:**</u>

Mr. Chuck Denman[7] proposed that Alabama Power conduct an additional study that analyzes pre-dam and post-dam impacts on flooding, erosion, plants, and fisheries. This study request did not meet FERC's criteria for an additional study; however, Alabama Power notes that many of the analyses requested by Mr. Denman are in fact occurring as part of the Harris relicensing. FERC does not require a licensee to evaluate pre-project conditions in a relicensing. In FERC's "*Guide to Understanding and Applying the Integrated Licensing Process Study Criteria*" (2012), FERC notes that where information is being sought solely to look at historic effects, FERC staff will not require an applicant to reconstruct pre-project conditions, because that is not the baseline from which the FERC conducts its environmental analysis. The FERC's choice of current environmental conditions as the baseline for environmental analysis in relicense cases was affirmed in American Rivers v. FERC, 187 F.3d 1007, amended and rehearing denied, 201 F.3d 1186 (9th Cir., 1999); Conservation Law Foundation v. FERC, 216 F.3d 41 (D. C. Cir. 2000).

[7] Accession No 20200611-5174.

Alabama Power has consistently communicated and explained that it will use the 100-year flood event to model effects from a change in Harris Project operations on downstream resources. Alabama Power has also completed an erosion evaluation and is reviewing all stakeholder comments on lake and downstream erosion and sedimentation and will address those comments in the Final Erosion and Sedimentation Report. Alabama Power is also evaluating how changes to current Project operations may affect nuisance aquatic vegetation. Finally, Alabama Power has compiled a large amount of existing information on the Tallapoosa River fisheries community and is also conducting three studies investigating fish habitat, aquatic resources in the Tallapoosa River, and water quality and water temperature in both Lake Harris and in the Tallapoosa River. For these reasons, Alabama Power believes the issues raised by Mr. Denman are covered in the FERC-approved Study Plan and a new study is not warranted.

3) A New Study of the Downstream River Using Historic Images Overlaid onto Current Imagery

Alabama Power's Response:

Ms. Donna Matthews[8] proposed that Alabama Power conduct a new study using GIS to compare historic imagery to current imagery to evaluate effects of releases downstream of Harris Dam. Ms. Matthews notes that existing data can be used and that Alabama Power can gather historic images and overlay them on current images to determine the effects of the dam on the river downstream. The primary purpose of this study is to address "significant and persistent concerns about erosion" in the Tallapoosa River downstream of Harris Dam.

Alabama Power notes that while this study does not conform to FERC's criteria for additional studies, Alabama Power is committed to evaluating erosion and sedimentation effects on Lake Harris and in the Tallapoosa River downstream of Harris Dam. Alabama Power is reviewing stakeholder comments on the Draft Erosion and Sedimentation Report and will address these comments in the Final Erosion and Sedimentation Report. Further, the FERC-approved Erosion and Sedimentation Study Plan provides adequate methodology to address erosion and sedimentation issues resulting from Harris Project operations.

As noted above, FERC does not require licensees in the relicensing process to study pre-project conditions; however, Ms. Matthews volunteered in the April 28, 2020 ISR Meeting to provide images to Alabama Power that FERC may consider in conducting its cumulative effects analysis for soils and geologic resources, specifically erosion and sedimentation. Alabama Power intends to contact Ms. Matthews to obtain copies of these photos.

[8] Accession No. 20200611-5169.

Note: The large-scale maps referenced in the response to Question #10 are not included in this version of the filing due to file size recommendations for eFiling.

Harris relicensing - response to ISR comments

APC Harris Relicensing <g2apchr@southernco.com>

Fri 7/10/2020 6:58 PM

To: 'harrisrelicensing@southernco.com' <harrisrelicensing@southernco.com>
Bcc: 1942jthompson420@gmail.com <1942jthompson420@gmail.com>; 9sling@charter.net <9sling@charter.net>; allan.creamer@ferc.gov <allan.creamer@ferc.gov>; alpeeple@southernco.com <alpeeple@southernco.com>; amanda.fleming@kleinschmidtgroup.com <amanda.fleming@kleinschmidtgroup.com>; amanda.mcbride@ahc.alabama.gov <amanda.mcbride@ahc.alabama.gov>; amccartn@blm.gov <amccartn@blm.gov>; ammcvica@southernco.com <ammcvica@southernco.com>; amy.silvano@dcnr.alabama.gov <amy.silvano@dcnr.alabama.gov>; andrew.nix@dcnr.alabama.gov <andrew.nix@dcnr.alabama.gov>; arsegars@southernco.com <arsegars@southernco.com>; athall@fujifilm.com <athall@fujifilm.com>; aubie84@yahoo.com <aubie84@yahoo.com>; awhorton@corblu.com <awhorton@corblu.com>; bart_roby@msn.com <bart_roby@msn.com>; baxterchip@yahoo.com <baxterchip@yahoo.com>; bboozer6@gmail.com <bboozer6@gmail.com>; bdavis081942@gmail.com <bdavis081942@gmail.com>; beckyrainwater1@yahoo.com <beckyrainwater1@yahoo.com>; bill_pearson@fws.gov <bill_pearson@fws.gov>

1 attachments (143 KB)

2020-07-10 Response to ISR Comments.pdf;

Harris relicensing stakeholders,

On April 10, 2020, Alabama Power filed the Initial Study Report (ISR) along with six Draft Study Reports and two cultural resources documents. Alabama Power held the ISR Meeting with stakeholders and FERC on April 28, 2020. On May 12, 2020, Alabama Power filed the ISR Meeting Summary. Comments on the ISR, draft reports, and ISR Meeting Summary were due on June 11, 2020.

Alabama filed a response to ISR comments with FERC today. The response is attached and can also be found on the relicensing website: www.harrisrelicensing.com under "Relicensing Documents." Note that the larger scale maps requested by FERC can be found in the HAT 4 – Project Lands folder.

Thanks,

Angie Anderegg
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(205)257-2251
arsegars@southernco.com

From: Anderegg, Angela Segars
Sent: Monday, July 13, 2020 8:53 AM
To: Barry Morris
Subject: RE: Harris Relicensing: continuous minimum flow in Tallapoosa River

Hi Barry,

The answer is B – the Green Plan includes pulses *plus* releases for generation needs.

The Green Plan is included in the Downstream Release Alternatives study plan and in the Pre-Application Document (Appendix E). However, the best explanation of how we operate is in a presentation Alan Peeples gave on January 31, 2018. The entire presentation is worth watching; however, the specifics of peaking operations and the Green Plan begins around minute 40 in the video and slide 53 in the powerpoint.

http://harrisrelicensing.com/_layouts/15/start.aspx#/HAT%201%20%20Project%20Operations/Forms/AllItems.aspx

I hope this helps!

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From: Barry Morris <rbmorris222@gmail.com>
Sent: Saturday, July 11, 2020 10:20 AM
To: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Subject: Re: Harris Relicensing: continuous minimum flow in Tallapoosa River

Your explanation is not confusing, but what I can't grasp is why the CMF plus peak demand generating will not cause the lake level to go lower.

OR, has the dam been doing the 3x10 pulsing *plus* peak demand generating for years and I've not been aware of it? In that case obviously the amount of water thru the dam in CMF is the same, just spaced out throughout the day.

Sorry if my ignorance of the green plan is causing you extra work. Does the company have a concise summary of the green plan that I could use to make me and the LWPOA smarter?

Thanks for your help. Barry

On July 10, 2020, at 8:37 AM, "Anderegg, Angela Segars" <ARSEGARS@southernco.com> wrote:

Hi Barry,

A 150 cfs continuous minimum flow is the same daily volume as the 3- 10 minute pulses currently provided by the Green Plan and does not include any releases for peaking operations. The Green Plan pulses are released through the turbines, so a large volume of water is released over a short period of time each time we pulse. The 150 cfs continuous flow spreads the volume provided by the pulses throughout the day. Also, the 150 cfs would have to be provided through some other mechanism than the turbines because they are not designed to operate at that low flow.

I hope this helps, but if it's still confusing, don't hesitate to give me a call.

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From: Barry Morris <rbmorris222@gmail.com>
Sent: Thursday, July 9, 2020 12:49 PM
To: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Subject: Harris Relicensing: continuous minimum flow in Tallapoosa River

Angie: I'm trying to write up relicensing notes for the LWPOA membership and I'm still puzzled as to how a 150 CFS continuous minimum flow (equivalent of a day's generation) would not impact the Lake RL Harris water level. Seems to me it would double the amount of water released thru the dam every day and thus *must* lower the lake. What am I missing here?

I can't find anything in the on line documents, but there's a lot there. Could you please have one of your folks send me some sort of explanation, or direct me to a place in the documents where this is spelled out?

Thanks for your help.

Barry Morris
LWPOA
404 449 3452

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, DC 20426
August 10, 2020

OFFICE OF ENERGY PROJECTS

Project No. 2628-065 – Alabama
R.L. Harris Hydroelectric Project
Alabama Power Company

VIA FERC Service

Angie Anderegg
Harris Relicensing Project Manager
Alabama Power Company
600 North 18th Street
Birmingham, AL 35203

Reference: Determination on Requests for Study Modifications for the R.L. Harris Hydroelectric Project

Dear Ms. Anderegg:

Pursuant to 18 C.F.R. § 5.15 of the Commission's regulations, this letter contains the determination on requests for modifications to the approved study plan for Alabama Power Company's (Alabama Power) R.L. Harris Hydroelectric Project No. 2628 (Harris Project). The determination is based on the study criteria set forth in sections 5.9(b) and 5.15(d) and (e) of the Commission's regulations, applicable law, Commission policy and practice, and Commission staff's review of the record of information.

Background

Commission staff issued the study plan determination (SPD) for the Harris Project on April 12, 2019. Alabama Power filed an initial study report (ISR) and associated draft study reports on April 10, 2020, held an ISR meeting on April 28, 2020, and filed an ISR meeting summary on May 12, 2020. Comments on the ISR and meeting summary were filed by Commission staff on June 10, 2020, and by Alabama Department of Conservation and Natural Resources, Alabama Rivers Alliance, David Bishop, Dana Chandler, Wayne Cotney, Chuck Denman, Albert Eiland, Nelson Hay, Sharon Holland, Carol Knight, Joe Meigs, David Royster, Ronnie Siskey, Mike Smith, Michelle Waters, and John Carter Wilkins on June 11, 2020. The Alabama Department of Environmental Management, the U.S. Environmental Protection Agency (EPA), and Donna Matthews filed comments on June 12, 2020,[1] and the National Park Service filed comments June 29, 2020. Alabama Power filed reply comments on July 10, 2020.

Comments

Some of the comments received do not specifically request modifications to the approved study plan. This determination does not address these types of comments, which include: comments on the presentation of data and results; requests for additional information; disagreements on study results; recommendations for protection, mitigation, or enhancement measures; or issues that were previously addressed in either the November 16, 2018 Scoping Document 2 or the April 12, 2019 SPD.

Study Plan Determination

Pursuant to section 5.15(d) of the Commission's regulations, any proposal to modify a required study must be accompanied by a showing of good cause, and must demonstrate that: (1) the approved study was not conducted as provided for in the approved study plan, or (2) the study was conducted under anomalous environmental conditions or that environmental conditions have changed in a material way. As specified in section 5.15(e), requests for new information gathering or studies must include a statement explaining: (1) any material change in law or regulations applicable to the information request, (2) why the goals and objectives of the approved study could not be met with the approved study methodology, (3) why the request was not made earlier, (4) significant changes in the project proposal or that significant new information material to the study objectives has become available, and (5) why the new study request satisfies the study criteria in section 5.9(b).

Alabama Power agreed with requests to modify its Water Quality Study, as discussed immediately below. As indicated in Appendix A, two additional study modifications were requested, one of which Alabama Power partially agreed to and is required with staff modifications. In addition, three new studies were requested, one of which is approved herein, with staff modifications. The bases for modifying the study plan or approving new studies are explained in Appendix B (Requested Modifications to Approved Studies). Commission staff considered all study plan criteria in section 5.9 of

[1] Alabama Department of Environmental Management (Alabama DEM) and Donna Matthews' comments were filed on June 11, 2020, just after close of Commission business at 5:00 p.m. EST. Section 385.2001(a)(2) of the Commission's regulations provide that any filing received on a regular business day after close of Commission business is considered filed on the next regular business day. Therefore, the comments by Alabama Department of Environmental Management and Donna Matthews are considered filed on the next regular business day, or June 12, 2020.

the Commission's regulations; however, only the specific study criteria particularly relevant to the study in question are referenced in Appendix B.

Water Quality Study

The draft Water Quality Study Report includes measurements of dissolved oxygen concentration and water temperature at a generation monitor located in the Harris Dam tailrace (3 years of data) and at a continuous monitor located about 0.5 mile downstream from Harris Dam (1 year of data). As requested by Alabama Rivers Alliance and other stakeholders, in its ISR reply comments,[2] Alabama Power agrees to collect additional water quality data in 2020 and 2021. Alabama Power provided a monitoring schedule for 2021 but did not do so for 2020 other than to say that monitoring began on May 4, 2020. Because the approved study plan requires Alabama Power to monitor dissolved oxygen and water temperature through October 31, the 2020 monitoring period should extend until October 31, 2020.

Threatened and Endangered Species Study

As noted in staff's comments on the ISR, the draft Threatened and Endangered (T&E) Species Study Report does not provide an assessment of T&E species populations and/or their habitats at the project, or a record of consultation with the U.S. Fish and Wildlife Service (FWS) regarding the need for field surveys for all of the species on the official T&E species list.[3] In its reply comments, Alabama Power states that existing information is insufficient to determine some of the T&E species' presence/absence and habitat suitability in the project area. Alabama Power also states that it may conduct additional field surveys[4] for T&E species and/or their potentially suitable habitat based on ongoing consultation with the FWS and Alabama Natural Heritage Program, and will provide documentation of this consultation in the Final T&E Species Report which will be filed in January 2021, per the approved study plan schedule filed on May 13, 2019.

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[2] *See* Alabama Power's July 10, 2020 Reply Comments at 2. Alabama Power indicates that the continuous monitor was installed on May 4, 2020, and the tailrace monitor was installed on June 1, 2020.

[3] *See* the official list of T&E species within the Harris Project boundaries (i.e., at Lake Harris and Skyline), accessed on July 27, 2018, by staff using the FWS's Information for Planning and Conservation website (https://ecos.fws.gov/ipac/) and filed on July 30, 2018.

[4] Alabama Power confirmed it would complete T&E species field verifications by September 2020, per the approved study plan schedule.

Requested Variances

In the ISR, Alabama Power requests variances to the approved schedules for the Draft Recreation Evaluation Study Report and the Cultural Resources Study.[5] Specifically, Alabama Power proposes to file its Draft Recreation Evaluation Study Report in August 2020, instead of June 2020, to allow time to complete two new recreation surveys, a Tallapoosa River Downstream Landowner Survey and a Tallapoosa River Recreation User Survey. Alabama Power also proposes to finalize the Area of Potential Effect (APE) for its Cultural Resources Study and file it with documentation of consultation in June 2020, which it did on June 29, 2020. No stakeholders objected to the requested variances and these changes to the approved study schedule will not affect the overall relicensing schedule. Therefore, the requested variances are approved.

Please note that nothing in this determination is intended, in any way, to limit any agency's proper exercise of its independent statutory authority to require additional studies.

If you have any questions, please contact Sarah Salazar at sarah.salazar@ferc.gov or (202) 502-6863.

Sincerely,

for
Terry L. Turpin
Director
Office of Energy Projects

Enclosures: Appendix A – Summary of determinations on requested modifications to approved studies and new study requests

[5] Alabama Power also requested a variance to the approved schedule for the Water Quality Study, proposing to submit its Clean Water Act section 401 water quality certification (certification) application to the Alabama DEM in April 2021, instead of as originally proposed in 2020. Section 5.23(b) of the Commission's regulations requires the application for certification to be submitted to the certifying agency within 60 days of issuance of the Ready for Environmental Analysis notice, which will occur post-filing. Accordingly, a variance for submitting the certification application prior to filing the license application is not needed.

Appendix B – Commission staff's recommendations on requested modifications to approved studies and new study requests

APPENDIX A

SUMMARY OF DETERMINATIONS ON REQUESTED MODIFICATIONS TO APPROVED STUDIES (see Appendix B for discussion)

Study	Recommending Entity	Approved	Approved with Modifications	Not Required
Requested Modifications to Approved Studies				
Downstream Release Alternatives Study	Commission staff, Alabama Rivers Alliance, EPA		X	
Operating Curve Change Feasibility Analysis Study and Downstream Release Alternatives Study – Climate Change Assessment	Donna Matthews			X
New Study Requests				
Battery Storage Feasibility Study	Alabama Rivers Alliance		X	
Pre-and Post-Dam Analysis of Downstream Impacts	Chuck Denman			X
Study of the Downstream River Using Historic, Pre-Dam Images Overlaid onto Current, Post-Dam Imagery	Donna Matthews			X

APPENDIX B

STAFF RECOMMENDATIONS ON REQUESTED MODIFICATIONS TO APPROVED STUDIES AND NEW STUDY REQUESTS

Downstream Release Alternatives Study

Background

Alabama Power designed and constructed the Harris Project, which began operation in 1983, as a peaking project. Prior to 2005, Alabama Power, while operating in a peaking mode, would alternately generate electricity for part of the day, and store flow in the reservoir for the rest of the day.[6] While storing flows, there would be no downstream flow releases into the Tallapoosa River other than a license required minimum release of 45 cubic feet per second (cfs), as measured at the United States Geological Survey (USGS) gage located 14 miles downstream at Wadley, Alabama.

In 2005, Alabama Power voluntarily modified project operation to provide downstream pulse flow releases ranging from 15 minutes to 4 hours in length during non-generation periods for the benefit of the aquatic community downstream (called "Green Plan").

The goal of the approved Downstream Release Alternatives Study is to evaluate the effects of the current Green Plan and the historic peaking operation, along with alternative downstream releases, on environmental and developmental resources affected by the project. Throughout the study planning and implementation process, Alabama Power has requested that stakeholders provide alternative flow releases to model as part of the study.[7]

Requested Study Modification

The approved study plan requires Alabama Power to model four downstream release scenarios, including: (1) current operation (the Green Plan); (2) the project's historic peaking operation; (3) a modified Green Plan (i.e., modifying the time of day during which the pulses are released); and (4) a downstream continuous minimum flow of 150 cfs under a historic peaking operation scenario. Based on the findings in the draft Downstream Release Alternatives Study Report, in comments on the ISR, Commission

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[6] *See* Final Downstream Release Alternatives Study Report at 1.

[7] *See* Study Plan Meeting Summary in the Revised Study Plan filed on March 13, 2019; the ISR Meeting Summary filed on May 12, 2020; and Alabama Power's ISR reply comments filed on July 10, 2020.

staff, the Environmental Protection Agency (EPA), and Alabama Rivers Alliance, request that Alabama Power evaluate additional downstream release alternatives. Commission staff request that Alabama Power model continuous minimum flows of 150, 350, 600, and 800 cfs under the historic peaking, Green Plan, and modified Green Plan release scenarios. EPA requests that Alabama Power evaluate: (1) the Green Plan with minimum flows; and (2) continuous minimum flows higher than 150 cfs. Alabama River Alliance requests Alabama Power evaluate the following downstream flow alternatives:

1. a variation of the existing Green Plan where the Daily Volume Release is 100 percent of the prior day's flow at the upstream USGS Heflin stream gage (rather than the current 75 percent);
2. a hybrid Green Plan that incorporates a downstream continuous minimum flow of 150 cfs;
3. releases from the Harris Project that match flow at the downstream USGS Wadley stream gage to the USGS Heflin stream gage to mimic natural flow variability; and
4. downstream continuous minimum flows of 300 and 600 cfs.

<u>Comments on Requested Study Modification</u>

In Attachment B of its reply comments, Alabama Power proposes to model the following five downstream release alternative model runs, in addition to the required four initial alternative model runs, for a total of nine alternative model runs:

1. a variation to the existing Green Plan where the Daily Volume Release is 100 percent of the prior day's flow at the USGS Heflin stream gage;
2. a 150-cfs continuous minimum flow with Green Plan releases;
3. a 300-cfs continuous minimum flow with historic peaking operation;[8]
4. a 600-cfs continuous minimum flow with historic peaking; and
5. an 800-cfs continuous minimum flow with historic peaking.

Alabama Power does not propose to model Alabama Rivers Alliance's requested alternative for a release from the Harris Project that mimics the natural flow variability in the Tallapoosa River. Alabama Power states that such operation would significantly reduce or eliminate use of the project for peaking. Moreover, Alabama Power states that the project's units are not capable of adjusting, to the extent necessary, to simulate natural

[8] In the draft Downstream Release Alternatives Study Report, Alabama Power refers to the continuous minimum flow alternatives solely as minimum flows. To eliminate confusion, we recommend Alabama Power define the minimum flow alternatives, with regard to the associated operational scenario (e.g., 150-cfs continuous minimum flow with Green Plan operation).

river flows. Alabama Power also does not propose to model staff's requested range of minimum flows with the Green Plan (except 150 cfs) or modified Green Plan releases (with any flow). Alabama Power states that modeling one combination of a minimum flow (150 cfs) and Green Plan releases is adequate to determine the effect of this downstream release alternative on project resources.

Discussion and Staff Recommendation

The purpose of the Green Plan releases is to reduce the effects of peaking operation on the aquatic community, including habitat, in the Tallapoosa River downstream from Harris Dam. Monitoring conducted since initiation of the Green Plan in 2005 indicates that there has been an increase in shoal habitat availability, but the response by the fish community has been mixed (Irwin, 2019).

Alabama Rivers Alliance's request for a downstream release alternative, whereby releases from the Harris Project would mimic the Tallapoosa River's natural flow variability, which could benefit the habitat and aquatic community downstream from Harris Dam, would require a change in project operation from peaking to run-of-river. As detailed by Alabama Power in its July 10, 2020, comments,[9] the turbine-generator units at the Harris Project are designed to be operated at best gate and are not capable of adjusting to the extent necessary to simulate natural river flows (i.e., it is unable to operate in a run-of-river mode). Operating the units in this manner would lead to cavitation, which would damage the units. Therefore, operating the Harris Project to mimic the river's natural flow variability under a run-of-river mode would likely require significant redesign and redevelopment of the project (e.g., structural modifications, intake redesign, turbine retrofits, etc.). Because run-of-river operation is not feasible at the Harris Project without a major redesign and redevelopment of the project, we do not consider it to be a reasonable alternative for further consideration as part of our eventual environmental analysis. Therefore, we do not recommend modifying the study to include a release alternative that mimics natural flow variability in the Tallapoosa River.

With respect to the modified Green Plan releases requested by staff, we no longer recommend that Alabama Power model continuous minimum flows with this release strategy because, other than shifting the time of day of the releases, the release characteristics, model results, and environmental benefits would be the same as those for the continuous minimum flows and the Green Plan release strategy being modeled.

As noted above, the current license requires Alabama Power to release flows from the project such that a 45-cfs minimum flow is provided at the downstream USGS Wadley streamflow gage. Incrementally higher minimum flows (e.g., 150, 300, 600, and

[9] *See* Alabama Power's July 10, 2020 comments, Attachment B, page 2.

800 cfs) would provide additional wetted width, which could improve habitat availability between pulsing releases. Therefore, there is the potential for additional enhancement and protection that we will need to consider as part of our environmental analysis. Modeling a range of continuous minimum flows with the existing Green Plan releases would allow for an evaluation of flows that could improve downstream aquatic habitat. Therefore, in addition to the nine alternative model runs identified by Alabama Power,[10] we recommend Alabama Power model three additional continuous minimum flows with the Green Plan releases (i.e., 300, 600, and 800 cfs).[11]

Operating Curve Change Feasibility Analysis Study and Downstream Release Alternatives Study – Climate Change Assessment

Background

The approved study plan includes two operations-related modeling studies: an Operating Curve Change Feasibility Analysis Study and a Downstream Release Alternative Study. The respective objectives of these approved studies are to: (1) evaluate proposed incremental increases to the winter rule curve for Harris Lake; and (2) evaluate the effects of the historic peaking, existing Green Plan, and alternative downstream release alternatives, on environmental and developmental resources affected by the project.

Requested Study Modification

Donna Matthews requests that the Operating Curve Change Feasibility Analysis and Downstream Release Alternative Studies be modified to include additional modeling of the effect of climate change on flows and Harris Project operation. The additional modeling would use predictive data from climate change studies.

Comments on Requested Study Modification

No comments were filed on this requested study modification.

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[10] *See* Alabama Power's July 10, 2020 Reply Comments at Appendix B, page 2.

[11] These flows were selected because they are consistent with those minimum flows selected by Alabama Power for their historic peaking model runs.

Discussion and Staff Recommendation

We are not aware of any available climate change model or assessment, including the climate change assessment referenced by Ms. Matthews,[12] that would support, with any degree of accuracy and reliability, a prediction of water availability at the individual project level. However, there is historical streamflow data available for the Tallapoosa River upstream of, and downstream from, the Harris Project. This data can be used to evaluate whether climate change has resulted in any changes to hydrologic inputs over time at the project. Therefore, we do not recommend modifying either the Operating Curve Change Feasibility Analysis Study or Downstream Release Alternative Study to include additional modeling using predictive data from climate change studies.

[12] Ms. Matthews references U.S. Department of Energy (2017), which was cited in EPA's March 29, 2019 comments on Alabama Power's Revised Study Plan.

STAFF RECOMMENDATIONS ON REQUESTED NEW STUDIES

Battery Energy Storage Systems (BESS) Study

Background

Harris Lake is a storage reservoir in which flows are stored to supplement inflows from April through December. The daily discharge from the project is based on a percentage of flows measured at the upstream USGS Heflin gage (i.e., the Green Plan calls for daily discharge to be at least 75 percent of flows at Heflin). Hydropower is typically generated during hours when demand for electrical power is highest (i.e., peak energy), causing significant variations in downstream flows. Daily hydropower releases from the dam vary from 0 cfs during off-peak periods to as much as 16,000 cfs, which is approximately best gate,[13] or the maximum turbine discharge.

The project has two turbine-generating units, rated at 67.5 megawatts (MW) each, which produce about 60 MW and have a hydraulic capacity of 8,000 cfs each at best gate opening. Lake elevations can vary 0.5- to 1.5-feet during a 24-hour period as a result of daily peak releases. Daily tailwater levels can vary significantly (up to 5 feet) because of peaking hydropower operations at Harris Dam, characterized by a rapid rise in downstream water levels immediately after generation is initiated, and a rapid fall in elevations as generation is ceased. Except during high flow conditions when hydropower may be generated for more extended periods of time, this peaking power generation scenario with daily fluctuating downstream flows is repeated nearly every weekday. Under the voluntary Green Plan, environmental flows are released through the turbines daily for short periods of time (i.e., 15 minutes to 4 hours).

Recommended New Study

In its comments on the ISR, Alabama Rivers Alliance requests a new study titled "Battery Storage Feasibility Study to Retain Full Peaking Capabilities While Mitigating Hydropeaking Impacts." The goal of the study is to determine whether a battery energy storage system (BESS) could be economically integrated at Harris to mitigate the impacts of peaking, while retaining full system peaking capabilities. Under such a scenario, the BESS would be used to provide power during peak demand periods, which would

[13] In its reply comments, Alabama Power notes that the best gate setting is a permanent setting on the governor system to ensure that the control system will force a fast movement of the wicket gates to the best gate position thereby minimizing the time spent in the rough zone (i.e., an area on the operating curve in which flows that are less than efficient gate cause increased vibrations in the turbine and cavitation along the low-pressure surfaces of the turbine runner).

decrease the need for peak generation flow releases and reduce flow fluctuations downstream of the project. The objectives of the study are to evaluate battery type and size configurations, costs, and ownership options, as well as technical barriers to implementing BESS. The study would also assess how much operational flexibility could be provided by BESS and allow for more control of discharges downstream of the dam.

Alabama Rivers Alliance acknowledges that BESS at hydropower projects is a new field with no established methodologies. Alabama Rivers Alliance requests a desktop analysis to evaluate the feasibility of BESS at the Harris Project, including a preliminary cost/benefit analysis. Alabama Rivers Alliance estimates the cost of this study would be $20,0000 to $30,000.

Comments on the Study Request

Alabama Power did not adopt this study because it believes the system would have a high cost and the turbines at Harris Dam are not designed to operate in a gradually loaded rate over an extended period. Rather, the turbines are peaking units designed to quickly react to electrical grid needs. Restricted ramping may be possible; however, it would require replacement of both turbine runners at a cost in addition to the cost of the batteries. Alabama Power estimates the cost of one 60 MW-1-hour storage battery unit equivalent to the power of one turbine, would be $36,000,000. A battery equivalent to the power of both turbines would be $72,000,000. There would be additional cost for any necessary modification of the project turbine-generator units. (Alabama Power did not provide an estimate for the cost of modifying/replacing the turbine runners.) Alabama Power dismisses the feasibility of a smaller MW battery. Alabama Power states that a smaller MW battery, i.e., 5 MW, would not be large enough to make up the lost power in full ramping mode. A battery smaller than the turbine's efficient gate would not allow for full ramping of that turbine.

Discussion and Staff Recommendation

We reviewed Alabama Power's cost estimate for the installation of a BESS at the Harris Project. Alabama Power's cost of the battery is based on a 2018 National Renewable Energy Report which estimates the cost of a 60 MW, 1-hour reserve battery at $601/kWh, or about $36,0000,000 to be used in place of the MWs from one turbine at Harris (DOE, 2018). This cost does not include any modifications to the turbine-generator units, which would be necessary. In addition, a battery with 4 hours reserve storage may be necessary, because the Harris Project can generate up to 4 hours in peaking mode. The 2018 National Renewable Energy Report estimates the cost of a 60 MW, 4-hour reserve battery at $380/kWh, or about $91,0000,000 to mirror the MW from one unit at Harris. This option would also require modification of the turbine runners at additional costs.

The goal of Alabama Rivers Alliance's study is to evaluate the feasibility of a storage system which could be economically implemented at the Harris Project. Such a study would require evaluating not only the cost of installing the battery units, but also the potential benefits to both developmental and non-developmental resources. Installing a BESS at the Harris Project has the potential to mitigate project effects on water levels in Harris Lake, and fluctuations in flows released downstream during peaking operations. Potential hydrologic changes could be achieved by spreading out the releases throughout the day/night rather than releasing most of flows during peak hours. Assuming the same daily volume of flow is released, installing one 60-MW battery to provide an equivalent amount of the power provided by one turbine-generator unit could reduce daily fluctuations in Harris Lake by half. Harris Lake water levels, which currently fluctuate up to 1.5 feet daily, could be reduced to 0.75 feet daily. Downstream releases during peaking could be reduced from 16,000 cfs to 8,000 cfs, and the tailwater surface elevation could be reduced by 2.8 feet.[14] To consider the environmental benefits potentially associated with such changes in hydrologic conditions described above, the changes in releases from the project would have to be considered in the context of Alabama Power's approved Downstream Release Alternatives Study, which provides for identifying and evaluating Alternative Release scenarios.

Sections 4(e) and 10(a) of the Federal Power Act require the Commission to give equal consideration to all uses of the waterway on which a project is located. When reviewing a proposed action, the Commission must consider the environmental, recreational, fish and wildlife, and other non-developmental values of the project. We currently have insufficient information to evaluate the potential environmental benefits of a BESS. The cost of conducting the study, between \$20,000 and \$30,000, is relatively low and would provide information that does not already exist and is needed for our analysis.

Alabama Rivers Alliance's study methodology includes a description of operational flexibility associated with installing a range of battery sizes. Alabama Power did not consider a smaller battery because of the operational limits of the existing turbines. Alabama Power's analysis should not be limited to the existing turbines but should also consider the feasibility and cost of modifying or replacing a turbine necessary to support operation of a smaller battery, which may be more cost-effective and provide some environmental benefits. At minimum, the study should look at the costs and

[14] The tailwater elevation below Harris dam is 667.7 feet msl when two units are operating and 664.9 feet msl when one unit is operating, a difference of 2.8 feet.

environmental benefits of replacing one 60 MW unit, as discussed above, and at least one smaller battery and its associated changes in project releases.

Alabama Rivers Alliance's study methodology includes a survey of battery cost estimates based on public resources, future projections for battery costs, and potential incentives to offset battery cost. Alabama Power used a 2018 Department of Energy Report which provides a reasonable methodology for estimating the cost of a technology which has not been widely implemented in hydropower. The cost of batteries, however, is rapidly decreasing,[15] and future projections in the cost of a battery should be considered in the cost analysis.

In summary, we recommend that Alabama Power conduct a BESS Study, along with the Downstream Release Alternative Study. The Downstream Release Alternative Study should be amended to include at least two new release alternatives: (a) a 50 percent reduction in peak releases associated with installing one 60 MW battery unit, and (b) a proportionately smaller reduction in peak releases associated with installing a smaller MW battery unit (i.e. 5, 10 or 20 MW battery). Alabama Power should include in its cost estimates for installing a BESS any specific structural changes, any changes in turbine-generator units, and costs needed to implement each battery storage type. Finally, consistent with the Downstream Release Alternative Study Plan, Alabama Power should evaluate how each of these release alternatives (i.e., items (a) and (b) above) would affect recreation and aquatic resources in the project reservoir and downstream.

Change Analyses: Project Operation Effects on Environmental Resources in the Tallapoosa River Downstream from Harris Dam

Background

The purpose of the Erosion and Sedimentation Study relative to downstream resources is to identify problematic erosion sites and sedimentation areas on the Tallapoosa River downstream from Harris Dam as well as determine the likely causes. The plan calls for sites downstream of Harris Dam to be identified, including by stakeholders; documented by observation and video; and assessed for the location, extent, and potential causes of erosion or sedimentation. As outlined in the approved study plan, during Phase 1 of the Operating Curve Change Feasibility Analysis Study, Alabama Power modeled the effect of increasing the winter elevation of Harris Lake by 1-, 2-, 3-, and 4-feet on the ability to provide flood control and downstream releases, among other operational parameters. Information from the Erosion and Sedimentation Study will be used in Phase 2 of both the Downstream Release Alternatives Study and the Operating

[15] The National Energy Research Laboratory reports that since 2018, battery costs have been reduced by about 15 percent, with further decreases expected.

Curve Change Feasibility Analysis Study to assess the effects of potential changes in project operation on resources downstream from Harris Dam, including erosion and sedimentation in the Tallapoosa River.

Recommended New Studies

Pre-and Post-Dam Analysis of Downstream Impacts

Chuck Denman requests a new study with the goal of analyzing pre-dam and post-dam impacts on environmental resources downstream from Harris Dam, including flooding, erosion, and habitat changes to flora and fauna. Specifically, Mr. Denman requests the following information:

1. a storm runoff model comparing 25-, 50-, and 100-year 24-hour storm events.
2. use of available remote sensing materials to identify erosion by comparing the current river channel and islands' sizes and shapes with pre-dam conditions.
3. use of remote sensing to map flag grass[16] and invasive plant communities to compare changes from pre-dam conditions.
4. review available materials from local individuals in the community, as well as fish and game and other resources to determine what effect the dam has had on downstream fish species and population sizes.

Study of the Downstream River Using Historic, Pre-Dam Images Overlaid onto Current, Post-Dam Imagery

Donna Matthews states that erosion is a significant and persistent concern that is problematic for landowners, flora, and fauna in and around the Tallapoosa River downstream from Harris Dam. Ms. Matthews requests that Alabama Power use existing aerial imagery[17] and other available data to analyze changes in erosion, fisheries, and other environmental resources downstream from Harris Dam. As part of the study, Ms. Matthews requests that Alabama Power prepare a detailed geographic information system (GIS) map with existing information relating fish populations and other parameters in three dimensions (3D). The 3D GIS map would display presence/absence of species along the river length and during different decades, where data are available. Ms.

[16] Staff assumes that "flag grass" here refers to a non-native plant in the genus *Acorus*, such as *Acorus calamus*, given that the range of the native *Acorus americanus*, or "American sweetflag," is northern United States and Canada (USDA, 2020).

[17] Ms. Matthews filed an image of the Tallapoosa River in the Harris Project area from 1942 and provided a source for obtaining additional existing aerial imagery of the project area from 1950, 1954, 1964, and 1973.

Matthews states that the results could be used to evaluate the potential effects of future changes to downstream flow patterns.

Comments on the Study Requests

Alabama Power indicates that it is conducting many of the requested analyses as part of the approved study plan, including evaluations of how existing operation affects, and alternative operations may affect, erosion and sedimentation, nuisance aquatic vegetation, fisheries/aquatic resources, and water quality in the Tallapoosa River downstream from Harris Dam. Alabama Power also states that the approved Erosion and Sedimentation Study provides an adequate methodology to evaluate project-related effects on erosion and sedimentation downstream from Harris Dam. To support the Commission's cumulative effects analysis for soils and geologic resources (i.e., erosion and sedimentation), Alabama Power indicates that it intends to contact Ms. Matthews to obtain copies of the aerial images referenced in her study request and file them with the Commission.[18]

Discussion and Staff Recommendation

Mr. Denman and Ms. Matthews present their new study requests as collecting data on pre-dam conditions, which is not necessary with the context of the Commission's environmental baseline (i.e., current conditions) for evaluating project effects during a relicensing proceeding and does not relate to the eventual proposed action, which is relicensing an existing hydroelectric project.[19] The images of the project area that Ms. Matthews identifies were all taken prior to the construction and operation of the Harris Project. Analysis of these images would not be helpful in evaluating project-related erosion.

The flood analysis component of the Operating Curve Change Feasibility Analysis is intended to assess the effects of a large-scale flood, which could address some of the existing stormwater runoff and erosion issues that Mr. Denman identifies in his proposed study. The Downstream Release Alternatives Study calls for Alabama Power to model potential changes in operational flow releases. Modeling these potential operational scenarios will support an analysis of flow effects downstream of Harris Dam under a range of scenarios more effectively than additional modeling of smaller floods. The 100-year flood serves as a representative large flood for risk assessment and planning purposes. Therefore, modeling the 100-year flood scenario is sufficient.

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[18] *See* Alabama Power August 4, 2020 Memo.

[19] *Am. Rivers v. FERC*, 187 F.3d 1007, *amended by and denying reh'g*, 201 F.3d 1186 (9th Cir. 1999); *Conservation Law Found. v. FERC*, 216 F.3d 41 (D. C. Cir. 2000).

The data collected as part of the approved studies, including the Downstream Release Alternatives Study, Erosion and Sedimentation Study, Aquatic Resource Study, and Downstream Aquatic Habitat Study, include much of the information that Mr. Denman and Ms. Matthews request with regard to current conditions. The results of Phase 2 of the Downstream Release Alternatives Study that is being conducted currently (during the second study season, April 2020 through April 2021) will also provide information responsive to most of Mr. Denman and Ms. Mathews' requests. The information gained through the approved studies should be adequate to assess the effects of project operation on downstream resources, including erosion and sedimentation and related invasive species effects, fisheries, water quality and use, terrestrial resources, recreation, and cultural resources. Therefore, we do not recommend that Alabama Power conduct Mr. Denman's or Ms. Matthews' requested new studies.

LITERATURE CITED

Irwin, E.R., ed. 2019. Adaptive management of flows from R.L. Harris Dam (Tallapoosa River, Alabama) – Stakeholder process and use of biological monitoring data for decision making: U.S. Geological Survey, Open-File Report 2019–1026. 93 p. access at https://doi.org/10.3133/ofr20191026.

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Determination on Study Modifications

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Wed 8/12/2020 8:45 PM

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Harris relicensing stakeholders,

Yesterday FERC issue a determination on study modifications for the Harris Project. It can be found on FERC elibrary and on the Harris relicensing website (www.harrisrelicensing.com) in the Relicensing Documents folder.

Thanks,

Angie Anderegg
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HAT 1 - Final Operating Curve Change Feasibility Analysis Phase 1 Report

APC Harris Relicensing <g2apchr@southernco.com>

Mon 8/31/2020 8:08 PM

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HAT 1,

Today, Alabama Power filed the Final Operating Curve Change Feasibility Analysis Phase 1 Report with FERC. This final report can be found on the Harris relicensing website in the HAT 1 folder and on FERC elibrary.

Thanks,

Angie Anderegg
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APC Harris Relicensing

From: APC Harris Relicensing
Sent: Wednesday, September 16, 2020 8:52 AM
To: james traylor
Subject: RE: HAT 3 - Additional Comments on Aquatic Resources Report

Hi Jimmy,

Harris is operated for flood control in accordance with rules prescribed by the U.S. Army Corps of Engineers. Our intention is to follow those specified rules/operations for all high flow events, including this event.

Those rules do not call for pre-evacuation of the Harris pool. The reason is that significant pre-evacuation can have the impact of exacerbating downstream flooding, when following the rules could have allowed Harris to operate for its flood control purpose and prevent that from happening. Couple that with uncertainties in forecasts, including this event forecast, and it further supports following those prescribed rules.

Thanks,

Angie Anderegg
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From: james traylor <trayjim@bellsouth.net>
Sent: Tuesday, September 15, 2020 8:47 AM
To: APC Harris Relicensing <g2apchr@southernco.com>
Subject: Re: HAT 3 - Additional Comments on Aquatic Resources Report

Can someone please explain to me why APC is keeping Harris full when we are expecting 8-10” of rain?

What are the intentions of APC?

Jimmy Traylor
Sent from iPhone

> On Sep 3, 2020, at 11:41 AM, APC Harris Relicensing <g2apchr@southernco.com> wrote:
>
> HAT 3,
>
> Below are one additional set of comments on the draft Aquatic Resources Report.
>
> Thanks,

Angie Anderegg
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From: Donna Matthews <donnamatthews2014@gmail.com>
Sent: Monday, August 31, 2020 4:12 PM
To: APC Harris Relicensing <g2apchr@southernco.com>
Subject: Fwd: Aquatic Life Studies

---------- Forwarded message ---------
From: **Donna Matthews** <donnamatthews2014@gmail.com>
Date: Sat, Aug 29, 2020 at 12:01 AM
Subject: Aquatic Life Studies
To: <arsegars@southercompany.com>

28 Aug 2020
re : P-2628
Aquatic Resources Study

Dear Angie,
Below are my comments on the proposed Aquatic/Bioenergetic studies.

This is a huge and complex area of study, far beyond my scope.
However, I have one major concern:

Given the wide array of study data already available, it seems prudent to design studies built upon previously gleaned knowledge and understanding. This river has been studied for decades. It is known that regulation of rivers including erratic flows and induced temperature variations are detrimental to downstream aquatic life. I saw no mention of previous 'Wisconsin" Bioenergetic Studies in the literature review. If creation of a model adaped for this study is breaking new ground, how is it superior to previous methodologies of *in situ* fish and critter counts at various points along the river? What does it aspire to contribute to the knowledge of the aquatic life, in all its totality, of the Tallapoosa River? What information will it (Bioeneretic Model) provide that other study methods do not? What information is not collected from a bioenergetic study which might be present in biological monitoring studies?

My understanding was the 20 or so level loggers set out last year were to record temp and flow data every 15 minutes. Are the level logger locations being used to collect fish samples for any of the studies? Since the locations of the level loggers are known, they become reference points from which to gather and study species of concern.

Since the data comparing regulated/unregulated temperatures is retrospective sec (3.2.2) are there plans to collect temp and flow data at the study/collection sites? Looking for species of concern at these specific locations will provide clear baseline data available for future scientists.

Constructing a new bioenergetics model to assess aquatic life seems excessive. Adding data to protocols for established aquatic biological monitoring would appear to be the better use of resources and allow better comparison of data from years past going forward.

Sincerely,
Donna Matthews

Harris Relicensing Progress Update

APC Harris Relicensing <g2apchr@southernco.com>

Fri 10/30/2020 5:37 PM

To: APC Harris Relicensing <harrisrelicensing@southernco.com>
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Harris Relicensing stakeholders,

In the Harris Project Final Study Plans, filed with FERC on May 13, 2019, Alabama Power agreed to file voluntary Progress Updates with FERC in October 2019 and October 2020. The purpose of the Progress Update is to ensure that stakeholders and FERC can review the study progress to date and plan for future reports, meetings, and overall relicensing activities. This is a voluntary action that is not required under the ILP. Alabama Power has filed the October 2020 Progress Update with FERC and posted it to the Harris Project relicensing website: www.harrisrelicensing.com [harrisrelicensing.com] (in the Relicensing Documents folder).

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

Alabama Power

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October 30, 2020

VIA ELECTRONIC FILING

Project No. 2628-065
R.L. Harris Hydroelectric Project
Progress Update

Ms. Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street N.
Washington, DC 20426

Dear Secretary Bose,

Alabama Power Company (Alabama Power) is the Federal Energy Regulatory Commission (FERC) licensee for the R.L. Harris Hydroelectric Project (Harris Project) (FERC No. 2628). On March 13, 2019[1], Alabama Power filed 10 study plans for FERC approval as part of the Integrated Licensing Process (ILP) for the Harris Project. On April 12, 2019[2], FERC approved Alabama Power's study plans with FERC modifications. Alabama Power filed the Final Study Plans with FERC on May 13, 2019[3] and posted the Final Study Plans to the Harris Project relicensing website at www.harrisrelicensing.com. Alabama Power filed the Initial Study Report along with six Draft Study Reports and two cultural resources documents on April 10, 2020[4].

As part of the May 13, 2019 filing, Alabama Power recognized the complexity of tracking the 10 relicensing studies and committed to filing a voluntary Progress Update with FERC in October 2019 and October 2020. Alabama Power filed the 2019 Progress Update on October 30, 2019[5]. The purpose of this Progress Update (Attachment A) is to ensure that stakeholders and FERC can review the study progress to date and plan for future reports, meetings, and overall relicensing activities. This is a voluntary action that is not required under the ILP. A summary of the Harris Project relicensing activities for the six established Harris Action Teams (HAT) and their associated studies from April 10, 2020 to date is outlined in the Progress Update. Alabama Power will post this 2020 Progress Update to the Harris Project relicensing website. The current HAT distribution lists are included as Attachment B.

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[1] Accession No. 20190313-5060
[2] Accession No. 20190412-3000
[3] Accession No. 20190513-5093
[4] Accession No. 20200410-5084
[5] Accession No. 20191030-5053

If there are any questions concerning this filing, please contact me at arsegars@southernco.com or 205-257-2251.

Sincerely,

Angie Anderegg
Harris Relicensing Project Manager

Attachments (2)

cc: Harris Stakeholder List

Attachment A
October 2020 Harris Project Progress Update

Harris Progress Update Report

R.L. Harris Hydroelectric Project

FERC No. 2628

Prepared for:

Alabama Power Company

Prepared by:

Kleinschmidt Associates

October 2020

TABLE OF CONTENTS

1.0 INTRODUCTION

Alabama Power Company (Alabama Power) is the Federal Energy Regulatory Commission (FERC) licensee for the R.L. Harris Hydroelectric Project (Harris Project) (FERC No. 2628). On June 1, 2018, Alabama Power filed a Pre-Application Document and began the Integrated Licensing Process (ILP) for the Harris Project[1].

On November 13, 2018, Alabama Power filed ten proposed study plans for the Harris Project. FERC issued a Study Plan Determination on April 12, 2019, which included FERC staff recommendations. Alabama Power incorporated FERC's recommendations and filed the Final Study Plans with FERC on May 13, 2019[2]. Based upon FERC's prior comments and as part of the Final Study Plans, Alabama Power incorporated within each study plan's schedule a milestone to file a voluntary Progress Update in October 2019 and October 2020. This Progress Update is designed to inform stakeholders and FERC of the study progress, future reports, Harris Action Team (HAT) meetings, and overall relicensing activities.

Three activities apply to all the HATs that are described here: the Initial Study Report (ISR), ISR Meeting, and the ISR Meeting Summary. On April 10, 2020, Alabama Power filed the ISR[3] along with six Draft Study Reports and two cultural resources documents. Alabama Power held an ISR Meeting with stakeholders and FERC on April 28, 2020 and filed the ISR Meeting Summary on May 12, 2020[4]. Comments on the ISR and ISR Meeting Summary were due June 11, 2020. On July 10, 2020, Alabama Power filed its response to questions/comments on the ISR and additional studies/study modifications for the Harris Project.[5]

On August 10, 2020, FERC sent a letter to Alabama Power discussing the Determination on Requests for Study Modifications for the R.L. Harris Hydroelectric Project[6]. In that letter, FERC recommended that Alabama Power conduct a new study titled Battery Energy Storage System (BESS). FERC recommended that the BESS study be conducted with the

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[1] Accession No. 20180601-5125
[2] Accession No. 20190513-5093
[3] Accession No. 20200410-5084
[4] Accession No. 20200512-5083
[5] Accession No. 20200710-5122
[6] Accession No. 20200810-3007

Downstream Release Alternative Study and include at least two new release alternatives: (a) a 50 percent reduction in peak releases associated with installing one 60 MW battery unit, and (b) a proportionately smaller reduction in peak releases associated with installing a smaller MW battery unit (i.e., 5, 10 or 20 MW battery). FERC further recommended that Alabama Power include in its cost estimates for installing a BESS, any specific structural changes, any changes in turbine-generator units, and costs needed to implement each battery storage type. Finally, FERC recommended that, consistent with the Downstream Release Alternative Study Plan, Alabama Power evaluate how each of the release alternatives (i.e., items (a) and (b) above) would affect recreation and aquatic resources in the Harris Project reservoir and downstream. Alabama Power is conducting the BESS study as recommended by FERC and will prepare and file a BESS report in first quarter 2021.

Sections 2-7 of this Progress Report summarize the relicensing activities of the six established HATs from the ISR filing to date.

2.0 HAT 1 – PROJECT OPERATIONS

2.1 DOWNSTREAM RELEASE ALTERNATIVES STUDY PLAN

- Alabama Power downloaded the lever logger data and incorporated these data into the HEC-RAS (Hydrologic Engineering Center's River Analysis System) model.
- Alabama Power filed the Draft *Downstream Release Alternatives Phase 1 Report* on April 10, 2020[7] with comments due June 11, 2020. This report was also distributed to the HAT 1 (Project Operations) participants and posted on the Harris Relicensing website at www.harrisrelicensing.com.
- Alabama Power filed the Final *Downstream Release Alternatives Phase 1 Report* on July 27, 2020[8]. This report was also distributed to the HAT 1 participants and posted on the Harris Relicensing website at www.harrisrelicensing.com.
- As noted in the Alabama Power Response to ISR Disputes or Requests for Modifications of Study Plan filed on July 10, 2020 and recommended in FERC's August 10, 2020 Determination on Study Modifications, Alabama Power is analyzing additional downstream releases and using qualitative and quantitative data to identify potential resource impacts from changes in the downstream releases. Alabama Power will present this information in the Phase 2 Report. The Draft Phase 2 report will be filed on or before April 12, 2021.

2.2 OPERATING CURVE CHANGE FEASIBILITY ANALYSIS STUDY PLAN

- Alabama Power filed the Draft *Operating Curve Change Feasibility Analysis Phase 1 Report* on April 10, 2020[9] with comments due June 11, 2020. This report was also distributed to the HAT 1 (Project Operations) participants and posted on the Harris Relicensing website at www.harrisrelicensing.com.
- Alabama Power hosted a HAT 1 meeting on June 4, 2020, to present the methodologies for analyzing how structures on Lake Harris and downstream

[7] Accession No. 20200410-5069
[8] Accession No. 20200727-5088
[9] Accession No. 20200410-5086

of Harris Dam might be affected by the proposed winter operating curve alternatives and posted the meeting summary on the Harris Relicensing website at www.harrisrelicensing.com.

- Alabama Power filed the Final *Operating Curve Change Feasibility Analysis Phase 1 Report* on August 31, 2020[10]. This report was also distributed to the HAT 1 participants and posted on the Harris Relicensing website at www.harrisrelicensing.com.
- Alabama Power is analyzing qualitative and quantitative data in Phase 2 to identify potential resource impacts from a change in the operating curve. The Draft Phase 2 report will be filed on or before April 12, 2021.

[10] Accession No. 20200831-5339

3.0 HAT 2 – WATER QUALITY AND USE

3.1 EROSION AND SEDIMENTATION STUDY PLAN

- Alabama Power distributed the Draft *Erosion and Sedimentation Study Report* to HAT 2 (Water Quality and Use) participants for review on March 18, 2020. Alabama Power provided this report to HAT 2 participants prior to the official ISR comment period to allow additional time for review.
- Alabama Power filed the Draft *Erosion and Sedimentation Study Report* on April 10, 2020[11] with comments due June 11, 2020. This report was also distributed to the HAT 2 participants and posted on the Harris Relicensing website at www.harrisrelicensing.com.
- Alabama Power posted the videos associated with the *Tallapoosa River High Definition Stream Survey Final Report* on the Harris Relicensing website at www.harrisrelicensing.com.
- Alabama Power facilitated obtaining from a stakeholder copies of various images of the Tallapoosa River pre-Harris Dam and post-construction. Alabama Power filed these images as Consultation Regarding Historic Photographs of the Tallapoosa River with FERC on August 4, 2020[12]. These photos were also posted to the Harris Relicensing website at www.harrisrelicensing.com.
- Alabama Power performed additional reconnaissance at identified sedimentation sites on Lake Harris during full (summer) pool conditions to determine if any nuisance aquatic vegetation is present and will provide the results of that assessment to HAT 2 participants in the form of a technical memorandum on or before April 12, 2021.
- Alabama Power will file the Final *Erosion and Sedimentation Study Report* on or before April 12, 2021.

[11] Accession No. 20200410-5091
[12] Accession No. 20200804-5252

3.2 WATER QUALITY STUDY PLAN

- Alabama Power distributed the *Draft Water Quality Study Report* to HAT 2 participants for review on March 11, 2020. Alabama Power provided this report to HAT 2 participants prior to the official ISR comment period to allow additional time for review.
- Alabama Power filed the *Draft Water Quality Study Report* on April 10, 2020[13] with comments due June 11, 2020. This report was also distributed to the HAT 2 participants and posted on the Harris Relicensing website at www.harrisrelicensing.com.
- As filed in the Response to ISR Disputes or Requests for Modifications of Study Plan on July 10, 2020, Alabama Power is collecting additional water quality data in 2020 and 2021 as requested by Alabama Rivers Alliance and other stakeholders.
- To collect dissolved oxygen and water temperature data in 2020, Alabama Power installed the continuous monitor on May 4, 2020, following the ISR meeting. The generation monitor was installed on June 1, 2020, to align with the monitoring season start date in the Water Quality Study Plan.
- Alabama Power will collect water quality data at both locations in 2021 (from March 1 – June 30, 2021 at the continuous monitor and June 1 – June 30, 2021 at the generation monitor) to include in the Final License Application (FLA).
- Alabama Power will file the Final *Water Quality Study Report* on or before April 12, 2021.

[13] Accession No. 20200410-5095

4.0 HAT 3 – FISH AND WILDLIFE

4.1 AQUATIC RESOURCES STUDY PLAN

- Alabama Power hosted a HAT 3 (Fish and Wildlife) meeting on June 2, 2020. Auburn University presented its research to date and informed meeting participants of remaining work on the Aquatic Resources Study. Alabama Power posted the June 2, 2020 HAT 3 meeting summary on the Harris Relicensing website at www.harrisrelicensing.com.
- Auburn has conducted fish sampling in May, July, and September 2020 and will also sample in November 2020.
- Auburn deployed eight acoustic receivers from Harris Dam to Malone to detect overall fish movement and responses and two acoustic receivers at Wadley. Auburn tagged 13 Alabama Bass and 3 Tallapoosa Bass and has also performed manual tracking of these fish. Results of this tagging will be compiled and presented in Auburn's report in 2021.
- Auburn continues to perform static and swimming respirometry testing of target fish species.
- Auburn continues to analyze temperature data and work on the bioenergetics modeling protocols.
- Alabama Power filed the Draft *Aquatic Resources Report* on July 28, 2020[14] with comments due August 28, 2020. This report was also distributed to the HAT 3 participants and posted on the Harris Relicensing website at www.harrisrelicensing.com.
- Alabama Power will host a HAT 3 meeting on November 5, 2020; a meeting agenda was provided to HAT 3 participants on October 16, 2020.
- Alabama Power will file the Final *Aquatic Resources Report* on or before April 12, 2021.

[14] Accession No. 20200728-5120

4.2 DOWNSTREAM AQUATIC HABITAT STUDY PLAN

- Alabama Power filed the Draft *Downstream Aquatic Habitat Study Report* on June 30, 2020[15] with comments due August 1, 2020. This report was also distributed to the HAT 3 participants and posted on the Harris Relicensing website at www.harrisrelicensing.com.
- Alabama Power will host a HAT 3 meeting on November 5, 2020; a meeting agenda was provided to HAT 3 participants on October 16, 2020.
- Alabama Power will file the Final *Downstream Aquatic Habitat Report*, including all Geographic Information System (GIS) Shapefiles and HEC-RAS model outputs on or before April 12, 2021.

4.3 THREATENED AND ENDANGERED (T&E) SPECIES STUDY PLAN

- Alabama Power filed the Draft *Threatened and Endangered Species Desktop Assessment* on April 10, 2020[16] with comments due June 11, 2020. This report was also distributed to the HAT 3 participants and posted on the Harris Relicensing website at www.harrisrelicensing.com.
- In accordance with FERC's Determination on Requests for Study Modifications for the R.L. Harris Hydroelectric Project, Alabama Power conducted additional field surveys for Threatened & Endangered species and/or their potentially suitable habitat based on ongoing consultation with the United States Fish and Wildlife Service (USFWS), Alabama Department of Conservation and Natural Resources (ADCNR), and Alabama Natural Heritage Program.
- Alabama Power will host a HAT 3 meeting on November 5, 2020; a meeting agenda was provided to HAT 3 participants on October 16, 2020.

  Alabama Power will provide documentation of consultation in the Final *Threatened and Endangered Species Report*, which will be filed in January 2021.

[15] Accession No. 20200630-5200
[16] Accession No. 20200410-5094

5.0 HAT 4 – PROJECT LANDS

5.1 PROJECT LANDS EVALUATION STUDY PLAN

- Alabama Power filed the Draft *Phase 1 Project Lands Evaluation Study Report* on April 10, 2020[17] with comments due June 11, 2020. This report was also distributed to the HAT 4 (Project Lands) participants and posted on the Harris Relicensing website at www.harrisrelicensing.com.
- Alabama Power filed the Final *Phase 1 Project Lands Evaluation Study Report* on October 2, 2020[18]. This report was also distributed to the HAT 3 participants and posted on the Harris Relicensing website at www.harrisrelicensing.com.
- Spring and summer fieldwork at the Flat Rock botanical area was completed, and researchers are planning one additional site visit to document any remaining plant species that bloom in late autumn. To date, 403 species have been documented from the Flat Rock botanical area. Researchers will submit a draft report in December 2020 on the additional research at the Flat Rock Botanical area, and a final report in Q1 2021; this report will be included in the Updated Study Report.
- On October 5, 2020, Alabama Power distributed the Final *Project Lands Evaluation Study Report* as well as a Draft Shoreline Management Plan (SMP) and Draft Wildlife Management Plan (WMP) Annotated Outline to HAT 4 for review and comment.
- Alabama Power held a HAT 4 meeting on October 19, 2020 to review and discuss the Draft SMP and WMP outline. A meeting summary was distributed to HAT 4 participants and posted on the Harris relicensing website at www.harrisrelicensing.com.
- Phase 2 of the Project Lands Evaluation Study will use the Phase 1 evaluation information, as well as results from other studies, to develop a WMP and a SMP, and draft versions of both plans will be filed with the FLA.

[17] Accession No. 20200410-5092
[18] Accession No. 20201002-5139

6.0 HAT 5 – RECREATION

6.1 RECREATION EVALUATION STUDY PLAN

- In the April 10, 2020 ISR, Alabama Power noted a variance in the Recreation Evaluation Study Plan due to the additional study elements and an extended deadline for landowners and the public to participate in the recreation surveys. Alabama Power noted a variance for filing the Draft *Recreation Evaluation Study Report* in August 2020 rather than in April 2020. FERC concurred with this variance on August 10, 2020.
- Alabama Power held a HAT 5 (Recreation) meeting on June 4, 2020 to present the methodologies for analyzing how structures on Lake Harris might be affected by the proposed winter operating curve alternatives and posted the HAT 5 meeting summary on the Harris Relicensing website at www.harrisrelicensing.com.
- Alabama Power filed the Draft *Recreation Evaluation Study Report* on August 24, 2020[19] with comments due September 30, 2020. This report was also distributed to the HAT 5 participants and posted on the Harris Relicensing website at www.harrisrelicensing.com.
- Alabama Power hosted a HAT 5 meeting on October 19, 2020 to present the methodology for analyzing boatable flows in the Tallapoosa River and present initial recreation protection, mitigation and enhancement measures and posted the meeting summary on the Harris Relicensing website at www.harrisrelicensing.com.
- Alabama Power will file the Final *Recreation Evaluation Study Report* in November 2020.

[19] Accession No. 20200824-5241

7.0 HAT 6 – CULTURAL RESOURCES

7.1 CULTURAL RESOURCES PROGRAMMATIC AGREEMENT AND HISTORIC PROPERTIES MANAGEMENT PLAN STUDY PLAN

- Alabama Power filed the Inadvertent Discovery Plan (IDP) and Traditional Cultural Properties (TCP) Identification Plan on April 10, 2020[20] with comments due June 11, 2020. These documents were also distributed to the HAT 6 (Cultural Resources) participants and posted on the Harris Relicensing website at www.harrisrelicensing.com.
- In the April 10, 2020 ISR, Alabama Power noted a variance in the Cultural Resources Programmatic Agreement and Historic Properties Management Plan Study Plan to finalize and file the Area of Potential Effects (APE) and associated consultation by June 30, 2020 (revised from April 2020).
- Alabama Power distributed the Draft *Harris Project Area of Potential Effects Report* to HAT 6 on May 15, 2020 and posted the report on the Harris Relicensing website at www.harrisrelicensing.com.
- Alabama Power held a HAT 6 meeting on May 28, 2020, to discuss the Draft *Harris Project Area of Potential Effects Report* and review the status of the cultural resources surveys. Stakeholders comments were due June 15, 2020.
- Alabama Power posted a public version of the May 28, 2020 HAT 6 meeting summary on the Harris Relicensing website at www.harrisrelicensing.com; however, due to the privileged information discussed in the meeting, distribution of some of the meeting materials were limited.
- On June 18, 2020, the Alabama State Historic Preservation Office (SHPO) concurred with the Harris Project APE as defined by Alabama Power.
- Alabama Power filed the Final *Harris Project Area of Potential Effects Report* on June 29, 2020[21].
- On August 11, 2020, FERC found Alabama Power's proposed APE for the Harris Project appropriate[22].

[20] Accession Nos. 20200410-5067, 20200410-5068
[21] Accession No. 20200629-5328
[22] Accession No. 20200811-3007

- Alabama Power and the Office of Archeological Research (OAR) completed approximately 80 percent of all of the preliminary archeological assessments (96 sites) around Lake Harris. The remaining 20 percent will be completed as the water level of Lake Harris lowers in the winter months of 2020-2021 and the necessary shoreline is accessible.
- Alabama Power and OAR completed cultural resources assessments at Skyline (30 sites). In addition, OAR finished approximately 90 percent of the cave art survey sample in Skyline (14 caves were investigated, and OAR will reevaluate 3 cave sites).
- Alabama Power and OAR continue TCP consultation with the Muscogee (Creek) Nation. To date, there have been seven discussions.

  OAR identified known cultural resources sites in the Tallapoosa River downstream of Harris Dam. Alabama Power and OAR are evaluating effects on cultural resources due to any changes in Harris Project operations.

Attachment B
Harris Action Team Distribution Lists

HAT 1 – Project Operations

Full Name	Company
Damon Abernethy	Alabama Department of Conservation and Natural Resources
Bob Allen	U.S. Army Corps of Engineers
Brian Atkins	Alabama Department of Economic and Community Affairs
Nathan Aycock	Alabama Department of Conservation and Natural Resources
Richard Bronson	Stakeholder
Steve Bryant	Alabama Department of Conservation and Natural Resources
Nancy Burnes	Lake Wedowee Property Owners Association
Richard Burnes	Property Owner
Matt and Ann Campbell	Stakeholder
Kristie Coffman	Auburn University
Allan Creamer	Federal Energy Regulatory Commission
Doug & Jan Crisp	Stakeholder
Robin Crockett	Stakeholder
Gene Crouch	Keller Williams Realty Group; Lake Wedowee
Jesse Cunningham	Lake Martin HOBO
Dennis Devries	Auburn University
Mike Dollar	Lake Martin HOBO
Jeff Duncan	U.S. National Park Service
Albert Eiland	Property Owner
Todd Fobian	Alabama Department of Conservation and Natural Resources
Steve Forehand	Lake Martin Resource Association
Sylvia French	Lake Wedowee Property Owners Association
Tom Garland	Lake Wedowee Property Owners Association
Lisa Perras Gordon	U.S. Environmental Protection Agency
Chris Greene	Alabama Department of Conservation and Natural Resources
Jennifer Grunewald	U.S. Fish and Wildlife
Andrew Hall	Property Owner
Randall Harvey	U.S. Army Corps of Engineers
Jennifer Haslbauer	Alabama Department of Environmental Management
James Hathorn	U.S. Army Corps of Engineers
Dave Heinzen	Lake Martin HOBO
Keith Henderson	Alabama Department of Conservation and Natural Resources
Mike Holley	Alabama Department of Conservation and Natural Resources
Dan Holliman	U.S. Environmental Protection Agency
Sonja Hollomon	Stakeholder
Martha Hunter	Alabama Rivers Alliance
Elise Irwin	Auburn University
Butch Jackson	Stakeholder

Full Name	Company
Gerrit Jobsis	American Rivers
Chris Johnson	Alabama Department of Environmental Management
Evan Lawrence	Alabama Department of Conservation and Natural Resources
Michael Len	Alabama Department of Environmental Management
Fred Leslie	Alabama Department of Environmental Management
Tom Littlepage	Alabama Department of Economic and Community Affairs
Cindy Lowry	Alabama Rivers Alliance
Matthew Marshall	Alabama Department of Conservation and Natural Resources
Donna Matthews	Stakeholder
Lydia Mayo	U.S. Environmental Protection Agency
Rachel McNamara	Federal Energy Regulatory Commission
David Moore	Alabama Department of Environmental Management
Barry Morris	Lake Wedowee Property Owners Association
Ginny Oxford	Stakeholder
Erin Padgett	U.S. Fish and Wildlife
Mellie Parrish	Stakeholder
Ira Parsons	Lake Wedowee Property Owners Association
Jeff Powell	U.S. Fish and Wildlife
Becky Rainwater	ReMax Lakefront
Mitch Reid	Nature Conservancy
Sarah Salazar	Federal Energy Regulatory Commission
Jerrel Shell	Stakeholder
Barry Smith	Stakeholder
David Smith	Stakeholder
Paul Smith	Stakeholder
Linda Stone	Stakeholder
Chuck Sumner	U.S. Army Corps of Engineers
Monte Terhaar	Federal Energy Regulatory Commission
David Thomas	Stakeholder
David Thompson	Property Owner
John Thompson	Lake Martin Resource Association
George Traylor	Property Owner
Jimmy Traylor	Stakeholder
Steve Traylor	Stakeholder
Jack West	Alabama Rivers Alliance
Jonas White	U.S. Army Corps of Engineers
Russell Wright	Auburn University

HAT 2 – Water Quality and Use

Full Name	Company
Damon Abernethy	Alabama Department of Conservation and Natural Resources
Nathan Aycock	Alabama Department of Conservation and Natural Resources
Steve Bryant	Alabama Department of Conservation and Natural Resources
Nancy Burnes	Lake Wedowee Property Owners Association
Richard Burnes	Property Owner
Matt and Ann Campbell	Stakeholder
Maria Clark	U.S. Environmental Protection Agency
Kristie Coffman	Auburn University
Allan Creamer	Federal Energy Regulatory Commission
Jan and Doug Crisp	Stakeholder
Robin Crockett	Stakeholder
Jesse Cunningham	Lake Martin HOBO
Chris Decker	U.S. Environmental Protection Agency
Chuck Denman	Stakeholder
Jeff Duncan	U.S. National Park Service
Albert Eiland	Property Owner
Todd Fobian	Alabama Department of Conservation and Natural Resources
Steve Forehand	Lake Martin Resource Association
Tom Garland	Lake Wedowee Property Owners Association
Lisa Perras Gordon	U.S. Environmental Protection Agency
Chris Greene	Alabama Department of Conservation and Natural Resources
Evelyn Hammrick	Property Owner
Jennifer Haslbauer	Alabama Department of Environmental Management
Keith Henderson	Alabama Department of Conservation and Natural Resources
Mike Holley	Alabama Department of Conservation and Natural Resources
Dan Holliman	U.S. Environmental Protection Agency
Martha Hunter	Alabama Rivers Alliance
Elise Irwin	Auburn University
Gerrit Jobsis	American Rivers
Chris Johnson	Alabama Department of Environmental Management
Carol Knight	Stakeholder
Michael Len	Alabama Department of Environmental Management
Fred Leslie	Alabama Department of Environmental Management
Cindy Lowry	Alabama Rivers Alliance
Matthew Marshall	Alabama Department of Conservation and Natural Resources
Donna Matthews	Stakeholder
Lydia Mayo	U.S. Environmental Protection Agency
Rachel McNamara	Federal Energy Regulatory Commission

Full Name	Company
Harry Merrill	Stakeholder
David Moore	Alabama Department of Environmental Management
Barry Morris	Lake Wedowee Property Owners Association
Mellie Parrish	Stakeholder
Jerry & Mary Lee Poss	Stakeholder
Mitch Reid	Nature Conservancy
Eric Reutebuch	Auburn University
Sarah Salazar	Federal Energy Regulatory Commission
Amy Silvano	Alabama Department of Conservation and Natural Resources
David Smith	Stakeholder
Monte Terhaar	Federal Energy Regulatory Commission
John Thompson	Lake Martin Resource Association
Jack West	Alabama Rivers Alliance

HAT 3 – Fish and Wildlife

Full Name	Company
Damon Abernethy	Alabama Department of Conservation and Natural Resources
Nathan Aycock	Alabama Department of Conservation and Natural Resources
Steve Bryant	Alabama Department of Conservation and Natural Resources
Matt and Ann Campbell	Stakeholder
Kristie Coffman	Auburn University
Evan Collins	U.S. Fish and Wildlife
Allan Creamer	Federal Energy Regulatory Commission
Robin Crockett	Stakeholder
Chris Decker	U.S. Environmental Protection Agency
Dennis Devries	Auburn University
Jeff Duncan	U.S. National Park Service
Todd Fobian	Alabama Department of Conservation and Natural Resources
Steve Forehand	Lake Martin Resource Association
Tom Garland	Lake Wedowee Property Owners Association
Chris Greene	Alabama Department of Conservation and Natural Resources
Jennifer Grunewald	U.S. Fish and Wildlife
Keith Henderson	Alabama Department of Conservation and Natural Resources
Mike Holley	Alabama Department of Conservation and Natural Resources
Dan Holliman	U.S. Environmental Protection Agency
Martha Hunter	Alabama Rivers Alliance
Elise Irwin	Auburn University
Gerrit Jobsis	American Rivers
Evan Lawrence	Alabama Department of Conservation and Natural Resources
Cindy Lowry	Alabama Rivers Alliance
Matthew Marshall	Alabama Department of Conservation and Natural Resources
Donna Matthews	Stakeholder
Lydia Mayo	U.S. Environmental Protection Agency
Rachel McNamara	Federal Energy Regulatory Commission
Barry Morris	Lake Wedowee Property Owners Association
Chris Oberholster	Birmingham Audubon
Erin Padgett	U.S. Fish and Wildlife
Mellie Parrish	Stakeholder
Bill Pearsons	U.S. Fish and Wildlife
Jeff Powell	U.S. Fish and Wildlife
Mitch Reid	Nature Conservancy
Sarah Salazar	Federal Energy Regulatory Commission
Amy Silvano	Alabama Department of Conservation and Natural Resources
Tricia Stearns	Stakeholder

Full Name	**Company**
Monte Terhaar	Federal Energy Regulatory Commission
Jimmy Traylor	Stakeholder
Steve Traylor	Stakeholder
Jack West	Alabama Rivers Alliance
Pace Wilber	National Oceanic and Atmospheric Administration
Ken Wills	Alabama Glade Conservation Coalition
Russell Wright	Auburn University

HAT 4 – Project Lands

Full Name	Company
Damon Abernethy	Alabama Department of Conservation and Natural Resources
Nathan Aycock	Alabama Department of Conservation and Natural Resources
Matt Brooks	Alabama Law Enforcement Agency
Coty Brown	Alabama Law Enforcement Agency
Steve Bryant	Alabama Department of Conservation and Natural Resources
Matt and Ann Campbell	Stakeholder
Kristie Coffman	Auburn University
Evan Collins	U.S. Fish and Wildlife
Allan Creamer	Federal Energy Regulatory Commission
Robin Crockett	Stakeholder
Gene Crouch	Keller Williams Realty Group; Lake Wedowee
Todd Fobian	Alabama Department of Conservation and Natural Resources
Steve Forehand	Lake Martin Resource Association
Tom Garland	Lake Wedowee Property Owners Association
Keith Gauldin	Alabama Department of Conservation and Natural Resources
Chris Greene	Alabama Department of Conservation and Natural Resources
Jennifer Grunewald	U.S. Fish and Wildlife
Keith Henderson	Alabama Department of Conservation and Natural Resources
Mike Holley	Alabama Department of Conservation and Natural Resources
Martha Hunter	Alabama Rivers Alliance
Elise Irwin	Auburn University
Gerrit Jobsis	American Rivers
Bruce Knapp	Stakeholder
Evan Lawrence	Alabama Department of Conservation and Natural Resources
Cindy Lowry	Alabama Rivers Alliance
Diane Lunsford	Lake Wedowee Property Owners Association
Matthew Marshall	Alabama Department of Conservation and Natural Resources
Donna Matthews	Stakeholder
Lydia Mayo	U.S. Environmental Protection Agency
Allison McCartney	U.S. Bureau of Land Management
Rachel McNamara	Federal Energy Regulatory Commission
Harry Merrill	Stakeholder
Brad Mitchell	Lake Wedowee Property Owners Association
Barry Morris	Lake Wedowee Property Owners Association
Stan Nelson	Nelson and Company
Chris Oberholster	Birmingham Audubon
Erin Padgett	U.S. Fish and Wildlife
Mellie Parrish	Stakeholder

Full Name	Company
Jerry & Mary Lee Poss	Stakeholder
Jeff Powell	U.S. Fish and Wildlife
Mark Prestridge	Randolph County Water Authority
Mitch Reid	Nature Conservancy
Sarah Salazar	Federal Energy Regulatory Commission
Amy Silvano	Alabama Department of Conservation and Natural Resources
Chris Smith	Alabama Department of Conservation and Natural Resources
David Smith	Stakeholder
Glenell Smith	Stakeholder
Paul Smith	Stakeholder
John Sullivan	U.S. Bureau of Land Management
Monte Terhaar	Federal Energy Regulatory Commission
John Thompson	Stakeholder
Jack West	Alabama Rivers Alliance
Ken Wills	Alabama Glade Conservation Coalition

HAT 5 – Recreation

Full Name	Company
Damon Abernethy	Alabama Department of Conservation and Natural Resources
Nathan Aycock	Alabama Department of Conservation and Natural Resources
Matt Brooks	Alabama Law Enforcement Agency
Coty Brown	Alabama Law Enforcement Agency
Matt and Ann Campbell	Stakeholder
Kristie Coffman	Auburn University
Allan Creamer	Federal Energy Regulatory Commission
Robin Crockett	Stakeholder
Jesse Cunningham	Lake Martin HOBO
Mike Dollar	Lake Martin HOBO
Jeff Duncan	U.S. National Park Service
Todd Fobian	Alabama Department of Conservation and Natural Resources
Steve Forehand	Lake Martin Resource Association
Sylvia French	Stakeholder
Tom Garland	Stakeholder
Keith Gauldin	Alabama Department of Conservation and Natural Resources
Chris Greene	Alabama Department of Conservation and Natural Resources
Dave Heinzen	Lake Martin HOBO
Keith Henderson	Alabama Department of Conservation and Natural Resources
Mike Holley	Alabama Department of Conservation and Natural Resources
Sonja Hollomon	Stakeholder
Kevin Hunt	Consultant
Martha Hunter	Alabama Rivers Alliance
Elise Irwin	Auburn University
Butch Jackson	Property Owner
Gerrit Jobsis	American Rivers
Gerry Knight	Stakeholder
Evan Lawrence	Alabama Department of Conservation and Natural Resources
Cindy Lowry	Alabama Rivers Alliance
Matthew Marshall	Alabama Department of Conservation and Natural Resources
Donna Matthews	Stakeholder
Lydia Mayo	U.S. Environmental Protection Agency
Rachel McNamara	Federal Energy Regulatory Commission
Harry Merrill	Stakeholder
Brad Mitchell	Lake Wedowee Property Owners Association
Barry Morris	Lake Wedowee Property Owners Association
Chris Oberholster	Birmingham Audubon
Ginny Oxford	Stakeholder

Full Name	**Company**
Mellie Parrish	Stakeholder
Ira Parsons	Lake Wedowee Property Owners Association
Jerry and Mary Lee Poss	Stakeholder
Mitch Reid	Nature Conservancy
Sarah Salazar	Federal Energy Regulatory Commission
Chris Smith	Alabama Department of Conservation and Natural Resources
Paul Smith	Stakeholder
Jim Sparrow	Alabama Bass Federation
Tricia Stearns	Stakeholder
Monte Terhaar	Federal Energy Regulatory Commission
Jack West	Alabama Rivers Alliance
Bryant Whaley	Randolph County Economic / Industrial Development

HAT 6 – Cultural Resources

Full Name	Company
Nathan Aycock	Alabama Department of Conservation and Natural Resources
Steve Bryant	Alabama Department of Conservation and Natural Resources
Nancy Burnes	Lake Wedowee Property Owners Association
RaeLynn Butler	Muscogee (Creek) Nation of Oklahoma
Rae-Lynn Butler	Muscogee (Creek) Nation of Oklahoma
Bryant Celestine	Alabama-Coushatta Tribe of Texas
Kristie Coffman	Auburn University
Allan Creamer	Federal Energy Regulatory Commission
Robin Crockett	Stakeholder
Jeff Duncan	U.S. National Park Service
Todd Fobian	Alabama Department of Conservation and Natural Resources
Matthew Gage	Office of Archaeological Research
Chris Greene	Alabama Department of Conservation and Natural Resources
Larry Haikey	Poarch Band of Creek Indians
Evelyn Hamrick	Property Owner
Mike Holley	Alabama Department of Conservation and Natural Resources
Martha Hunter	Alabama Rivers Alliance
Gerrit Jobsis	American Rivers Alliance
Dr. Linda Langley	Coushatta Tribe of Louisiana
Janice Lowe	Alabama Quassarte Tribe
Matthew Marshall	Alabama Department of Conservation and Natural Resources
Donna Matthews	Stakeholder
Janet Maylen	Thlopthlocco Tribal Town
Lydia Mayo	U.S. Environmental Protection Agency
Amanda McBride	Alabama Historical Commission
Allison McCartney	U.S. Bureau of Land Management
Rachel McNamara	Federal Energy Regulatory Commission
Barry Morris	Lake Wedowee Property Owners Association
Karen Pritchett	United Keetoowah Band of Cherokee Indians
Mitch Reid	Nature Conservancy
Sarah Salazar	Federal Energy Regulatory Commission
Eric D. Sipes	Alabama Historical Commission
Barry Smith	Stakeholder
Robin Soweka	Muscogee (Creek) Nation of Oklahoma
John Sullivan	U.S. Bureau of Land Management
Monte Terhaar	Federal Energy Regulatory Commission
Elizabeth Toombs	Tribal Historic Preservation Office Cherokee Nation
Russ Townsend	Eastern Band of Cherokee Indians

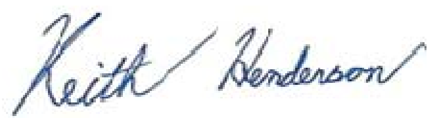
Full Name	Company
Jack West	Alabama Rivers Alliance
Lee Anne Wofford	Alabama Historical Commission

APC Harris Relicensing

From: Henderson, Keith <Keith.Henderson@dcnr.alabama.gov>
Sent: Friday, October 30, 2020 12:58 PM
To: Colin Dinken
Subject: RE: Lonnie White ramp

You are very welcome!

Sincerely,



Keith Henderson
Fisheries Development Coordinator
Wildlife & Freshwater Fisheries
64 N. Union St., Suite 551
Montgomery, Ala.   36130
Office: (334)-353-7485
Cell: (334)-850-4206
Fax: (334)-242-2061

From: Colin Dinken <Colin.Dinken@Kleinschmidtgroup.com>
Sent: Friday, October 30, 2020 12:55 PM
To: Henderson, Keith <Keith.Henderson@dcnr.alabama.gov>
Subject: RE: Lonnie White ramp

Perfect. Thanks!

From: Henderson, Keith <Keith.Henderson@dcnr.alabama.gov>
Sent: Friday, October 30, 2020 12:54 PM
To: Colin Dinken <Colin.Dinken@Kleinschmidtgroup.com>
Subject: RE: Lonnie White ramp

The ramp (prior to being torn out) extended approximately 15' into the water at low pool. After we are completed the ramp will extend approximately 30' into the water at low pool water levels on a 15% grade. That would put the end of the ramp at approximately 5' deep.

Sincerely,

Keith Henderson

Keith Henderson
Fisheries Development Coordinator
Wildlife & Freshwater Fisheries
64 N. Union St., Suite 551
Montgomery, Ala.   36130
Office: (334)-353-7485
Cell: (334)-850-4206
Fax: (334)-242-2061

From: Colin Dinken <Colin.Dinken@Kleinschmidtgroup.com>
Sent: Friday, October 30, 2020 12:48 PM
To: Henderson, Keith <Keith.Henderson@dcnr.alabama.gov>
Subject: RE: Lonnie White ramp

Ok one more question if you have an answer haha: Do you know about how deep the edge of the concrete slab is for Lonnie White at winter pool or how far that ramp currently extends into the reservoir? Thanks!

From: Henderson, Keith <Keith.Henderson@dcnr.alabama.gov>
Sent: Thursday, October 29, 2020 7:42 AM
To: Colin Dinken <Colin.Dinken@Kleinschmidtgroup.com>
Subject: Re: Lonnie White ramp

You are welcome!

KH

Get Outlook for iOS

From: Colin Dinken <Colin.Dinken@Kleinschmidtgroup.com>
Sent: Wednesday, October 28, 2020 11:30:53 PM
To: Henderson, Keith <Keith.Henderson@dcnr.alabama.gov>
Subject: Re: Lonnie White ramp

Haha yeah that answers everything. For now. Thanks man!

Sent from my iPhone

On Oct 28, 2020, at 12:45 PM, Henderson, Keith <Keith.Henderson@dcnr.alabama.gov> wrote:

To clear up any confusion, the picture on the left is White's Bridge, and the picture on the right is Swagg. At low water White's Bridge (Lonnie White) used to extend about 15' into the water and people were backing off the end of the ramp and damaging equipment. Swagg is short and ends at the water at low pool. We did not build either of those ramps, we just took them over at some point in time. I don't think Swagg is as big of a deal because it is a lower use facility and is obvious that it ends. We were getting more complaints from White's Bridge. We are going to complete at the end of the drawdown due to other projects statewide. We will actually pour the concrete on dry land, let it cure, then push it down into the water. Then pour the rest of the way up the hill to connect into the remaining slab.

Did that answer everything! Ha!

Sincerely,

<image004.png>

Keith Henderson
Fisheries Development Coordinator
Wildlife & Freshwater Fisheries
64 N. Union St., Suite 551
Montgomery, Ala. 36130
Office: (334)-353-7485
Cell: (334)-850-4206
Fax: (334)-242-2061
<image005.jpg>

From: Colin Dinken <Colin.Dinken@Kleinschmidtgroup.com>
Sent: Tuesday, October 27, 2020 2:23 PM
To: Henderson, Keith <Keith.Henderson@dcnr.alabama.gov>
Subject: RE: Lonnie White ramp

I was thinking I had Lonnie White and Swagg confused because it looks like a bunch of people have been using Lonnie but only a few have been using Swagg. Swagg's ramp looks like it ends right at the water's edge during low pool. I'm not sure if the fella pictured just can't back a trailer straight or if he needs to launch that way.
<image001.jpg>
<image002.jpg>

From: Colin Dinken
Sent: Tuesday, October 27, 2020 1:41 PM
To: Henderson, Keith <Keith.Henderson@dcnr.alabama.gov>
Subject: RE: Lonnie White ramp

Ahh I see. I was wondering because on aerial imagery it looks like folks have been using it at low pool, but I guess they've just been backing off the edge of the slab or launching shorter boats. When are those changes supposed to be finished? And just out of curiosity, how do they extend the ramp out 15' without drawing the reservoir down below winter pool? Thanks!

From: Henderson, Keith <Keith.Henderson@dcnr.alabama.gov>
Sent: Tuesday, October 27, 2020 12:41 PM
To: Colin Dinken <Colin.Dinken@Kleinschmidtgroup.com>
Subject: Re: Lonnie White ramp

I think it will be about 15' longer than what it was and some of the launching slab is being replaced in the process.

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From: Henderson, Keith <Keith.Henderson@dcnr.alabama.gov>
Sent: Tuesday, October 27, 2020 12:39:32 PM
To: Colin Dinken <Colin.Dinken@Kleinschmidtgroup.com>
Subject: Re: Lonnie White ramp

We are extending to ramp to make it usable year round.

KH

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From: Colin Dinken <Colin.Dinken@Kleinschmidtgroup.com>
Sent: Monday, October 26, 2020 12:42:06 PM
To: Henderson, Keith <Keith.Henderson@dcnr.alabama.gov>
Subject: Lonnie White ramp

Hey man,

Do you have any specific info on the types of repairs being made to the Lonnie White boat ramp on Harris? It was briefly mentioned during that HAT 5 meeting the other week, but I can't recall anything specific. Thanks!

-Colin

Colin Dinken
Associate Scientist
<image003.gif>
Office: 205-588-4613
www.KleinschmidtGroup.com

HAT 1 Meeting - March 18th

APC Harris Relicensing <g2apchr@southernco.com>

Wed 3/3/2021 9:19 PM

To: APC Harris Relicensing <harrisrelicensing@southernco.com>
Bcc: damon.abernethy@dcnr.alabama.gov <damon.abernethy@dcnr.alabama.gov>; nathan.aycock@dcnr.alabama.gov <nathan.aycock@dcnr.alabama.gov>; steve.bryant@dcnr.alabama.gov <steve.bryant@dcnr.alabama.gov>; todd.fobian@dcnr.alabama.gov <todd.fobian@dcnr.alabama.gov>; chris.greene@dcnr.alabama.gov <chris.greene@dcnr.alabama.gov>; keith.henderson@dcnr.alabama.gov <keith.henderson@dcnr.alabama.gov>; mike.holley@dcnr.alabama.gov <mike.holley@dcnr.alabama.gov>; evan.lawrence@dcnr.alabama.gov <evan.lawrence@dcnr.alabama.gov>; matthew.marshall@dcnr.alabama.gov <matthew.marshall@dcnr.alabama.gov>; brian.atkins@adeca.alabama.gov <brian.atkins@adeca.alabama.gov>; tom.littlepage@adeca.alabama.gov <tom.littlepage@adeca.alabama.gov>; jhaslbauer@adem.alabama.gov <jhaslbauer@adem.alabama.gov>; cljohnson@adem.alabama.gov <cljohnson@adem.alabama.gov>; mlen@adem.alabama.gov <mlen@adem.alabama.gov>; fal@adem.alabama.gov <fal@adem.alabama.gov>; djmoore@adem.alabama.gov <djmoore@adem.alabama.gov>; arsegars@southernco.com <arsegars@southernco.com>; dkanders@southernco.com <dkanders@southernco.com>; wtanders@southernco.com <wtanders@southernco.com>; jefbaker@southernco.com <jefbaker@southernco.com>

HAT 1,

We will have a HAT 1 meeting on **March 18th** from 9:00-3:00 (Central Time) in order to review the results of the Phase 2 analyses of both the Operating Curve Change Feasibility and Downstream Release Alternatives Studies. The agenda and Teams meeting information is below. Let me know if you have any questions.

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

-
Agenda

9:00-11:00 Review results of Downstream Release Alternatives Phase 2 analysis

11:00-1:00 Break for lunch

1:00-3:00 Review results of Operating Curve Change Feasibility Phase 2 analysis

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Meeting Postponed

APC Harris Relicensing <g2apchr@southernco.com>

Wed 3/17/2021 2:44 PM

To: APC Harris Relicensing <harrisrelicensing@southernco.com>
Bcc: damon.abernethy@dcnr.alabama.gov <damon.abernethy@dcnr.alabama.gov>; nathan.aycock@dcnr.alabama.gov <nathan.aycock@dcnr.alabama.gov>; steve.bryant@dcnr.alabama.gov <steve.bryant@dcnr.alabama.gov>; todd.fobian@dcnr.alabama.gov <todd.fobian@dcnr.alabama.gov>; chris.greene@dcnr.alabama.gov <chris.greene@dcnr.alabama.gov>; keith.henderson@dcnr.alabama.gov <keith.henderson@dcnr.alabama.gov>; mike.holley@dcnr.alabama.gov <mike.holley@dcnr.alabama.gov>; evan.lawrence@dcnr.alabama.gov <evan.lawrence@dcnr.alabama.gov>; matthew.marshall@dcnr.alabama.gov <matthew.marshall@dcnr.alabama.gov>; brian.atkins@adeca.alabama.gov <brian.atkins@adeca.alabama.gov>; tom.littlepage@adeca.alabama.gov <tom.littlepage@adeca.alabama.gov>; jhaslbauer@adem.alabama.gov <jhaslbauer@adem.alabama.gov>; cljohnson@adem.alabama.gov <cljohnson@adem.alabama.gov>; mlen@adem.alabama.gov <mlen@adem.alabama.gov>; fal@adem.alabama.gov <fal@adem.alabama.gov>; djmoore@adem.alabama.gov <djmoore@adem.alabama.gov>; arsegars@southernco.com <arsegars@southernco.com>; dkanders@southernco.com <dkanders@southernco.com>; wtanders@southernco.com <wtanders@southernco.com>; jefbaker@southernco.com <jefbaker@southernco.com>

HAT 1,

Given the severe weather forecast for most of the southeast today and throughout tonight and the uncertainty in what the impact may be and how many of us may be without power, we have decided to postpone tomorrow's HAT 1 meeting until **Thursday, April 1** from 9:00-3:00 (Central Time). The agenda will be the same.

I apologize for any inconvenience. Please be weather aware and stay safe!

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

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Phone Conference ID: 740 663 097#

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APC Harris Relicensing

From: APC Harris Relicensing
Sent: Wednesday, March 17, 2021 1:23 PM
To: Barry Morris
Subject: RE: Meeting Postponed

Hi Barry,

You're right that the study report won't be ready prior to the April 1 meeting. We have quite a bit that we're working on wrapping up right now in order to meet the April 12 Updated Study Report filing. We will file the full report on that date.

We have been working with Southern Company in-house battery experts to answer the BESS questions, including capital and O&M costs and how the battery would be charged, and will file that info on April 12th as well.

Stay safe today!

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From: Barry Morris <rbmorris222@gmail.com>
Sent: Wednesday, March 17, 2021 11:45 AM
To: APC Harris Relicensing <g2apchr@southernco.com>
Subject: Re: Meeting Postponed

Angie: Barry Morris with the Lake Wedowee Property Owners Association. Too bad about the postponement. Is it safe to conclude that the HAT 1 Operations Phase 2 Study results will not be available until the April 1 meeting? I'd love to get a pre-read.

Also, it seems to me that installing a 60MW battery won't fix anything unless the company has a way to charge it from a source other than generating from the dam. Maybe charging it overnight with excess steam plant capacity? Dare I ask the cost and cycles/lifespan of a 60MW battery? These are rhetorical questions. Don't worry about having one of the experts give a detailed reply. I'm sure it will be covered in the meeting.

See you (sort of) on April Fools day. Barry

On Wed, Mar 17, 2021 at 9:44 AM APC Harris Relicensing <g2apchr@southernco.com> wrote:

> HAT 1,
>
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APC Harris Relicensing

From: Anderegg, Angela Segars
Sent: Monday, March 29, 2021 1:09 PM
To: APC Harris Relicensing
Subject: HAT 1 Meeting - April 1st

HAT 1,

The presentations we will be walking through this Thursday in our HAT 1 meeting are on the relicensing website in the HAT 1 folder: HAT 1 - Project Operations - All Documents (harrisrelicensing.com). Agenda and Teams meeting info is below.

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

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Phone Conference ID: 740 663 097#
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From: APC Harris Relicensing
Sent: Wednesday, March 17, 2021 9:45 AM
To: APC Harris Relicensing <harrisrelicensing@southernco.com>
Subject: Meeting Postponed

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Thanks,

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(205)257-2251
arsegars@southernco.com

RE: Harris Relicensing - Updated Study Report

Anderegg, Angela Segars <ARSEGARS@southernco.com>

Mon 4/12/2021 6:52 PM

To: APC Harris Relicensing <g2apchr@southernco.com>
Bcc: 1942jthompson420@gmail.com <1942jthompson420@gmail.com>; 9sling@charter.net <9sling@charter.net>; abnoel@southernco.com <abnoel@southernco.com>; allan.creamer@ferc.gov <allan.creamer@ferc.gov>; alpeeple@southernco.com <alpeeple@southernco.com>; amanda.mcbride@ahc.alabama.gov <amanda.mcbride@ahc.alabama.gov>; amccartn@blm.gov <amccartn@blm.gov>; ammcvica@southernco.com <ammcvica@southernco.com>; amy.silvano@dcnr.alabama.gov <amy.silvano@dcnr.alabama.gov>; andrew.nix@dcnr.alabama.gov <andrew.nix@dcnr.alabama.gov>; arsegars@southernco.com <arsegars@southernco.com>; athall@fujifilm.com <athall@fujifilm.com>; aubie84@yahoo.com <aubie84@yahoo.com>; awhorton@corblu.com <awhorton@corblu.com>; bart_roby@msn.com <bart_roby@msn.com>; baxterchip@yahoo.com <baxterchip@yahoo.com>; bboozer6@gmail.com <bboozer6@gmail.com>; bdavis081942@gmail.com <bdavis081942@gmail.com>; beckyrainwater1@yahoo.com <beckyrainwater1@yahoo.com>; bill_pearson@fws.gov <bill_pearson@fws.gov>; blacklake20@gmail.com <blacklake20@gmail.com>; blm_es_inquiries@blm.gov <blm_es_inquiries@blm.gov>; bob.stone@smimail.net <bob.stone@smimail.net>; bradandsue795@gmail.com <bradandsue795@gmail.com>; bradfordt71@gmail.com <bradfordt71@gmail.com>; brian.atkins@adeca.alabama.gov <brian.atkins@adeca.alabama.gov>; bruce.bradford@forestry.alabama.gov <bruce.bradford@forestry.alabama.gov>; bruce@bruceknapp.com <bruce@bruceknapp.com>; bsmith0253@gmail.com <bsmith0253@gmail.com>; btseale@southernco.com <btseale@southernco.com>; butchjackson60@gmail.com <butchjackson60@gmail.com>; bwhaley@randolphcountyeda.com <bwhaley@randolphcountyeda.com>; carolbuggknight@hotmail.com <carolbuggknight@hotmail.com>; celestine.bryant@actribe.org <celestine.bryant@actribe.org>; cengstrom@centurytel.net <cengstrom@centurytel.net>; cggoodma@southernco.com <cggoodma@southernco.com>; cgnav@uscg.mil <cgnav@uscg.mil>; chandlermary937@gmail.com <chandlermary937@gmail.com>; chiefknight2002@yahoo.com <chiefknight2002@yahoo.com>; chimneycove@gmail.com <chimneycove@gmail.com>; 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harry.merrill47@gmail.com <harry.merrill47@gmail.com>; helen.greer@att.net <helen.greer@att.net>; holliman.daniel@epa.gov <holliman.daniel@epa.gov>; info@aeconline.org <info@aeconline.org>; info@tunica.org <info@tunica.org>; inspector_003@yahoo.com <inspector_003@yahoo.com>; irapar@centurytel.net

<irapar@centurytel.net>; irwiner@auburn.edu <irwiner@auburn.edu>; j35sullivan@blm.gov <j35sullivan@blm.gov>;
jabeason@southernco.com <jabeason@southernco.com>; james.e.hathorn.jr@sam.usace.army.mil
<james.e.hathorn.jr@sam.usace.army.mil>; jason.moak@kleinschmidtgroup.com <jason.moak@kleinschmidtgroup.com>;
jcandler7@yahoo.com <jcandler7@yahoo.com>; jcarlee@southernco.com <jcarlee@southernco.com>; jec22641@aol.com
<jec22641@aol.com>; jeddins@achp.gov <jeddins@achp.gov>; jefbaker@southernco.com <jefbaker@southernco.com>;
jeff_duncan@nps.gov <jeff_duncan@nps.gov>; jeff_powell@fws.gov <jeff_powell@fws.gov>;
jennifer.l.jacobson@usace.army.mil <jennifer.l.jacobson@usace.army.mil>; jennifer_grunewald@fws.gov
<jennifer_grunewald@fws.gov>; jerrelshell@gmail.com <jerrelshell@gmail.com>; jessecunningham@msn.com
<jessecunningham@msn.com>; jfcrew@southernco.com <jfcrew@southernco.com>; jhancock@balch.com
<jhancock@balch.com>; jharjo@alabama-quassarte.org <jharjo@alabama-quassarte.org>; jhaslbauer@adem.alabama.gov
<jhaslbauer@adem.alabama.gov>; jhouser@osiny.org <jhouser@osiny.org>; jkwdurham@gmail.com
<jkwdurham@gmail.com>; jnyerby@southernco.com <jnyerby@southernco.com>; joan.e.zehrt@usace.army.mil
<joan.e.zehrt@usace.army.mil>; john.free@psc.alabama.gov <john.free@psc.alabama.gov>; johndiane@sbcglobal.net
<johndiane@sbcglobal.net>; jonas.white@usace.army.mil <jonas.white@usace.army.mil>; josh.benefield@forestry.alabama.gov
<josh.benefield@forestry.alabama.gov>; jpsparrow@att.net <jpsparrow@att.net>; jsrasber@southernco.com
<jsrasber@southernco.com>; jthacker@southernco.com <jthacker@southernco.com>; jthroneberry@tnc.org
<jthroneberry@tnc.org>; judymcrealtor@gmail.com <judymcrealtor@gmail.com>; jwest@alabamarivers.org
<jwest@alabamarivers.org>; kajumba.ntale@epa.gov <kajumba.ntale@epa.gov>; karen.brunso@chickasaw.net
<karen.brunso@chickasaw.net>; kcarleton@choctaw.org <kcarleton@choctaw.org>; kechandl@southernco.com
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<kenbarnes01@yahoo.com>; kenneth.boswell@adeca.alabama.gov <kenneth.boswell@adeca.alabama.gov>;
kmhunt@maxxsouth.net <kmhunt@maxxsouth.net>; kmo0025@auburn.edu <kmo0025@auburn.edu>;
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Corrected Harris relicensing link

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From: APC Harris Relicensing
Sent: Monday, April 12, 2021 1:47 PM
To: APC Harris Relicensing <harrisrelicensing@southernco.com>
Subject: Harris Relicensing - Updated Study Report

Harris relicensing stakeholders,

Pursuant to FERC's Integrated Licensing Process, Alabama Power filed its Harris Project Updated Study Report (USR) today. Concurrent with the USR filing, Alabama Power filed three draft study reports, four final study reports and the results of a Botanical Inventory at Flat Rock Park. Stakeholders may access the USR and the study reports on FERC's website (http://www.ferc.gov) by going to the "eLibrary" link and entering the docket number (P-2628). The USR and study reports are also available on the Project relicensing website at www.harrisrelicensing.com.

The Updated Study Report meeting will be held on **April 27, 2021**. Please hold this date from 9:00 am to 12:00 pm central time. Call in information for the meeting can be found below. The purpose of the meeting is to provide an opportunity to review the contents of the USR.

Alabama Power will file a summary of the USR meeting by **May 12, 2021**. Stakeholders will have until **June 11, 2021** to file written comments with FERC on the USR Meeting Summary.

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

Microsoft Teams meeting

Join on your computer or mobile app

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Alabama Power

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Birmingham, AL 35203
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April 12, 2021

VIA ELECTRONIC FILING

Project No. 2628-065
R.L. Harris Hydroelectric Project
Transmittal of the Updated Study Report

Ms. Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street NE
Washington, DC 20426

Dear Secretary Bose,

Alabama Power Company (Alabama Power) is the Federal Energy Regulatory Commission (FERC or Commission) licensee for the R.L. Harris Hydroelectric Project (Harris Project) (FERC No. 2628-065). On April 12, 2019, FERC issued its Study Plan Determination[1] (SPD) for the Harris Project, approving Alabama Power's ten relicensing studies with FERC modifications. On May 13, 2019, Alabama Power filed Final Study Plans to incorporate FERC's modifications and posted the Final Study Plans on the Harris relicensing website at www.harrisrelicensing.com. In the Final Study Plans, Alabama Power proposed a schedule for each study that included filing a voluntary Progress Update in October 2019[2] and October 2020[3].

Pursuant to the Commission's Integrated Licensing Process (ILP) and 18 CFR § 5.15(f), Alabama Power is filing the Harris Project Updated Study Report (USR) (Attachment 1). The enclosed USR describes Alabama Power's overall progress in implementing the study plans, and summarizes the data collected and any variances from the study plan and schedule.

Concurrent with this USR filing, Alabama Power is filing:

- **Draft** *Downstream Release Alternatives Phase 2 Study Report*
- **Draft** *Operating Curve Change Feasibility Analysis Phase 2 Study Report*
- **Final** *Aquatic Resources Study Report*
- **Final** *Downstream Aquatic Habitat Study Report*
- **Final** *Erosion and Sedimentation Study Report*
- **Final** *Water Quality Study Report*
- A Botanical Inventory of a 35-Acre Parcel at Flat Rock Park, Blake's Ferry, Alabama

[1] Accession No 20190412-3000.
[2] Accession No 20191030-5053.
[3] Accession No 20201030-5215.

- **Draft** *Battery Energy Storage System at R.L. Harris Project Report*

Alabama Power is reporting the following variance to schedule/methods for the following studies:

- Operating Curve Change Feasibility Analysis Phase 2 Study - While use of historic photos from Lake Harris was mentioned in the Study Plan, photos could not be used to assess the effects of the winter pool alternatives due to the limited resolution of publicly available historical photos needed to assess individual erosion areas. In addition, Alabama Power provided qualitative information (rather than quantitative information noted in the Study Plan) regarding cultural resources on Lake Harris as the analysis of cultural resources is ongoing.

- Battery Energy Storage System (BESS) Study - FERC did not request a study plan for the BESS Study but provided recommendations for the type of analysis FERC expected Alabama Power to complete. Alabama Power evaluated the BESS separately from the other downstream release alternatives and results of the analysis are presented in a separate report, rather than included in the Downstream Release Alternatives Study.

- Erosion and Sedimentation Study - Alabama Power provided the results of the *Nuisance Aquatic Vegetation Survey Report* in Appendix F of the final report rather than providing to HAT 3 in the form of a technical memorandum.

- Aquatic Resources Study - Auburn University did not use the 30+2 sampling method as it was determined in the field to not be feasible/effective for sampling the sites and instead, shallow areas were sampled using boat and barge electrofishing equipment, which were found to be effective in sampling shallow areas within the study sites. The boat method used was a modification of the recently developed non-wadeable index of biological integrity (IBI). Sampling intensity was modified to accommodate available habitat, sampling frequency, and therefore IBI scores were not calculated.

- Cultural Resources Programmatic Agreement and Historic Properties Management Plan Study - A schedule variance occurred for completing the TCP identification process with the Muscogee (Creek) Nation in April 2021 (rather than February 2021 as noted in the Study Plan).

Pursuant to 18 CFR §5.15(f), Alabama Power will host the Updated Study Report Meeting (Meeting) with stakeholders and FERC on April 27, 2021 by conference call. The Meeting will begin at 9 AM central and conclude by 12 PM central. The purpose of the Meeting is to provide an opportunity to review the contents of the USR.

Alabama Power will file the Updated Study Report Meeting Summary by May 12, 2021. Stakeholders will have until June 11, 2021, to file written comments with FERC on the USR Meeting Summary. All comments must adhere to FERC regulations at 18 CFR Section 5.15 (c)(2)-(7). All Harris studies have been completed and a proposal for new information gathering or studies is subject to paragraph (e) of Section 5.15 except that the proponent must demonstrate extraordinary circumstances warranting approval. Stakeholders may access the USR and the individual study reports on FERC's website (http://www.ferc.gov) by going to the "eLibrary" link and entering the docket number (P-2628). The USR and study reports are also available on the Project relicensing website at https://harrisrelicensing.com.

If there are any questions concerning this filing, please contact me at arsegars@southernco.com or 205-257-2251.

Sincerely,

Angela Anderegg

Angie Anderegg
Harris Relicensing Project Manager

Attachment – Updated Study Report

cc: Harris Stakeholder List

Attachment
Updated Study Report

Updated Study Report

R.L. Harris Hydroelectric Project

FERC No. 2628

Prepared for:

Alabama Power Company

Prepared by:

Kleinschmidt Associates

April 2021

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1.0 INTRODUCTION

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

The following Project terms will have these meanings throughout this Updated Study Report (USR):

[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).

- Lake Harris refers to the 9,870-acre reservoir, the 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.

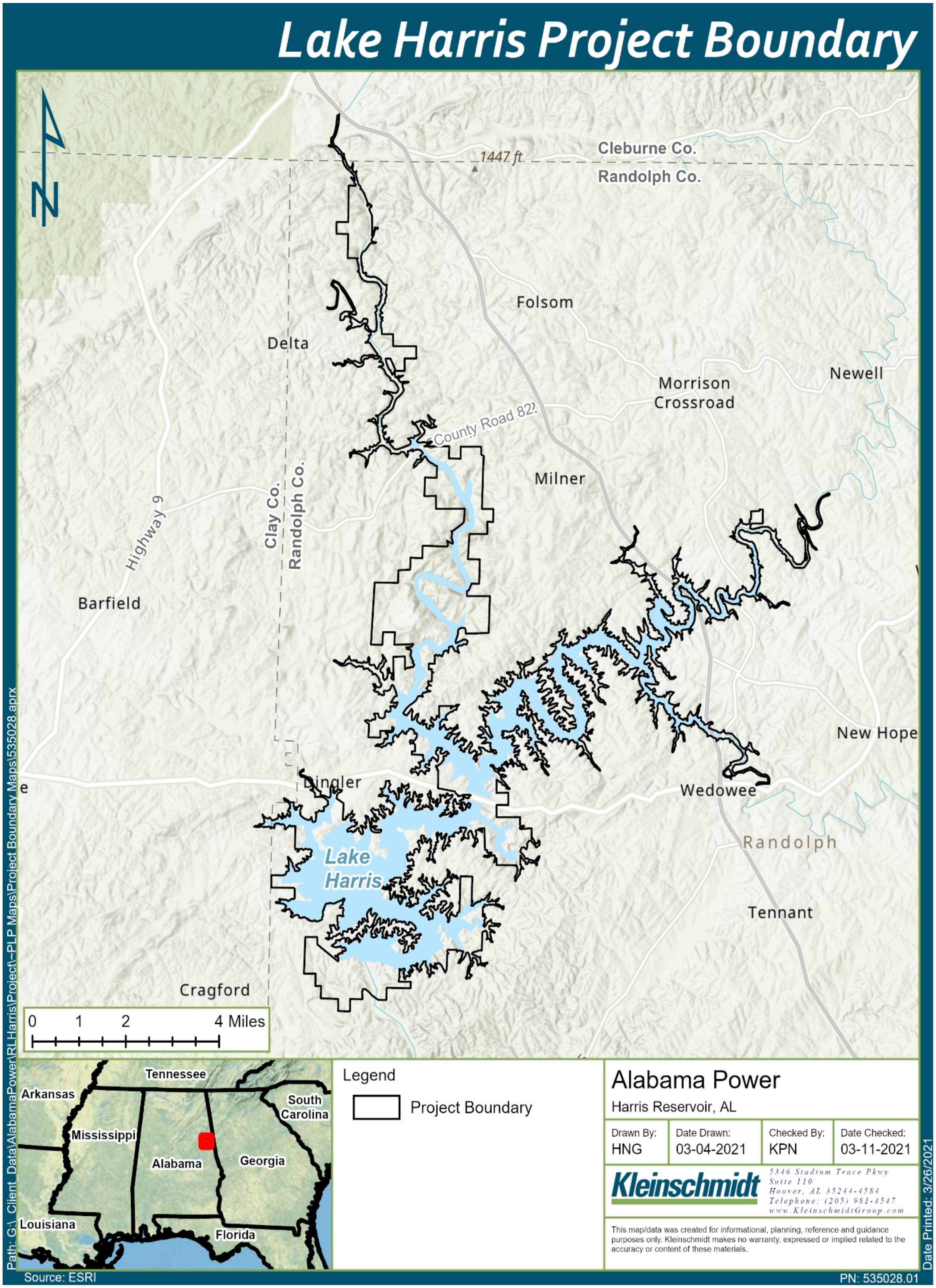

Figure 1 Lake Harris Project Boundary

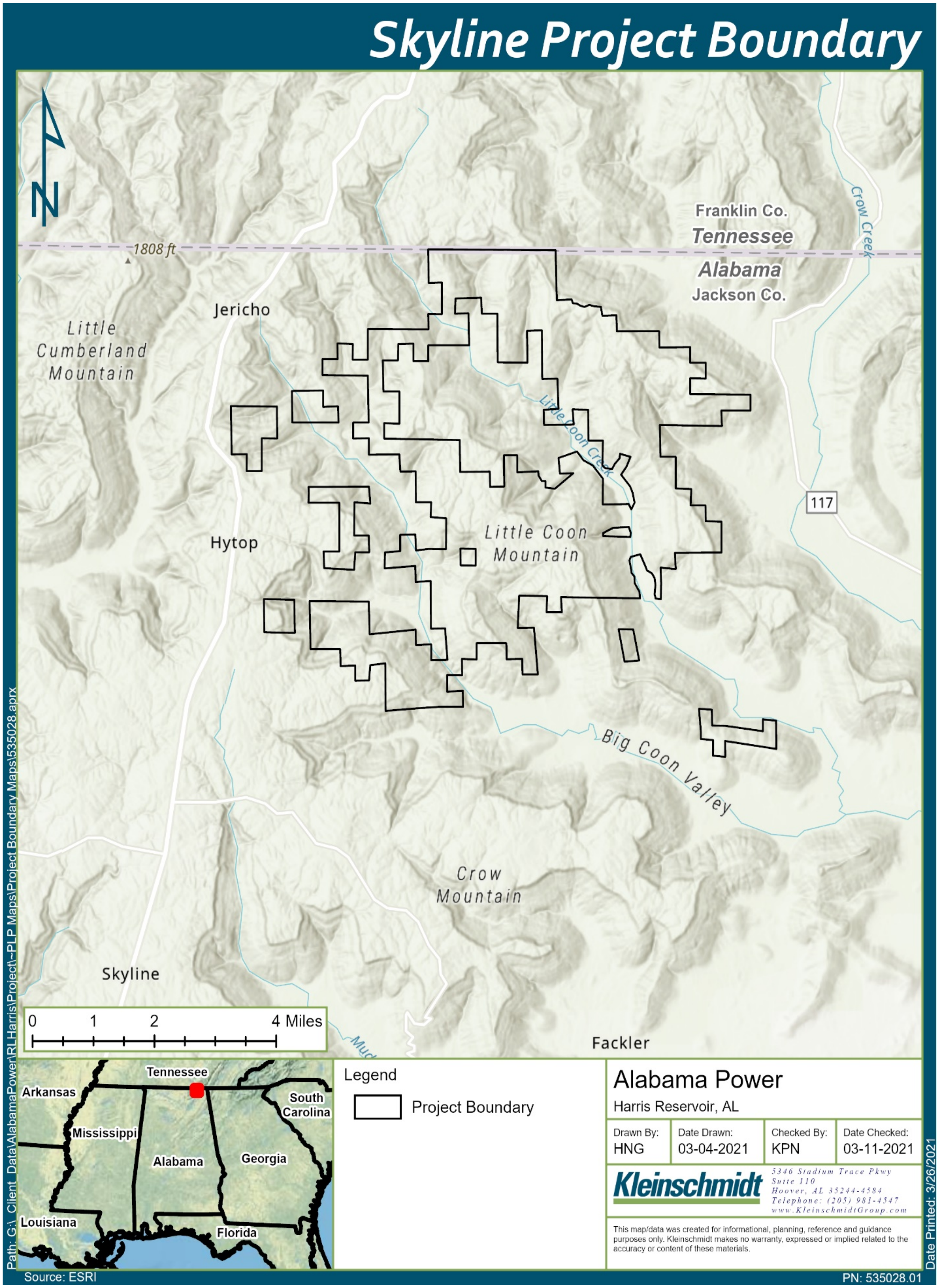

Figure 2 Skyline Project Boundary

2.0 HARRIS STUDY PLAN PROCESS OVERVIEW

During the October 19, 2017 Issue Identification Workshop, stakeholders provided information on resources that may be affected by the Harris Project. On August 28 and 29, 2018, FERC held Harris Project Scoping Meetings[2] to provide additional opportunities for stakeholders and the public to present and discuss any issues related to the Harris Project relicensing. On November 13, 2018, Alabama Power filed the following 10 proposed study plans for the Harris Project.

- Operating Curve Change Feasibility Analysis Study
- Downstream Release Alternatives Study
- Erosion and Sedimentation Study
- Water Quality Study
- Aquatic Resources Study
- Downstream Aquatic Habitat Study
- Threatened and Endangered Species Study
- Project Lands Evaluation Study
- Recreation Evaluation Study
- Cultural Resources Programmatic Agreement and Historic Properties Management Plan Study

Based on comments filed by stakeholders, Alabama Power filed revised study plans on March 13, 2019[3]. FERC issued a Study Plan Determination (SPD)[4] on April 12, 2019, which approved Alabama Power's study plans and included FERC staff recommendations. Alabama Power incorporated FERC's recommendations and filed the Final Study Plans with FERC on May 13, 2019[5].

Alabama Power formed the Harris Action Teams (HATs) to provide stakeholders an opportunity to work on the issues of most importance to them and, in the case of federal and state agencies, those issues where it has regulatory or statutory responsibility. The HATs include:

[2] Accession Nos. 20181010-4002 and 20181010-4003
[3] Accession No. 20190313-5060
[4] Accession No. 20190412-3000
[5] Accession No. 20190513-5093

- HAT 1 – Project Operations
- HAT 2 – Water Quality and Use
- HAT 3 – Fish and Wildlife
- HAT 4 – Project Lands
- HAT 5 – Recreation
- HAT 6 – Cultural Resources

The HATs met throughout 2018, 2019, 2020, and into 2021 to discuss the various studies. All HAT meetings from April 2020 to present were held virtually due to Coronavirus 2019 (COVID-19) and related travel and public gathering restrictions.

On April 10, 2020, Alabama Power filed six of the ten draft study reports and two cultural resources documents concurrently with the Initial Study Report (ISR), which included the consultation record for each of these six reports and cultural resource documents. On August 10, 2020, FERC sent a letter to Alabama Power discussing the Determination on Requests for Study Modifications for the R.L. Harris Hydroelectric Project [6], recommending an additional study on a Battery Energy Storage System (BESS).

The following provides a chronological account of all Draft and Final Study Reports as well as Progress Reports filed with FERC since the ISR filing on April 10, 2020.

- **Final** *Area of Potential Effects Report* on June 29, 2020[7]
- **Draft** *Downstream Aquatic Habitat Study Report* on June 30, 2020[8],
- **Final** *Downstream Release Alternatives Phase 1 Study Report* on July 27, 2020[9];
- **Draft** *Aquatic Resources Study Report* on July 28, 2020[10],
- **Draft** *Recreation Evaluation Study Report on* August 24, 2020[11].
- **Final** *Operating Curve Change Feasibility Analysis Phase 1 Study Report* on August 31, 2020[12];
- **Final** *Phase 1 Project Lands Evaluation Study Report* on October 2, 2020[13];

[6] Accession No. 20200810-3007
[7] Accession No. 20200629-5328
[8] Accession No. 20200630-5200
[9] Accession No. 20200727-5088
[10] Accession No. 20200728-5120
[11] Accession No. 20200824-5241
[12] Accession No. 20200831-5339
[13] Accession No. 20201002-5139

- Voluntary Progress Report on October 30, 2020[14];
- **Final** *Recreation Evaluation Study Report* on November 24, 2020[15]; and
- **Final** *Threatened and Endangered Species Study Report* on January 29, 2021[16].

Concurrent with this USR filing and pursuant to FERC's SPD and Determination on Requests for Study Modifications, Alabama Power is filing two draft Phase 2 study reports, four final study reports, a botanical inventory report, and the BESS Report, as follows.

- **Draft** *Downstream Release Alternatives Phase 2 Study Report*
- **Draft** *Operating Curve Change Feasibility Analysis Phase 2 Study Report*
- **Final** *Aquatic Resources Study Report*
- **Final** *Downstream Aquatic Habitat Study Report*
- **Final** *Erosion and Sedimentation Study Report*
- **Final** *Water Quality Study Report*
- A Botanical Inventory of a 35-Acre Parcel at Flat Rock Park, Blake's Ferry, Alabama
- **Draft** *Battery Energy Storage System at R.L. Harris Project Report*

The draft and final study reports include HAT meeting summaries and presentations, and documentation of consultation between April 2019 [17] through March 2021. Alabama Power will hold an USR meeting on April 27, 2021 and will file the meeting summary with FERC on May 12, 2021. Stakeholders may submit to Alabama Power and FERC by June 11, 2021, any disagreement concerning the USR meeting summary, and/or any modifications to any on-going studies or proposal to gather new information (18 Code of Federal Regulations (CFR), Section 5.15 (f)).

Sections 3.0 through 13.0 of this USR summarize the 11 FERC-approved studies in accordance with 18 CFR, Section 5.15, including 1) overall study progress, including data collected; 2) any variance from the FERC SPD and schedule; and 3) remaining activities and any modifications to the existing study or new studies proposed by Alabama Power.

[14] Accession No 20201030-5215
[15] Accession No. 20201124-5182
[16] Accession No. 20210129-5393
[17] Consultation records on some studies predate April 2019; the BESS consultation record begins April 2020 through March 2021.

3.0 OPERATING CURVE CHANGE FEASIBILITY ANALYSIS STUDY

3.1 Study Progress and Data Collection Summary

In accordance with the FERC-approved Study Plan, the evaluation of the winter pool alternatives were completed in two phases. Alabama Power filed the Draft *Operating Curve Change Feasibility Phase 1 Study Report* on April 10, 2020[18]. Alabama Power held a virtual HAT 1 meeting on June 4, 2020. Subsequently, FERC and the Alabama Department of Conservation and Natural Resources (ADCNR) submitted comments to Alabama Power on the Draft Phase 1 Study Report. As noted in Section 2.0, Alabama Power filed the Final *Operating Curve Change Feasibility Phase 1 Study Report* on August 31, 2020.

The Phase 1 Report described the hydrologic models (Hydrologic Engineering Center's River Analysis System [HEC-RAS] and Hydrologic Engineering Center's Reservoir System Simulation [HEC-ResSim]) developed for evaluating the winter pool alternatives (increasing the winter pool elevation in increments of 1 foot from 786 feet msl to 789 feet msl) and presented the results of the potential impacts of the alternatives on hydropower generation, flood control, navigation, drought operations, Green Plan (GP) flows, and downstream release alternatives. Due to timing of the development of the Phase 1 Report, Alabama Power included only the Pre-Green Plan (PGP), GP, and a 150 cubic feet per second (cfs) continuous minimum flow (CMF) in the Phase 1 Report. Shortly after Alabama Power finalized the Phase 1 Report, FERC required Alabama Power to evaluate additional downstream release alternatives. Alabama Power included the analysis of the impacts of raising the winter operating curve on the ability to pass the additional downstream release alternatives in the Draft *Operating Curve Change Feasibility Analysis Phase 2 Study Report*.

Alabama Power used the information in the Final Phase 1 Study Report along with FERC-approved relicensing study results and existing information to conduct the Phase 2 analysis to determine potential resource impacts on water quality, water use, erosion, sedimentation (including invasive species), aquatic resources, wildlife, threatened and endangered (T&E) species, terrestrial wetlands, recreation resources, downstream structures, and cultural resources. The Draft *Operating Curve Change Feasibility Analysis Phase 2 Study Report* provides the detailed methodology used to evaluate impacts on Project resources and accompanying results. Additional analyses were conducted using data from existing sources and the relicensing studies.

---

[18] Accession No. 20200410-5086

Alabama Power held a HAT 1 meeting on April 1, 2021, to review the results of the Phase 2 analysis with stakeholders and is filing the Draft *Operating Curve Change Feasibility Analysis Phase 2 Study Report* concurrently with the USR.

3.2 Variance from the Study Plan and Schedule

Alabama Power conducted the Operating Curve Change Feasibility Analysis Phase 2 Study in accordance with the methods and schedule described in the FERC SPD with the following variances:

- While use of historic photos from Lake Harris was mentioned in the Study Plan, photos could not be used to assess the effects of the winter pool alternatives due to the limited resolution of publicly available historical photos needed to assess individual erosion areas.
- Alabama Power provided qualitative information (rather than quantitative information noted in the Study Plan) regarding cultural resources on Lake Harris as the analysis of cultural resources is ongoing.

3.3 Remaining Activities/Modifications or Other Proposed Studies

Phase 2 analyses are complete. Alabama Power does not propose any additional operating curve change studies beyond those in the FERC SPD.

Remaining activities include:

- Review comments on the Draft *Operating Curve Change Feasibility Analysis Phase 2 Study Report* and modify the Final Report, as appropriate. The Final Report will be filed with the Final License Application (FLA).
- Alabama Power will present its operating proposal and protection, mitigation, and enhancement (PME) measures in the Preliminary Licensing Proposal (PLP), which will be filed by July 3, 2021.

4.0 DOWNSTREAM RELEASE ALTERNATIVES STUDY

4.1 Study Progress and Data Collection Summary

In accordance with the FERC-approved Study Plan, the evaluation of the downstream release alternatives was completed in two phases. In Phase 1, study methods included using existing data (hydrologic record and baseline information) to develop the appropriate simulation models to conduct the analysis of the following downstream release alternatives:

- GP (baseline or existing condition)
- PGP
- 150CMF

The primary tool for this study was the HEC-River Analysis System (HEC-RAS); however, Alabama Power used other HEC models to address the effects of downstream release alternatives. For example, effects to Harris Reservoir in Phase 2 were evaluated by modeling the current operations combined with each downstream release alternative through the daily HEC-Reservoir Simulation Model (HEC Res-Sim) for the ACT basin.

Alabama Power filed the Draft *Downstream Release Alternatives Phase 1 Study Report* on April 10, 2020[19]. Subsequently, FERC, the Alabama Rivers Alliance (ARA), ADCNR, and the U.S. Environmental Protection Agency (USEPA) submitted comments to Alabama Power on the Draft Phase 1 Study Report. As noted in Section 2.0, Alabama Power filed the Final *Downstream Release Alternatives Phase 1 Study Report* on July 27, 2020.

During Phase 2 of this study, the outflow hydrographs from HEC-ResSim were routed downstream using HEC-RAS to assess effects of the following downstream release alternatives on Project resources (water quality, water use, erosion and sedimentation, downstream aquatic resources [temperature and habitat], wildlife and terrestrial resources, T&E species, recreation, and cultural resources):

- GP
- PGP
- Modified Green Plan
- 150CMF
- 300CMF
- 600CMF

[19] Accession No. 20200410-5069

- 800CMF
- 150CMF+GP
- 300CMF+GP
- 600CMF+GP
- 800CMF+GP

Additional analyses in Phase 2 were conducted using data from existing sources and the relicensing studies. Due to timing of the development of the Phase 1 Report and the request to evaluate additional downstream alternatives, Alabama Power included impacts from all downstream release alternatives on existing operational parameters (reservoir levels, hydropower generation, flood control, navigation and drought operations) in the Phase 2 analysis. While the SPD notes the effects analysis ongoing from June 2020-November 2021, Alabama Power and Kleinschmidt have completed the analyses.

Alabama Power held a HAT 1 meeting on April 1, 2021 to review the results of the Phase 2 analysis with stakeholders and is filing the Draft *Downstream Release Alternatives Phase 2 Study Report* concurrently with the USR.

4.2 Variance from the Study Plan and Schedule

Alabama Power conducted the Downstream Release Alternatives Phase 2 Study in conformance with FERC's SPD. There are no variances from the study plan or schedule.

4.3 Remaining Activities/Modifications or Other Proposed Studies

Phase 2 analyses are complete. Alabama Power does not propose any downstream release alternative studies beyond those in the FERC SPD**.**

Remaining Activities include:

- Review comments on the Draft *Downstream Release Alternatives Study Phase 2 Report* and modify the Final Report, as appropriate. The Final Report will be filed with the FLA.
- Alabama Power will present its operating proposal and PME measures in the PLP, which will be filed by July 3, 2021.

5.0 BATTERY ENERGY STORAGE SYSTEM

5.1 Study Progress and Data Collection Summary

On August 10, 2020, FERC sent a letter to Alabama Power discussing the Determination on Requests for Study Modifications for the Project. In that letter, FERC recommended that Alabama Power conduct a BESS study. FERC recommended that the BESS study be conducted along with the Downstream Release Alternative Study and include at least two new release alternatives: (a) a 50 percent reduction in peak releases associated with installing one 60 MW battery unit, and (b) a proportionately smaller reduction in peak releases associated with installing a smaller MW battery unit (i.e., 5, 10 or 20 MW battery). FERC further recommended that Alabama Power include in its cost estimates for installing a BESS, any specific structural changes, any changes in turbine-generator units, and costs needed to implement each battery storage type. Finally, FERC recommended that, consistent with the Downstream Release Alternative Study Plan, Alabama Power evaluate how each of the release alternatives (i.e., items (a) and (b) above) would affect recreation and aquatic resources in the Harris Project reservoir and downstream of Harris Dam.

As discussed in the BESS report, Alabama Power does not consider installation of a BESS at the Harris Project as a reasonable alternative. The BESS study was conducted to provide FERC with the information needed to support its analysis. Although FERC recommended that these analyses be conducted as part of the Downstream Release Alternatives Study, Alabama Power determined that a separate analysis is more appropriate in that the BESS study is a screening level effort, requires a more detailed economic analysis, and considers the replacement and addition of generation equipment such as the replacement cost of a turbine and installation/replacement cost of batteries. Additionally, to model Project operations with peaking removed, the HEC-ResSim and HEC-RAS models would need to be redesigned to incorporate new operating rules. Defining new operating rules and redesigning the models is outside the scope of the study proposed by ARA and recommended by FERC. Alabama Power is filing the *Battery Energy Storage System Report* concurrently with the USR.

5.2 Variance from the Study Plan and Schedule

FERC did not request a study plan for the BESS Study but provided recommendations for the type of analysis FERC expected Alabama Power to complete. The BESS was evaluated separately from the other downstream release alternatives and results of the analysis are presented in a separate report.

5.3 Remaining Activities/Modifications or Other Proposed Studies

The BESS Study is complete. Alabama Power does not propose any additional BESS analysis beyond that recommended by FERC in its Determination on Requests for Study Modifications for the Project

Remaining Activities include:

- Review comments on the Draft *Battery Energy Storage System at R.L. Harris Project Report* and modify the Final Report, as appropriate. The Final Report will be filed with the FLA.

6.0 WATER QUALITY STUDY

6.1 Study Progress and Data Collection Summary

The Draft *Water Quality Study Report* was filed concurrently with the ISR on April 10, 2020[20]. Subsequently, the ADCNR, ARA, EPA, Alabama Department of Environmental Management (ADEM), and FERC submitted comments to Alabama Power on the Draft Study Report.

Alabama Power collected dissolved oxygen and temperature data at the generation monitor from June 1 to October 31, 2020 and at the continuous monitor from May 4 to October 31, 2020[21]. In addition, Alabama Power also collected monthly vertical profiles in the Harris Reservoir forebay from March to October 2020 and will continue collecting from March to October 2021. Alabama Power is continuing to collect water quality data at both downstream monitoring locations in 2021 (from March 1 – June 30, 2021 at the continuous monitor and June 1 – June 30, 2021 at the generation monitor) to include in the final license application.

Alabama Power is filing the *Final Water Quality Study Report* concurrently with the USR.

6.2 Variance from the Study Plan and Schedule

Alabama Power conducted the Water Quality Study in conformance with FERC's SPD. There are no variances from the study plan or schedule.[22]

6.3 Remaining Activities/Modifications or Other Proposed Studies

Alabama Power does not propose any additional water quality studies.

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[20] Accession No. 20200410-5095

[21] As noted in the ISR, Alabama Power also collected water quality data at 15-minute intervals at the generation monitor from June to October 2017-2019, and at the continuous monitor from March to October 2019.

[22] In the ISR, Alabama Power requested a variance to the approved Water Quality Study schedule to submit its Clean Water Act section 401 water quality certification to ADEM in April 2021, instead of as originally proposed in 2020. In the Determination on Study Modifications, FERC noted that Section 5.23(b) of the Commission's regulations requires the application for certification to be submitted to the certifying agency within 60 days of issuance of the Ready for Environmental Analysis notice, which will occur post-filing. Accordingly, a variance for submitting the certification application prior to filing the license application is not needed. As such, although a variance to the schedule does not need to be requested, Alabama Power notes that it plans to submit an application to ADEM for the 401 Water Qualification Certification (WQC) after the FLA is submitted in November 2021, not in April 2021 as noted in Alabama Power's ISR.

Remaining Activities include:

- Alabama Power will prepare the 401 WQC application and submit to ADEM after the FLA is filed with FERC.

7.0 EROSION AND SEDIMENTATION STUDY

7.1 Study Progress and Data Collection Summary

The Draft *Erosion and Sedimentation Study Report* was filed concurrently with the ISR on April 10, 2020[23]. Subsequently, the ADCNR, ARA, FERC and individual stakeholders submitted comments to Alabama Power on the Draft Study Report. Alabama Power is filing the Final *Erosion and Sedimentation Study Report* concurrently with the USR.

7.1.1 Lake Harris

Alabama Power performed additional reconnaissance at identified sedimentation sites on Lake Harris during full (summer) pool conditions to determine if any nuisance aquatic vegetation was present. Alabama Power provided the results of the nuisance aquatic vegetation assessment in Appendix F of the Final *Erosion and Sedimentation Study Report*.

7.1.2 Tallapoosa River Downstream of Harris Dam

No additional data were collected in the Tallapoosa River downstream of Harris Dam to complete the analyses presented in the Final *Erosion and Sedimentation Study Report*.

7.2 Variance from the Study Plan and Schedule

Alabama Power conducted the Erosion and Sedimentation Study in accordance with the methods **and schedule described in the FERC SPD except for the following variance:**

- Alabama Power provided the results of the Nuisance Aquatic Vegetation Survey Report in Appendix F of the Final Erosion and Sedimentation Study Report rather than providing to HAT 3 in the form of a technical memorandum.

7.3 Remaining Activities/Modifications or Other Proposed Studies

Alabama Power does not propose any additional erosion and sedimentation studies, and there are no remaining activities.

[23] Accession No. 20200410-5091

8.0 AQUATIC RESOURCES STUDY

8.1 Study Progress and Data Collection Summary

As noted in Section 2.0, Alabama Power filed the Draft *Aquatic Resources Study Report*, which included the aquatic resources desktop assessment, on July 28, 2020. Subsequently, the ADCNR, ARA, EPA, individual stakeholders, and FERC submitted comments to Alabama Power on the Draft Study Report. Alabama Power held HAT 3 meetings on June 2, 2020, November 5, 2020, and March 31, 2021.

Auburn University (Auburn) conducted a literature review of temperature requirements of target species (Redbreast Sunfish [*Lepomis auratus*], Channel Catfish [*Ictalurus punctatus*], Tallapoosa Bass [*Micropterus tallapoosae*], and Alabama Bass [*Micropterus henshalli*]). Auburn University obtained temperature data from the U.S. Geological Survey (USGS), Alabama Power monitors, and the 20 temperature level loggers stationed downstream of Harris Dam and consolidated these data with historical data. Auburn continued fish sampling through January 2021 and tagged and tracked fish with acoustic/radio (CART tags) during the summer of 2020. Auburn also conducted static respirometry tests and measured active metabolic rates using a combination of increasing water velocity and decreasing water temperature. Auburn incorporated the necessary physiological parameters into bioenergetics models to conduct simulations needed to test potential influence of water temperature and flow on specific growth rates of target fishes below Harris Dam. Auburn conducted growth simulations of Redbreast Sunfish using respiration rate parameters largely gathered from Bluegill, a closely-related species. Growth simulations could not be conducted for other target species due to one or more factors, such as low sample sizes for laboratory experiments, a lack of published models developed for riverine populations, or because parameters for other target species did not fit models developed for closely-related species.

Alabama Power is filing the Final *Aquatic Resources Study Report*, including Auburn's final bioenergetics report, concurrently with the USR.

8.2 Variance from the Study Plan and Schedule

Alabama Power conducted the Aquatic Resources Study in accordance with the methods and schedule described in the FERC SPD with the following variance:

- Auburn University did not use the 30+2 sampling method as it was determined in the field to not be feasible/effective for sampling the sites and instead, shallow areas were sampled using boat and barge electrofishing equipment, which were found to be effective in sampling shallow areas within the study sites. The boat method used was a modification of the recently developed non-wadeable index of biological integrity (IBI). Sampling intensity was modified to accommodate available habitat, sampling frequency, and therefore IBI scores were not calculated.

8.3 Remaining Activities/Modifications or Other Proposed Studies

Alabama Power does not propose any additional aquatic resources studies, and there are no remaining activities.

9.0 DOWNSTREAM AQUATIC HABITAT STUDY

9.1 Study Progress and Data Collection Summary

As noted in Section 2.0, Alabama Power filed the Draft *Downstream Aquatic Habitat Study Report* on June 30, 2020. Subsequently, the ADCNR and ARA submitted comments to Alabama Power on the Draft Study Report. Alabama Power held a virtual HAT 3 meeting on June 2, 2020, November 5, 2020, and March 31, 2021.

In reviewing the comments on the Draft *Downstream Aquatic Habitat Study Report*, Alabama Power determined that the primary purpose of this study was to examine effects on habitat only; therefore, in the final report, all previous data and references to temperature were removed and are now included in the Final *Aquatic Resources Study Report* and the Draft *Downstream Release Alternatives Phase 2 Study Report* consistent with that FERC-approved Study Plan.

Alabama Power continued collecting level logger data at 20 locations in the Tallapoosa River below Harris Dam through June 2020, which were incorporated into the analysis and subsequent final report.

Alabama Power is filing the Final *Downstream Aquatic Habitat Study Report* concurrently with the USR.

9.2 Variance from the Study Plan and Schedule

Alabama Power conducted the Downstream Aquatic Habitat Study in conformance with FERC's SPD. There are no variances from the study plan or schedule.

9.3 Remaining Activities/Modifications or Other Proposed Studies

Alabama Power does not propose any additional downstream aquatic habitat studies, and there are no remaining activities.

10.0 THREATENED AND ENDANGERED SPECIES STUDY

10.1 Study Progress and Data Collection Summary

The Draft *Threatened and Endangered Species Desktop Assessment* was filed concurrently with the ISR on April 10, 2020[24]. Subsequently, the U.S. Fish and Wildlife Service (USFWS), ADCNR, FERC, ARA, the Alabama Glade Conservation Association, and an individual stakeholder submitted comments and questions regarding the Draft Desktop Assessment. Alabama Power held a virtual HAT 3 meeting on June 2, 2020, November 5, 2020, and March 31, 2021.

Alabama Power completed field surveys at Lake Harris and Skyline to determine if T&E species are located within the Project Boundary. As noted in Section 2.0, Alabama Power filed the Final *Threatened and Endangered Species Study Report*, including the Desktop Assessment and the results of all field investigations, on January 29, 2021.

10.2 Variance from the Study Plan and Schedule

Alabama Power conducted the Threatened & Endangered Species Study in conformance with FERC's SPD. There are no variances from the study plan or schedule.

10.3 Remaining Activities/Modifications or Other Proposed Studies

Alabama Power does not propose any additional threatened and endangered species studies, and there are no remaining activities.

[24] Accession No. 20200410-5094

11.0 PROJECT LANDS EVALUATION STUDY

11.1 Study Progress and Data Collection Summary

The Draft *Phase 1 Project Lands Evaluation Study Report* was filed concurrently with the ISR on April 10, 2020[25]. Subsequently, the ADCNR and FERC submitted comments to Alabama Power on the Draft Study Report. As noted in Section 2.0, Alabama Power filed the Final *Phase 1 Project Lands Evaluation Study Report* on October 2, 2020. Alabama Power held a HAT 4 meeting on October 19, 2020, to present the Draft Shoreline Management Plan (SMP) and the Wildlife Management Plan (WMP) annotated outline.

Samford University conducted a botanical survey on an additional 35 acres of land adjacent to the previously surveyed area at Flat Rock Park. This additional botanical inventory report (*A Botanical Inventory of a 35-Acre Parcel at Flat Rock Park, Blake's Ferry, Alabama)* is being filed concurrently with the USR.

Phase 2 of this study is using the results of Phase 1 and other Harris relicensing studies to develop a WMP and a SMP. Specific activities for developing the SMP and WMP are included in the FERC-approved Study Plan.

11.2 Variance from the Study Plan and Schedule

Alabama Power conducted the Project Lands Evaluation in conformance with FERC's SPD. There are no variances from the study plan or schedule.

11.3 Remaining Activities/Modifications or other Proposed Studies

Alabama Power does not propose any additional land evaluation studies.

Remaining activities include:

- Alabama Power will file a WMP and SMP with the FLA.

[25] Accession No. 20200410-5092

12.0 RECREATION EVALUATION STUDY

12.1 Study Progress and Data Collection Summary

As noted in Section 2.0, Alabama Power filed the Draft *Recreation Evaluation Study Report* on August 24, 2020[26]. Subsequently, the ADCNR, ARA, Tim Coe (Mayor of Wedowee), Donna McKay (Mayor of Town of Wadley), Bob Fincher (State Representative 37th House District), individual stakeholders, and FERC submitted comments to Alabama Power on the Draft Study Report. Alabama Power held HAT 5 meetings on June 4, 2020 and October 19, 2020. As noted in Section 2.0, Alabama Power filed the Final *Recreation Evaluation Study Report* on November 24, 2020.

12.2 Variance from the Study Plan and Schedule

Alabama Power conducted the Recreation Evaluation Study in accordance with the methods and schedule described in the FERC SPD, including a variance that was approved by FERC on August 10, 2020.

12.3 Remaining Activities/Modifications or Other Proposed Studies

Alabama Power does not propose any additional recreation studies, and there are no remaining activities.

[26] This was noted as a schedule variance in the Initial Study Report due to the additional study elements and extended participation deadlines.

13.0 CULTURAL RESOURCES STUDY

13.1 Study Progress and Data Collection Summary

The Harris Project Cultural Resources *Programmatic Agreement and Historic Properties Management Plan* Study Plan involves collecting and summarizing existing cultural resources baseline information and developing a plan to assess cultural resources identified in the Harris Project Area of Potential Effect (APE). Alabama Power filed the *Inadvertent Discovery (IDP) Plan and Traditional Cultural Properties (TCP) Identification Plan* concurrent with the ISR on April 10, 2020[27]. Subsequently, stakeholders submitted comments to Alabama Power[28]. On May 15, 2020, Alabama Power provided the Draft *Area of Potential Effects Report* to HAT 6 for review. Alabama Power held a HAT 6 meeting on May 28, 2020 to discuss the APE report and the status of the TCP Identification study. Alabama Power filed the Final *Area of Potential Effects Report* on June 29, 2020[29]. On August 11, 2020, FERC issued its Determination of Area of Potential Effects for the Project[30]. Alabama Power held a virtual site visit of Skyline on March 4, 2021, for applicable tribes and the Alabama Historical Commission.

Alabama Power concluded cultural resources assessments for the sites identified during the Lake Harris preliminary archeological assessment in February 2021 and will complete the TCP identification process with the Muscogee (Creek) Nation in April 2021.

In addition to assessments on sites on Lake Harris, Alabama Power completed cultural resource assessments for Skyline. Further, as part of the Draft *Downstream Release Alternatives Phase 2 Study Report,* Alabama Power reviewed the effects of Project operations (including any proposed changes in downstream releases) to the known cultural resources downstream of Harris Dam[31].

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[27] Accession No. 20200410-5068
[28] The Draft TCP Identification Plan and IDP Plan were distributed to HAT 6 for comments in February 2020.
[29] This was noted as a schedule variance in the Initial Study Report.
[30] Accession No. 20200811-3007
[31] This was a desktop review and did not include cultural resource assessments as most of the cultural resources downstream are outside of Alabama Power's administrative area of control.

13.2 Variance from the Study Plan and Schedule

Alabama Power conducted the Cultural Resources Programmatic Agreement and Historic Properties Management Plan Study in conformance with FERC's SPD with the following variances:

- a variance for filing the Final *Area of Potential Effects Report* which was approved by FERC following the ISR.
- will complete the TCP identification process with the Muscogee (Creek) Nation in April 2021 (rather than February 2021 as noted in the Study Plan).

13.3 Remaining Activities/Modifications or Other Proposed Studies

Alabama Power does not propose any additional cultural studies.

Remaining Activities include:

- Alabama Power will complete eligibility assessments for known cultural resources by July 2021.
- Alabama Power will issue determination of effect on historic properties by July 2021.
- Alabama Power will develop a Draft Historic Properties Management Plan (HPMP) for the Harris Project to be filed concurrently with the PLP. The HPMP will describe the Harris Project, APE, anticipated effects, and Alabama Power's proposed measures to protect historic properties.

HAT 1 - Draft Operations Reports

APC Harris Relicensing <g2apchr@southernco.com>

Mon 4/12/2021 7:03 PM

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HAT 1,

The draft Operating Curve Feasibility Analysis Phase 2 Report, draft Downstream Release Alternatives Phase 2 Report and draft BESS Report are available for your review on the Harris relicensing website in the HAT 1 folder. These reports can also be found on FERC's website (http://www.ferc.gov) by going to the "elibrary" link and entering docket number P-2628.

Please submit your comments on these reports to Alabama Power at harrisrelicensing@southernco.com by **May 11, 2021**.

Thanks,

Angie Anderegg
Hydro Services
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Alabama Power

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April 12, 2021

VIA ELECTRONIC FILING

Project No. 2628-065
R.L. Harris Hydroelectric Project
Transmittal of the Draft Operating Curve Change Feasibility Analysis Phase 2 Report

Ms. Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street NE
Washington, DC 20426

Dear Secretary Bose,

Alabama Power Company (Alabama Power) is the Federal Energy Regulatory Commission (FERC or Commission) licensee for the R.L. Harris Hydroelectric Project (Harris Project) (FERC No. 2628-065). On April 12, 2019, FERC issued its Study Plan Determination[1] (SPD) for the Harris Project, approving Alabama Power's ten relicensing studies with FERC modifications. On May 13, 2019, Alabama Power filed Final Study Plans to incorporate FERC's modifications and posted the Final Study Plans on the Harris relicensing website at www.harrisrelicensing.com. In the Final Study Plans, Alabama Power proposed a schedule for each study that included filing a voluntary Progress Update in October 2019[2] and October 2020[3].

Consistent with FERC's April 12, 2019 SPD, Alabama Power is filing the Draft Operating Curve Change Feasibility Analysis Phase 2 Report (Draft Report) (Attachment 1). This filing also includes the stakeholder consultation for this study beginning April 2019 through March 2021 (Attachment 2). Stakeholders have until May 11, 2021 to submit their comments to Alabama Power on the Draft Report. Comments should be sent directly to harrisrelicensing@southernco.com.

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[1] Accession Number 20190412-3000.
[2] Accession Number 20191030-5053.
[3] Accession Number 20201030-5215.

If there are any questions concerning this filing, please contact me at arsegars@southernco.com or 205-257-2251.

Sincerely,

Angela Anderegg

Angie Anderegg
Harris Relicensing Project Manager

Attachment 1 – Draft Operating Curve Change Feasibility Analysis Phase 2 Report
Attachment 2 – Operating Curve Change Feasibility Analysis Consultation Record (April 2019 – March 2021)

cc: Harris Action Team 1 Stakeholder List

HAT 1 - April 1 Meeting Summary

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Fri 4/16/2021 4:22 PM

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jennifer_grunewald@fws.gov <jennifer_grunewald@fws.gov>; erin_padgett@fws.gov <erin_padgett@fws.gov>; jeff_powell@fws.gov <jeff_powell@fws.gov>; jeff_duncan@nps.gov <jeff_duncan@nps.gov>

HAT 1,

The meeting summary and presentation from our April 1 meeting can be found on the Harris relicensing website in the HAT 1 - Project Operations folder.

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

Meeting Summary
Harris Relicensing Harris Action Team (HAT) 1 Meeting
April 1, 2021
1:00 pm – 3:00 pm
Microsoft Teams Meeting

Participants:
Angie Anderegg – Alabama Power Company (Alabama Power)
Dave Anderson – Alabama Power
Clyde Avery – Lake Harris Property Owner
Jeff Baker – Alabama Power
Jason Carlee – Alabama Power
Keith Chandler – Alabama Power
Allan Creamer – Federal Energy Regulatory Commission (FERC)
Jim Crew – Alabama Power
Colin Dinken – Kleinschmidt Associates (Kleinschmidt)
Scott Fant – Alabama Power
Amanda Fleming – Alabama Power
Todd Fobian – Alabama Department of Conservation and Natural Resources (ADCNR)
Chris Goodman – Alabama Power
Stacey Graham – Alabama Power
Jim Hancock – Balch and Bingham
Jennifer Haslbauer - Alabama Department of Environmental Management (ADEM)
James Hathorn – U.S. Army Corps of Engineers (USACE)
Martha Hunter – Alabama Rivers Alliance
Elise Irwin – U.S. Geological Survey (USGS)
Kelly Kirven – Kleinschmidt
Michael Len – ADEM
Fred Leslie – ADEM
Ashley Lockwood – ADEM
Donna Matthews – Downstream Property Owner
Tina Mills – Alabama Power
Jason Moak – Kleinschmidt
David Moore –ADEM
Barry Morris – Lake Wedowee Property Owners Association (LWPOA)
Kevin Nebiolo – Kleinschmidt
Jessica Nissenbaum – Alabama Power
Kenneth Odom – Alabama Power
Erin Padgett – USFWS
Alan Peeples – Alabama Power
Jennifer Rasberry – Alabama Power
Sarah Salazar – FERC
Kelly Schaeffer – Kleinschmidt
Sheila Smith – Alabama Power
Thomas St. John – Alabama Power
Jimmy Traylor – Downstream Property Owner
Sandra Wash – Kleinschmidt
Jack West – Alabama Rivers Alliance

Meeting Summary:

Angie Anderegg (Alabama Power) opened the meeting with a safety moment and stated the meeting purpose: to present a summary of the results of the Phase 2 Operating Curve Change Feasibility Analysis study by resource area. Angie noted the Draft *Operating Curve Change Feasibility Analysis Phase 2 Study Report* (Draft Report) will be filed April 12, 2021 with a stakeholder comment period until May 11, 2021.

Dave Anderson (Alabama Power) provided a summary of the Harris operating curve, the four operating curve alternatives analyzed, and the downstream structures analysis. Sarah Salazar (Federal Energy Regulatory Commission (FERC)) asked if it would be useful to add a point display on top of the graph (slide 16) to show how many structures are impacted under the different operating curve alternatives. Kevin Nebiolo (Kleinschmidt Associates (Kleinschmidt)) noted that this graph is a particular cross section near Wadley and the point display would only show those structures near this particular cross section. Sarah asked if there was another way to show the impacts of the operating curve alternatives on specific structures. Dave replied that the Draft Report does not show which polygons associated with downstream flooding the structures are located in, but the structures identified are presented in a table in the Draft Report. Dave and Angie noted additional information is in the report that is not included in the presentation and recommended stakeholders comment on the Draft Report if additional information is needed. Sarah noted that polygons associated with downstream flooding may be helpful and answer questions regarding flood duration and particular structures. Allan Creamer (FERC) asked if the Draft Report will contain maps of the structures and the flooding limits associated with each of these operating curve alternatives. Dave replied that the Phase 1 Report contained maps of the flooded areas with the operating curve alternatives color-coded. Dave added that the Draft Report contains one map that shows all of the identified structures (over 1,000). Allan agreed with Sarah that this information would be useful in the final report. Sarah requested Alabama Power to file the GIS data related to the structures with the final report. Kelly Schaeffer (Kleinschmidt) noted the data could be filed, at the latest, with the Final License Application (FLA).

Jason Moak (Kleinschmidt) presented results of the water quality and use analysis. Sarah asked for confirmation that all potential operating curves would not affect the ability to release any of the downstream flows. Angie confirmed but noted that some of the downstream release alternatives impact the lake level elevation. Allan asked if Alabama Power is prioritizing the downstream flows. Dave explained that the HEC-ResSim model looked at lake level elevation and downstream releases separately. Stacey Graham (Alabama Power) added that at this point in the analysis, the combinations of operating curve scenarios and downstream release alternatives have not been modeled together.

Jason M. presented the results of the erosion and sedimentation analysis. Jason M. explained that increased potential for scour may occur downstream with higher operating curve elevations due to decreased storage in the reservoir and associated increased velocities downstream. Sarah asked if certain downstream release alternatives, in combination with the operating curve alternatives, could potentially result in less scour. Jason M. noted that the generalized statement regarding increased potential for scour downstream that is associated with higher operating curve elevations is related to extreme events. Jason M. agreed that a minimum flow may not expose the channel to as much fluctuations and could reduce scour downstream. Sarah asked if the effects related to scour would attenuate downstream similar to flows. Jason M. stated the attenuation would likely be further than seven miles downstream with storm events.

Martha Hunter (Alabama Rivers Alliance (ARA)) requested clarification on the use of "submerged" and "inundation", specifically, if that is considered flooding or still within the riverbanks. Jason M. noted that many of the sedimentation areas on the upper portion of the lake are underwater at full pool, and depending on the lake elevation, are currently exposed during the winter drawdown and may be partially flushed by spring rains. Jason noted that a higher winter pool would not allow these areas to be flushed. Martha clarified her question, if the use of "submerged" and "inundation" downstream, specifically in terms of wetted habitat, is considered flooding or within the riverbanks. Jason M. confirmed the use of those terms related to wetted habitat is referencing water in the river channel. Barry Morris (LWPOA) asked for clarification on the Sedimentation Area Change table (slide 20). Dave clarified that numbers in the table represent acreage of sediment areas that are inundated (not exposed) and noted that inundation would allow for vegetation to grow and decrease flushing events. Barry asked if any studies cover deposition of the sediments under the various operating curve changes and how long it would take areas of sediment to be seen above the water. Barry stated that short-term benefits could be experienced with an increase in the operating curve but could potentially cause more mud where the creeks and rivers flow into the lake. Jason M. noted that it was not analyzed but subjectively, the lake has likely reached an equilibrium and increasing the winter operating curve would likely increase sedimentation until a new equilibrium, or new normal, was reached.

Jason M. presented the results on the wildlife and terrestrial species and threatened and endangered (T&E) species analysis. Sarah asked if there were any state-listed species. Jeff Baker (Alabama Power) stated that he checked during the break and did not notice any state-protected species in the Project Area according to the Natural Heritage Database[1]. Sarah asked specifically about the rare plants found at Flat Rock Park (Flat Rock). Jeff noted that he only checked animals but did not know of any state-protected plant species at Flat Rock. Sarah asked how the operating curve alternatives may affect other rare plants documented at Flat Rock. Jason M. noted that due to its elevation, Flat Rock is not impacted by any of the operating curve alternatives. Allan asked if the zone of influence increased upriver with each operating curve increase. Jason M. confirmed. Allan asked how close the zone of influence encroaches on Finelined Pocketbook's (*Hamiota altilis*) (mussel) critical habitat under the four-foot operating curve increase. Jason M. explained that the river downstream of the critical habitat (downstream of the Highway 431 bridge) is still flowing under normal, summer pool conditions. Jason M. stated that Alabama Power could provide a map of the elevation contours during summer pool in relation to the critical habitat boundary. Allan noted that would be helpful. Sarah asked if any sedimentation areas could affect the flow from the Finelined Pocketbook's critical habitat to the reservoir. Jason M. replied no.

Jason M. presented the terrestrial wetlands analysis noting the majority of the wetlands exist in the shallower areas of the reservoir (sloughs, creeks, etc.) due to the terrain surrounding the reservoir. Sarah asked if an increase in the operating curve would potentially inundate mostly upland habitat. Jason M. explained that areas that are typically dewatered for five or six months would be inundated and allow vegetation to persist in littoral areas.

Colin Dinken (Kleinschmidt) presented the results of the recreation analysis. Barry asked what criteria were used to determine if a structure was usable, specifically on floating docks. Colin

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[1] The Lipstick Darter (*Etheostoma chuckwachatte*) is a state-protected fish species occurring downstream of Harris Dam. The Finelined Pocketbook (*Hamiota altilis*) is a federal and state-protected mussel species with critical habitat located in the Tallapoosa River upstream of Harris Reservoir.

replied that criteria varied depending on recreation structure type and floats were considered usable if 2.5 feet of water existed on the back end of the structure. Sarah asked if the downstream results of the operating curve change analysis (slide 32) took in account both the downstream release and the operating curve alternatives. Colin confirmed the analysis only considered the operating curve alternatives. Sarah asked when both of those scenarios will be analyzed together. Kelly stated that Alabama Power did not propose to do so in the study plans and focused on the discrete impacts of the downstream release alternatives and the operating curve change alternatives on Project resources. Kelly added that Alabama Power's relicensing proposal will be presented in the Preliminary Licensing Proposal (PLP), but Alabama Power does not have plans to model the downstream release alternatives in combination with the operating curve alternatives. Sarah stated that flooding will have to be addressed and the data sets will need to be combined to understand how water level fluctuations may interact. Jack West (ARA) asked if the final report will provide quantifiable results related to increases in flooding for each operating curve change. Dave explained that percentage of time spent in spillway operations (flooding increase) and in turbine capacity was presented in Phase 1. Angie added that the Phase 1 Report provides quantified results on flooding, specifically related to the increase, frequency, and magnitude of flooding.

Amanda Fleming (Alabama Power) presented the results of the cultural analysis.

James Hathorn (U.S. Army Corps of Engineers (USACE)) asked if additional flooding would be expected upstream with the operating curve alternatives. Dave stated that the Phase 1 Report showed that the reservoir did not exceed the 795 foot-msl flood easement elevation. James asked if any proposed changes to the Induced Surcharge Curve were anticipated with any of the operating curve changes. Kenneth Odom (Alabama Power) replied that it had not been analyzed. Stacey Graham (Alabama Power) confirmed that was not something being considered, and current operations were used in the models. James asked if the HEC-ResSim model would be provided to USACE. Dave noted that the model outputs will be filed with the FLA. James stated that all results are based on the 100-year design flood and asked FERC if any other flood event modeling would be requested. Allan did not anticipate that FERC would require additional modeling based on other storm events. Sarah asked James if the HEC-ResSim model was needed to allow USACE to perform their own model runs. James confirmed it would be used to verify the results and perform "what-if" scenarios that could prompt a comment on the report. Angie confirmed that the model would be provided to USACE.

The meeting concluded.

HAT 1 Meeting
Operating Curve Change Feasibility - Phase 2 Analyses

R.L. Harris Dam Relicensing
FERC No. 2628

April 1, 2021

HARRIS DAM
RELICENSING

Meeting Etiquette

- ❑ Be patient with technology issues
- ❑ Follow the facilitator’s instructions
- ❑ Phones will be muted during presentations
- ❑ Follow along with PDF of presentations
- ❑ Use the "chat" feature in Microsoft Teams or write down any questions you have for the designated question section
- ❑ Facilitator will ask for participant questions following sections of the presentation
- ❑ Clearly state name and organization when asking questions
- ❑ Meeting will be recorded to assist with meeting notes

HARRIS DAM
RELICENSING

Safety and Roll Call

Spring is here!

Meeting Purpose

- Present a summary of the results of the **Phase 2** Operating Curve Change Feasibility Analysis Study by resource area

- Draft Phase 2 Report will be filed **April 12, 2021**

- Comments on draft report due on **May 11, 2021**

Relicensing Review

- Much data/reports on Harris Project resources exists – see https://harrisrelicensing.com
- Summary level presentation today
  - Reports available for review & comment April 12
  - Read reports for details
- If you have concerns about current operations, contact Alan Peeples in Reservoir Management
  - Today's focus is summary of operating alternatives

- <u>4 alternatives analyzed</u>
  - All alternatives include the Harris Dam and peaking operations
  - Baseline for relicensing is the existing condition, which includes Harris Dam, powerhouse, Lake Harris

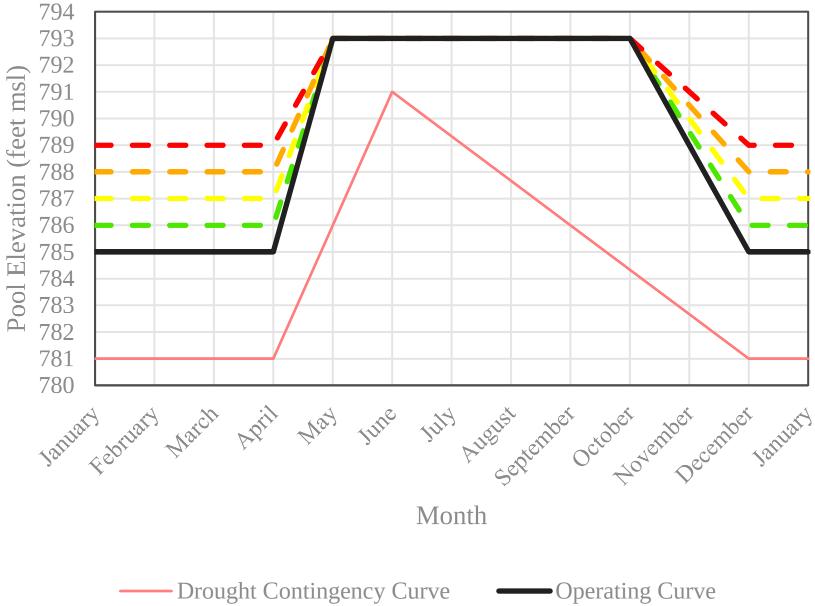
HARRIS DAM RELICENSING

Agenda

- Present Operating Curve Change Feasibility Phase 2 Analysis, by resource area
  - Downstream Release Alternatives
  - Structures Downstream of Harris Dam
  - Water Quality
  - Water Use
  - Erosion and Sedimentation
  - Aquatic Resources (Fish spawning and entrainment)
  - Wildlife, Threatened and Endangered Species
  - Terrestrial Wetlands
  - Recreation
  - Cultural

HARRIS DAM RELICENSING

Harris Operating Curve and Operating Alternatives



- Evaluated in increments of 1 foot from 786 feet msl to 789 feet msl

Phase 1

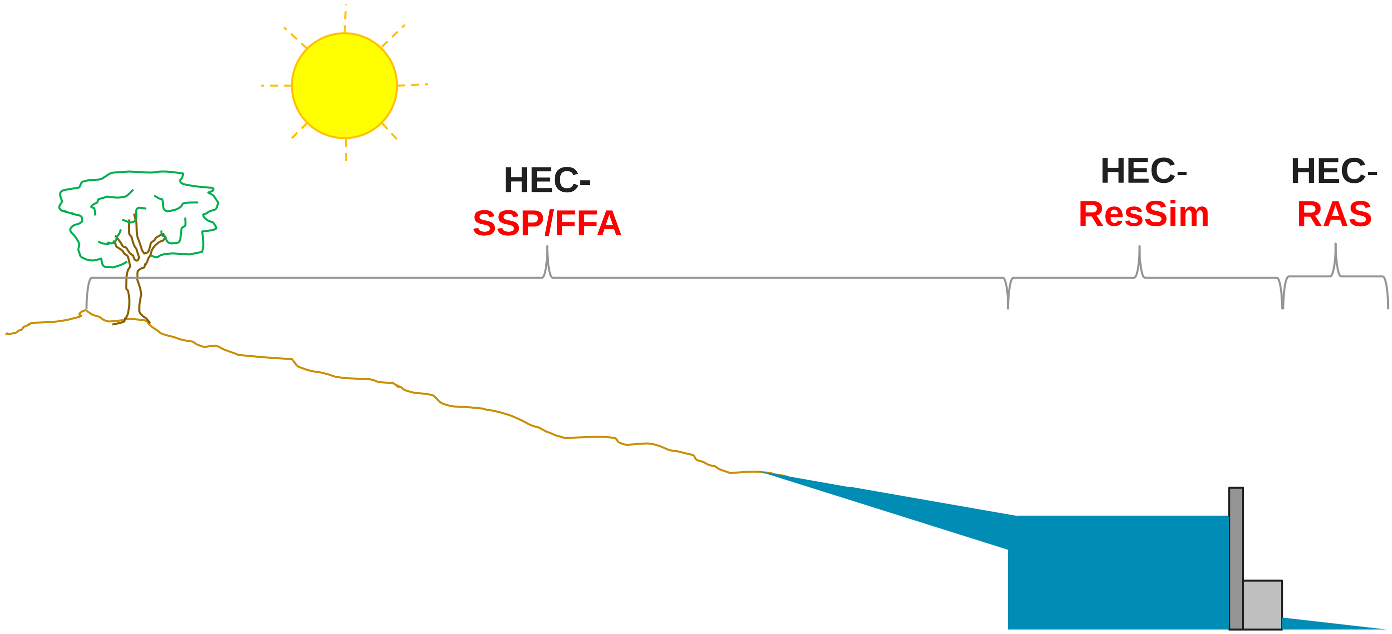
- Modeling to evaluate potential impacts of winter operating curve change on:
  - generation
  - flood control
  - navigation
  - drought operations
  - Green Plan flows
  - downstream release alternatives

Phase 2

- quantitative and qualitative evaluations of potential resource impacts

HARRIS DAM RELICENSING

Hydrologic Models



Operating Curve Effect on Downstream Release Alternatives

Purpose

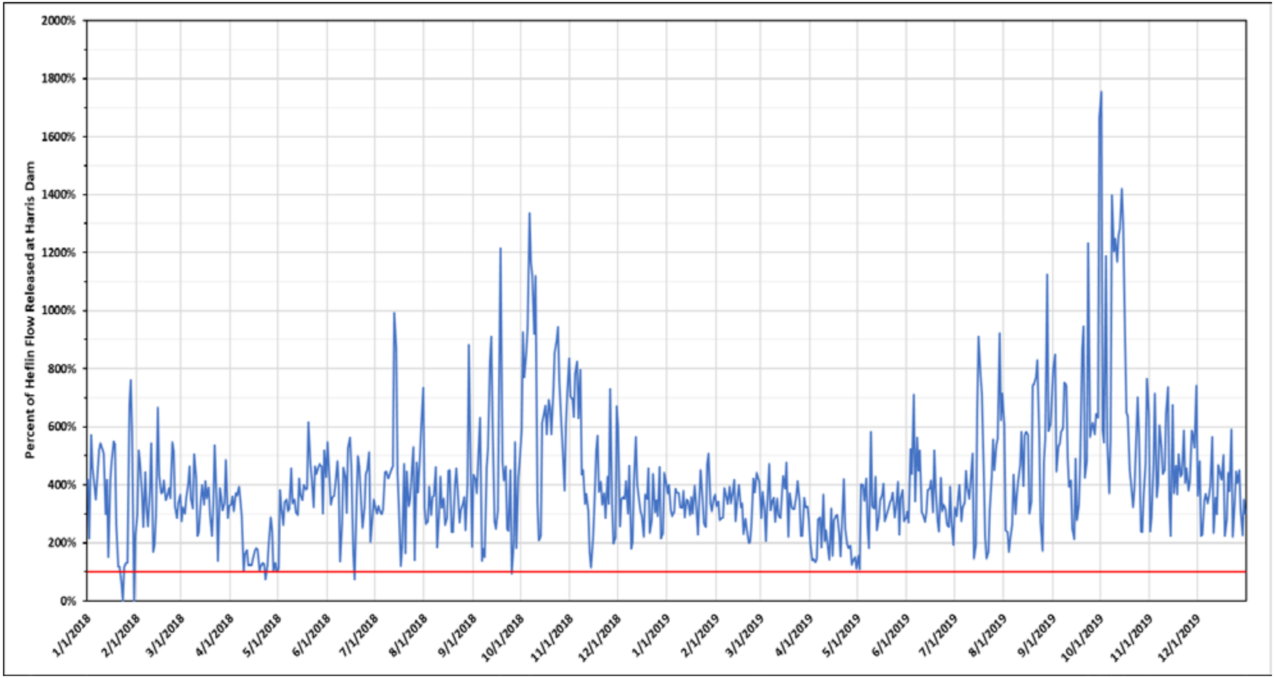
- To evaluate the effect of the operating curve changes on Alabama Power’s ability to pass any of the additional downstream release alternatives.

Methods

- Used HEC-ResSim model
  - Modified Green Plan - changing the time of day in which the Green Plan pulses are released
  - 150 cfs continuous minimum flow (CMF),
  - 300 cfs CMF
  - 600 cfs CMF
  - 800 cfs CMF
  - and four “hybrid” Green Plan alternatives that incorporate both a base and the GP pulsing

HARRIS DAM RELICENSING

Operating Curve Effect on Downstream Release Alternatives



RELEASES FROM HARRIS DAM IN 2018 AND 2019 COMPARED TO 100% FLOW AT THE USGS HEFLIN GAGE

HARRIS DAM RELICENSING

Operating Curve Effect on Downstream Release Alternatives

Results

- Model results indicated that raising the winter operating curve would not affect Alabama Power’s ability to pass any of the additional downstream release alternatives.
- The effect of downstream release alternatives on the reservoir level is analyzed in the Downstream Release Alternatives Phase 2 Report.

Downstream Flooding

TOTAL ACRES INUNDATED DOWNSTREAM OF HARRIS DAM BASED ON RESULTS OF 100-YEAR DESIGN FLOOD IN HARRIS-MARTIN HEC-RAS MODEL

Elevation	Total Inundation Area (acres)	Increase over Baseline (acres)	Percent Increase over Baseline
Baseline (785 feet msl)	6,105	-	-
+ 1 foot	6,403	298	4.9%
+ 2 feet	6,590	485	7.9%
+ 3 feet	6,791	686	11.2%
+ 4 feet	6,995	889	14.6%

Downstream Structures Analysis

Purpose

- Determine the number of structures that would be affected by an increase in high flow events resulting from a change in the elevation of the winter pool (1-4 ft increase), including depth of inundation

Methods

- Overlay analysis, find those structures affected by worst case scenario
- Spatial join affected structures with tax parcel data
- Summarize by structure type tax-parcel use category (Agricultural, Forestry, Single Family, etc.)
- Count the number of HEC-RAS model timesteps (hours) that each structure is inundated and summarizing by alternative.

Downstream Structures Analysis

Results

- Of the 88 structures affected by the 4-foot guide curve change, 29 are in lots classified as single-family home.

Parcel Use	785	786	787	788	789
Residential	1	1	1	1	1
Vacant Agricultural	2	2	2	2	2
Cabin	2	2	2	2	2
Unknown	2	2	2	2	3
Agricultural	4	4	4	4	4
Forestry	6	6	6	6	6
Commercial	6	6	6	6	6
Mobile Home	8	8	9	9	10
Vacant	24	24	25	25	25
Single Family	24	24	26	26	29
Total	79	79	83	83	88

HARRIS DAM RELICENSING

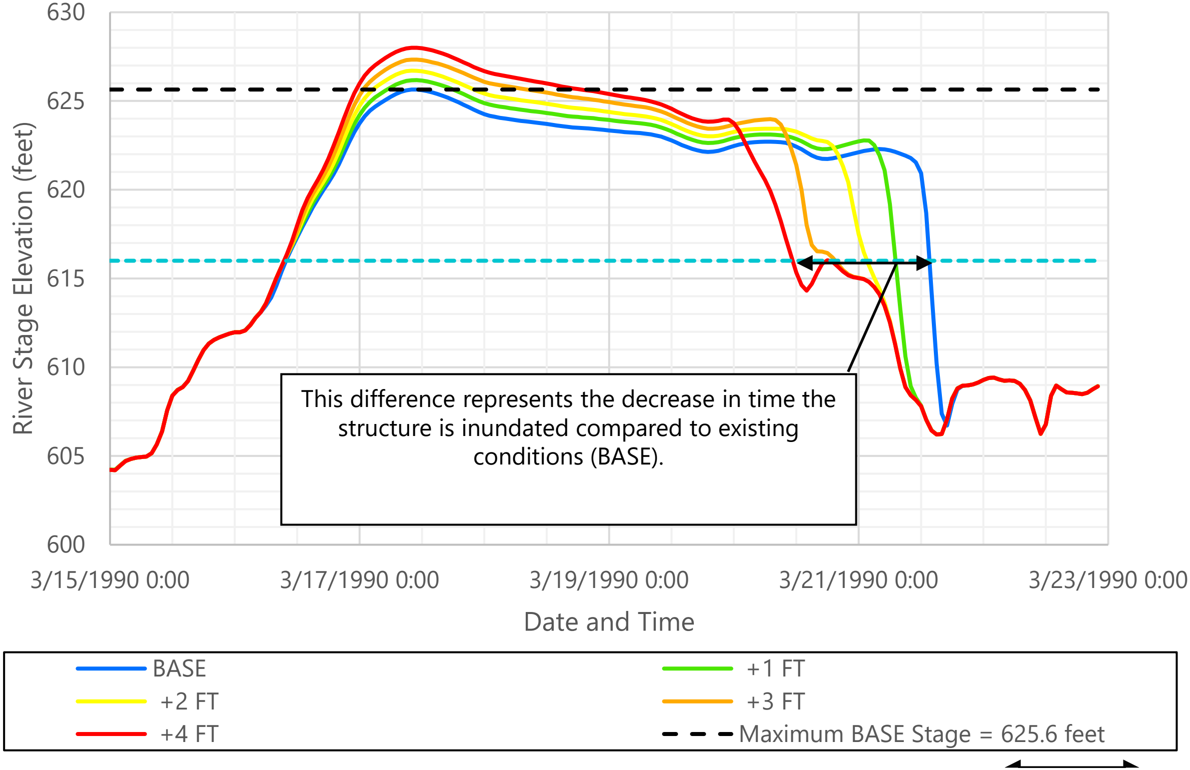
Downstream Structures Analysis

Results

- 4-foot winter pool increase has the largest impact in terms of number of structures inundated, the median duration of inundation was the lowest.
- This occurs because changes to the winter operating curve increase the starting pool elevation; Harris has less storage available in the reservoir to store floodwaters before Alabama Power must begin releasing water.
- Downstream flood is more intense in terms of magnitude (greater rise), but more water is released more quickly due to the higher reservoir elevation
- The magnitude of the inundation for each structure is lower because the peak of the flood hydrograph is attenuated by having smaller magnitude floodwaters released over a longer time.

HARRIS DAM RELICENSING

Downstream Structures Analysis



TALLAPOOSA RIVER STAGE HYDROGRAPHS AT RM 122.7 (WADLEY) FROM RESULTS OF 100-YEAR DESIGN FLOOD IN HARRIS-MARTIN HEC-RAS MODEL

Water Quality Analysis

Purpose

- Evaluate the effects of each operating curve change on dissolved oxygen and temperature in the forebay

Methods

- Developed a three-dimensional Environmental Fluid Dynamics Code (EFDC) hydrodynamic and water quality model for Lake Harris and evaluate the effects of each rule curve change scenario on water temperature and dissolved oxygen versus baseline.

Results

- Lake Harris
  - EFDC model results indicated that raising the winter pool water level would have negligible effects on water temperature and dissolved oxygen in the forebay withdrawal zone.

- Downstream
  - Since model results indicated negligible changes to water temperature and dissolved oxygen in the forebay withdrawal zone, there would be negligible effects on downstream water quality.

HARRIS DAM RELICENSING

Water Use Analysis

Purpose

- Determine effects on water uses in Lake Harris and the Tallapoosa River downstream as a result of a change in winter operating curve.

Methods

- Review the Water Quantity, Water Use, and Discharge Report to determine water users' location relative to the Project Boundary.
- HEC-ResSim used to determine the effect of an increase in winter operating curve on available water in Harris Reservoir.
- HEC-RAS modeling used to assess how changes in outflow from Harris Dam could affect downstream water users.

Results

- No adverse effect on existing or future users in Lake Harris or downstream
- Each one-foot winter operating curve increase provides additional water available for use during the winter in Lake Harris

HARRIS DAM RELICENSING

Erosion and Sedimentation Analysis

Methods

- Lake Harris
  - Data from the Erosion and Sedimentation Study Report was reviewed to evaluate operating curve change effects on identified E&S areas.
    - Used existing lake LIDAR (2015) data to identify erosion and sedimentation areas impacted at each incremental operating curve elevation.
    - Used existing lake LIDAR (2015) data to identify areas at risk for occurrence of nuisance aquatic vegetation, specifically sedimentation areas.
  - Analyzed the potential effect of increasing recreation on E&S areas.

- Downstream
  - Erosion and Sedimentation Study Report results to evaluate operating curve change effects on downstream E&S areas.
  - Operating Curve Change Feasibility Analysis Phase I Report and associated HEC-RAS model to identify change in magnitude and frequency of flood events downstream.

HARRIS DAM
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Erosion and Sedimentation Analysis

Results

- Lake Harris
  - None of existing erosion areas would be affected by winter pool alternatives.
    - All existing erosion sites are located above 789 contour.
  - An increase in winter recreation may result in more boat induced wave action.
  - Increased acreage at each sedimentation area left submerged.
    - Increased nuisance aquatic vegetation habitat due to decrease in flushing of exposed sediment to deeper depths.

Harris Sedimentation Area Change

Site	Baseline Acreage	+1 foot	+2 feet	+3 feet	+4 feet
S1	23.83	3.95	5.66	4.25	5.95
S2	4.96	1.93	0.93	0.27	0.15
S3	10.51	4.42	1.01	1.62	2.94
S4	5.49	1.51	1.27	2.34	0.13
S5	6.68	2.57	2.70	0.73	0.23
S6	13.55	7.11	2.14	1.18	0.83
S7	26.14	7.07	5.46	5.15	3.13
S8	10.59	0.93	1.32	1.46	1.78
S9	18.25	6.54	2.57	1.90	1.81

Erosion and Sedimentation Analysis

Results

- Downstream
  - Increased potential for scour may occur as velocities increase with the higher channelized flows resulting from the decreased storage in Harris Reservoir associated with higher winter operating curve elevations

  - No effect on sedimentation at tributary confluences

Fish Spawning Analysis

Methods

- HEC-RAS
  - determine effects on wetted perimeter and littoral area in Lake Harris
  - determine effects of time spent in spillway operations and at turbine capacity

- Use information on fish spawning from the Aquatic Resources Desktop Assessment

Fish Spawning Analysis

Results

- Lake Harris
  - Winter pool elevations of 786, 787, 788, and 789 would create an additional 276, 506, 730, and 944 acres of wetted perimeter, respectively
  - Potential Beneficial effects: reduced plant desiccation resulting in more plant growth, increased spawning area and structure for young-of-year fish and benthic invertebrates

HARRIS DAM RELICENSING

Fish Spawning Analysis

Results

- Downstream
  - Increasing winter pool elevation causes greater outflow from Harris Dam and subsequent flooding associated with outflow.

  - Increases in time spent in spillway operations and at turbine capacity are small and would likely occur outside of the spawning period for the majority of species.

Percentage of Time Spent in Spillway Operations and in Turbine Capacity for Each Alternative

Elevation	Spillway Operations	Turbine Capacity
Baseline (785 feet msl)	0.2%	0.7%
+ 1 foot (786 feet msl)	0.3%	0.7%
+ 2 feet (787 feet msl)	0.3%	0.8%
+ 3 feet (788 feet msl)	0.3%	0.8%
+ 4 feet (789 feet msl)	0.4%	1.0%

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Fish Entrainment Analysis

Methods

- Desktop Fish Entrainment and Turbine Mortality Report estimated entrainment rates based of information from the Electric Power Research Institute (EPRI 1992).

- Estimated turbine-induced mortality rates were then applied to fish entrainment estimates to determine potential fish mortality.

Results

- The volume and velocity of water passing through the turbines would not change under a different winter operating curve; therefore, fish entrainment is not expected to change under any of the winter pool alternatives.

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Wildlife and Terrestrial Species Analysis

Methods

- Data were reviewed from the Pre-Application Document (PAD) (Alabama Power 2018) to evaluate the potential effects of each winter pool alternative on Wildlife and Terrestrial Resources

Results

- <u>Lake Harris</u>
  - Increasing operating curve would increase shallow littoral habitats
  - May increase winter cover and feeding sites for waterfowl
  - May increase winter foraging habitat for wading birds
  - May marginally increase breeding sites for amphibians
- <u>Downstream</u>
  - Although a greater number of flood days are expected due to the one to four foot increase, no long-term effects to wildlife downstream are expected

Threatened and Endangered Species Analysis

Methods

- Alabama Power reviewed data (e.g., species habitat range, species surveys, etc.) from the FERC-approved Threatened and Endangered Species Study to evaluate the potential effects of each incremental winter operating curve elevation on T&E species

Results

- Lake Harris
  - No T&E species or critical habitat present at Lake Harris Project Boundary
  - Finelined Pocketbook critical habitat is located 2.45 miles upstream of the Project Boundary and is not affected by rule curve change
  - Not expected to affect T&E species within the Lake Harris Project Boundary

- Downstream
  - No effect because no T&E species or critical habitats are present in the Tallapoosa River from Harris Dam through the Horseshoe Bend.

Terrestrial Wetlands Analysis

Methods

- The effects of increasing the winter operating curve on terrestrial resources (wetlands) were assessed using existing wetland data and Phase 1 Results.
- For the Tallapoosa River downstream of Harris Dam, identified wetlands were analyzed based on changes in magnitude and frequency of flood events for each of the winter pool alternatives.

Results

- Lake Harris
  - 1-4 foot increase in the winter operating curve elevation could potentially alter the dominant vegetation composition of wetlands bordering Harris Reservoir.
    - Existing wetlands may increase in size due to the increase of acreage of the Harris Reservoir during the winter months

- Downstream
  - No effect from periodic high flow events.

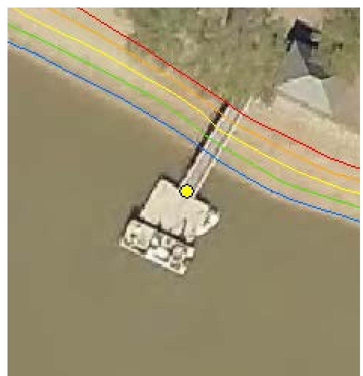
HARRIS DAM RELICENSING

Recreation Analysis

Methods

- LIDAR used to measure elevation (785, 786, 787, 788, 789 ft msl contours)
- Elevation data used to calculate depth at point
- Depth for points beyond the 785 ft msl contour was estimated by slope analysis
- The amount of depth was determined separately for each type of private structure (i.e., boathouses, floats, piers, wet slips, and boardwalks) and for public boat ramps.

- Example:



HARRIS DAM RELICENSING

Recreation Analysis

Results

- Private structures
  - 2,282 private structures identified
  - Total number analyzed: 2,123 structures

Winter Pool Elevation (feet msl)	Number of Usable Structures	Percentage of Usable Structures	Incremental Percentage Increase
785	449	21.1	-
786	642	30.2	9.1
787	826	38.9	8.7
788	1112	52.4	13.5
789	1327	62.5	10.1

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Recreation Analysis

Methods

- Public Boat Ramps
  - Used minimum of 4.5 ft of depth over bottom of ramp at low pool

Results

- Public ramps usable at current winter pool: Highway 48 Bridge, Big Fox Creek, Crescent Crest, and Foster's Boat Ramps

Boat Ramp	Lowest Reservoir Elevation Usable (feet msl)
Big Fox Creek	785.0
Crescent Crest	785.0
Foster's Bridge	785.0
Hwy 48 Bridge	785.0
Lee's Bridge	791.5
Little Fox Creek	790.0
Lonnie White*	787.5
Swagg**	790.0

*Lonnie White Boat Ramp is frequently used at current winter pool, but larger boats cannot launch, and many boat trailers need to back off the edge of the ramp. ADCNR is currently extending the ramp so that it is fully usable by the drawdown of 2021.

**Swagg Boat Ramp ends right at the water's edge during current winter pool but is still in use by some recreators.

HARRIS DAM RELICENSING

Recreation Analysis

Results

- <u>Downstream</u>
  - The maximum depth of inundation at each recreation site increases as the winter pool alternatives increase.
  - The duration of time above the ground elevation that each recreation site is inundated tends to decrease as the winter pool alternatives increase.
    - This is due to the decreasing amount of storage available in Harris Reservoir for each winter pool alternative compared to existing conditions.

HARRIS DAM
RELICENSING

Cultural Analysis

Methods

- Lake Harris and Downstream
  - Existing information (LIDAR and expert opinion) and Phase 1 Results were used to provide a qualitative analysis for the effects of cultural resources

Results

- Lake Harris
  - Changes in the operating curve above 785 msl, would leave otherwise exposed cultural resources inundated and less susceptible to water fluctuation, wind erosion, recreational activities, and looting (vandalism).
- Downstream
  - Higher flow releases have the potential to impact cultural resources downstream, including the Miller Covered Bridge, exposing them to additional fluctuations and erosion.
    - These releases would be sporadic and would result in irregular inundation periods for the cultural resources downstream of Harris Dam.

HARRIS DAM RELICENSING

From: Barry Morris <rbmorris222@gmail.com>
Sent: Monday, April 19, 2021 8:03 PM
To: Anderegg, Angela Segars
Subject: Re: Operating Curve analysis question

EXTERNAL MAIL: Caution Opening Links or Files

Thanks Angie. That helps clear it up. And don't worry, we're looking at all impacts of the winter level, in the lake and downstream. Barry

On April 19, 2021, at 11:59 AM, "Anderegg, Angela Segars" <ARSEGARS@southernco.com> wrote:

Hi Barry,

In the context of this analysis, "inundated" means that if the modeled flood elevation at that location (cross section) exceeds the elevation of the ground at the structure's location (based on LIDAR), then that structure is "inundated." Or, more simply put, it means that it has water over it from an elevation standpoint.

Keep in mind that this structure impacts analysis is only one component of the overall resource impacts analysis. We have to consider the entire flooding impacts analysis done in Phase 1 of the study, as well as consider impacts to all the other resources.

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From: Barry Morris <rbmorris222@gmail.com>
Sent: Saturday, April 17, 2021 11:25 AM
To: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Subject: Operating Curve analysis question

EXTERNAL MAIL: Caution Opening Links or Files

Hello Angie: In studying the Operating Curve analysis, I cannot find a definition of the term "inundated" referring to flooding of downstream structures (table 3.3). Can your team please define "inundated" for me. Is it just over the front door sill? A foot of water in the main level? Up to the eaves?

In looking at the winter pool change to +1' and +2', it appears the only additional serious flooding is one single family structure that would be "inundated" at +2'. While the LWPOA isn't ready to throw one homeowner under the bus (or in front of the torrent), it would be nice to have the lake a couple of feet higher in the winter. Yes, I am discounting the other three structures that seem of very limited value.

The LWPOA wants to maintain cordial relations with the folks downstream, but having the lake two feet higher in the winter would seem to have a serious economic upside.

Thanks in advance for your help. Barry

Barry Morris
Chairman, LWPOA 2020/21
404 449 3452

From: Jack West <jwest@alabamarivers.org>
Sent: Friday, April 23, 2021 8:42 AM
To: Anderegg, Angela Segars
Cc: Sarah Salazar
Subject: Re: Next Week's Harris Updated Study Report Meeting

EXTERNAL MAIL: Caution Opening Links or Files

Hi Angie,

Thanks for sharing the draft agenda, and with all there is to get through next Tuesday, I agree that a separate meeting to discuss the BESS report makes sense. Thank you for setting that up. The Synapse guys will join for that one but will likely not be attending the meeting on Tuesday.

I look forward to the meeting Tuesday. Have a great weekend.

On Thu, Apr 22, 2021 at 5:30 PM Anderegg, Angela Segars <ARSEGARS@southernco.com> wrote:

> Hi Jack,
>
> Below is the agenda for the USR meeting. On Monday, I'm going to send this out to all stakeholders, along with the call in information and a link to the meeting presentation. You are welcome to forward the meeting invite to the Synapse folk and we'll make sure to capture them in the attendee list for the meeting. If they would like to be added to the overall stakeholder list, or any of the HATs, just ask them to forward me their contact info.
>
> Because we will be walking through where we are with all of the studies, we won't spending a ton of time on BESS on Tuesday. However, I do think it's a good idea to have a HAT 1 meeting specific to the BESS study, so stakeholders have more opportunity to ask questions. I'm going to send out a meeting notice for a HAT 1 meeting for Monday, May 3rd at 2:00.
>
> 9 AM – Introduction, Roll Call, Safety Moment
>
> 9:15 AM – USR Summary by Study
>
> - Operating Curve Change Feasibility Analysis
> - Downstream Release Alternatives
> - Battery Energy Storage System
> - Water Quality
> - Erosion and Sedimentation

- Aquatic Resources
- Downstream Aquatic Habitat
- Threatened and Endangered Species
- Project Lands Evaluation
- Recreation Evaluation
- Cultural Resources

Review any Action Items

Adjourn

Thanks!

Angie Anderegg

Hydro Services

(205)257-2251

arsegars@southernco.com

From: Jack West <jwest@alabamarivers.org>
Sent: Wednesday, April 21, 2021 3:50 PM
To: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Cc: Sarah Salazar <sarah.salazar@ferc.gov>
Subject: Next Week's Harris Updated Study Report Meeting

Hi Angie,

I hope you're doing well. We are preparing for the Updated Study Report meeting on Tuesday, and I wanted to check with you to see if an agenda is available for that meeting. I know a lot will be compressed into three hours. We have engaged a consulting firm, Synapse Energy Economics, to advise on the battery storage study report, and they will be joining for part of the meeting. I can provide you names and email addresses of attendees if you need to update an invite list, or I can simply share the meeting link with them if that is easier.

If a draft agenda is available, it would be helpful to let them know the structure of the meeting and what parts are relevant to them.

Thanks, and we look forward to attending next week.

Best,

--

Jack West, Esq.

Policy and Advocacy Director

Alabama Rivers Alliance

2014 6th Ave N, Suite 200

Birmingham, AL 35203

205-322-6395

www.alabamarivers.org [alabamarivers.org]

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--

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Harris Relicensing - Updated Study Report Meeting

Anderegg, Angela Segars <ARSEGARS@southernco.com>

Mon 4/26/2021 2:53 PM

To: APC Harris Relicensing <g2apchr@southernco.com>
Bcc: Martindale, Lisa (LMARTIND@southernco.com) <LMARTIND@southernco.com>; Crew, James F. <JFCREW@southernco.com>; 1942jthompson420@gmail.com <1942jthompson420@gmail.com>; 9sling@charter.net <9sling@charter.net>; abnoel@southernco.com <abnoel@southernco.com>; allan.creamer@ferc.gov <allan.creamer@ferc.gov>; alpeeple@southernco.com <alpeeple@southernco.com>; amanda.mcbride@ahc.alabama.gov <amanda.mcbride@ahc.alabama.gov>; ammcvica@southernco.com <ammcvica@southernco.com>; amy.silvano@dcnr.alabama.gov <amy.silvano@dcnr.alabama.gov>; andrew.nix@dcnr.alabama.gov <andrew.nix@dcnr.alabama.gov>; arsegars@southernco.com <arsegars@southernco.com>; Ashley Lockwood <alockwodd@adem.alabama.gov>; athall@fujifilm.com <athall@fujifilm.com>; aubie84@yahoo.com <aubie84@yahoo.com>; awhorton@corblu.com <awhorton@corblu.com>; bart_roby@msn.com <bart_roby@msn.com>; baxterchip@yahoo.com <baxterchip@yahoo.com>; bboozer6@gmail.com <bboozer6@gmail.com>; bdavis081942@gmail.com <bdavis081942@gmail.com>; beckyrainwater1@yahoo.com <beckyrainwater1@yahoo.com>; 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<scsmith@southernco.com>; section106@mcn-nsn.gov <section106@mcn-nsn.gov>; sforehand@russelllands.com <sforehand@russelllands.com>; sgraham@southernco.com <sgraham@southernco.com>; sherry.bradley@adph.state.al.us <sherry.bradley@adph.state.al.us>; sidney.hare@gmail.com <sidney.hare@gmail.com>; simsthe@aces.edu <simsthe@aces.edu>; snelson@nelsonandco.com <snelson@nelsonandco.com>; sonjahollomon@gmail.com <sonjahollomon@gmail.com>; Stephen Yerka <syerka@nc-cherokee.com>; steve.bryant@dcnr.alabama.gov <steve.bryant@dcnr.alabama.gov>; stewartjack12@bellsouth.net <stewartjack12@bellsouth.net>; straylor426@bellsouth.net <straylor426@bellsouth.net>; sueagnew52@yahoo.com <sueagnew52@yahoo.com>; tdadunaway@gmail.com <tdadunaway@gmail.com>; thpo@pci-nsn.gov <thpo@pci-nsn.gov>; thpo@tttown.org <thpo@tttown.org>; timguffey@jcch.net <timguffey@jcch.net>; tlamberth@russelllands.com <tlamberth@russelllands.com>; tlmills@southernco.com <tlmills@southernco.com>; todd.fobian@dcnr.alabama.gov <todd.fobian@dcnr.alabama.gov>; tom.diggs@ung.edu <tom.diggs@ung.edu>; tom.lettieri47@gmail.com <tom.lettieri47@gmail.com>; tom.littlepage@adeca.alabama.gov <tom.littlepage@adeca.alabama.gov>; trayjim@bellsouth.net <trayjim@bellsouth.net>; triciastearns@gmail.com <triciastearns@gmail.com>; twstjohn@southernco.com <twstjohn@southernco.com>; variscom506@gmail.com <variscom506@gmail.com>; walker.mary@epa.gov <walker.mary@epa.gov>; william.puckett@swcc.alabama.gov <william.puckett@swcc.alabama.gov>; wmcampbell218@gmail.com <wmcampbell218@gmail.com>; wrighr2@aces.edu <wrighr2@aces.edu>; wsgardne@southernco.com <wsgardne@southernco.com>; wtanders@southernco.com <wtanders@southernco.com>; wwarrior@ukb-nsn.gov <wwarrior@ukb-nsn.gov>

Harris relicensing stakeholders,

The presentation for tomorrow's Updated Study Report meeting is available on the Harris relicensing website (Relicensing Documents). Microsoft Teams call-in information is below.

I look forward to talking with you tomorrow.

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From: APC Harris Relicensing
Sent: Monday, April 12, 2021 1:47 PM
To: APC Harris Relicensing <harrisrelicensing@southernco.com>
Subject: Harris Relicensing - Updated Study Report

Harris relicensing stakeholders,

Pursuant to FERC's Integrated Licensing Process, Alabama Power filed its Harris Project Updated Study Report (USR) today. Concurrent with the USR filing, Alabama Power filed three draft study reports, four final study reports and the results of a Botanical Inventory at Flat Rock Park. Stakeholders may access the USR and the study reports on FERC's website (http://www.ferc.gov) by going to the "eLibrary" link and entering the docket number (P-2628). The USR and study reports are also available on the Project relicensing website at http://harrisrelicensing.com.

The Updated Study Report meeting will be held on **April 27, 2021**. Please hold this date from 9:00 am to 12:00 pm central time. Call in information for the meeting can be found below. The purpose of the meeting is to provide an opportunity to review the contents of the USR.

Alabama Power will file a summary of the USR meeting by **May 12, 2021**. Stakeholders will have until **June 11, 2021** to file written comments with FERC on the USR Meeting Summary.

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

Microsoft Teams meeting

Join on your computer or mobile app

Click here to join the meeting

Video Conference ID: 112 301 635 7
Alternate VTC dialing instructions

Or call in (audio only)

+1 470-705-0860,,168184661# United States, Atlanta
Phone Conference ID: 168 184 661#
Find a local number |

Updated Study Report (USR) Meeting

R.L. Harris Dam Relicensing
FERC No. 2628

April 27, 2021

Meeting Etiquette

- ❑ Be patient with technology issues
- ❑ Follow the facilitator’s instructions
- ❑ Phones will be muted during presentations
- ❑ Turn off cameras to avoid bandwidth issues
- ❑ Meeting will be recorded to assist with preparing the meeting summary
- ❑ Follow along with PDF of presentations
- ❑ Facilitator will ask for participant questions at designated times during presentation; chat feature also available for questions
- ❑ Clearly state name and organization when asking questions

HARRIS DAM
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Safety and Roll Call

Source: USCG Recreational Boating Report

Accidents happen!

Be prepared while on the water:

- PFDs
- Inspected fire extinguisher
- First aid kit
- Tool kit with flashlight
- Float plan
- Check the weather

Harris Relicensing Milestones

April 12, 2021 FERC Filing

❖Updated Study Report

❖Draft Reports

- Downstream Release Alternatives Phase 2
- Operating Curve Change Feasibility Analysis Phase 2
- Battery Energy Storage System (BESS)

❖Final Reports

- Aquatic Resources
- Erosion and Sedimentation
- Downstream Aquatic Habitat
- Water Quality
- A Botanical Inventory of a 35-Acre Parcel at Flat Rock Park, Blake's Ferry, Alabama

- Stakeholder comments on Draft Reports - May 11, 2021
- USR Meeting Summary - May 12, 2021
- USR Meeting Summary comments - June 11, 2021
- Preliminary Licensing Proposal (PLP) - by July 3, 2021
  - 90-day comment period
- Final License Application (FLA) and 3 Final Reports – by November 30, 2021

USR Meeting Purpose

Pursuant to 18 C.F.R. § 5.15(f)

- ❖ Overall study progress, including data collected
- ❖ Any variance from the study plan or schedule
- ❖ Remaining activities or study modifications, if any

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Summary of HAT Meetings – Post ISR

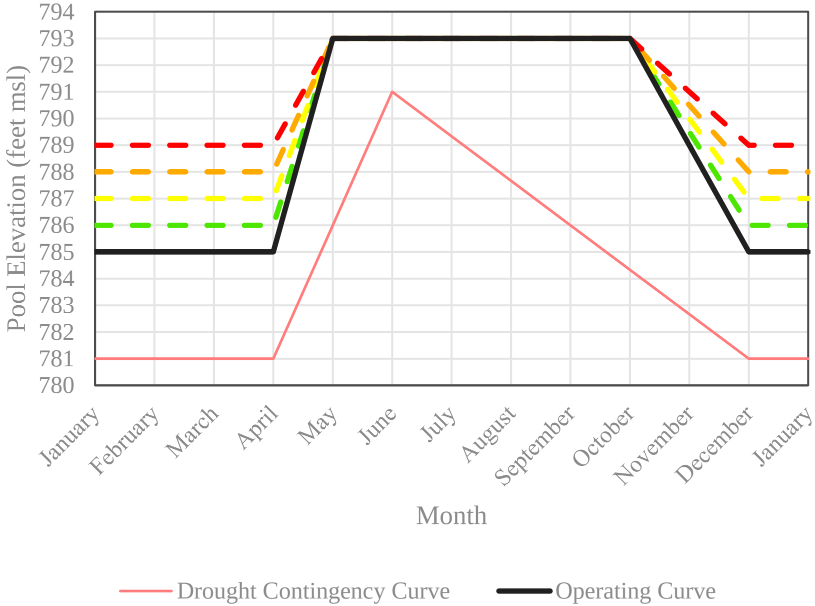
Meeting	Description	Date
Initial Study Report	Alabama Power presented information on the progress of each study including applicable study results, variances requested, and any additional studies or requested study modifications.	04/28/2020
HAT 3	Auburn University presented research to date and informed the HAT of remaining work on the Aquatic Resources Study.	06/02/2020
HAT 1 and 5	Alabama Power presented the methodology for: • analyzing the number of usable recreation structures on Lake Harris at the current winter operating curve and the alternatives • analyzing how structures located downstream of Harris Dam might be affected by a change in the winter operating curve during a 100-year flood event	06/04/2020
HAT 4	Alabama Power reviewed the goals and objectives of the Project Lands EvaluationStudy and discussed the Shoreline Management Plan and the Wildlife Management Plan outline.	10/19/2020
HAT 5	Alabama Power discussed the Phase 2 analyses for the recreation component of the Downstream Release Alternatives study including the definition for boatable flows, as well as potential recreation PME measures.	10/19/2020
HAT 3	Alabama Power presented modeling results on the Downstream Aquatic Habitat Study and discussed Auburn University's progress to date on the Aquatic Resources Study.	11/05/2020
Selected HAT 6	Alabama Power and OAR presented a virtual cultural resources overview of Skyline. Selected HAT 6 participants attended due to the privileged nature of material.	03/04/2021
HAT 3	Alabama Power and Auburn University presented results of the Downstream Fish Population Study for the Aquatic Resources Study.	03/31/2021
HAT 1	Alabama Power presented results of the Phase 2 Operating Curve Change Feasibility Analysis Study and the Phase 2 Downstream Release Alternatives Study.	04/01/2021

Agenda

Harris Relicensing Studies
• Operating Curve Change Feasibility Analysis
• Downstream Release Alternatives
• Battery Energy Storage System (BESS)
• Water Quality
• Erosion and Sedimentation
• Aquatic Resources
• Downstream Aquatic Habitat
• Threatened and Endangered (T&E) Species
• Project Land Evaluation
• Recreation Evaluation
• Cultural Resources

HARRIS DAM RELICENSING

Harris Operating Curve and Operating Alternatives



- Evaluated in increments of 1 foot from 786 feet msl to 789 feet msl

Phase 1

- Modeling to evaluate potential impacts of winter operating curve change on:
  - generation
  - flood control
  - navigation
  - drought operations
  - Green Plan flows
  - downstream release alternatives

Phase 2

- quantitative and qualitative evaluations of potential resource impacts

HARRIS DAM RELICENSING

Operating Curve Change Feasibility Analysis Study

Study Progress:

- ❖ Used existing information, relicensing studies, and Phase 1 analysis
- ❖ Phase 2 Analysis analyzed operating curve effects on Project resource areas

- ❖ HAT 1 Meetings - June 4, 2020, and April 1, 2021

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Operating Curve Change Feasibility Analysis Study

Resource	+1 Foot	+2 Feet	+3 Feet	+ 4 Feet
Hydro Generation	$(19,400)	$(40,600)	$(52,100)	$(124,900)
Harris Reservoir Elevations	Over the period of record, increasing the winter pool elevation did not affect the amount of time the reservoir was at or above the full summer pool elevation of 793 feet msl.			
Downstream Effects of 100-Year Design Flood	298 acres (4.9%)	485 acres (7.9%)	686 acres (11.2%)	889 acres (14.6%)
Spillway Operation	12 (0.1%)	13 (0.1%)	20 (0.1%)	37 (0.2%)
Turbine Capacity Operation	15 (0.0%)	29 (0.1%)	54 (0.1%)	103 (0.3%)
Navigation	No Effect			
Drought Operations	No Effect			
Green Plan Flows	No Effect			
Downstream Release Alternatives	No Effect			
Structures Downstream of Harris Dam	0	4	4	9
Water Quality – Harris Reservoir	No Effect			
Water Quality – Harris Dam Discharge	No Effect			
Water Use – Harris Reservoir	Minor Beneficial Effect			
Water Use – Tallapoosa River	No Effect			

Operating Curve Change Feasibility Analysis Study

Resource	+1 Foot	+2 Feet	+3 Feet	+ 4 Feet
Erosion – Harris Reservoir	No Effect			
Sedimentation – Harris Reservoir	Adverse Effect			
Erosion – Tallapoosa River	Minor Adverse Effect			
Sedimentation – Tallapoosa River	No Effect			
Aquatic Resources – Harris Reservoir	Beneficial Effect			
Aquatic Resources – Tallapoosa River	No Effect			
Wildlife – Harris Reservoir	Beneficial Effect			
Wildlife – Tallapoosa River	No Effect			
T&E Species – Harris Reservoir and Tallapoosa River	No Effect			
Terrestrial Wetlands – Harris Reservoir	Beneficial Effect			
Terrestrial Wetlands – Tallapoosa River	No Effect			
Recreation – Harris Reservoir	9.1%	17.8%	31.3%	41.4%
Recreation – Tallapoosa River	Minor Adverse Effect			
Cultural Resources – Harris Reservoir	Minor Beneficial Effect			
Cultural Resources – Tallapoosa River	Potential Adverse Effect			

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Operating Curve Change Feasibility Analysis Study

Variances:

- Historic photos of Lake Harris could not be used to assess the effects of the winter pool alternatives due to the limited resolution to assess individual erosion areas.

- Provided qualitative information (rather than quantitative information noted in the Study Plan) regarding cultural resources on Lake Harris
  - analysis of cultural resources is ongoing.

Remaining Activities

- Stakeholder comments on the Draft Phase 2 Study Report

- Present the operating proposal and PME measures in PLP

Review of Downstream Release Alternatives Analyzed in Phase 2

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	ModGP
150 cfs continuous minimum flow (CMF)	150CMF
300 cfs continuous minimum flow	300CMF
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

HARRIS DAM RELICENSING

Operations Model Assumptions

- A rule for peaking operations is included in all simulations.
- The minimum elevation for Harris Reservoir is 770.5 feet msl.
- Pre-Green Plan: The release criteria from the Green Plan contained in the model were removed.
- Continuous Minimum Flows: A new continuous release rule replaces the current Green Plan release rule. The releases were reduced to 85 cfs when the flows at the Heflin gage drop below 50 cfs. This is the drought cutback in the current Green Plan.
- Continuous Minimum Flows + Green Plan: A new continuous release rule is added with the current Green Plan release rule. Both rules reduce their releases to 85 cfs when the flows at the Heflin gage drop below 50 cfs. This is the drought cutback in the current Green Plan.
- A theoretical minimum flow unit that uses same intake as existing Harris unit to produce power.

Downstream Release Alternatives Study

Study Progress

- Phase 2 Analysis:
  - Outflow hydrographs from HEC-ResSim were routed downstream using HEC-RAS to assess effects of the downstream release alternatives on Project resources

- HAT 1 Meeting - April 1

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Downstream Release Alternatives Study

Resource	PreGP	ModGP	150CMF	300CMF	600CMF	800CMF	150CMF+GP	300CMF+GP	600CMF+GP	800CMF+GP
Harris Reservoir Elevations	=	=	=	=	-	-	=	-	-	-
Hydro Generation	+	-	-	-	-	-	-	-	-	-
Flood Control	=	=	=	=	=	=	=	=	=	=
Navigation	=	=	=	=	=	=	=	=	=	=
Drought Operations	=	=	=	=	=	=	=	=	=	=
Martin Conditional Fall Ext.	+	=	+	+	-	-	-	-	-	-
Water Quality - Reservoir	=	=	=	=	-	-	=	-	-	-
Water Quality – Tallapoosa	=	=	=	=	=	=	=	=	=	=
Water Use – Reservoir	=	=	=	=	=	-	=	=	-	-
Water Use – Tallapoosa	=	=	=	=	=	=	=	=	=	=
Erosion – Reservoir	=	=	=	=	=	=	=	=	=	=
Erosion – Tallapoosa	-	+	+	+	+	+	+	+	+	+
Aquatic Resources – Reservoir	=	=	=	=	-	-	=	-	-	-
Aquatic Resources – Fish Entrainment	=	=	=	=	=	=	=	=	=	=

Downstream Release Alternatives Study

Resource	PreGP	ModGP	150CMF	300CMF	600CMF	800CMF	150CMF+GP	300CMF+GP	600CMF+GP	800CMF+GP
Downstream Aquatic Habitat – Tallapoosa	-	+	+	+	+	+	+	+	+	+
Downstream Temperature Fluctuation – Tallapoosa	-	+	+	+	+	+	+	+	+	+
Wildlife – Reservoir	=	=	=	=	-	-	=	-	-	-
Wildlife – Tallapoosa	-	+	+	+	+	+	+	+	+	+
T&E Species – Reservoir	=	=	=	=	=	=	=	=	=	=
T&E Species – Tallapoosa	=	=	=	=	=	=	=	=	=	=
Recreation – Reservoir	=	=	=	=	-	-	=	-	-	-
Recreation – Tallapoosa	-	+	+	+	+	+	+	+	+	+
Cultural Resources – Reservoir	=	=	=	=	-	-	=	-	-	-
Cultural Resources – Tallapoosa	+	=	-	-	-	-	-	-	-	-

Downstream Release Alternatives Study

Variance

- ❖ No variances from the study plan or schedule

Remaining Activities

- ❖ Stakeholder comments on the Draft Phase 2 Study Report

- ❖ Present the operating proposal and PME measures in PLP

HARRIS DAM RELICENSING

Battery Energy Storage System (BESS) Study

Study Progress

❖ Evaluated 2 BESS release alternatives:
  - 50% reduction in peak releases associated with installing one 60 MW battery unit (Option A)
  - A proportionately smaller reduction in peak releases associated with installing a smaller MW battery unit (Option B)

❖ Developed costs for installing a BESS

❖ Structural changes including changes in turbine generator units and costs for implementing each battery storage type

❖ Effects on recreation and aquatic resources at Harris Project

❖ Upcoming HAT 1 Meeting on May 3

HARRIS DAM RELICENSING

Battery Energy Storage System (BESS) Study

Study Results

❖BESS Costs Over 40-Year License Term

	Option A	Option B
Total Installed Cost (2025$)	$96.6M ($1,610 / kW)	$39.0M ($1,950 / kW)
Fixed O&M (including augmentation) (2025-2044)	$1.77M * 20 years	$0.597 * 20 years
Total Replacement Cost (2025$)	$56.4M ($941 / kW)	$19.7M ($984 / kW)
Fixed O&M (including augmentation) (2045-2064)	$1.94M * 20 years	$0.647M * 20 years
Turbine Replacement Cost	Undetermined	$20M
Interconnection O&M (based on current OATT rate and subject to periodic adjustments)	$173,000 * 40 years	$173,000 * 40 years

❖Existing turbines are not designed to operate at flows lower than best gate

HARRIS DAM RELICENSING

Battery Energy Storage System (BESS) Study

Study Results

- ❖ Recreation – Lake Harris
  - No effect to recreation if BESS would result in releasing same daily volume of water as current operations
  - Adverse impact on recreation if BESS affected ability to maintain operating curve

- ❖ Recreation – Tallapoosa River downstream of Harris Dam
  - Option A – under certain assumptions, may benefit recreationists launching in tailrace and for the first few miles below Harris Dam
  - Option B – recreation based activities would still occur as they do under current operations, although peak release would be smaller

- ❖ Aquatic Resources – Tallapoosa River downstream of Harris Dam
  - Option A – could potentially benefit aquatic resources first 7 miles downstream
  - Option B – would not have same benefits as Option A as peak is still required; similar to Pre-Green Plan operations

HARRIS DAM RELICENSING

Battery Energy Storage System (BESS) Study

Variance

- The BESS was evaluated separately from the other downstream release alternatives and results of the analysis are presented in a separate report.
  - Due to constraints of existing model rules
  - Not considered a reasonable alternative

Remaining Activities

- Stakeholders comment on the Draft BESS Report

HARRIS DAM
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Water Quality Study

Study Progress

Location	Source	Description	Period
Lake Harris	ADEM	Vertical profiles and discrete chemistry samples at six locations	April - October 2018; June, July, September, & October 2020
	Alabama Power	Vertical profiles in the forebay	March - October 2017 – 2020
	Alabama Water Watch	Surface samples at six locations	monthly to semi-monthly, 2011 – 2019
	ADEM	Monthly measurements and discrete samples at Tailrace, Malone, Wadley, and Horseshoe Bend	2018 – 2020 (no measurements collected at Tailrace in 2019)
Tallapoosa River, Harris Dam to Horseshoe Bend	ADEM	Continuous (15-minute interval) monitoring at Malone	May 2018 - November 2019; April – November 2020
	Alabama Power	Continuous (15-minute interval) monitoring during generation (approximately 800 ft downstream of dam)	June - October 2017 – 2020
	Alabama Power	Continuous (15-minute interval) monitoring (approximately 0.5 miles downstream of dam)	March - October 2019; May – October 2020
	Alabama Water Watch	Surface samples at Horseshoe Bend	1993, 2007, & 2014 – 2017

Water Quality Study

Variance

- ❖ No variances from the study plan or schedule

Remaining Activities

- ❖ Alabama Power will prepare the 401 Water Quality Certification application and submit to ADEM after the FLA is filed with FERC.

Erosion and Sedimentation Study

Study Progress:

- No additional erosion data was collected downstream

- Conducted additional reconnaissance at identified sedimentation sites on Lake Harris during full (summer) pool conditions to determine if any nuisance aquatic vegetation was present.

Variance

- Alabama Power provided the results of the Nuisance Aquatic Vegetation Survey Report in Appendix F of the Final Erosion and Sedimentation Study Report rather than providing to HAT 3 in the form of a technical memorandum.

Remaining Activities

- No additional studies proposed and no remaining activities.

HARRIS DAM RELICENSING

Aquatic Resources Study

Study Progress:

❖ Desktop Assessment characterizes aquatic resources and temperature in the Study Area

❖ Auburn University:
- Conducted a literature review of temperature requirements of target species
- Temperature analysis
- Fish community sampling - continued sampling through January 2021
  - Tagged and tracked fish with acoustic/radio (CART tags) during the summer of 2020
- Conducted static respirometry tests and measured active metabolic rates
- Respirometry and bioenergetics modeling: effects of Harris operations (flow and temperature) on energy expenditures of target species

❖ HAT 3 Meetings - June 2, 2020, November 5, 2020, and March 31, 2021

HARRIS DAM RELICENSING

Auburn University Study

Temperature Results:

- ❖No differences found between pre- and post-Green Plan Temperatures
- ❖99.71% of hourly temperature fluctuations were within 2 ℃
- ❖Extreme hourly fluctuations(≥10 ℃) were rare and could possibly be attributed to exposure of a logger to air or direct sunlight for a prolonged period followed by re-submersion
- ❖Lowest daily range in temperatures at Heflin
- ❖Temperature tended to increase with increasing distance from the dam but, in winter, temperature was typically warmer near the dam

Auburn University Study

Fish Community Results

- Diversity was lower than Travnichek and Maceina (1994), but overall trends in diversity upstream and downstream were similar

- Relative contribution of centrarchids lower than 1996 rotenone sample; combined contribution of cyprinids and castostomids similar to 1951 rotenone sample

- Channel Catfish and Alabama Bass had greater body condition in the tailrace. Several factors could cause this potentially including cooler temperatures (temp not reaching thermal maximum for growth) and/or diet

- Fewer older, larger fish captured in tailrace attributed to less available shelter from flows and/or sampling gear (barge instead of boat electrofisher)

- Lipstick Darter were abundant in tailrace, likely due to ideal habitat

HARRIS DAM
RELICENSING

Auburn University Study

Bioenergetics and Growth Simulations:

❖Growth simulations could only be run for Redbreast Sunfish (using respiration rate parameters from published Bluegill data)

❖Other species had insufficient sample sizes or models that did not accurately estimate respiration rates

Bioenergetics Results:

❖Releases could slightly increase growth rate of age-1 Redbreast Sunfish

❖Release could slightly decrease growth rate of age-3 and age-5 Redbreast Sunfish due o the increased energy expenditure of swimming during releases; Model assumes that fish do not seek shelter during releases

❖Model used activity rates around Horseshoe Bend and assumes releases decrease temperature 5℃, but temperature fluctuations of that magnitude likely occur further upstream (tailrace to Malone)

Aquatic Resources Study

Variance

- ❖ Auburn University did not use the 30+2 sampling method as it was determined in the field to not be feasible/effective for sampling the sites

- ❖ Instead, shallow areas were sampled using boat and barge electrofishing equipment, which were found to be effective in sampling shallow areas within the study sites.

- ❖ The boat method used was a modification of the recently developed non-wadeable index of biological integrity (IBI). Sampling intensity was modified to accommodate available habitat, sampling frequency, and therefore IBI scores were not calculated.

Remaining Activities

- ❖ No additional studies proposed and no remaining activities.

HARRIS DAM
RELICENSING

Downstream Aquatic Habitat Study

Study Progress

- ❖ Collected level logger data at 20 locations in the Tallapoosa River below Harris Dam through June 2020
- ❖ HAT 3 Meetings - June 2, 2020, November 5, 2020, and March 31, 2021

Variance

- ❖ No variances from the study plan or schedule

Remaining Activities

- ❖ No additional studies proposed and no remaining activities.

Threatened and Endangered Species Study

Study Progress

- ❖ Alabama Power completed field surveys at Lake Harris and Skyline to determine if T&E species are located within the Project Boundary.

- ❖ Filed the final report on January 29, 2021
  - Included the Desktop Analysis and results of all field investigations

- ❖ HAT 3 Meetings - June 2, 2020, November 5, 2020, and March 31, 2021

Variance

- ❖ No variances from the study plan or schedule

Remaining Activities

- ❖ No additional studies proposed and no remaining activities.

Project Land Evaluation

Study Progress

- ❖ Samford University conducted a botanical survey on an additional 35 acres of land adjacent to the previously surveyed area at Flat Rock Park.
  - This additional botanical inventory report was filed on April 12, 2021

- ❖ HAT 4 Meeting - October 19, 2020

Variance:

- ❖ No variances from the study plan or schedule

Remaining activities:

- ❖ Alabama Power will file a Wildlife Management Plan and Shoreline Management Plan with the FLA.

HARRIS DAM RELICENSING

Recreation Evaluation

Study Progress

❖ Filed the Final Recreation Evaluation on November 24, 2020.

❖ HAT 5 Meetings - June 4, 2020 and October 19, 2020.

Variance

❖ No additional variances from the study plan or schedule

Remaining Activities

❖ No additional studies proposed and no remaining activities.

Cultural Resources Study

Study Progress

- February 2021 - Concluded cultural resources assessments for the sites identified during the Lake Harris preliminary archeological and completed cultural resource assessments for Skyline

- March 4, 2021 - Held a virtual site visit of Skyline for applicable tribes and the Alabama Historical Commission

- April 2021 – Complete TCP identification process with the Muscogee (Creek) Nation

HARRIS DAM
RELICENSING

Cultural Resources Study

Variance

- ❖ Alabama Power will complete the TCP identification process with the Muscogee (Creek) Nation in April 2021 (rather than February 2021 as noted in the Study Plan)

Remaining Activities

- ❖Complete eligibility assessments for known cultural resources
- ❖ Issue determination of effect on historic properties
- ❖ Develop a Draft Historic Properties Management Plan (HPMP) for the Harris Project to be filed concurrently with the PLP
- ❖ Upcoming Selected HAT 6 Meeting- May 5, 2021. Selected due to sensitive nature of meeting material.

HARRIS DAM RELICENSING

HAT 1 - Draft Operations Reports

APC Harris Relicensing <g2apchr@southernco.com>

Wed 4/28/2021 3:17 PM

To: APC Harris Relicensing <harrisrelicensing@southernco.com>
Bcc: damon.abernethy@dcnr.alabama.gov <damon.abernethy@dcnr.alabama.gov>; nathan.aycock@dcnr.alabama.gov <nathan.aycock@dcnr.alabama.gov>; steve.bryant@dcnr.alabama.gov <steve.bryant@dcnr.alabama.gov>; todd.fobian@dcnr.alabama.gov <todd.fobian@dcnr.alabama.gov>; chris.greene@dcnr.alabama.gov <chris.greene@dcnr.alabama.gov>; keith.henderson@dcnr.alabama.gov <keith.henderson@dcnr.alabama.gov>; mike.holley@dcnr.alabama.gov <mike.holley@dcnr.alabama.gov>; evan.lawrence@dcnr.alabama.gov <evan.lawrence@dcnr.alabama.gov>; matthew.marshall@dcnr.alabama.gov <matthew.marshall@dcnr.alabama.gov>; brian.atkins@adeca.alabama.gov <brian.atkins@adeca.alabama.gov>; tom.littlepage@adeca.alabama.gov <tom.littlepage@adeca.alabama.gov>; jhaslbauer@adem.alabama.gov <jhaslbauer@adem.alabama.gov>; cljohnson@adem.alabama.gov <cljohnson@adem.alabama.gov>; mlen@adem.alabama.gov <mlen@adem.alabama.gov>; fal@adem.alabama.gov <fal@adem.alabama.gov>; alockwood@adem.alabama.gov <alockwood@adem.alabama.gov>; djmoore@adem.alabama.gov <djmoore@adem.alabama.gov>; arsegars@southernco.com <arsegars@southernco.com>; dkanders@southernco.com <dkanders@southernco.com>; wtanders@southernco.com <wtanders@southernco.com>; jefbaker@southernco.com <jefbaker@southernco.com>; jcarlee@southernco.com <jcarlee@southernco.com>; kechandl@southernco.com <kechandl@southernco.com>; mcoker@southernco.com <mcoker@southernco.com>; afleming@southernco.com <afleming@southernco.com>; cggoodma@southernco.com <cggoodma@southernco.com>; sgraham@southernco.com <sgraham@southernco.com>; ammcvica@southernco.com <ammcvica@southernco.com>; tlmills@southernco.com <tlmills@southernco.com>; cmnix@southernco.com <cmnix@southernco.com>; abnoel@southernco.com <abnoel@southernco.com>; kodom@southernco.com <kodom@southernco.com>; alpeeple@southernco.com <alpeeple@southernco.com>; scsmith@southernco.com <scsmith@southernco.com>; twstjohn@southernco.com <twstjohn@southernco.com>; Rasberry, Jennifer S. <JSRASBER@southernco.com>; mhunter@alabamarivers.org <mhunter@alabamarivers.org>; clowry@alabamarivers.org <clowry@alabamarivers.org>; jwest@alabamarivers.org <jwest@alabamarivers.org>; gjobsis@americanrivers.org <gjobsis@americanrivers.org>; kmo0025@auburn.edu <kmo0025@auburn.edu>; devridr@auburn.edu <devridr@auburn.edu>; irwiner@auburn.edu <irwiner@auburn.edu>; wrighr2@aces.edu <wrighr2@aces.edu>; lgallen@balch.com <lgallen@balch.com>; jhancock@balch.com <jhancock@balch.com>; allan.creamer@ferc.gov <allan.creamer@ferc.gov>; rachel.mcnamara@ferc.gov <rachel.mcnamara@ferc.gov>; sarah.salazar@ferc.gov <sarah.salazar@ferc.gov>; monte.terhaar@ferc.gov <monte.terhaar@ferc.gov>; gene@wedoweelakehomes.com <gene@wedoweelakehomes.com>; colin.dinken@kleinschmidtgroup.com <colin.dinken@kleinschmidtgroup.com>; chris.goodell@kleinschmidtgroup.com <chris.goodell@kleinschmidtgroup.com>; jason.moak@kleinschmidtgroup.com <jason.moak@kleinschmidtgroup.com>; kelly.schaeffer@kleinschmidtgroup.com <kelly.schaeffer@kleinschmidtgroup.com>; sandra.wash@kleinschmidtgroup.com <sandra.wash@kleinschmidtgroup.com>; jessecunningham@msn.com <jessecunningham@msn.com>; mdollar48@gmail.com <mdollar48@gmail.com>; drheinzen@charter.net <drheinzen@charter.net>; sforehand@russelllands.com <sforehand@russelllands.com>; 1942jthompson420@gmail.com <1942jthompson420@gmail.com>; nancyburnes@centurylink.net <nancyburnes@centurylink.net>; sandnfrench@gmail.com <sandnfrench@gmail.com>; lgarland68@aol.com <lgarland68@aol.com>; rbmorris222@gmail.com <rbmorris222@gmail.com>; irapar@centurytel.net <irapar@centurytel.net>; mitchell.reid@tnc.org <mitchell.reid@tnc.org>; richardburnes3@gmail.com <richardburnes3@gmail.com>; eilandfarm@aol.com <eilandfarm@aol.com>; athall@fujifilm.com <athall@fujifilm.com>; ebt.drt@numail.org <ebt.drt@numail.org>; georgettraylor@centurylink.net <georgettraylor@centurylink.net>; beckyrainwater1@yahoo.com <beckyrainwater1@yahoo.com>; dbronson@charter.net <dbronson@charter.net>; wmcampbell218@gmail.com <wmcampbell218@gmail.com>; jec22641@aol.com <jec22641@aol.com>; robinwaldrep@yahoo.com <robinwaldrep@yahoo.com>; sonjahollomon@gmail.com <sonjahollomon@gmail.com>; butchjackson60@gmail.com <butchjackson60@gmail.com>; donnamat@aol.com <donnamat@aol.com>; goxford@centurylink.net <goxford@centurylink.net>; mhpwedowee@gmail.com <mhpwedowee@gmail.com>; jerrelshell@gmail.com <jerrelshell@gmail.com>; bsmith0253@gmail.com <bsmith0253@gmail.com>; inspector_003@yahoo.com <inspector_003@yahoo.com>; paul.trudine@gmail.com <paul.trudine@gmail.com>; lindastone2012@gmail.com <lindastone2012@gmail.com>; granddadth@windstream.net <granddadth@windstream.net>; trayjim@bellsouth.net <trayjim@bellsouth.net>; straylor426@bellsouth.net <straylor426@bellsouth.net>; robert.a.allen@usace.army.mil <robert.a.allen@usace.army.mil>; randall.b.harvey@usace.army.mil <randall.b.harvey@usace.army.mil>; james.e.hathorn.jr@sam.usace.army.mil <james.e.hathorn.jr@sam.usace.army.mil>; lewis.c.sumner@usace.army.mil <lewis.c.sumner@usace.army.mil>; jonas.white@usace.army.mil <jonas.white@usace.army.mil>; gordon.lisa-perras@epa.gov <gordon.lisa-perras@epa.gov>; holliman.daniel@epa.gov <holliman.daniel@epa.gov>; mayo.lydia@epa.gov <mayo.lydia@epa.gov>; jennifer_grunewald@fws.gov <jennifer_grunewald@fws.gov>; erin_padgett@fws.gov <erin_padgett@fws.gov>; jeff_powell@fws.gov <jeff_powell@fws.gov>; jeff_duncan@nps.gov <jeff_duncan@nps.gov>; Martindale, Lisa (LMARTIND@southernco.com) <LMARTIND@southernco.com>

HAT 1,

Due to the length and complexity of these reports, Alabama Power would like to provide additional time for your review and comment. Please submit any comments you may have on the draft Operating Curve Feasibility Analysis Phase 2 Report, draft Downstream Release Alternatives Phase 2 Report and draft BESS Report by **May 26, 2021**.

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

HAT 1,

The draft Operating Curve Feasibility Analysis Phase 2 Report, draft Downstream Release Alternatives Phase 2 Report and draft BESS Report are available for your review on the Harris relicensing website in the HAT 1 folder. These reports can also be found on FERC's website (http://www.ferc.gov) by going to the "elibrary" link and entering docket number P-2628.

Please submit your comments on these reports to Alabama Power at harrisrelicensing@southernco.com by **May 11, 2021**.

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From:	Clark, Maria
To:	Anderegg, Angela Segars
Subject:	RE: Harris Relicensing - Updated Study Report Meeting
Date:	Wednesday, May 12, 2021 11:24:05 AM
Importance:	High

EXTERNAL MAIL: Caution Opening Links or Files

Hi Angie,

Yes please, I need to know all dates and meetings for this project, my colleagues (from EPA) are collaborating in reviewing this project, but I'm the project's officer. You only will see EPA's official comments coming from me.
Thank you!
Maria

P.S. You might delete Dan Holliman from the list.

From: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Sent: Wednesday, May 12, 2021 10:26 AM
To: Clark, Maria <Clark.Maria@epa.gov>
Subject: RE: Harris Relicensing - Updated Study Report Meeting

You aren't receiving the HAT 1 emails because you aren't on the HAT 1 distribution list. I have Lisa Perras Gordon, Dan Holliman and Lydia Mayo signed up for EPA. I can include you on this email list also – just let me know what you prefer.

Thanks!

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From: Clark, Maria <Clark.Maria@epa.gov>
Sent: Wednesday, May 12, 2021 9:12 AM
To: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Subject: RE: Harris Relicensing - Updated Study Report Meeting

EXTERNAL MAIL: Caution Opening Links or Files

Thank you Angie. I checked and still not getting all the emails from AP.

From: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Sent: Wednesday, May 12, 2021 10:00 AM
To: Clark, Maria <Clark.Maria@epa.gov>
Subject: RE: Harris Relicensing - Updated Study Report Meeting

Hi Maria,

The attached email was sent out on 4/28, extending the comment period for the three draft operations study reports to May 26.

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From: Clark, Maria <Clark.Maria@epa.gov>
Sent: Wednesday, May 12, 2021 8:47 AM
To: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Subject: RE: Harris Relicensing - Updated Study Report Meeting
Importance: High

EXTERNAL MAIL: Caution Opening Links or Files

Dear Angie,

Has there been an extension for this round of comments to AP?

Thank you!

Maria R. Clark
NEPA Section – Region 4
Strategic Programs Office
U.S. Environmental Protection Agency
61 Forsyth Street, SW
Atlanta, GA 30303
Phone# 404-562-9513

From: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Sent: Monday, April 26, 2021 10:55 AM
To: APC Harris Relicensing <g2apchr@southernco.com>
Subject: Harris Relicensing - Updated Study Report Meeting

Harris relicensing stakeholders,

The presentation for tomorrow's Updated Study Report meeting is available on the Harris relicensing website (Relicensing Documents [gcc02.safelinks.protection.outlook.com] [gcc02.safelinks.protection.outlook.com] [gcc02.safelinks.protection.outlook.com]). Microsoft Teams call-in information is below.

I look forward to talking with you tomorrow.

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From: APC Harris Relicensing
Sent: Monday, April 12, 2021 1:47 PM
To: APC Harris Relicensing <harrisrelicensing@southernco.com>
Subject: Harris Relicensing - Updated Study Report

Harris relicensing stakeholders,

Pursuant to FERC's Integrated Licensing Process, Alabama Power filed its Harris Project Updated Study Report (USR) today. Concurrent with the USR filing, Alabama Power filed three draft study reports, four final study reports and the results of a Botanical Inventory at Flat Rock Park. Stakeholders may access the USR and the study reports on FERC's website (http://www.ferc.gov [gcc02.safelinks.protection.outlook.com] [gcc02.safelinks.protection.outlook.com] [gcc02.safelinks.protection.outlook.com]) by going to the "eLibrary" link and entering the docket number (P-2628). The USR and study reports are also available on the Project relicensing website at http://harrisrelicensing.com [gcc02.safelinks.protection.outlook.com] [gcc02.safelinks.protection.outlook.com] [gcc02.safelinks.protection.outlook.com].

The Updated Study Report meeting will be held on **April 27, 2021**. Please hold this date from 9:00 am to 12:00 pm central time. Call in information for the meeting can be found below. The purpose of the meeting is to provide an opportunity to review the contents of the USR.

Alabama Power will file a summary of the USR meeting by **May 12, 2021**. Stakeholders will have until **June 11, 2021** to file written comments with FERC on the USR Meeting Summary.

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

Microsoft Teams meeting

Join on your computer or mobile app
Click here to join the meeting [gcc02.safelinks.protection.outlook.com]
[gcc02.safelinks.protection.outlook.com] [gcc02.safelinks.protection.outlook.com]

Video Conference ID: 112 301 635 7
Alternate VTC dialing instructions [gcc02.safelinks.protection.outlook.com]
[gcc02.safelinks.protection.outlook.com] [gcc02.safelinks.protection.outlook.com]
Or call in (audio only)
+1 470-705-0860,,168184661#   United States, Atlanta
Phone Conference ID: 168 184 661#
Find a local number [gcc02.safelinks.protection.outlook.com]
[gcc02.safelinks.protection.outlook.com] [gcc02.safelinks.protection.outlook.com] |

Harris relicensing - USR meeting summary

APC Harris Relicensing <g2apchr@southernco.com>

Wed 5/12/2021 11:56 AM

To: APC Harris Relicensing <harrisrelicensing@southernco.com>
Bcc: 1942jthompson420@gmail.com <1942jthompson420@gmail.com>; 9sling@charter.net <9sling@charter.net>;
abnoel@southernco.com <abnoel@southernco.com>; allan.creamer@ferc.gov <allan.creamer@ferc.gov>;
alockwood@adem.alabama.gov <alockwood@adem.alabama.gov>; alpeeple@southernco.com <alpeeple@southernco.com>;
amanda.mcbride@ahc.alabama.gov <amanda.mcbride@ahc.alabama.gov>; ammcvica@southernco.com
<ammcvica@southernco.com>; amy.silvano@dcnr.alabama.gov <amy.silvano@dcnr.alabama.gov>;
andrew.nix@dcnr.alabama.gov <andrew.nix@dcnr.alabama.gov>; arsegars@southernco.com <arsegars@southernco.com>;
athall@fujifilm.com <athall@fujifilm.com>; aubie84@yahoo.com <aubie84@yahoo.com>; awhorton@corblu.com
<awhorton@corblu.com>; bart_roby@msn.com <bart_roby@msn.com>; baxterchip@yahoo.com <baxterchip@yahoo.com>;
bboozer6@gmail.com <bboozer6@gmail.com>; bdavis081942@gmail.com <bdavis081942@gmail.com>;
beckyrainwater1@yahoo.com <beckyrainwater1@yahoo.com>; bill_pearson@fws.gov <bill_pearson@fws.gov>;
blacklake20@gmail.com <blacklake20@gmail.com>; blm_es_inquiries@blm.gov <blm_es_inquiries@blm.gov>;
bob.stone@smimail.net <bob.stone@smimail.net>; bradandsue795@gmail.com <bradandsue795@gmail.com>;
bradfordt71@gmail.com <bradfordt71@gmail.com>; brian.atkins@adeca.alabama.gov <brian.atkins@adeca.alabama.gov>;
bruce.bradford@forestry.alabama.gov <bruce.bradford@forestry.alabama.gov>; bruce@bruceknapp.com
<bruce@bruceknapp.com>; bsmith0253@gmail.com <bsmith0253@gmail.com>; btseale@southernco.com
<btseale@southernco.com>; butchjackson60@gmail.com <butchjackson60@gmail.com>; bwhaley@randolphcountyeda.com
<bwhaley@randolphcountyeda.com>; carolbuggknight@hotmail.com <carolbuggknight@hotmail.com>;
celestine.bryant@actribe.org <celestine.bryant@actribe.org>; cengstrom@centurytel.net <cengstrom@centurytel.net>;
cggoodma@southernco.com <cggoodma@southernco.com>; cgnav@uscg.mil <cgnav@uscg.mil>;
chandlermary937@gmail.com <chandlermary937@gmail.com>; chiefknight2002@yahoo.com <chiefknight2002@yahoo.com>;
chimneycove@gmail.com <chimneycove@gmail.com>; chris.goodell@kleinschmidtgroup.com
<chris.goodell@kleinschmidtgroup.com>; chris.greene@dcnr.alabama.gov <chris.greene@dcnr.alabama.gov>;
chris.smith@dcnr.alabama.gov <chris.smith@dcnr.alabama.gov>; chris@alaudubon.org <chris@alaudubon.org>;
chuckdenman@hotmail.com <chuckdenman@hotmail.com>; clark.maria@epa.gov <clark.maria@epa.gov>;
claychamber@gmail.com <claychamber@gmail.com>; clint.lloyd@auburn.edu <clint.lloyd@auburn.edu>;
cljohnson@adem.alabama.gov <cljohnson@adem.alabama.gov>; clowry@alabamarivers.org <clowry@alabamarivers.org>;
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<cooper.jamal@epa.gov>; coty.brown@alea.gov <coty.brown@alea.gov>; craig.litteken@usace.army.mil
<craig.litteken@usace.army.mil>; crystal.davis@adeca.alabama.gov <crystal.davis@adeca.alabama.gov>;
crystal.lakewedoweedocks@gmail.com <crystal.lakewedoweedocks@gmail.com>; crystal@hunterbend.com
<crystal@hunterbend.com>; dalerose120@yahoo.com <dalerose120@yahoo.com>; damon.abernethy@dcnr.alabama.gov
<damon.abernethy@dcnr.alabama.gov>; dbronson@charter.net <dbronson@charter.net>; dcnr.wffdirector@dcnr.alabama.gov
<dcnr.wffdirector@dcnr.alabama.gov>; decker.chris@epa.gov <decker.chris@epa.gov>; devridr@auburn.edu
<devridr@auburn.edu>; dfarr@randolphcountyalabama.gov <dfarr@randolphcountyalabama.gov>; dhayba@usgs.gov
<dhayba@usgs.gov>; director.cleburnecountychamber@gmail.com <director.cleburnecountychamber@gmail.com>;
djmoore@adem.alabama.gov <djmoore@adem.alabama.gov>; dkanders@southernco.com <dkanders@southernco.com>;
donnamat@aol.com <donnamat@aol.com>; doug.deaton@dcnr.alabama.gov <doug.deaton@dcnr.alabama.gov>;
dpreston@southernco.com <dpreston@southernco.com>; drheinzen@charter.net <drheinzen@charter.net>;
ebt.drt@numail.org <ebt.drt@numail.org>; eddieplemons@charter.net <eddieplemons@charter.net>; eilandfarm@aol.com
<eilandfarm@aol.com>; el.brannon@yahoo.com <el.brannon@yahoo.com>; elizabeth-toombs@cherokee.org <elizabeth-
toombs@cherokee.org>; emathews@aces.edu <emathews@aces.edu>; eric.sipes@ahc.alabama.gov
<eric.sipes@ahc.alabama.gov>; erin_padgett@fws.gov <erin_padgett@fws.gov>; evan.lawrence@dcnr.alabama.gov
<evan.lawrence@dcnr.alabama.gov>; evan_collins@fws.gov <evan_collins@fws.gov>; eveham75@gmail.com
<eveham75@gmail.com>; fal@adem.alabama.gov <fal@adem.alabama.gov>; Fleming, Amanda <afleming@southernco.COM>;
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garyprice@centurytel.net <garyprice@centurytel.net>; gene@wedoweelakehomes.com <gene@wedoweelakehomes.com>;
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gfhorn@southernco.com <gfhorn@southernco.com>; gjobsis@americanrivers.org <gjobsis@americanrivers.org>;
gld@adem.alabama.gov <gld@adem.alabama.gov>; glea@wgsarrell.com <glea@wgsarrell.com>; gmraines@ten-o.com
<gmraines@ten-o.com>; gordon.lisa-perras@epa.gov <gordon.lisa-perras@epa.gov>; goxford@centurylink.net
<goxford@centurylink.net>; granddadth@windstream.net <granddadth@windstream.net>; harry.merrill47@gmail.com
<harry.merrill47@gmail.com>; helen.greer@att.net <helen.greer@att.net>; holliman.daniel@epa.gov
<holliman.daniel@epa.gov>; info@aeconline.org <info@aeconline.org>; info@tunica.org <info@tunica.org>;

inspector_003@yahoo.com <inspector_003@yahoo.com>; irapar@centurytel.net <irapar@centurytel.net>; irwiner@auburn.edu <irwiner@auburn.edu>; j35sullivan@blm.gov <j35sullivan@blm.gov>; jabeason@southernco.com <jabeason@southernco.com>; james.e.hathorn.jr@sam.usace.army.mil <james.e.hathorn.jr@sam.usace.army.mil>; jason.moak@kleinschmidtgroup.com <jason.moak@kleinschmidtgroup.com>; jcandler7@yahoo.com <jcandler7@yahoo.com>; jcarlee@southernco.com <jcarlee@southernco.com>; jec22641@aol.com <jec22641@aol.com>; jeddins@achp.gov <jeddins@achp.gov>; jefbaker@southernco.com <jefbaker@southernco.com>; jeff_duncan@nps.gov <jeff_duncan@nps.gov>; jeff_powell@fws.gov <jeff_powell@fws.gov>; jennifer.l.jacobson@usace.army.mil <jennifer.l.jacobson@usace.army.mil>; jennifer_grunewald@fws.gov <jennifer_grunewald@fws.gov>; jerrelshell@gmail.com <jerrelshell@gmail.com>; jessecunningham@msn.com <jessecunningham@msn.com>; jfcrew@southernco.com <jfcrew@southernco.com>; jhancock@balch.com <jhancock@balch.com>; jharjo@alabama-quassarte.org <jharjo@alabama-quassarte.org>; jhaslbauer@adem.alabama.gov <jhaslbauer@adem.alabama.gov>; jhouser@osiny.org <jhouser@osiny.org>; jkwdurham@gmail.com <jkwdurham@gmail.com>; jnyerby@southernco.com <jnyerby@southernco.com>; joan.e.zehrt@usace.army.mil <joan.e.zehrt@usace.army.mil>; john.free@psc.alabama.gov <john.free@psc.alabama.gov>; johndiane@sbcglobal.net <johndiane@sbcglobal.net>; jonas.white@usace.army.mil <jonas.white@usace.army.mil>; josh.benefield@forestry.alabama.gov <josh.benefield@forestry.alabama.gov>; jpsparrow@att.net <jpsparrow@att.net>; jsrasber@southernco.com <jsrasber@southernco.com>; jthacker@southernco.com <jthacker@southernco.com>; jthroneberry@tnc.org <jthroneberry@tnc.org>; judymcrealtor@gmail.com <judymcrealtor@gmail.com>; jwest@alabamarivers.org <jwest@alabamarivers.org>; kajumba.ntale@epa.gov <kajumba.ntale@epa.gov>; karen.brunso@chickasaw.net <karen.brunso@chickasaw.net>; kcarleton@choctaw.org <kcarleton@choctaw.org>; kechandl@southernco.com <kechandl@southernco.com>; 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1 attachments (207 KB)

2021-05-12 USR Meeting Summary.pdf;

Harris relicensing stakeholders,

Pursuant to FERC's Integrated Licensing Process and 18 cfr § 5.15(f), Alabama Power filed the Harris Project Updated Study Report (USR) on April 12, 2021 and held the USR Meeting on April 27, 2021. Stakeholders have until **June 11, 2021** to file written comments with FERC on the attached USR Meeting Summary. All comments must adhere to FERC regulations at 18 CFR Section 5.15 (c)(2)-(7). Any proposal for new information gathering or studies is subject to paragraph (e) of Section 5.15 except that the proponent must demonstrate extraordinary circumstances warranting approval.

Stakeholders may access the USR Meeting Summary on FERC's website (http://www.ferc.gov) by going to the "eLibrary" link and entering the docket number (P-2628). The USR Meeting Summary is also available on the Project relicensing website at R.L. Harris Hydroelectric Project Relicensing Website - Welcome (harrisrelicensing.com).

Thanks,

Angie Anderegg
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May 12, 2021

VIA ELECTRONIC FILING

Project No. 2628-065
R.L. Harris Hydroelectric Project
Transmittal of the Updated Study Report Meeting Summary

Ms. Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street NE
Washington, DC 20426

Dear Secretary Bose,

Alabama Power Company (Alabama Power) is the Federal Energy Regulatory Commission (FERC or Commission) licensee for the R.L. Harris Hydroelectric Project (Harris Project) (FERC No. 2628-065). On April 12, 2019, FERC issued its Study Plan Determination[1] (SPD) for the Harris Project, approving Alabama Power's ten relicensing studies with FERC modifications. On May 13, 2019, Alabama Power filed Final Study Plans to incorporate FERC's modifications and posted the Final Study Plans on the Harris relicensing website at www.harrisrelicensing.com.

Pursuant to the Commission's Integrated Licensing Process (ILP) and 18 CFR § 5.15(f), Alabama Power filed the Harris Project Updated Study Report (USR) on April 12, 2021[2] and held the USR Meeting on April 27, 2021.

Stakeholders have until June 11, 2021 to file written comments with FERC on the attached USR Meeting Summary. All comments must adhere to FERC regulations at 18 CFR Section 5.15 (c)(2)-(7). Any proposal for new information gathering or studies is subject to paragraph (e) of Section 5.15 except that the proponent must demonstrate extraordinary circumstances warranting approval. Stakeholders may access the USR Meeting Summary on FERC's website (http://www.ferc.gov) by going to the "eLibrary" link and entering the docket number (P-2628). The USR Meeting Summary is also available on the Project relicensing website at https://harrisrelicensing.com.

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[1] Accession No 20190412-3000.

[2] Accession No 20210412-5737.

If there are any questions concerning this filing, please contact me at arsegars@southernco.com or 205-257-2251.

Sincerely,

Angela Anderegg

Angie Anderegg
Harris Relicensing Project Manager

Attachment – Updated Study Report Meeting Summary

cc: Harris Stakeholder List

Attachment
Updated Study Report Meeting Summary

Updated Study Report Meeting Summary
Harris Project
April 27, 2021
9:00 am – 12:00 pm
Microsoft Teams Meeting

Participants:
Angie Anderegg – Alabama Power Company (Alabama Power)
Wes Anderson – Alabama Power
Dave Anderson – Alabama Power
Jeff Baker – Alabama Power
Katie Bolton – Alabama Power
RaeLynn Butler – Muscogee (Creek) Nation
Jason Carlee – Alabama Power
Bryant Celestine – Alabama Coushatta Tribe of Texas
Keith Chandler – Alabama Power
Maria Clark – Environmental Protection Agency (EPA)
Evan Collins – United States Fish and Wildlife Service (USFWS)
Allan Creamer – Federal Energy Regulatory Commission (FERC)
Jim Crew – Alabama Power
Colin Dinken – Kleinschmidt Associates (Kleinschmidt)
Danielle Elefritz - FERC
Amanda Fleming – Alabama Power
Todd Fobian – Alabama Department of Conservation and Natural Resources (ADCNR)
Mike Godfrey – Alabama Power
Chris Goodman – Alabama Power
Stacey Graham – Alabama Power
Jim Hancock – Balch and Bingham
Jennifer Haslbauer – Alabama Department of Environmental Management (ADEM)
Martha Hunter – Alabama Rivers Alliance (ARA)
Kelly Kirven – Kleinschmidt
Carol Knight – Downstream Property Owners
Lisa Martindale – Alabama Power
Donna Matthews – Downstream Property Owner
Lydia Mayo – EPA
Amanda McBride – Alabama Historical Commission (AHC)
Rachel McNamara – FERC
Ashley McVicar – Alabama Power
Tina Mills – Alabama Power
Jason Moak - Kleinschmidt
David Moore – ADEM
Barry Morris – Lake Wedowee Property Owners' Association
Kenneth Odom – Alabama Power
Courtenay O'Mara – Georgia Power Company
Erin Padgett – USFWS
Alan Peeples – Alabama Power

Jennifer Rasberry – Alabama Power
Sarah Salazar - FERC
Kelly Schaeffer – Kleinschmidt
Robin Soweka – Muscogee (Creek) Nation
Sheila Smith – Alabama Power
Monte Terhaar - FERC
Jimmy Traylor – Downstream Property Owner
Sandra Wash – Kleinschmidt
Jack West – ARA
Ken Wills – Alabama Glade Conservation Coalition
Josh Yerby – Alabama Power

Updated Study Report (USR) Meeting Summary:

Angie Anderegg (Alabama Power Company (Alabama Power)) opened the meeting with a safety moment, reviewed Harris Relicensing milestones, and noted an upcoming (May 3, 2021) Harris Action Team (HAT) meeting on the Battery Energy Storage System (BESS) study. Angie stated the Updated Study Report (USR) meeting purpose: to present an overview of the study progress, including data collected, any variance to the study plan or schedule, and remaining activities for the Harris studies.

Dave Anderson (Alabama Power) presented the study progress, applicable variances, and remaining activities on the Operating Curve Change Feasibility Analysis study. Sarah Salazar (Federal Energy Regulatory Commission (FERC)) asked if Alabama Power would consolidate the effects on resources of the operating curve alternatives combined with proposed downstream alternatives in the Preliminary Licensing Proposal (PLP) so that stakeholders could comment on those proposed measures knowing the combined effects of both. Angie confirmed that only if Alabama Power's proposal includes both a downstream release and a change in the operating curve would those be analyzed together. Allan Creamer (FERC) noted that all existing erosion sites identified in the Erosion and Sedimentation Study appear to be located above the summer pool elevation and asked if an increase in the winter pool could cause additional wind and wave action on portions of the shoreline from a potential increase in recreation/boating. Dave agreed that the potential for that effect exists. Angie confirmed that, in general, there would be an increase in wave action with an increase in recreation. Allan recommended that this be identified as a potential effect on erosion in the *Operating Curve Change Feasibility Phase 2 Analysis Study Report*.

Sarah asked if the GIS data associated with the *Operating Curve Change Feasibility Phase 2 Analysis Study Report* had been filed. Dave replied no and noted that the GIS data will be filed with the Final License Application (FLA) in November. Sarah noted that the Project Boundary layer and the two other GIS layers filed with the *Phase 1 Project Lands Evaluation Study Report* contained differing projections and she requested that future GIS data layers use the same projection and coordinate system. Dave asked if the GIS data could be provided through the Harris Relicensing Website instead of FERC's e-Library. Sarah confirmed that the data would need to be filed on FERC's e-Library but could be added to the Harris Relicensing website as well. Donna Matthews asked for clarification on the variance related to the use of historic photos on Lake Harris[1]. Dave stated that historical aerial photos of the identified sedimentation sites on Harris Reservoir were to be compared to 2015 high-resolution photos; however, poor resolution of the historic photos did not provide the ability to compare the photos. Jason Moak (Kleinschmidt) added that Alabama Power's historic photos of the lake were also taken during different times of the year when the lake was at different levels. Donna asked if the photographs could be overlayed using landmarks. Dave mentioned that the photos could be georeferenced and overlayed, but the resolution of the photographs are not comparable. Jimmy Traylor (Downstream Property Owner) stated there were no advantages to downstream property owners if Alabama Power increased the lake level elevation, but instead could increase flooding and erosion downstream. Jimmy asked if Alabama Power could limit flooding by pre-evacuating the reservoir. Dave stated that pre-evacuation of the reservoir is not in the current Water Control Manual (WCM) procedures that are established by the U.S. Army Corps of Engineers (USACE). Jimmy asked if that could be changed. Dave noted it potentially could with extensive studies and noted that the USACE would require a lot more data to evaluate a change in the flood control procedures compared to the information Alabama Power has gathered thus far. Angie added that would be outside of the scope of the relicensing process.

Dave presented the study progress, applicable variances, and the remaining activities on the Downstream Release Alternatives Phase 2 study. Barry Morris (Lake Wedowee Property Owner's Association (LWPOA) stated that the 300 cubic feet per second (cfs) continuous minimum flow (CMF) is double the flow that Alabama Power currently passes through the dam and inquired on how 300 CMF would not affect the reservoir level. In addition, Barry asked if there would be a rule that would cutback the CMF depending on inflows to the lake. Angie responded that 300 CMF does not affect the reservoir level as there would be less water on peak and instead would pass continuously. Angie noted that the Green Plan (current operations) has provisions for cutbacks during drought. Angie added that if a minimum flow were proposed, Alabama Power would evaluate what drought cutback is needed for the minimum flow operations and how that would be provided. Barry asked for confirmation that the only time Alabama Power would cutback the CMF is during drought operations. Angie confirmed and noted that a drought cutback is built into the HEC-ResSim model that was used in the relicensing studies. Sarah asked if the terminology of the CMF alternatives could include "plus peaking" to clarify that the CMF is not the only water that is passing through the dam. Angie noted that Alabama Power will clearly describe its operations proposal in the PLP.

Allan asked for clarification on the trend in the average daily water surface fluctuation exceedance tables and on the average wetted perimeter tables in the *Downstream Release Alternatives Phase 2 Analysis Study Report*. Dave asked Allan to submit written comments on the draft report. Jack West (Alabama Rivers Alliance (ARA) noted that the 150 CMF and 300 CMF alternatives had no effect on Harris Reservoir elevations, with 600 CMF having an adverse effect. Jack asked if anything between 300 CMF and 600 CMF were modeled and at what point the CMF begins to impact lake levels. Dave responded that Alabama Power analyzed the alternatives that were approved by FERC and did not model anything between 300 CMF and 600 CMF. Jimmy asked why Alabama Power only considered the flow from the Tallapoosa River and had not analyzed the flow from the Little Tallapoosa River. Dave stated the Heflin gage was

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[1] While use of historic photos from Lake Harris was mentioned in the Operating Curve Change Analysis Study Plan, photos could not be used to assess the effects of the winter pool alternatives due to the limited resolution of the historical photos. This was noted as a variance in the Updated Study Report and is separate from the downstream historical photos submitted by Donna Matthews that were filed with FERC.

found to be more representative of flows in the basin when the Green Plan (GP) was developed. Jimmy noted that if a CMF is proposed, the flow from the Tallapoosa River and the Little Tallapoosa River should be analyzed to understand the impacts to Harris Reservoir and the Tallapoosa River downstream. Dave stated that current operations in the model are based on the Heflin gage in the Tallapoosa River[2].

Carol Knight (Downstream Property Owner) stated concerns regarding erosion downstream of Harris Dam and recommended pre-evacuation of the reservoir be further considered. Alan Peeples (Alabama Power) explained that pre-evacuation could exacerbate flooding downstream due to error in rain forecasts. In addition, the current operations are dictated by the USACE WCM. Sarah asked why the 300 CMF+GP would impact reservoir elevations while the 300 CMF does not, even though the alternatives represent the same volume of water. Dave clarified that the two alternatives are not the same volume, as the 300 CMF+GP includes GP pulses in addition to the CMF and peaking operations (while 300 CMF includes 300 cfs CMF and peaking operations). Sarah asked for clarification, in that the GP pulses are subtracted from what would be used for peaking at any given time. Angie explained that in the model there is a rule that maintains the reservoir level and any water available above that needed for the CMF is allocated for peaking. Angie noted that the amount available for peaking varies depending on inflow (i.e. there are times when there is only enough water available for the CMF) and added that the higher CMF alternatives (and the 300 CMP+GP alternative) impact reservoir levels due to outflow being greater than inflow. Regarding impacts to generation, Monte Terhaar (FERC) requested megawatt hours (MWh) be presented in the summary table in the operating reports in addition to the monetary value. Kelly confirmed this change will be made in the Final Phase 2 reports.

Tina Mills (Alabama Power) presented the study progress, applicable variances, and remaining activities for the Battery Energy Storage System (BESS) study. There were no questions.

Jason M. presented study progress, applicable variances, and remaining activities for the Water Quality study. Allan noted that Table 4-9 of the *Water Quality Study Report* provides a monthly summary of dissolved oxygen (DO) and temperature data from the continuous monitor from 2019-2020 and asked how the generation and non-generation data would compare at that monitor. Jason M. noted that the analysis was not included in the report but anecdotally, there were minimal differences between data collected at the same time at the generation monitor versus the continuous monitor. Jason M. added that the monitors are approximately one-half mile apart so there is travel time to account for. Keith Chandler (Alabama Power) explained that the continuous monitor location was chosen in consultation with Alabama Department of Environmental Management (ADEM) as a site to monitor the fishery and the generation monitor location was agreed upon with ADEM as a site that was representative of turbine discharge. Keith added that travel time or other potential influences have not been evaluated at the continuous monitor. Allan stated that he would not expect travel time to impact data with the sites being approximately one-half mile apart. Keith clarified that the intent of the continuous monitor was to monitor the fishery, not plant discharge. Allan requested the data spreadsheet include generation information for the continuous monitor in order to compare DO and temperature. Jason M. added that zero generation listed for either data set does not mean zero

[2] Alabama Power notes that while the Green Plan is based on Heflin gage flows, the model used to analyze the downstream release alternatives uses average daily basin flows from 1939-2011.

flow since there is still flow while the river reaches equilibrium following generation in addition to intervening flows.

Jason M. presented the study progress, applicable variances, and remaining activities on the Erosion and Sedimentation study. Sarah noted that erosion is an area of concern for many stakeholders and wanted to ensure stakeholders had a chance to review the report and understand the results. Donna noted she had not had a chance to review the report and noted historical photos should be on the record to draw conclusions regarding erosion. Kelly confirmed that the historical photos provided by Donna had been filed with FERC and are on the record.

Jason M. presented the study progress, applicable variances, and remaining activities on the Aquatic Resources study. Jack asked if Alabama Power was studying ways to modify temperatures to ensure a warm-water fishery. Jack added that flows and temperature should not be decoupled and that a CMF of colder water could hinder the fishery. Jason M. noted that Alabama Power is reviewing information that was submitted regarding temperature modifications at other hydropower projects. Jason M. added that the temperature regime of the Tallapoosa River has been well studied during the relicensing process and noted temperatures below Harris Dam are well within the required temperature range of target species presented in Auburn's report. Jason M. stated that the data shows the temperature regime of the river below Harris Dam is not much different from a warm-water fishery, as it averages over 20 degrees Celsius (°C) and closer to 25 °C at several locations downstream during the summer. Jason M. added that only a 2-3°C difference exists in portions of the year when compared to unregulated sites like Heflin or Newell; therefore, there does not appear to be a strong case for making a temperature modification. Jack stated that some of this information is in conflict with previous studies and ARA will file additional comments on temperature. Jimmy asked what the temperature difference is between the uppermost and lowest position of the skimmer weir. Jason M. noted that temperature at the lowest position had not been measured as the weir has been in the uppermost position since the early 2000s but speculated there would be a couple °C difference if the weir were lowered.

Jason M. presented the study progress, applicable variances, and remaining activities for the Downstream Aquatic Habitat (there were no stakeholder questions) and the Threatened and Endangered Species studies. Sarah noted that FERC requires licensees to specify timber management activities within the Project Boundary to perform their analysis on bat species. Sarah added that specific timber acreages of any tree removal activities as defined by the U.S. Fish and Wildlife Service (USFWS) are needed for the Streamlined Consultation regarding the Northern Long-eared Bat (*Myotis septentrionalis*) and asked if that information would be provided with the PLP. Angie responded that Alabama Power has been consulting with the USFWS on what is needed for consultation and is currently working on the Draft Wildlife Management Plan (WMP). Keith confirmed that timber management practices that are protective of bat species are currently being finalized with the USFWS. Angie added that the WMP will be filed in November 2021 with the FLA. Jason M. noted that the range of the Indiana Bat (*Myotis sodalist*) overlaps with the range of the Northern-Long eared Bat and the USFWS did not recommend Streamlined Consultation. Evan Collins (USFWS) suggested an additional meeting with FERC regarding Endangered Species Act (ESA) consultation. Evan noted there are three bat species likely to occur within the Project Boundary. Evan added that Streamlined Consultation is available to use for the Northern Long-eared Bat, but it would not address the effects to the Indiana Bat. Evan added that USFWS is working with Alabama Power on a more programmatic approach to managing timber for bats, reviewing areas of timber harvest as they are proposed over time. Sarah noted that FERC's federal action is issuing the license and T&E species issues need to be addressed in the license order. Regarding Alabama Power's proposed land classifications at Lake Harris, Sarah noted that there are not any distinguishing polygons in the GIS data within the natural areas that show areas of timber management. Sarah requested that Alabama Power's timber harvest estimates need to be on the record.

Tina presented the study progress, applicable variances, and remaining activities for the Project Lands Evaluation study. Ken Wills (Alabama Glade Conservation Coalition) asked if the original 20-acre botanical inventory report at Flat Rock Park was previously filed as a final report. Tina confirmed and noted that it was filed as an appendix to the *Phase 1 Project Lands Evaluation Study Report* in October 2020. Ken asked if the WMP would be available for additional review. Tina confirmed that Alabama Power is currently working with resource agencies on details of the WMP and it would be presented to the Harris Action Team 4 (HAT) prior to being filed with FERC in November 2021. Angie confirmed the WMP would be distributed for review and Alabama Power would hold a HAT 4 meeting prior to filing the WMP. Sarah requested the draft WMP be filed with the PLP by July 3, 2021 so that stakeholder comments could be incorporated prior to the FLA.

Amanda Fleming (Alabama Power) presented the study progress, applicable variances, and remaining activities on the Recreation study. Donna stated that there is only one public swimming area/day-use park on the reservoir and asked for additional information on Alabama Power's plan regarding new recreation sites. Amanda clarified that the Recreation Evaluation Study Report did not include this information and the Protection, Mitigation, and Enhancement (PME) measures (such as new recreation sites) will be presented in the PLP. Angie confirmed that Alabama Power has identified the need for an additional day-use park on the reservoir and it will be part of Alabama Power's proposal.

Amanda presented the study progress, applicable variances, and remaining activities on the Cultural Resources study. Regarding the downstream release alternatives and the operating curve alternatives, Rachel McNamara (FERC) asked if the location of the known cultural resources (19 sites downstream and 96 on Lake Harris) would be provided to HAT 6. Amanda requested that Rachel file written comments of her request. Rachel added it would be helpful to know which cultural resources were potentially being affected. Amanda clarified that the 19 sites downstream that were determined from the Alabama State Site File and not further analyzed, but the 96 sites around Lake Harris will be presented in the eligibility assessments.

Bryant Celestine (Alabama Coushatta Tribe of Texas) apologized for not previously participating in HAT 6 meetings thus far and asked if the Traditional Cultural Properties (TCP) invitation could be extended. Amanda stated that the TCP process is near completion with the Muscogee (Creek) Nation. Bryant stated the invitation to conduct TCP should not be concluded and noted a concern that the general area may contain archaeological sites that link the Alabama Coushatta Tribe of Texas to the Muscogee (Creek) Nation. Bryant added that the Coushatta Tribe of Louisiana and the Alabama-Quassarte Tribal Town of Oklahoma would likely have an interest in participating in the TCP process. Amanda requested Bryant to submit a written comment regarding his request. Maria Clark (Environmental Protection Agency (EPA)) encouraged Alabama Power to allow the Coushatta Tribe of Texas to participate in the TCP process.

Kelly asked participants for any additional questions. Regarding pre-evacuation of the reservoir in the case of a forecasted rain, Barry asked how long it would take, and at what flow, to lower the lake one to two feet. Alabama Power was not sure and requested Barry to file a written comment. Jack asked when the HEC-RAS and HEC-ResSim models and associated outputs would be available to stakeholders. Kelly noted these would be filed with the FLA to include any additional modeling that may be required based on comments from the draft operating reports. Jack stated that the models or at least some of the outputs would be helpful to have sooner to provide comments on the draft BESS report. Kelly requested this be further discussed in the upcoming HAT 1 meeting on May 6, 2021. Jack asked for an extension of the comment period of the draft operating reports. Kelly asked if Alabama Power could get back with stakeholders on this request[3]. Ken clarified that the comment period is only related to the draft operating reports and not the final study reports. Angie confirmed and added that stakeholders will have until June 11, 2021 to comment on the USR meeting summary.

Microsoft Teams Chat Questions and Responses:

- Jimmy Traylor: What is the inflow from The Little Tallapoosa River?
    - Jason Moak: Average annual flow in Little Tallapoosa River at USGS Newell gauge is 573 cfs based on 1976-2020 period of record.

- Donna Matthews: I, too, wonder what the interaction between Army Corp and dam operations is and why they are not participating.
    - Kelly Schaeffer: The USACE has been participating in this relicensing process. They attended the HAT 1 meetings on April 1, 2021.

- Donna Matthews: How many of the original 20 Level loggers remain in place. Do they continue to generate data? Where is that data available for viewing?
    - Colin Dinken (Kleinschmidt): All of those loggers were removed after May 2020 after they had gathered one year of continuous data. *15-minute data continuously for one year.

[3] Alabama Power provided stakeholders an additional 15-day comment period with comments due on May 26, 2021 on the Draft *Downstream Release Alternatives Phase 2 Study Report*, Draft *Operating Curve Change Feasibility Analysis Phase 2 Study Report*, and Draft *Battery Energy Storage System at R.L. Harris Project Report.*

From: Barry Morris <rbmorris222@gmail.com>
Sent: Wednesday, May 19, 2021 10:29 AM
To: APC Harris Relicensing
Cc: Barry Morris; Cherry Ward; Crystal Barnes-Key; Ed Sloman; Frank Varisco; Lynn Amason; Melinda Hardwick; Mike Browning; Tom Comte; Tom Lettieri; Tommy Bell
Subject: Comments of LWPOA on study reports
Attachments: FERC letter, May 2021.docx

The attached letter was submitted today to FERC, stating the Lake Wedowee Property Owners Association comments and positions on Alabama Power's Draft Downstream Release Alternatives Study Report and Draft Operating Curve Change Feasibility Report, both filed with FERC on 12 April 2021.

The LWPOA asks that this correspondence be made a part of the Company's official record of relicensing R.L. Harris Hydroelectric Project, FERC project no. P-2628.

Questions or comments should be directed to:
Barry Morris
Lake Wedowee Property Owners Association
PO Box 55
Wedowee, AL 36278
404 449 3452
rbmorris222@gmail.com

Thank you.

Barry Morris
LWPOA Chairman, 2020/21

Lake Wedowee Property Owners Association
P.O. Box 55
Wedowee, Alabama 36278

May 19, 2021

Project No. 2628-065
R.L. Harris Hydroelectric Project

Comments of the Lake Wedowee Property Owners Association on Draft Downstream Release Alternatives Phase 2 Report and Draft Operating Curve Change Feasibility Analysis Phase 2 Report

Ms. Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street NE
Washington, DC 20426

Dear Secretary Bose,

1. This correspondence states the position of the Lake Wedowee Property Owners Association (the Association, or LWPOA) regarding Alabama Power Company's Draft Downstream Release Alternatives Phase 2 Report (DRA) and Draft Operating Curve Change Feasibility Analysis Phase 2 (OCCA) Report, both of which were filed with FERC on April 12, 2021.

2. The LWPOA consists of nearly 500 families and businesses which own property on R.L. Harris Reservoir (also known popularly as Lake Wedowee), representing their interests in the reservoir and by extension representing many of the other 2,000+ property owners who are not members of the LWPOA. The Association is the only association representing the community of Lake R.L. Harris property owners.

3. The LWPOA will strenuously object to any change in reservoir/dam operations and downstream releases that would cause reservoir levels to drop below their current licensed levels of 793' msl in summer and 785' msl in winter, except for variations caused by drought. After reviewing both referenced study reports the Association can identify little good that would accrue to any stakeholders for any reason that would come from lowering reservoir levels from those currently licensed.

a. Changes in release methods and timing that do not affect lake levels, such as continuous minimum flows or modifying the current "Green Plan" are of limited concern to the LWPOA and should be based on the maximum good the maximum number of stakeholders.

b. Based on our review of the study reports, in scenarios where CMF or CMF+Green Plan releases approach or exceed 300 cfs total, reservoir levels would drop below currently licensed levels during various months and for greater periods of time than in accordance with present operating rules (Section 3.1.2, pp 9-18, DRA).

c. According to Section 3.7.1, Table 3-14, pg 74 of the DRA, no public boat ramps would be available for use six months each year (November to April) should the winter pool fall below 785' msl.

d. LWPOA asks that Alabama Power and FERC carefully consider the negative effects on thousands of lakefront property owners of increasing downstream releases in any way that will lower summer or winter pool levels. While economic analysis is not part of the draft reports, common sense dictates that lowering lake levels would have a negative impact on property values, county property tax receipts, and recreational opportunities that generate significant income for local businesses.

4. The LWPOA asks that Alabama Power and FERC approve raising the winter pool from the current 785' to 786' msl.

a. A winter pool of 786' would result in an increase of 193 usable private lakeshore structures, from 449 to 642 (Table 3.13, pg 74 of DRA), and make one additional public launch (Lonnie White ramp) available (Table 3.14, pg 74 of DRA) at winter pool. Further, many LWPOA members report that a rise of one foot would make their private structure far more usable, though not technically meeting Alabama Power's definition of usable.

b. As LWPOA reads the data, the only potential negative environmental impact at 786' is Submerged Aquatic Vegetation in the reservoir. According to the study results SAV is largely non-existent in sedimentation areas now after nearly 40 years of reservoir operations (Section 3.5.7, pg 28, OCCA) so a threat of vegetation increasing at a one foot higher winter pool is assumed to be low.

c. Fish spawning in the reservoir would be enhanced (Section 3.6.2, pg 32, OCCA).

d. Raising the winter level one foot to 786' would have negligible impact on the river environment or downstream landowners in the event of a 100 year flood. Table 3-2, pg 14, OCCA shows no more inundated structures downstream at 786' than 785'. Table 3-4 pg 15, OCCA shows the duration of inundation downstream actually decreases, since flood releases would end earlier at a higher pool level.

5. While it is not the official position of the LWPOA, many property owners around R.L. Harris reservoir support raising the winter level two feet to 787'. Table 3-2, pg 14, OCCA shows that at 787' four additional structures downstream would be inundated during a 100 year flood event for a shorter duration. Benefits of raising the winter pool two feet are the same as raising the level one foot as detailed above, making even more lakeshore structures and recreational opportunities available year round. Table 3-13, pg 73, DRA shows the number of usable lakeshore structures increases by 377, from 449 to 826.

6. The Lake Wedowee Property Owners Association supports the tenet that everyone has equal rights to Tallapoosa River waters, and desires to be a good neighbor to the entire basin community. Based on the data in the referenced study reports, the Association asks for nothing that would substantially harm any other stakeholder group with whom it shares the Tallapoosa River system.

7. If there are any questions concerning this filing, please contact me at rbmorris333@gmail.com or 404 449 3452.

On behalf of the members and board of directors, I am

Sincerely,

(signed)

Barry Morris
Chairman of the Board, 2020/21
Lake Wedowee Property Owners Association

APC Harris Relicensing

From: Anderson, Dave
Sent: Wednesday, May 19, 2021 10:26 AM
To: Barry Morris
Cc: Anderegg, Angela Segars
Subject: RE: FERC e-filing question

Awesome. Glad we could help.

Dave

From: Barry Morris <rbmorris222@gmail.com>
Sent: Wednesday, May 19, 2021 10:18 AM
To: Anderson, Dave <DKANDERS@SOUTHERNCO.COM>
Cc: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Subject: Re: FERC e-filing question

EXTERNAL MAIL: Caution Opening Links or Files

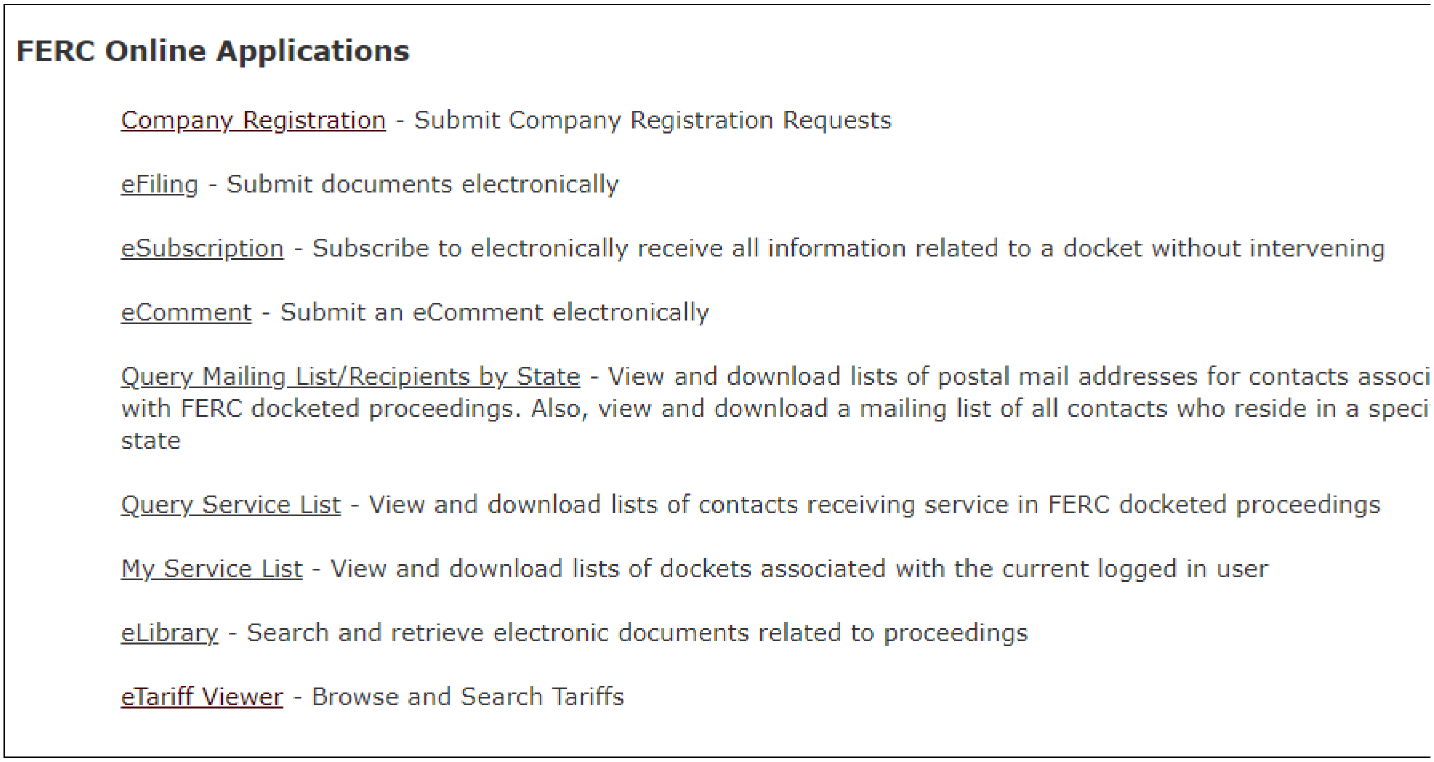
Dave: Worked like a charm! Thank you so much. Barry

Barry Morris
LWPOA Chairman 2020/21
404 449 3452

[avg.com] Virus-free. www.avg.com [avg.com]

On Tue, May 18, 2021 at 1:54 PM Anderson, Dave <DKANDERS@southernco.com> wrote:

> Hi Barry,
>
> Let's make sure we are on the same page and I can help you out. When I log in to the site, I see this (clipped from the page, so this is just part of it):



FERC Online Applications

Company Registration - Submit Company Registration Requests

eFiling - Submit documents electronically

eSubscription - Subscribe to electronically receive all information related to a docket without intervening

eComment - Submit an eComment electronically

Query Mailing List/Recipients by State - View and download lists of postal mail addresses for contacts associ with FERC docketed proceedings. Also, view and download a mailing list of all contacts who reside in a speci state

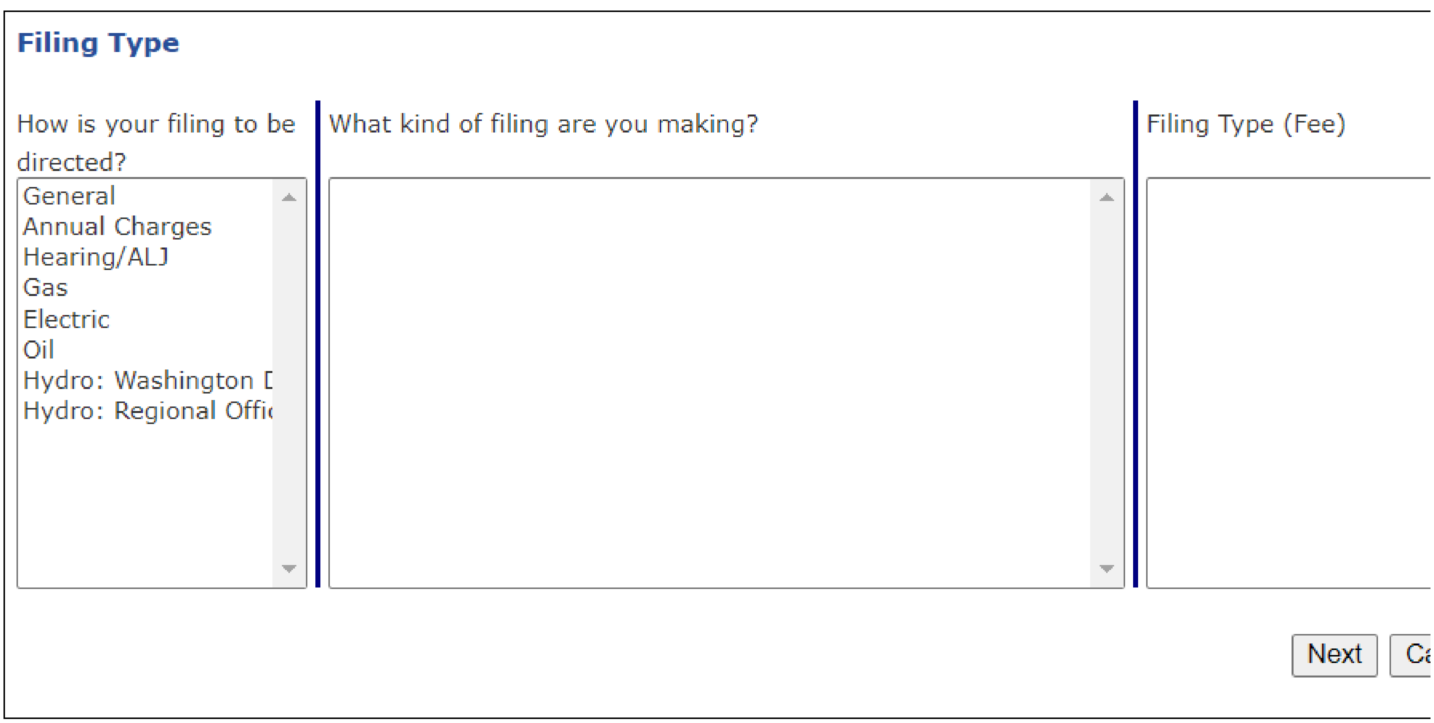
Query Service List - View and download lists of contacts receiving service in FERC docketed proceedings

My Service List - View and download lists of dockets associated with the current logged in user

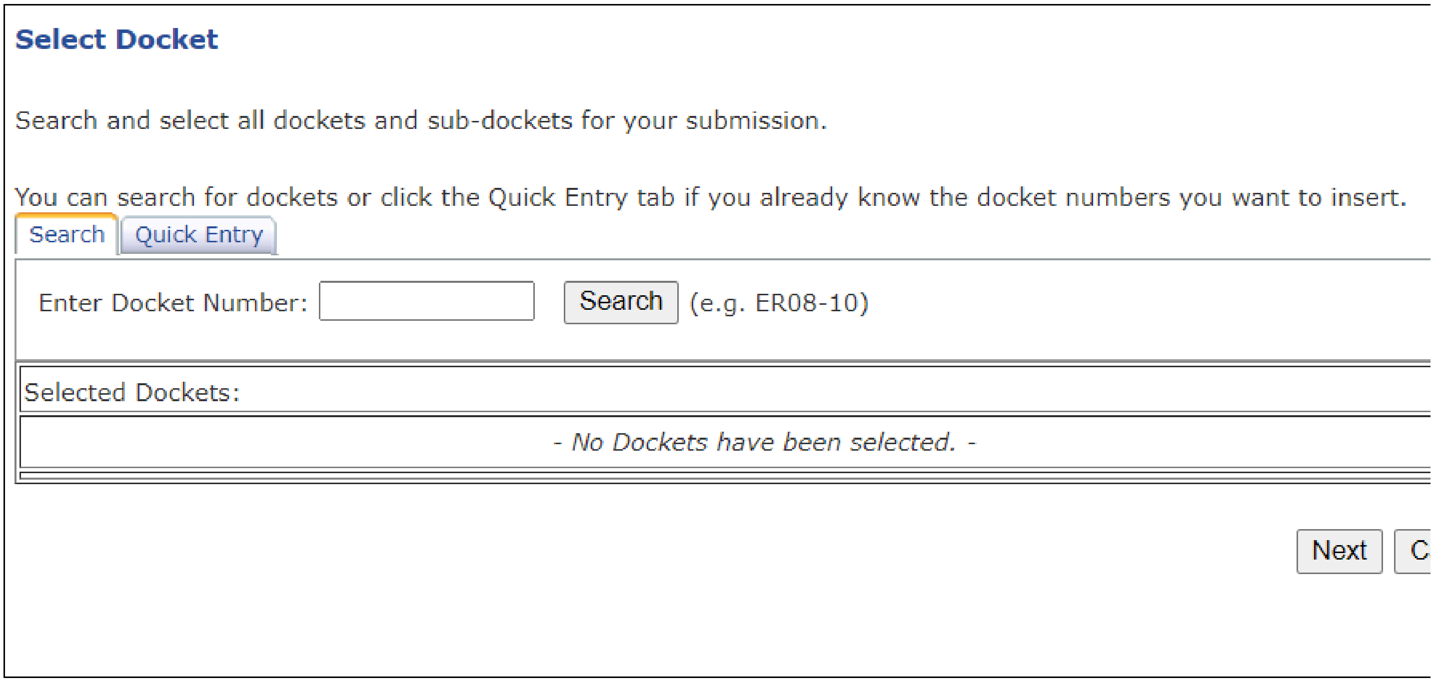
eLibrary - Search and retrieve electronic documents related to proceedings

eTariff Viewer - Browse and Search Tariffs

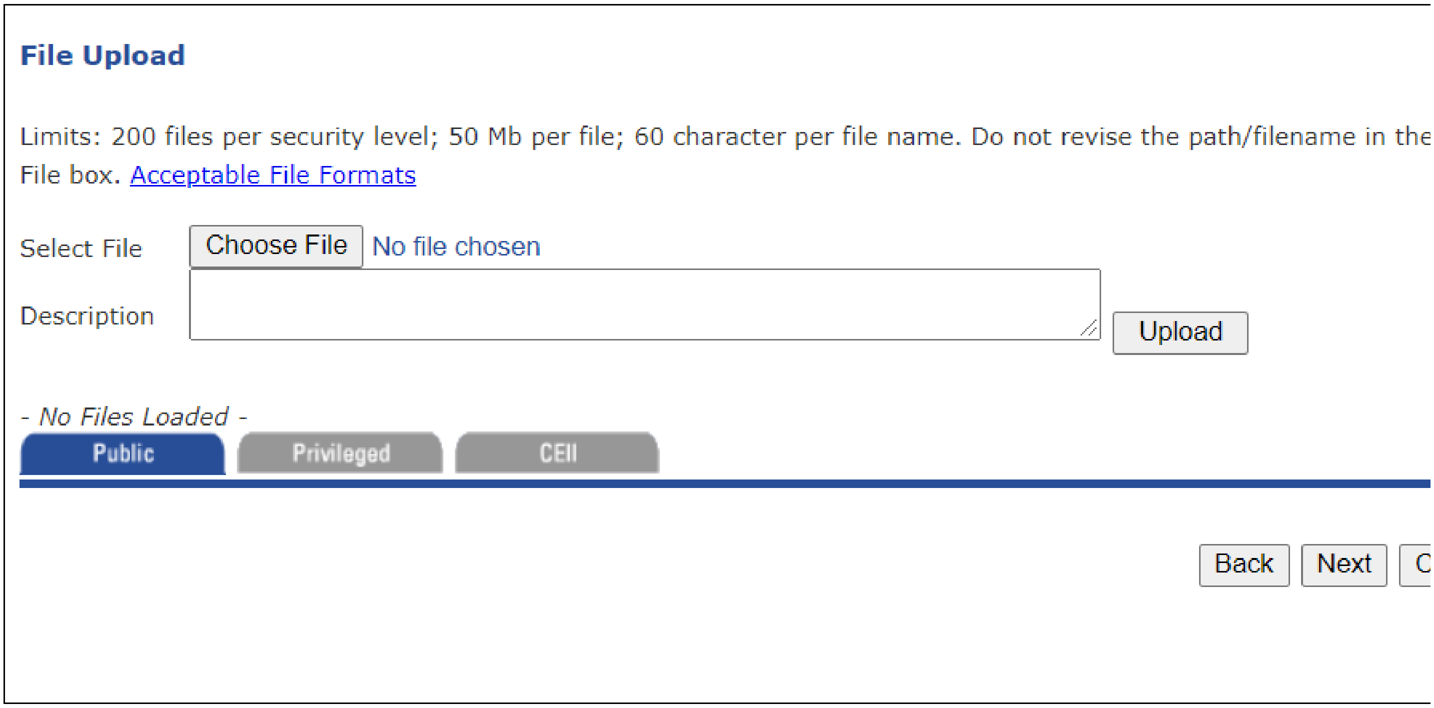
Once you click on "eFiling", you should see this:



On this page, you will select “Hydro: Washington DC, which then brings up the options in the second column. Select “ILP (Integrated licensing) Submission”, which brings up the options in the third column. Select the first item “ILP Comments or Study Report” and hit the Next button. Now you should see this:



Enter P-2628 and click the Search button. It will bring up a list of all “sub-dockets” for Harris. You are looking for P-2628-065, which is on the page when you click the ellipsis after the number 10 at the bottom. Click the blue “+” sign next to it and then click Next. You should now see this:



This is where you upload your letter/file. Click Choose File and it will bring up a window to find it on your computer. Type in a description, and then click Upload. The file and description should then appear under the dark blue line. Once it is there, click Next and from there it should be fairly self-explanatory (I can't go any farther without really making a filing). I think you enter the organization (if LWPOA isn't on there, you may refer to FERC's Help page: FERC Online Help [ferconline.ferc.gov] on how to add it) and then your e-mail address as the Signer. There's one more page to describe what you are filing, and then a final page to review everything and click "Submit". You will get an e-mail confirmation if everything went correctly.

Feel free to reach out if you have any trouble.

Dave

From: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Sent: Tuesday, May 18, 2021 1:33 PM
To: Barry Morris <rbmorris222@gmail.com>
Cc: Anderson, Dave <DKANDERS@SOUTHERNCO.COM>
Subject: RE: FERC e-filing question

Hi Barry,

Fortunately, for me, I don't have to do a lot of our efiling. However, Dave Anderson in our group, cc'ed, can help you out. And yes, you can send a copy of your comments to the Harris relicensing email address and they will be included in our consultation record.

Thanks!

Angie Anderegg

Hydro Services

(205)257-2251

arsegars@southernco.com

From: Barry Morris <rbmorris222@gmail.com>
Sent: Tuesday, May 18, 2021 12:13 PM
To: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Subject: FERC e-filing question

EXTERNAL MAIL: Caution Opening Links or Files

Help! Angie, I have the LWPOA's comments on the operations study reports you filed on 12 April, but I cannot figure out how to e-file our comment document on the FERC e-comment website. After I login, it will not show any results for docket number P2628. Nor does it appear to have a means to attach a document.

Can someone on your staff please give me a hint? I hate to bother you all as I know you are busy, but I'm stumped. I see Alabama Power's submissions as "Via Electronic Filing" so you folks must have the key to the castle.

After I get this e-filed with FERC I will send a copy to Alabama Power. Should I use the harris relicensing email address and attach our letter?

Thanks in advance for your help.

Barry Morris

LWPOA

404 449 3452

[avg.com] Virus-free. www.avg.com [avg.com]

Lake Wedowee Property Owners Association
P.O. Box 55
Wedowee, Alabama 36278

May 19, 2021

Project No. 2628-065
R.L. Harris Hydroelectric Project

Comments of the Lake Wedowee Property Owners Association on Draft Downstream Release Alternatives Phase 2 Report and Draft Operating Curve Change Feasibility Analysis Phase 2 Report

Ms. Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street NE
Washington, DC 20426

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c. According to Section 3.7.1, Table 3-14, pg 74 of the DRA, no public boat ramps would be available for use six months each year (November to April) should the winter pool fall below 785' msl.

d. LWPOA asks that Alabama Power and FERC carefully consider the negative effects on thousands of lakefront property owners of increasing downstream releases in any way that will lower summer or winter pool levels. While economic analysis is not part of the draft reports, common sense dictates that lowering lake levels would have a negative impact on property values, county property tax receipts, and recreational opportunities that generate significant income for local businesses.

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7. If there are any questions concerning this filing, please contact me at rbmorris333@gmail.com or 404 449 3452.

On behalf of the members and board of directors, I am

Sincerely,

(signed)

Barry Morris
Chairman of the Board, 2020/21
Lake Wedowee Property Owners Association

Document Content(s)

From: Jack West <jwest@alabamarivers.org>
Sent: Friday, May 21, 2021 9:29 AM
To: Anderegg, Angela Segars
Cc: Sarah Salazar
Subject: Re: Request for Harris Models and Temperature Data

EXTERNAL MAIL: Caution Opening Links or Files

Angie,

Thank you for the clarification. We'll look forward to reviewing the models and temp data once everything is ready.

Have a great weekend,

On Thu, May 20, 2021 at 12:29 PM Anderegg, Angela Segars <ARSEGARS@southernco.com> wrote:

> Hi Jack,
>
> They are not ready to share at this point. We are in the process of developing our license proposal and packaging everything, including the models, to share with all stakeholders when we file the Final License Application.
>
> Thanks,
>
> **Angie Anderegg**
>
> Hydro Services
>
> (205)257-2251
>
> arsegars@southernco.com
>
> ---
>
> **From:** Jack West <jwest@alabamarivers.org>
> **Sent:** Wednesday, May 19, 2021 10:48 AM
> **To:** Anderegg, Angela Segars <ARSEGARS@southernco.com>
> **Cc:** Sarah Salazar <sarah.salazar@ferc.gov>
> **Subject:** Re: Request for Harris Models and Temperature Data

EXTERNAL MAIL: Caution Opening Links or Files

Hi Angie,

Thank you for the response about when models, outputs, and temperature data will be available. Having the models and outputs available at this point would allow us to better analyze the economic and operational context in which a BESS would operate and to identify possible operating strategies that could improve the BESS economic and environmental benefits. Is your team continuing to refine the models between now and the filing of the final license application in November, or are they mostly finalized at this point?

Thank you,

On Thu, May 13, 2021 at 3:49 PM Anderegg, Angela Segars <ARSEGARS@southernco.com> wrote:

> Hi Jack,
>
> Following the BESS meeting, I consulted with our modeling group and our plan is to file all the models and outputs with the Final License Application in November 2021. As you will recall, we did not model the two options for the BESS study—it would have required developing new operating rules and assumptions, which was beyond the scope of the study. Therefore, any comments on the BESS study can likely be filed on the report itself, since no modeling occurred.
>
> The D/S Release alternatives study used both HEC-ResSim and HEC-RAS. As noted, these models and the outputs will be made available at the time we file the Final License Application. In addition to the models, Alabama Power will also file the temperature data you referenced with the Final License Application.
>
> Thanks,
>
> **Angie Anderegg**

Hydro Services

(205)257-2251

arsegars@southernco.com

From: Jack West <jwest@alabamarivers.org>
Sent: Friday, May 7, 2021 10:15 AM
To: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Cc: Sarah Salazar <sarah.salazar@ferc.gov>
Subject: Request for Harris Models and Temperature Data

EXTERNAL MAIL: Caution Opening Links or Files

Hi Angie,

At the last few meetings there has been some discussion of when the HEC-RAS and HEC-ResSim models and outputs will be made available to stakeholders. If you could let me know when we might expect those to be made available, I would appreciate it. Again, our consultants reviewing the draft BESS study report would like to use those models and outputs for some of their analysis to be incorporated into comments for Alabama Power on May 26.

I would also like to request that Alabama Power's historical water temperature data from 2000-2018 be made available to stakeholders. This data is referenced and analyzed in the final Aquatic Resources Study Report and its appendices, and it would be helpful to be able to access the underlying data. When you can, please let me know if that is possible and a timeframe for when water temperature data might be available.

Enjoy your weekend,

--

Jack West, Esq.

Policy and Advocacy Director

Alabama Rivers Alliance

2014 6th Ave N, Suite 200

Birmingham, AL 35203

205-322-6395

www.alabamarivers.org [alabamarivers.org]

Celebrating more than 20 years of protecting Alabama's 132,000 miles of rivers and streams!

--

Jack West, Esq.

Policy and Advocacy Director

Alabama Rivers Alliance

2014 6th Ave N, Suite 200

Birmingham, AL 35203

205-322-6395

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--
Jack West, Esq.
Policy and Advocacy Director
Alabama Rivers Alliance
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Birmingham, AL 35203
205-322-6395
www.alabamarivers.org [alabamarivers.org]

Celebrating more than 20 years of protecting Alabama's 132,000 miles of rivers and streams!

From: Sarah Salazar
To: APC Harris Relicensing
Subject: RE: HAT 1 - Draft Operations Reports
Date: Wednesday, May 26, 2021 4:09:58 PM

Good afternoon Angie,

We have been working on comments on the draft operations reports, but will not be able to provide them by the requested deadline (today). We will provide them as soon as possible.

Thanks,

Sarah L. Salazar ✧ *Environmental Biologist* ✧ *Federal Energy Regulatory Commission* ✧ *888 First St, NE, Washington, DC 20426* ✧ *(202) 502-6863* **Please consider the environment before printing this email.**

From: APC Harris Relicensing <g2apchr@southernco.com>
Sent: Wednesday, April 28, 2021 11:19 AM
To: APC Harris Relicensing <g2apchr@southernco.com>
Subject: HAT 1 - Draft Operations Reports

HAT 1,

Due to the length and complexity of these reports, Alabama Power would like to provide additional time for your review and comment. Please submit any comments you may have on the draft Operating Curve Feasibility Analysis Phase 2 Report, draft Downstream Release Alternatives Phase 2 Report and draft BESS Report by **May 26, 2021**.

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

HAT 1,

The draft Operating Curve Feasibility Analysis Phase 2 Report, draft Downstream Release Alternatives Phase 2 Report and draft BESS Report are available for your review on the Harris relicensing website in the HAT 1 [harrisrelicensing.com] folder. These reports can also be found on FERC's website (http://www.ferc.gov [ferc.gov]) by going to the "elibrary" link and entering docket number P-2628.

Please submit your comments on these reports to Alabama Power at harrisrelicensing@southernco.com by **May 11, 2021**.

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

APC Harris Relicensing

From: Anderegg, Angela Segars
Sent: Thursday, May 27, 2021 7:27 AM
To: Jack West; APC Harris Relicensing
Subject: Re: ARA Comments on Draft Study Reports

Together is just fine.

Thanks,

Angie

Get Outlook for iOS

From: Jack West <jwest@alabamarivers.org>
Sent: Wednesday, May 26, 2021 4:34:07 PM
To: Anderegg, Angela Segars <ARSEGARS@southernco.com>; APC Harris Relicensing <g2apchr@southernco.com>
Subject: ARA Comments on Draft Study Reports

EXTERNAL MAIL: Caution Opening Links or Files

Hi Angie,

I've attached ARA's comments on the draft Phase 2 Downstream Release Alternatives report, the draft Phase 2 Operating Curve Change Feasibility Analysis, and the draft BESS Report. Two attachments are included within the one .pdf file. I'm happy to send those as separate files if needed.

Thanks, and please let me know if you have any questions.

Best,

--
Jack West, Esq.
Policy and Advocacy Director
Alabama Rivers Alliance
2014 6th Ave N, Suite 200
Birmingham, AL 35203
205-322-6395
www.alabamarivers.org [alabamarivers.org]

Celebrating more than 20 years of protecting Alabama's 132,000 miles of rivers and streams!

Alabama Rivers Alliance
Water Is Life

May 26, 2021

VIA EMAIL

Ms. Angie Anderegg
Harris Relicensing Project Manager
Alabama Power Company
600 North 18th Street
Birmingham, AL 35203

RE: Comments on Draft Phase 2 Downstream Release Alternatives Report, Draft Phase 2 Operating Curve Change Feasibility Analysis, and Draft Battery Energy Storage System (BESS) Report for R.L. Harris Hydroelectric Project (P-2628-065)

Dear Ms. Anderegg:

Please see below for the comments of Alabama Rivers Alliance (ARA) on the Draft Phase 2 Downstream Release Alternatives Report, the Draft Phase 2 Operating Curve Change Feasibility Analysis, and the Draft Battery Energy Storage System (BESS) Report submitted by Alabama Power Company for the relicensing of R.L. Harris Dam (P-2628-065). Thank you for the opportunity to comment and for including these comments in the Federal Energy Regulatory Commission (FERC) correspondence record. If you have any questions or concerns, please contact me at jwest@alabamarivers.org or by phone at (205)-322-6395.

I. Draft Phase 2 Downstream Release Alternatives Report

The Draft Phase 2 Downstream Release Alternatives Report ("DRA Phase 2 Report") evaluates 11 release alternatives, including the current Green Plan, along with multiple continuous minimum flow scenarios ranging from 150cfs to 800cfs both with and without the pulsing laid out in the existing Green Plan release criteria. As previously noted by FERC staff in comments on the Initial Study Reports, 150cfs represents "poor" to "fair" habitat conditions, while 800cfs represents "good" to "excellent" habitat.[1]

A. Evaluation of Providing a Continuous Minimum Flow

ARA encourages the release of a continuous minimum flow to restore a more natural flow regime and reduce both flow and water temperature fluctuations in the river downstream of Harris, which could lead to improved aquatic habitat, lessen erosion, and benefit recreationists. Following the

[1] FERC Staff Comments on ISR and ISR Meeting Summary (Jun. 10, 2020), Accession No. 20200610-3059, at A-2.

scientific literature, we continue to stress the importance of considering flows and temperature together and not assuming that any particular level of continuous minimum flow will yield a positive ecological response if water temperatures below the dam remain out of line with temperatures at unregulated sites.[2] In fact, a continuous minimum flow of excessively cold water could suppress spawning cues and inhibit the productivity of the aquatic environment.

Data from the DRA Phase 2 Report shows that releasing a continuous minimum flow may not significantly shift overall water temperatures, but it could reduce large swings in temperature close to the dam.[3] For instance, Table 3-12 shows that a 300CMF alternative could reduce maximum daily and hourly temperature changes by roughly half in the tailrace and one mile downstream compared to current operations. Figures 3-31, 3-32, and 3-33 of the report contain clear visual representations of how temperatures at the unregulated Heflin site compare to water temperatures below the dam. The departure of water temperatures downstream of the dam from unregulated Heflin water temperatures is most pronounced in spring and fall, which are critical spawning seasons.

According to Alabama Power's analysis, the HEC-ResSim model indicates that "PreGP, 150CMF, and 300CMF have negligible effects on average reservoir elevations" though 300CMF+GP, 600CMF, and 800CMF scenarios do begin to lower reservoir levels.[4]

The DRA Phase 2 Report does not specify, however, what level of continuous minimum flow (with or without Green Plan pulsing) begins to affect reservoir levels. ARA supports releasing the greatest continuous minimum flow possible that will not adversely affect reservoir levels, and we request that one further step of analysis be conducted to determine what amount of minimum flow can be released without impacting lake levels. For instance, if a 400cfs or 500cfs minimum flow could be released without impacting reservoir levels, that could represent substantial gains in habitat downstream and even further reduce fluctuations in river levels and water temperatures. As the report notes, "[g]enerally, results show that river fluctuations are lower with increasing continuous minimum flows."[5]

The point at which a minimum flow begins to impact lake levels is an important piece of information for stakeholders and FERC to have, and determining this point should not require extensive additional effort on Alabama Power's part. We request that it be included in the final report.

B. Possible Addition of a New Continuous Minimum Flow Turbine

The DRA Phase 2 Report describes generating off of the various minimum flow scenarios and employs a "theoretical unit that pulls water from the existing penstock" to use in Alabama Power's HydroBudget model.[6] As this analysis proceeds and potentially moves from the theoretical realm

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[2] *See generally*, Julien D. Olden and Robert J. Naiman, *Incorporating Thermal Regimes into Environmental Flows Assessments: Modifying Dam Operations to Restore Freshwater Ecosystem Integrity*, Freshwater Biology (2010) 55.
[3] Downstream Release Alternatives Draft Phase 2 Report (April 2021), Accession No. 20210412-5748, at 54.
[4] *Id.* at 9.
[5] *Id.* at 29.
[6] *Id.* at 9.

into design and engineering, we encourage Alabama Power to investigate ways to supply any new generating unit used to pass a minimum flow with water from an elevation higher up in the water column than the existing intake and penstock.

Releasing and generating off of a continuous minimum flow of warmer water with higher levels of dissolved oxygen could benefit water quality and aquatic resources substantially. The current intake's skimmer weir is set at 756 feet msl, in the upmost position, yet at a full pool level of 793 feet msl, the water entering the penstock when the reservoir is at full pool comes from a depth of roughly 37 feet and ranges in temperature from approximately 12℃ to 22℃ from March to October, according to the forebay profiles provided as an appendix to the Water Quality Study Report data.[7] That compares to water temperatures in the range of 13℃ to 30℃ over the same months at a depth of 10 feet in the forebay profiles.

If a new continuous minimum flow turbine is proposed, it should be designed to draw from as high as possible in the reservoir in order to provide the greatest gains in water quality and benefits to aquatic resources downstream. The existing intake and penstock could potentially be modified to accommodate this, or a separate intake may be needed for a new generating unit.

II. Draft Phase 2 Operating Curve Change Feasibility Analysis

The Operating Curve Change Feasibility Analysis Draft Phase 2 Report ("Operative Curve Phase 2 Report") applies the hydrologic models and modeling results developed for the Phase 1 Report to quantitatively and qualitatively describe possible impacts to resources that would result from raises in the winter pool level.[8] Under the current operating curve, winter pool elevation is 785 feet msl, and the Phase 2 Report evaluates raising the winter pool level to either 786, 787, 788, or 789 feet msl.[9]

Elevating the winter pool level could benefit recreation on Lake Wedowee in the winter months by making some structures and boat ramps more accessible, however, increased recreation opportunities must be weighed against exacerbated downstream flooding that could result from a raise in the winter pool elevation. As the Operating Curve Phase 2 Report summarizes: "The primary adverse effect of raising the winter pool is on downstream resources in the form of an increase in flooding….The primary beneficial effect of raising the winter pool is in the number of reservoir recreational structures (boat slips, docks, etc.) that are available for private recreational use/access during the winter months."[10]

A. Exacerbated Flooding Downstream – Impacts to Downstream Residents and River Users

[7] Water Quality Report Study Data, Appendix B, Accession No. 20210412-5760.
[8] Operating Curve Change Feasibility Analysis Draft Phase 2 Report (April 2021), Accession No. 20210412-5750.
[9] *Id.* at 1.
[10] *Id.* at 55.

The modeling results summarized in Table 3-2 and Table 3-3 of the Phase 2 Report show that once the winter pool is raised by two feet and reaches 787 feet msl, more downstream structures become inundated during the 100-year design flood, including single family and mobile homes. With any amount of raise in the winter pool level, flooding becomes shorter in duration, but more intense in magnitude with a more rapid rise due to less storage being available in the reservoir and a quicker release of water.

Throughout the relicensing, many river users and downstream property owners have voiced concern about unpredictable flooding, property damage, and risks to personal safety caused by rapid and unannounced rises in river levels. ARA highly recommends that Alabama Power pay careful attention to these very real concerns of people living below Harris and those who recreate on the river. These flood events not only harm property but also present a threat to public safety.

Recreation downstream of Harris could also suffer with a higher winter pool level. Table 3-16 of the Phase 2 Report shows that the seven existing recreation sites below the dam would have a greater maximum depth of inundation, ranging from roughly 0.5 foot of depth increase with a 1-foot raise up to approximately 2.5 feet of depth increase with a four-foot raise in the winter pool. This additional inundation could make the recreation access points below the dam less accessible.

B. Exacerbated Flooding Downstream – Impacts to Aquatic Life and Habitat

Periodic flooding on the Tallapoosa River, particularly in the spring, is part of natural riverine processes. However, since beginning operations Harris Dam has highly altered hydrologic processes and flow regime characteristics and created frequent large flow fluctuations that can lead to more intense flooding than the ecosystem would experience in its natural state. The modeling in the Operating Curve Phase 2 Report shows that raising the winter pool level "results in greater outflow from Harris Dam and subsequent flooding" due to increases in spill frequency and the amount of time spent at turbine capacity.[11] While the percentage increases may appear small, more time spent at turbine capacity could have further repercussions on downstream aquatic resources and affect fish spawning sites and spawning behavior. Infrequent but intense flood events can have sizable negative effects on spawning success.

Erosion could also be worsened by raising the winter pool level. Due to steep streambanks and soil conditions, the Operating Curve Phase 2 Report notes that "[i]ncreased scour would occur as velocities increase with the higher channelized flows resulting from the decreased storage in Harris Reservoir associated with higher winter operating curve elevations."[12] Issues of erosion and sedimentation have been frequently cited by river users and property owners downstream of Harris, and any operational changes that could lead to increased erosion should be carefully considered and only adopted with robust mitigation and protection efforts.

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[11] *Id.* at 33.
[12] *Id.* at 31.

In deciding whether to change the operating curve to raise the winter pool, Alabama Power must weigh the potential benefits of increased recreation on the reservoir during winter months against possible exacerbated flooding below the dam, increased erosion, and further negative impacts to aquatic life and habitat. Without detailed and robust protection and mitigation plans, ARA would not support a change in the operating curve to raise the winter pool level. Whether or not the operating curve is changed to raise the winter pool level, protection and mitigation measures should be taken downstream of Harris to reduce flooding impacts, restore eroded and impaired streambank segments, and provide safer conditions for recreationists and residents.

III. Draft Battery Energy Storage System (BESS) Report

In order to make the Battery Energy Storage System (BESS) study as useful and productive as possible, ARA engaged experts from Synapse Energy Economics, Inc. to review the draft BESS Report produced by Alabama Power, and Synapse's comments and recommendations are included in Attachment A and incorporated into these comments by reference.

While no study plan was required to be created for the draft BESS Report, in its study determination issued in August 2020, FERC recommended that Alabama Power conduct the BESS study and amend the Downstream Release Alternatives Study to include at least two new release scenarios:

(a) A 50 percent reduction in peak releases associated with installing one 60 MW battery unit
(b) A proportionately smaller reduction in peak releases associated with installing a smaller battery unit (5, 10, or 20 MW battery).

Because pairing a BESS with the Harris project would require modifying or replacing one of the existing turbine-generators, FERC recommended Alabama Power include estimated costs for any specific structural changes, as well as the costs for the BESS itself. Finally, FERC advised that Alabama Power evaluate how each of the release alternatives specified in scenarios (a) and (b) above would impact recreation and aquatic resources on the reservoir and downstream of Harris.

A. Cost Analysis

The draft BESS report contains significant analysis of costs supported by estimates from NREL's 2020 Annual Technology Book. However, Alabama Power only explored one ownership option to procure a BESS, which is a company investment in the BESS. An evaluation of a power purchase agreement (PPA) was not evaluated as an alternative to financing the BESS internally. Both ARA's study request and FERC's study recommendation included comparing ownership options for BESS procurement, and we continue to suggest that Alabama Power provide a PPA financing alternative in its cost analysis since it is a common method by which utilities contract for BESS services. See Synapse's comments and recommendations in Attachment A for more detail on this point.

Unfortunately, Alabama Power's cost analysis does not factor in any potential incentives, including tax credits, that could be used to reduce the overall costs of a BESS. This is explicitly stated in Section 2.1 of the draft BESS Report, "…potential incentives to offset battery costs are not included."[13] Dramatic declines in BESS costs have been driven by technological advancements and through incentives—tax credits in particular—and these incentives continue to shape the market for BESS. Ignoring this reality skews the cost analysis towards the high end and paints an unreasonable picture of the actual costs of BESS. Again, incorporating a survey of market PPA prices for BESS into the analysis will more accurately reflect these available incentives. As Synapse notes in Attachment A, Alabama Power already has some useful PPA price comparisons available. Meaningful discussion of how incentives could reduce overall costs should be included in the BESS Report.

Additionally, Alabama Power's cost analysis shows high interconnection costs due to a lack of spare terminals at Harris or the Crooked Creek Transformer Substation, but the draft BESS Report did not explore siting a BESS elsewhere on the transmission and distribution system where it could produce greater benefits to the grid while still being optimized with the hydropower facility.

Finally, Alabama Power did not fully determine the costs of modifying or replacing one of the turbine-generators to accommodate installation of a BESS and enable a wider range of flows. ARA acknowledges the current physical and engineering constraints at Harris, but quantifying these upgrade costs is a crucial piece of the cost/benefit analysis, and this information is needed by stakeholders, FERC, and Alabama Power to analyze whether the benefits of justify the costs.

B. <u>Benefits Analysis</u>

Alabama Power initially declined to undertake the BESS study and does not consider it to be a reasonable alternative due to the costs of battery storage and associated improvements to the turbine-generators. However, a thorough analysis of the potential system and environmental benefits should still be conducted to provide stakeholders and FERC with the information necessary to evaluate the full spectrum of benefits a BESS may provide to measure against the costs of infrastructure improvements. The draft BESS Report currently lacks sufficient benefits analysis, both regarding environmental benefits and system benefits. Indeed, the current analysis is focused almost solely on costs to the exclusion of any benefits, producing an imbalanced report.

a. Environmental Benefits

Only a paragraph of the report is dedicated to assessing the effects on aquatic resources below the dam, and the possibility of improved environmental outcomes are largely dismissed as "potential limited environmental benefits" without analysis.[14] No attempt was made to quantify the environmental benefit of a 1/3 reduction in peaking flows resulting from Option B. Instead, a conclusory statement that "Option B would not likely benefit habitat stability, because the peak release would still occur"[15] takes the place of useful analysis.

As discussed further below, new research shows just how many environmental benefits can accrue from optimizing BESS with hydropower operations, including releasing flows that are more similar to the historical hydrograph, improving temperature regimes and dissolved oxygen levels,

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[13] Draft Battery Energy Storage System (BESS) Report (April 201), Accession No. 20210412-5747, at 6.
[14] *Id.* at 21.
[15] *Id.* at 20.

accommodating spawning windows, and fostering safer fish passage through hydropower structures.

b. *Grid and Economic Benefits*

See Synapse's comments and recommendations in Attachment A for a list of potential grid and economic benefits that should be analyzed and added to the draft BESS Report.

c. *Recommendations for Strengthening Benefits Analysis*

Recent work by the Pacific Northwest National Laboratory (PNNL) can help inform the benefits analysis and can push the study forward with an improved methodology and framework for analyzing environmental benefits stemming from a BESS addition. PNNL's recent white paper, "Deployment of Energy Storage to Improve Environmental Outcomes of Hydropower" is directly relevant to this study (in fact, it cites the Harris project as a case study), and a copy of this paper is included as Attachment B.[16]

PNNL's work explains how either co-located or offsite BESS can be co-optimized with hydropower facilities to gain "complementary performance profiles to hydropower projects, opening a broad spectrum of operational patterns" while improving environmental outcomes.[17] It provides both methodological guidance and a comprehensive framework for determining "the range and type of potential localized environmental benefits realized through integrating energy storage and hydropower."[18]

Environmental benefits mentioned in the PNNL paper range from reducing hydropeaking and releasing more natural flows to improving water temperature and dissolved gases—all of which are pertinent at Harris. Section 5.1 of the PNNL white paper contains a particularly applicable conceptual example that illustrates how a BESS could be used to enhance environmental benefits for a hydropeaking plant such as Harris. PNNL's discussion of deciding energy storage type, size, and location can inform and strengthen the initial analysis contained in the draft BESS report, particularly in the area of battery siting and interconnection.

PNNL's important and relevant work on this topic should be considered and used to update the draft BESS Report with more concrete benefits analysis, both environmental and economic. We encourage Alabama Power to incorporate the expanded methodology and framework presented in the PNNL white paper as it updates the draft BESS Report.

C. Lack of Modeling Data Available

Currently, the HEC-RAS and HEC-ResSim models and outputs are not available to stakeholders. Having the models and outputs available would allow stakeholders to better analyze the economic and operational context in which a BESS could operate and to identify possible operating strategies

---

[16] Pacific Northwest National Laboratory, *Deployment of Energy Storage to Improve Environmental Outcomes of Hydropower* (May 2021), PNNL-SA-157672, available at https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-SA-157672.pdf.

[17] *Id.* at iii.

[18] *Id.*

that could improve the BESS economic and environmental benefits. This information has been requested by ARA and other stakeholders and will be filed with the final license application in November 2020. ARA will continue analysis of the opportunities for increased operational flexibility and associated environmental benefits once those models and outputs are available. See Synapse's comments and recommendations in Attachment A for additional information that could help further assess economic and environmental benefits.

D. Potential Use of BESS with a Continuous Minimum Flow Turbine

As described in Section I above, the draft Phase 2 Downstream Release Alternatives Study incorporates a theoretical new turbine to release and generate off of a minimum flow. During the Updated Study Report meeting, Alabama Power noted that passing a continuous minimum flow leaves less water available to use on peak. Though not within the original scope of the current BESS study, ARA suggests that Alabama Power consider matching a smaller sized BESS with any minimum flow turbine to store energy to use on peak while passing a continuous minimum flow. Added flexibility will enhance project operations and create better environmental outcomes below Harris.

Thank you for your careful consideration of these comments.

Sincerely,

Jack K. West

Jack K. West, Esq.
Alabama Rivers Alliance
Policy and Advocacy Director
2014 6th Avenue North
Suite 200
Birmingham, AL 35203

ATTACHMENT A

Comments of Synapse Energy Economics, Inc. on

Draft Battery Energy Storage System (BESS) Report

Memorandum

TO: JACK WEST, ALABAMA RIVERS ALLIANCE

FROM: MAX CHANG, ANDREW TAKASUGI, AND DAVID WHITE

DATE: MAY 25, 2021

RE: COMMENTS ON DRAFT ALABAMA POWER BATTERY ENERGY STORAGE SYSTEM FOR R.L. HARRIS DAM

Introduction

On April 12, 2021, Alabama Power released a draft feasibility study to quantify the associated costs assumed for the installation of a Battery Energy Storage System (BESS) for moderating the current water releases associated with peaking operations of the 135 megawatt[1] (MW) R.L. Harris Dam (Harris Project) located on the Tallapoosa River.[2] The draft report studied two alternatives:[3]

- Option A: A 60 MW battery with 240 MWh capacity that can provide the near equivalent generation of one unit at best gate for 4 hours per day/every day.
- Option B: A 20 MW battery with 80 MWh capacity that can provide the equivalent generation of about one-third of one unit at best gate for 4 hours per day/every day. The remaining 40 MW needed for 1-unit peaking generation would be produced by a new, upgraded unit.

The installation of a BESS could allow changes in the peak water discharges that would lessen the impacts on water quality and the riparian environment. The Alabama Power draft study considered changes in the dam operations that would generally operate only one turbine during peak periods. The generation at other times could be used to charge the BESS that could then discharge and provide power during the peak load periods. The BESS would thus essentially be used for a time shifting operation to maintain peak generation capability and revenues for Alabama Power.[4]

---

[1] The facility has two 67.5 MW turbines for a total capacity of 135 MW.

[2] Alabama Power. Battery Energy Storage System (BESS) Report R.L Harris Hydroelectric Project FERC No. 2628. April 2021. Available at http://www.harrisrelicensing.com/_layouts/15/start.aspx#/SitePages/Welcome.aspx

[3] Ibid. Page 5.

[4] The plant could change its operational mode even without a BESS, but a BESS provides a means for retaining some of its peak operating characteristics.

Alabama Power ultimately concluded that the installation of a BESS would not be a "reasonable alternative" based on its estimate of costs and benefits.[5]

Comments

Synapse has reviewed the draft report and has identified several issues with the report and as well as opportunities to reduce the dam's impact on the Tallapoosa river by altering the dam's operations and investing in specific infrastructure upgrades at the facility. Synapse's comments are detailed in the following bullets.

Synapse notes the following observations regarding Alabama Power's BESS installation costs/planning:

- In this draft report, Alabama Power did not evaluate an independent power purchase agreement (PPA) as an alternative to financing the battery internally. Synapse notes that in 2019, Alabama Power filed a petition for the issuance of a certificate of convenience and necessity that included five PPAs for solar and BESS systems.[6] Alabama Power did not reference specific costs or opportunities information from the Docket 32953 proceeding in its analysis of BESS for the Harris Project.
- The draft report did not look into siting a BESS elsewhere on the Alabama Power transmission and distribution system that could address local needs. Synapse believes that the location of a BESS could impact the cost of interconnection as well as the benefits.
- Given that the BESS would charge from the grid regardless of its proximity to the Harris Project, Synapse recommends that Alabama Power investigate whether there are any BESS systems already connected to the Alabama Power distribution system which might negate the need for a new battery installation.
- The draft report did not look into possible arbitrage opportunities related to the operations of a BESS (e.g. charging from the grid and/or from hydro generation during off-peak hours and selling during peak hours)
- The draft report did not look at the other possible benefits of the battery system including various ancillary services such as voltage regulation and black start capabilities.
- The study did not consider a BESS system of the same size as one of the existing turbines (67 MW vs. 60 MW), which would simplify many of the issues raised by Alabama Power regarding the need for incremental capacity.
- The draft study did not look at the minimum flow option that could match a smaller sized battery system with a smaller turbine that might have better economics.
- The draft study did not investigate whether the economics of the project could be improved by coupling a BESS with a solar PV installation to gain investment tax credits.
- Alabama Power has not provided modeling information to quantify hydro operations. This information would be helpful to pair with BESS operations.
- Synapse noted that Alabama Power appears to be against switching out any of the existing turbines for a variable load Kaplan turbine due to cost and constructability issues with the turbine housing.

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[5] Alabama Power. (2021). Page 22.

[6] See Alabama Public Service Commission Docket 32953. Available at http://psc.alabama.gov/

Recommendations

Based on our observations regarding the draft report, Synapse makes the following recommendations:

- Alabama Power should provide cost and benefit information beyond the cost of the batteries. This would include economic and operational benefits in addition to more detailed environmental benefits.
- Alabama Power should provide details on the operational assumptions used for hydro generation and BESS operations.
- Alabama Power should provide information that evaluates possible BESS operations based on of hourly data for generation, water flow, energy prices, and modeled battery charging and discharging.
- Alabama Power should analyze sizing the BESS to match the full capacity of an existing turbine.
- Alabama Power should consider a power purchase agreement (PPA) for the battery system rather than a company investment. This would also include information on solar and BESS PPAs considered in Docket 32953 or other comparable PPAs.
- Alabama Power should consider the benefits of locating the BESS elsewhere on the grid.
- Alabama Power should consider the benefits of combining a BESS system with solar and obtaining investment tax credits.
- Alabama Power should consider a minimum flow turbine and a smaller matching battery system.
- Alabama Power should evaluate the impacts of reduced peaking operation without a BESS to the extent that has not been analyzed in the Green Plan.
- Alabama Power should evaluate the benefits, including environmental ones, as well as the costs in all the analyses.

ATTACHMENT B

Pacific Northwest National Laboratory White Paper

Deployment of Energy Storage to Improve Environmental Outcomes of Hydropower

PNNL-SA-157672

Deployment of Energy Storage to Improve Environmental Outcomes of Hydropower

White Paper

May 2021

B Bellgraph, T Douville,
A Somani, K DeSomber,
R O'Neil, R Harnish,
J Lessick, D Bhatnagar,
J Alam

Prepared for the U.S. Department of Energy
under Contract DE-AC05-76RL01830

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PNNL-SA-157672

Deployment of Energy Storage to Improve Environmental Outcomes of Hydropower

White Paper

May 2021

B Bellgraph, T Douville,
A Somani, K DeSomber,
R O'Neil, R Harnish,
J Lessick, D Bhatnagar,
J Alam

Prepared for
the U.S. Department of Energy
under Contract DE-AC05-76RL01830

Pacific Northwest National Laboratory
Richland, Washington 99354

Summary

Hydropower operators have many reasons to integrate energy storage, either co-located onsite or located elsewhere, but co-optimized with facility operations. Storage systems can be configured to have complementary performance profiles to hydropower projects, opening a broad spectrum of operational patterns.

Integrating energy storage can allow hydropower operators to accomplish the following:

- Capture additional revenue by using more agile operational characteristics for fast-response ancillary services or by generating greater amounts of peak energy with expanded operational limits.
- Adapt to changing regulatory and market conditions, such as evolution of the Energy Imbalance Market in the western United States, without pushing equipment beyond design parameters or optimal hydraulic performance.
- Improve asset management conditions by minimizing equipment wear and tear using energy storage to support fast-response ancillary services or support demands beyond optimally efficient setpoints.

An important but unexamined opportunity is to integrate energy storage systems with hydropower facilities to improve environmental outcomes. Integrated operations support increased flexibility in the management of the underlying water system and the associated ecosystem. The connections are particularly clear in modifying power generation relative to water storage, release, and flow regimes. Such integrated operations support regulatory requirements, including maintaining upstream reservoir levels, ensuring adequate downstream flows to meet an ecological target, or for human uses of a river such as fishing or boating.

This document provides an organized discussion of the relationship between hydropower-storage integration and improved localized environmental outcomes. Which includes:

- An overview and survey of current uses of energy storage in the hydropower industry.
- A comprehensive framework describing the range and type of potential localized environmental benefits realized through integrating energy storage and hydropower.
- Case study examples comparing real conditions with environmental requirements.
- Methodological guidance to analyze potential benefits, technology characteristics, and tradeoffs.
- A discussion of co-optimizing versus co-locating storage within the facility footprint.
- A concluding summary of the steps necessary for industry to fully develop and implement this concept.

This paper is a fundamental exploration of local environmental outcomes that can be realized through integration of energy storage systems with hydropower facilities. It provides a methodological foundation for future analysis rooted in expert knowledge of both hydropower–environmental interactions and attributes of energy storage technologies.

Acknowledgments

We thank several individuals and organizations who reviewed the contents of this white paper during its development and provided invaluable feedback that was integrated into the published version. Specifically (in no particular order), we thank Todd Olinsky-Paul of the Clean Energy States Alliance; Kevin Malone, independent consultant; Brent Nichols and Conor Giorgi of the Spokane Tribe of Indians; U.S. Department of Energy Southwestern Power Administration; Jack West at the Alabama Rivers Alliance; Jannik Haas at the University of Stuttgart; Kurt Miller with Northwest River Partners; the Low Impact Hydropower Institute; Jon Newman with Fluence Energy; The Hydropower Reform Coalition; and John Chandler of Puget Sound Energy.

Contents

Figures

Tables

1.0 Problem Overview

Hydroelectric dams have been operating in the United States (U.S.) for more than 100 years, and throughout this time, the range of potential environmental effects from hydroelectric dams has become well-established. As part of the periodic authorization or review of these dams, environmental effects are studied, evaluated, and in some cases mitigated. Mitigation may require investing in habitat restoration, improving river connectivity for migratory species, monitoring water quality, engaging the public, developing and implementing new technologies (hardware or software), and directly adjusting dam operations.

As dam operators balance the management of environmental impacts with maintenance of their electricity resource, new storage technologies may help to meet both needs. Most federally operated hydropower projects, as well as those operating under licenses granted by the Federal Energy Regulatory Commission (FERC), have limits on their operations to reduce environmental impacts. These limitations include spilling water outside of generating turbines, or managing flow on daily, seasonal, or yearly time scales balanced around the needs of fish and other aquatic species, reservoir levels, or downstream ecological needs. These flow management practices affect the economic viability of a given hydroelectric project by limiting its full operational flexibility. Additionally, the increase in renewable energy production has challenged the contribution of hydropower to the grid, and maintaining environmental flows mandated by FERC license requirements will become increasingly challenging (Kern et al. 2014). As storage technologies advance and become commercially available at utility-grade, grid-scale, and cost-effective levels there is a new opportunity to imagine how they can integrate with hydroelectric operations to support the larger electrical grid, while maintaining financial stability and improving environmental outcomes.

This paper describes how the installation of energy storage systems, co-sited with hydroelectric projects, offer operational, economic, and environmental benefits by enabling a broader range of electricity performance, capitalizing on its flexibility and grid reliability, while mitigating critical environmental impacts or improving environmental outcomes across U.S. rivers and streams. The paper attempts to link environmental outcomes to energy storage utilization. It offers a comprehensive inventory of research-grade work, site-specific studies, policies, and pilot projects regarding energy storage and hydropower that show significant environmental implications. It provides an outline of methodologies given the known costs and attributes of storage technologies, with case study illustrations. It also outlines the key components of a methodology that could be applied within the context of specific projects to reveal the environmental benefits of energy storage paired with hydropower production to properly size the storage systems to capitalize on potential benefits.

This paper provides a framework for assessing the degree to which energy storage can support operational strategies to improve environmental objectives, including where flow releases or other operational changes are provided to match a water quality, fish, or other ecological objective. Factors driving the integration of hydropower and energy storage will be site-specific, and include combinations of operational, maintenance, economic, and environmental considerations. The focus of this paper will strongly support the validity of the environmental approach. A set of knowledge gaps to be addressed in future work is provided. To validate and support the information provided in this paper, further analysis will be required on a physical facility to serve as a test case.

2.0 Current Use of Energy Storage by the Hydropower Industry

Hydroelectric plants currently offer energy storage due to the presence of water reservoirs, but to increase storage, operators have at times considered batteries to be a competitive resource. Energy storage could be accomplished by expanding the impoundment and raising the height of a dam; however, raising dam height introduces a host of civil engineering requirements, costs, and timelines, as well as regulatory authorizations, and doing so would inundate new lands. Despite these challenges, dam-raising efforts are being considered.[1] In contrast, energy storage systems can be installed in as little as 6 months, when physical space, electrical infrastructure, and construction permits are readily available (Pyper 2017). Larger reservoirs offer similar characteristics of storage that are already available; energy storage systems can offer a complementary capability rather than an expansion of existing flexibility.

As batteries become more reliable and efficient, an emerging idea is to directly integrate batteries with hydroelectric plants and hybridize their operations for overall improved plant performance. To date this idea has been explored for power flexibility benefits or market participation eligibility, such as provision of ancillary services, market eligibility as a fast-responding resource, or improved operational integration across cascading plants. Many energy storage systems are sited at utility infrastructure based on reliability, or distribution or transmission requirements. The appropriateness of whether to co-site or to co-optimize storage systems with hydroelectric plants, given ownership model, revenue mechanism, and grid operation conditions, is discussed in a later section.

Examples of power flexibility achieved by incorporating different types of storage on-site at hydroelectric plants, either simulated or actual, are provided below.

- In Sweden, Fortum has connected a 5 MW battery system to a 44 MW hydropower plant to improve its quick response time and the precision of its regulation service, because wind power has created the need for increased flexibility. The site has also asserted that the battery helps to keep the market in balance and reduces wear on hydropower turbines, allowing for deferral of investment in maintenance or replacement (Hydro Review 2018).
- The Buck and Bullesby power plants owned by AEP in southwestern Virginia have installed a 4 MW battery system. The system is used to reduce peaking in the older hydropower plants and increase the value of frequency regulation in the PJM market. This allows AEP to leverage and enhance revenue by providing regulation services and offset the charges that customers incur.
- Idaho Falls Power has also implemented a black start field demonstration to show that run-of-river hydropower plants with energy storage can restore electric power without assistance from the transmission system. This capability is essential for small hydropower facilities to be able to operate a microgrid to power critical loads in the event of an outage.[2]

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[1] San Vincente Dam in San Diego was raised more than 100 ft in 2012. See https://www.water-technology.net/projects/san-vicente-dam-raise-san-diego-california-us/. The Bureau of Reclamation intends to raise Shasta Dam in California by 18.5 ft. The project is currently in pre-construction. See https://www.usbr.gov/mp/ncao/shasta-enlargement.html.

[2] See the "Integrated" project, which explores the energy benefits to hydropower when paired with energy storage technology: https://factsheets.inl.gov/FactSheets/Integrating%20Hydropower.pdf.

- Other examples include the Cordova Electric Cooperative 1 MW battery and Kodiak Electric Association's 3 MW batteries. Both sites coordinate battery operations with small-scale hydropower to support small grids in Alaska. In Cordova, the battery system is designed to support a microgrid in the event of an outage due to harsh weather and avoid spill during dynamic seasonal loads. Kodiak aims to achieve reliability from an increase in the use of wind generation to support their microgrid, while reducing rates for customers with their two-battery system.
- Douglas County Public Utility District announced their intention to construct a 5 MW hydrogen electrolysis pilot project at its Wells Dam on the Columbia River (Shumkov 2020).
- In January 2020, Brookfield Renewable proposed an energy storage project at two of their hydro facilities along the Penobscot River—the Penobscot Mills and Ripogenus projects. Each project consists of a 10 MW, 20 MWh on-site system, which would be permitted under existing interconnection agreements. The batteries would allow the continued operation of the hydroelectric facilities during periods of high congestion and would have no impact on the operation or maintenance of the projects.[1]

It is clear from the examples above and the direction of the international industry that operational flexibility and asset management are the driving factors for hybridization of storage and hydroelectric plants. Even emerging "clean peak" policies such as Massachusetts' new Clean Peak Standard require hybridization of storage on clean energy projects to qualify for special treatment and remuneration, based on the premise that this additional flexibility is necessary to meet reliable system operations and clean energy goals.[2] [3] Additional power benefits for energy storage installations are yet to be analyzed, to the authors' knowledge. For example, storage systems could replace end-of-life small hydropower turbines to support station service at large plants.

3.0 A Novel Energy Storage Use Case: Environmental Benefits

This white paper posits that an additional class of benefits is derived from co-siting storage systems with hydroelectric plants—environmental benefits. As noted above, storage can improve the range of operational flexibility. Regardless of the primary investment driver, local environmental management is an essential part of the operational equation. Once hydropower plant operators install storage systems, the projects may operate differently to manage environmental constraints. Whether optimization occurs as an investment, regulatory, or planning tool, or after the fact as a new operational regime implemented from storage-integrated operations, improved environmental outcomes are possible with the installation of expanded on-site storage. New techniques such as advancements in multi-objective optimization of hydropower funded by the National Science Foundation (Roy et al. 2018) and

[1] FERC Project No. 2458-214 – Penobscot Mills Project, Great Lakes Hydro, LLC; FERC Project No. 2572 – Ripogenus Project, Great Lakes Hydro, LLC.

[2] Arizona, California, North Carolina, and New York have explored clean peak standards without success in implementation. Michigan has explored a "low-cost peak program," which would require renewable energy generation to be paired with energy storage.

[3] See the Low Impact Hydropower Institute's webinar with experts discussing how this standard may affect operational and economic outcomes for hydropower plants: https://lowimpacthydro.org/massachusetts-clean-peak-standard/.

data-rich demonstrations are needed to fully evaluate the flexibility and environmental opportunities.

The nexus between environmental objectives and operational flexibility is well-established, and research continues to define these relationships.[1] A short list of operational changes to improve environmental outcomes, depending on site-specific operational and structural configurations, includes discharge ramping rates, minimum flows, reservoir levels, downstream and upstream temperature, dissolved gases (too much or too little), turbine loading patterns, as well as recreational management, boating flows, fish passage, flood control, irrigation, and other uses of the river. How could batteries or comparable energy storage technologies permit a win-win opportunity—operational flexibility and environmental improvements?

Examples of direct advocacy for energy storage installation for environmental outcomes, under discussion in two open FERC proceedings exist, as indicated in the case studies highlighted below.

3.1 Case Study: Connecticut River Conservancy and Great River Hydro's Vernon Dam (White et al. 2020)

The Connecticut River Conservancy contracted a study with Synapse Energy Economics in February 2020 to analyze the potential for the Vernon Dam hydroelectric plant (P-1904), owned by Great River Hydro, to be re-operated in a run-of-river mode and paired with a 10 MW, 2 hr battery storage system. The researchers aimed to determine the energy market revenue impacts of transitioning Vernon Dam to run-of-river operations while quantifying the value of installing an integrated battery storage system to capture a portion of peak energy prices.

The researchers found that a transition to run-of-river operations would moderately affect energy market revenues by 3 to 10 percent, while the other revenue streams (capacity, ancillary services, and renewable energy credits) would have little to no impact. It may be necessary, however, to relax true run-of-river operations during peak-load hours to maintain capacity values (and thus capacity revenues). Energy price arbitrage can be leveraged by charging batteries from turbines during periods of low energy prices and discharging power during periods of high energy prices. As New England increases its renewable energy levels, price volatility may increase, increasing the value of energy arbitrage. The cost range of the 10 MW proposed storage system was determined to be $4.9 to $9.8 million—a cost-effective investment at the lower end of the range, but a loss at the higher end.

With five hydropower plants along the Connecticut River in Massachusetts, New Hampshire, and Vermont applying for new licenses, this case study illustrates the potential for battery storage to offset revenues if peak operating plants convert to run-of-river operations. The results of this case study have been provided to the applicants for their consideration and submitted to the FERC docket as an alternative scenario opportunity.

[1] See U.S. DOE HydroWIRES grant to the Electric Power Research Institute to *Quantify Hydropower Capabilities for Operational Flexibility*: https://www.energy.gov/articles/doe-announces-249-million-funding-selections-advance-hydropower-and-water-technologies

3.2 Case Study: Alabama Rivers Alliance and Alabama Power's Harris Project[1]

One emerging case study with a goal of reducing hydropower peaking to reduce the impact of unnatural flows on the Tallapoosa River's ecosystem may begin to explain the potential environmental benefits of adding a battery and allowing greater flexibility to meet electrical demand. In June 2020, Alabama Rivers Alliance advocated for Alabama Power to conduct studies of downstream release alternatives and battery storage integration at the Harris Project (FERC #P-2628) on the Tallapoosa River. Current operations include discharge variations, occurring within a few hours' time, from zero to about 16,000 cubic feet per second (cfs) when both turbines are operating. FERC proceedings regarding downstream release alternatives included comments from FERC staff, Alabama Rivers Alliance, and the U.S. Environmental Protection Agency, each recommending specific study scenarios. Alabama Rivers Alliance requested a study to compare models simulating the release of the natural flow variability of the Tallapoosa River compared to several alternative operations scenarios. Simulation of "natural flows" will ultimately not occur, but the alternative scenarios to be studied will include (1) the current operation plan ("Green Plan," designed to reduce effects from peaking operations on the aquatic community), (2) the project's historical peaking operation, (3) a modified current operation plan, (4) a downstream continuous minimum flow of 150 cfs under the historical peaking operation scenario, and (5) six other operations scenarios including minimum flows of 300, 600, and 800 cfs; a derivation of the "Green Plan;" and two other scenarios resulting from an addition of a battery energy system.

Alabama Rivers Alliance requested that a new study be conducted by Alabama Power titled "Battery Storage Feasibility Study to Retain Full Peaking Capabilities While Mitigating Hydropeaking Impacts." This study would determine whether a battery storage system could be economically integrated at the Harris Project to provide power during peak demand periods—decreasing the need for peak generation flow released and reducing flow fluctuations downstream—by evaluating battery type, size, costs, ownership options, and barriers to implementation. In their response, FERC described the potential benefits of adding a battery energy system to include reducing the fluctuations in the reservoir by half, reducing peak flows from 16,000 to 8,000 cfs, and achieving the ability to release flows throughout the day and night versus only during peak demand hours. Alabama Power initially rejected the study, citing the high costs of battery storage systems and turbines that are not designed to operate gradually over an extended period. Using a 2018 National Renewable Energy Laboratory report (DOE 2018), Alabama Power estimated the cost of a 60 MW, 1 hr battery (the equivalent to power one turbine at the site) to be $36 million, with a combined cost for both turbines of $72 million. FERC further noted that a 4 hr 60 MW battery, costing $91 million may be needed because Harris Dam can generate for up to 4 hr. FERC recommended that the company conduct the battery storage feasibility study to include (1) a 50 percent reduction in peak releases associated with installing one 60 MW battery unit, and (2) a smaller reduction in peak releases associated with installing a smaller MW battery unit (i.e., 5, 10, 20 MW), including cost estimates. The study will be conducted through April 2021 and will be used to assess the project impacts on downstream resources including aquatic species, erosion, water quality, terrestrial resources, and recreation.

[1] Project No. 2628-065 – Alabama R.L Harris Hydroelectric Project, Alabama Power Company.

4.0 Environmental Benefits Associated with Increased Operational Flexibility

An initial framework of relationships between storage and environmental outcomes is provided in Table 1. Although the issue categories in the table are not mutually exclusive, they begin to elucidate the potential environmental improvements that pairing energy storage with hydropower may provide. Future work would further characterize these examples and conduct a more thorough review of potential environmental gains derived from augmenting hydropower with energy storage technologies.

Adding a storage system to a facility would allow owners flexibility in generation, by breaking the tie between river flows and fluctuating power demands. Site-specific conditions, location, and regulations will dictate the magnitude and type of environmental outcome that may be realized. Table 1 discusses the potential improvements and is not intended to be all-inclusive, nor are all benefits applicable to every unique case.

Table 1. Taxonomy of potential environmental benefits from pairing hydropower with energy storage.

Issue Category	Desired Positive Environmental Outcome	Change in Operation with Energy Storage	Knowledge Gaps
Fisheries	Release flows that are more similar to the historic hydrograph (e.g., run-of-river) that includes cues used by fish for spawning, rearing, migration, etc.; reduce fish-stranding mortality.	Maintain operations and absorption of energy to permit a higher (or lower) release of flows.	Characterize the duration and intensity of flows and turbine operations/energy generation in relation to fish behavioral cues and survival relationships.
	Allow historical seasonal peak flows to enable fish spawning.	Reduce wear-and-tear on components through steady operation during fluctuating generation and release requirements.	Determine sizing and controls between energy storage and turbine units to integrate operations.
	Foster safe passage through hydropower infrastructure.	Allow spill for downstream passage to maintain the same electricity production; offset efficiency losses from fish screens.	Optimize storage capacity, state-of-charge, duration, degradation, and efficiency.
Water Quality	Reduce supersaturated total dissolved gas (TDG) levels.	Support more advantageous release schedules and reservoir management, absorption of energy if released through turbines under oversupply conditions.	Potentially improve TDG throughout a cascading hydropower system with new operations and energy storage flexibility?

Issue Category	Desired Positive Environmental Outcome	Change in Operation with Energy Storage	Knowledge Gaps
	Optimize dissolved oxygen.	Allow oxygen injection to be combined with turbine operation and releases through absorption of energy or support more advantageous release schedules.	Potentially improve dissolved oxygen with new operations and storage flexibility?
	Allow for improved temperature regimes.	Enable temperature control via locally powered reservoir control structure to manage downstream temperatures where seasonally stratified reservoirs are present.	Explore added flexibility of batteries and hydro operations to control temperature.
	Reduce unwanted nitrogen/phosphorous contributions to algal blooms.	Use energy storage system to allow spill variation in reservoir levels; local energy could be used for removing nutrients from water.	Understand the impacts of alternative operations on the ability to control nutrient levels.
Flows	Reduce intensity of peaking flows and up and/or down ramping rates.	Charge energy device in advance of peak flows to increase the responsiveness of the project to signal and shave flow releases to lower ramp rates.	Measurably improve environmental resources through changes in intensity and ramping that are possible with storage integration?
	Maintain minimum flows (varied by season or otherwise as specified).	Permit cost-effective decrement in flows and generation with releases not timed to match electricity demand.	Acquire new environmental benefits when minimum flows are more easily obtained as well as make valuation possible to allow new environmental markets?
	Enable bypass reach flows.	Allow maintenance of revenues during flow releases in the bypass.	Support releases for non-power flows?

4.1 Reducing Hydro Peaking

Hydropeaking and load following operation modes, whereby pulses of water are released in rapid response to meet changes in electrical demand, can alter the quantity, quality, and accessibility of downstream aquatic habitats (Clarke et al. 2008; Fisk et al. 2013). Depending on their timing, frequency, duration, and magnitude, discharge fluctuations can have adverse effects on stream fishes and other aquatic life (Young et al. 2011). Discharge fluctuations during the period of fish spawning may cause adult fish to abandon nests or alter spawning site selection (Chapman et al. 1986; Auer 1996; Zhong and Power 1996; Geist et al. 2008). Fluctuations in discharge that occur shortly after the spawning period can dewater nests, resulting in mortality of eggs and larval fish (Becker et al. 1982; McMichael et al. 2005; Fisk et al. 2013). Discharge fluctuations that occur during the early rearing stage can strand fish along changing channel margins or entrap them in isolated pockets of water (Cushman 1985; Halleraker et al. 2003; Connor and Pflug 2004; Nagrodski et al. 2012). Repeated, rapid fluctuations in discharge may also negatively affect downstream fishes indirectly by altering the density, biomass, and diversity of their food supply (Cushman 1985; Gislason 1985; Bunn and Arthington 2002), which can reduce fish growth as well as the biological productivity of the ecosystem. Reductions in spawning success, survival, and growth have the potential to reduce the productivity of populations that reside downstream of hydroelectric projects (Harnish et al. 2014).

Co-sited energy storage may enable a hydropower facility to meet system peaking needs, provided that state-of-charge control is aligned with the peaks, without releasing such significant water volumes downriver. Thus, energy storage systems would decrease peak generation flow releases, thereby reducing flow fluctuations downstream of the hydroelectric project—and ultimately, lowering the potential impacts on threatened fish and other organisms using the river habitat. Response times are also much faster when using batteries and power factors of 0.0 are supported, so more than just maintained but *improved* power system benefits (i.e., energy and ancillary services) may be achievable along with environmental improvements.

4.2 Securing Safe Fish Passage through Hydro Infrastructure

In addition to fish populations experiencing the effects of hydropower operations downstream of dams, fish migrating in a downstream direction may sustain injury or death while passing hydroelectric dams. At many hydroelectric dams, downstream migrants can pass via several different routes (e.g., spillways, turbines); however, passage through turbines is generally associated with the highest mortality rate (Muir et al. 2001). At some hydroelectric projects, operations have been altered to deliberately release water through spillways to direct downstream migrants from the turbines to the spillway to increase dam passage survival. Many species display differences in depth distribution and/or migratory activity throughout the daily cycle, which can alter their probability of turbine or spillway passage (Haro et al. 2000; Li et al. 2015). Therefore, energy storage systems, instead of the hydropower turbine, could be used to provide power when needed, allowing more water to be spilled during periods of peak fish passage or times when turbine passage rates are expected to be high. For example, salmon and steelhead smolts are more likely to pass through the powerhouses of Snake River dams at night than during the day due to a diel shift in depth distribution. Approximately 60 MW of stored power exported for 4 hr nightly could reduce powerhouse passage of Snake River Chinook salmon smolts by 12 to 23 percent over the entire summer passage season, thereby increasing survival significantly. Added flexibility of spill operations, and in turn, improved fish survival, may help hydropower operators further improve fish survival and reduce mitigation costs (e.g., mid-Columbia River No-Net-Impact funds).

Fish passage is not limited to spillways or downstream travel. Spill for upstream migration (i.e., fish ladders) can account for 10 percent of the flow rate, resulting in lost power generation potential. Noting that attraction flows to fish ladders need not spill constantly, the seasonality and perhaps even time of day of fish migration activity can allow for banking of energy benefits through energy storage, which can then be exported when spills do need to flow in correlation with fish activity.

A facility may also operate under specific flow rates for fish spawning benefits, which may require spilling water that cannot be used to generate electricity and may lower the annual energy production of a hydropower facility. However, just as spawning does not happen through all seasons and at all hours of the day, water can be released when needed for environmental benefit and the restriction may be relaxed at other times, thereby allowing a net energy production increase. When the timing of energy increases does not align with power system needs, there is an opportunity for energy storage systems to shift the available energy and make use of the surplus.

4.3 Operational Shifts and Requirements for Fish in the Eastern U.S.

In addition to operational shifts and flow management for western U.S. fish (in particular salmon) as indicated above, eastern U.S. hydropower plants also adjust operations for fisheries including resident, anadromous (e.g., American shad), and catadromous (e.g., American eel) fish. We discuss examples below related to fish specifically, because fish are often the driving factor of dam operational changes; however, we understand that many other aquatic species (e.g., mussels) as well as aquatic ecosystem health benefits are gained from these operational changes.

Operational shifts to ensure safe fish passage through hydropower plants is a precedented activity dating back to the early 1900s—particularly in the northeastern U.S., where migratory anadromous and catadromous fish use rivers highly developed with hydropower projects. For example:

- The Holtwood Hydroelectric Project on the Susquehanna River in Pennsylvania uses a tailrace lift with two entrances and a spillway lift for upstream fish passage and a pipe system for downstream fish passage.
- The York Haven Dam, also on the Susquehanna, uses a vertical slot fishway to support upstream passage of anadromous fish, primarily American Shad.
- In Maine, along the Penobscot River, the Milford Hydroelectric Project uses a 4 ft by 4 ft bottom entrance for American eels to pass through the dams slowed to 70 cfs into the plunge pool and an upstream fish lift capable of passing up to 300 cfs.
- The Orono Hydroelectric Project uses a similar system with an 8 ft wide downstream diadromous fish-passage floor screen chamber into the plunge pool and a lower-level 4 ft by 4 ft entrance designed to pass at 150 cfs.
- The Holyoke Dam, on the Connecticut River, uses two elevator fish lifts that carry migrating fish, including American Shad, Sea Lamprey, Atlantic Salmon, and American eel, up and over the dam.

In these cases, operational flows are altered to meet fish-passage needs. Storage augmentation at these facilities could allow increased flexibility to meet both the electrical demands of the grid as well as the site-specific fish-passage requirements.

4.4 Managing Spill for Habitat Benefit

Habitat benefits for the aquatic ecosystem as a whole may also extend to spill. Many river ecosystems rely on sediment that passes downstream in the absence of dams. Sandbars have been depleted by long-term dam presence, to the detriment of endangered species on the Colorado and Missouri Rivers. The Department of the Interior has shown success in rebuilding sandbars through controlled flood operations through the Glen Canyon Dam since 2012 (USGS 2015). Energy storage may enable a means for making up for some of the lost energy value associated with controlled flood events, or even increase their frequency to maximize the habitat benefit.

4.5 Preserving River Flows to Improve Water Temperature and Dissolved Gases

River water temperatures directly affect aquatic ecosystem health, and energy storage may allow more flexible operation to control downstream temperatures for environmental benefits. Extreme high temperatures, such as those that occurred in 2015 in the Columbia River, were associated with significant salmon and sturgeon fatalities;[1] in these situations, water temperatures may be able to be cooled by further operational flexibility at hydropower dams to release deeper and cooler hypolimnetic waters. Conversely, unnaturally cold water temperatures, such as in a dam tailrace when a thermally stratified reservoir releases the colder/deeper water through deep-draw turbines or spill, can also have detrimental effects such as creating unnatural temperatures that may allow, for example, an invasive species to increase predation on native warmwater fishes (Ward and Bonar 2003). To keep temperatures within acceptable ranges, the added operational flexibility that batteries paired with hydropower may provide could allow hydropower operators to be more selective about mixing upper warmer waters (using surface spillways) with deeper cooler waters (using deep-draw turbines or deep spill).

Similarly, oxygen and/or total dissolved gas (TDG) levels can be directly affected by hydropower operations to the detriment of fish and the larger ecosystem. For example, in the Coosa River in Alabama, low oxygen levels in tailrace waters are directly linked to operation of the turbines drawing low-oxygen water from deep water, which ultimately negatively affected ecosystem health and resulted in the operator's FERC licenses being vacated.[2] High dissolved gas levels above 100 percent also have detrimental effects on aquatic organisms. Dissolved gas levels above 110 percent can cause fish to lose their ability to sense (hear) encroaching predators (Weber and Schiewe 1976), and increasing gas concentrations up to 130 percent result in high mortality of some species (Mesa et al. 2000). An energy storage device may provide additional flexibility for hydropower generators to adjust operations as a function of oxygen/TDG level, or to allow some degree of spill from a considerable elevation to restore oxygen content. Operations to control dissolved oxygen and/or TDGs occur throughout the U.S., but, to our knowledge, the ability of batteries to improve the environmental outcomes has not yet been evaluated.

5.0 Considerations for Studying Storage Applications for Environmental Outcomes

Given the potential benefits, what is the best approach to determining whether a storage device could allow for operational changes that offer environmental benefits at hydropower projects?

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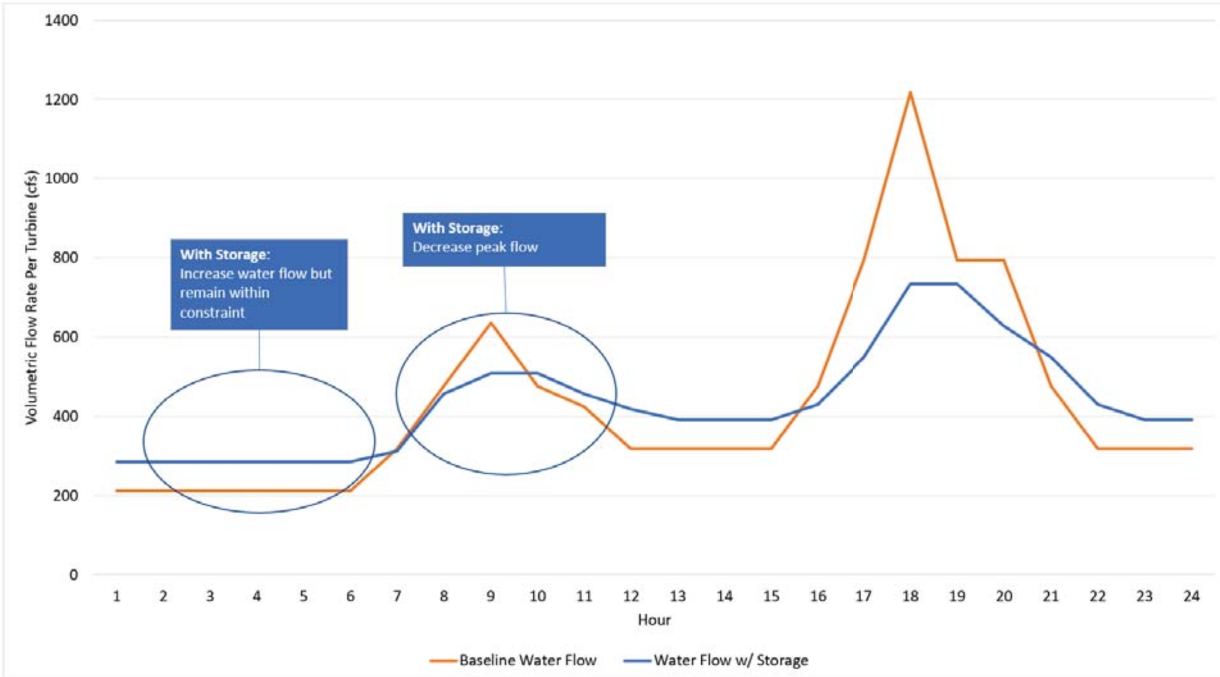
[1] https://www.nwcouncil.org/news/warm-water-wreaks-havoc-columbia-river-fish

[2] https://www.gadsdentimes.com/news/20180827/alabama-power-loses-coosa-river-dam-licenses

This paper highlights key components of a *conceptual* methodology to evaluate potential environmental benefits of deploying storage systems in cooperation with hydropower facilities. The following example shows how the deployment of energy storage at a peaking hydropower facility can yield win-win outcomes, i.e., maintain the power generation requirement, while simultaneously allowing for less severe changes in water flows.

5.1 Conceptual Example to Illustrate How Storage May Be Used to Enhance Environmental Benefits for a Peaking Hydropower Plant

Figure 1 presents a stylized example of a utility that operates its hydropower plant to maximize generation during the morning and afternoon peaking periods. In this example, it is assumed that plant operations reach the upper limit of available water (ramp up in water flow – cubic feet per second per hour [cfs/hr]), which is required to ramp up power generation. With the addition of a storage system, plant operators can employ alternative operational strategies, in general charging the storage system when fuel (water) is available and operations are more flexible, and discharging electricity during peak hours or when operational and water (storage) limitations have been reached. Such a strategy could allow the hydropower plant to operate above normal operating levels during off-peak hours and operate at a lower level during peak periods. Water flow to support such an operational strategy would change as well (i.e., increase during off-peak periods and decrease during peak periods). The implied benefits of a less severe ramp up and ramp down of water would include less severe variations in tailwater elevations, and reduced time of running with water flows close to the maximum limit. Depending on the plant configuration and operating conditions, such an operational strategy might also enable coincident benefits, such as longer periods of operating the turbines near their peak efficiencies. It should be noted that the primary benefit associated with market-facing operations—either revenue capture or more efficient generation portfolio stack—is not adversely impacted, because the effective power supply is identical to the baseline.



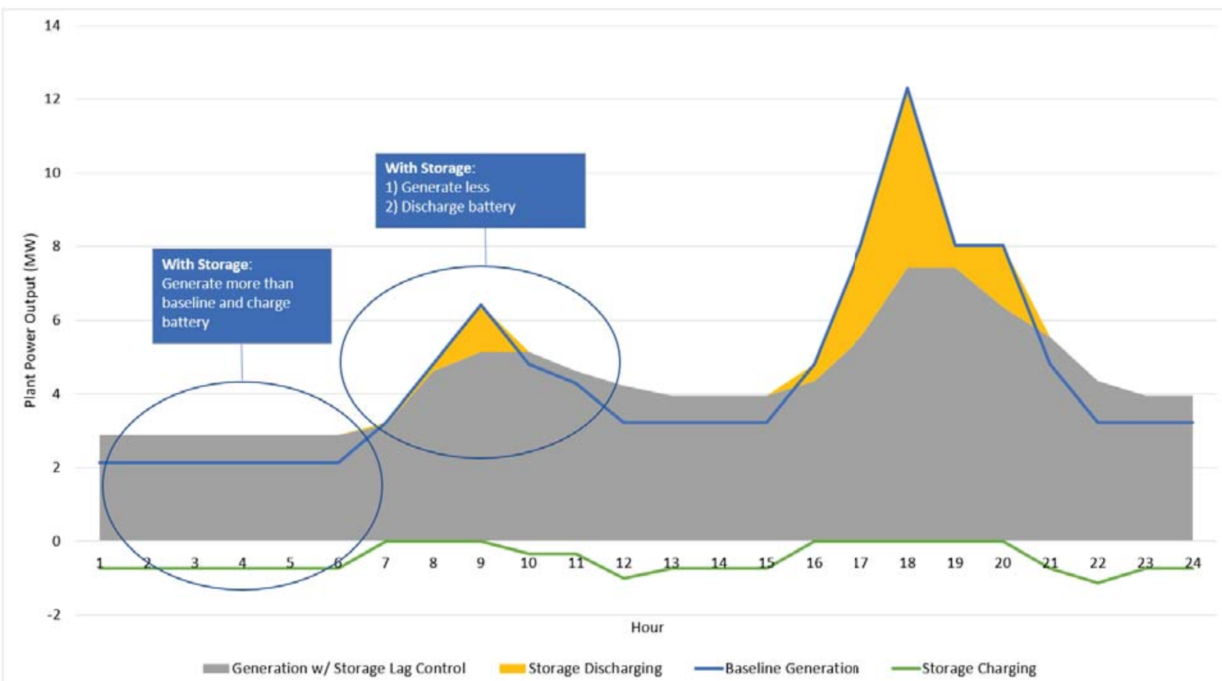


Figure 1. Conceptual example to illustrate alternative water flow regimes (top) and plant operations (bottom) based on deployment and use of energy storage technology.

5.2 General Process of Studying Storage Solutions for Environmental Outcomes

The hydropeaking example can be used to generalize the process one might use to study storage applications for environmental benefits. As highlighted in the example, the decision process requires an understanding of the relationship between environmental and power generation outcomes at a given location. Fundamentally, these outcomes are connected through water flow regimes at that location. Water flow regimes, characterized by min/max flow rates in units of cubic feet per second, daily fluctuations (cfs/24 hr), flow ramp rates (cfs/hr), and duration of sustained flows at increased or decreased levels, directly affect power generation possibilities at the location as well as the health of associated aquatic and riparian ecosystems. These regimes may need to be controlled in time, on hourly or seasonal bases, to balance positive environmental outcomes with power production. Any changes in water flow decisions, due to environmental or other objectives, will directly affect the power generation capabilities at that facility,[1] and hence, affect the choice of whether to install storage technology and if so what size. Figure 2 depicts the decision-making process that is encapsulated in the ensuing numbered steps.

Figure 2. Energy storage sizing methodology.

1. Baseline: Ascertain the existing operational baseline regime (i.e., generation and water flow patterns at a given location) by considering baseload, load following, and peaking.
2. Determine desired water flow regime(s):
   a. Flexibility: Identify the operational flexibility, in both power generation and flow patterns, relative to the baseline operational regime.
   b. Alternatives: Identify the alternative set of water flow regimes that help enhance environmental outcomes at the location based on the flexibility assessment.
3. Benefits and tradeoffs: Assess the environmental benefits, changes in power generation outcomes and other tradeoffs, if any, due to the alternative flow regime(s) (e.g., hydropeaking can limit the opportunities for whitewater recreation).
4. Determine the energy storage size and operation schedule: Perform analysis to optimize energy storage size, including identifying a suitable location, and identify an operational schedule for the hybrid system.

[1] A current, ongoing research project stewarded by the U.S. Department of Energy's Water Power Technology Office, called "HydroWIRES Topic A," will provide a comprehensive mapping of environmental objectives and power operations at a facility, which could be used to supplement the proposed methodology.

5. Decision: Perform techno-economic analysis to ascertain economic outcomes of the optimization.
6. Adjust objectives, if needed, and repeat Steps 2 through 6.

While knowledge of the baseline operational regime—generation and water flow profiles and the inherent flexibility therein—may be known, the identification of alternative flow regimes requires thorough understanding of local environmental needs. These needs will inform how and when hydropower operations must be restricted, and when they can be relaxed, to achieve desirable environmental outcomes.

5.3 Alternative Water Flow Regimes to Enable Environmental Benefits

In the hydropeaking example, a threshold analytical understanding of the relationship between flow rates, power outcomes, and environmental outcomes must first be established. Data related to water elevations in locations of potential fish spawning habitat, flow rates at various river locations, and correlations of these data with flow rates through hydropower facilities must be collected to determine more precisely where and when maximum flow rates should be reduced. Additional measurements will be needed in various locations within a specific river to understand the efficacy of specific restrictions on ramp rate and successive ramping events in attaining meaningful environmental benefits of hydropeaking reduction. These requirements reach beyond hydropeaking reduction; the same can be said for any environmental gain associated with modifications of hydropower operations. The changes in operations, such as minimum and maximum flow limits, etc., will require precise determination of enhanced environmental benefits.

Table 2 presents a *hypothetical* set of values for maximum flow rates, ramp rates, and successive ramps per day that (1) are standard in baseline operations, before hydropeaking avoidance, and (2) will be required to achieve the environmental benefits associated with eliminating or reducing hydropeaking. The additional restrictions on power operations that come with changes in the values of these constraints directly correlate with either reduced or increased power generation potential. In the case of hydropeaking reduction, maximum flows must be reduced within time periods spanning several hours. In the consideration of whether energy storage can yield environmental benefits while maintaining power benefits, it is equally important to know where and when power operations can exceed the baseline. Minimum flow rates at off-peak times serve to limit the ramps associated with hydropeaking as well as provide a means for additional power generation to charge the energy storage asset. In this way, the information pertaining to the new flow regime, as well as the trade-off in power generation timing and scale, can be used to approximate the size, type, and location of a useful energy storage technology application.

Dispatch of the energy storage asset to shave hydropeaking is conceptually demonstrated in Figure 1, which demonstrates how flows can be reduced while energy is exported from the storage asset to maintain power system benefits. In this way, energy storage dispatch is directly linked to benefits to downstream fish populations during various life stages, as described in Table 2. To provide greater precision, an optimization problem can be formulated that treats the new flow regimes as constraints to ascertain the appropriate size, location, and type of storage technology. Hydropeaking avoidance is just one conceptual example. Appendix A presents two tables that repeat this methodology for the potential benefits associated with spill for safe fish passage downstream and upstream, and water quality benefits.

Table 2. Operational shift requirements to enable environmental benefits of hydropeaking reduction (hypothetical metrics).

Operational Constraint	Baseline	Flows to Meet Environmental Objectives (limit impacts from hydropeaking)	Potential Benefit	What data are needed?
Spawning flow range (cfs)	No limit	2,500–5,000	Conducive to spawning activity for spawning fish. Species and river dependent.	
Minimum flow release (cfs)	1,000	1,500–2,600	Protect larval fish incubating in gravel or developing during larval drift phase.	
Downramp amplitude limit (cfs)	None	4,000	Limit fish from getting trapped in pools that are disconnected from the main channel.	Habitat use – including water elevation of spawning habitats and larval fish behavior and habitat use. Life stage phenology.
Maximum downramp rate (cfs/hr)	No limit	3,000	Limit fish from getting trapped in pools that are disconnected from the main channel.	
Daytime downramping	Allowed	Not allowed	Limit fish being trapped; site- and species-specific differences	

5.3.1 Case Study: Glen Canyon Dam

Prior to 1991, Glen Canyon Dam (GCD) operated under fewer environmental restrictions. Table 3 shows that power plant water releases could range from 1,000 cfs to 30,500 cfs, with no limit regarding the daily fluctuations or ramp rates. Such flexibility caused significant environmental damage, such as the endangered species listing of native fishes and changes in the overall ecosystem due to changes in downstream water temperatures and decreased sediment load. From August 1991 to January 1997, temporary restrictions called “Interim Flow Restrictions” were put in place before the release of a final environmental impact statement. Since 1997, the water release range has been reduced to a range from 5,000 to 25,000 cfs, and daily fluctuations and ramp rates have been limited. More recently, in January 2017, a new Record of Decision (ROD, DOI 2016) mandating the preferred alternative prescribed by the Long-Term Experimental and Management Plan has been adopted and was first implemented in October 2017.

Table 3. Evolution of Glen Canyon Dam operating constraints.

Operational Constraint	Historical Flows (before 1991)	1996 ROD Flows (from 1997 to 2017)	2016 ROD Flows (after 2017)
Minimum flows (cfs)	3,000 (summer) 1,000 (rest of year)	8,000 (7 a.m. - 7 p.m.) 5,000 (at night)	8,000 (7 a.m. - 7 p.m.) 5,000 (at night)
Maximum non-experimental flows (cfs)[(a)]	31,500	25,000	25,000
Daily fluctuations (cfs/24 hr)	28,500 (summer) 30,500 (rest of year)	5,000, 6,000, or 8,000 depending on release volume	Equal to 10 X monthly water release (in thousands of acre-feet) during June-August, and equal to 9 X monthly water release the rest of the year, but never exceeding 8,000 cfs
Ramp rate (cfs/hr)	Unrestricted	4,000 up 1,500 down	4,000 up 2,500 down

(a) Except during experimental releases.

Because water flow rate and power are closely related, peaking capability at GCD has been also significantly reduced (Figure 3). Power generation is dependent on available head and flowrates. Before the environmental restrictions, during the week from July 19 to July 25, 1987, GCD was able to produce a peak power of 1,164 MW, that is, 89 percent of the potential peaking capacity of this period. After the 1996 ROD, during the same week of year 2015, this peak generation dropped to 746 MW, that is, only 68 percent of its potential available capacity. The limitation on the peak capacity is due to the maximum daily fluctuations imposed above.

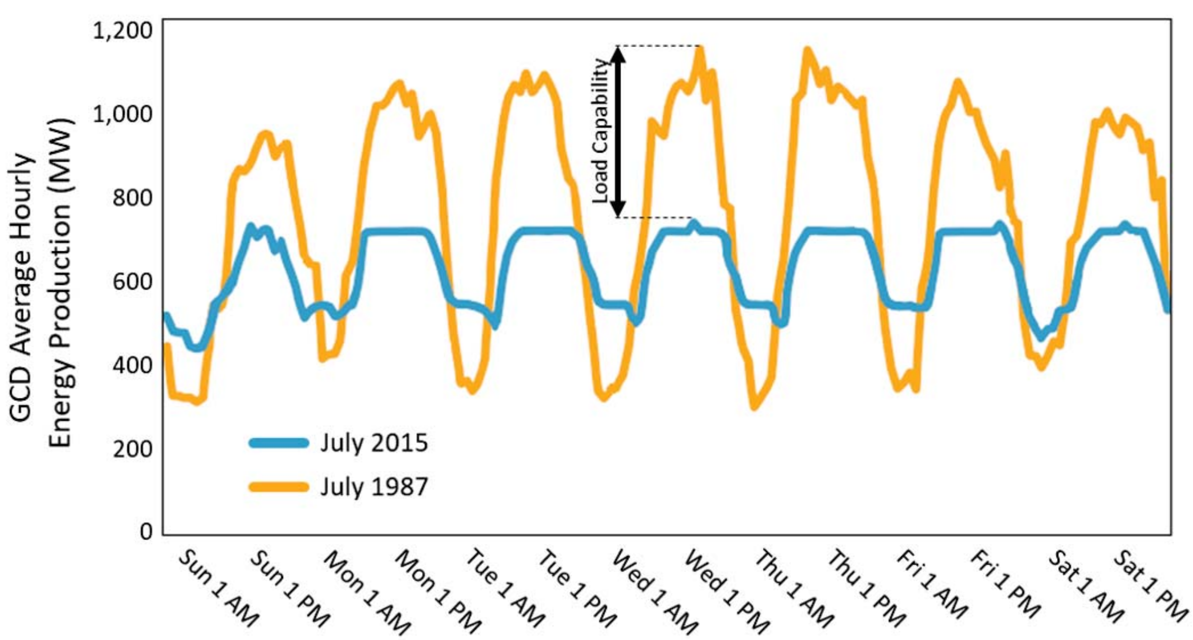


Figure 3. Hourly energy production at the GCD powerplant during a July week in 1987 and 2015.

5.3.2 Case Study: GCD Potential Improvements

The GCD case illustrates the potential benefits of implementing energy storage to improve environmental outcomes. Though the peaks vary significantly due to flow restrictions, the overall power generated relative to potential available power during the case periods is quite similar. Potential available power considers differences in head and assumes the maximum flowrate of 31,500 cfs can be achieved at the differing heads. If 31,500 cfs cannot be achieved during the lower head period of 2015, the convergence is increased. The July 1987 flow data generated at approximately 58 percent of the potential available power, whereas the July 2015 performance is approximately 54 percent of the potential available power. The convergence of these values is due to minimum flows being required during the night for 2015, increasing the generation over this period.

The imposed flow requirements resulting in night generation occur during a period of low demand. Increased power demands begin in the morning, taper through the day, then peak in the evening. Demand drops significantly at night. Implementing an energy storage system to capture the generation at night and discharge during the day would allow the average hourly energy productions from the environmentally restricted 2015 period to behave similarly to the less regulated 1987 period.

5.4 Process of Deciding the Storage Size, Type, and Location

Industry,[1] academia, and national labs have developed several tools and methodologies to assist with the sizing of energy storage for site-specific installations. Most of these tools and methodologies (Wu et al. 2017) focus primarily on maximizing revenues or cost-savings from power operations, either for the stand-alone storage technology or for a hybrid solution, such as a traditional solar or wind facility with the integrated addition of a storage system. To the best of our knowledge, currently there are no tools and methodologies that can assist with making decisions about the sizing of storage technologies for environmental benefits. However, existing methodologies can be adapted for this purpose. All that the methodologies require is a sufficiently precise characterization of the technical attributes of the resource being analyzed—whether a stand-alone storage system or a hybrid solution—and its intended functions. In the case of energy storage for environmental benefits, the technical characteristics of a hybrid hydropower resource with integrated storage will likely be based on the flow regimes, both baseline and alternative ones.

The changes in flow regimes may be required for a variety of reasons:

- FERC licensing or relicensing process, where the federal authorization for the facility requires a new flow regime or alternate water budget, such as maintaining upstream reservoir levels, or flow requirements to meet a downstream objective including human uses such as fishing or boating;
- operational strategies for asset management purposes, where the facility must adjust the hydraulic capacity of the system in order to maintain useful equipment life;
- new market opportunities, such as a change in the price of ancillary services, or changes in underlying regulatory and policy constructs, and market designs; and

[1] Det Norske Vitas (DNV)-GL's ES-Select tool compares energy storage technologies for different use cases; Pason Power Inc., and Energy Toolbase LLC., have designed a tool called Energy Toolbase to assist with sizing and controlling residential solar PV plus battery systems.

- mitigation of environmental issues, where water flows must be adjusted ~~provided~~ to match a water quality, fish, or other ecological objective.

In all but the last case, environmental benefits are not likely to be the primary drivers when making decisions about deploying an energy storage technology. Even so, the deployment of energy storage, whether for operational flexibility or asset management, will provide options for alternative operating practices and, by extension, alternative water flow regimes. The choice of storage technology in such cases will need to consider the appropriate combination of power generation and environmental outcomes, weighed against the cost of the storage technology itself. This process could be designed as a multi-objective optimization problem consisting of an appropriately weighted combination of objectives—(maximize) power generation responsiveness, operating limit, and flexibility, (minimize) asset management costs, (maximize) environmental compliance, and (minimize) technology costs. This process, essentially, uses a range of water flow regimes to construct the *pareto frontier* to analyze tradeoffs between different objectives.

Alternatively, one or more of the objectives may be treated as constraints in the design process. For instance, to avoid lost generation opportunity and attributes in the hydropeaking example, the baseline generation profile may be treated as a fixed requirement that the combination of storage and hydropower generation (with altered flow regime) must attain. Hence, the first step in the decision-making process is to determine the attributes of lost generation capacity—energy and power ranges, ramp rates, and so forth. The required set of attributes will help determine the choice of energy storage technologies. The next step in the process is to conduct techno-economic analyses based on understanding and knowledge of market conditions, water availability, and other critical considerations. The techno-economic analysis can be based on detailed time-series simulations and optimization of the hybrid resource, modeling its operations and dispatch in an actual market. Pacific Northwest National Laboratory's (PNNL's) energy storage evaluation tool (ESET), for instance, has been used extensively to create a sizing space for storage, based on known or assumed use cases (such as hydropeaking), deterministic or stochastic information on market conditions (prices, demand, and so forth), and storage technology specific considerations.

5.4.1 Storage Sizing Methodology for Maximizing Revenue of a Storage Hybrid System

The ESET tool formulates a linear programming problem to maximize the annual economic benefits of the energy storage or hybrid system. In this case, the benefits would include any identified hydropower use cases as well as any other market services that could be provided. The tool co-optimizes identified services to be provided subject to energy storage power and energy constraints, state-of-charge dynamics, and the coupling of different use cases. The ESET formulation dispatches the system on an hourly basis, first formulating a look-ahead optimization to determine a system operating point, and then dispatching the system on an hourly (or more granular) basis, to determine the number of hours the system would be actively engaged in the provision of each service. In addition, a storage system cost formulation can be added to the objective function to optimally size the storage system within the model. This cost formulation includes the equivalent system capital cost as a function of power and energy, which consists of investment, installation, and operations and maintenance costs for the storage device and associated inverter. The optimal sizing approach maximizes investment return for a given time frame. ESET then provides the maximized benefit, optimal size, and dispatch for the system under the given use cases and subject to the other variables (Wu et al. 2016). A *Monte Carlo type* analysis can then be conducted, varying one or more input variables of the formulation, including use case requirements, market prices, and storage technology types and costs, to generate a decision space. Within this space, present-value benefits and costs can be calculated to find optimal energy storage parameters that return the largest net-benefit.

The following sequence of steps presents a simplified version of the methodology:

1. Determine initial energy storage size.
2. Maximize revenue from hybrid plant operations subject to:
   - Plant electro-mechanical constraints,
   - Energy storage capacity limits.
3. Adjust energy storage size and re-initiate Step 2.

Figure 4 below, borrowed from Wu et al. (2016), presents an example decision space generated by the ESET tool across energy storage capacity and energy for different locations (i.e., San Francisco [SF], Chicago [CHI], Houston [HOU], and New York City [NYC]) and technology price points (i.e., high, medium, and low).

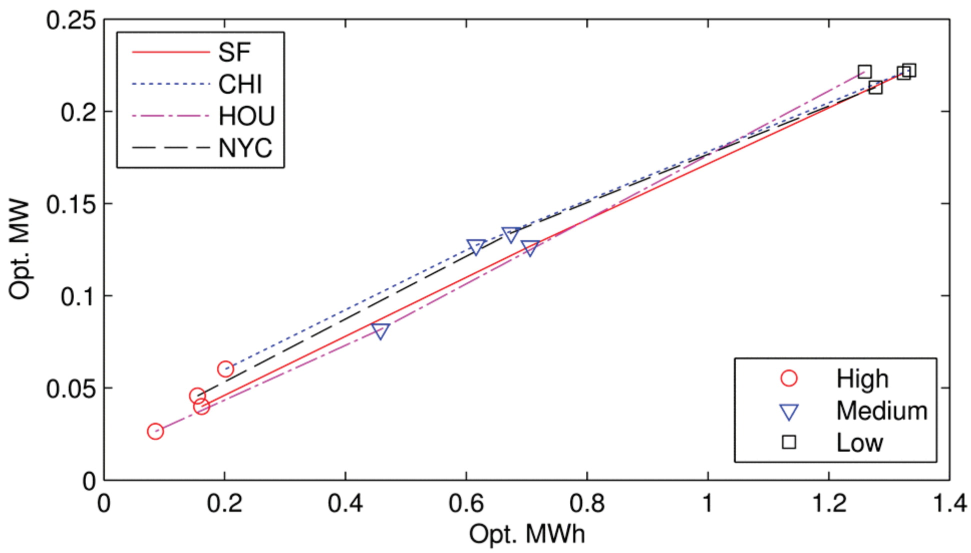


Figure 4. Optimal (Opt.) energy and power capacity in different battery cost scenarios and energy markets (San Francisco [SF], Chicago [CHI], Houston [HOU], New York City [NYC]).

Such tools and methodologies can be extended to study the suitability of different storage technologies for environmental benefits. The above methodology can be adapted to include desired environmental outcomes as additional constraints in the optimization problem. For instance,

1. Determine initial energy storage size.
2. Maximize revenue from hybrid plant operations subject to
   - Plant electro-mechanical constraints,
   - Energy storage capacity limits,
   - Environmental objectives:

  - Flow >= Min flow limit
  - Flow <= Max flow limit.

3. Adjust energy storage size and/or environmental objectives and rerun Step 2.

The min and max flow limits are derived from alternative flow regimes that correspond to desired environmental outcomes. In this way, the sensitivity of energy storage sizing relative to desired environmental outcomes can be determined by adjusting the water flow constraints.

6.0 Co-optimization vs. Co-location of Storage

There is a useful distinction here for when a storage system should be directly interconnected and integrated with a hydropower facility ("co-location") and when it should be operated in a coordinated fashion ("co-optimization"). Generating resources are already coordinated to operate as a portfolio, to serve load, to transmit energy, to balance control boundaries. Advanced control and communication can allow networked operation of electricity system assets across multiple systems. So, when does it make sense to site a storage system within a hydropower facility footprint? This section explores the contextual conditions that lean toward co-location or co-optimization of storage and hydropower assets.

6.1.1 Why Co-optimize?

Hydropower plants operate within a system context and their operation is coordinated with other resources to assure that load and generation are matched. In vertically integrated utilities or system-level coordination, the power tradeoffs for managing environmental objectives may be most cost-effectively dealt with by adjusting the merit order or dispatch of other plants, rather than co-siting storage at a specific project. For example, if a hydropower plant is limited in how fast it may ramp flows up and down, then the faster ramping requirement could be replaced by a gas unit or by other ramping resources already available elsewhere in the system.

For utility-owned plants, operating in organized markets, there may be locational considerations for siting energy storage systems based on geographical patterns of energy and ancillary service prices. One technique for identifying optimal siting of storage systems is to run a system-wide analysis using production cost models. These models enable co-optimization of the entire fleet of resources under a utility's ownership, with explicit consideration of certain locational aspects of its resources.

6.1.2 Why Co-locate?

Co-location of storage at the hydropower plant may allow additional local benefits. To achieve these locational benefits, utility-owned projects may be motivated to enhance the resource eligibility of a larger plant, or to maintain operational simplicity in response to a signal.

The case for co-location is notably broader for merchant (contracted resources) or market-facing plants. These plants are remunerated and environmentally governed independently from other resources, so there is greater motivation to demonstrate higher performance at the facility to be eligible for higher contractual rates, market products, or greater compensation.

Where avoiding harm to facility and unit components is a priority, integration of on-site storage solutions may help avoid detrimental use of existing equipment, such as low-loading units or frequent or sudden movement across hydraulic and efficiency ranges. Hydroelectric projects are uniquely capable of a suite of flexibility characteristics, including motoring units[1] and dispatchability using on-site water (energy) storage in reservoirs. Augmenting or preserving this flexibility with batteries could be very useful, because their characteristics are highly complementary to the flexibility of hydropower. Storage systems can increase the instantaneous responsiveness of units or avoid unit start-stop or rough zone utilization, thereby bolstering the case for on-site power value. They can also support local power needs, such as managing reactive power for voltage control, or assisting in the automatic generation control function for the management of area control error. Another factor is the speed of interconnecting a storage system to the grid, which is substantially more straightforward within the footprint of a large power plant (Kougias 2019).

In addition to the proximity benefits, it is typical for hydropower facilities to own a large parcel of land, or have overarching real-estate agreements for the surrounding land and its use, that may provide a suitable footprint for the location of the energy storage system. Locating energy storage on-site at the hydropower facility may eliminate the need for additional land acquisitions.

Aside from interconnection of the energy storage system, co-location is supported by existing transmission rights. The purpose of the energy storage being proposed provides operational flexibility rather than increased capacity beyond current peak demands. This allows the rights of the existing transmission system, sized for the existing generation, to be suitable for continued load transmission with the added energy storage system.

Many hydroelectric projects are located within a cascading operation, meaning that there are plants upstream or downstream between which there is a hydrologic link. Under these conditions, the project owner may operate the plants in a coordinated fashion, sequencing flows to an optimal outcome. Or if ownership is varied, there may be a coordination agreement regarding flow schedules or communication between plants to assure operational parameters are met at each plant. In these cases, energy storage, when integrated with a particular facility, such as a facility that acts as a hydrologic constraint, may permit additional flexibility to accrue to other plants in the same cascading system.

There also may be instances in which storage co-location is motivated by load tied directly to the water source, and the timing of the load does not align with hydropower production. Examples of this load include environmental restoration through active water treatment, oxygenation or cooling processes, hydrogen production, desalination, sensing, communications, and control and power backup. Loads of these types could be served by merchant resources as well as utilities under various arrangements. To the extent that these loads can be deferred in time and follow business-as-usual hydropower production patterns, the need for on-site storage to serve these loads and thus the requirement for co-location of energy storage assets may be reduced.

[1] Motoring of hydroelectric generators corresponds to an extreme idle state of running the turbines with insufficient pressure head to run the (interconnected) generator at synchronous speed. Under this condition, electrical generators act as synchronous motors and pull power from the grid to drive the turbines.

7.0 Next Steps

This paper outlines the potential for deriving improved environmental outcomes by integrating energy storage systems with hydropower plants. This idea is an exciting one, because it suggests that through technology investments, improvements in both river health and the financial future of hydropower plants can be achieved. Quantifying the mutual benefits is an important step in realizing storage adoption by privately and publicly owned hydropower projects.

Throughout this paper, existing knowledge and practical gaps in data, controls, and methodologies for evaluating this potential are indicated. The next steps, summarized below in order of action and scale, will help inform the industry and shape the discussion:

- Determine the full taxonomy and prioritization of the opportunity space for environmental benefits.
- Specify the practical considerations for retrofitting dams with energy storage, related to physical size, electrical interconnection, and charging mechanisms.
- Develop new techniques, based on multi-objective optimization, to support and evaluate the feasibility of hybridization for environmental benefits.
- Adapt or design a decision-support process to evaluate and inform the size, location, and type of energy storage technology.
- Simulate real hydropower plants and energy storage-informed operational models to design hybrid system controls and interactions of mutual benefit.
- Perform data-rich demonstrations of the relationships between environmental benefits and energy storage-augmented operations, in partnership with dam operators.

Several avenues are being explored to realize the data gaps listed above and to enable a demonstration project to serve as a foundation for integrating energy storage with hydropower projects for environmental benefits. Other use cases including the integration of energy storage with other electricity-dependent water infrastructure, such as water conveyance pumps, may offer similar potential for environmental benefits and will be additionally explored. Once a foundational use-case project is identified and implemented, the ultimate goal is to leverage this environmental use-case framework and apply it across the U.S. to other hydropower projects where energy storage could enable more cost-effective ecosystem improvements.

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Appendix A – Methodology Crosswalk

Table A.1. Operational shift requirements to enable environmental benefits of spill for safe fish passage (*hypothetical* metrics).

Operational Constraint	Baseline	Flows to Meet Environmental Objectives (limit impacts from not spilling)	Potential Benefit	What data are needed?
Minimum spill discharge (cfs)	7,000 (late summer) 30,000 (spring) Unrestricted (rest of year)	17,000 (summer smolt passage season) 100,000 for 16 hours daily (spring)	Route downstream-migrating fish from the powerhouse to the spillway to improve passage survival	Hourly passage routing of downstream-migrating fish
Passage flow rate (cfs)	Unrestricted	500 (upstream fish-passage season)	Provide adequate flow rate to attract for upstream fish passage	Seasonal and diel timing of upstream fish passage

Table A.2. Operational shift requirements to enable environmental benefits of Spill for Water Quality (*hypothetical* metrics).

Operational Constraint	Baseline	Flows to Meet Environmental Objectives (limit impacts on water quality)	Potential Benefit	What data are needed?
Minimum flows (cfs)	3,000 (summer) 1,000 (rest of year)	3,000 (summer) 1,000 (rest of year)	Reduce dissolved oxygen and total dissolved gas to at/near 100% for aquatic organism health	Water elevations near spawning habitat, correlation of elevations with flow rates as a function of river hydrology
Maximum non-experimental flows (cfs)[a]	31,500	31,500	Increase dissolved oxygen and/or total dissolved gas to increase under-saturated (<100%) water to avoid fish kills.	
Daily fluctuations (cfs/24 hr)	28,500 (summer) 30,500 (rest of year)	28,500 (summer) 30,500 (rest of year)	Manage spill to optimize oxygen and gas levels for aquatic system health.	
Spill flow rate (cfs)	No requirement	1000 (3-7am)	Spilling warmer surface water downstream may warm the river. Spill from higher elevations re-oxygenates the river but can be too much. Must be carefully planned.	

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The mission of the Wildlife and Freshwater Fisheries Division is to manage, protect, conserve, and enhance the wildlife and aquatic resources of Alabama for the sustainable benefit of the people of Alabama.

CHARLES F. "CHUCK" SYKES
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ASSISTANT DIRECTOR

May 26, 2021

Ms. Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, DC 20426

RE: Comments on the Updated Study Report (USR) Meeting Summary on April 27, 2021, Harris Relicensing Harris Action Team (HAT) 1 Meetings April 1, 2021 and May 3, 2021, Harris Project Downstream Release Alternatives Draft Phase 2 Report, Operating Curve Change Feasibility Analysis Draft Phase 2 Report and Battery Energy Storage System (BESS) Report for the R. L. Harris Hydroelectric Project (FERC No. 2628).

Dear Ms. Bose:

As the state agency responsible for the conservation and management of Alabama's freshwater fisheries and aquatic wildlife resources, we have participated in reviews, meetings and conversations related to the R.L. Harris relicensing process. The Alabama Department of Natural Resources, Division of Wildlife and Freshwater Fisheries (ADCNR) has reviewed the filed Updated Study Report (USR) Meeting Summary on April 27, 2021, Harris Relicensing Harris Action Team (HAT) 1 Meetings April 1, 2021 and May 3, 2021 meeting summaries, Harris Project Alternatives Draft Phase 2 Report, Operating Curve Change Feasibility Analysis Draft Phase 2 Report and Battery Energy Storage System (BESS) Report in regards to the relicensing of R.L. Harris Hydroelectric Project No. 2628 and submits the following comments and recommendations for your consideration:

Harris Relicensing Updated Study Report (USR) Meeting Summary on April 27, 2021

- ADCNR is providing these comments in addition to our previous comments on the Harris Project Initial Study Report (ISR), Using Bioenergetics to Address the Effects of Temperature and Flow on Fishes in the Harris Dam Tailrace Auburn Final Report (Auburn Report) prepared by Principal investigators Dennis R. DeVries, Russel A. Wright, Ehlana Stell, Elijah Lamb, School of Fisheries, Aquaculture & Aquatic Sciences Auburn University (Auburn PI's), part of the Aquatic Resources Final Report submitted to Alabama Power Company (APC) on April 2, 2021. Please note that responses to ADCNR comments are still pending and have not been provided a response.

- Section 4.2.3 of Aquatic Resources Study Plan states, "*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*." The non-wadeable, deepwater habitats sampling is included in the Auburn report and has been completed using boat and barge electrofishing under standardized protocols (O'Neil et al. 2014). To date, wadeable, shallow water habitat field sampling work has not been provided using a standardized protocol known as the 30+2 method (O'Neil et al. 2006) and as of April 12, 2021 the licensee has expressed this missing component as a variance to the Aquatic Resources Study Plan. Of note, ADEM's 2018 fish surveys in the Tallapoosa River have not been used to supplement collections by Auburn or Alabama Power. APC's 2017, 30+2 survey data are briefly included and discussed in R.L. Harris Hydroelectric Project Pre-Application Document (PAD), Volume 1, Appendix E, but not included, referenced or discussed in the Aquatic Resources Final Report.

- On page 30 of the PowerPoint presentation from the USR meeting on April 27, 2021, the licensee presented variances from the Final Aquatic Resources Study Plan. ADCNR noted that methodology modifications were made to the Final Aquatic Resources Study Plan without ADCNR and other stakeholder consultation or guidance. We are concerned that this variance highly reduces available collection data for shallow water fish populations in the Tailrace between 2017 and 2021 and that these data gaps and a fish population survey of deep water only are being used in summary statements to misrepresent the overall fish population status in the tailrace below Harris Dam. ADCNR has addressed its concern with the shallow water sampling data gaps in previous Draft Aquatic Resources comments (See P-2628-005 FERC ¶ 20200611-5152). If this issue was addressed in a timely manner, ADCNR and stakeholders could have provided approved shallow water methodology alternatives. The variance statements continue to state, that because the Study Plan was altered from a 30+2 sampling method (note without stakeholder input), that an index of biological integrity was not calculated, which further limits the ability of stakeholders to make easy comparisons to previous studies. It should be noted that the reason for not using the 30+2 method, Auburn and the licensee stated in the PowerPoint presentation during the USR meeting, "*that it was determined in the field to not be feasible/effective for sampling the sites.*" If this is true the licensee should explain the statement in PAD, Volume 1, Appendix E, page 7, which states, "*Alabama Power sampled fish communities in 2017 using standardize methods developed by the Geological Survey of Alabama (GSA) and ADCNR (O'Neil 2006.)…This sampling method is commonly referred to as the "30+2" method. Samples were collected at the Malone and Wadley sites along the Middle Tallapoosa in the spring and fall and the Upper Tallapoosa sites in July and October.*" In addition, ADEM was able to successfully complete a 30+2 sampling method at Wadley in 2018. The licensee should state why both the 2017 and 2018 data were not used to supplement collections as requested in the Study Plan. This data should be included and discussed in the Final Aquatic Resources Study Report. Page 11 of the PAD, Volume 1, Appendix E, includes Figure 3-3 with IBI scores for 2005-2015 fish community samples at Upper Tallapoosa, Malone, Wadley and Hillabee Creek. In ADCNR's 6/11/20, Draft Aquatic Resources Study Report comments (See P-2628-005 FERC ¶ 20200611-5152), we requested the licensee to provide IBI score overviews from both Irwin et al. (2011) and Irwin et al. (2019) data. The licensee response stated that exact values were not available, that standard deviation was high for some of the metrics and that specific values were left out of the summary. Information on pages 6-11 of the PAD, Volume 1, Appendix E, contradict these response statements. For example, on page 7 of the PAD, Volume 1, Appendix E, it states in regards to the Alabama Cooperative Fish and Wildlife Research Unit (ACFWRU)(same data presented and analyzed in Irwin et al. 2019) sampling efforts from 2005 to 2015 that, "IBI scores for the Upper Tallapoosa, Malone and Wadley sites appeared similar, with Hillabee Creek having consistently higher scores (Figure 3-3). The upper Tallapoosa site had an average score of 36 over the 11-year period, while the Malone and Wadley sites both have average scores of 35. Hillabee Creek had an average score of 43." The PAD, Volume 1, Appendix E, clearly indicates exact scores are available and have been evaluated by the licensee (See pages 10-11, Table 3-3, Figure 3-2 and 3-3 of PAD, Volume 1, Appendix E). In addition, the licensee presents IBI scores they completed utilizing the "30+2" method in 2017 at Malone, Wadley and Upper Tallapoosa. On page 7 of the PAD, Volume 1, Appendix E, it states, "*IBI scores at the Middle Tallapoosa sites during the spring and fall ranged from 30 (poor) to 38 (fair). However, three of the four collections resulted in poor scores. Scores at upstream sites were 40 (fair) and 36 (fair) during the summer and fall respectively*". If the licensee has evaluated this fish population data set and calculated IBI's, ADCNR is requesting these analyses for review and that they be provided in the Final Aquatic Resources Study Report. In Section 4.2 of Study Plan states, "*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.*" Although stakeholders agreed on target species, it was also explained in the study plan that fish populations would be studied, not just the four species identified to be studied extensively with bioenergetics and other methodologies. To date, the Final Aquatic Resources Report has not fully identified aquatic species and populations whose presence and/or sustainability within the Study Area may have been affected by the Harris Project. For one example among several, the Final Aquatic Resources Report should explain and discuss potential reasons why two important forage species (Threadfin, *Dorosoma petenense* and Gizzard Shad, *Dorosoma cepedianum*) are not present in the Harris Tailrace collections. These two species are the most dominant species for sportfish in Alabama rivers. Considering Blueback Herring have been introduced illegally to Lake Martin, and that they prefer cooler water over native clupeids, the dam could be offering suitable habitat to Blueback Herring, and negatively impacting native clupeids with the cold-water discharges. In addition, results indicate that few Tallapoosa Shiners (*Cyprinella gibbsi*) were collected and no Bullhead Minnow (*Pimephales vigilax*) were collected in the regulated sites. The dramatic decline of cyprinid abundance at regulated sites for both deep and shallow water surveys over the years is troubling and should have been included and discussed in overall Aquatic Resources USR meeting presentation (Swingle 1951; Irwin and Hornsby 1997, Travnicheck and Maceina 1994, Bowen et al. 1996, Irwin et al. 2011, Irwin et al. 2019). The Final Aquatic Resources Report lacks attention to individual species population trends outside of the target species and as a result provides a limited view of the overall fish population. The Final Aquatic Resources Report should include how survey results compare with other fish population studies in the Tallapoosa River system that utilized deep and shallow water fish collection methodologies and fully identify aquatic species and populations whose presence and/or sustainability within the Study Area may have been affected by the Harris Project.

- ADCNR disagrees with the summary statement by the licensee on page 30 of the PowerPoint presentation from the USR meeting on April 27, 2021 that "*boat sampling*" methodologies are "*effective at sampling shallow areas within study sites.*" Both boat and barge electrofishing equipment may collect shallow water fish species specialists but do not provide an equivalent result of a targeted shallow fish population survey comparison that shallow water pre-positioned area electrofishing grids (PAE) or 30+2 sampling method would provide. Similarly, a shallow water electrofishing grid or 30+2 sampling method can collect deep-water fish species specialists but does not effectively sample deep water to provide reliable deep-water fish population results. The goal of the Study Plan was not to test new sampling methodologies, but to provide collection data that could be used to compare to previous collections that targeted either deep or shallow fish populations to fill in data gaps. The study plan clearly separated the two methods for this specific reason. In addition, barge electrofishing equipment may collect more shallow water fish species specialists than boat electrofishing, further complicating the ability to compare results among sites in the Auburn Report or to past collections using other methodologies. On page 17 and pages 46-47 of the Auburn Report, boat electrofishing was used at Lee's Bridge, Wadley, and Horseshoe Bend, while barge electrofishing was used at Tailrace. Since the Auburn Report and page 28 of the PowerPoint presentation from the USR meeting on April 27, 2021, indicates that Lipstick Darter (*Etheostoma chuckwachatte*) (percids in Auburn Report) had a higher catch rate in the Tailrace compared to other sites, this may be due to the difference in the sampling techniques. A discussion if barge electrofishing is more effective at catching smaller fish, such as darters, compared to boat electrofishing is not included (Meador and McIntyre 2003). At minimum a discussion that includes how different methods of fish collection at various sites may bias sampling results should be included and translate to how overall results are presented to stakeholders (Bonar et al. 2009, Dolan and Miranda 2003, O'Neil et al. 2014). As presented, results are in sharp contrast to multiple shallow water species targeted studies in the tailrace (Travnicheck and Maceina 1994, Bowen et al. 1996, Irwin et al. 2011, Irwin et al. 2019, PAD June 2018 Appendix E) For example, Irwin et al. 2019 shallow water grid electrofishing results between 2006 and 2016 indicated benthic specialists in the Percidae family increased in abundance and diversity at sites progressively further downstream from the dam. In addition, all regulated sites had lower diversity and abundance when compared to unregulated sites. If the licensee is presenting the Auburn Report results as overall "Fish Community Results", without specifying that the methods are targeted for deep water fish populations only, then results are indicating even greater shallow water benthic species diversity and abundance declines in recent years and should be addressed at several collection sites downstream of the dam.

- Due to this variance in methodology of the Final Aquatic Resources Study Plan, conclusions and discussion of fish population results, any comparisons to past fish population collections in ISR reports such as Swingle (1951), Irwin and Hornsby (1997) and Travnicheck and Maceina (1994), should specify that these are for <u>deep water fish population comparisons only, not overall fish population and exclude shallow water analyses</u>. Travnicheck and Maceina (1994) which the Auburn Report compares results to frequently, clearly separated collection methods, results and discussion into deep water and shallow water analyses.

- On page 28 of the PowerPoint presentation from the USR meeting on April 27, 2021, it states, "*Diversity was lower than Travnicheck and Maceina (1994), but overall trends in diversity upstream and downstream were similar*" This statement fails to specify that this result from Travnichek and Maceina (1994) and the Auburn Report was for the deep-water fish populations only. It should be included that Travnicheck and Maceina (1994) results suggested that the effect of flow regulation on species richness and diversity of fishes in deep water habitats was negligible in the Tallapoosa River system downstream of hydroelectric facilities, but that <u>flow regulation appeared to alter shallow water fish assemblages with species richness progressively increasing with distance from Harris Dam.</u> <u>Alteration in natural flow corresponded to decreased species richness, diversity and abundance of species inhabiting shallow water areas, particularly species classified as fluvial specialists.</u> Remove, replace or provide caveats to conclusion statements regarding upstream to downstream fish composition to illustrate that results are for deep water fish population assessment only and include statements from past literature of both deep and shallow water fishery analyses. When discussing the Auburn Reports's deep water fish population collections in the discussion and in overall USR meeting summaries include that reporting of the <u>shallow water fish community monitoring between 2006 and 2016 indicates that fish densities in</u>

the regulated river downstream of Harris Dam were depressed when compared to unregulated sites (Irwin et al. 2019).

- ADCNR appreciates modification and removal of hybrid occurrences in the initial calculations of species diversity after ADCNR inquiries at a March 5, 2021 meeting with Auburn PI's and the licensee. (See Attachment 1, page 1205, P-2628-005 FERC ¶ 20210412-5745). In addition, total species and total native-species categories should be included. Including non-native species, such as Blueback Herring (*Alosa aestivalis*) and Snail Bullhead (*Ameiurus brunneus*), into species totals and analyses without this delineation can inflate species numbers and make it difficult to fully assess native species diversity changes. A decline of native species may not be evident if only evaluating total species diversity. Hughes and Oberdorff (1999) recommend using native species over total number of species in order to exclude several species of non-native fishes, which are generally tolerant, invasive, and could detract from the responsiveness of analyses in impaired streams. Incidence of unhealthy individuals in a fish community in the form of DELT's (Deformities, Eroded fins, Lesions, and Tumors) is frequently used in IBI metrics to reflect the health and condition of the fish community. Hybridization between species is also indicative of highly disturbed habitats and sometimes combined with DELT evaluation scores in IBI's (Karr et al. 1986, O'Neil et al. 2006). In addition, past research of the Harris tailwater often includes fluvial and benthic species specialists into analyses. This is highly recommended for comparisons and have been metrics strongly correlated to regulated tailwater operations. Adjust any conclusion statements and comparisons accordingly after separating non-native species from total species in calculations. Fluvial and benthic native species categories should be included as well.

- On page 48 of the Auburn report and on page 28 of the PowerPoint presentation from the USR meeting on April 27, 2021, it states, "*Relative contribution of centrarchids lower than 1996 rotenone sample; combined contribution of cyprinids and catostomids similar to 1951 rotenone sample*" Although proportionally this statement may be accurate, it is a deceiving conclusion to make regarding the overall density comparisons of cyprinids among studies. Catastomid overall catch numbers between these three studies (Swingle, 1951; Irwin and Hornsby,1997; Auburn Report) are fairly similar ranging between 26 and 66 individuals. Cyprinids, on the other hand, went from ~928 individuals collected by Swingle (1951) to between 12 and 77 cyprinids per site in collections by Irwin and Hornsby (1997) and Auburn Report samples, respectively. This is a dramatic decline of cyprinid abundance since 1951. It is also important to keep in mind when comparing Swingle (1951) data, that this study was attempting to monitor effects on the Tallapoosa River fish populations ~23 years post filling of Lake Martin and two other hydropower impoundments (i.e., Yates Lake and Thurlow Lake). Although Swingle (1951) fish collection data represent fish compositions closer to other southeastern U.S. unregulated large river fish population assessments in regards to Ictalurid and Cyprinid abundance/species richness, it was still a river that had already been impacted by fragmentation and regulated flows from dams and reservoirs downstream. Other studies including the Auburn Report 2020 deep water fish collection results (Irwin and Hornsby 1997, Travnichek and Maceina 1994) have indicated dramatic declines in Ictalurid diversity and abundance, post dam construction. Ictalurid diversity and abundance changes and comparisons to other studies should be included and discussed in more detail.

- If any of ADEM's 2018 fish surveys in the Tallapoosa River will be used to supplement collections by Auburn and APC as specified in the Aquatic Resources Study Plan, these data should be included in the report results and discussed. Data included in the licensee's PAD, Volume 1, Appendix E, document pages 6-11 should be included, referenced and discussed in the Final Aquatic Resources Study Report. Provide deep and shallow fish survey sampling metrics such as numbers of each species collected, abundance, diversity, evenness, etc. and calculate for each study reach (Recommend a similar basin calibrated IBI calculation for comparison to previous studies (Bowen et al. 1996; O'Neil et al. 2006; Irwin 2019)). Including how many sampling trips and shocking hours for each trip were completed. At the March 5, 2021 meeting it was indicated that seasonal collection comparisons in the Auburn Report included variable numbers of collection trips. Providing the number of sampling trips and boat shocking hours for each site and season column is important. Presenting only the Auburn Report deep water fish population results without including and discussing shallow water fish survey results presented in the PAD, Volume 1, Appendix E (plus additional supplementary material) in the Final Aquatic Resources Study Report and USR meeting conclusion statements is misleading to stakeholders in regards to the condition of overall fish population trends.

- There have been two other notable variances from the Aquatic Resources Study Plan that should have been included in the USR summary presentation. The first variance involves the adequate selection of an upstream control site. In NOI, PAD, Scoping Document and Study Plans, ADCNR comments from October 1, 2018 (See ADCNR, P-2628-005 FERC ¶ 20181002-5006) "*that selected sampling sites closely mirror those of samples collected historically and with the ADEM water quality and fish survey sites. This will allow for an ease of comparison over time and among various data sets.*" ADCNR had agreed with the Draft Aquatic Resources assessment that an alternative site was necessary for the current upstream control site due to its closely linked dam operation characteristics. ADCNR had requested input on site selection alternatives (See Attachment 2, page 18, ADCNR, P-2628-005 FERC ¶ 20210412-5745). Please include in the report why this was determined unnecessary and provide any comparison limitations the original upstream control site might contribute. The Auburn Report states on page 6, "*There is little habitat heterogeneity at this site which is dominated by sluggish, turbid water*" and page 47,"*Higher catch rates of clupeids above the reservoir were likely due to the high connectivity between the reservoir and the Lee's Bridge site*" indicating remaining researcher doubts about Lee's Bridge as an adequate control site. In addition, on page 22 of the Auburn Report, it states that Lee's Bridge was not accessible by boat during the winter due to reservoir drawdown. Using the Foster's Bridge access area, ADCNR frequently collects brood stock from the shoals above Lee's Bridge during early spring when Harris is still at winter pool and accessibility issues have not been problematic during low water. Overall, ADCNR remains concerned that the lack of an adequate control site could limit any strong conclusions when comparing data throughout the report.

- The second variance involves the change from original electromyogram (EMG) telemetry tags to acoustic/radio (CART tags). The Aquatic Resources Study Plan requested EMG 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…*". In the March 5, 2021 meeting, Auburn PI's stated that the fish were likely in the two-river kilometer gaps between the acoustic receivers. The lack of data between receivers or instream movement during pulsing and high flow events from CART tags is the reason for this initial request. The licensee should include in the discussion why the original electromyogram (EMG) telemetry data methodologies which included "tail-beat frequency" were modified and what key data gaps this change might have created. EMG tags could have provided data on how fish respond to increased flows and detected how tail-beat frequency corresponded to various flow conditions. The EMG tag variance was presented to stakeholders on page 23 of Initial Study Report (See P-2628-005 FERC ¶ 20200410-5084) but should still be included as an overall variance from the Study Plan in Aquatic Resources Final Report. It should be acknowledged that the change was a significant and critical loss to understanding in-situ target fish species movement in the tailrace. CART tag receivers were set to detect longitudinal stream distance movements and will not capture lateral movements or movements utilized between receivers to seek shelter due to flow changes.

- The Auburn Report bioenergetics model did not run a cold to warm scenario. During the HAT 3 meeting on March 5, 2021, ADCNR inquired on why the impacts of cold to warm temperatures were not analyzed. Auburn PI stated that "*the dam does not typically release warmer water into* *the river, so the analysis focused on warm to cold water transitions*." (See Attachment 1, page 1205, P-2628-005 FERC ¶ 20210412-5745). During the HAT 3 meeting on March 31, 2021, Dr. Wright, an Auburn PI, stated that "*fish are typically more tolerant of sudden temperature decreases compared to sudden increases.*" The Auburn Report temperature analysis in addition to the Water Quality Report both clearly show aquatic resources in the Harris tailrace are exposed to extreme changes in temperature both from warm to cold and cold to warm. After colder pulses in the summer or warmer pulses in the winter are discharged, water temperature fluctuations occur in both directions. Scenarios at the time when reviewing the bioenergetics model draft study plan were severely limited and premature due to the unprovided and not statistically analyzed Aquatic Resources Study Plan, Section 4.2.2. Comparison of Temperature Data in Regulated and Unregulated Portions of the Study Area. The Aquatic Resources Study Plan states that "*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 <u>after the Initial assessment of temperature data (see Section 4.2.2).</u>*" Note a large portion of the temperature analyses in various study plans for the ISR were not released until 2021. For example, Heflin and Newell temperature data was not provided to HAT 3 until the Final Aquatic Resources Study was released on April 12, 2021 (See page 49 of Final Aquatic Resources Report, Attachment 2, P-2628-005 FERC ¶ 20210412-5745). Include in the discussion with supporting literature how thermal shock from abrupt changes in stream temperature caused by anthropogenic activities (both rapid warming and cooling) can result in serious sub-lethal and lethal consequences for resident fish, including increased susceptibility to predation, increased avoidance energy costs, and other negative effects (Beitinger 1974, Donaldson et al. 2008, Fry 1947, McCullough 1999, Todd et al. 2010) In this discussion include how physiologically subjecting fish from cold to warm temperatures is more detrimental than subjecting fish from warm to cold. The interaction of temperature and dissolved oxygen should also be included and note how it only takes one low DO event or only one drastic temperature change event to harm aquatic fish species.

- On page 5 of the USR meeting summary, Jason Moak with Kleinschmidt "*noted that Alabama Power is reviewing information that was submitted regarding temperature modifications at other hydropower projects. Jason M. added that the temperature regime of the Tallapoosa River has been well studied during the relicensing process and noted temperatures below Harris Dam are well within the required temperature range of target species presented in Auburn's report. Jason M. stated that the data shows the temperature regime of the river below Harris Dam is not much different from a warm-water fishery, as it averages over 20 degrees Celsius (℃) and closer to 25 ℃ at several locations downstream during the summer. Jason M. added that only a 2-3℃ difference exists in portions of the year when compared to unregulated sites like Heflin or Newell; <u>therefore, there does not appear to be a strong case for making a temperature modification</u>.*" These statements summarize the <u>licensee's interpretation only</u>, with many points that are in sharp contrast to the temperature analyses presented in the Water Quality Report, Aquatic Resources Report and synopses presented in pages 26-45 of the Final Aquatic Resources Study, several of which indicate temperature effects on aquatic resources below Harris Dam. It is important to note even with strong temperature effects indicated, that the Auburn Report is just one study among many concerning Harris Dam with many ADCNR review comments still unaddressed. <u>Overall, ADCNR remains concerned that temperature and flow of the turbine releases has documented negative impacts on aquatic resources in the Tallapoosa River below Harris Dam resulting in a strong case for making both temperature and flow modifications below Harris Dam</u>. Please see additional details below in the <u>Downstream Release Alternatives Draft Phase 2 Report</u> comment section, regarding our concerns with temperature analyses in the Final Aquatic Resources Study, Auburn Report, USR meeting summary statements and temperature inputs into the data modeling.

- ADCNR agrees with the licensee summary statement on page 29 of the PowerPoint presentation from the USR meeting on April 27, 2021, that the majority of the target species had "insufficient sample sizes or models that did not accurately estimate respiration rates." These limitations highly reduced the overall conclusions that can be drawn from the Auburn Report bioenergetics results. The difficulty for Auburn PI's to obtain sufficient samples sizes and length distributions of the target species from study sites downstream of the dam for the Auburn Report bioenergetics study is concerning. A healthy natural unregulated river of that size, with the deep-water survey efforts deployed, would likely not have resulted in difficulties obtaining sufficient sample sizes and length distributions of the selected target species. Despite the limitations of the Auburn Report due to limited sample sizes, slightly decreasing growth rates modeled for only a short 24-hour time period (Auburn PI's note changes in growth have a multiplicative impact over longer periods) of age-3 and age-5 Redbreast Sunfish due to increased energy expenditure of swimming releases is alarming. Results from the Auburn Report laboratory swimming performance trials found that all target fish species were unable to maintain position in the open water column during single turbine generation without using burst swimming behaviors and must seek shelter when water velocity increases. In addition, the Auburn Report concluded that predicted velocities in the tailrace were greater than the measured Ucrit values for the target species and that the that high flow rates including that from Harris hydroelectric peaking generation can exceed the prolonged swimming capability of the target species. Fish forced to seek shelter at increased intervals requires energy expenditure as well. On page 61 of the Auburn Report, it states, "*Modeling growth and respiration rates of Redbreast Sunfish under temperature conditions experience both in the Harris Dam tailrace and further downstream at Horseshow Bend, suggests that water temperatures exceeds the optimal growth temperature for Redbreast Sunfish.*" The full optimal growth temperatures, growth rate and swimming performance results for just one target species, Redbreast Sunfish, coupled with the low sample sizes and length distributions of the target species point to both flow and temperature issues downstream of Harris Dam.

- On page 28 of the PowerPoint presentation from the USR meeting on April 27, 2021, the licensee includes two bullet points regarding body condition and fish size. These points fail to include page 49 of the Auburn Report statement, "*Based on this evidence, it appears that abundance and diet variation could be, in part, affecting the observed patterns of body condition in the tailrace.*" Goar et al. 2013 also hypothesized that lower fish densities at regulated sites may contribute to higher growth at early life stages of Redbreast Sunfish.

Harris Relicensing Harris Action Team (HAT) 1 Meetings April 1, 2021 and May 3, 2021

- On page 4 of 9:00 am to 11:30 am and on page 3 of 1:00 pm to 3:00 pm meeting summaries, of the Harris Relicensing Harris Action Team (HAT) 1 Meetings April 1, 2021, it states in the footnotes that, "*The Lipstick Darter (Etheostoma chuckwachatte) is a state-protected fish species occurring downstream of Harris Dam. The Finelined Pocketbook (Hamiota altilis) is a federal and state-protected mussel species with critical habitat located in the Tallapoosa River upstream of Harris Reservoir.*", in regards to Sarah Salazar – FERC question if there were any state-listed species in the Project Area. ADCNR Natural Heritage Database has records for two state protected aquatic species within the Harris Project Area. These include the Lipstick Darter and Tallapoosa Crayfish (*Cambarus englishi*) both occurring upstream, downstream and within the Harris Project Area. ADCNR can provide specific locations upon request. In reference to the Natural Heritage Database resources, include additional details as to which specific Database is being sourced.

- ADCNR concurs with FERC meeting note comments regarding the benefit of having combinations of operating curve scenarios and downstream release alternatives modeled together for further analyses.

<u>Downstream Release Alternatives Draft Phase 2 Report</u>

- ADCNR has consistently stated and provided published peer reviewed references that support recommendations for downstream flows to mimic a natural flow regime with an adaptive management of flows that follows state dissolved oxygen guidelines and provides natural temperature regimes, at all times for the sustained long term benefit and conservation of aquatic species (See ADCNR, P-2628-005 FERC ¶ 20181002-5006). ADCNR remains concerned that temperature and discharge of the turbine releases has documented negative impacts on aquatic resources in the Tallapoosa River below Harris Dam." (See ADCNR, P-2628-005 FERC ¶ 20181002-5006). Licensee has stated it will examine options for temperature mitigation technologies once it has been determined that water temperature is a problem (page 26 of Initial Study Report Meeting Summary (May 12, 2020), (See P-2628-005 FERC ¶ 20200512-5083). In our ADCNR, NOI, PAD, Scoping Document 1, and Study Plans for the R. L. Harris Hydroelectric Project comments we stated, "*We request that when evaluating impacts on downstream water quality (including water temperature) due to project operations, that methods to mitigate the unnatural water temperature variability be fully assessed. Over the past 40 years, several different technologies have been developed and used to improve flows and water temperatures below hydropeaking dams, nationally and internationally. We recommend that Alabama Power evaluate these technologies to determine feasibility for the Harris Project. The following technologies are not an exhaustive list but are examples of technologies utilized at other hydropower projects: house turbine unit, temperature control devices, trunnions, deep-water aeration or pumps, surface pumps, draft tube mixer, submerged weirs or curtains, and sluice gates. ADCNR is not advocating for any particular method, but merely stating that all options should be investigated by Alabama Power to determine the best option for the Harris Project.*" (See ADCNR, P-2628-005 FERC ¶ 20181002-5006). We recommend an analysis of how different technology options in collaboration with the Downstream Release Alternatives and Operating Curve Change could provide modifications in regard to timing, duration, rate of change, frequency and magnitude of water temperatures at varying distances from the dam to most closely align with unregulated temperature (Newell and Heflin gauges) regimes at all times and throughout the year.

- On April 2, 2021, ADCNR provided the licensee with comments regarding the Auburn Report. We are currently awaiting a response to these comments and are concerned with temperature and aquatic resource information details that may be input into the model from reports prior to our comments being fully addressed. Allan Creamer with FERC at HAT 3 meeting notes from March 31, "*expressed concern about models that do not have good data going into them.*" ADCNR agrees that accurate and reliable data modeling requires inputs to be accurate and reliable. Below sub bulleted are comments regarding temperature overview statements provided by the licensee on page 27 of the PowerPoint presentation from the USR meeting on April 27, 2021. These comments concern the licensee's USR meeting summary statement that, "*there does not appear to be a strong case for making a temperature modification*", and issues to address when inputting temperature data into the Downstream Release alternative models:

    - On page 26 of the Downstream Release Alternative Draft Phase 2 Report, water quality data utilized for modeling seems to be limited in years (2017-2020) and does not include winter months, drought years or years with high variation as indicated in the larger temperature data sets. For example, PAD, Volume 1, Appendix E, pages 17-18, Figures 3-8, 3-9 and 3-10 include histograms of daily water temperature range for three sites below Harris Dam from 2005 through 2017. These figures indicate daily temperature ranges (the difference between the minimum and maximum temperatures) occurring as high as 15°C in the Tailrace, 10°C in Malone and 15°C in Wadley, with numerous instances of daily water temperature ranges above 5°C (Note that in the Auburn Report the Auburn PI's goal was to test extreme fluctuations seen downstream of Harris Dam. In order to test extreme fluctuations in temperature the Auburn PI's selected 5° C decreases for the study). If only temperature data from 2017-2020 was included, variation may be misrepresented especially for periods of high variation indicate in the Auburn Report. From 2000-2018, Auburn Report, Figures 2.2 pages 120-129, illustrate highlighted high variation years of interest including 2000, 2002, 2003, 2008, 2009 and 2015. ADCNR had previously requested in comments that this Auburn Report temperature data be presented in similar form to the boxplots and histograms in the Aquatic Resources Study Report for the water level logger data for the May 1, 2019 through April 30, 2020 providing the number of temperature change events not just percentages, noting that it only takes one extreme temperature change to cause a detrimental aquatic species event.

- Include if model input data presented in the Downstream Release Alternative Draft Phase 2 Report utilized the continuous monitoring data or generation only temperature and DO data. With so many temperature gages and sites in the various studies and the vast difference in time ranges the data spans, it is crucial to specify which data was input into the model and why. It is important to note that Auburn Report temperature evaluation methodology (page 12), highly reduced variation in its analyses. It also excluded winter temperature data and had numerous gaps of missing data during known high variation periods. It is of note that although temperature data as presented in the Auburn Report, reduced variation in analyses, the data still indicate numerous daily and hourly temperature changes outside of temperature measurements examined for the two unregulated upstream control sites (Newell and Heflin). When comparing temperature data from two unregulated sites to regulated sites, all regulated sites had higher daily and hourly temperature variation throughout the year. Tailrace temperatures were higher in the winter at all sites compared to unregulated sites. Seasonal temperature shifts indicate warmer mean temperatures in the tailrace later in the fall season when compared to unregulated sites. In addition, warmer temperatures in the tailrace during the winter and cooler temperatures in the summer when compared to unregulated sites. Model input data should span a larger time period (include high variation years) and should include winter temperature data.

- On page 26 of the Downstream Release Alternative Draft Phase 2 Report, ADCNR wants to ensure that the water quality data utilized for modeling is not limited in downstream distance locations input into the model. Temperature data only includes input from the first 7 miles and makes statements indicating flow and temperature effects are limited to this stretch of the river only. Average wetted perimeter results Table 3-1 and 3-11 of the Downstream Release Alternative Draft Phase 2 Report and temperature data presented in Auburn Report show regulated release impacts throughout the tailrace but diminishing in magnitude with distance from the dam.

- On page 26, of the Downstream Release Alternatives Draft Phase 2 Report, include or reference the additional potential contributing factors provided on page 49 of the Water Quality Study Report regarding the dissolved oxygen levels in 2017. <u>In addition to evaluating potential causes of the 2017 low dissolved oxygen events, changes and improvements that can be made to detect, adjust and improve operations to prevent another 2017 event from occurring again should be considered and evaluated for the sustained benefit of downstream aquatic resources</u>. <u>It is important to note when presenting dissolved oxygen or temperature that it only takes a single incident of depleted dissolved oxygen or extreme temperature change to cause a detrimental aquatic species event.</u> If drought conditions are potentially impacting dissolved oxygen levels in drought years and in following years as stated on page 26 Downstream Release Alternatives Draft Phase 2 Report and as stated by licensee at the Harris Relicensing Harris Action Team (HAT) 1 Meetings April 1, 2021 that downstream temperature "*deltas decrease with a CMF due to* *having more water in the channel as it prevents the water from getting shallower and experiencing thermal heating*", then drought cutback releases currently at 85 cfs should be re-evaluated and analyzed. In addition, when re-evaluating and analyzing drought cutback releases, an emphasis should be placed on maintaining a minimum flow for the channel geomorphology of the Tallapoosa River downstream of Harris Dam to prevent direct solar radiation in shallow river sections from excessive heating. These flows should follow state dissolved oxygen guidelines and provides natural temperature regimes, at all times (during generation and non-generation). Temperature results presented in the Aquatic Resources Study Report indicate that the current channel geomorphology at flows below a certain threshold may be warming tailrace sections and increasing deltas to rates outside of control unregulated site (Newall, Heflin) ranges. The concept illustrated in the Aquatic Resources Study Report on page 56 to point out effects of low flows on measurements of water temperature fluctuation, also may be indicative that a low stable flow of 150 cfs in the example may not be suitable at providing riffle velocity and depths able to prevent direct solar radiation from excessive heating. Sufficient releases throughout the year especially late summer and early fall are required to prevent excessive heating of this nature in channels historically supporting higher mean annual flows. Table 5, pages 147 and 148 of Feaster and Lee (2017) an evaluation of the Tallapoosa River flows at Wadley, AL (Pre-regulation and Regulation) is provided and analyzed. Lowest average flows and duration of daily flow from April 1924 to March 1982 (Pre-regulation), indicated the river channel at Wadley was exposed to flows that equaled or exceeded 528 cfs 90 percent and 387 cfs 95 percent of the period and equaled or exceeded 7,820 cfs 5 percent of the time. These flows are drastically different than what the channel has been subjected to Post-regulation, especially in regard to low flows and the period of time the channel is exposed to low flows. During the Regulated period analyzed from April 1983 to March 2014, the Tallapoosa River at Wadley, AL river channel was exposed to flows that equaled or exceeded 220 cfs 90 percent and 170 cfs 95 percent of the period and equaled or exceeded 8,080 cfs 5 percent of the time. Focusing on lowest average flow for indicated number of consecutive days (7) at the site, pre regulation had recurrence interval of 10 years for flows below 170 cfs, during post regulation there was a recurrence interval of 5 years for flows below 170 cfs. Determining the change in water surface elevation and flow from the different downstream release alternatives in the Tallapoosa River downstream of Harris Dam and their effects on solar radiation heating (water temperature) for the channel geomorphology is a key component to consider when determining drought cutbacks and potential flow alternatives.

- In the Aquatic Resources Study Report, Newell temperature data was provided but not statistically analyzed. In the Auburn Report, unregulated Heflin data was provided but not statistically analyzed. Include statements clarifying how three years of temperature data was unable to be statistically analyzed. If the data was unable to be compared to the full regulated site data, a separate analysis could be completed for the same available time periods allowing for statistical evaluation comparisons. Regardless of the variables associated with the Heflin or Newell sites, temperature was the main metric of interest in the study, and there is no reason not to conduct analyses at the Heflin site or Newell site. Certain statements made, such as air hitting loggers at Heflin, and the suspect data at Malone and Wadley where water temperature consistently exceeds air temperature could potentially be further examined with statistical analyses of the data from both sites. For example, during the March 5, 2021 meeting (See Attachment 1, pages 1204-1206, P-2628-005 FERC ¶ 20210412-5745). Auburn indicated that the Heflin water temperature data during winter was suspect. If data at Newell was analyzed, the researchers could distinguish whether the changes were due to logger malfunction, or the logger being exposed to air. In limited comparisons of unregulated and regulated temperature data included in the Auburn Report, it appears that the Heflin data included December to March months while the regulated site data excluded these December to March time periods. These time periods should either be fully analyzed for regulated sites as well or removed from the unregulated site data for equivalent comparison. ADCNR recommends fully evaluating all time periods, especially with indications that warmer water temperatures, compared to unregulated sites and downstream regulated sites, are being released into the tailwater during winter months.

- In the Auburn Report, explain how high temperature variation for a specific time period could be detected in the Tailrace and Wadley, but not at Malone (for example months 9-12 Figure 2.2, year 2015). As noted in our draft Aquatic Resources comments, if temperature data is unavailable for a specific site during a time period when other sites indicate high temperature variation, provide a caveat recognizing these specific key data range gaps with an explanation for the absence. For example, Tailrace 2000 Temperature Range is unavailable for 10-12-month data, but Malone and Wadley both indicate high temperature variation during this same time period. Unavailable temperature data gaps, during key high temperature variation events, have the potential to significantly reduce analyses of temperature changes and impacts occurring in the regulated reach. These limitations to the overall conclusions of temperature analyses should be included and discussed.

- On page 12 of the Auburn Report it states, "*Hourly data points were used to generate hourly and daily averages, minimum, and maximum temperatures through the year. This eliminated some variation but allowed for a consistent comparison of temperatures across years.*" Analyzing the temperature data in a way that "eliminates variation" in a study aimed at targeting the amount of "temperature variation" conflicts with the overall purpose. It is important to make sure that minimums and maximums that occur in the tailrace are not averaged or reduced. Provide Tables in addition to Figures similar to draft Water Quality Study Report Tables 4-9 and 4-10 for each year and site. In the draft Water Quality Study Report Tables 4-9 and 4-10 indicate that maximum temperature ranges reaching 29.35° C during generation and 35.60° C from the continuous downstream monitor for the 2019 monitoring period. Although the 2019 temperature data is not included in the Tailrace figures provided in Figure 2.2A of the Auburn Report, the maximum temperatures displayed do not seem to correlate with previous years. Explain how maximum temperature ranges from the continuous downstream monitor for 2019 are higher than the Auburn Report temperature range maximums included in Figure 2.2A for the tailrace. If they are at different gage locations or using different instrumentation, explain how they could differentiate so much in their temperature readings.

- On page 42 of the Downstream Release Alternative Draft Phase 2 Report, it states that different flow scenarios potentially "*reduce the amount of littoral habitat for juvenile fish and mollusks*". This reduction in littoral habitat for reservoir tolerant juvenile fish and mollusks could be offset if an increase in upstream riverine habitat is produced for species of fish and mollusks that are riverine specialists. Including or referencing to a table indicating the amount of littoral habitat that will be lost or gained versus the amount of riverine habitat lost or gained for the different downstream release alternatives is recommended. Percentage of littoral habitat gained or lost compared to existing operations would assist in determining potential effects to aquatic resources.

- On page 42 of the Downstream Release Alternative Draft Phase 2 Report, specify the population of "*Striped Bass*" is referencing (for example, Harris Reservoir, Tailrace or Lake Martin). Note that ADCNR does not currently manage for Striped Bass in Harris Reservoir. The Auburn Report indicated Striped Bass collections at Lee's Bridge. If accurate, this would be the first records of Striped Bass in Harris Reservoir and needs to be further analyzed as to the populations size and sustainability. The statement on page 42 of the Downstream Release Alternative Draft Phase 2 Report, "*In the summer, lower reservoir elevations compared to existing operations (GP) could* *reduce retention time and cause less pronounced thermal stratification. The impact on reservoir stratification could theoretically reduce the amount of cooler, oxygenated water during the summer months necessary for the survival of Striped Bass.*", has many inaccuracies without supporting data and does not specify where the statement is referring to within the system. ADCNR does not stock Striped Bass in Harris Reservoir and does not have a management plan for a Striped Bass population in Harris Reservoir. Alternatively, ADCNR does stock and manage for Striped Bass in Lake Martin.

- On page 42 of the Downstream Release Alternative Draft Phase 2 Report, fish entrainment is discussed. If lake levels will change with potential downstream release alternatives, so will the distance from lake surface to the penstock intake (if modeled using a set distance, upper penstock setting is input). Even if the water passing through the turbines would not differ among alternatives the location of water withdrawal in proportion to the surface change could potentially effect fish entrainment zones (FEZ). Studies have indicated that even turbine type can affect fish mortality risk. For example, "within field studies, Francis turbines resulted in a higher immediate mortality risk than Kaplan turbines" on fish (Algera et al. 2020). The fish entrainment zone (FEZ) at a dam portal is defined as the volume of water in which fish have a 90% or greater probability of moving into the portal (Johnson et al. 2004). Entrainment zones are important because they indicate the biological extent of influence of the portal's flow field. The Fish Entrainment Zone (FEZ) can vary depending upon many factors. A few of these include turbine, intake design, fish species/size, depth, distance from dam, season and time of day (Johnson et al. 2004, Johnson et al. 2009). APC recognizes that fish entrainment and turbine mortality occur at the Harris Hydroelectric Project which results in a loss of public trust resources. ADCNR is concerned with this issue and how the combinations of operating curve scenarios and downstream release alternatives modeled together may potentially influence fish entrainment. Entrainment issues have complicated Hydroelectric Project relicensing across the U.S.

<u>Operating Curve Change Feasibility Analysis Draft Phase 2 Report</u>

- ADCNR has no additional comments or recommendations at this time other than to reiterate our support of having combinations of operating curve scenarios and downstream release alternatives modeled together for further analyses.

<u>Battery Energy Storage (BESS) Report</u>

- On page 17, Table 3-1 of the BESS Report, in addition to Option A and Option B, we recommend including a column which includes Cost Estimates Over 40-Year License Term at the Harris Project under current Green Plan operating procedures. It would be beneficial to include and discuss when the last turbine replacements were completed, the current life expectancy of the operating turbines, what routine turbine replacement would cost and what fixed O&M will be. Without this information it is difficult for stakeholders to identify and compare the full extent of cost estimates for BESS versus current operating conditions.

Thank you for the opportunity to comment on the R.L. Harris Hydroelectric Project relicensing filed Updated Study Report (USR) Meeting Summary on April 27, 2021, Harris Relicensing Harris Action Team (HAT) 1 Meetings April 1, 2021 and May 3, 2021 meeting summaries, Harris Project Alternatives Draft Phase 2 Report, Operating Curve Change Feasibility Analysis Draft Phase 2 Report and Battery Energy Storage System (BESS) Report. We look forward to continuing our cooperative efforts with the Federal Energy Regulatory Commission, Alabama Power, and other stakeholders during this process.

If you have any questions regarding these comments, please contact me at (334-353-7484) or Todd.Fobian@dcnr.alabama.gov.

Sincerely,

Todd Fobian

Environmental Affairs Supervisor

<u>References:</u>

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Alabama Department of Conservation and Natural Resources Comments under P-2628-005. Washington, United States. Federal Energy Regulatory Commission, FERC ¶ 20200611-5152, June 11, 2020. 14pp.

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Document Content(s)

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426
June 9, 2021

OFFICE OF ENERGY PROJECTS

Project No. 2628-065 – Alabama
R.L. Harris Hydroelectric Project
Alabama Power Company

VIA Electronic Mail

Ms. Angie Anderegg
Harris Relicensing Project Manager
Alabama Power Company
ARSEGARS@southernco.com

Subject: Staff Comments on the Updated Study Report and Updated Study Report Meeting Summary for the R.L. Harris Hydroelectric Project No. 2628

Dear Ms. Anderegg:

Commission staff have reviewed Alabama Power Company's (Alabama Power) Updated Study Report (USR) and associated draft and final study reports for the R.L. Harris Hydroelectric Project (Harris Project) No. 2628 filed on April 12, 2021. Staff also attended the USR Meeting held via teleconference on April 27, 2021, and reviewed the USR Meeting Summary filed on May 12, 2021.[1] June 11, 2021 is the deadline posted in the issued process plan (Attachment B) for filing: (1) comments on the USR and draft and final study reports; (2) comments on the USR Meeting summary; (3) requests for modifications to the approved study plan; and (4) proposals for new studies.

Based on a review of the USR, associated draft and final study reports, discussions at the USR Meeting, and the USR Meeting Summary, Commission staff provide comments and recommended updates on Alabama Power's filings in Attachment A. Unless otherwise noted, please address the comments in Attachment A in the final study

[1] In addition, staff attended a discussion of the Cultural Resources Programmatic Agreement and Historic Properties Management Plan Study on May 5, 2021, and a discussion regarding the consultation process for federally listed bat species under section 7 of the Endangered Species Act on May 18, 2021.

reports. A copy of the Commission's Integrated Licensing Process (ILP) process plan for the Harris Project pre-filing milestones is attached as a reminder (Attachment B).

If you have questions please contact Sarah Salazar at (202) 502-6863, or at sarah.salazar@ferc.gov.

Sincerely,

Stephen Bowler

Stephen Bowler, Chief
South Branch
Division of Hydropower Licensing

Enclosures: Attachment A
Attachment B

Attachment A

Staff comments on the Updated Study Report (USR) and USR Meeting Summary

General

1. The Updated Revised Study Plan filed on May 13, 2019 states that in Phase 1 of the Operating Curve Change Feasibility Analysis and Downstream Release Alternatives Study, "[o]nce Alabama Power has completed the model(s) according to the methods described in [Appendices A and B, respectively], Alabama Power will present the models and assumptions to [Harris Action Team] (HAT 1)."[1] According to the study plan schedules, the Phase 1 modeling and draft study reports were to be completed in April of 2020 and the final Phase 1 study reports were due in July 2020 (Downstream Release Alternatives Study) and August 2020 (Operating Curve Change Feasibility Analysis).

The draft and final reports were filed according to the study plan schedules. However, the models associated with Phase 1 of the Operating Curve Change Feasibility Analysis and Downstream Release Alternative Study have not been filed or provided to HAT 1 members, which should have been done over a year ago. The Study Plan Determination stipulates that "[a]ll interim work products, including models (with methodologies, inputs and outputs, assumptions, and summary reports), alternatives to be analyzed, and draft and final study reports, should be distributed to the HATs, and, at the same time, filed with the Commission."[2]

As called for in the Study Plan and Study Plan Determination, please file the models, including the methodologies, inputs and outputs, assumptions, and summary reports that were developed during Phase 1 of the Operating Curve Change Feasibility Analysis and Downstream Release Alternative Study. Please file all of the other non-proprietary models developed in support of the full suite of draft and final study reports (e.g., water temperature model, etc.) as well; before, or at the same time, the Preliminary Licensing Proposal (PLP) is filed.

2. In the Initial Study Report (ISR), Updated Study Report (USR), the associated draft and final study reports, and the USR Meeting, Alabama Power states that it intends to identify certain proposed protection, mitigation, and enhancement (PM&E) measures in the R.L. Harris license application and not in the PLP (e.g., the proposed Shoreline

[1] Alabama Power's May 13, 2019 Updated Revised Study Plan at Attach. A, Downstream Release Alternative Study, p. 8; and Attach. A, Operating Curve Change Feasibility Analysis, p. 8.

[2] Director's April 12, 2019 Study Plan Determination at B-1.

Management Plan (SMP) and Wildlife Management Plan (WMP)). However, Section 5.16(b)(2) of the Commission's regulations require that the PLP "[c]learly describe, as applicable, the existing and proposed project operation and maintenance plan, to include measures for protection, mitigation, and enhancement measures with respect to each resource affected by the project proposal." Please file the full suite of proposed operation, maintenance, and environmental PM&E measures with the PLP, including provisions for shoreline and wildlife management, to give stakeholders an opportunity to review and comment. Based on stakeholder comments, the license application should include any modifications to the proposed operation, maintenance, and environmental PM&E measures. If stakeholder recommendations are not adopted, the license application should include Alabama Power's reasons, based on project-specific information.

Draft Operating Curve Change Feasibility Analysis (Phase 2) Study Report

3. The HEC-ResSim Model developed during Phase 1 of the Operating Curve Change Feasibility Analysis[3] includes a minimum release provision that is based on flow at the upstream Heflin gage, which is located on the mainstem Tallapoosa River. There is also a streamflow gage (Newell) located on the Little Tallapoosa River Arm of Lake Harris, which was not used to develop the minimum release provision. Alabama Power's response to a Commission staff's additional information request regarding these streamflow gages,[4] indicates that during the development of the Green Plan, the stakeholders involved in the process considered the Heflin gage "the gage that best mimicked the unregulated, natural flow of the Tallapoosa River;" thus the Newell gage was not considered in developing the Green Plan and the minimum release provision. However, it remains unclear how flow from the Little Tallapoosa River is accounted for by the HEC-ResSim Model developed during Phase 1 of the study and its relationship to the minimum release provision.

Because the HEC-ResSim Model is a mass balance model, it should account for all inflow coming into Lake Harris (i.e., the output from the HEC-SSP model). Therefore, to better understand how the HEC-ResSim Model works, please revise the Draft Operating Curve Change Feasibility Analysis (Phase 2) Report to include an explanation for how flow from the Little Tallapoosa River is accounted for in the model, including describing (a) the model's assumptions related to the Little Tallapoosa River and its flow entering the R.L. Harris Project, and (b) the relationship between the Little

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[3] The HEC-ResSim Model developed during Phase 1 of the analysis was used in Phase 2 to determine if raising the winter operating curve would affect Alabama Power's ability to pass 11 discrete downstream release alternatives.

[4] Alabama Power's July 10, 2020 Response to Comments at Attach. A, p. 2.

Tallapoosa River flow and the minimum release requirement included in the HEC-ResSim model.

Draft Downstream Release Alternatives (Phase 2) Study Report

4. Table 3-7, Section 3.4.2 of the Draft Downstream Flow Alternatives Phase 2 Report presents the average daily water surface fluctuation (in feet) exceedance for each of the modeled downstream release alternatives at a location on the Tallapoosa River 7.7 miles downstream from Harris Dam. For the 1 percent exceedance value, fluctuations varied from 6.48 feet (Pre-Green Plan) to 4.97 feet (800 continuous minimum flow [CMF] and 800 CMF with Green Plan releases). Table 3-8 in the draft report presents the same information for the downstream release alternatives at a location 20.6 miles downstream from Harris Dam. The 1 percent exceedance values for fluctuations at this location range from 8.27 feet (Green Plan) to 6.37 feet (800 CMF and 800 CMF with Green Plan releases). The increase in magnitude of fluctuations seems inconsistent with the report's conclusion that fluctuations attenuate with distance from Harris Dam. Please confirm the accuracy of the values for the 1 percent exceedance line in table 3-8. If the values are correct, please explain why river fluctuations would be greater 20.6 miles downstream compared to the location 7.7 miles downstream from Harris Dam for the lowest percent exceedance value.

5. Table 3-8, reports that the 1 percent exceedance value for the average daily fluctuation under the Pre-Green Plan is 7.67 feet and the value for the Green Plan is 8.27 feet. The average daily fluctuations drop with each successive release alternative, including continuous minimum flows both with and without the Green Plan releases. For every other exceedance level, the average daily fluctuations decrease between the Pre-Green Plan and the Green Plan alternatives. Please verify the accuracy of the 1 percent exceedance values for the Pre-Green Plan and Green Plan release alternatives. If the values are correct, please explain why the average daily fluctuation is greater for the Green Plan alternative compared to the Pre-Green Plan alternative at the 1 percent exceedance level.

6. Table 3-10 of the Draft Downstream Flow Alternatives Phase 2 Report presents a comparison of the percent difference from existing conditions in average wetted perimeter for each downstream release alternative. Table 3-11 in the draft report presents a comparison of percent difference from existing conditions in daily wetted perimeter fluctuation for each of the downstream release alternatives. Finally, table 3-12 in the draft report presents the water temperature statistics downstream from Harris Dam for each of the release alternatives. As highlighted in the tables shown below, there are specific values that fall outside the overall general trends seen in the output from the HEC-RAS Model. Please check these values for accuracy. If found to be accurate, please explain why the anomaly(ies) exist.

TABLE 3-10 COMPARISON OF PERCENT DIFFERENCE FROM EXISTING CONDITIONS (GP) IN AVERAGE WETTED PERIMETER BASED ON HEC-RAS MODEL OF DOWNSTREAM RELEASE ALTERNATIVES

	Miles Below Harris Dam Habitat Type										
	0.4	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%
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	5.8%	2.2%	6.8%	0.5%	6.0%	1.1%	0.6%	2.4%	2.8%	1.3%	0.7%
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	10.9%	3.2%	8.3%	1.0%	10.6%	1.9%	1.0%	7.1%	7.2%	2.2%	1.4%
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	14.1%	4.0%	9.1%	1.2%	12.4%	2.4%	1.2%	10.9%	10.6%	2.8%	1.9%
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 3-11 COMPARISON OF PERCENT DIFFERENCE FROM EXISTING CONDITIONS (GP) IN DAILY WETTED PERIMETER FLUCTUATION BASED ON HEC-RAS MODEL OF DOWNSTREAM RELEASE ALTERNATIVES

	Miles Below Harris Dam Habitat Type										
	0.4	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%
150CMF+GP	-19%	-10%	-32%	-10%	-19%	-8%	-10%	-1%	1%	-5%	-5%
300CMF	-37%	-23%	-68%	-14%	-31%	-13%	-13%	0%	3%	-9%	-9%
300CMF+GP	-37%	-25%	-70%	-18%	-35%	-16%	-16%	-3%	2%	-10%	-10%
600CMF	-61%	-29%	-78%	-28%	-56%	-22%	-23%	-5%	4%	-14%	-20%
600CMF+GP	-61%	-31%	-78%	-30%	-58%	-24%	-25%	-8%	2%	-15%	-21%
800CMF	-77%	-32%	-82%	-35%	-64%	-26%	-28%	-16%	2%	-17%	-27%
800CMF+GP	-78%	-34%	-82%	-37%	-66%	-28%	-29%	-17%	1%	-18%	-27%

TABLE 3-12 WATER TEMPERATURE STATISTICS (IN DEGREES CELSIUS) BELOW HARRIS DAM BASED ON HEC-RAS MODEL OF DOWNSTREAM RELEASE ALTERNATIVES

		Spring					Summer					Fall				
	Alternative	Period Avg	Avg Daily Δ	Max Daily Δ	Avg Hourly Δ	Max Hourly Δ	Period Avg	Avg Daily Δ	Max Daily Δ	Avg Hourly Δ	Max Hourly Δ	Period Avg	Avg Daily Δ	Max Daily Δ	Avg Hourly Δ	Max Hourly Δ
Tailrace	PGP	16.95	3.90	6.79	0.35	5.90	24.76	5.59	6.89	0.52	4.10	25.72	4.60	5.78	0.398	2.63
	GP	16.95	3.88	6.79	0.35	5.90	23.94	4.32	5.23	0.54	3.90	25.39	3.61	4.40	0.39	2.99
	ModGP	16.98	3.85	6.79	0.36	5.90	24.12	4.00	4.88	0.54	4.25	25.68	3.51	4.48	0.39	2.19
	150CMF	17.02	2.89	4.88	0.27	3.98	23.79	3.27	4.08	0.40	2.81	25.63	3.09	4.01	0.28	1.99
	150CMF+GP	17.02	2.89	4.88	0.27	3.98	23.79	3.27	4.08	0.40	2.81	25.45	2.71	3.41	0.29	1.98
	300CMF	17.06	2.36	3.71	0.23	2.85	23.65	2.54	3.24	0.31	2.04	25.56	2.20	2.89	0.23	1.61
	300CMF+GP	17.06	2.36	3.71	0.23	2.85	23.65	2.54	3.24	0.31	2.04	25.47	2.13	2.72	0.25	1.57
	600CMF	17.11	1.97	2.90	0.00	2.26	23.52	1.93	2.48	0.23	1.39	25.50	1.68	2.15	0.22	1.56
	600CMF+GP	17.11	1.97	2.90	0.00	2.26	23.52	1.93	2.48	0.23	1.39	25.48	1.69	2.14	0.23	1.55
	800CMF	17.12	1.88	2.75	0.01	2.12	23.48	1.79	2.27	0.21	1.31	25.49	1.58	1.98	0.22	1.60
	800CMF+GP	17.12	1.88	2.75	0.01	2.12	23.48	1.79	2.27	0.21	1.31	25.48	1.58	1.97	0.22	1.60
1-mi Downstream	PGP	16.82	5.03	8.85	0.43	6.96	25.38	7.43	9.37	0.67	5.87	25.87	6.48	8.36	0.548	3.38
	GP	16.85	5.00	8.85	0.43	6.96	24.15	5.15	6.04	0.59	4.07	25.41	4.75	5.67	0.45	2.22
	ModGP	16.90	4.95	8.85	0.44	6.96	24.43	5.01	6.37	0.63	5.40	25.81	4.65	5.59	0.45	2.65
	150CMF	16.94	3.80	6.47	0.34	4.40	24.03	4.20	5.03	0.47	3.11	25.75	4.47	5.71	0.38	2.38
	150CMF+GP	16.94	3.80	6.47	0.34	4.40	24.03	4.20	5.03	0.47	3.11	25.48	3.44	4.06	0.32	1.64
	300CMF	17.02	2.90	4.78	0.27	2.82	23.88	3.28	4.05	0.36	2.24	25.65	2.98	3.72	0.26	1.63
	300CMF+GP	17.02	2.90	4.78	0.27	2.82	23.88	3.28	4.05	0.36	2.24	25.53	2.57	3.04	0.24	1.14
	600CMF	17.08	2.25	3.54	0.22	1.96	23.72	2.48	3.12	0.26	1.51	25.56	2.04	2.50	0.21	1.11
	600CMF+GP	17.08	2.25	3.54	0.22	1.96	23.72	2.48	3.12	0.26	1.51	25.54	1.92	2.24	0.20	0.94
	800CMF	17.10	2.07	3.18	0.21	1.76	23.65	2.24	2.81	0.23	1.30	25.54	1.79	2.17	0.20	0.97
	800CMF+GP	17.10	2.07	3.18	0.21	1.76	23.65	2.24	2.81	0.23	1.30	25.53	1.74	2.00	0.19	0.92

		Spring					Summer					Fall				
	Alternative	Period Avg	Avg Daily Δ	Max Daily Δ	Avg Hourly Δ	Max Hourly Δ	Period Avg	Avg Daily Δ	Max Daily Δ	Avg Hourly Δ	Max Hourly Δ	Period Avg	Avg Daily Δ	Max Daily Δ	Avg Hourly Δ	Max Hourly Δ
7-mi Downstream	PGP	16.78	3.67	5.31	0.29	2.65	26.98	3.80	5.17	0.32	0.91	26.48	2.96	4.19	0.255	0.79
	GP	16.78	3.67	5.31	0.29	2.65	25.80	4.19	5.31	0.33	1.89	26.66	2.84	3.64	0.24	0.78
	ModGP	16.79	3.70	5.31	0.29	2.65	25.80	4.18	5.31	0.34	1.78	26.67	2.52	3.31	0.22	0.66
	150CMF	16.78	3.64	5.07	0.29	2.51	25.62	4.05	5.12	0.32	1.79	26.41	2.92	4.11	0.25	0.76
	150CMF+GP	16.78	3.64	5.07	0.29	2.51	25.62	4.05	5.12	0.32	1.79	26.50	2.73	3.54	0.23	0.74
	300CMF	16.79	3.57	5.15	0.28	2.29	25.37	3.90	5.10	0.31	1.63	26.18	2.97	4.14	0.25	0.71
	300CMF+GP	16.79	3.57	5.15	0.28	2.29	25.37	3.90	5.10	0.31	1.63	26.28	2.67	3.53	0.23	0.68
	600CMF	16.83	3.36	4.77	0.27	1.94	25.02	3.75	5.10	0.30	1.38	25.97	3.07	4.11	0.27	0.68
	600CMF+GP	16.83	3.36	4.77	0.27	1.94	25.02	3.75	5.10	0.30	1.38	26.07	2.83	3.70	0.24	0.65
	800CMF	16.86	3.23	4.60	0.25	1.77	24.86	3.66	5.10	0.29	1.27	25.89	3.05	3.99	0.26	0.71
	800CMF+GP	16.86	3.23	4.60	0.25	1.77	24.86	3.66	5.10	0.29	1.27	25.99	2.86	3.69	0.25	0.62

Final Water Quality Report

7. Table 4-9, Section 4.2.2 of the Final Water Quality Report, provides the monthly summary of dissolved oxygen (DO) concentration and water temperature data collected at the continuous downstream monitor in 2019 and 2020. The data presented is for the entire dataset. To effectively compare data for generation and non-generation periods, please add a table to the report that includes the same information provided in table 4-9, but that differentiates the data for generation and non-generation periods. In addition, include a comparative analysis of that data in Section 4.2.2 of the report, including the percentage of time below 5.0 milligrams per liter (mg/L) and 4.0 mg/L for generation and non-generation periods.

8. Appendix B of the Final Water Quality Report provides an Excel spreadsheet that includes the 2017-2020 water quality monitoring data for the generation and downstream continuous monitors. The data for the generation monitor includes generation information (i.e., total discharge and discharge by turbine) for each DO concentration and water temperature data point. However, the dataset for DO and water temperature at the downstream continuous monitor does not include generation information. The purpose of collecting continuous data is to provide a means to compare DO and water temperature for generation and non-generation periods. To allow for such comparisons, please revise Appendix B of the water quality report to include generation information for each DO and water temperature data point for the downstream continuous monitor, as was done for the generation monitor. Also, update the spreadsheet to include data collected during 2021: March 1 – June 30 for the continuous monitor; and June 1 – June 30 for the generation monitor.

Final Project Lands Evaluation (Phase 1) Report and Phase 2 Study Progress

9. The goal of Phase 2 of the Project Lands Evaluation was to develop a SMP and a WMP using the information collected during Phase 1 of the study.[5] The Phase 1 Project Lands Evaluation was completed and a draft study report was filed in April of 2020. The study plan contemplated that Phase 2 would occur from 2020-2021. Phase 2, included provisions to consult with the members of HAT 4 on various tasks as part of the development of the SMP and WMP. However, the SMP and WMP have not been filed with the Commission and there is no documentation in the record showing that some of the approved tasks associated with Phase 2 of the study have occurred. Specifically, there is no documentation on the record of the status of the following Phase 2 tasks associated with the development of the SMP: (1) develop shoreline management provisions involving tree removal, to protect any known hibernacula and/or maternity roost trees of federally listed bat species in the project vicinity identified through consultation with U.S. Fish and Wildlife Service and Alabama Natural Heritage Program; (2) incorporate the Aquatic Nuisance Vegetation and Vector Control Program into the SMP; and (3) develop a detailed description of existing vegetation management practices at the project, including the methods, frequency of treatments, and any monitoring. Similarly, there is no documentation on the record of the status of the following Phase 2 tasks associated with the development of the WMP: (1) forest stand data showing cover type, composition, and age of forest stands within the project boundary;[6] (2) current timber management objectives and any existing best management practices; and (3) characterization and composition of riparian, wetland, and littoral habitats within the project boundary. Please file documentation that all of the Phase 2 tasks have been completed for the SMP and WMP and provide the information that was collected in Phase 2 of the Project Lands Evaluation Study with the PLP.

10. To facilitate review of the SMP and WMP, please file the geographic information system (GIS) data associated with the approved study plan to the Commission's eLibrary system with the PLP. Please include the GIS data layers that have been provided on Alabama Power's relicensing website and all other GIS data layers that were developed or collected as part of the approved study plan. As discussed during the USR Meeting,

[5] Phase 1 of the Project Lands Evaluation included: (1) identifying and classifying lands at the project that are needed for Harris Project purposes; (2) evaluating existing land use classifications at Harris Lake and determining if any changes are needed to conform to Alabama Power's current land classification system and other Alabama Power Shoreline Management Plans; and (3) identifying lands to be added to, or removed from the current project boundary.

[6] This information appears to have been provided in the form of GIS data on Alabama Power's relicensing website.

please ensure that all of the GIS data layers use the same coordinate system and projection to facilitate accurate review of the data. In addition, the GIS data layers that have already been filed (i.e., the project boundary and existing and proposed land use classifications) do not have compatible coordinate systems and projections, and should be refiled. Prior to filing the GIS data, please ensure that the labels in the attribute table of each data set can be easily deciphered, or file a separate key or legend for each data set. For example, the timber stand GIS data for both Harris and Skyline provided on the Alabama Power relicensing website includes codes for the attribute values under the "ForestType" and "BroadType" fields; however, there is no key or legend for these codes and it is unclear what distinction exists between the two fields, if any.

Botanical Inventories at Blake's Ferry Alabama

11. The botanical inventories conducted at two parcels adjacent to Flat Rock Park documented 22 non-native invasive plant species among the native plants that were observed. If available, please provide additional information about the locations and/or extents of these plants in relation to rare or state/county record[7] native plants or potential state Champion Trees.

12. The initial botanical inventory documented disturbance/damage to the native plants caused by All-Terrain Vehicle (ATV) use. Please provide additional detail regarding ATV use in this area including: (1) the location(s) of ATV access on the two surveyed parcels; (2) location(s) of any established ATV trails near the surveyed parcels; (3) the extent of damage to the native plants/communities; and (4) a detailed description of any measures that may have been implemented to protect the native plants/communities.

Cultural Resources Programmatic Agreement and Historic Properties Management Plan Study

13. The USR states that cultural resource assessments for Lake Harris and Skyline are complete; however, the USR does not include the results of those assessments. The cultural resource assessments should be fully documented and provided with the PLP. Alabama Power also intends to file a draft Historic Properties Management Plan (HPMP) with the PLP and proposes to allow stakeholders 60 days to comment. However, under section 5.16(e) of the Commission's regulations, stakeholders have a 90-day comment

[7] The inventory team documented 1 species which had never been documented in the state of Alabama and 67 species which had never been documented in Randolph County (denoted as "state record" and "county record," respectively, in table 2 of the study report).

period for filing comments on the PLP, which would include the cultural resource assessment results and draft HPMP.

14. The Draft Downstream Release Alternatives (Phase 2) Study Report contained a qualitative review of the effects of project operation alternatives to known cultural resources downstream of Harris Dam. Please include in the draft HPMP sufficient information about the 19 cultural resources discussed in the Downstream Release Alternatives Study Report to support an analysis of the effect of the project on the resources, including the general location, elevation, and character-defining features of the resource. In the draft HPMP also discuss treatment measures for reducing the effects of relicensing the project on the resources, as applicable and appropriate. File any location data for archaeological resources as “Privileged.”

15. During the USR Meeting, Bryant Celestine of the Alabama-Coushatta Tribe of Texas requested that both the Alabama-Coushatta Tribe and the Coushatta Tribe of Louisiana be consulted about potential Traditional Cultural Properties (TCPs) within the project’s area of potential effects. Please consult with these tribes regarding the need, timeline, and process for identifying TCPs and include any details about TCP identification in the draft HPMP. In the draft HPMP include the full record of consultation with Tribes, including the Alabama-Coushatta Tribe of Texas and the Coushatta Tribe of Louisiana.

Attachment B

R.L. Harris Process Plan and Schedule for the Integrated Licensing Process (ILP)

(shaded milestones are unnecessary if there are no study disputes; if due date falls on a weekend or holiday, the due date is the following business day)

18 C.F.R.	Lead	Activity	Timeframe	Deadline
§ 5.5(a)	Alabama Power	Filing of NOI and PAD	Actual filing date	6/1/2018
§ 5.7	FERC	Initial Tribal Consultation Meeting	No later than 30 days from NOI and PAD	7/1/2018
§5.8	FERC	FERC Issues Notice of Commencement of Proceeding and Scoping Document (SD1)	Within 60 days of NOI and PAD	7/31/2018
§5.8 (b)(3)(viii)	FERC/ Stakeholders	Public Scoping Meetings and Environmental Site Review	Within 30 days of NOI and PAD notice and issuance of SD1	8/28/2018 - 8/29/2018
§ 5.9	Stakeholders/ FERC	File Comments on PAD, SD1, and Study Requests	Within 60 days of NOI and PAD notice and issuance of SD1	9/29/2018
§5.10	FERC	FERC Issues Scoping Document 2 (SD2), if necessary	Within 45 days of deadline for filing comments on SD1	11/13/2018
§5.11(a)	Alabama Power	File Proposed Study Plans	Within 45 days of deadline for filing comments on SD1	11/13/2018
§5.11(e)	Alabama Power/ Stakeholders	Study Plan Meetings	Within 30 days of deadline for filing proposed Study Plans	12/13/2018
§5.12	Stakeholders	File Comments on Proposed Study Plan	Within 90 days after proposed study plan is filed	2/11/2019
§5.13(a)	Alabama Power	File Revised Study Plan	Within 30 days following the deadline for filing comments on proposed Study Plan	3/13/2019
§5.13(b)	Stakeholders	File Comments on Revised Study Plan (if necessary)	Within 15 days following Revised Study Plan	3/28/2019
§5.13(c)	FERC	FERC Issues Study Plan Determination	Within 30 days following Revised Study Plan	4/12/2019
§5.14(a)	Mandatory Conditioning Agencies	Notice of Formal Study Dispute (if necessary)	Within 20 days of Study Plan determination	5/2/2019
§5.14(l)	FERC	Study Dispute Determination	Within 70 days of notice of formal study dispute	7/11/2019
§5.15(a)	Alabama Power	Conduct First Season Field Studies	Spring/Summer 2019	

18 C.F.R.	Lead	Activity	Timeframe	Deadline
§5.15(c)(1)	Alabama Power	File Initial Study Reports	No later than one year from Study Plan approval	4/12/2020
§5.15(c)(2)	Alabama Power	Initial Study Results Meeting	Within 15 days of Initial Study Report	4/28/2020
§5.15(c)(3)	Alabama Power	File Study Results Meeting Summary	Within 15 days of Study Results Meeting	5/12/2020
§5.15(c)(4)	Stakeholders/ FERC	File Meeting Summary Disagreements/Modifications to Study/Requests for New Studies	Within 30 days of filing Meeting Summary	6/11/2020
§5.15(c)(5)	Alabama Power	File Responses to Disagreements/Modifications/ New Study Requests	Within 30 days of disputes	7/11/2020
§5.15(c)(6)	FERC	Resolution of Disagreements/ Study Plan Determination (if necessary)	Within 30 days of filing responses to disputes	8/10/2020
§5.15	Alabama Power	Conduct Second Season Field Studies	Spring/Summer 2020	
§5.15 (f)	Alabama Power	File Updated Study Reports	No later than two years from Study Plan approval	4/12/2021
§5.15(c)(2)	Alabama Power	Second Study Results Meeting	Within 15 days of Updated Study Report	4/27/2021
§5.15(c)(3)	Alabama Power	File Study Results Meeting Summary	With 15 days of Study Results Meeting	5/12/2021
§5.15(c)(4)	Stakeholders/ FERC	File Meeting Summary Disagreements/ Modifications to Study Requests/Requests for New Studies	Within 30 days of filing Meeting Summary	6/11/2021
§5.15(c)(5)	Alabama Power/ Stakeholders	File Responses to Disagreements/Modifications/ New Study Requests	Within 30 days of disputes	7/11/2021
§5.15(c)(6)	FERC	Resolution of Disagreements/ Study Plan Determination (if necessary)	Within 30 days of filing responses to disagreements	8/10/2021
§5.16(a)	Alabama Power	File Preliminary Licensing Proposal (or Draft License Application) with the FERC and distribute to Stakeholders	Not later than 150 days before final application is filed	7/3/2021
§5.16 (e)	FERC/ Stakeholders	Comments on Alabama Power's Preliminary Licensing Proposal, Additional Information Request (if necessary)	Within 90 days of filing Preliminary Licensing Proposal (or Draft License Application)	10/1/2021
§5.17 (a)	Alabama Power	License Application Filed		11/30/2021

Document Content(s)

Alabama Rivers Alliance
Water Is Life

June 11, 2021

VIA ELECTRONIC FILING

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

RE: Comments on Updated Study Reports, Updated Study Report Meeting Summary, and Study Dispute for R.L. Harris Hydroelectric Project (P-2628-065)

Dear Secretary Bose:

Enclosed for filing in the above-referenced docket are comments on various updated study reports, the Updated Study Report Meeting Summary, and a study dispute submitted by Alabama Rivers Alliance for the R.L. Harris Hydroelectric Project. If you have any questions or need additional information, please email me at jwest@alabamarivers.org or call 205-322-6395.

Sincerely,

Jack K. West

Jack K. West, Esq.

Alabama Rivers Alliance
Policy and Advocacy Director
2014 6th Avenue North
Suite 200
Birmingham, AL 35203

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Alabama Power Company	)	R.L. Harris Hydroelectric Pro ject
	)	
	)	Project No. 2628-065

ALABAMA RIVERS ALLIANCE'S COMMENTS ON UPDATED STUDY REPORTS, UPDATED STUDY REPORT MEETING SUMMARY, AND STUDY DISPUTE

As part of the Federal Energy Regulatory Commission's Integrated Licensing Process for the R.L. Harris Hydroelectric Project, FERC Project No. P-2628, Alabama Rivers Alliance (ARA) submits the following comments on the Final Water Quality Study Report, Final Aquatic Resources Study Report, Draft Phase 2 Downstream Release Alternatives Study Report, Draft Phase 2 Operating Curve Change Feasibility Analysis, and the Updated Study Report Meeting Summary filed by Alabama Power Company ("Licensee"). Additionally, ARA submits comments on Licensee's Draft Battery Energy Storage System (BESS) Study Report, together with a study dispute requesting completion of the BESS study.

I. FINAL WATER QUALITY STUDY REPORT

A. Dissolved Oxygen Levels

Monitoring data collected by Licensee, the Alabama Department of Environmental Management (ADEM), and Alabama Water Watch presented with the Final Water Quality Study Report show numerous events where dissolved oxygen (DO) levels failed to meet water quality standards. These recurring low DO levels pose a threat to aquatic resources below Harris. State water quality criteria specify that for waters classified as Fish and Wildlife, DO levels must meet the following:

> "For a diversified warm water biota, including game fish, daily dissolved oxygen concentrations shall not be less than 5 mg/1 at all times; except under extreme conditions due to natural causes, it may range between 5 mg/1 and 4 mg/1, 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/1 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/1 dissolved oxygen where practicable and 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."[1]

[1] Ala. Admin. Code r. 335-6-10-.09, Specific Water Quality Criteria (2021) (emphasis added).

Data provided in the Appendix B spreadsheet to the Final Water Quality Report show DO levels did not meet 5 milligrams per liter (mg/L) downstream of Harris at the following times and locations:

1. *ADEM Malone Monitor* (approximately seven river miles downstream of dam; collected data at 15-minute intervals from May 2018 through September 2020)
    a. 111 instances during July 2018; 79 instances during August 2018; 171 instances during September 2018; 81 instances during October 2018; 25 instances during November 2018; 3 instances during November 2019; 10 instances during October 2020.

2. *APC Generation Monitor* (approximately 800 feet downstream of dam; collected data at 15-minute intervals from June to October 2017-2020)
    a. 552 instances during June 2017; 625 instances during July 2017; 586 instances during August 2017; 109 instances during September 2017; 49 instances during October 2017; 4 instances in July 2018; 223 instances during August of 2018; 74 instances during September 2018; 3 instances during June 2019; 4 instances during August 2019; 1 instance during October 2019; 36 instances during August 2020; 18 instances during September 2020; 85 instances during October 2020.

3. *APC Downstream Monitor* (approximately 0.5 miles downstream of dam; collected data at 15-minute intervals from March to October of 2019 and May to October 2020)
    a. 16 instances during June 2019; 11 instances during August 2019; 2 instances during October 2019; 14 instances during July 2020; 75 instances during August 2020; 64 instances during September 2020; and 134 instances during October 2020.

Interpreting ADEM's Malone monitor data, the Final Water Quality Report states: "Overall, dissolved oxygen levels were above 5mg/L for a majority of monitoring period, with less than one percent of all measurements falling below 5mg/L."[2] As other stakeholders have warned, interpretation of DO data in terms of percentage of time meeting the 5mg/L threshold obscures the harm to aquatic biota that can result from a single low-DO event. A more ecologically appropriate approach would be to focus on times when DO levels are *not* meeting water quality criteria with an assessment of possible corrective measures.

The Final Water Quality Report averages and summarizes other ADEM monitoring data from a site at Wadley (TA-1) and a site at Horseshoe Bend (TART-1); however, the full dataset is not included in the Appendix B spreadsheet. Again, averaging and summarizing data can be helpful to present results but risks misleading stakeholders about occasional or isolated low-DO events that harm and kill aquatic species. The data from ADEM's Wadley and Horseshoe Bend sites are presented as summaries and averages in Tables 4-4, 4-5, 4-6, and 4-7, but we ask that Licensee include the full monitoring data in the Appendix B spreadsheet for the Wadley (TA-1) and Horseshoe Bend (TART-1) ADEM sites.

[2] Final Water Quality Study Report (Apr. 2021), Accession No. 20210412-5760, at 25.

B. Aeration System

The Final Water Quality Report contains some discussion of the aeration system used to enhance DO levels, which can "provide up to a 2 mg/L increase in dissolved oxygen."[3] According to Licensee, the aeration devices were tested in 1983 and showed a 1.37 mg/L average increase in DO levels. Licensee tested the aeration system again in 2016, and results showed an average increase in DO levels of 1.1 mg/L. ARA requests that copies of both test results be made available to stakeholders.

ARA recommends Licensee conduct a full appraisal of the condition of the aeration devices and a comparison to currently available technologies used to support DO levels. As of 2016, the devices were only operating at 55 percent of their originally stated potential, and the effectiveness of the aeration system declined by approximately 20 percent since it was last tested in 1983. At some point, this system will have to be refurbished or upgraded, and addressing it as part of the relicensing process could help avoid repetition of the prolonged period of low DO levels from 2017. Were the aeration devices to have provided a full 2 mg/L boost, water quality criteria would have been met much more frequently during that time.

As a "party responsible for impoundments" under Ala. Admin. Code r. 335-6-10-.09, Licensee should seek to improve the design of existing facilities by evaluating whether the aeration devices should be updated or if other technologies should be integrated to ensure low-DO events do not occur. Modification of the existing intake structure could also allow for warmer water with higher levels of DO to be released and ensure that water quality criteria are met.

II. FINAL AQUATIC RESOURCES STUDY REPORT

A. Water Temperatures Downstream

ARA disagrees with the statements of Licensee's representatives contained in the Updated Study Report Meeting Summary that "the temperature regime of the river below Harris Dam is not much different from a warm-water fishery" and that "there does not appear to be a strong case for making a temperature modification."[4] These comments represent Licensee's evaluation of the temperature data collected as part of the study prepared for this relicensing and not an overall scientific consensus. The Tallapoosa River below Harris has been rigorously studied over the past 25 years, and the Final Aquatic Resources Study, including Auburn University's bioenergetics modeling and temperature analysis, is only one of a number of studies.

Based on prior extensive studies surveying a wide variety of fishes and macroinvertebrates below Harris, and based on the water temperature concerns put forth by resource agencies, enough evidence exists of the temperature impacts created by the hypolimnetic releases from Harris to justify discussion of the options available to remedy the current thermal regime. The following is

[3] *Id.* at 48.
[4] Updated Study Report Meeting Summary (May 12, 2021), Accession No. 20210512-5067, at 5.

a brief summarization of the considerable research pointing to ecological problems caused by low water temperatures below Harris:

- Nesting success for Redbreast Sunfish was negatively related to both peaking power generation and depressed water temperatures (Andress 2002).[5]
- Strongly fluctuating flows and decreased water temperatures negatively affect survival and early growth of age-0 Channel Catfish and Alabama Bass. Mortality was highest in treatments with decreased water temperatures, indicating that variation of the thermal regime could have significant impacts on survival of juvenile Channel Catfish and Alabama Bass. Daily growth rates were also lower in treatments with decreased water temperatures. Data also suggest that growth and survival may be impacted more by fluctuations in temperature versus flow variation (Goar 2013).[6]
- Improving flow and temperature criteria from Harris could enhance growth and hatch success of sport fishes (Irwin and Goar 2015).[7]
- Thermal spawning conditions for Channel Catfish occurred every year in unregulated reach but in only 7 out of 12 years in regulated river segment and occurred earlier in the year in regulated reaches (Lloyd et al. 2017)[8]
- Flow and temperature remain in a non-natural state in regulated reaches downstream of Harris, and the macroinvertebrate community in regulated reaches shows many dissimilarities to communities from unregulated river reaches (Irwin 2019).[9]

The detailed, long-term documented impacts on aquatic life due to excessively cold temperatures, temperature fluctuations, and flow fluctuations from the Harris project are at odds with the conclusions drawn by Licensee in the USR Meeting Summary and support the contention that temperature modifications are in fact needed.

Most recently, the US Geological Survey's Open File Report from 2019 ("USGS Report") recaps the history of the biological studies and monitoring below Harris and firmly links water temperature to detrimental effects on fishes and macroinvertebrates below the Harris project.[10] The USGS Report clearly points to an unnaturally cooler temperature regime as detrimental to aquatic species: "*Our long-term metapopulation data provide evidence that suggests broadscale negative influences of the dam on species persistence and colonization parameters. Specifically,*

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[5] Andress, R. O., *Nest Survival of* Lepomis *Species in Regulated and Unregulated Rivers*, Master's Thesis, Auburn University (2002).
[6] Goar, T.P., *Effects of Hydrologic Variation and Water Temperatures on Early Growth and Survival of Selected Age-0 Fishes in the Tallapoosa River, Alabama*, Doctoral Dissertation (2013).
[7] Irwin, E.R. and Goar, T.P., *Spatial and Temporal Variation in Recruitment and Growth of Channel Catfish, Alabama Bass and Tallapoosa Bass in the Tallapoosa River and Associated Tributaries* (2015), U.S. Department of Interior, Fish and Wildlife Service, Cooperator Science Series FWS/CSS -116, Washington, D.C.
[8] Lloyd, M.C., Q. Lai, S. Sammons, and E. Irwin, *Experimental Stocking of Sport Fish in the Regulated Tallapoosa River to Determine Critical Periods for Recruitment* (2017).
[9] Elise R. Irwin, *Adaptive Management of Flows from R.L. Harris Dam (Tallapoosa River, Alabama)—Stakeholder Process and Use of Biological Monitoring Data for Decision Making*, U.S. Geological Survey Open-File Report 2019-1026 (2019) [hereinafter "USGS 2019 OFR"].
[10] USGS 2019 OFR.

generation frequency and cool thermal regimes negatively affected fish persistence and colonization, respectively."[11]

Having broadly studied 38 fish species from 25 sites over a 12-year period below Harris, the authors of the USGS Report write: "*Although it has long been recognized that temperatures are altered below R.L. Harris Dam, specific inference regarding the influence on biotic processes has been lacking until this study, which clearly relates colonization rates (that is, recruitment of a species to a site) to increased thermal energy in the river. In addition, our data indicate that there is no downstream recovery for colonization processes such that colonization rates did not increase with distance from the dam."*[12] Increasing thermal energy in the river, and thereby increasing colonization rates and recruitment, can only be achieved by adjusting the temperature of releases.

The Final Aquatic Resources Report sourced significant amounts of historic temperature data from regulated and unregulated river segments, but "unregulated and regulated river temperatures were not compared statistically due to limited data from the Heflin gage and a variety of other variables that could contribute to temperature differences between the regulated and unregulated river."[13] To enable a complete evaluation of thermal issues, all available water temperature data should be shared with stakeholders, including Licensee's historic temperature data provided to Auburn University. ARA has requested Licensee's 2000-2018 water temperature data referenced in Section 5.2.2 of the Final Aquatic Resources Report and used in Auburn's water temperature assessment. Licensee responded that its 2000-2018 temperature data will be filed with the Final License Application in November 2021. We request that all temperature data be made available to stakeholders as soon as possible since temperature has been a long-time area of concern.

B. <u>Fish Population Study</u>

The Aquatic Resources Study Plan states that the goal of many stakeholders in this relicensing is to "protect and enhance the health of populations of game and non-game species of fish and other aquatic fauna."[14] The FERC-approved study plan describes an "assessment of the entire fish population" while noting that a "subset of target species will be studied more intensively."[15] While Auburn researchers under contract with Licensee did some fish community sampling and reported those results in Appendix D, no portion of the Final Aquatic Resources Study Report has sufficiently assessed the impacts of flow regulation and temperature on non-game and non-target species. Population trends of non-target species are not discussed. No Index of Biology Integrity (IBI) scores were calculated to compare to prior studies. Variances in study methodology and control site selection were undertaken without adequate stakeholder input.

In August 2020, ARA recommended in comments on the Draft Aquatic Resources Study that Licensee review temperature data for at least some of the non-target species. Particularly because

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[11] USGS 2019 OFR at 48.
[12] USGS 2019 OFR at 47.
[13] Final Aquatic Resources Study Report (Apr. 2021), Accession No. 20210412-5745, at 58.
[14] Final Aquatic Resources Study Plan (May 2019), Accession No. 20190513-5093, at 3.
[15] *Id.* at 5.

scant temperature data exists for two of the four target species (Tallapoosa Bass and Alabama Bass) and a wide range in thermal minima and preferred temperatures has been reported in the literature for another target species, Channel Catfish, we suggested a literature review of similar temperature data for at least some of the non-target species, including species the USGS Report indicates are most affected by Harris, such as Stippled Studfish, Blackspotted Topminnow, Black Redhorse, Blacktail Redhorse, Riffle Minnow, and Bullhead Minnow.[16] No information on thermal requirements for non-target species has been included in the final report.

C. Adaptive Management

A stakeholder process was begun in 2005 to evaluate and adjust flows, which culminated in the Green Plan, a process described as an adaptive management plan (AMP) by Licensee and other stakeholders. That painstaking and model-driven process consisted of years of stakeholder meetings, data collection, and evaluation. Yet the ultimate flow prescription that resulted was still a scientific "best guess" of what would benefit aquatic biota while meeting power generation requirements. After twelve years of research and monitoring, this flow hypothesis was disproved as to both fishes and macroinvertebrates: "Irwin and others reported an increase in shoal habitat persistence associated with the Green Plan; however, positive population responses have not ensued."[17] But the failure of the AMP was not that its flow prescription did not achieve the desired biological outcome; the failure was that there was no mechanism to reevaluate and adjust operations based on the knowledge gained after the Green Plan was instituted.

Adaptive management is by nature iterative, and no matter the flow scenario ultimately selected through this relicensing process, monitoring future ecological responses and preserving the flexibility to adjust operations based on system feedback is imperative. Especially because few of the alternative flow scenarios under consideration have been physically implemented and monitored, the flow regime arising from this relicensing process will be the next scientific "best guess."

In the face of changing climatic conditions that are forecasted to accelerate over the next license term, Licensee and FERC should not write a static flow prescription into the next license but instead fashion a mechanism for monitoring and responsive change. Biologists studying the river below Harris have for decades been calling for iterative adaptive management, a refrain heard most recently in the 2019 USGS Report: "Despite potential obstacles, an adaptive management approach still holds substantial promise for improving the management of regulated rivers by allowing managers and scientists to address the uncertainty in predicting and measuring how river fauna will respond to flow-regime alterations."[18] Licensee and stakeholders should not make the same mistake again and lock in a flow regime with no mechanism to adapt. One positive example of adaptive management involving minimum flows in another Southeastern river, which resulted from a recent relicensing, that Licensee, FERC, and stakeholders can can look to is the Parr Hydroelectric Project (FERC No. 1894).

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[16] *See* USGS 2019 OFR, Table B1 (at 31), Figure B6 (at 37), and Figure B7 (at 38).
[17] USGS 2019 OFR at 48.
[18] USGS 2019 OFR, at 3.

III. DRAFT PHASE 2 DOWNSTREAM RELEASE ALTERNATIVES REPORT

The Draft Phase 2 Downstream Release Alternatives Report ("DRA Phase 2 Report") evaluates 11 release alternatives, including the current Green Plan, along with multiple continuous minimum flow scenarios ranging from 150cfs to 800cfs, both with and without the pulsing laid out in the existing Green Plan release criteria. As previously noted by FERC staff in comments on the Initial Study Reports, by some measures, 150cfs represents "poor" to "fair" habitat conditions, while 800cfs represents "good" to "excellent" habitat.[19]

A. Evaluation of Providing a Continuous Minimum Flow

ARA encourages the release of a continuous minimum flow to reduce both flow and water temperature fluctuations in the river downstream of Harris, which could lead to improved aquatic habitat, lessen erosion, and benefit recreationists. As part of an adaptive management program and along with other operational changes, a continuous minimum flow could be help restore a more natural flow and thermal regime.

Following the scientific literature, we continue to stress the importance of considering flows and temperature together and not assuming that any particular level of continuous minimum flow will yield a positive ecological response if water temperatures below the dam remain out of line with unregulated reaches.[20] In fact, a continuous minimum flow of excessively cold water could disrupt thermal cues for breeding and inhibit the productivity of the aquatic environment. Figures 3-31, 3-32, and 3-33 of the DRA Phase 2 Report contain clear visual representations of how temperatures at the unregulated Heflin site compare to water temperatures below Harris. The difference in water temperatures downstream from unregulated water temperatures is most pronounced in spring and fall, which are critical spawning seasons. Releases from Harris result in both substantial daily and hourly temperature fluctuations and also have a more general dampening effect on maximum and minimum temperatures, such that the river below Harris does not reach the high temperatures it would ordinarily reach in the summer nor the level of natural low temperatures in the winter.

Data from the DRA Phase 2 Report shows that releasing a continuous minimum flow may not significantly shift overall water temperatures, but it could reduce large swings in temperature close to the dam.[21] For instance, Table 3-12 shows that the 300CMF alternative could reduce maximum daily and hourly temperature changes by roughly half in the tailrace and one mile downstream compared to current operations.

B. Flow Impacts on Reservoir Levels

According to Licensee's analysis, the HEC-ResSim model indicates that "PreGP, 150CMF, and 300CMF have negligible effects on average reservoir elevations," but 300CMF+GP, 600CMF,

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[19] FERC Staff Comments on Initial Study Reports and Initial Study Report Meeting Summary (Jun. 10, 2020), Accession No. 20200610-3059, at A-2.
[20] *See generally*, Julien D. Olden and Robert J. Naiman, *Incorporating Thermal Regimes into Environmental Flows Assessments: Modifying Dam Operations to Restore Freshwater Ecosystem Integrity*, Freshwater Biology (2010) 55.
[21] Downstream Release Alternatives Draft Phase 2 Report (Apr. 2021), Accession No. 20210412-5748, at 54.

and 800CMF scenarios do begin to lower reservoir levels.[22] The DRA Phase 2 Report does not specify, however, what level of continuous minimum flow (with or without Green Plan pulsing) begins to affect reservoir levels. ARA supports releasing the greatest continuous minimum flow possible that will not adversely affect reservoir levels, and we request that one further step of analysis be conducted to determine what amount of minimum flow can be released without impacting lake levels. For instance, if a 400cfs or 500cfs minimum flow could be released without impacting reservoir levels, that could represent substantial gains in habitat downstream and even further reduce fluctuations in river levels and water temperatures. As the report notes, "[g]enerally, results show that river fluctuations are lower with increasing continuous minimum flows."[23]

The point at which a minimum flow begins to impact lake levels is an important piece of information for stakeholders and FERC to have, and determining this point should not require extensive additional effort on Licensee's part. We request that it be included in the final report.

C. Possible Addition of a New Continuous Minimum Flow Turbine

The DRA Phase 2 Report describes generating off of the various minimum flow scenarios and employs a "theoretical unit that pulls water from the existing penstock" to use in Licensee's HydroBudget model.[24] We encourage Licensee to investigate ways to supply any new generating unit used to pass a minimum flow with well-oxygenated and warmer water from the epilimnion layer of the reservoir.

Releasing and generating off of a continuous minimum flow of warmer water with higher levels of dissolved oxygen could benefit water quality and aquatic resources substantially. If a new continuous minimum flow turbine is proposed, it should be designed to draw from as high as possible in the reservoir in order to provide the greatest gains in water quality and benefits to aquatic resources downstream. The existing intake and penstock could potentially be modified to accommodate this, or a separate intake may be needed for a new generating unit.

IV. DRAFT PHASE 2 OPERATING CURVE CHANGE FEASIBILITY ANALYSIS

The Operating Curve Change Feasibility Analysis Draft Phase 2 Report ("Operative Curve Phase 2 Report") applies the hydrologic models and modeling results developed for the Phase 1 Report to quantitatively and qualitatively describe possible impacts to resources that would result from raises in the winter pool level.[25] Under the current operating curve, winter pool elevation is 785 feet msl, and the Phase 2 Report evaluates raising the winter pool level to either 786, 787, 788, or 789 feet msl.[26]

Elevating the winter pool level could benefit recreation on Lake Wedowee in the winter months by making some structures and boat ramps more accessible, however, increased recreation

[22] *Id.* at 9.
[23] *Id.* at 29.
[24] *Id.* at 9.
[25] Operating Curve Change Feasibility Analysis Draft Phase 2 Report (Apr. 2021), Accession No. 20210412-5750.
[26] *Id.* at 1.

opportunities must be weighed against exacerbated downstream flooding that could result from a raise in the winter pool elevation. As the Operating Curve Phase 2 Report summarizes: "The primary adverse effect of raising the winter pool is on downstream resources in the form of an increase in flooding….The primary beneficial effect of raising the winter pool is in the number of reservoir recreational structures (boat slips, docks, etc.) that are available for private recreational use/access during the winter months."[27]

A. Impacts to Downstream Residents and River Users

The modeling results summarized in Table 3-2 and Table 3-3 of the Operating Curve Phase 2 Report show that once the winter pool is raised by two feet and reaches 787 feet msl, more downstream structures become inundated during the 100-year design flood, including single family and mobile homes. With any amount of raise in the winter pool level, flooding becomes shorter in duration, but more intense in magnitude with a more rapid rise due to less storage being available in the reservoir and a quicker release of water.

Throughout the relicensing, many river users and downstream property owners have voiced concern about unpredictable flooding, property damage, and risks to personal safety caused by rapid and unannounced rises in river levels. ARA highly recommends that Licensee pay careful attention to these very real concerns of people living below Harris and those who recreate on the river. These flood events not only harm property but also present a threat to public safety.

Recreation downstream of Harris could also suffer with a higher winter pool level. Table 3-16 of the Operating Curve Phase 2 Report shows that the seven existing recreation sites below the dam would have a greater maximum depth of inundation, ranging from roughly 0.5 foot of depth increase with a 1-foot raise up to approximately 2.5 feet of depth increase with a four-foot raise in the winter pool. This additional inundation could make the recreation access points below the dam less accessible.

B. Impacts to Aquatic Resources and Habitat

Periodic flooding on the Tallapoosa River, particularly in the spring, is part of natural riverine processes. However, since beginning operations, the Harris Project has highly altered hydrologic processes and flow regime characteristics and created frequent large flow fluctuations that can lead to more intense flooding than the ecosystem would experience in its natural state. The modeling in the Operating Curve Phase 2 Report shows that raising the winter pool level "results in greater outflow from Harris Dam and subsequent flooding" due to increases in spill frequency and the amount of time spent at turbine capacity.[28] While the percentage increases may appear small, more time spent at turbine capacity could have further repercussions on downstream aquatic resources and affect fish spawning sites and spawning behavior. Infrequent but intense flood events can have considerable negative effects on spawning success.

[27] *Id.* at 55.
[28] *Id.* at 33.

Erosion could also be worsened by raising the winter pool level. Due to steep streambanks and soil conditions, the Operating Curve Phase 2 Report notes that "[i]ncreased scour would occur as velocities increase with the higher channelized flows resulting from the decreased storage in Harris Reservoir associated with higher winter operating curve elevations."[29] Issues of erosion and sedimentation have been frequently cited by river users and property owners downstream of Harris, and any operational changes that could lead to increased erosion should be carefully considered and only adopted with robust mitigation and protection efforts.

In deciding whether to change the operating curve to raise the winter pool, Licensee, FERC, and stakeholders must weigh the potential benefits of increased recreation on the reservoir during winter months against possible exacerbated flooding below the dam, increased erosion, and further negative impacts to aquatic life and habitat. Without detailed and robust protection and mitigation plans, ARA would not support a change in the operating curve to raise the winter pool level. Either way, protection and mitigation measures should be taken downstream of Harris to reduce flooding impacts, restore eroded and impaired streambank segments, and provide safer conditions for recreationists and residents.

V. STUDY DISPUTE CONCERNING THE DRAFT BATTERY ENERGY STORAGE SYSTEM (BESS) REPORT

The Commission's study determination issued in August 2020 recommended that Licensee conduct the BESS study requested by ARA, along with amending the Downstream Release Alternatives Study to include at least two new release scenarios resulting from the addition of a BESS:

(a) A 50 percent reduction in peak releases associated with installing one 60 MW battery unit, and
(b) A proportionately smaller reduction in peak releases associated with installing a smaller battery unit (5, 10, or 20 MW battery).[30]

Because pairing a BESS with the Harris project could require modifying or replacing one of the existing turbine-generators, FERC specified that Licensee include estimated costs for any specific structural changes, as well as the costs for the BESS itself. Finally, FERC advised that Licensee evaluate how each of the release alternatives specified in Options A and B above would impact recreation and aquatic resources on the reservoir and downstream of Harris.

In making the study determination, Commission staff explained that FERC currently has "insufficient information to evaluate the potential environmental benefits of a BESS."[31] Despite Licensee's initial efforts in completing the study, this is still the case. The Draft Battery Energy

[29] *Id.* at 31.
[30] FERC Staff Recommendations on Requested Modifications to Approved Studies and New Study Requests (Aug. 10, 2020), Accession No. 20200810-3007, at B-10.
[31] *Id.* at B-9.

Storage System Report ("Draft BESS Report") filed by Licensee[32] offers progress towards quantifying the costs of a BESS installation, O&M and replacement costs, an assessment of interconnection issues, and siting overview. However, as it stands currently, the Draft BESS Report does not adequately analyze the possible environmental and grid benefits of adding BESS under Option A or B. Rather, it contains a lop-sided analysis long on costs and short on benefits.

ARA disagrees with the May 3, 2021 HAT 1 Meeting Summary statement that "FERC expected a fairly cursory study from Alabama Power at this point."[33] Instead, we recollect FERC staff's characterization of the benefits portion of the analysis as being merely cursory, not that the Commission expected a hasty and undetailed study.

Simply put, the draft report has not met the criteria laid out in the Commission's study determination, and further work is needed to supply FERC and stakeholders with the full picture of BESS cost/benefits analysis. Fortunately, as discussed below, a new publication by the Pacific Northwest National Laboratory directly on this topic can guide and better direct the environmental benefits analysis.

A. Cost Analysis

In order to make the BESS study as useful and productive as possible, ARA engaged experts from Synapse Energy Economics, Inc. ("Synapse") to review the Draft BESS Report and attend the HAT 1 meeting devoted to this topic held on May 3, 2021. Synapse's comments and recommendations produced for ARA are included in Attachment A and referenced here.

The Draft BESS Report contains significant analysis of costs for Options A and B supported by estimates from the National Renewable Energy Laboratory's (NREL) 2020 Annual Technology Book. However, Licensee only explored one ownership option for procuring BESS, that being an outright purchase or company investment in the BESS. An evaluation of an independent power purchase agreement (PPA) for BESS services was not included as an alternative to financing the BESS internally, though both ARA's study request and FERC's study determination mentioned comparing ownership options for the BESS. During the May 3, 2021 HAT 1 meeting, representatives of Licensee stated they did not review PPA pricing and only relied on NREL pricing estimates.[34] We continue to recommend that Licensee provide a PPA financing alternative in its cost analysis since this is a common method by which utilities contract for BESS services and could present a more economically viable path.[35]

Unfortunately, Licensee's cost analysis does not factor in any potential incentives, including tax credits, that could be used to reduce the overall costs of a BESS. This is explicitly stated in Section 2.1 of the Draft BESS Report, "…potential incentives to offset battery costs are not included."[36] Dramatic declines in BESS costs have been driven by both technological advancements and through incentives—tax credits in particular—and these incentives continue to shape the market

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[32] Draft Battery Energy Storage System (BESS) Report (Apr. 2021), Accession No. 20210412-5747.
[33] HAT 1 Meeting Summary (May 3, 2021), at 4, *available at* http://www.harrisrelicensing.com.
[34] *Id.* at 2.
[35] *See* Attachment A, Memorandum of Synapse Energy Economics, Inc. (Jun. 9, 2021) at 3.
[36] Draft Battery Energy Storage System (BESS) Report (Apr. 2021), Accession No. 20210412-5747, at 6.

for BESS. Ignoring this reality skews the cost analysis towards the high end and paints an unreasonable picture of the actual costs of BESS. Again, incorporating a survey of market PPA prices for BESS into the analysis will more accurately reflect these available incentives. As Synapse notes in Attachment A, Licensee already has some useful PPA price comparisons available to it. Discussion of how incentives could reduce overall costs should be included in the final BESS Report.

Licensee's cost analysis shows high interconnection costs due to a lack of spare terminals at the Harris project or the Crooked Creek Transformer Substation,[37] but the Draft BESS Report did not explore or mention the possibility of siting a BESS elsewhere on the transmission and distribution system where it could be less expensive to interconnect, produce greater benefits to the grid, and still be co-optimized with the Harris project. Synapse notes in Attachment A that Licensee should consider the system benefits (and reduced interconnection costs) of siting the BESS elsewhere on the grid.[38]

Finally, Licensee did not fully determine the costs of modifying or replacing one of the turbine-generators to enable installation of a BESS and accommodate a wider range of flows. ARA acknowledges the current physical and engineering constraints at Harris and the undertaking required to assess turbine modification or replacement. Nonetheless, quantifying these costs is fundamental to a cost/benefit analysis, was spelled out in the Commission's study determination, and is needed by FERC, stakeholders, and Licensee to understand whether the benefits of adding a BESS outweigh the costs.

The closest the Draft BESS Report comes to assessing turbine upgrade costs is for Option B (no turbine upgrade cost estimate is given that could enable Option A): the cost of replacing one of the two Francis turbines with a new Francis turbine with a wider operating range would "exceed $20 million" based on "recent turbine upgrades at other Alabama Power Projects."[39] Estimating costs in excess of $20 million for the turbine upgrade is helpful, but far from precise. For some overall financial context, Licensee's original cost estimate to design and construct the Harris project was on the order of $210 million in today's dollars.[40]

B. Benefits Analysis

More than a cursory analysis of the potential grid and environmental benefits should be added to the Draft BESS Report to provide stakeholders and FERC with the information necessary to evaluate the full spectrum of benefits a BESS may provide to aquatic resources, aquatic habitat, recreation, erosion and sedimentation, water quality and to measure against the costs of infrastructure improvements. The Draft BESS Report currently lacks sufficient benefits analysis, both regarding environmental benefits and system benefits that could make the installation more

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[37] *Id.* at 15.
[38] *See* Attachment A, Memorandum of Synapse Energy Economics, Inc. (Jun. 9, 2021) at 3.
[39] Draft Battery Energy Storage System (BESS) Report (Apr. 2021), Accession No. 20210412-5747, at 16.
[40] Federal Power Commission Press Release, "Alabama Power Co. Seeks FPC License for $27.4 Million Hydroelectric Project on Tallapoosa River" (Nov. 21, 1968), Accession No. 20010204-2552. The more precise figure stated in the press release of $27,438,455 adjusted for inflation is approximately $210,561,757 in today's dollars.

economic. In its current form, the report is focused almost solely on costs to the exclusion of any benefits, resulting in an imbalanced document.

a. Grid and Economic Benefits

Licensee did not analyze any potential benefits that adding a BESS could provide to its distribution system, its peak capacity, or any ancillary services such as voltage regulation and black start capabilities that would result.[41] The Draft BESS Report did not explore potential arbitrage opportunities stemming from operation of a BESS (*e.g.*, charging the BESS from the grid or hydro during off-peak hours and then selling the stored electricity during peak hours). Acknowledgement and analysis of these overall system benefits that could make the installation of a BESS more economic should be included in the final report.

b. Environmental Benefits

Only a single paragraph of the Draft BESS Report is dedicated to assessing the beneficial effects on aquatic resources,[42] and improved environmental outcomes generally are dismissed as "potential limited environmental benefits" without analysis.[43] No attempt was made to quantify the environmental benefit of a 1/3 reduction in peaking flows resulting from Option B. Instead, a conclusory statement that the reduced peaking flow provided by "Option B would not likely benefit habitat stability, because the peak release would still occur" takes the place of useful quantitative analysis.[44]

In contrast to the Draft BESS Report, new research by the Pacific Northwest National Laboratory (PNNL) explores just how many environmental benefits can accrue from optimizing BESS with hydropower operations, including releasing flows that are more similar to the historical hydrograph, improving water temperature regimes and dissolved oxygen levels, accommodating spawning windows, and fostering safer fish passage through hydropower structures. PNNL's recent white paper, *Deployment of Energy Storage to Improve Environmental Outcomes of Hydropower*, is directly relevant to this study (in fact, it cites the Harris project as a case study), and a copy of this paper is included as Attachment B.[45] This important work can help inform the environmental benefits analysis in the Draft BESS Report and can bolster the study with an improved framework for analyzing the benefits stemming from a BESS addition.

PNNL's white paper explains how either co-located or offsite BESS can be co-optimized with hydropower facilities to gain "complementary performance profiles to hydropower projects, opening a broad spectrum of operational patterns" while improving environmental outcomes.[46] It provides both methodological guidance and a comprehensive framework for determining "the

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[41] HAT 1 Meeting Summary (May 3, 2021), at 3, *available at* http://www.harrisrelicensing.com.
[42] Draft Battery Energy Storage System (BESS) Report (Apr. 2021), Accession No. 20210412-5747, at 20.
[43] *Id.* at 21.
[44] *Id.* at 20.
[45] Pacific Northwest National Laboratory, *Deployment of Energy Storage to Improve Environmental Outcomes of Hydropower* (May 2021), PNNL-SA-157672, *available at* https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-SA-157672.pdf [hereinafter "PNNL Paper"].
[46] PNNL Paper at iii.

range and type of potential localized environmental benefits realized through integrating energy storage and hydropower."[47] The array of benefits includes reducing hydropeaking to preserve more natural flows, improving water temperature and levels of dissolved gases, managing spill for habitat benefit, and securing safe fish passage through hydro infrastructure—all of which are pertinent at Harris.

Section 5.1 of the PNNL white paper contains a particularly applicable conceptual example that illustrates how a BESS can be used to enhance environmental benefits for a hydropeaking plant such as Harris. A BESS sizing methodology is also presented that can help balance power generation needs with a more flexible flow regime. PNNL's discussion of deciding energy storage type, size, and location can also inform and strengthen the initial analysis of siting and interconnection contained in the Draft BESS Report. This relevant and timely work on this topic should be considered and used to update the Draft BESS Report with more concrete benefits analysis, both environmental and economic. We encourage Licensee to incorporate the new research and instructive framework presented in the PNNL white paper.

C. Lack of Modeling Data Available

Currently, the HEC-RAS and HEC-ResSim models and outputs are not available to stakeholders. Without access to the models and outputs, the stakeholders cannot fully analyze the economic and operational context in which a BESS would operate and identify possible operating strategies that could improve the BESS economic and environmental benefits. The models and associated outputs have been requested by ARA and other stakeholders. They have been told that this information will be filed with the final license application in November 2020.[48] At that point, Licensee will have determined its preferred course of action, and input from stakeholders will not be as welcome. To fulfill the stakeholder input goals of the ILP, Licensee should make the models and outputs available as soon as possible. ARA will continue its investigation of opportunities for increased operational flexibility and associated environmental benefits once those models and outputs are available.

D. Potential Use of BESS with a Continuous Minimum Flow Turbine

As described in Section III above, the Draft Phase 2 Downstream Release Alternatives Study incorporates a theoretical new turbine to release and generate off of a minimum flow. During the Updated Study Report meeting, Licensee noted that passing a continuous minimum flow leaves less water available to use on peak. Though not within the original scope of the current BESS study, ARA suggests that Licensee consider matching a smaller-sized BESS with any minimum flow turbine to store energy to use on peak while passing a continuous minimum flow.

Synapse has completed some initial modeling of pairing a smaller BESS with a new CMF turbine at the various minimum flows being studied (150, 300, 600, and 800cfs). See the Minimum Flow Analysis section of the Synapse memorandum included as Attachment A for this analysis. It shows, for instance, an example of pairing an 11 MW/4-hour battery with a new CMF turbine to

[47] *Id.*
[48] HAT 1 Meeting Summary (May 3, 2021), at 3, FN1, *available at* http://www.harrisrelicensing.com.

generate off of ~300cfs minimum flow with approximately a one percent revenue loss.[49] The added flexibility provided by BESS could enhance project operations, facilitate future adaptive management, and create better environmental outcomes below Harris.

E. Dispute of Study

In the Updated Study Report, Licensee stated that "[t]he BESS Study is complete" and proposes to do no further analysis other than reviewing comments received.[50] For the reasons stated above, under 18 C.F.R. § 5.15(d) ARA disputes that the BESS study has been conducted as provided for in the Commission's study determination and requests that Licensee complete the environmental and economic benefits portion of the study. ARA is not asking for a significant modification to the study, just that it be conducted thoroughly and objectively to provide FERC the information staff initially requested so an assessment can be made of the potential environmental benefits of adding a BESS at Harris, along with the costs.

We offer up the latest technical research on this topic, along with Synapse's recommendations and analysis, to help guide the study to completion. As the PNNL paper evidences, this is an important emerging area that will continue to arise in hydropower relicensing. Integrating energy storage at hydropower projects can allow operators to improve asset management, adapt to changing regulatory and market conditions, and capture additional revenue—all while improving environmental outcomes.[51]

As the Commission considers a new license for the Harris project, now is the time to thoroughly analyze how a historically inflexible hydropeaking project will function in a rapidly evolving grid. What flexibilities and expanded operational parameters could be enabled to both mitigate environmental impacts and create a more flexible generation resource? At this juncture, ARA requests a full analysis of possible environmental benefits, which may ultimately lead to a more flexible and valuable project that can better accommodate recreation, aquatic resources, power generation, help meet water quality standards, and can support the transformation the larger grid will undergo during the Harris project's next license term.

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[49] *See* Attachment A, Memorandum of Synapse Energy Economics, Inc. (Jun. 9, 2021), at 6.
[50] Updated Study Report (Apr. 2021), Accession No. 20210412-5737, at 13.
[51] PNNL Paper at iii.

ATTACHMENT A

Comments of Synapse Energy Economics, Inc. on Draft Battery Energy Storage System (BESS) Report

Synapse Energy Economics, Inc.

Memorandum

TO: JACK WEST, ALABAMA RIVERS ALLIANCE

FROM: MAX CHANG, ANDREW TAKASUGI, AND DAVID WHITE

DATE: AMENDED JUNE 9, 2021

RE: COMMENTS ON DRAFT ALABAMA POWER BATTERY ENERGY STORAGE SYSTEM AND ILLUSTRATIVE MINIMUM FLOW ANALYSIS FOR R.L. HARRIS DAM

Introduction

On April 12, 2021, Alabama Power released a draft feasibility study to quantify the associated costs assumed for the installation of a Battery Energy Storage System (BESS) for moderating the current water releases associated with peaking operations of the 135 megawatt[1] (MW) R.L. Harris Dam (Harris Project) located on the Tallapoosa River.[2] The draft report studied two alternatives:[3]

- Option A: A 60 MW battery with 240 MWh capacity that can provide the near equivalent generation of one unit at best gate for 4 hours per day/every day.
- Option B: A 20 MW battery with 80 MWh capacity that can provide the equivalent generation of about one-third of one unit at best gate for 4 hours per day/every day. The remaining 40 MW needed for 1-unit peaking generation would be produced by a new, upgraded unit.

The installation of a BESS could allow changes in the water discharges that would lessen the impacts on water quality and the riparian environment. The Alabama Power draft study considered changes in the dam operations that would generally operate only one turbine during peak periods. The generation at other times could be used to charge the BESS that could then discharge and provide power during the peak load periods. The BESS would thus essentially be used for a time shifting operation to maintain peak generation capability and revenues for Alabama Power.[4]

[1] The facility has two 67.5 MW turbines for a total capacity of 135 MW.

[2] Alabama Power. Battery Energy Storage System (BESS) Report R.L Harris Hydroelectric Project FERC No. 2628. April 2021. Available at http://www.harrisrelicensing.com/_layouts/15/start.aspx#/SitePages/Welcome.aspx

[3] Ibid. Page 5.

[4] The plant could change its operational mode even without a BESS, but a BESS provides a means for retaining some of its peak operating characteristics and revenues.

Alabama Power ultimately concluded that the installation of a BESS would not be a "reasonable alternative" based on its estimate of costs and benefits.[5] Synapse has provided Alabama Rivers Alliance with comments and recommendations on the draft BESS report as well illustrative examples of how the dam operations could be altered to provide minimum flows of between 150 and 800 cubic feet per second (cfs).

Comments

Synapse has reviewed the draft report and has identified several issues with the report and as well as opportunities to reduce the dam's impact on the Tallapoosa river by altering the dam's operations and investing in specific infrastructure upgrades at the facility. Synapse's comments are detailed in the following bullets.

Synapse notes the following observations regarding Alabama Power's BESS installation costs/planning:

- In this draft report, Alabama Power did not evaluate an independent power purchase agreement (PPA) as an alternative to financing the battery internally. Synapse notes that in 2019, Alabama Power filed a petition for the issuance of a certificate of convenience and necessity that included five PPAs for solar and BESS systems.[6] Alabama Power did not reference specific costs or opportunities information from the Docket 32953 proceeding in its analysis of BESS for the Harris Project.
- The draft report did not look into siting a BESS elsewhere on the Alabama Power transmission and distribution system that could address local needs. Synapse believes that the location of a BESS could impact the cost of interconnection as well as the benefits.
- Given that the BESS would charge from the grid regardless of its proximity to the Harris Project, Synapse recommends that Alabama Power investigate whether there are any BESS systems already connected to the Alabama Power distribution system which might negate the need for a new battery installation.
- The draft report did not look into possible arbitrage opportunities related to the operations of a BESS (e.g. charging from the grid and/or from hydro generation during off-peak hours and selling during peak hours)
- The draft report did not look at the other possible benefits of the battery system including various ancillary services such as voltage regulation and black start capabilities.
- The study did not consider a BESS system of the same size as one of the existing turbines (67 MW vs. 60 MW), which would simplify many of the issues raised by Alabama Power regarding the need for incremental capacity.
- The draft study did not look at the minimum flow option that could match a smaller sized battery system with a smaller turbine that might have better economics.
- The draft study did not investigate whether the economics of the project could be improved by coupling a BESS with a solar PV installation to gain investment tax credits.
- Alabama Power has not provided modeling information to quantify hydro operations. This information would be helpful to pair with BESS operations.

[5] Alabama Power. (2021). Page 22.

[6] See Alabama Public Service Commission Docket 32953. Available at http://psc.alabama.gov/

- Synapse noted that Alabama Power appears to be against switching out any of the existing turbines for a variable load Kaplan turbine due to cost and constructability issues with the turbine housing.

Recommendations on Draft BESS Report

Based on our observations regarding the draft report, Synapse makes the following recommendations:

- Alabama Power should provide cost and benefit information beyond the cost of the batteries. This would include economic and operational benefits in addition to more detailed environmental benefits.
- Alabama Power should provide details on the operational assumptions used for hydro generation and BESS operations.
- Alabama Power should provide information that evaluates possible BESS operations based on of hourly data for generation, water flow, energy prices, and modeled battery charging and discharging.
- Alabama Power should analyze sizing the BESS to match the full capacity of an existing turbine.
- Alabama Power should consider a power purchase agreement (PPA) for the battery system rather than a company investment. This would also include information on solar and BESS PPAs considered in Docket 32953 or other comparable PPAs.
- Alabama Power should consider the benefits of locating the BESS elsewhere on the grid.
- Alabama Power should consider the benefits of combining a BESS system with solar and obtaining investment tax credits.
- Alabama Power should consider a minimum flow turbine and a smaller matching battery system.
- Alabama Power should evaluate the impacts of reduced peaking operation without a BESS to the extent that has not been analyzed in the Green Plan.
- Alabama Power should evaluate the benefits, including environmental ones, as well as the costs in all the analyses.

Minimum Flow Analysis

Synapse understands that Alabama Power operates the RL Harris hydroelectric facility in Alabama as a peaking resource, which means that downstream water flows can vary dramatically within any day. Synapse also understands that providing a continuous minimum flow could improve the downstream river environment.[7] This analysis looks at some operational aspects of such a change including a battery energy storage system. The scenarios described below should be treated as illustrative examples based on publicly available data undertaken in the absence of more specific generation and pricing data from Alabama Power.

[7] A true run-of-river operation could stabilize the upstream reservoir as well, but that is not explored in this memo.

Operational Background

The Harris facility contains two 67.5 MW vertical Francis turbines that typically operate together in a peaking mode producing 135 MW of power. Although these existing turbines can start and stop in a fairly short time frame, Alabama Power contends that the turbines cannot be operated at partial capacity. Each turbine has a maximum hydraulic capacity of 8,000 cubic feet per second (cfs) for a maximum turbine flow at peak operating conditions of 16,000 cfs. The average generation in a year is 151,878 MWh for an average hourly generation of 17.3 MWh, and an average daily generation of 416 MWh. This is equivalent to an average water flow of 2,055 cfs.[8]

The minimum continuous flows that have been recommended range from 150 to 800 cfs. These are quite small when compared to the maximum flows, but larger when compared to the annual average flow.

Analysis

Minimum flow scenarios ranging from 150 to 800 cfs have been proposed, with the higher levels having greater environmental value.[9]

We look at the impacts from several perspectives and configurations for the RL Harris facility. In all of these illustrative situations we assume that the existing turbines remain in place and operate in peaking mode using the available water consistent with the current reservoir operating curve. The minimum flow modes will reduce the amount of water available for those peaking operations, and thus the amount of peaking generation and revenue. In our minimum flow analysis, we have assumed that there is no need for the pulsing operation of the existing turbines associated with the current Green Plan which may allow some increased peak period generation.

1. **Minimum flow discharge with no generation.** The first scenario we analyzed was a minimum flow requirement, without any accompanying generation. These low minimum flow rates could not be captured by the two existing turbines that cannot operate at partial capacity. Table 1, below, shows the amount of generation (and revenue) which would be forfeit if this approach were adopted.[10]

   The assumption that no accompanying generation is produced during periods of minimum flow is based on the current turbine configuration. Alabama Power asserted in its draft Battery Energy Storage System Report that, “the existing turbines are not designed to operate in a gradually loaded state or at flows lower than best gate,” which is, “approximately 6,500 cfs,” per unit.[11]

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[8] Information is from Chapter 4 of the Pre-Application document of June 2018.

[9] Synapse understands that flows above 600 cfs may impact water levels at the RL Harris reservoir.

[10] The daily generation equivalent is an estimate of the power that could be generated using the minimum flow if the existing turbine configuration allowed for the flow. The percent of average generation can be understood as the percent of current revenue that would be lost under this scenario.

[11] Alabama Power Battery Energy Storage System Report pages 4, 15.

Table 1. Illustrative Scenario: Minimum Flow with No Generation

	Flow Rate Scenarios				Units
Min Flow Rate[12]	**150**	**300**	**600**	**800**	cfs
Daily Generation Equivalent	22.8	45.6	91.1	121.5	MWh
% of Average Generation	5.5%	10.9%	21.9%	29.2%	

2. **Minimum flow with matching generation.** The second scenario we analyzed assumes that the minimum flow is captured with a new matching turbine and the energy is sold at market prices during the hours of operation. Given Alabama Power's comments regarding the current turbine configuration, it is likely that this scenario would require the installation of an additional turbine capable of operating at minimum flow.

   Table 2 shows the daily generation equivalent which could be produced by the matching turbine at minimum flow.[13] In addition, it shows projected lost-revenue from selling energy at an off-peak rate which is assumed to be 30% of the on-peak price associated with current operations.[14] These losses can be understood as opportunity costs relative to RL Harris's current operations which allow the power to be sold at the higher price.

   While the cost of installing the new matching turbine should be considered, Alabama Power has not provided any estimates of the costs associated with such a matching turbine modification. If Alabama Power chose this approach, it is possible that Alabama Power would seek to recover the incremental costs associated with new turbine installation from ratepayers.

Table 2.Illustrative Scenario: Minimum Flow with Generation

	Flow Rate Scenarios				Units
Min Flow Rate	**150**	**300**	**600**	**800**	cfs
Daily Generation Equivalent	22.8	45.6	91.1	121.5	MWh
% of Average Generation	5.5%	10.9%	21.9%	29.2%	
Off Peak Rate	30.0%	30.0%	30.0%	30.0%	% of peak rate
Lost Revenue	3.8%	7.7%	15.3%	20.4%	% of annual total

3. **Minimum flow with matching generation and storage.** In this example 16 hours per day of the minimum flow is captured with a matching turbine and the energy is stored in a battery system for discharge on peak. The introduction of battery storage in this scenario enables Alabama Power to reduce revenue impacts by selling off-peak generation at on-peak prices. The remaining revenue

[12] These minimum flow rates are illustrative and could vary, for example, by season.

[13] This new turbine is assumed to operate at the same efficiency as the existing turbines. Different configurations involving different elevations could also be considered.

[14] If hourly price data were available this estimate could be refined. Since Alabama Power is a vertically integrated utility the system lambda or marginal cost could be utilized in absence of an energy market.

impacts are due to efficiency losses associated with the battery system. Table 3 shows that revenue losses in this scenario are quite modest, though the cost of the battery system needs to be considered as well. In addition, the battery system could also generate revenue from other services it provides such as its added capacity for example.

Table 3. Illustrative Scenario: Minimum Flow with Generation and Battery

	Flow Rate Scenarios				Units
Min Flow Rate	**150**	**300**	**600**	**800**	cfs
Daily Generation Equivalent	22.8	45.6	91.1	121.5	MWh
% of Average Generation	5.5%	10.9%	21.9%	29.2%	
Battery efficiency[15]	85%	85%	85%	85%	%
Lost Revenue	0.6%	1.1%	2.3%	3.1%	% of annual total

4. Costs and Benefits

Table 4 shows the installation cost for a battery system based on information provided for Option A of the BESS report, although the actual costs might actually be lower as through a PPA for example. And there is also the unknown cost of the new minimum flow turbine.

Table 4. Battery Cost Estimate for Different Flow Rate Scenarios

	Flow Rate Scenarios				Units
Flow Rate	**150**	**300**	**600**	**800**	cfs
Battery Size	5.7	11.4	22.8	30.4	MW for 4 hours
Battery Cost	$8.7	$17.5	$34.9	$46.6	$M based on BESS Report

Beyond the cost of the battery and turbine, there remain some other factors which could influence decision makers. As already noted, changes in hydro operations to include minimum flow would provide environmental benefits downstream of the dam. Additionally, homeowners both upstream and downstream of the Harris Project will be interested in both recreational and flood prevention impacts of any operational changes.

This analysis provides a high level and illustrative estimate of some aspects of minimum flow operations with a matching turbine and batteries. Synapse recommends that Alabama Power further analyze the environment and economic aspects of such a modified operation for Harris.

[15] Battery efficiency value from the BESS draft report (page 12).

ATTACHMENT B

Pacific Northwest National Laboratory White Paper

Deployment of Energy Storage to Improve Environmental Outcomes of Hydropower

Pacific Northwest NATIONAL LABORATORY

PNNL-SA-157672

Deployment of Energy Storage to Improve Environmental Outcomes of Hydropower

White Paper

May 2021

B Bellgraph, T Douville,
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R O'Neil, R Harnish,
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J Alam

U.S. DEPARTMENT OF ENERGY

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PNNL-SA-157672

Deployment of Energy Storage to Improve Environmental Outcomes of Hydropower

White Paper

May 2021

B Bellgraph, T Douville,
A Somani, K DeSomber,
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J Alam

Prepared for
the U.S. Department of Energy
under Contract DE-AC05-76RL01830

Pacific Northwest National Laboratory
Richland, Washington 99354

Summary

Hydropower operators have many reasons to integrate energy storage, either co-located onsite or located elsewhere, but co-optimized with facility operations. Storage systems can be configured to have complementary performance profiles to hydropower projects, opening a broad spectrum of operational patterns.

Integrating energy storage can allow hydropower operators to accomplish the following:

- Capture additional revenue by using more agile operational characteristics for fast-response ancillary services or by generating greater amounts of peak energy with expanded operational limits.
- Adapt to changing regulatory and market conditions, such as evolution of the Energy Imbalance Market in the western United States, without pushing equipment beyond design parameters or optimal hydraulic performance.
- Improve asset management conditions by minimizing equipment wear and tear using energy storage to support fast-response ancillary services or support demands beyond optimally efficient setpoints.

An important but unexamined opportunity is to integrate energy storage systems with hydropower facilities to improve environmental outcomes. Integrated operations support increased flexibility in the management of the underlying water system and the associated ecosystem. The connections are particularly clear in modifying power generation relative to water storage, release, and flow regimes. Such integrated operations support regulatory requirements, including maintaining upstream reservoir levels, ensuring adequate downstream flows to meet an ecological target, or for human uses of a river such as fishing or boating.

This document provides an organized discussion of the relationship between hydropower-storage integration and improved localized environmental outcomes. Which includes:

- An overview and survey of current uses of energy storage in the hydropower industry.
- A comprehensive framework describing the range and type of potential localized environmental benefits realized through integrating energy storage and hydropower.
- Case study examples comparing real conditions with environmental requirements.
- Methodological guidance to analyze potential benefits, technology characteristics, and tradeoffs.
- A discussion of co-optimizing versus co-locating storage within the facility footprint.
- A concluding summary of the steps necessary for industry to fully develop and implement this concept.

This paper is a fundamental exploration of local environmental outcomes that can be realized through integration of energy storage systems with hydropower facilities. It provides a methodological foundation for future analysis rooted in expert knowledge of both hydropower–environmental interactions and attributes of energy storage technologies.

Acknowledgments

We thank several individuals and organizations who reviewed the contents of this white paper during its development and provided invaluable feedback that was integrated into the published version. Specifically (in no particular order), we thank Todd Olinsky-Paul of the Clean Energy States Alliance; Kevin Malone, independent consultant; Brent Nichols and Conor Giorgi of the Spokane Tribe of Indians; U.S. Department of Energy Southwestern Power Administration; Jack West at the Alabama Rivers Alliance; Jannik Haas at the University of Stuttgart; Kurt Miller with Northwest River Partners; the Low Impact Hydropower Institute; Jon Newman with Fluence Energy; The Hydropower Reform Coalition; and John Chandler of Puget Sound Energy.

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1.0 Problem Overview

Hydroelectric dams have been operating in the United States (U.S.) for more than 100 years, and throughout this time, the range of potential environmental effects from hydroelectric dams has become well-established. As part of the periodic authorization or review of these dams, environmental effects are studied, evaluated, and in some cases mitigated. Mitigation may require investing in habitat restoration, improving river connectivity for migratory species, monitoring water quality, engaging the public, developing and implementing new technologies (hardware or software), and directly adjusting dam operations.

As dam operators balance the management of environmental impacts with maintenance of their electricity resource, new storage technologies may help to meet both needs. Most federally operated hydropower projects, as well as those operating under licenses granted by the Federal Energy Regulatory Commission (FERC), have limits on their operations to reduce environmental impacts. These limitations include spilling water outside of generating turbines, or managing flow on daily, seasonal, or yearly time scales balanced around the needs of fish and other aquatic species, reservoir levels, or downstream ecological needs. These flow management practices affect the economic viability of a given hydroelectric project by limiting its full operational flexibility. Additionally, the increase in renewable energy production has challenged the contribution of hydropower to the grid, and maintaining environmental flows mandated by FERC license requirements will become increasingly challenging (Kern et al. 2014). As storage technologies advance and become commercially available at utility-grade, grid-scale, and cost-effective levels there is a new opportunity to imagine how they can integrate with hydroelectric operations to support the larger electrical grid, while maintaining financial stability and improving environmental outcomes.

This paper describes how the installation of energy storage systems, co-sited with hydroelectric projects, offer operational, economic, and environmental benefits by enabling a broader range of electricity performance, capitalizing on its flexibility and grid reliability, while mitigating critical environmental impacts or improving environmental outcomes across U.S. rivers and streams. The paper attempts to link environmental outcomes to energy storage utilization. It offers a comprehensive inventory of research-grade work, site-specific studies, policies, and pilot projects regarding energy storage and hydropower that show significant environmental implications. It provides an outline of methodologies given the known costs and attributes of storage technologies, with case study illustrations. It also outlines the key components of a methodology that could be applied within the context of specific projects to reveal the environmental benefits of energy storage paired with hydropower production to properly size the storage systems to capitalize on potential benefits.

This paper provides a framework for assessing the degree to which energy storage can support operational strategies to improve environmental objectives, including where flow releases or other operational changes are provided to match a water quality, fish, or other ecological objective. Factors driving the integration of hydropower and energy storage will be site-specific, and include combinations of operational, maintenance, economic, and environmental considerations. The focus of this paper will strongly support the validity of the environmental approach. A set of knowledge gaps to be addressed in future work is provided. To validate and support the information provided in this paper, further analysis will be required on a physical facility to serve as a test case.

2.0 Current Use of Energy Storage by the Hydropower Industry

Hydroelectric plants currently offer energy storage due to the presence of water reservoirs, but to increase storage, operators have at times considered batteries to be a competitive resource. Energy storage could be accomplished by expanding the impoundment and raising the height of a dam; however, raising dam height introduces a host of civil engineering requirements, costs, and timelines, as well as regulatory authorizations, and doing so would inundate new lands. Despite these challenges, dam-raising efforts are being considered.[1] In contrast, energy storage systems can be installed in as little as 6 months, when physical space, electrical infrastructure, and construction permits are readily available (Pyper 2017). Larger reservoirs offer similar characteristics of storage that are already available; energy storage systems can offer a complementary capability rather than an expansion of existing flexibility.

As batteries become more reliable and efficient, an emerging idea is to directly integrate batteries with hydroelectric plants and hybridize their operations for overall improved plant performance. To date this idea has been explored for power flexibility benefits or market participation eligibility, such as provision of ancillary services, market eligibility as a fast-responding resource, or improved operational integration across cascading plants. Many energy storage systems are sited at utility infrastructure based on reliability, or distribution or transmission requirements. The appropriateness of whether to co-site or to co-optimize storage systems with hydroelectric plants, given ownership model, revenue mechanism, and grid operation conditions, is discussed in a later section.

Examples of power flexibility achieved by incorporating different types of storage on-site at hydroelectric plants, either simulated or actual, are provided below.

- In Sweden, Fortum has connected a 5 MW battery system to a 44 MW hydropower plant to improve its quick response time and the precision of its regulation service, because wind power has created the need for increased flexibility. The site has also asserted that the battery helps to keep the market in balance and reduces wear on hydropower turbines, allowing for deferral of investment in maintenance or replacement (Hydro Review 2018).
- The Buck and Bullesby power plants owned by AEP in southwestern Virginia have installed a 4 MW battery system. The system is used to reduce peaking in the older hydropower plants and increase the value of frequency regulation in the PJM market. This allows AEP to leverage and enhance revenue by providing regulation services and offset the charges that customers incur.
- Idaho Falls Power has also implemented a black start field demonstration to show that run-of-river hydropower plants with energy storage can restore electric power without assistance from the transmission system. This capability is essential for small hydropower facilities to be able to operate a microgrid to power critical loads in the event of an outage.[2]

[1] San Vincente Dam in San Diego was raised more than 100 ft in 2012. See https://www.water-technology.net/projects/san-vicente-dam-raise-san-diego-california-us/. The Bureau of Reclamation intends to raise Shasta Dam in California by 18.5 ft. The project is currently in pre-construction. See https://www.usbr.gov/mp/ncao/shasta-enlargement.html.

[2] See the “Integrated” project, which explores the energy benefits to hydropower when paired with energy storage technology: https://factsheets.inl.gov/FactSheets/Integrating%20Hydropower.pdf.

- Other examples include the Cordova Electric Cooperative 1 MW battery and Kodiak Electric Association's 3 MW batteries. Both sites coordinate battery operations with small-scale hydropower to support small grids in Alaska. In Cordova, the battery system is designed to support a microgrid in the event of an outage due to harsh weather and avoid spill during dynamic seasonal loads. Kodiak aims to achieve reliability from an increase in the use of wind generation to support their microgrid, while reducing rates for customers with their two-battery system.
- Douglas County Public Utility District announced their intention to construct a 5 MW hydrogen electrolysis pilot project at its Wells Dam on the Columbia River (Shumkov 2020).
- In January 2020, Brookfield Renewable proposed an energy storage project at two of their hydro facilities along the Penobscot River—the Penobscot Mills and Ripogenus projects. Each project consists of a 10 MW, 20 MWh on-site system, which would be permitted under existing interconnection agreements. The batteries would allow the continued operation of the hydroelectric facilities during periods of high congestion and would have no impact on the operation or maintenance of the projects.[1]

It is clear from the examples above and the direction of the international industry that operational flexibility and asset management are the driving factors for hybridization of storage and hydroelectric plants. Even emerging "clean peak" policies such as Massachusetts' new Clean Peak Standard require hybridization of storage on clean energy projects to qualify for special treatment and remuneration, based on the premise that this additional flexibility is necessary to meet reliable system operations and clean energy goals.[2] [3] Additional power benefits for energy storage installations are yet to be analyzed, to the authors' knowledge. For example, storage systems could replace end-of-life small hydropower turbines to support station service at large plants.

3.0 A Novel Energy Storage Use Case: Environmental Benefits

This white paper posits that an additional class of benefits is derived from co-siting storage systems with hydroelectric plants—environmental benefits. As noted above, storage can improve the range of operational flexibility. Regardless of the primary investment driver, local environmental management is an essential part of the operational equation. Once hydropower plant operators install storage systems, the projects may operate differently to manage environmental constraints. Whether optimization occurs as an investment, regulatory, or planning tool, or after the fact as a new operational regime implemented from storage-integrated operations, improved environmental outcomes are possible with the installation of expanded on-site storage. New techniques such as advancements in multi-objective optimization of hydropower funded by the National Science Foundation (Roy et al. 2018) and

[1] FERC Project No. 2458-214 – Penobscot Mills Project, Great Lakes Hydro, LLC; FERC Project No. 2572 – Ripogenus Project, Great Lakes Hydro, LLC.

[2] Arizona, California, North Carolina, and New York have explored clean peak standards without success in implementation. Michigan has explored a "low-cost peak program," which would require renewable energy generation to be paired with energy storage.

[3] See the Low Impact Hydropower Institute's webinar with experts discussing how this standard may affect operational and economic outcomes for hydropower plants: https://lowimpacthydro.org/massachusetts-clean-peak-standard/.

data-rich demonstrations are needed to fully evaluate the flexibility and environmental opportunities.

The nexus between environmental objectives and operational flexibility is well-established, and research continues to define these relationships.[1] A short list of operational changes to improve environmental outcomes, depending on site-specific operational and structural configurations, includes discharge ramping rates, minimum flows, reservoir levels, downstream and upstream temperature, dissolved gases (too much or too little), turbine loading patterns, as well as recreational management, boating flows, fish passage, flood control, irrigation, and other uses of the river. How could batteries or comparable energy storage technologies permit a win-win opportunity—operational flexibility and environmental improvements?

Examples of direct advocacy for energy storage installation for environmental outcomes, under discussion in two open FERC proceedings exist, as indicated in the case studies highlighted below.

3.1 Case Study: Connecticut River Conservancy and Great River Hydro's Vernon Dam (White et al. 2020)

The Connecticut River Conservancy contracted a study with Synapse Energy Economics in February 2020 to analyze the potential for the Vernon Dam hydroelectric plant (P-1904), owned by Great River Hydro, to be re-operated in a run-of-river mode and paired with a 10 MW, 2 hr battery storage system. The researchers aimed to determine the energy market revenue impacts of transitioning Vernon Dam to run-of-river operations while quantifying the value of installing an integrated battery storage system to capture a portion of peak energy prices.

The researchers found that a transition to run-of-river operations would moderately affect energy market revenues by 3 to 10 percent, while the other revenue streams (capacity, ancillary services, and renewable energy credits) would have little to no impact. It may be necessary, however, to relax true run-of-river operations during peak-load hours to maintain capacity values (and thus capacity revenues). Energy price arbitrage can be leveraged by charging batteries from turbines during periods of low energy prices and discharging power during periods of high energy prices. As New England increases its renewable energy levels, price volatility may increase, increasing the value of energy arbitrage. The cost range of the 10 MW proposed storage system was determined to be $4.9 to $9.8 million—a cost-effective investment at the lower end of the range, but a loss at the higher end.

With five hydropower plants along the Connecticut River in Massachusetts, New Hampshire, and Vermont applying for new licenses, this case study illustrates the potential for battery storage to offset revenues if peak operating plants convert to run-of-river operations. The results of this case study have been provided to the applicants for their consideration and submitted to the FERC docket as an alternative scenario opportunity.

[1] See U.S. DOE HydroWIRES grant to the Electric Power Research Institute to *Quantify Hydropower Capabilities for Operational Flexibility*: https://www.energy.gov/articles/doe-announces-249-million-funding-selections-advance-hydropower-and-water-technologies

3.2 Case Study: Alabama Rivers Alliance and Alabama Power's Harris Project[1]

One emerging case study with a goal of reducing hydropower peaking to reduce the impact of unnatural flows on the Tallapoosa River's ecosystem may begin to explain the potential environmental benefits of adding a battery and allowing greater flexibility to meet electrical demand. In June 2020, Alabama Rivers Alliance advocated for Alabama Power to conduct studies of downstream release alternatives and battery storage integration at the Harris Project (FERC #P-2628) on the Tallapoosa River. Current operations include discharge variations, occurring within a few hours' time, from zero to about 16,000 cubic feet per second (cfs) when both turbines are operating. FERC proceedings regarding downstream release alternatives included comments from FERC staff, Alabama Rivers Alliance, and the U.S. Environmental Protection Agency, each recommending specific study scenarios. Alabama Rivers Alliance requested a study to compare models simulating the release of the natural flow variability of the Tallapoosa River compared to several alternative operations scenarios. Simulation of "natural flows" will ultimately not occur, but the alternative scenarios to be studied will include (1) the current operation plan ("Green Plan," designed to reduce effects from peaking operations on the aquatic community), (2) the project's historical peaking operation, (3) a modified current operation plan, (4) a downstream continuous minimum flow of 150 cfs under the historical peaking operation scenario, and (5) six other operations scenarios including minimum flows of 300, 600, and 800 cfs; a derivation of the "Green Plan;" and two other scenarios resulting from an addition of a battery energy system.

Alabama Rivers Alliance requested that a new study be conducted by Alabama Power titled "Battery Storage Feasibility Study to Retain Full Peaking Capabilities While Mitigating Hydropeaking Impacts." This study would determine whether a battery storage system could be economically integrated at the Harris Project to provide power during peak demand periods—decreasing the need for peak generation flow released and reducing flow fluctuations downstream—by evaluating battery type, size, costs, ownership options, and barriers to implementation. In their response, FERC described the potential benefits of adding a battery energy system to include reducing the fluctuations in the reservoir by half, reducing peak flows from 16,000 to 8,000 cfs, and achieving the ability to release flows throughout the day and night versus only during peak demand hours. Alabama Power initially rejected the study, citing the high costs of battery storage systems and turbines that are not designed to operate gradually over an extended period. Using a 2018 National Renewable Energy Laboratory report (DOE 2018), Alabama Power estimated the cost of a 60 MW, 1 hr battery (the equivalent to power one turbine at the site) to be $36 million, with a combined cost for both turbines of $72 million. FERC further noted that a 4 hr 60 MW battery, costing $91 million may be needed because Harris Dam can generate for up to 4 hr. FERC recommended that the company conduct the battery storage feasibility study to include (1) a 50 percent reduction in peak releases associated with installing one 60 MW battery unit, and (2) a smaller reduction in peak releases associated with installing a smaller MW battery unit (i.e., 5, 10, 20 MW), including cost estimates. The study will be conducted through April 2021 and will be used to assess the project impacts on downstream resources including aquatic species, erosion, water quality, terrestrial resources, and recreation.

[1] Project No. 2628-065 – Alabama R.L Harris Hydroelectric Project, Alabama Power Company.

4.0 Environmental Benefits Associated with Increased Operational Flexibility

An initial framework of relationships between storage and environmental outcomes is provided in Table 1. Although the issue categories in the table are not mutually exclusive, they begin to elucidate the potential environmental improvements that pairing energy storage with hydropower may provide. Future work would further characterize these examples and conduct a more thorough review of potential environmental gains derived from augmenting hydropower with energy storage technologies.

Adding a storage system to a facility would allow owners flexibility in generation, by breaking the tie between river flows and fluctuating power demands. Site-specific conditions, location, and regulations will dictate the magnitude and type of environmental outcome that may be realized. Table 1 discusses the potential improvements and is not intended to be all-inclusive, nor are all benefits applicable to every unique case.

Table 1. Taxonomy of potential environmental benefits from pairing hydropower with energy storage.

Issue Category	Desired Positive Environmental Outcome	Change in Operation with Energy Storage	Knowledge Gaps
Fisheries	Release flows that are more similar to the historic hydrograph (e.g., run-of-river) that includes cues used by fish for spawning, rearing, migration, etc.; reduce fish-stranding mortality.	Maintain operations and absorption of energy to permit a higher (or lower) release of flows.	Characterize the duration and intensity of flows and turbine operations/energy generation in relation to fish behavioral cues and survival relationships.
	Allow historical seasonal peak flows to enable fish spawning.	Reduce wear-and-tear on components through steady operation during fluctuating generation and release requirements.	Determine sizing and controls between energy storage and turbine units to integrate operations.
	Foster safe passage through hydropower infrastructure.	Allow spill for downstream passage to maintain the same electricity production; offset efficiency losses from fish screens.	Optimize storage capacity, state-of-charge, duration, degradation, and efficiency.
Water Quality	Reduce supersaturated total dissolved gas (TDG) levels.	Support more advantageous release schedules and reservoir management, absorption of energy if released through turbines under oversupply conditions.	Potentially improve TDG throughout a cascading hydropower system with new operations and energy storage flexibility?

Issue Category	Desired Positive Environmental Outcome	Change in Operation with Energy Storage	Knowledge Gaps
	Optimize dissolved oxygen.	Allow oxygen injection to be combined with turbine operation and releases through absorption of energy or support more advantageous release schedules.	Potentially improve dissolved oxygen with new operations and storage flexibility?
	Allow for improved temperature regimes.	Enable temperature control via locally powered reservoir control structure to manage downstream temperatures where seasonally stratified reservoirs are present.	Explore added flexibility of batteries and hydro operations to control temperature.
	Reduce unwanted nitrogen/phosphorous contributions to algal blooms.	Use energy storage system to allow spill variation in reservoir levels; local energy could be used for removing nutrients from water.	Understand the impacts of alternative operations on the ability to control nutrient levels.
Flows	Reduce intensity of peaking flows and up and/or down ramping rates.	Charge energy device in advance of peak flows to increase the responsiveness of the project to signal and shave flow releases to lower ramp rates.	Measurably improve environmental resources through changes in intensity and ramping that are possible with storage integration?
	Maintain minimum flows (varied by season or otherwise as specified).	Permit cost-effective decrement in flows and generation with releases not timed to match electricity demand.	Acquire new environmental benefits when minimum flows are more easily obtained as well as make valuation possible to allow new environmental markets?
	Enable bypass reach flows.	Allow maintenance of revenues during flow releases in the bypass.	Support releases for non-power flows?

4.1 Reducing Hydro Peaking

Hydropeaking and load following operation modes, whereby pulses of water are released in rapid response to meet changes in electrical demand, can alter the quantity, quality, and accessibility of downstream aquatic habitats (Clarke et al. 2008; Fisk et al. 2013). Depending on their timing, frequency, duration, and magnitude, discharge fluctuations can have adverse effects on stream fishes and other aquatic life (Young et al. 2011). Discharge fluctuations during the period of fish spawning may cause adult fish to abandon nests or alter spawning site selection (Chapman et al. 1986; Auer 1996; Zhong and Power 1996; Geist et al. 2008). Fluctuations in discharge that occur shortly after the spawning period can dewater nests, resulting in mortality of eggs and larval fish (Becker et al. 1982; McMichael et al. 2005; Fisk et al. 2013). Discharge fluctuations that occur during the early rearing stage can strand fish along changing channel margins or entrap them in isolated pockets of water (Cushman 1985; Halleraker et al. 2003; Connor and Pflug 2004; Nagrodski et al. 2012). Repeated, rapid fluctuations in discharge may also negatively affect downstream fishes indirectly by altering the density, biomass, and diversity of their food supply (Cushman 1985; Gislason 1985; Bunn and Arthington 2002), which can reduce fish growth as well as the biological productivity of the ecosystem. Reductions in spawning success, survival, and growth have the potential to reduce the productivity of populations that reside downstream of hydroelectric projects (Harnish et al. 2014).

Co-sited energy storage may enable a hydropower facility to meet system peaking needs, provided that state-of-charge control is aligned with the peaks, without releasing such significant water volumes downriver. Thus, energy storage systems would decrease peak generation flow releases, thereby reducing flow fluctuations downstream of the hydroelectric project—and ultimately, lowering the potential impacts on threatened fish and other organisms using the river habitat. Response times are also much faster when using batteries and power factors of 0.0 are supported, so more than just maintained but *improved* power system benefits (i.e., energy and ancillary services) may be achievable along with environmental improvements.

4.2 Securing Safe Fish Passage through Hydro Infrastructure

In addition to fish populations experiencing the effects of hydropower operations downstream of dams, fish migrating in a downstream direction may sustain injury or death while passing hydroelectric dams. At many hydroelectric dams, downstream migrants can pass via several different routes (e.g., spillways, turbines); however, passage through turbines is generally associated with the highest mortality rate (Muir et al. 2001). At some hydroelectric projects, operations have been altered to deliberately release water through spillways to direct downstream migrants from the turbines to the spillway to increase dam passage survival. Many species display differences in depth distribution and/or migratory activity throughout the daily cycle, which can alter their probability of turbine or spillway passage (Haro et al. 2000; Li et al. 2015). Therefore, energy storage systems, instead of the hydropower turbine, could be used to provide power when needed, allowing more water to be spilled during periods of peak fish passage or times when turbine passage rates are expected to be high. For example, salmon and steelhead smolts are more likely to pass through the powerhouses of Snake River dams at night than during the day due to a diel shift in depth distribution. Approximately 60 MW of stored power exported for 4 hr nightly could reduce powerhouse passage of Snake River Chinook salmon smolts by 12 to 23 percent over the entire summer passage season, thereby increasing survival significantly. Added flexibility of spill operations, and in turn, improved fish survival, may help hydropower operators further improve fish survival and reduce mitigation costs (e.g., mid-Columbia River No-Net-Impact funds).

Fish passage is not limited to spillways or downstream travel. Spill for upstream migration (i.e., fish ladders) can account for 10 percent of the flow rate, resulting in lost power generation potential. Noting that attraction flows to fish ladders need not spill constantly, the seasonality and perhaps even time of day of fish migration activity can allow for banking of energy benefits through energy storage, which can then be exported when spills do need to flow in correlation with fish activity.

A facility may also operate under specific flow rates for fish spawning benefits, which may require spilling water that cannot be used to generate electricity and may lower the annual energy production of a hydropower facility. However, just as spawning does not happen through all seasons and at all hours of the day, water can be released when needed for environmental benefit and the restriction may be relaxed at other times, thereby allowing a net energy production increase. When the timing of energy increases does not align with power system needs, there is an opportunity for energy storage systems to shift the available energy and make use of the surplus.

4.3 Operational Shifts and Requirements for Fish in the Eastern U.S.

In addition to operational shifts and flow management for western U.S. fish (in particular salmon) as indicated above, eastern U.S. hydropower plants also adjust operations for fisheries including resident, anadromous (e.g., American shad), and catadromous (e.g., American eel) fish. We discuss examples below related to fish specifically, because fish are often the driving factor of dam operational changes; however, we understand that many other aquatic species (e.g., mussels) as well as aquatic ecosystem health benefits are gained from these operational changes.

Operational shifts to ensure safe fish passage through hydropower plants is a precedented activity dating back to the early 1900s—particularly in the northeastern U.S., where migratory anadromous and catadromous fish use rivers highly developed with hydropower projects. For example:

- The Holtwood Hydroelectric Project on the Susquehanna River in Pennsylvania uses a tailrace lift with two entrances and a spillway lift for upstream fish passage and a pipe system for downstream fish passage.
- The York Haven Dam, also on the Susquehanna, uses a vertical slot fishway to support upstream passage of anadromous fish, primarily American Shad.
- In Maine, along the Penobscot River, the Milford Hydroelectric Project uses a 4 ft by 4 ft bottom entrance for American eels to pass through the dams slowed to 70 cfs into the plunge pool and an upstream fish lift capable of passing up to 300 cfs.
- The Orono Hydroelectric Project uses a similar system with an 8 ft wide downstream diadromous fish-passage floor screen chamber into the plunge pool and a lower-level 4 ft by 4 ft entrance designed to pass at 150 cfs.
- The Holyoke Dam, on the Connecticut River, uses two elevator fish lifts that carry migrating fish, including American Shad, Sea Lamprey, Atlantic Salmon, and American eel, up and over the dam.

In these cases, operational flows are altered to meet fish-passage needs. Storage augmentation at these facilities could allow increased flexibility to meet both the electrical demands of the grid as well as the site-specific fish-passage requirements.

4.4 Managing Spill for Habitat Benefit

Habitat benefits for the aquatic ecosystem as a whole may also extend to spill. Many river ecosystems rely on sediment that passes downstream in the absence of dams. Sandbars have been depleted by long-term dam presence, to the detriment of endangered species on the Colorado and Missouri Rivers. The Department of the Interior has shown success in rebuilding sandbars through controlled flood operations through the Glen Canyon Dam since 2012 (USGS 2015). Energy storage may enable a means for making up for some of the lost energy value associated with controlled flood events, or even increase their frequency to maximize the habitat benefit.

4.5 Preserving River Flows to Improve Water Temperature and Dissolved Gases

River water temperatures directly affect aquatic ecosystem health, and energy storage may allow more flexible operation to control downstream temperatures for environmental benefits. Extreme high temperatures, such as those that occurred in 2015 in the Columbia River, were associated with significant salmon and sturgeon fatalities;[1] in these situations, water temperatures may be able to be cooled by further operational flexibility at hydropower dams to release deeper and cooler hypolimnetic waters. Conversely, unnaturally cold water temperatures, such as in a dam tailrace when a thermally stratified reservoir releases the colder/deeper water through deep-draw turbines or spill, can also have detrimental effects such as creating unnatural temperatures that may allow, for example, an invasive species to increase predation on native warmwater fishes (Ward and Bonar 2003). To keep temperatures within acceptable ranges, the added operational flexibility that batteries paired with hydropower may provide could allow hydropower operators to be more selective about mixing upper warmer waters (using surface spillways) with deeper cooler waters (using deep-draw turbines or deep spill).

Similarly, oxygen and/or total dissolved gas (TDG) levels can be directly affected by hydropower operations to the detriment of fish and the larger ecosystem. For example, in the Coosa River in Alabama, low oxygen levels in tailrace waters are directly linked to operation of the turbines drawing low-oxygen water from deep water, which ultimately negatively affected ecosystem health and resulted in the operator's FERC licenses being vacated.[2] High dissolved gas levels above 100 percent also have detrimental effects on aquatic organisms. Dissolved gas levels above 110 percent can cause fish to lose their ability to sense (hear) encroaching predators (Weber and Schiewe 1976), and increasing gas concentrations up to 130 percent result in high mortality of some species (Mesa et al. 2000). An energy storage device may provide additional flexibility for hydropower generators to adjust operations as a function of oxygen/TDG level, or to allow some degree of spill from a considerable elevation to restore oxygen content. Operations to control dissolved oxygen and/or TDGs occur throughout the U.S., but, to our knowledge, the ability of batteries to improve the environmental outcomes has not yet been evaluated.

5.0 Considerations for Studying Storage Applications for Environmental Outcomes

Given the potential benefits, what is the best approach to determining whether a storage device could allow for operational changes that offer environmental benefits at hydropower projects?

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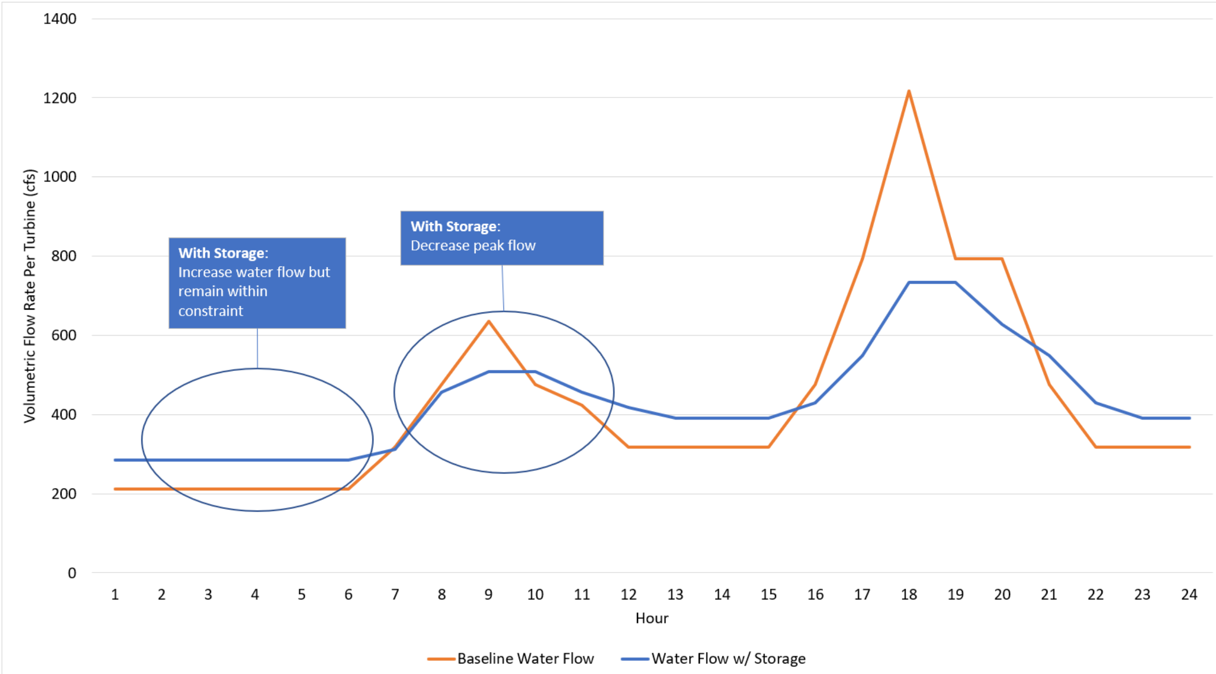
[1] https://www.nwcouncil.org/news/warm-water-wreaks-havoc-columbia-river-fish

[2] https://www.gadsdentimes.com/news/20180827/alabama-power-loses-coosa-river-dam-licenses

This paper highlights key components of a *conceptual* methodology to evaluate potential environmental benefits of deploying storage systems in cooperation with hydropower facilities. The following example shows how the deployment of energy storage at a peaking hydropower facility can yield win-win outcomes, i.e., maintain the power generation requirement, while simultaneously allowing for less severe changes in water flows.

5.1 Conceptual Example to Illustrate How Storage May Be Used to Enhance Environmental Benefits for a Peaking Hydropower Plant

Figure 1 presents a stylized example of a utility that operates its hydropower plant to maximize generation during the morning and afternoon peaking periods. In this example, it is assumed that plant operations reach the upper limit of available water (ramp up in water flow – cubic feet per second per hour [cfs/hr]), which is required to ramp up power generation. With the addition of a storage system, plant operators can employ alternative operational strategies, in general charging the storage system when fuel (water) is available and operations are more flexible, and discharging electricity during peak hours or when operational and water (storage) limitations have been reached. Such a strategy could allow the hydropower plant to operate above normal operating levels during off-peak hours and operate at a lower level during peak periods. Water flow to support such an operational strategy would change as well (i.e., increase during off-peak periods and decrease during peak periods). The implied benefits of a less severe ramp up and ramp down of water would include less severe variations in tailwater elevations, and reduced time of running with water flows close to the maximum limit. Depending on the plant configuration and operating conditions, such an operational strategy might also enable coincident benefits, such as longer periods of operating the turbines near their peak efficiencies. It should be noted that the primary benefit associated with market-facing operations—either revenue capture or more efficient generation portfolio stack—is not adversely impacted, because the effective power supply is identical to the baseline.



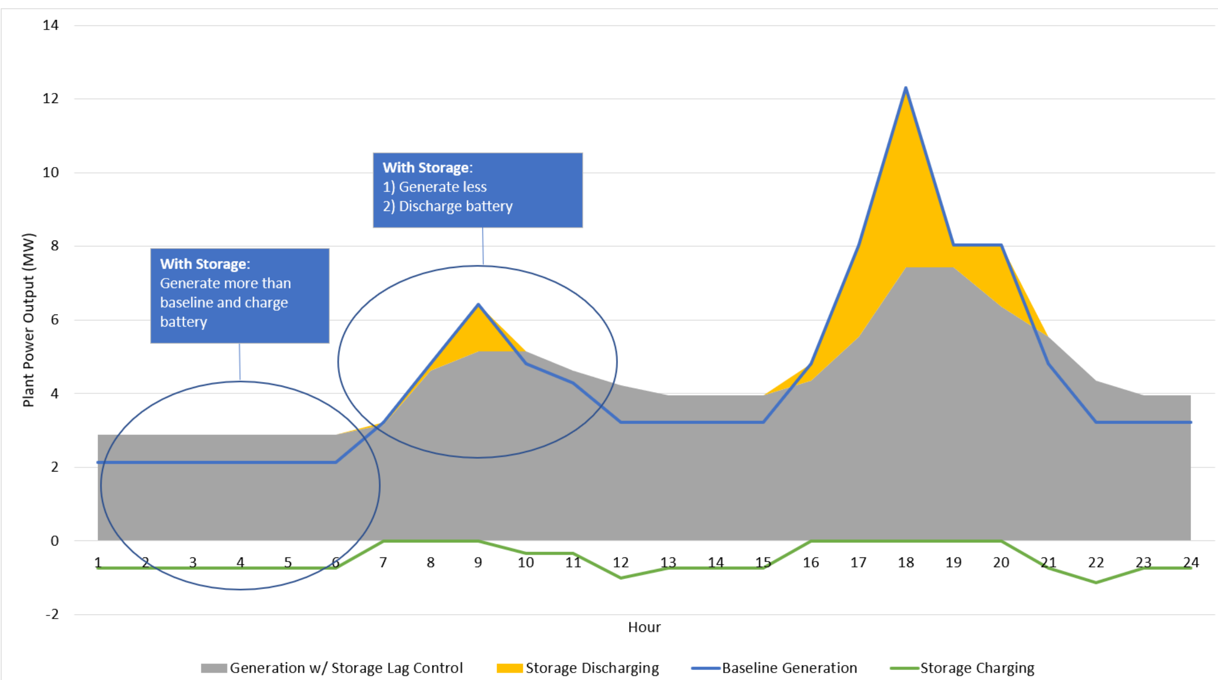


Figure 1. Conceptual example to illustrate alternative water flow regimes (top) and plant operations (bottom) based on deployment and use of energy storage technology.

5.2 General Process of Studying Storage Solutions for Environmental Outcomes

The hydropeaking example can be used to generalize the process one might use to study storage applications for environmental benefits. As highlighted in the example, the decision process requires an understanding of the relationship between environmental and power generation outcomes at a given location. Fundamentally, these outcomes are connected through water flow regimes at that location. Water flow regimes, characterized by min/max flow rates in units of cubic feet per second, daily fluctuations (cfs/24 hr), flow ramp rates (cfs/hr), and duration of sustained flows at increased or decreased levels, directly affect power generation possibilities at the location as well as the health of associated aquatic and riparian ecosystems. These regimes may need to be controlled in time, on hourly or seasonal bases, to balance positive environmental outcomes with power production. Any changes in water flow decisions, due to environmental or other objectives, will directly affect the power generation capabilities at that facility,[1] and hence, affect the choice of whether to install storage technology and if so what size. Figure 2 depicts the decision-making process that is encapsulated in the ensuing numbered steps.

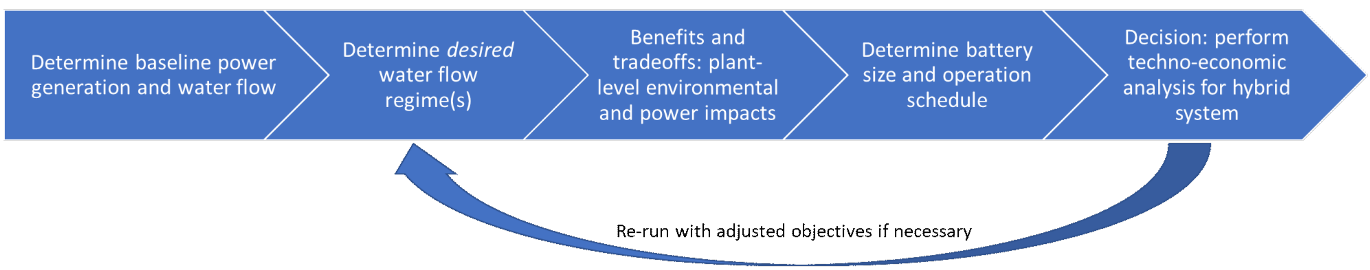


Figure 2. Energy storage sizing methodology.

1. Baseline: Ascertain the existing operational baseline regime (i.e., generation and water flow patterns at a given location) by considering baseload, load following, and peaking.
2. Determine desired water flow regime(s):
   a. Flexibility: Identify the operational flexibility, in both power generation and flow patterns, relative to the baseline operational regime.
   b. Alternatives: Identify the alternative set of water flow regimes that help enhance environmental outcomes at the location based on the flexibility assessment.
3. Benefits and tradeoffs: Assess the environmental benefits, changes in power generation outcomes and other tradeoffs, if any, due to the alternative flow regime(s) (e.g., hydropeaking can limit the opportunities for whitewater recreation).
4. Determine the energy storage size and operation schedule: Perform analysis to optimize energy storage size, including identifying a suitable location, and identify an operational schedule for the hybrid system.

[1] A current, ongoing research project stewarded by the U.S. Department of Energy's Water Power Technology Office, called "HydroWIRES Topic A," will provide a comprehensive mapping of environmental objectives and power operations at a facility, which could be used to supplement the proposed methodology.

5. Decision: Perform techno-economic analysis to ascertain economic outcomes of the optimization.
6. Adjust objectives, if needed, and repeat Steps 2 through 6.

While knowledge of the baseline operational regime—generation and water flow profiles and the inherent flexibility therein—may be known, the identification of alternative flow regimes requires thorough understanding of local environmental needs. These needs will inform how and when hydropower operations must be restricted, and when they can be relaxed, to achieve desirable environmental outcomes.

5.3 Alternative Water Flow Regimes to Enable Environmental Benefits

In the hydropeaking example, a threshold analytical understanding of the relationship between flow rates, power outcomes, and environmental outcomes must first be established. Data related to water elevations in locations of potential fish spawning habitat, flow rates at various river locations, and correlations of these data with flow rates through hydropower facilities must be collected to determine more precisely where and when maximum flow rates should be reduced. Additional measurements will be needed in various locations within a specific river to understand the efficacy of specific restrictions on ramp rate and successive ramping events in attaining meaningful environmental benefits of hydropeaking reduction. These requirements reach beyond hydropeaking reduction; the same can be said for any environmental gain associated with modifications of hydropower operations. The changes in operations, such as minimum and maximum flow limits, etc., will require precise determination of enhanced environmental benefits.

Table 2 presents a *hypothetical* set of values for maximum flow rates, ramp rates, and successive ramps per day that (1) are standard in baseline operations, before hydropeaking avoidance, and (2) will be required to achieve the environmental benefits associated with eliminating or reducing hydropeaking. The additional restrictions on power operations that come with changes in the values of these constraints directly correlate with either reduced or increased power generation potential. In the case of hydropeaking reduction, maximum flows must be reduced within time periods spanning several hours. In the consideration of whether energy storage can yield environmental benefits while maintaining power benefits, it is equally important to know where and when power operations can exceed the baseline. Minimum flow rates at off-peak times serve to limit the ramps associated with hydropeaking as well as provide a means for additional power generation to charge the energy storage asset. In this way, the information pertaining to the new flow regime, as well as the trade-off in power generation timing and scale, can be used to approximate the size, type, and location of a useful energy storage technology application.

Dispatch of the energy storage asset to shave hydropeaking is conceptually demonstrated in Figure 1, which demonstrates how flows can be reduced while energy is exported from the storage asset to maintain power system benefits. In this way, energy storage dispatch is directly linked to benefits to downstream fish populations during various life stages, as described in Table 2. To provide greater precision, an optimization problem can be formulated that treats the new flow regimes as constraints to ascertain the appropriate size, location, and type of storage technology. Hydropeaking avoidance is just one conceptual example. Appendix A presents two tables that repeat this methodology for the potential benefits associated with spill for safe fish passage downstream and upstream, and water quality benefits.

Table 2. Operational shift requirements to enable environmental benefits of hydropeaking reduction (hypothetical metrics).

Operational Constraint	Baseline	Flows to Meet Environmental Objectives (limit impacts from hydropeaking)	Potential Benefit	What data are needed?
Spawning flow range (cfs)	No limit	2,500–5,000	Conducive to spawning activity for spawning fish. Species and river dependent.	Habitat use – including water elevation of spawning habitats and larval fish behavior and habitat use. Life stage phenology.
Minimum flow release (cfs)	1,000	1,500–2,600	Protect larval fish incubating in gravel or developing during larval drift phase.	
Downramp amplitude limit (cfs)	None	4,000	Limit fish from getting trapped in pools that are disconnected from the main channel.	
Maximum downramp rate (cfs/hr)	No limit	3,000	Limit fish from getting trapped in pools that are disconnected from the main channel.	
Daytime downramping	Allowed	Not allowed	Limit fish being trapped; site- and species-specific differences	

5.3.1 Case Study: Glen Canyon Dam

Prior to 1991, Glen Canyon Dam (GCD) operated under fewer environmental restrictions. Table 3 shows that power plant water releases could range from 1,000 cfs to 30,500 cfs, with no limit regarding the daily fluctuations or ramp rates. Such flexibility caused significant environmental damage, such as the endangered species listing of native fishes and changes in the overall ecosystem due to changes in downstream water temperatures and decreased sediment load. From August 1991 to January 1997, temporary restrictions called “Interim Flow Restrictions” were put in place before the release of a final environmental impact statement. Since 1997, the water release range has been reduced to a range from 5,000 to 25,000 cfs, and daily fluctuations and ramp rates have been limited. More recently, in January 2017, a new Record of Decision (ROD, DOI 2016) mandating the preferred alternative prescribed by the Long-Term Experimental and Management Plan has been adopted and was first implemented in October 2017.

Table 3. Evolution of Glen Canyon Dam operating constraints.

Operational Constraint	Historical Flows (before 1991)	1996 ROD Flows (from 1997 to 2017)	2016 ROD Flows (after 2017)
Minimum flows (cfs)	3,000 (summer) 1,000 (rest of year)	8,000 (7 a.m. - 7 p.m.) 5,000 (at night)	8,000 (7 a.m. - 7 p.m.) 5,000 (at night)
Maximum non-experimental flows (cfs)[(a)]	31,500	25,000	25,000
Daily fluctuations (cfs/24 hr)	28,500 (summer) 30,500 (rest of year)	5,000, 6,000, or 8,000 depending on release volume	Equal to 10 X monthly water release (in thousands of acre-feet) during June-August, and equal to 9 X monthly water release the rest of the year, but never exceeding 8,000 cfs
Ramp rate (cfs/hr)	Unrestricted	4,000 up 1,500 down	4,000 up 2,500 down

(a) Except during experimental releases.

Because water flow rate and power are closely related, peaking capability at GCD has been also significantly reduced (Figure 3). Power generation is dependent on available head and flowrates. Before the environmental restrictions, during the week from July 19 to July 25, 1987, GCD was able to produce a peak power of 1,164 MW, that is, 89 percent of the potential peaking capacity of this period. After the 1996 ROD, during the same week of year 2015, this peak generation dropped to 746 MW, that is, only 68 percent of its potential available capacity. The limitation on the peak capacity is due to the maximum daily fluctuations imposed above.

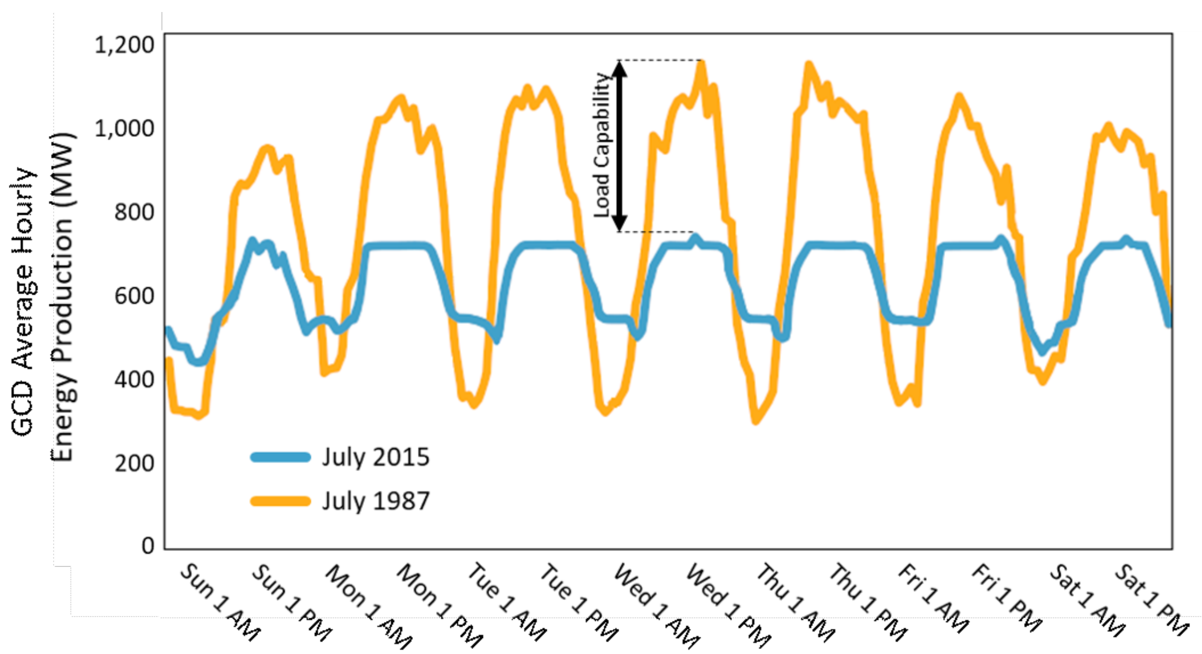


Figure 3. Hourly energy production at the GCD powerplant during a July week in 1987 and 2015.

5.3.2 Case Study: GCD Potential Improvements

The GCD case illustrates the potential benefits of implementing energy storage to improve environmental outcomes. Though the peaks vary significantly due to flow restrictions, the overall power generated relative to potential available power during the case periods is quite similar. Potential available power considers differences in head and assumes the maximum flowrate of 31,500 cfs can be achieved at the differing heads. If 31,500 cfs cannot be achieved during the lower head period of 2015, the convergence is increased. The July 1987 flow data generated at approximately 58 percent of the potential available power, whereas the July 2015 performance is approximately 54 percent of the potential available power. The convergence of these values is due to minimum flows being required during the night for 2015, increasing the generation over this period.

The imposed flow requirements resulting in night generation occur during a period of low demand. Increased power demands begin in the morning, taper through the day, then peak in the evening. Demand drops significantly at night. Implementing an energy storage system to capture the generation at night and discharge during the day would allow the average hourly energy productions from the environmentally restricted 2015 period to behave similarly to the less regulated 1987 period.

5.4 Process of Deciding the Storage Size, Type, and Location

Industry,[1] academia, and national labs have developed several tools and methodologies to assist with the sizing of energy storage for site-specific installations. Most of these tools and methodologies (Wu et al. 2017) focus primarily on maximizing revenues or cost-savings from power operations, either for the stand-alone storage technology or for a hybrid solution, such as a traditional solar or wind facility with the integrated addition of a storage system. To the best of our knowledge, currently there are no tools and methodologies that can assist with making decisions about the sizing of storage technologies for environmental benefits. However, existing methodologies can be adapted for this purpose. All that the methodologies require is a sufficiently precise characterization of the technical attributes of the resource being analyzed—whether a stand-alone storage system or a hybrid solution—and its intended functions. In the case of energy storage for environmental benefits, the technical characteristics of a hybrid hydropower resource with integrated storage will likely be based on the flow regimes, both baseline and alternative ones.

The changes in flow regimes may be required for a variety of reasons:

- FERC licensing or relicensing process, where the federal authorization for the facility requires a new flow regime or alternate water budget, such as maintaining upstream reservoir levels, or flow requirements to meet a downstream objective including human uses such as fishing or boating;
- operational strategies for asset management purposes, where the facility must adjust the hydraulic capacity of the system in order to maintain useful equipment life;
- new market opportunities, such as a change in the price of ancillary services, or changes in underlying regulatory and policy constructs, and market designs; and

[1] Det Norske Vitas (DNV)-GL's ES-Select tool compares energy storage technologies for different use cases; Pason Power Inc., and Energy Toolbase LLC., have designed a tool called Energy Toolbase to assist with sizing and controlling residential solar PV plus battery systems.

- mitigation of environmental issues, where water flows must be adjusted ~~provided~~ to match a water quality, fish, or other ecological objective.

In all but the last case, environmental benefits are not likely to be the primary drivers when making decisions about deploying an energy storage technology. Even so, the deployment of energy storage, whether for operational flexibility or asset management, will provide options for alternative operating practices and, by extension, alternative water flow regimes. The choice of storage technology in such cases will need to consider the appropriate combination of power generation and environmental outcomes, weighed against the cost of the storage technology itself. This process could be designed as a multi-objective optimization problem consisting of an appropriately weighted combination of objectives—(maximize) power generation responsiveness, operating limit, and flexibility, (minimize) asset management costs, (maximize) environmental compliance, and (minimize) technology costs. This process, essentially, uses a range of water flow regimes to construct the *pareto frontier* to analyze tradeoffs between different objectives.

Alternatively, one or more of the objectives may be treated as constraints in the design process. For instance, to avoid lost generation opportunity and attributes in the hydropeaking example, the baseline generation profile may be treated as a fixed requirement that the combination of storage and hydropower generation (with altered flow regime) must attain. Hence, the first step in the decision-making process is to determine the attributes of lost generation capacity—energy and power ranges, ramp rates, and so forth. The required set of attributes will help determine the choice of energy storage technologies. The next step in the process is to conduct techno-economic analyses based on understanding and knowledge of market conditions, water availability, and other critical considerations. The techno-economic analysis can be based on detailed time-series simulations and optimization of the hybrid resource, modeling its operations and dispatch in an actual market. Pacific Northwest National Laboratory's (PNNL's) energy storage evaluation tool (ESET), for instance, has been used extensively to create a sizing space for storage, based on known or assumed use cases (such as hydropeaking), deterministic or stochastic information on market conditions (prices, demand, and so forth), and storage technology specific considerations.

5.4.1 Storage Sizing Methodology for Maximizing Revenue of a Storage Hybrid System

The ESET tool formulates a linear programming problem to maximize the annual economic benefits of the energy storage or hybrid system. In this case, the benefits would include any identified hydropower use cases as well as any other market services that could be provided. The tool co-optimizes identified services to be provided subject to energy storage power and energy constraints, state-of-charge dynamics, and the coupling of different use cases. The ESET formulation dispatches the system on an hourly basis, first formulating a look-ahead optimization to determine a system operating point, and then dispatching the system on an hourly (or more granular) basis, to determine the number of hours the system would be actively engaged in the provision of each service. In addition, a storage system cost formulation can be added to the objective function to optimally size the storage system within the model. This cost formulation includes the equivalent system capital cost as a function of power and energy, which consists of investment, installation, and operations and maintenance costs for the storage device and associated inverter. The optimal sizing approach maximizes investment return for a given time frame. ESET then provides the maximized benefit, optimal size, and dispatch for the system under the given use cases and subject to the other variables (Wu et al. 2016). A *Monte Carlo type* analysis can then be conducted, varying one or more input variables of the formulation, including use case requirements, market prices, and storage technology types and costs, to generate a decision space. Within this space, present-value benefits and costs can be calculated to find optimal energy storage parameters that return the largest net-benefit.

The following sequence of steps presents a simplified version of the methodology:

1. Determine initial energy storage size.
2. Maximize revenue from hybrid plant operations subject to:
   - Plant electro-mechanical constraints,
   - Energy storage capacity limits.
3. Adjust energy storage size and re-initiate Step 2.

Figure 4 below, borrowed from Wu et al. (2016), presents an example decision space generated by the ESET tool across energy storage capacity and energy for different locations (i.e., San Francisco [SF], Chicago [CHI], Houston [HOU], and New York City [NYC]) and technology price points (i.e., high, medium, and low).

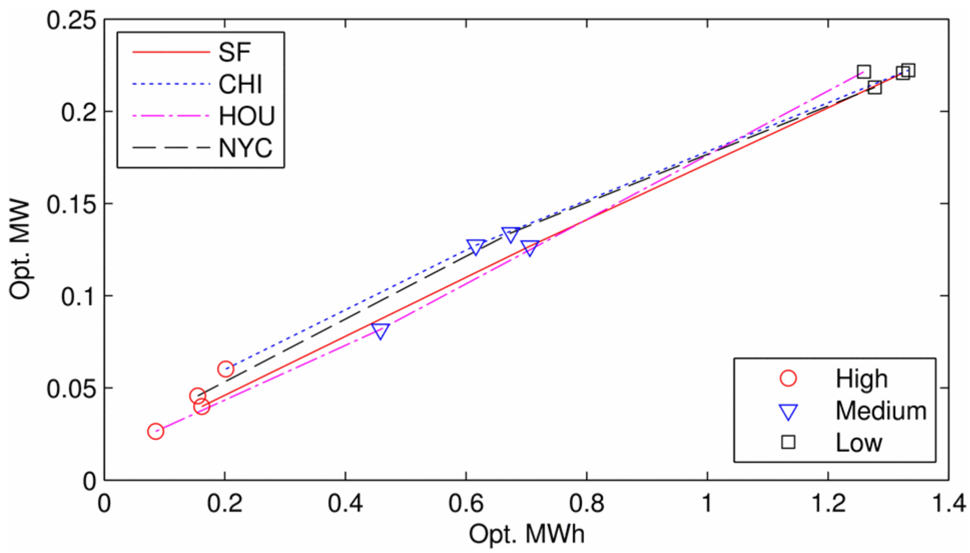


Figure 4. Optimal (Opt.) energy and power capacity in different battery cost scenarios and energy markets (San Francisco [SF], Chicago [CHI], Houston [HOU], New York City [NYC]).

Such tools and methodologies can be extended to study the suitability of different storage technologies for environmental benefits. The above methodology can be adapted to include desired environmental outcomes as additional constraints in the optimization problem. For instance,

1. Determine initial energy storage size.
2. Maximize revenue from hybrid plant operations subject to
   - Plant electro-mechanical constraints,
   - Energy storage capacity limits,
   - Environmental objectives:

   - Flow >= Min flow limit
   - Flow <= Max flow limit.
3. Adjust energy storage size and/or environmental objectives and rerun Step 2.

The min and max flow limits are derived from alternative flow regimes that correspond to desired environmental outcomes. In this way, the sensitivity of energy storage sizing relative to desired environmental outcomes can be determined by adjusting the water flow constraints.

6.0 Co-optimization vs. Co-location of Storage

There is a useful distinction here for when a storage system should be directly interconnected and integrated with a hydropower facility ("co-location") and when it should be operated in a coordinated fashion ("co-optimization"). Generating resources are already coordinated to operate as a portfolio, to serve load, to transmit energy, to balance control boundaries. Advanced control and communication can allow networked operation of electricity system assets across multiple systems. So, when does it make sense to site a storage system within a hydropower facility footprint? This section explores the contextual conditions that lean toward co-location or co-optimization of storage and hydropower assets.

6.1.1 Why Co-optimize?

Hydropower plants operate within a system context and their operation is coordinated with other resources to assure that load and generation are matched. In vertically integrated utilities or system-level coordination, the power tradeoffs for managing environmental objectives may be most cost-effectively dealt with by adjusting the merit order or dispatch of other plants, rather than co-siting storage at a specific project. For example, if a hydropower plant is limited in how fast it may ramp flows up and down, then the faster ramping requirement could be replaced by a gas unit or by other ramping resources already available elsewhere in the system.

For utility-owned plants, operating in organized markets, there may be locational considerations for siting energy storage systems based on geographical patterns of energy and ancillary service prices. One technique for identifying optimal siting of storage systems is to run a system-wide analysis using production cost models. These models enable co-optimization of the entire fleet of resources under a utility's ownership, with explicit consideration of certain locational aspects of its resources.

6.1.2 Why Co-locate?

Co-location of storage at the hydropower plant may allow additional local benefits. To achieve these locational benefits, utility-owned projects may be motivated to enhance the resource eligibility of a larger plant, or to maintain operational simplicity in response to a signal.

The case for co-location is notably broader for merchant (contracted resources) or market-facing plants. These plants are remunerated and environmentally governed independently from other resources, so there is greater motivation to demonstrate higher performance at the facility to be eligible for higher contractual rates, market products, or greater compensation.

Where avoiding harm to facility and unit components is a priority, integration of on-site storage solutions may help avoid detrimental use of existing equipment, such as low-loading units or frequent or sudden movement across hydraulic and efficiency ranges. Hydroelectric projects are uniquely capable of a suite of flexibility characteristics, including motoring units[1] and dispatchability using on-site water (energy) storage in reservoirs. Augmenting or preserving this flexibility with batteries could be very useful, because their characteristics are highly complementary to the flexibility of hydropower. Storage systems can increase the instantaneous responsiveness of units or avoid unit start-stop or rough zone utilization, thereby bolstering the case for on-site power value. They can also support local power needs, such as managing reactive power for voltage control, or assisting in the automatic generation control function for the management of area control error. Another factor is the speed of interconnecting a storage system to the grid, which is substantially more straightforward within the footprint of a large power plant (Kougias 2019).

In addition to the proximity benefits, it is typical for hydropower facilities to own a large parcel of land, or have overarching real-estate agreements for the surrounding land and its use, that may provide a suitable footprint for the location of the energy storage system. Locating energy storage on-site at the hydropower facility may eliminate the need for additional land acquisitions.

Aside from interconnection of the energy storage system, co-location is supported by existing transmission rights. The purpose of the energy storage being proposed provides operational flexibility rather than increased capacity beyond current peak demands. This allows the rights of the existing transmission system, sized for the existing generation, to be suitable for continued load transmission with the added energy storage system.

Many hydroelectric projects are located within a cascading operation, meaning that there are plants upstream or downstream between which there is a hydrologic link. Under these conditions, the project owner may operate the plants in a coordinated fashion, sequencing flows to an optimal outcome. Or if ownership is varied, there may be a coordination agreement regarding flow schedules or communication between plants to assure operational parameters are met at each plant. In these cases, energy storage, when integrated with a particular facility, such as a facility that acts as a hydrologic constraint, may permit additional flexibility to accrue to other plants in the same cascading system.

There also may be instances in which storage co-location is motivated by load tied directly to the water source, and the timing of the load does not align with hydropower production. Examples of this load include environmental restoration through active water treatment, oxygenation or cooling processes, hydrogen production, desalination, sensing, communications, and control and power backup. Loads of these types could be served by merchant resources as well as utilities under various arrangements. To the extent that these loads can be deferred in time and follow business-as-usual hydropower production patterns, the need for on-site storage to serve these loads and thus the requirement for co-location of energy storage assets may be reduced.

[1] Motoring of hydroelectric generators corresponds to an extreme idle state of running the turbines with insufficient pressure head to run the (interconnected) generator at synchronous speed. Under this condition, electrical generators act as synchronous motors and pull power from the grid to drive the turbines.

7.0 Next Steps

This paper outlines the potential for deriving improved environmental outcomes by integrating energy storage systems with hydropower plants. This idea is an exciting one, because it suggests that through technology investments, improvements in both river health and the financial future of hydropower plants can be achieved. Quantifying the mutual benefits is an important step in realizing storage adoption by privately and publicly owned hydropower projects.

Throughout this paper, existing knowledge and practical gaps in data, controls, and methodologies for evaluating this potential are indicated. The next steps, summarized below in order of action and scale, will help inform the industry and shape the discussion:

- Determine the full taxonomy and prioritization of the opportunity space for environmental benefits.
- Specify the practical considerations for retrofitting dams with energy storage, related to physical size, electrical interconnection, and charging mechanisms.
- Develop new techniques, based on multi-objective optimization, to support and evaluate the feasibility of hybridization for environmental benefits.
- Adapt or design a decision-support process to evaluate and inform the size, location, and type of energy storage technology.
- Simulate real hydropower plants and energy storage-informed operational models to design hybrid system controls and interactions of mutual benefit.
- Perform data-rich demonstrations of the relationships between environmental benefits and energy storage-augmented operations, in partnership with dam operators.

Several avenues are being explored to realize the data gaps listed above and to enable a demonstration project to serve as a foundation for integrating energy storage with hydropower projects for environmental benefits. Other use cases including the integration of energy storage with other electricity-dependent water infrastructure, such as water conveyance pumps, may offer similar potential for environmental benefits and will be additionally explored. Once a foundational use-case project is identified and implemented, the ultimate goal is to leverage this environmental use-case framework and apply it across the U.S. to other hydropower projects where energy storage could enable more cost-effective ecosystem improvements.

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Appendix A – Methodology Crosswalk

Table A.1. Operational shift requirements to enable environmental benefits of spill for safe fish passage (*hypothetical* metrics).

Operational Constraint	Baseline	Flows to Meet Environmental Objectives (limit impacts from not spilling)	Potential Benefit	What data are needed?
Minimum spill discharge (cfs)	7,000 (late summer) 30,000 (spring) Unrestricted (rest of year)	17,000 (summer smolt passage season) 100,000 for 16 hours daily (spring)	Route downstream-migrating fish from the powerhouse to the spillway to improve passage survival	Hourly passage routing of downstream-migrating fish
Passage flow rate (cfs)	Unrestricted	500 (upstream fish-passage season)	Provide adequate flow rate to attract for upstream fish passage	Seasonal and diel timing of upstream fish passage

Table A.2. Operational shift requirements to enable environmental benefits of Spill for Water Quality (*hypothetical* metrics).

Operational Constraint	Baseline	Flows to Meet Environmental Objectives (limit impacts on water quality)	Potential Benefit	What data are needed?
Minimum flows (cfs)	3,000 (summer) 1,000 (rest of year)	3,000 (summer) 1,000 (rest of year)	Reduce dissolved oxygen and total dissolved gas to at/near 100% for aquatic organism health	Water elevations near spawning habitat, correlation of elevations with flow rates as a function of river hydrology
Maximum non-experimental flows (cfs)[a]	31,500	31,500	Increase dissolved oxygen and/or total dissolved gas to increase under-saturated (<100%) water to avoid fish kills.	
Daily fluctuations (cfs/24 hr)	28,500 (summer) 30,500 (rest of year)	28,500 (summer) 30,500 (rest of year)	Manage spill to optimize oxygen and gas levels for aquatic system health.	
Spill flow rate (cfs)	No requirement	1000 (3-7am)	Spilling warmer surface water downstream may warm the river. Spill from higher elevations re-oxygenates the river but can be too much. Must be carefully planned.	

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From: Anderegg, Angela Segars
Sent: Friday, June 18, 2021 12:43 PM
To: Sarah Salazar
Cc: Anderson, Dave
Subject: RE: Guidance for Filers: How to Transmit Files that cannot be eFiled to FERC

Hey Sarah,

Because there are quite a few extra large files that take a long time to upload/download (some are hours per file), we will put everything we can on our external, public site. This will (hopefully) include all of the ResSim and RAS models and associated files.

At over 100 GB total, the EFDC files exceed the capacity of our site. We can try to load these files (5, 25 GB each) to the FERC SharePoint site if it has the capacity to support them. Otherwise, flash drive will be our only option. We'll let you know how it goes.

Thanks!

Angie Anderegg
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From: Sarah Salazar <Sarah.Salazar@ferc.gov>
Sent: Thursday, June 17, 2021 2:35 PM
To: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Subject: RE: Guidance for Filers: How to Transmit Files that cannot be eFiled to FERC

Hi Angie,

I checked with our team and some of our staff have successfully downloaded and used similar models/associated files from our external Sharepoint site and applicants' sharepoint sites for other projects. Also, it might actually be more difficult for us to use the flash drive option. Could you try uploading all the files e-library can't accept to our external Sharepoint site (for us) and your relicensing website (for other stakeholders) and if we run into any glitches we could try the other methods next? If you need technical assistance with uploading the files to our external sharepoint site I can help connect you with someone in our FERC Online/IT Support next week.

Thanks,

Sarah L. Salazar ✧ *Environmental Biologist* ✧ *Federal Energy Regulatory Commission* ✧ *888 First St, NE, Washington, DC 20426* ✧ *(202) 502-6863*

From: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Sent: Thursday, June 17, 2021 12:47 PM
To: Sarah Salazar <Sarah.Salazar@ferc.gov>
Subject: RE: Guidance for Filers: How to Transmit Files that cannot be eFiled to FERC

Hi Sarah,

Thank you for following up. We've reviewed the files associated with the models and everything associated with the HEC-ResSim and HEC-RAS can be broken down into <2GB files. In our filing, we'll explain what is what and direct everyone to our website to download if they want them.

The EFDC model files include 5, 25 GB files that cannot be broken down or compressed any further. We may be able to put these on our website but they will require a strong network connection and quite a bit of time to download. Would you prefer us send the EFDC models to FERC via flash drive? We can make a note in our filing that we can provide this model via flash drive to stakeholders upon request.

Thanks,

Angie Anderegg
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From: Sarah Salazar <Sarah.Salazar@ferc.gov>
Sent: Wednesday, June 16, 2021 3:18 PM
To: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Subject: RE: Guidance for Filers: How to Transmit Files that cannot be eFiled to FERC

Good afternoon Angie,

Following up on the filing guidance for the models, it came to our attention that our external sharepoint site is not publicly accessible. Given that the Corps and Alabama Rivers Alliance also requested access to the models (including any inputs, outputs, and assumptions), would it be possible for you to share these files via the APC relicensing website as well? If so, when you file the models with the Commission, could you also indicate in the cover letter for the associated filings on e-library how stakeholders can access/request access to such files? Please let me know if you have any questions or concerns.

Thanks in advance,

Sarah L. Salazar ✧ *Environmental Biologist* ✧ *Federal Energy Regulatory Commission* ✧ *888 First St, NE, Washington, DC 20426* ✧ *(202) 502-6863*

From: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Sent: Thursday, June 10, 2021 4:44 PM
To: Sarah Salazar <Sarah.Salazar@ferc.gov>
Subject: RE: Guidance for Filers: How to Transmit Files that cannot be eFiled to FERC

Thanks! This is very helpful. I'll let you know if I have any questions.

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From: Sarah Salazar <Sarah.Salazar@ferc.gov>
Sent: Thursday, June 10, 2021 1:26 PM
To: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Subject: Guidance for Filers: How to Transmit Files that cannot be eFiled to FERC

Hi Angie,

With help from a colleague, I found the attached guidance that was recently developed to provide options for filing documents that cannot be submitted to e-library. My colleague stated that our external sharepoint site works well and recommends it, but we can use the other filing options as well. Please review this guidance and let us know if you have follow-up questions.

Best,

Sarah L. Salazar ✧ *Environmental Biologist* ✧ *Federal Energy Regulatory Commission* ✧ *888 First St, NE, Washington, DC 20426* ✧ *(202) 502-6863*

Guidance for Filers:
How to Transmit Files that cannot be eFiled to FERC

There are some files that are needed for FERC staff to carry out their mission responsibilities that cannot be eFiled, or the eFiled files cannot be used by staff because of certain eLibrary limitations. Historically, filers send these files via CD, DVD, or external hard drive directly to OEP staff. Receipt of these files via these physical methods is limited during 100% telework. The purpose of this guidance is to provide filers and staff with alternative methods to receive these files while still ensuring that FERC is meeting our obligations for CUI Management, Records Management, IT Security, etc.

Below we identify four methods for filers to send these files to FERC. Note that these methods are NOT in lieu of eFiling. Any submission of files to FERC staff via these methods is **<u>in addition to eFiling</u>** all the parts of the submittal that can be eFiled. We also identify several business rules to ensure we receive the files in a manner that is consistent with CUI Management and Records Management policies. These business rules apply to all the methods discussed below.

Business Rules

1) The filer must eFile everything that can be eFiled:
    a. Every submittal that has a component that cannot be eFiled must have something in eLibrary to document what we are receiving, including:
        - Cover letter describing the filing in its entirety, including the portions that cannot be eFiled.
        - Any text-based documents, drawings, other supporting information, that can be broken into 50mb components.
    b. The transfer of the components that cannot be eFiled should occur AFTER the other components are available in eLibrary.
2) Only these types of submittals can be transmitted from the filer to FERC staff using one of the methods below:
    a. Any file types not accepted by eFiling: Winflow, PHAST, HEC-RAS, Flo 3D, Geostudio, etc (these are examples, not an exhaustive list).
    b. Files >50mb that cannot be broken down into smaller components;
    c. Files that require specific naming convention and/or folder structure to use in software: GIS, modeling files, etc; or
    d. Dam Safety STID Reference data.
3) Each method has certain file attributes that must followed. Carefully read both the File Attributes for All Methods AND the file attributes for each method to ensure that you can smoothly transfer files. Not following the file attributes will result in errors and more effort to correct the files.

Acceptable Methods of Transfer

1) Email
2) Filer-owned/provided external site
3) FERC's external SharePoint site
4) CD, DVD, or external drive sent to FERC HQ (**Not** to a regional office or staff home address)

Choosing a Method of Transfer

The method of transfer should be determined on a case-by-case basis considering the following factors:

- Size of the filing
- Filer capabilities and system limitations
- FERC system capabilities and limitations

- ➢ By far, email is the easiest method. However, use is limited by the email size limitations of both you, the filer, and FERC (25 MB).
- ➢ If you, the filer, or your representative/consultant, can create a site that FERC staff can access, then this is the second-best option.
- ➢ The third-best option is using FERC's External SharePoint site, but not all filer's IT Security settings will allow them to access FERC's site.
- ➢ The option to send a CD, DVD, or external drive to FERC HQ (**Not** to a regional office or staff home address). This should be used in those cases where none of the above are an option.
- ➢ Understanding each of the methods and communicating with FERC staff is the best way to determine which method will be best for your case.

File Attributes for All Methods

- All files must be labeled with appropriate labels for Controlled Unclassified Information (see list of labels here https://www.ferc.gov/enforcement-legal/ceii/ferc-cui-processes).
- Do not password protect files.
- All files and folders must be compressed into .zip files. Files should be grouped in .zip files according to their security classification. All Public Files in one .zip file, all CEII files in a separate .zip file, all Privilege files in another separate .zip file, etc. This drastically improves both upload and download speeds, avoids running into file or folder name length issues, and helps with FERC's information management and record keeping responsibilities.
- File size limit is 2GB. Each .zip file must be less than 2GB and smaller is preferred. If your files exceed 2GB, they must be divided into components less than 2GB.

Filer Instructions for Each Method

1) Email
   a. After eFiling everything that can be eFiled, the filer may email the other components directly to FERC staff.
   b. Prepare the files for email:
      i. File attributes for all methods listed above; AND
      ii. There is a 25 MB limit on FERC's incoming email. If the submittal is larger than 25 MB, either break the files into more than one email submission or work with your FERC staff counterpart to use another method to transmit.
   c. After eFiling all parts of the submittal that can be eFiled, email the files that cannot be eFiled to FERC staff assigned to the project. In the body of the email provide FERC staff with the following:
      - Project Number(s)
      - Description of the files you are transmitting:
      - List all security classes included in the submittal: (Public, CEII, Privileged)
      - Accession number(s) for the corresponding submittal in eLibrary:

2) Filer or its representative/consultant provides a site
   a. After eFiling everything that can be eFiled, the filer, or its representative/consultant, may set up an external site and provide FERC staff access to the site.
   b. Prepare the files for transfer:
      i. File attributes for all methods listed above
   c. After eFiling all parts of the submittal that can be eFiled, email the FERC staff assigned to the project. In the body of the email provide FERC staff with the following:
      - Link to the site where staff can retrieve the files
      - Any instructions needed to retrieve the files
      - Project Number(s)
      - Description of the files you are transmitting:
      - List all security classes included in the submittal: (Public, CEII, Privileged)
      - Accession number(s) for the corresponding submittal in eLibrary:
   d. Once FERC staff retrieve the files, they will notify you.

3) FERC's External SharePoint Site
   a. After eFiling everything that can be eFiled, the filer should contact FERC staff to arrange for the creation of a SharePoint site specific to your submittal. Provide FERC staff with the following:
      - Project Number(s)

- Description of the files you will be transmitting:
- Names and email addresses of your staff that will upload the files:
- List all security classes included in the submittal: (Public, CEII, Privileged)
- Accession number(s) for the corresponding submittal in eLibrary:

b. Prepare the files for transfer:
   i. File attributes for all methods listed above;
   ii. There is a 2GB limit on file size. If the submittal is larger than 2GB please break into packages of 2GB or less;
   iii. File names cannot have any of these characters " * : < > ? / \ | ;
   iv. There can be no leading or trailing spaces in file or folder names; AND
   v. When documents are uploaded, a url is created for each one. The url is a combined name of the site, all of the folders in the file path, and the file name. This url has a 400 character limit. If this is exceeded it will generate an error. If files are compressed into .zip files, this issue is avoided.

c. Once a SharePoint site is created, the staff you identified will receive an email from no-reply@sharepointonline.com stating that FERC staff wants to share the site. Follow the instructions in the email to accept the invitation and access the site.

d. Once you have successfully uploaded all your files, notify the FERC staff person you are working with.

e. If you have any issues with the site, contact the FERC staff person who is included on the email from SharePoint in Step c above.

f. Once FERC staff retrieve the files, they will notify you.

4) CD, DVD, or external drive mailed to FERC HQ

Note: All CD, DVD, and external drives are to be sent to FERC HQ (address below) for processing due to the uncertainty and changing access conditions in each of the Regional Offices which are not controlled by FERC. In addition, CD, DVD, and external drives will be retrieved from the HQ office on a limited basis in order to limit staff exposure by having to go into the office to retrieve these media. Please allow additional time for this retrieval to be completed. This process is only for media that contain information that cannot be eFiled and that have been coordinated with FERC staff. Media that have not been coordinated will not be retrieved.

a. After eFiling everything that can be eFiled, and exploring other options above, the filer should contact FERC staff and let them know that a CD, DVD, or external drive is being mailed to FERC HQ.

b. Prepare the files for transfer:
   i. File attributes for all methods listed above

c. After eFiling all parts of the submittal that can be eFiled, mail the CD, DVD, or external drive using a non- USPS carrier to the following address:

   Federal Energy Regulatory Commission
   Office of Energy Projects, Room 61-02
   12225 Wilkins Avenue
   Rockville MD 20852

d. Email FERC project staff with the following information regarding the mailed items:
   i. Any tracking number for the mailed item.
   ii. Project Number(s)
   iii. Description of the files you sent on the CD, DVD, or external drive:
   iv. List all security classes included in the submittal: (Public, CEII, Privileged)
   v. Accession number(s) for the corresponding submittal in eLibrary:

e. Once FERC project staff retrieve the files, they will notify you.

Alabama Power

600 North 18th Street
Hydro Services 16N-8180
Birmingham, AL 35203
205 257 2251 tel
arsegars@southernco.com

June 29, 2021

VIA ELECTRONIC FILING

Project No. 2628-065
R.L. Harris Hydroelectric Project
Transmittal of the Preliminary Licensing Proposal

Ms. Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street NE
Washington, DC 20426

Dear Secretary Bose,

Alabama Power Company (Alabama Power) is the Federal Energy Regulatory Commission (FERC or Commission) licensee for the R.L. Harris Hydroelectric Project (Harris Project) (FERC No. 2628-065). The existing Project license will expire on November 30, 2023, and Alabama Power is utilizing the Integrated Licensing Process (ILP) to relicense the Harris Project.

Pursuant to the Commission's ILP and 18 CFR § 5.16, Alabama Power is filing the Harris Project Preliminary Licensing Proposal (PLP). The attached PLP includes Alabama Power's proposed operations and protection, mitigation, and enhancement (PM&E) measures, a summary of the existing environment, and an environmental analysis of the proposed actions' effects on the Harris Project resources. Stakeholders may file comments on the PLP within 90 days of this filing. The PLP and the individual study reports are available on FERC's website (http://www.ferc.gov) by going to the "eLibrary" link and entering the docket number (P-2628). The PLP is also available on the Project relicensing website at https://harrisrelicensing.com.

If there are any questions concerning this filing, please contact me at arsegars@southernco.com or 205-257-2251.

Sincerely,

Angela Anderegg

Angie Anderegg
Harris Relicensing Project Manager

Attachment – Preliminary Licensing Proposal (PLP)

cc: Harris Action Teams Stakeholder List

Harris Relicensing - Preliminary Licensing Proposal

APC Harris Relicensing <g2apchr@southernco.com>

Tue 6/29/2021 2:15 PM

To: APC Harris Relicensing <harrisrelicensing@southernco.com>
Bcc: 1942jthompson420@gmail.com <1942jthompson420@gmail.com>; 9sling@charter.net <9sling@charter.net>; abnoel@southernco.com <abnoel@southernco.com>; allan.creamer@ferc.gov <allan.creamer@ferc.gov>; alockwood@adem.alabama.gov <alockwood@adem.alabama.gov>; alpeeple@southernco.com <alpeeple@southernco.com>; amanda.mcbride@ahc.alabama.gov <amanda.mcbride@ahc.alabama.gov>; ammcvica@southernco.com <ammcvica@southernco.com>; amy.silvano@dcnr.alabama.gov <amy.silvano@dcnr.alabama.gov>; andrew.nix@dcnr.alabama.gov <andrew.nix@dcnr.alabama.gov>; arsegars@southernco.com <arsegars@southernco.com>; athall@fujifilm.com <athall@fujifilm.com>; aubie84@yahoo.com <aubie84@yahoo.com>; awhorton@corblu.com <awhorton@corblu.com>; bart_roby@msn.com <bart_roby@msn.com>; baxterchip@yahoo.com <baxterchip@yahoo.com>; bboozer6@gmail.com <bboozer6@gmail.com>; bdavis081942@gmail.com <bdavis081942@gmail.com>; beckyrainwater1@yahoo.com <beckyrainwater1@yahoo.com>; bill_pearson@fws.gov <bill_pearson@fws.gov>; blacklake20@gmail.com <blacklake20@gmail.com>; 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sarah.salazar@ferc.gov <sarah.salazar@ferc.gov>; sbryan@pci-nsn.gov <sbryan@pci-nsn.gov>; scsmith@southernco.com
<scsmith@southernco.com>; section106@mcn-nsn.gov <section106@mcn-nsn.gov>; sforehand@russelllands.com
<sforehand@russelllands.com>; sgraham@southernco.com <sgraham@southernco.com>; sherry.bradley@adph.state.al.us

<sherry.bradley@adph.state.al.us>; sidney.hare@gmail.com <sidney.hare@gmail.com>; simsthe@aces.edu <simsthe@aces.edu>; snelson@nelsonandco.com <snelson@nelsonandco.com>; sonjahollomon@gmail.com <sonjahollomon@gmail.com>; steve.bryant@dcnr.alabama.gov <steve.bryant@dcnr.alabama.gov>; stewartjack12@bellsouth.net <stewartjack12@bellsouth.net>; straylor426@bellsouth.net <straylor426@bellsouth.net>; sueagnew52@yahoo.com <sueagnew52@yahoo.com>; syerka@nc-cherokee.com <syerka@nc-cherokee.com>; tdadunaway@gmail.com <tdadunaway@gmail.com>; thpo@pci-nsn.gov <thpo@pci-nsn.gov>; thpo@tttown.org <thpo@tttown.org>; timguffey@jcch.net <timguffey@jcch.net>; tlamberth@russelllands.com <tlamberth@russelllands.com>; tlmills@southernco.com <tlmills@southernco.com>; todd.fobian@dcnr.alabama.gov <todd.fobian@dcnr.alabama.gov>; tom.diggs@ung.edu <tom.diggs@ung.edu>; tom.lettieri47@gmail.com <tom.lettieri47@gmail.com>; tom.littlepage@adeca.alabama.gov <tom.littlepage@adeca.alabama.gov>; trayjim@bellsouth.net <trayjim@bellsouth.net>; triciastearns@gmail.com <triciastearns@gmail.com>; twstjohn@southernco.com <twstjohn@southernco.com>; variscom506@gmail.com <variscom506@gmail.com>; walker.mary@epa.gov <walker.mary@epa.gov>; william.puckett@swcc.alabama.gov <william.puckett@swcc.alabama.gov>; wmcampbell218@gmail.com <wmcampbell218@gmail.com>; wrighr2@aces.edu <wrighr2@aces.edu>; wsgardne@southernco.com <wsgardne@southernco.com>; wtanders@southernco.com <wtanders@southernco.com>; wwarrior@ukb-nsn.gov <wwarrior@ukb-nsn.gov>

Harris relicensing stakeholders,

Today, Alabama Power filed the Harris Project Preliminary Licensing Proposal (PLP). The PLP includes Alabama Power's proposed operations and protection, mitigation, and enhancement (PM&E) measures, a summary of the existing environment, and an environmental analysis of the proposed actions' effects on the Harris Project resources. Stakeholders may file comments on the PLP within 90 days of this filing (by September 27, 2021). The PLP and the individual study reports are available on FERC's website (http://www.ferc.gov) by going to the "eLibrary" link and entering the docket number (P-2628). The PLP is also available on the Project relicensing website at https://harrisrelicensing.com.

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

HAT 1 - Transmittal of Modeling Files

APC Harris Relicensing <g2apchr@southernco.com>

Tue 6/29/2021 2:20 PM

To: APC Harris Relicensing <harrisrelicensing@southernco.com>
Bcc: damon.abernethy@dcnr.alabama.gov <damon.abernethy@dcnr.alabama.gov>; nathan.aycock@dcnr.alabama.gov <nathan.aycock@dcnr.alabama.gov>; steve.bryant@dcnr.alabama.gov <steve.bryant@dcnr.alabama.gov>; todd.fobian@dcnr.alabama.gov <todd.fobian@dcnr.alabama.gov>; chris.greene@dcnr.alabama.gov <chris.greene@dcnr.alabama.gov>; keith.henderson@dcnr.alabama.gov <keith.henderson@dcnr.alabama.gov>; mike.holley@dcnr.alabama.gov <mike.holley@dcnr.alabama.gov>; evan.lawrence@dcnr.alabama.gov <evan.lawrence@dcnr.alabama.gov>; matthew.marshall@dcnr.alabama.gov <matthew.marshall@dcnr.alabama.gov>; brian.atkins@adeca.alabama.gov <brian.atkins@adeca.alabama.gov>; tom.littlepage@adeca.alabama.gov <tom.littlepage@adeca.alabama.gov>; jhaslbauer@adem.alabama.gov <jhaslbauer@adem.alabama.gov>; cljohnson@adem.alabama.gov <cljohnson@adem.alabama.gov>; mlen@adem.alabama.gov <mlen@adem.alabama.gov>; fal@adem.alabama.gov <fal@adem.alabama.gov>; alockwood@adem.alabama.gov <alockwood@adem.alabama.gov>; djmoore@adem.alabama.gov <djmoore@adem.alabama.gov>; arsegars@southernco.com <arsegars@southernco.com>; dkanders@southernco.com <dkanders@southernco.com>; wtanders@southernco.com <wtanders@southernco.com>; jefbaker@southernco.com <jefbaker@southernco.com>; jcarlee@southernco.com <jcarlee@southernco.com>; kechandl@southernco.com <kechandl@southernco.com>; mcoker@southernco.com <mcoker@southernco.com>; afleming@southernco.com <afleming@southernco.com>; cggoodma@southernco.com <cggoodma@southernco.com>; sgraham@southernco.com <sgraham@southernco.com>; ammcvica@southernco.com <ammcvica@southernco.com>; tlmills@southernco.com <tlmills@southernco.com>; cmnix@southernco.com <cmnix@southernco.com>; abnoel@southernco.com <abnoel@southernco.com>; kodom@southernco.com <kodom@southernco.com>; alpeeple@southernco.com <alpeeple@southernco.com>; scsmith@southernco.com <scsmith@southernco.com>; twstjohn@southernco.com <twstjohn@southernco.com>; Rasberry, Jennifer S. <JSRASBER@southernco.com>; mhunter@alabamarivers.org <mhunter@alabamarivers.org>; clowry@alabamarivers.org <clowry@alabamarivers.org>; jwest@alabamarivers.org <jwest@alabamarivers.org>; gjobsis@americanrivers.org <gjobsis@americanrivers.org>; kmo0025@auburn.edu <kmo0025@auburn.edu>; devridr@auburn.edu <devridr@auburn.edu>; irwiner@auburn.edu <irwiner@auburn.edu>; wrighr2@aces.edu <wrighr2@aces.edu>; lgallen@balch.com <lgallen@balch.com>; jhancock@balch.com <jhancock@balch.com>; allan.creamer@ferc.gov <allan.creamer@ferc.gov>; rachel.mcnamara@ferc.gov <rachel.mcnamara@ferc.gov>; sarah.salazar@ferc.gov <sarah.salazar@ferc.gov>; monte.terhaar@ferc.gov <monte.terhaar@ferc.gov>; gene@wedoweelakehomes.com <gene@wedoweelakehomes.com>; colin.dinken@kleinschmidtgroup.com <colin.dinken@kleinschmidtgroup.com>; chris.goodell@kleinschmidtgroup.com <chris.goodell@kleinschmidtgroup.com>; jason.moak@kleinschmidtgroup.com <jason.moak@kleinschmidtgroup.com>; kelly.schaeffer@kleinschmidtgroup.com <kelly.schaeffer@kleinschmidtgroup.com>; sandra.wash@kleinschmidtgroup.com <sandra.wash@kleinschmidtgroup.com>; jessecunningham@msn.com <jessecunningham@msn.com>; mdollar48@gmail.com <mdollar48@gmail.com>; drheinzen@charter.net <drheinzen@charter.net>; sforehand@russelllands.com <sforehand@russelllands.com>; 1942jthompson420@gmail.com <1942jthompson420@gmail.com>; nancyburnes@centurylink.net <nancyburnes@centurylink.net>; sandnfrench@gmail.com <sandnfrench@gmail.com>; lgarland68@aol.com <lgarland68@aol.com>; rbmorris222@gmail.com <rbmorris222@gmail.com>; irapar@centurytel.net <irapar@centurytel.net>; mitchell.reid@tnc.org <mitchell.reid@tnc.org>; richardburnes3@gmail.com <richardburnes3@gmail.com>; eilandfarm@aol.com <eilandfarm@aol.com>; athall@fujifilm.com <athall@fujifilm.com>; ebt.drt@numail.org <ebt.drt@numail.org>; georgettraylor@centurylink.net <georgettraylor@centurylink.net>; beckyrainwater1@yahoo.com <beckyrainwater1@yahoo.com>; dbronson@charter.net <dbronson@charter.net>; wmcampbell218@gmail.com <wmcampbell218@gmail.com>; jec22641@aol.com <jec22641@aol.com>; robinwaldrep@yahoo.com <robinwaldrep@yahoo.com>; sonjahollomon@gmail.com <sonjahollomon@gmail.com>; butchjackson60@gmail.com <butchjackson60@gmail.com>; donnamat@aol.com <donnamat@aol.com>; goxford@centurylink.net <goxford@centurylink.net>; mhpwedowee@gmail.com <mhpwedowee@gmail.com>; jerrelshell@gmail.com <jerrelshell@gmail.com>; bsmith0253@gmail.com <bsmith0253@gmail.com>; inspector_003@yahoo.com <inspector_003@yahoo.com>; paul.trudine@gmail.com <paul.trudine@gmail.com>; lindastone2012@gmail.com <lindastone2012@gmail.com>; granddadth@windstream.net <granddadth@windstream.net>; trayjim@bellsouth.net <trayjim@bellsouth.net>; straylor426@bellsouth.net <straylor426@bellsouth.net>; robert.a.allen@usace.army.mil <robert.a.allen@usace.army.mil>; randall.b.harvey@usace.army.mil <randall.b.harvey@usace.army.mil>; james.e.hathorn.jr@sam.usace.army.mil <james.e.hathorn.jr@sam.usace.army.mil>; lewis.c.sumner@usace.army.mil <lewis.c.sumner@usace.army.mil>; jonas.white@usace.army.mil <jonas.white@usace.army.mil>; clark.maria@epa.gov <clark.maria@epa.gov>; gordon.lisa-perras@epa.gov <gordon.lisa-perras@epa.gov>; holliman.daniel@epa.gov <holliman.daniel@epa.gov>; mayo.lydia@epa.gov <mayo.lydia@epa.gov>; jennifer_grunewald@fws.gov <jennifer_grunewald@fws.gov>; erin_padgett@fws.gov <erin_padgett@fws.gov>; jeff_powell@fws.gov <jeff_powell@fws.gov>; jeff_duncan@nps.gov <jeff_duncan@nps.gov>

1 attachments (39 KB)

2021-06-29 Modeling Files Cover Letter.PDF;

HAT 1,

Alabama Power has submitted the attached letter concerning transmittal of the HEC-ResSim, HEC-RAS and EFDC models to FERC and stakeholders. As noted, stakeholders may request a copy of the one or all of the models by email harrisrelicensing@southernco.com and the models will be provided on a flash drive via U.S. Postal Service. If you would like to request the models, please include a mailing address in your email.

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

600 North 18th Street
Hydro Services 16N-8180
Birmingham, AL 35203
205 257 2251   tel
arsegars@southernco.com

June 29, 2021

VIA ELECTRONIC FILING

Project No. 2628-065
R.L. Harris Hydroelectric Project
Transmittal of Modeling Files

Ms. Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street N.
Washington, DC 20426

Dear Secretary Bose,

Alabama Power Company (Alabama Power) is the Federal Energy Regulatory Commission (FERC or Commission) licensee for the R.L. Harris Hydroelectric Project (Harris Project) (FERC No. 2628-065). On April 12, 2021, pursuant to the Commission's Integrated Licensing Process (ILP) and 18 CFR § 5.15(f), Alabama Power filed the Harris Project Updated Study Report (USR)[1]. On June 9, 2021, FERC staff filed comments on the USR and USR Meeting Summary[2]. In Attachment A, item 1 of the June 29, 2021 filing, FERC requested that Alabama Power file the models, including the methodologies, inputs and outputs, assumptions, and summary reports that were developed during Phase 1 of the Operating Curve Change Feasibility Analysis and Downstream Release Alternatives Study. FERC also requested all other non-proprietary models developed in support of the Harris Project relicensing studies. As such, Alabama Power is providing the Hydrologic Engineering Center's Reservoir Simulation (HEC-ResSim) and the HEC-River Analysis System (HEC-RAS) models developed for the Operating Curve Feasibility Analysis and Downstream Release Alternatives Study. Further, Alabama Power is making available the Environmental Fluid Dynamics Code (EFDC) model developed for Phase 2 of the Operating Curve Feasibility Analysis.

Due to the file sizes associated with the HEC-RAS, HEC-ResSim, and EFDC models, Alabama Power is unable to file these models on FERC's elibrary. HEC-ResSim and HEC-RAS will be filed with FERC via FERC's external SharePoint site, which is not publicly available. However, due to the size of the EFDC model (over 100 GB in zipped format), Alabama Power cannot provide this model via a website and will need to provide it to FERC on a flash drive via U.S Postal Service.

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[1] Accession No. 20210412-5737

[2] Accession No. 20210609-3045

Stakeholders may request a copy of the three models by e-mailing harrisrelicensing@southernco.com and the models will be provided on a flash drive via U.S Postal Service. All files contain instructions on unzipping the model files. All other methodologies, inputs and outputs, and assumptions are contained in the *Final Downstream Release Alternatives Phase 1 Study Report*[3], *Final Operating Curve Change Feasibility Analysis Phase 1 Study Report*[4], *Draft Downstream Release Alternatives Phase 2 Study Report*[5], and *Draft Operating Curve Change Feasibility Analysis Phase 2 Study Report*[6].

If there are any questions concerning this filing, please contact me at arsegars@southernco.com or 205-257-2251.

Sincerely,

Angie Anderegg

Angie Anderegg
Harris Relicensing Project Manager

cc: Harris Action Team 1 Stakeholder List

[3] Accession No. 20200727-5088

[4] Accession No. 20200831-5339

[5] Accession No. 20210412-5748

[6] Accession No. 20210412-5750

APC Harris Relicensing

From: APC Harris Relicensing
Sent: Sunday, July 11, 2021 3:54 PM
To: Hathorn, James E Jr CIV USARMY CESAM (USA)
Subject: RE: RL Harris Transmittal of Model Files

Hi James,

We mailed a flash drive to the address below via FedEx this past Friday. You should receive it by Tuesday. We're going to keep an eye on the shipment, but please let me know if you don't receive it.

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From: Hathorn, James E Jr CIV USARMY CESAM (USA) <James.E.Hathorn.Jr@usace.army.mil>
Sent: Tuesday, June 29, 2021 4:01 PM
To: APC Harris Relicensing <g2apchr@southernco.com>
Subject: RL Harris Transmittal of Model Files

To Whom It May Concern:

Mobile District Office of Water Management would like to request the Hydrologic Engineering Center's Reservoir Simulation (HEC-ResSim) and the HEC-River Analysis System (HEC-RAS) models developed for the Operating Curve Feasibility Analysis and Downstream Release Alternatives Study. Also, the Environmental Fluid Dynamics Code (EFDC) model developed for Phase 2 of the Operating Curve Feasibility Analysis.

Thank you in advance.

James Hathorn, Jr
Chief, Water Management Section
US Army Corps of Engineers, Mobile District
109 St Joseph St
Mobile, AL 36602-3630

Office: 251-690-2730
Cell: 251-509-5368
Email: james.e.hathorn.jr@usace.army.mil
Web: www.sam.usace.army.mil [sam.usace.army.mil]

Essayons!

Harris Relicensing - Response to Study Disputes

APC Harris Relicensing <g2apchr@southernco.com>

Mon 7/12/2021 1:07 PM

To: APC Harris Relicensing <harrisrelicensing@southernco.com>
Bcc: 1942jthompson420@gmail.com <1942jthompson420@gmail.com>; 9sling@charter.net <9sling@charter.net>;
abnoel@southernco.com <abnoel@southernco.com>; allan.creamer@ferc.gov <allan.creamer@ferc.gov>;
alockwood@adem.alabama.gov <alockwood@adem.alabama.gov>; alpeeple@southernco.com <alpeeple@southernco.com>;
amanda.mcbride@ahc.alabama.gov <amanda.mcbride@ahc.alabama.gov>; ammcvica@southernco.com
<ammcvica@southernco.com>; amy.silvano@dcnr.alabama.gov <amy.silvano@dcnr.alabama.gov>;
andrew.nix@dcnr.alabama.gov <andrew.nix@dcnr.alabama.gov>; arsegars@southernco.com <arsegars@southernco.com>;
athall@fujifilm.com <athall@fujifilm.com>; aubie84@yahoo.com <aubie84@yahoo.com>; awhorton@corblu.com
<awhorton@corblu.com>; bart_roby@msn.com <bart_roby@msn.com>; baxterchip@yahoo.com <baxterchip@yahoo.com>;
bboozer6@gmail.com <bboozer6@gmail.com>; bdavis081942@gmail.com <bdavis081942@gmail.com>;
beckyrainwater1@yahoo.com <beckyrainwater1@yahoo.com>; bill_pearson@fws.gov <bill_pearson@fws.gov>;
blacklake20@gmail.com <blacklake20@gmail.com>; blm_es_inquiries@blm.gov <blm_es_inquiries@blm.gov>;
bob.stone@smimail.net <bob.stone@smimail.net>; bradandsue795@gmail.com <bradandsue795@gmail.com>;
bradfordt71@gmail.com <bradfordt71@gmail.com>; brian.atkins@adeca.alabama.gov <brian.atkins@adeca.alabama.gov>;
bruce.bradford@forestry.alabama.gov <bruce.bradford@forestry.alabama.gov>; bruce@bruceknapp.com
<bruce@bruceknapp.com>; bsmith0253@gmail.com <bsmith0253@gmail.com>; btseale@southernco.com
<btseale@southernco.com>; butchjackson60@gmail.com <butchjackson60@gmail.com>; bwhaley@randolphcountyeda.com
<bwhaley@randolphcountyeda.com>; carolbuggknight@hotmail.com <carolbuggknight@hotmail.com>;
celestine.bryant@actribe.org <celestine.bryant@actribe.org>; cengstrom@centurytel.net <cengstrom@centurytel.net>;
cggoodma@southernco.com <cggoodma@southernco.com>; cgnav@uscg.mil <cgnav@uscg.mil>;
chandlermary937@gmail.com <chandlermary937@gmail.com>; chiefknight2002@yahoo.com <chiefknight2002@yahoo.com>;
chimneycove@gmail.com <chimneycove@gmail.com>; chris.goodell@kleinschmidtgroup.com
<chris.goodell@kleinschmidtgroup.com>; chris.greene@dcnr.alabama.gov <chris.greene@dcnr.alabama.gov>;
chris.smith@dcnr.alabama.gov <chris.smith@dcnr.alabama.gov>; chris@alaudubon.org <chris@alaudubon.org>;
chuckdenman@hotmail.com <chuckdenman@hotmail.com>; clark.maria@epa.gov <clark.maria@epa.gov>;
claychamber@gmail.com <claychamber@gmail.com>; clint.lloyd@auburn.edu <clint.lloyd@auburn.edu>;
cljohnson@adem.alabama.gov <cljohnson@adem.alabama.gov>; clowry@alabamarivers.org <clowry@alabamarivers.org>;
cmnix@southernco.com <cmnix@southernco.com>; coetim@aol.com <coetim@aol.com>;
colin.dinken@kleinschmidtgroup.com <colin.dinken@kleinschmidtgroup.com>; cooper.jamal@epa.gov
<cooper.jamal@epa.gov>; coty.brown@alea.gov <coty.brown@alea.gov>; craig.litteken@usace.army.mil
<craig.litteken@usace.army.mil>; crystal.davis@adeca.alabama.gov <crystal.davis@adeca.alabama.gov>;
crystal.lakewedoweedocks@gmail.com <crystal.lakewedoweedocks@gmail.com>; crystal@hunterbend.com
<crystal@hunterbend.com>; dalerose120@yahoo.com <dalerose120@yahoo.com>; damon.abernethy@dcnr.alabama.gov
<damon.abernethy@dcnr.alabama.gov>; dbronson@charter.net <dbronson@charter.net>; dcnr.wffdirector@dcnr.alabama.gov
<dcnr.wffdirector@dcnr.alabama.gov>; decker.chris@epa.gov <decker.chris@epa.gov>; devridr@auburn.edu
<devridr@auburn.edu>; dfarr@randolphcountyalabama.gov <dfarr@randolphcountyalabama.gov>; dhayba@usgs.gov
<dhayba@usgs.gov>; director.cleburnecountychamber@gmail.com <director.cleburnecountychamber@gmail.com>;
djmoore@adem.alabama.gov <djmoore@adem.alabama.gov>; dkanders@southernco.com <dkanders@southernco.com>;
donnamat@aol.com <donnamat@aol.com>; doug.deaton@dcnr.alabama.gov <doug.deaton@dcnr.alabama.gov>;
dpreston@southernco.com <dpreston@southernco.com>; drheinzen@charter.net <drheinzen@charter.net>;
ebt.drt@numail.org <ebt.drt@numail.org>; eddieplemons@charter.net <eddieplemons@charter.net>; eilandfarm@aol.com
<eilandfarm@aol.com>; el.brannon@yahoo.com <el.brannon@yahoo.com>; elizabeth-toombs@cherokee.org <elizabeth-
toombs@cherokee.org>; emathews@aces.edu <emathews@aces.edu>; eric.sipes@ahc.alabama.gov
<eric.sipes@ahc.alabama.gov>; erin_padgett@fws.gov <erin_padgett@fws.gov>; evan.lawrence@dcnr.alabama.gov
<evan.lawrence@dcnr.alabama.gov>; evan_collins@fws.gov <evan_collins@fws.gov>; eveham75@gmail.com
<eveham75@gmail.com>; fal@adem.alabama.gov <fal@adem.alabama.gov>; Fleming, Amanda <afleming@southernco.COM>;
fredcanoes@aol.com <fredcanoes@aol.com>; gardenergirl04@yahoo.com <gardenergirl04@yahoo.com>;
garyprice@centurytel.net <garyprice@centurytel.net>; gene@wedoweelakehomes.com <gene@wedoweelakehomes.com>;
georgettraylor@centurylink.net <georgettraylor@centurylink.net>; gerryknight77@gmail.com <gerryknight77@gmail.com>;
gfhorn@southernco.com <gfhorn@southernco.com>; gjobsis@americanrivers.org <gjobsis@americanrivers.org>;
gld@adem.alabama.gov <gld@adem.alabama.gov>; glea@wgsarrell.com <glea@wgsarrell.com>; gmraines@ten-o.com
<gmraines@ten-o.com>; gordon.lisa-perras@epa.gov <gordon.lisa-perras@epa.gov>; goxford@centurylink.net
<goxford@centurylink.net>; granddadth@windstream.net <granddadth@windstream.net>; harry.merrill47@gmail.com
<harry.merrill47@gmail.com>; helen.greer@att.net <helen.greer@att.net>; info@aeconline.org <info@aeconline.org>;
info@tunica.org <info@tunica.org>; inspector_003@yahoo.com <inspector_003@yahoo.com>; irapar@centurytel.net

<irapar@centurytel.net>; irwiner@auburn.edu <irwiner@auburn.edu>; j35sullivan@blm.gov <j35sullivan@blm.gov>;
jabeason@southernco.com <jabeason@southernco.com>; james.e.hathorn.jr@sam.usace.army.mil
<james.e.hathorn.jr@sam.usace.army.mil>; jason.moak@kleinschmidtgroup.com <jason.moak@kleinschmidtgroup.com>;
jcandler7@yahoo.com <jcandler7@yahoo.com>; jcarlee@southernco.com <jcarlee@southernco.com>; jec22641@aol.com
<jec22641@aol.com>; jeddins@achp.gov <jeddins@achp.gov>; jefbaker@southernco.com <jefbaker@southernco.com>;
jeff_duncan@nps.gov <jeff_duncan@nps.gov>; jeff_powell@fws.gov <jeff_powell@fws.gov>;
jennifer.l.jacobson@usace.army.mil <jennifer.l.jacobson@usace.army.mil>; jennifer_grunewald@fws.gov
<jennifer_grunewald@fws.gov>; jerrelshell@gmail.com <jerrelshell@gmail.com>; jessecunningham@msn.com
<jessecunningham@msn.com>; jfcrew@southernco.com <jfcrew@southernco.com>; jhancock@balch.com
<jhancock@balch.com>; jharjo@alabama-quassarte.org <jharjo@alabama-quassarte.org>; jhaslbauer@adem.alabama.gov
<jhaslbauer@adem.alabama.gov>; jhouser@osiny.org <jhouser@osiny.org>; jkwdurham@gmail.com
<jkwdurham@gmail.com>; jnyerby@southernco.com <jnyerby@southernco.com>; joan.e.zehrt@usace.army.mil
<joan.e.zehrt@usace.army.mil>; john.free@psc.alabama.gov <john.free@psc.alabama.gov>; johndiane@sbcglobal.net
<johndiane@sbcglobal.net>; jonas.white@usace.army.mil <jonas.white@usace.army.mil>; josh.benefield@forestry.alabama.gov
<josh.benefield@forestry.alabama.gov>; jpsparrow@att.net <jpsparrow@att.net>; jsrasber@southernco.com
<jsrasber@southernco.com>; jthacker@southernco.com <jthacker@southernco.com>; jthroneberry@tnc.org
<jthroneberry@tnc.org>; judymcrealtor@gmail.com <judymcrealtor@gmail.com>; jwest@alabamarivers.org
<jwest@alabamarivers.org>; kajumba.ntale@epa.gov <kajumba.ntale@epa.gov>; karen.brunso@chickasaw.net
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Harris relicensing stakeholders,

Alabama Power has filed the response to Updated Study Report Meeting Summary Disagreements and Study Dispute with FERC. The filing can be found on eLibrary | File List (ferc.gov), as well as the Harris relicensing website (www.harrisrelicensing.com) in the Relicensing Documents folder.

Thanks,

Angie Anderegg
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Alabama Power

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July 12, 2021

VIA ELECTRONIC FILING

Project No. 2628-065
R.L. Harris Hydroelectric Project
Response to Updated Study Report (USR) Meeting Summary Disagreements and Study Dispute

Ms. Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street N.
Washington, DC 20426

Dear Secretary Bose,

Alabama Power Company (Alabama Power) is the Federal Energy Regulatory Commission (FERC) licensee for the R.L. Harris Hydroelectric Project (Harris Project) (FERC No. 2628). On April 12, 2021, Alabama Power filed the Updated Study Report (USR) along with three Draft Study Reports, four Final Study Reports, and a botanical inventory report. Comments on the three Draft Study Reports were due on May 26, 2021. Alabama Power held the USR Meeting with stakeholders and FERC on April 27, 2021. On May 12, 2021, Alabama Power filed the USR Meeting Summary. Comments on the USR Meeting Summary were due on June 11, 2021.

The Alabama Department of Conservation and Natural Resources (ADCNR), Federal Energy Regulatory Commission (FERC), and Alabama Rivers Alliance (ARA) submitted disagreements on the USR presentation and/or the USR meeting summary. Attachment A of this filing includes Alabama Power's responses to those disagreements and comments. In addition, ARA submitted a Dispute of Study for the Battery Energy Storage System (BESS) study. Alabama Power's response to the study dispute is provided in Attachment B.

Alabama Power is reviewing FERC and stakeholder comments on the USR and Draft Study Reports, as well as a small number of comments that were submitted on Final Study Reports. Alabama Power will address these comments, as applicable, and file all Final Study Reports with the Final License Application (FLA) in November 2021. The Final Study Reports will contain comment matrices listing the comment and how Alabama Power addressed the comments.

If there are any questions concerning this filing, please contact me at arsegars@southernco.com or 205-257-2251.

Sincerely,

Angie Anderegg
Harris Relicensing Project Manager

Attachment A: Alabama Power's Response to Disagreements on the Updated Study Report Meeting Summary for the R.L. Harris Hydroelectric Project
Attachment B: Alabama Power's Response to Alabama Rivers Alliance Study Dispute for the R.L. Harris Hydroelectric Project

cc: Harris Stakeholder List

ATTACHMENT A

Alabama Power's Response to Stakeholder Disagreements on the Updated Study Report Meeting Summary for the R.L. Harris Hydroelectric Project

Pursuant to the Federal Energy Regulatory Commission's (FERC) Integrated Licensing Process (ILP) and 18 CFR § 5.15(f), Alabama Power Company (Alabama Power) filed the R.L. Harris Project Updated Study Report (USR) on April 12, 2021[1]. The USR described Alabama Power's overall progress in implementing the study plans, and summarized the data collected and any variances from the study plan and schedule.

The Alabama Department of Conservation and Natural Resources (ADCNR), FERC, and Alabama Rivers Alliance (ARA) submitted comments disagreeing with certain aspects of the USR Meeting Summary for the R.L. Harris Project[2]. The comments provided below state the disagreement on the USR Meeting and Meeting Summary, followed by Alabama Power's response. The comments have been truncated to present only that portion that contains the disagreement specific to the USR Meeting Summary or USR Meeting presentation.

Comments are presented in italic text and Alabama Power's response follows.

ADCNR Comments submitted May 27, 2021

ADCNR Comment:

On page 30 of the PowerPoint presentation from the USR meeting on April 27, 2021, the licensee presented variances from the Final Aquatic Resources Study Plan. ADCNR noted that methodology modifications were made to the Final Aquatic Resources Study Plan without ADCNR and other stakeholder consultation or guidance…

It should be noted that the reason for not using the 30+2 method, Auburn and the licensee stated in the PowerPoint presentation during the USR meeting, that it was determined in the field to not be feasible/effective for sampling the sites. If this is true the licensee should explain the statement in PAD, Volume 1, Appendix E, page 7, which states, Alabama Power sampled fish communities in 2017 using standardize methods developed by the Geological Survey of Alabama (GSA) and ADCNR (O'Neil 2006). This sampling method is commonly referred to as the "30+2" method. Samples were collected at the Malone and Wadley sites along the Middle Tallapoosa in the spring and fall and the Upper Tallapoosa sites in July and October." In addition, ADEM was able to successfully complete a 30+2 sampling method at Wadley in 2018....

Alabama Power Response:

Previous comments provided by ADCNR regarding the use of the 30+2 method were addressed in the Final Aquatic Resources Report filed with FERC on April 12, 2021[3] and Alabama Power's response provided to ADCNR on June 4, 2021, and filed with FERC on June 15, 2021[4].

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[1] Accession No 20210412-5737

[2] Accession Nos. 20210527-5024, 20210609-3045, and 20210611-5070

[3] Accession No. 20210412-5745

[4] Accession No. 20210615-5110

ADCNR Comment:

ADCNR disagrees with the summary statement by the licensee on page 30 of the PowerPoint presentation from the USR meeting on April 27, 2021, that boat sampling methodologies are effective at sampling shallow areas within study sites. Both boat and barge electrofishing equipment may collect shallow water fish species specialists but do not provide an equivalent result of a targeted shallow fish population survey comparison that shallow water pre-positioned area electrofishing grids (PAE) or 30+2 sampling method would provide. Similarly, a shallow water electrofishing grid or 30+2 sampling method can collect deep-water fish species specialists but does not effectively sample deep water to provide reliable deep-water fish population results…"

Alabama Power Response:

Previous comments provided by ADCNR regarding the use of the 30+2 method were addressed in the Final Aquatic Resources Report filed with FERC on April 12, 2021, and Alabama Power's response provided to ADCNR on June 4, 2021, and filed with FERC on June 15, 2021.

ADCNR Comment:

On page 28 of the PowerPoint presentation from the USR meeting on April 27, 2021, it states, "Diversity was lower than Travnichek and Maceina (1994), but overall trends in diversity upstream and downstream were similar." This statement fails to specify that this result from Travnichek and Maceina (1994) and the Auburn Report was for the deep-water fish populations only. It should be included that Travnichek and Maceina (1994) results suggested that the effect of flow regulation on species richness and diversity of fishes in deep water habitats was negligible in the Tallapoosa River system downstream of hydroelectric facilities, but that flow regulation appeared to alter shallow water fish assemblages with species richness progressively increasing with distance from Harris Dam. … When discussing the Auburn Report's deep water fish population collections in the discussion and in overall USR meeting summaries include that reporting of the shallow water fish community monitoring between 2006 and 2016 indicates that fish densities in the regulated river downstream of Harris Dam were depressed when compared to unregulated sites (Irwin et al. 2019).

Alabama Power Response:

This comment was addressed in Alabama Power's response provided to ADCNR on June 4, 2021 and filed with FERC on June 15, 2021.

ADCNR Comment:

On page 48 of the Auburn report and on page 28 of the PowerPoint presentation from the USR meeting on April 27, 2021, it states, "Relative contribution of centrarchids lower than 1996 rotenone sample; combined contribution of cyprinids and catostomids similar to 1951 rotenone sample." Although proportionally this statement may be accurate, it is a deceiving conclusion to make regarding the overall density comparisons of cyprinids among studies…"

Alabama Power Response:

This comment was addressed in Alabama Power's response provided to ADCNR on June 4, 2021 and filed with FERC on June 15, 2021.

ADCNR Comment:

…Presenting only the Auburn Report deep water fish population results without including and discussing shallow water fish survey results presented in the PAD, Volume 1, Appendix E (plus additional supplementary material) in the Final Aquatic Resources Study Report and USR meeting conclusion statements is misleading to stakeholders in regard to the condition of overall fish population trends.

Alabama Power Response:

This comment was addressed in Alabama Power's response provided to ADCNR on June 4, 2021 and filed with FERC on June 15, 2021.

ADCNR Comment:

There have been two other notable variances from the Aquatic Resources Study Plan that should have been included in the USR summary presentation. The first variance involves the adequate selection of an upstream control site. In NOI, PAD, Scoping Document and Study Plans, ADCNR comments from October 1, 2018 (See ADCNR, P-2628-005 FERC ¶ 20181002-5006) “that selected sampling sites closely mirror those of samples collected historically and with the ADEM water quality and fish survey sites. This will allow for an ease of comparison over time and among various data sets.” ADCNR had agreed with the Draft Aquatic Resources assessment that an alternative site was necessary for the current upstream control site due to its closely linked dam operation characteristics. ADCNR had requested input on site selection alternatives (See Attachment 2, page 18, ADCNR, P-2628-005 FERC ¶ 20210412-5745). Please include in the report why this was determined unnecessary and provide any comparison limitations the original upstream control site might contribute. The Auburn Report states on page 6, “There is little habitat heterogeneity at this site which is dominated by sluggish, turbid water” and page 47, “Higher catch rates of clupeids above the reservoir were likely due to the high connectivity between the reservoir and the Lee’s Bridge site” indicating remaining researcher doubts about Lee’s Bridge as an adequate control site. In addition, on page 22 of the Auburn Report, it states that Lee’s Bridge was not accessible by boat during the winter due to reservoir drawdown. Using the Foster’s Bridge access area, ADCNR frequently collects brood stock from the shoals above Lee’s Bridge during early spring when Harris is still at winter pool and accessibility issues have not been problematic during low water. Overall, ADCNR remains concerned that the lack of an adequate control site could limit any strong conclusions when comparing data throughout the report.

Alabama Power Response:

This comment was addressed in Alabama Power’s response provided to ADCNR on June 4, 2021 and filed with FERC on June 15, 2021.

ADCNR Comment:

The second variance involves the change from original electromyogram (EMG) telemetry tags to acoustic/radio (CART tags)… . The licensee should include in the discussion why the original electromyogram (EMG) telemetry data methodologies which included "tail-beat frequency" were modified and what key data gaps this change might have created. EMG tags could have provided data on how fish respond to increased flows and detected how tail-beat frequency corresponded to various flow conditions. The EMG tag variance was presented to stakeholders on page 23 of Initial Study Report (See P-2628-005 FERC ¶ 20200410-5084) but should still be included as an overall variance from the Study Plan in Aquatic Resources Final Report. It should be acknowledged that the change was a significant and critical loss to understanding in-situ target fish species movement in the tailrace. CART tag receivers were set to detect longitudinal stream distance movements and will not capture lateral movements or movements utilized between receivers to seek shelter due to flow changes.

Alabama Power Response:

Alabama Power noted the potential use of acoustic/radio (CART) tags and associated reasoning in the Initial Study Report[5] (ISR) filed April 10, 2020, and this variance was not repeated in the USR. The USR described overall progress in implementing the study plans, and summarized the data collected and any variances from the study plan and schedule with a focus on those variances that occurred after filing the ISR. Previous comments provided by ADCNR regarding CART tags were addressed in the Final Aquatic Resources Report filed with FERC on April 12, 2021, and Alabama Power's response provided to ADCNR on June 4, 2021, and filed with FERC on June 15, 2021.

[5] Accession No. 20200410-5084

ADCNR Comment:

On page 5 of the USR meeting summary, Jason Moak with Kleinschmidt noted that Alabama Power is reviewing information that was submitted regarding temperature modifications at other hydropower projects. Jason M. added that the temperature regime of the Tallapoosa River has been well studied during the relicensing process and noted temperatures below Harris Dam are well within the required temperature range of target species presented in Auburn's report. Jason M. stated that the data shows the temperature regime of the river below Harris Dam is not much different from a warm-water fishery, as it averages over 20 degrees Celsius (℃) and closer to 25 ℃ at several locations downstream during the summer. Jason M. added that only a 2-3℃ difference exists in portions of the year when compared to unregulated sites like Heflin or Newell; therefore, there does not appear to be a strong case for making a temperature modification. These statements summarize the licensee's interpretation only, with many points that are in sharp contrast to the temperature analyses presented in the Water Quality Report, Aquatic Resources Report and synopses presented in pages 26-45 of the Final Aquatic Resources Study, several of which indicate temperature effects on aquatic resources below Harris Dam…

Alabama Power Response:

Alabama Power's analysis of the long-term record of water temperatures below Harris, comparisons with recent water temperature records from unregulated sites upstream of Harris, and the results of Auburn's review of fish temperature requirements contained in the *Aquatic Resources Study Report* support the referenced statements by Jason Moak. Alabama Power agrees that previous studies indicated some effects on aquatic resources from water temperature and/or flow, though many of those studies show both negative and positive effects depending on the species and life stage. Alabama Power notes that the intent of the Aquatic Resources Study was to supplement the research conducted prior to relicensing, specifically those studies conducted by U.S. Geological Survey (USGS) and summarized in the 2019 USGS report[6], and to fill information gaps identified by Alabama Power, ADCNR, and other stakeholders during the 2018-2019 development of study plans. Results of the Downstream Aquatic Habitat Study and Phase 2 Downstream Release Alternatives Study indicate that flow modifications – specifically a continuous minimum flow – would have beneficial effects on aquatic resources by providing a reduction in daily and sub-daily water temperature fluctuations.

[6] Available at: https://pubs.usgs.gov/of/2019/1026/ofr20191026.pdf.

ADCNR Comment:

On April 2, 2021, ADCNR provided the licensee with comments regarding the Auburn Report. We are currently awaiting a response to these comments and are concerned with temperature and aquatic resource information details that may be input into the model from reports prior to our comments being fully addressed. Allan Creamer with FERC at HAT 3 meeting notes from March 31, "expressed concern about models that do not have good data going into them." ADCNR agrees that accurate and reliable data modeling requires inputs to be accurate and reliable. Below sub bulleted are comments regarding temperature overview statements provided by the licensee on page 27 of the PowerPoint presentation from the USR meeting on April 27, 2021. These comments concern the licensee's USR meeting summary statement that, "there does not appear to be a strong case for making a temperature modification," and issues to address when inputting temperature data into the Downstream Release alternative models…

Alabama Power Response:

Alabama Power sent a response to ADCNR's April 2, 2021 comments on June 4, 2021 and filed this response with FERC on June 15, 2021.

See response to ADCNR Comment on page 8. Alabama Power notes there are several sub-bulleted comments included with this comment that are related to study reports and not the USR. Alabama Power will address these comments, where applicable, in the *Final Downstream Release Alternatives Report* and the *Final Aquatic Resources Report* to be filed with the Final License Application in November 2021.

In the March 31, 2021, Harris Action Team (HAT) 3 meeting, Sarah Salazar (FERC) inquired if it was possible to compare the bioenergetics results obtained by Auburn University to those of similar rivers. After discussion on the limitations of comparing different river systems, Allan Creamer (FERC) noted that if data does not exist for a certain time, qualitative conclusions would need to be drawn and noted his concern regarding modeling with anecdotal data (versus qualitative conclusions). For context, the dialogue from the meeting is presented in quotes, below:

> "Sarah asked if it was possible to compare the bioenergetics results to those of similar rivers. Ehlana said different rivers could possibly be compared if there are a lot of similarities between the two systems. Dr. Devries said that studies used in the literature review of temperature requirements of the target species came from many different systems and regions (e.g., from ponds versus rivers or northern versus southern regions). Comparisons cannot be reliably made between systems or regions. A bioenergetics model from the northern United States could not be used in the southern United States. Only growth rates can be reliably compared using von Bertalannfy growth curves. Having growth records below Harris Dam would have been very helpful. Allan stated that the outcomes of the five inter-related studies being conducted for relicensing will need to be integrated to draw conclusions about different operating scenarios for Harris Dam. Allan noted the importance of understanding that only data and information from the record can be used for relicensing. If data does not exist for a certain time period, the best that can be done is to qualitatively describe what things may have been like at that time and try to draw some conclusions. Allan expressed concern about models that do not have good data going into them. He acknowledged that anecdotal

information could contain inherent biases, and it is not necessarily information that should be used in a model. Angie stated that the pieces are starting to come together and that the purpose of the meeting today was only to present results of the Auburn University study.”

FERC Comments submitted June 9, 2021

FERC Comment:

The USR states that cultural resource assessments for Lake Harris and Skyline are complete; however, the USR does not include the results of those assessments. The cultural resource assessments should be fully documented and provided with the PLP. Alabama Power also intends to file a draft Historic Properties Management Plan (HPMP) with the PLP and proposes to allow stakeholders 60 days to comment. However, under section 5.16(e) of the Commission's regulations, stakeholders have a 90-day comment period for filing comments on the PLP, which would include the cultural resources assessment results and draft HPMP.

Alabama Power Response:

The cultural resource assessments are fully documented and the reports for the assessments were provided as Appendix C and Appendix D in the Draft HPMP filed on June 29, 2021[7]. Per FERC's request, quantitative analysis regarding the impact of different flows to the 19 cultural resource sites downstream of Harris Dam were also filed in Appendix J of the PLP, which was filed as "privileged". Although the draft HPMP was filed concurrent with the PLP, the draft HPMP is a separate filing and not specified under section 5.16(e). Due to the sensitive nature of the material and in accordance with Section 304 of the NHPA, Alabama Power filed the HPMP, associated appendices, and consultation record as "privileged". A copy of the draft HPMP and consultation record was distributed to limited stakeholders, who may submit comments directly to harrisrelicensing@southernco.com within **60 days** of the filing (or August 30, 2021) as specified in the HPMP cover letter. Stakeholders may provide comments on the cultural resources evaluation contained in the PLP in accordance with Section 5.16(e) which provides a 90 day comment period on the PLP (or Monday, September 27, 2021).

[7] Accession No. 20210629-5086

FERC Comment:

During the USR Meeting, Bryant Celestine of the Alabama-Coushatta Tribe of Texas requested that both the Alabama-Coushatta Tribe and the Coushatta Tribe of Louisiana be consulted about potential Traditional Cultural Properties (TCPs) within the project's area of potential effects. Please consult with these tribes regarding the need, timeline, and process for identifying TCPS and include any details about the TCP identification in the draft HPMP. In the draft HPMP include the full record of consultation with Tribes, including the Alabama-Coushatta Tribe of Texas and the Coushatta Tribe of Louisiana.

Alabama Response:

Following the USR meeting, Alabama Power contacted the Alabama-Coushatta Tribe of Texas, the Coushatta Tribe of Louisiana, and the Alabama-Quassarte Tribal Town regarding potential TCP consultation. The complete HAT 6 consultation record from April 2018 to June 2021 was filed with the draft HPMP[8].

[8] Accession No. 20210629-5086

ARA Comments submitted June 11, 2021

ARA Comment:

ARA disagrees with the statements of the Licensee's representatives contained in the Updated Study Report Meeting Summary that "the temperature regime of the river below Harris Dam is not much different from a warm-water fishery" and that "there does not appear to be a strong case for making a temperature modification". These comments represent Licensee's evaluation of the temperature data collected as part of the study prepared for this relicensing and not an overall scientific consensus. The Tallapoosa River below Harris has been rigorously studied over the past 25 years, and the Final Aquatic Resources Study, including Auburn University's bioenergetic modeling and temperature analysis, is only one of a number of studies.

Based on prior extensive studies surveying a wide variety of fishes and macroinvertebrates below Harris and based on the water temperature concerns put forth by resource agencies, enough evidence exists of the temperature impacts created by the hypolimnetic releases from Harris to justify discussion of the options available to remedy the current thermal regime. The following is a brief summarization of the considerable research pointing to ecological problems caused by low water temperatures below Harris:

- *Nesting success for Redbreast Sunfish was negatively related to both peaking power generation and depressed water temperatures (Andress 2002).*
- *Strongly fluctuating flows and decreased water temperatures negatively affect survival and early growth of age-0 Channel Catfish and Alabama Bass. Mortality was highest in treatments with decreased water temperatures, indicating that variation of the thermal regime could have significant impacts on survival of juvenile Channel Catfish and Alabama Bass. Daily growth rates were also lower in treatments with decreased water temperatures. Data also suggest that growth and survival may be impacted more by fluctuations in temperature versus flow variation (Goar 2013).*
- *Improving flow and temperature criteria from Harris could enhance growth and hatch success of sport fishes (Irwin and Goar 2015).*
- *Thermal spawning conditions for Channel Catfish occurred every year in unregulated reach but in only 7 out of 12 years in regulated river segment and occurred earlier in the year in regulated reaches (Lloyd et al. 2017)*
- *Flow and temperature remain in a non-natural state in regulated reaches downstream of Harris, and the macroinvertebrate community in regulated reaches shows many dissimilarities to communities from unregulated river reaches (Irwin 2019).*

The detailed, long-term documented impacts on aquatic life due to excessively cold temperatures, temperature fluctuations, and flow fluctuations from the Harris project are at odds with the conclusions drawn by Licensee in the USR Meeting Summary and support the contention that temperature modifications are in fact needed.

Most recently, the US Geological Survey's Open File Report from 2019 ("USGS Report") recaps the history of the biological studies and monitoring below Harris and firmly links water temperature to detrimental effects on fishes and macroinvertebrates below the Harris project. The USGS Report clearly points to an unnaturally cooler temperature regime as detrimental to aquatic species: "Our long-term *metapopulation data provide evidence that suggests broadscale negative influences of the dam on species persistence and colonization parameters. Specifically, generation frequency and cool thermal regimes negatively affected fish persistence and colonization, respectively."*

Having broadly studied 38 fish species from 25 sites over a 12-year period below Harris, the authors of the USGS Report write: "Although it has long been recognized that temperatures are altered below R.L. Harris Dam, specific inference regarding the influence on biotic processes has been lacking until this study, which clearly relates colonization rates (that is, recruitment of a species to a site) to increased thermal energy in the river. In addition, our data indicate that there is no downstream recovery for colonization processes such that colonization rates did not increase with distance from the dam." Increasing thermal energy in the river, and thereby increasing colonization rates and recruitment, can only be achieved by adjusting the temperature of releases.

The Final Aquatic Resources Report sourced significant amounts of historic temperature data from regulated and unregulated river segments, but "unregulated and regulated river temperatures were not compared statistically due to limited data from the Heflin gage and a variety of other variables that could contribute to temperature differences between the regulated and unregulated river." To enable a complete evaluation of thermal issues, all available water temperature data should be shared with stakeholders, including Licensee's historic temperature data provided to Auburn University. ARA has requested Licensee's 2000-2018 water temperature data referenced in Section 5.2.2 of the Final Aquatic Resources Report and used in Auburn's water temperature assessment. Licensee responded that its 2000-2018 temperature data will be filed with the Final License Application in November 2021. We request that all temperature data be made available to stakeholders as soon as possible since temperature has been a long-time area of concern.

Alabama Power Response:

Alabama Power disagrees with ARA's position that "enough evidence exists of the temperature impacts created by the hypolimnetic releases from Harris to justify discussion of the options available to remedy the current thermal regime". Alabama Power's review of the long-term record of water temperatures below Harris, comparisons with recent water temperature records from unregulated sites upstream of Harris, and the results of Auburn's review of fish temperature requirements contained in the *Aquatic Resources Study Report* support the referenced statements by Jason Moak of Kleinschmidt Associates. Temperature data from 2000-2018 is being filed concurrent with this response. Alabama Power agrees that previous studies indicated some effects on aquatic resources from water temperature and/or flow, though many of those studies show both negative and positive effects depending on the species and life stage. In addition, to our knowledge, none of the previous studies included an analysis and/or comparison of the temperature regime in the Tallapoosa River below Harris to reference sites. Alabama Power notes that the intent of the Aquatic Resources Study was to supplement the research conducted prior to relicensing, specifically those studies conducted by U.S. Geological Survey (USGS) and summarized in the 2019 USGS report[9], and to fill information gaps identified by Alabama Power, ADCNR, and other stakeholders during the 2018-2019 development of study plans.

[9] Available at: https://pubs.usgs.gov/of/2019/1026/ofr20191026.pdf.

The aquatic resources and water temperature data provided on the record will facilitate FERC's ability to review and conduct their own independent analysis of the temperature effects in the Tallapoosa River below Harris Dam, given Alabama Power's proposed operations and PME measures. Results of the Downstream Aquatic Habitat Study and Phase 2 Downstream Release Alternatives Study indicate that flow modifications – a continuous minimum flow – would have beneficial effects on aquatic resources by providing a reduction in daily and sub-daily water temperature fluctuations.

ATTACHMENT B

Alabama Power’s Response to Alabama Rivers Alliance Dispute on the Battery Energy Storage Study for the R.L. Harris Hydroelectric Project

On April 12, 2021, Alabama Power Company (Alabama Power) filed its Updated Study Report for the R.L. Harris Hydroelectric Project (Harris Project) (FERC No. 2628-065) and draft and final study reports, including the *Battery Energy Storage System (BESS) Study Report*,[10] which FERC recommended in its August 10, 2020 Determination on Study Modifications. On June 11, 2021, Alabama Rivers Alliance (ARA) filed a letter commenting on Alabama Power's Updated Study Report Meeting Summary that included a study dispute with respect to the *BESS Study Report*[11].

In a June 11, 2020 letter filed with FERC, ARA proposed that Alabama Power conduct a BESS study for the Harris Project. In a July 10, 2020 response to that study request, Alabama Power declined to conduct the BESS study, explaining that the integration of a BESS at Harris Dam is not economically feasible and providing information demonstrating significant technical and other challenges associated with installing a BESS at Harris Dam. However, in its August 10, 2020 Determination on Study Modifications, FERC staff recommended that Alabama Power conduct a BESS study for Harris. Specifically, FERC staff recommended that Alabama Power:

1. Evaluate two release alternatives: (a) a 50 percent reduction in peak releases associated with installing one 60 MW battery unit, and (b) a proportionately smaller reduction in peak releases associated with installing a smaller MW battery unit (i.e., 5, 10 or 20 MW battery);
2. Include in its cost estimates for installing a BESS any specific structural changes, any changes in turbine-generator units, and costs needed to implement each battery storage type; and
3. Evaluate how each of the release alternatives would affect recreation and aquatic resources in the project reservoir and downstream.

Though Alabama Power's July 10, 2020 letter to FERC had provided sufficient information demonstrating that a BESS could not be economically integrated at Harris Dam, Alabama Power agreed to conduct the limited study as recommended by FERC in order to complete the Harris Project relicensing record with respect to a BESS and provide FERC "information that does not already exists and is needed for our analysis". To that end, Alabama Power's BESS study report submitted to FERC on April 12, 2021 evaluated each criterion recommended for study by FERC. The study report demonstrates that because integrating a BESS at the Harris Project in order to mitigate the effects of peaking would require significant redesign and redevelopment of the project, a BESS is not a reasonable alternative that necessitates further consideration[12]. Despite the fact that Alabama Power performed the BESS study consistent with the FERC-recommended criteria, ARA's June 11, 2021 comment letter disputes whether Alabama Power conducted the study in accordance with FERC's August 10, 2020 Determination on Study Modifications.

On June 9, 2021, FERC staff sent Alabama Power a detailed letter commenting on the Harris USR and the associated draft and final study reports. Alabama Power notes that FERC staff did not provide any

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[10] Accession No. 20210412-5747

[11] Alabama Power also notes that ARA provided comments on May 26, 2021 on the draft *BESS Report*. Alabama Power will address these comments in the final *BESS Report* to be filed with the FLA.

[12] In the context of downstream release alternatives, FERC stated in the August 10, 2020 Determination on Study Modifications that "… run-of-river mode would likely require significant redesign and redevelopment of the project (e.g. structural modifications, intake design, turbine retrofits, etc.) … run-of-river operation is not feasible at the Harris Project without a major redesign and redevelopment of the project, we do not consider it to be a reasonable alternative for further consideration …." (See p. B-4).

comments in their June 9, 2021 letter regarding insufficient information or inadequate analyses in the BESS Study Report. There is no suggestion in the comment letter that FERC staff believes the BESS study was not conducted as it was recommended to Alabama Power.

From a close reading of ARA's June 11, 2021 letter, it does not appear that ARA is attempting to make the case that Alabama Power's study report fails to meet the criteria of the recommended study. Instead, ARA identifies new or expanded topics for further study. For example, ARA's June 11, 2021 comment letter asks that FERC require Alabama Power to: 1) evaluate an independent purchase power agreement financing alternative; 2) to explore the possibility of siting a BESS somewhere on Alabama Power's transmission system other than at Harris Dam; 3) to evaluate potential incentives that could reduce costs of a BESS; 4) to engage in a full determination of the costs of modifying or replacing one of the turbines to enable installation of a BESS; and 5) to evaluate the potential benefits that adding a BESS could provide to Alabama Power's distribution system, etc. These topics go far beyond the limited scope of the study recommended by FERC and can more accurately be viewed as a request for additional studies. However, ARA fails to meet the requirements in 18 CFR § 5.15(e) for requesting new studies at this late stage of the Harris relicensing proceeding and fails to show good cause for why these additional studies are justified by one of the criteria in §5.15(e).

Because Alabama Power's *BESS Study Report* makes clear that a BESS is not economically feasible or a reasonable alternative at the Harris Project, and for the other reasons cited above, ARA's dispute with respect to Alabama Power's *BESS Study Report* and its attempt to expand the scope of that study should be rejected.

From: Anderegg, Angela Segars
Sent: Monday, July 12, 2021 11:09 AM
To: Sarah Salazar
Subject: RE: Guidance for Filers: How to Transmit Files that cannot be eFiled to FERC

Hi Sarah,

I'll give Dave a heads up to be on the lookout for the email today and ask him to let you know when the files have been uploaded. Because they are such large files, it make take a while to get them up there.

Also, we're putting a flash drive with all 3 models in the mail today and I'll send you a tracking number when they are on the way.

Thanks!

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From: Sarah Salazar <Sarah.Salazar@ferc.gov>
Sent: Monday, July 12, 2021 11:02 AM
To: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Subject: RE: Guidance for Filers: How to Transmit Files that cannot be eFiled to FERC

Hello again Angie,

It looks like our front office staff will send an email to Dave Anderson, the APC staff who will be uploading the files, and FERC staff with access to the files sometime later today. The email will have information on accessing the external SP site. Could you ask Dave to email me after he accesses the SP site and finishes uploading the files? Then we will download the files and notify Dave that the files were received. Let us know if you have any questions or if Dave experiences any glitches and we can troubleshoot.

Thanks,

Sarah L. Salazar ✧ *Environmental Biologist* ✧ *Federal Energy Regulatory Commission* ✧ *888 First St, NE, Washington, DC 20426* ✧ *(202) 502-6863*

From: Sarah Salazar
Sent: Monday, July 12, 2021 11:15 AM
To: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Subject: RE: Guidance for Filers: How to Transmit Files that cannot be eFiled to FERC

Good morning Angie,

Could you include all 3 models in the flash drive just in case, assuming they all fit? I will have to contact our front office staff again to find out how/when you will know that you have access to the SP site to upload those HEC files. I'll reach out to them and get back to you. Thanks in advance for your patience with this process.

Sarah L. Salazar ✧ Environmental Biologist ✧ Federal Energy Regulatory Commission ✧ 888 First St, NE, Washington, DC 20426 ✧ (202) 502-6863

From: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Sent: Friday, July 09, 2021 4:37 PM
To: Sarah Salazar <Sarah.Salazar@ferc.gov>
Subject: RE: Guidance for Filers: How to Transmit Files that cannot be eFiled to FERC

Will do! While we're in the process of adding the files to your flash drive (which takes a minute)…would you like us to go ahead and include all 3 models or EFDC only? And how/when will we know we have access to the SP site to start uploading the Res-Sim and RAS files?

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From: Sarah Salazar <Sarah.Salazar@ferc.gov>
Sent: Friday, July 9, 2021 9:49 AM
To: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Subject: RE: Guidance for Filers: How to Transmit Files that cannot be eFiled to FERC

Thank you for the update Angie. Please do let me know once you have a tracking number for the package with the EFDC model files. I have to share the tracking information with our front office staff and there are a series of other steps we have to follow after that to gain access to the files.

Thanks in advance,

Sarah L. Salazar ✧ Environmental Biologist ✧ Federal Energy Regulatory Commission ✧ 888 First St, NE, Washington, DC 20426 ✧ (202) 502-6863

Please consider the environment before printing this email.

From: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Sent: Tuesday, June 29, 2021 3:33 PM
To: Sarah Salazar <Sarah.Salazar@ferc.gov>
Subject: RE: Guidance for Filers: How to Transmit Files that cannot be eFiled to FERC

Hi Sarah,

As you can see from the attached letter that we filed today, we were unable to e-File the HEC-RAS, HEC-ResSim, and EFDC models. As such, we are planning on submitting the HEC-RAS and HEC-ResSim models via FERC's external SharePoint site. The information requested in the guidance document is below:

- Project Number: R.L. Harris Project (FERC No. 2628)
- Description of Files: “zip” files of HEC-RAS and HEC-ResSim models used for Harris relicensing studies, including instruction on “unzipping” and use
- Name and e-mail address of staff: Dave Anderson, dkanders@southernco.com
- List of all security classes: All files are public
- Accession Number of Cover Letter: 20210629-5073

Also, because the files associated with the EFDC model cannot be broken down into <2GB files, we will be providing the EFDC model via the U.S. Postal Service and will send you the information for that submittal when we get a tracking number for the package.

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From: Sarah Salazar <Sarah.Salazar@ferc.gov>
Sent: Thursday, June 17, 2021 2:35 PM
To: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Subject: RE: Guidance for Filers: How to Transmit Files that cannot be eFiled to FERC

EXTERNAL MAIL: Caution Opening Links or Files

Hi Angie,

I checked with our team and some of our staff have successfully downloaded and used similar models/associated files from our external Sharepoint site and applicants’ sharepoint sites for other projects. Also, it might actually be more difficult for us to use the flash drive option. Could you try uploading all the files e-library can’t accept to our external Sharepoint site (for us) and your relicensing website (for other stakeholders) and if we run into any glitches we could try the other methods next? If you need technical assistance with uploading the files to our external sharepoint site I can help connect you with someone in our FERC Online/IT Support next week.

Thanks,

Sarah L. Salazar ✧ *Environmental Biologist* ✧ *Federal Energy Regulatory Commission* ✧ *888 First St, NE, Washington, DC 20426* ✧ *(202) 502-6863*
Please consider the environment before printing this email.

From: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Sent: Thursday, June 17, 2021 12:47 PM
To: Sarah Salazar <Sarah.Salazar@ferc.gov>
Subject: RE: Guidance for Filers: How to Transmit Files that cannot be eFiled to FERC

Hi Sarah,

Thank you for following up. We've reviewed the files associated with the models and everything associated with the HEC-ResSim and HEC-RAS can be broken down into <2GB files. In our filing, we'll explain what is what and direct everyone to our website to download if they want them.

The EFDC model files include 5, 25 GB files that cannot be broken down or compressed any further. We may be able to put these on our website but they will require a strong network connection and quite a bit of time to download. Would you prefer us send the EFDC models to FERC via flash drive? We can make a note in our filing that we can provide this model via flash drive to stakeholders upon request.

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From: Sarah Salazar <Sarah.Salazar@ferc.gov>
Sent: Wednesday, June 16, 2021 3:18 PM
To: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Subject: RE: Guidance for Filers: How to Transmit Files that cannot be eFiled to FERC

EXTERNAL MAIL: Caution Opening Links or Files

Good afternoon Angie,

Following up on the filing guidance for the models, it came to our attention that our external sharepoint site is not publicly accessible. Given that the Corps and Alabama Rivers Alliance also requested access to the models (including any inputs, outputs, and assumptions), would it be possible for you to share these files via the APC relicensing website as well? If so, when you file the models with the Commission, could you also indicate in the cover letter for the associated filings on e-library how stakeholders can access/request access to such files? Please let me know if you have any questions or concerns.

Thanks in advance,

Sarah L. Salazar ✧ *Environmental Biologist* ✧ *Federal Energy Regulatory Commission* ✧ *888 First St, NE, Washington, DC 20426* ✧ *(202) 502-6863*
Please consider the environment before printing this email.

From: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Sent: Thursday, June 10, 2021 4:44 PM
To: Sarah Salazar <Sarah.Salazar@ferc.gov>
Subject: RE: Guidance for Filers: How to Transmit Files that cannot be eFiled to FERC

Thanks! This is very helpful. I'll let you know if I have any questions.

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From: Sarah Salazar <Sarah.Salazar@ferc.gov>
Sent: Thursday, June 10, 2021 1:26 PM
To: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Subject: Guidance for Filers: How to Transmit Files that cannot be eFiled to FERC

EXTERNAL MAIL: Caution Opening Links or Files

Hi Angie,

With help from a colleague, I found the attached guidance that was recently developed to provide options for filing documents that cannot be submitted to e-library. My colleague stated that our external sharepoint site works well and recommends it, but we can use the other filing options as well. Please review this guidance and let us know if you have follow-up questions.

Best,

Sarah L. Salazar ✧ *Environmental Biologist* ✧ *Federal Energy Regulatory Commission* ✧ *888 First St, NE, Washington, DC 20426* ✧ *(202) 502-6863*

Please consider the environment before printing this email.

APC Harris Relicensing

From: Jack West <jwest@alabamarivers.org>
Sent: Tuesday, July 13, 2021 11:44 AM
To: APC Harris Relicensing
Subject: Re: Request of Harris Models

Hi Angie,

Thanks for mailing the flash drive with models. Just confirming that I received it today.

Best,

On Sun, Jul 11, 2021 at 3:52 PM APC Harris Relicensing <g2apchr@southernco.com> wrote:

> Hi Jack,
>
> We mailed a flash drive to the address below via FedEx this past Friday. You should receive it by Tuesday. We're going to keep an eye on the shipment, but please let me know if you don't receive it.
>
> Thanks,
>
> **Angie Anderegg**
>
> Hydro Services
>
> (205)257-2251
>
> arsegars@southernco.com
>
> ---
>
> **From:** APC Harris Relicensing <g2apchr@southernco.com>
> **Sent:** Tuesday, July 6, 2021 3:04 PM
> **To:** Jack West <jwest@alabamarivers.org>
> **Subject:** RE: Request of Harris Models
>
> Hi Jack,

We’re copying the models to flash drives (it takes a minute) and I’ll send you a note when we drop yours in the mail. It should be by the end of the week. We haven’t planned on a follow up meeting for the PLP, but I’ll let everyone know a few weeks out if/when we do.

I hope you had a great 4th!

Angie Anderegg

Hydro Services

(205)257-2251

arsegars@southernco.com

From: Jack West <jwest@alabamarivers.org>
Sent: Thursday, July 1, 2021 1:08 PM
To: APC Harris Relicensing <g2apchr@southernco.com>
Subject: Request of Harris Models

Hi Angie,

I'm responding to the message sent out a few days ago about stakeholders' ability to request models and outputs. ARA would like to request copies of the HEC-ResSim, HEC-RAS and EFDC models and outputs, which can be mailed to the following address:

Alabama Rivers Alliance

ATTN: Jack West

2014 6th Ave North

Suite 200

Birmingham, AL 35203

Also, I saw the PLP filing and am wondering if there will be a stakeholder meeting scheduled to discuss APC's proposal. Currently, I don't see one on the relicensing calendar but hope that there will be an opportunity for an in-person stakeholder meeting to go over and discuss the PLP. Please let me know if that is in the works. Have a great holiday weekend.

Thanks,

--

Jack West, Esq.

Policy and Advocacy Director

Alabama Rivers Alliance

2014 6th Ave N, Suite 200

Birmingham, AL 35203

205-322-6395

www.alabamarivers.org [alabamarivers.org]

Celebrating more than 20 years of protecting Alabama's 132,000 miles of rivers and streams!

--

Jack West, Esq.
Policy and Advocacy Director
Alabama Rivers Alliance
2014 6th Ave N, Suite 200
Birmingham, AL 35203
205-322-6395
www.alabamarivers.org [alabamarivers.org]

Celebrating more than 20 years of protecting Alabama's 132,000 miles of rivers and streams!

APC Harris Relicensing

From: Jesse Cunningham <jessecunningham@msn.com>
Sent: Thursday, July 22, 2021 12:40 PM
To: APC Harris Relicensing
Subject: Re: HAT 1 - Harris Relicensing

Got it Monday, thanks.

Jesse Cunningham

From: APC Harris Relicensing <g2apchr@southernco.com>
Sent: Thursday, July 22, 2021 12:11:21 PM
To: Jesse Cunningham <jessecunningham@msn.com>
Subject: RE: HAT 1 - Harris Relicensing

Hi Jesse,

So I forgot to let you know it was in the mail. It was sent last Friday. Let me know if you didn't receive it.

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From: Jesse Cunningham <jessecunningham@msn.com>
Sent: Thursday, July 15, 2021 7:12 PM
To: APC Harris Relicensing <g2apchr@southernco.com>
Subject: Re: HAT 1 - Harris Relicensing

Ok. Thanks.

Jesse Cunningham

From: APC Harris Relicensing <g2apchr@southernco.com>
Sent: Thursday, July 15, 2021 10:59:54 AM
To: Jesse Cunningham <jessecunningham@msn.com>
Subject: RE: HAT 1 - Harris Relicensing

Good deal. I'll let you know when it's in the mail.

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From: Jesse Cunningham <jessecunningham@msn.com>
Sent: Wednesday, July 14, 2021 2:55 PM
To: APC Harris Relicensing <g2apchr@southernco.com>
Subject: Re: HAT 1 - Harris Relicensing

Thanks Angie. We would like to have the three model files for future files and use (if necessary).

Jesse Cunningham

From: APC Harris Relicensing <g2apchr@southernco.com>
Sent: Wednesday, July 14, 2021 11:05:17 AM
To: Jesse Cunningham <jessecunningham@msn.com>
Subject: RE: HAT 1 - Harris Relicensing

Hi Jesse,

The flash drive would have the HEC-ResSim, HEC-RAS and EFDC models that we use to conduct the operations studies. We are happy to send one to you, but I wanted to make sure you knew that these are all the modeling files themselves. The study results reports can be found on our relicensing website in the HAT 1 - Project Operations [na01.safelinks.protection.outlook.com] [na01.safelinks.protection.outlook.com] [na01.safelinks.protection.outlook.com] folder. Below is a list of the three operations studies and the associated reports. If you would still like the models, just let me know.

Operating Curve Change Feasibility Analysis

- 2020-08-31 Final Op Curve Feasibility Analysis Report
- 2021-04-12 Draft Operating Curve Feasibility Analysis Phase 2 Report

Downstream Release Alternatives

- 2020-07-27 Final Downstream Release Alternatives Report
- 2021-04-12 Draft Downstream Release Alternatives Phase 2 Report

Battery Energy Storage System

- 2021-04-12 Draft BESS report

Thanks!

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From: Jesse Cunningham <jessecunningham@msn.com>
Sent: Tuesday, July 13, 2021 4:04 PM
To: APC Harris Relicensing <g2apchr@southernco.com>
Subject: HAT 1 - Harris Relicensing

Angie,

The Lake Martin HOBOs would like to review the three studies you offered for our review. Please send the Flash Drive to:

Lake Martin HOBOs

Jesse Cunningham
782 Ridge Road
Dadeville, Alabama 36853

Thanks,

Jesse Cunningham
H: 256-825-0919
C: 256-307-5755
HOBO: jesse@lakemartinhobos.com

APC Harris Relicensing

From: Sarah Salazar <Sarah.Salazar@ferc.gov>
Sent: Thursday, August 5, 2021 1:37 PM
To: Anderegg, Angela Segars; Anderson, Dave
Subject: RE: Guidance for Filers: How to Transmit Files that cannot be eFiled to FERC

EXTERNAL MAIL: Caution Opening Links or Files

Good afternoon Angie and Dave,

I just want to confirm that I was able to download all the HEC-RAS and HEC-ResSim files from the external sharepoint site soon after you uploaded them. Also, last Monday our front office staff retrieved the flash drive and shared the remaining (EFDC) modeling files with us. I was able to copy them to another folder for our use by the end of the week.

Thank you,

Sarah L. Salazar ✧ *Environmental Biologist* ✧ *Federal Energy Regulatory Commission* ✧ *888 First St, NE, Washington, DC 20426* ✧ *(202) 502-6863*
Please consider the environment before printing this email.

From: Sarah Salazar
Sent: Tuesday, July 13, 2021 3:20 PM
To: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Cc: Anderson, Dave <dkanders@southernco.com>
Subject: RE: Guidance for Filers: How to Transmit Files that cannot be eFiled to FERC

Thank you Angie. I notified our front office staff. I am not sure if they will be available to go to the office today, but I will let you know when they receive it.

Thanks again,

Sarah L. Salazar ✧ *Environmental Biologist* ✧ *Federal Energy Regulatory Commission* ✧ *888 First St, NE, Washington, DC 20426* ✧ *(202) 502-6863*
Please consider the environment before printing this email.

From: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Sent: Tuesday, July 13, 2021 11:48 AM
To: Sarah Salazar <Sarah.Salazar@ferc.gov>
Cc: Anderson, Dave <dkanders@southernco.com>
Subject: RE: Guidance for Filers: How to Transmit Files that cannot be eFiled to FERC

Hi Sarah,

We mailed the flash drive containing all three models via US Postal Service yesterday. It was 1-day delivery, so it should arrive today. Tracking number and details are below.

Tracking Number: EJ569533538US
Project Number: R.L. Harris Project (FERC No. 2628)
Description of Flash Drive: “zip” files of HEC-RAS, HEC ResSim, and EFDC models used for Harris relicensing studies, including instructions on “unzipping” and use

List of all security classes: All files are public
Access Number of Cover Letter: 20210629-5073

Thanks!

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From: Sarah Salazar <Sarah.Salazar@ferc.gov>
Sent: Monday, July 12, 2021 4:38 PM
To: Anderson, Dave <DKANDERS@SOUTHERNCO.COM>; Anderegg, Angela Segars <ARSEGARS@southernco.com>
Subject: RE: Guidance for Filers: How to Transmit Files that cannot be eFiled to FERC

EXTERNAL MAIL: Caution Opening Links or Files

Thank you Dave, I see the files and will get back to you as soon as we finish downloading them (tomorrow at the earliest).

Thanks again,

Sarah L. Salazar ✧ *Environmental Biologist* ✧ *Federal Energy Regulatory Commission* ✧ *888 First St, NE, Washington, DC 20426* ✧ *(202) 502-6863*
Please consider the environment before printing this email.

From: Anderson, Dave <DKANDERS@SOUTHERNCO.COM>
Sent: Monday, July 12, 2021 5:20 PM
To: Anderegg, Angela Segars <ARSEGARS@southernco.com>; Sarah Salazar <Sarah.Salazar@ferc.gov>
Subject: RE: Guidance for Filers: How to Transmit Files that cannot be eFiled to FERC

Sarah,

The HEC-RAS and HEC-ResSim files have been uploaded to the FERC SharePoint site.

Dave

From: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Sent: Tuesday, June 29, 2021 2:33 PM
To: Sarah Salazar <Sarah.Salazar@ferc.gov>
Subject: RE: Guidance for Filers: How to Transmit Files that cannot be eFiled to FERC

Hi Sarah,

As you can see from the attached letter that we filed today, we were unable to e-File the HEC-RAS, HEC-ResSim, and EFDC models. As such, we are planning on submitting the HEC-RAS and HEC-ResSim models via FERC's external SharePoint site. The information requested in the guidance document is below:

- Project Number: R.L. Harris Project (FERC No. 2628)
- Description of Files: "zip" files of HEC-RAS and HEC-ResSim models used for Harris relicensing studies, including instruction on "unzipping" and use

- Name and e-mail address of staff: Dave Anderson, dkanders@southernco.com
- List of all security classes: All files are public
- Accession Number of Cover Letter: 20210629-5073

Also, because the files associated with the EFDC model cannot be broken down into <2GB files, we will be providing the EFDC model via the U.S. Postal Service and will send you the information for that submittal when we get a tracking number for the package.

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From: Sarah Salazar <Sarah.Salazar@ferc.gov>
Sent: Thursday, June 17, 2021 2:35 PM
To: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Subject: RE: Guidance for Filers: How to Transmit Files that cannot be eFiled to FERC

EXTERNAL MAIL: Caution Opening Links or Files

Hi Angie,

I checked with our team and some of our staff have successfully downloaded and used similar models/associated files from our external Sharepoint site and applicants' sharepoint sites for other projects. Also, it might actually be more difficult for us to use the flash drive option. Could you try uploading all the files e-library can't accept to our external Sharepoint site (for us) and your relicensing website (for other stakeholders) and if we run into any glitches we could try the other methods next? If you need technical assistance with uploading the files to our external sharepoint site I can help connect you with someone in our FERC Online/IT Support next week.

Thanks,

Sarah L. Salazar ✧ *Environmental Biologist* ✧ *Federal Energy Regulatory Commission* ✧ *888 First St, NE, Washington, DC 20426* ✧ *(202) 502-6863*
Please consider the environment before printing this email.

From: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Sent: Thursday, June 17, 2021 12:47 PM
To: Sarah Salazar <Sarah.Salazar@ferc.gov>
Subject: RE: Guidance for Filers: How to Transmit Files that cannot be eFiled to FERC

Hi Sarah,

Thank you for following up. We've reviewed the files associated with the models and everything associated with the HEC-ResSim and HEC-RAS can be broken down into <2GB files. In our filing, we'll explain what is what and direct everyone to our website to download if they want them.

The EFDC model files include 5, 25 GB files that cannot be broken down or compressed any further. We may be able to put these on our website but they will require a strong network connection and quite a bit of time to download. Would you prefer us send the EFDC models to FERC via flash drive? We can make a note in our filing that we can provide this model via flash drive to stakeholders upon request.

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From: Sarah Salazar <Sarah.Salazar@ferc.gov>
Sent: Wednesday, June 16, 2021 3:18 PM
To: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Subject: RE: Guidance for Filers: How to Transmit Files that cannot be eFiled to FERC

Good afternoon Angie,

Following up on the filing guidance for the models, it came to our attention that our external sharepoint site is not publicly accessible. Given that the Corps and Alabama Rivers Alliance also requested access to the models (including any inputs, outputs, and assumptions), would it be possible for you to share these files via the APC relicensing website as well? If so, when you file the models with the Commission, could you also indicate in the cover letter for the associated filings on e-library how stakeholders can access/request access to such files? Please let me know if you have any questions or concerns.

Thanks in advance,

Sarah L. Salazar ✧ *Environmental Biologist* ✧ *Federal Energy Regulatory Commission* ✧ *888 First St, NE, Washington, DC 20426* ✧ *(202) 502-6863*
Please consider the environment before printing this email.

From: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Sent: Thursday, June 10, 2021 4:44 PM
To: Sarah Salazar <Sarah.Salazar@ferc.gov>
Subject: RE: Guidance for Filers: How to Transmit Files that cannot be eFiled to FERC

Thanks! This is very helpful. I'll let you know if I have any questions.

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From: Sarah Salazar <Sarah.Salazar@ferc.gov>
Sent: Thursday, June 10, 2021 1:26 PM
To: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Subject: Guidance for Filers: How to Transmit Files that cannot be eFiled to FERC

Hi Angie,

With help from a colleague, I found the attached guidance that was recently developed to provide options for filing documents that cannot be submitted to e-library. My colleague stated that our external sharepoint site works well and recommends it, but we can use the other filing options as well. Please review this guidance and let us know if you have follow-up questions.

Best,

Sarah L. Salazar ✧ *Environmental Biologist* ✧ *Federal Energy Regulatory Commission* ✧ *888 First St, NE, Washington, DC 20426* ✧ *(202) 502-6863*

Please consider the environment before printing this email.

From: Sarah Salazar <Sarah.Salazar@ferc.gov>
Sent: Thursday, September 2, 2021 3:17 PM
To: Anderegg, Angela Segars
Cc: Anderson, Dave
Subject: RE: Update - model files

EXTERNAL MAIL: Caution Opening Links or Files

Thank you so much Angie and Dave. That is great news! I really appreciate your help and patience! I will let Jay know to expect the mailing from you.

Thank you again and I hope you enjoy Labor Day weekend!

Sarah L. Salazar ✧ *Environmental Biologist* ✧ *Federal Energy Regulatory Commission* ✧ *888 First St, NE, Washington, DC 20426* ✧ *(202) 502-6863*
Please consider the environment before printing this email.

From: Anderegg, Angela Segars <ARSEGARS@southernco.com>
Sent: Thursday, September 02, 2021 4:06 PM
To: Sarah Salazar <Sarah.Salazar@ferc.gov>
Cc: Anderson, Dave <dkanders@southernco.com>
Subject: RE: Update - model files

Hi Sarah,

No problem at all sending all of the models to Jay via flash drive. We've verified that the HEC-RAS files are not corrupted and are creating a new flash drive as I type (it is super slow). We'll put the flash drive in the mail tomorrow via FedEx.

Thanks,

Angie Anderegg
Hydro Services
(205)257-2251
arsegars@southernco.com

From: Sarah Salazar <Sarah.Salazar@ferc.gov>
Sent: Thursday, September 2, 2021 1:49 PM
To: Anderegg, Angela Segars <ARSEGARS@southernco.com>; Anderson, Dave <DKANDERS@SOUTHERNCO.COM>
Subject: Update - model files

EXTERNAL MAIL: Caution Opening Links or Files

Hello Angie and Dave,

Following up on my call with Angie a little while ago, I've now exhausted all the options for sharing the modeling files with our contract staff. My last attempt was unsuccessful and it appears that my computer is not going to be able to share the HEC-RAS files, or the four largest HEC-ResSim files with them. So far I was only able to share the two smaller HEC-ResSim files. Given that the EFDC model files are even larger, I doubt my computer could handle sharing them. If it is possible to send a flash drive to our contract staff, could you please include a copy of all the models for them? If this option is feasible, the contractor's name and address (for mailings anytime tomorrow through next week) is as follows:

Jay Greska
11 Warren Street
Medford, MA 02155
617-960-5021

If this option isn't feasible, I can work with our front office staff to set up a new external sharepoint site for uploading the HEC-models. In that case they would send you a new link via email. Please accept my apologies for having to ask for another copy of these files. We didn't anticipate these IT issues.

Thank you very much for your help.

Sarah L. Salazar ✧ *Environmental Biologist* ✧ *Federal Energy Regulatory Commission* ✧ *888 First St, NE, Washington, DC 20426* ✧ *(202) 502-6863*

Please consider the environment before printing this email.

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426
October 1, 2021

OFFICE OF ENERGY PROJECTS

Project No. 2628-065 – Alabama
R.L. Harris Hydroelectric Project
Alabama Power Company

VIA Electronic Mail

Angie Anderegg
Harris Relicensing Project Manager
Alabama Power Company
ARSEGARS@southernco.com

Subject: Comments on Preliminary Licensing Proposal for the R.L. Harris Hydroelectric Project

Dear Ms. Anderegg:

Pursuant to section 5.16(e) of the Commission's regulations, this letter contains Commission staff's comments on Alabama Power Company's Preliminary Licensing Proposal for the R.L. Harris Hydroelectric Project filed on June 29, 2021.

Staff comments are provided in Schedule A and should be addressed in the final license application.

If you have any questions, please contact Sarah Salazar at (202) 502-6863 or sarah.salazar@ferc.gov.

Sincerely,

Stephen Bowler

Stephen Bowler, Chief
South Branch
Division of Hydropower Licensing

Enclosure: Schedule A

Schedule A: Staff Comments on Preliminary Licensing Proposal

General

1. Throughout the preliminary licensing proposal (PLP), many text citations refer to information sources that are not provided in the list of references in section 14 of the PLP. Instead, many text citations in the PLP refer to the pre-application document (PAD), study reports, and/or proposed draft resource plans for the full citations for these information sources. For example, many in-text citations provide the author(s) and year of the original source of the information, followed by "…as cited in Alabama Power and Kleinschmidt 2018," which is the citation for the PAD. To facilitate review of the license application, please include in-text citations to original sources and a complete list of citations for all the original sources of information that will be used in the references section.

2. The PLP includes several figures (e.g., 2-4, 2-5, and 3-1) which denote Alabama Power and/or the U.S. Army Corps of Engineers' (Corps) hydroelectric projects in the Alabama-Coosa-Tallapoosa River Basin. Horseshoe Bend and Jaybird Landing were identified as the hydraulic extents of various study areas. These locations, as well as two main upstream U.S. Geological Survey (USGS) gages (i.e., Heflin and Newell), are mentioned throughout the PLP as reference points but are not labeled on the figures. Please identify these locations on all maps in the license application, as appropriate.

3. The PLP and draft and final study reports include maps that display multiple geographic information system (GIS) data layers that were developed during the pre-filing study phase of the relicensing process for the Harris Project. Having access to these GIS data layers would facilitate Commission staff's analysis of the effects of proposed project operation and environmental measures on project resources. Please file the GIS data layers identified in the following table as ArcMap shapefiles with the license application.

Data Layer	Report	Figure
Stream segments	Final Erosion Report Trutta High Definition Stream Survey videos downstream of dam	8
Water Quality Sampling Points	Corrected Water Quality Study_3-21-19	4-1
Flood Boundaries	Final-Water-Quality-Report_4-12-22, Attachment A, Initial Study Report (ISR), Appendix B, ISR Meeting Presentation	Slides 26-31
Average Bank Condition	Final-Water-Quality-Report_4-12-22, Attachment A, ISR, Appendix B, ISR Meeting Presentation	Slide 49

Data Layer	Report	Figure
Worst Bank Condition Areas	Final-Water-Quality-Report_4-12-22, Attachment A, ISR, Appendix B, ISR Meeting Presentation	Slide 50
Alabama Department of Environmental Management (DEM) Monitoring Sites	Final-Water-Quality-Report_4-12-22, Attachment 3, Water Quality Study Report	Figure 3-1
Alabama Water Watch Monitoring Locations	Final-Water-Quality-Report_4-12-22, Attachment 3, Water Quality Study Report	Figure 3-11
Alabama DEM Downstream Monitoring Stations	Final-Water-Quality-Report_4-12-22, Attachment 3, Water Quality Study Report	Figure 4-1
Alabama Cooperative Fish and Wildlife Research Unit Sampling Sites	Final Aquatic Resources Report	Figure 2-2
Level logger Locations	Final Aquatic Resources Report	Figure 3-1
Sites	Final Aquatic Resources Report	Figure 3-1
Hourly Temperature Modeling Data	Final Aquatic Resources Report, Appendix D	Pages 142-237
Tailwater Transect Locations	Final Downstream Aquatic Habitat Report	USR Presentation Slide 20
Mesohabitat Type	Final Downstream Aquatic Habitat Report	Figure 3-2 through 3-7
Tallapoosa River Bathymetric Sources	Final Downstream Release Alternatives (Phase 1) Report	Figure 4-1
785' Contour and 793' Contour	Final Erosion and Sedimentation Report	Figure 2-1 through 2-5
Sedimentation and Erosions Sites	Final Erosion and Sedimentation Report	Figure 2-1 through 2-6
Sedimentation Area	Final Erosion and Sedimentation Report	Figure 2-6 through 2-9
Sedimentation area 2007	Final Erosion and Sedimentation Report	Figure 2-10 through 2-18
Sedimentation area 2015	Final Erosion and Sedimentation Report	Figure 2-10 through 2-19
Streambank Condition Areas	Final Erosion and Sedimentation Report	Figure 3-1

Data Layer	Report	Figure
Little Coon Creek Land Use 2001 and 2016	Final Erosion and Sedimentation Report	Figure 4-1
Left Bank Condition	Final Erosion and Sedimentation Report, Appendix E, Tallapoosa River High Definition Stream Survey Final Report	Figure 12
Stream bank Modification	Final Erosion and Sedimentation Report, Appendix E, Tallapoosa River High Definition Stream Survey Final Report	Figure 13
Left Bank Confidence	Final Erosion and Sedimentation Report, Appendix E, Tallapoosa River High Definition Stream Survey Final Report	Figure 17
Left Bank Condition	Final Erosion and Sedimentation Report, Appendix E, Tallapoosa River High Definition Stream Survey Final Report	Figure 18
Stream bank Modification	Final Erosion and Sedimentation Report, Appendix E, Tallapoosa River High Definition Stream Survey Final Report	Figure 19
Left Bank Confidence	Final Erosion and Sedimentation Report, Appendix E, Tallapoosa River High Definition Stream Survey Final Report	Figure 23
Average Depth	Final Erosion and Sedimentation Report, Appendix E, Tallapoosa River High Definition Stream Survey Final Report	Figure 26
Transect Locations	Final Erosion and Sedimentation Report, Appendix E, Tallapoosa River High Definition Stream Survey Final Report	Figure 35
ADCNR Quail Call Survey Locations	Final Lands Evaluation Report	Figure 4-1
Skyline WMA	Final Lands Evaluation Report	Figure 4-1
Plant Locations	Final Lands Evaluation Report, Appendix D	Figure 2
Wetland Quality files[1]	PLP, Appendix G, Terrestrial Resources, Attachment 1	Wetland Map set

1 – A shapefile for Lake Harris Wetlands was filed on June 29, 2021; however, the file did not include the attribute data with the wetland quality ratings as displayed in the wetland map set in Appendix G of the PLP. Please ensure this information is included.

Protection, Mitigation, and Enhancement (PM&E) Measures

4. Section 3.7, *Existing PM&E Measures*, of the PLP includes table 3-1 which summarizes the PM&E measures implemented at the project during the current license term. Alabama Power's proposed PM&Es are summarized in tables 5-2, 6-5, 7-4, 8-9, 9-4, 10-8, 11-7, 12-1, and 13-1. Some of the descriptions of the existing and proposed PM&E measures are abbreviated to the extent that they are unclear, are inconsistently described in the tables, and/or lack citations to the referenced agreements, plans, programs, policies, and other documents. For example, in the third row of table 3-1, it states "Operate the reservoir for flood control in accordance with the agreement between [the Corps] and Alabama Power," but it doesn't cite to the "agreement" that is referenced. As another example, the seventh row of table 3-1 states "Perform vector control, as necessary," but, it is unclear what "vectors" are controlled, what criteria would trigger the use of control measures, and the types of monitoring and control methods that are used. To facilitate review of the existing and proposed PM&Es in the license application, please update the PM&E tables to include: (1) a repeated header row; (2) a more detailed description of each PM&E that is consistent across all the PM&E tables; and (3) citations to documents (e.g., existing programs, plans, agreements) that are referenced in the PM&Es.

5. Section 5.4, *Proposed Environmental Measures*, of the PLP includes table 5-2, which presents Alabama Power's list of proposed operational and PM&E measures. The list of measures includes monitoring plans that it appears would be developed post-licensing, including the Project Operations and Flow Monitoring Plan, Water Quality Monitoring Plan, and Aquatic Resources Monitoring Plan. To ensure that Commission staff has sufficient information to inform an economic and environmental analysis for each of these plans, please include with the license application the conceptual elements and cost estimates for the plans as described below:

a. Project Operation and Flow Monitoring Plan-

Alabama Power proposes to develop and implement a Project Operation and Flow Monitoring Plan that would monitor compliance with: (1) project operation and water level management; (2) flood control operation; (3) drought management; and (4) flow releases from Harris Dam. The conceptual plan should include: (1) the goals of the monitoring; (2) the variables to be monitored and the anticipated methods for monitoring project operation and flow; (3) general locations of monitoring sites; (4) provisions for reporting results and making recommendations; (5) monitoring and reporting frequency; (6) a schedule for developing and implementing the plan; and (7) estimated capital and annual costs associated with the plan.

b. Water Quality Monitoring Plan-

Alabama Power proposes to develop and implement a Water Quality Management Plan to monitor compliance with its water quality requirements. The conceptual plan should include: (1) the goals of the monitoring; (2) anticipated water quality parameters to be monitored and methods for monitoring those parameters; (3) the number and general locations of monitoring sites; (4) provisions for reporting results and making recommendations; (5) monitoring and reporting frequency; (6) a schedule for developing and implementing the plan; and (7) estimated capital and annual costs associated with the plan.

c. Aquatic Resources Monitoring Plan-

Alabama Power proposes to develop and implement an Aquatic Resources Monitoring Plan following implementation of a continuous minimum flow from Harris Dam. The conceptual plan should include: (1) the goals of the monitoring; (2) preliminary criteria for determining the success of the program (e.g., water temperature target[s]), growth rate and/or condition target[s], water level fluctuation target[s], etc.); (3) anticipated methods for monitoring aquatic resources; (4) the number and general locations of monitoring sites; (5) provisions for reporting results and making recommendations; (6) monitoring and reporting frequency; (7) a schedule for developing and implementing the plan; and (8) estimated capital and annual costs associated with the plan.

6. Section 5.4, *Proposed Environmental Measures*, table 5-2, also presents proposed plans for operational, maintenance, and facility-based PM&E measures, including a Recreation Plan, Nuisance Aquatic Vegetation and Vector Control Program, and Shoreline Management Plan. Section 5.18(b)(5)(iii)(B) of the Commission's regulations requires that the final license application describe all "operation and maintenance procedures for any existing or proposed measures or facilities." As described in section 5.16(b)(2) of the Commission's regulations, this requirement includes PM&E measures with respect to each resource affected by the project. To ensure that the license application includes all of the proposed PM&E measures for review by staff and stakeholders, please include with the license application the draft plans and overall estimated cost as described below.

a. Recreation Plan-

According to table 5-2 in section 5.4, *Proposed Environmental Measures*, table 11-7, *Proposed Operations and PME Measures That May Affect Recreation and Land Use*, and section 11.2.2, *Lake Harris – Recreation Plan*, of the PLP, the Recreation Plan would include provisions to:

(1) continue to operate and maintain 11 project recreation sites; (2) remove Wedowee Marine South as a project recreation site and request approval to identify the entire facility as a non-project use; (3) install and maintain recreation (canoe/kayak) access below Harris Dam within the project boundary; (4) provide an additional recreation site on Lake Harris to include a day use park (with swimming, picnicking, and boat ramp); (5) implement a Barrier-Free Evaluation Program at existing recreation sites; and (6) provide an update for the Recreation Plan every 10 years. The draft plan also should include: (1) the methods for operating and maintaining the project recreation sites; (2) a description and map of the proposed new canoe/kayak recreation access below Harris Dam, the existing environment at the site, and the potential effects of construction, operation, and maintenance of the new site on environmental resources; (3) a description and map of the proposed new recreation site (day use park), the existing environment at the site, and the potential effects of construction, operation, and maintenance of the new site on environmental resources, (4) a description of the proposed Barrier-Free Evaluation Program or a draft of the program; (5) a description of the information to be included in each 10-year Recreation Plan update; (6) criteria for determining the success of the plan; (7) monitoring protocols and sampling methodologies, including the frequency of monitoring/sampling recreation use; (8) provisions for reporting recommendations on the plan; (9) a schedule for finalizing and implementing the plan; and (10) estimated capital and annual costs associated with the plan.

b. Nuisance Aquatic Vegetation and Vector Control Program-

According to Section 11.2.2, *Lake Harris – Nuisance Aquatic Vegetation and Vector Control Program*, of the PLP, the Nuisance Aquatic Vegetation and Vector Control Program would include the following provisions: (1) the frequency, timing, and locations, of surveys to identify areas where nuisance aquatic vegetation could create a public health hazard, affect power generation facilities, restrict recreational use, or pose a threat to the ecological balance of Lake Harris; (2) methods for monitoring for increases in nuisance aquatic vegetation; (3) methods for controlling nuisance aquatic vegetation and vectors; and (4) a schedule for monitoring. The draft plan should also include (1) a description of the species of aquatic vegetation that would be monitored; (2) the criteria for determining success of the plan, (3) a schedule for finalizing and implementing the plan, and (4) estimated capital and annual costs associated with the plan.

c. Shoreline Management Plan-

On October 5, 2020, a draft Shoreline Management Plan (SMP) was provided to stakeholders who are members of the Harris Action Team 4, a group of stakeholders interested in participating in Recreation and Land Use relicensing issues. Stakeholders provided Alabama Power with initial comments on the draft SMP in November of 2020. Commission staff requested that the SMP be filed with the PLP in comments on the updated study report issued on June 9, 2021. A revised draft SMP was not filed with the PLP. In table 11-7 of the PLP, it states that Alabama Power proposes to develop and implement an SMP that would include provisions to: (1) incorporate proposed changes in land use classifications (including reclassifying the botanical area at Flat Rock Park from recreation to natural/undeveloped); (2) continue to encourage the use of alternative bank stabilization techniques other than seawalls; (3) continue implementing the Dredge Permit Program; (4) continue implementing the Water Withdrawal Policy; (5) continue implementing a shoreline classification system to guide management and permitting activities; (6) continue the requirements of a scenic easement for the purpose of protecting scenic and environmental values; (7) continue the use of a "sensitive resources" designation in conjunction with shoreline classifications on project lands managed for the protection and enhancement of cultural resources, wetlands, and threatened and endangered species; (8) continue implementing a shoreline compliance program and shoreline permitting program; and (9) 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 project reservoir, and to control soil erosion and sedimentation.

Please ensure that the draft SMP also includes drafts of the proposed Dredge Permit Program, Water Withdrawal Policy, shoreline permitting and compliance programs, and the specific recommended BMPs to protect shoreline vegetation and water quality and to prevent erosion and sedimentation. In addition, please ensure that the SMP identifies recreation and other activities that would be permitted/allowed in areas classified as natural/undeveloped and any areas that are classified as "sensitive." As examples, please describe the land use categories and/or specific areas where camping and all-terrain vehicle (ATV) use would be allowed within the project boundary. Finally, please include (1) a schedule for finalizing and implementing the SMP; and (2) estimated capital and annual costs associated with the plan.

Project Description and Operation

7. Section 2.1, *Harris Project Facilities*, of the PLP, indicates that the intake

structure at the Harris Project includes six intake gates that are protected with trash racks. However, section 2.1 does not include a detailed description of the trash racks, including (a) the total number of trash racks and the dimensions of those racks; (b) the trash racks' clear bar spacing; (c) the intake approach velocity; and (d) the through-rack velocity. This information, which is required by sections 4.51(b)(1) and 5.18(a)(5)(iii) of the Commission's regulations, is necessary to evaluate the potential for fish entrainment at the project, and, therefore, should be included in the license application.

8. In section 6.1.3, *Tallapoosa River Downstream of Harris Dam*, of the PLP, figure 6-5 appears to have incorrect River Mile (RM) labeling. There is no RM 1 or RM 0 labeled in the figure. If RM 0 is at Harris Dam, then the downstream RM sites should be relabeled. If RM 1 is at Harris Dam, this should be noted in the license application.

9. In section 7.1.2.2, *Water Quantity*, of the PLP, the maximum and mean depths of the reservoir are stated as 121 feet and 110 feet, respectively. If the 425,721 acre-feet gross storage volume is divided by the 9,870-acre surface area, the resulting average depth is approximately 43 feet. In the license application, please include an explanation of this calculation or revise these depth values as appropriate.

10. Section 12.1.3, *Tallapoosa River Downstream of Harris Dam*, of the PLP, states "There are four dams along the Tallapoosa River with Harris Dam the most downstream." However, as shown in the figures in the PLP, Harris Dam is the most *upstream* dam on the Tallapoosa River. Please ensure that the locations of the dams on the Tallapoosa River are accurately described in the license application.

Model Results

11. Section 6.2.2, *Lake Harris - Continuous Minimum Flow*, of the PLP, states that the 150-cubic feet per second (cfs) and 300-cfs continuous minimum flows would not affect summer or winter pool elevations. However, figure 7-6, which is at a scale that does not allow for clear distinction among the alternatives, suggests that these minimum flows would result in reservoir elevations that vary from the Green Plan (baseline) condition. In the license application, please clarify how increasing the continuous minimum flow from 45 cfs to 150 cfs or 300 cfs would not lower the reservoir at all. If there's a nominal reduction in reservoir elevations, it should be stated and described as "negligible" or "minimal."

12. Section 8.2.2, *Lake Harris – Continuous Minimum Flow*, of the PLP, states that the same volume of water would continue to be passed under the proposed continuous minimum flow operations as compared to Green Plan (baseline) operations. The PLP does not indicate if the current 45-cfs continuous minimum flow is used for generation or spilled. If it is currently spilled, the volume used for generation under the proposed alternatives could be slightly higher. In the license application, please explain how the

current 45-cfs minimum flow is released.

13. In section 5.2, *Alternatives Considered but Eliminated*, of the PLP, table 5-1 shows that the 300-cfs continuous minimum flow + Green Plan alternative results in reservoir elevations 4 feet lower than with the Green Plan (baseline) from April through October. In addition, according to table 5-1, the 600-cfs continuous minimum flow + Green Plan alternative results in reservoir elevations 2 feet lower than Green Plan (baseline) for May and June, increasing to approximately 4 feet lower during September. The 800-cfs continuous minimum flow + Green Plan alternative results in reservoir elevations 4 feet lower than Green Plan (baseline) for May and June, increasing to approximately 12 feet lower during September. In the license application, please explain how the 600-cfs continuous minimum flow + Green Plan alternative releases more water and yet results in higher reservoir elevations than the 300-cfs continuous minimum flow + Green Plan alternative.

14. In tables 8-10, 8-11 and 8-12, displaying the release alternative comparison tables in the PLP, please provide the time range for the data that was used for the Hydrologic Engineering Center's River Analysis System (HEC-RAS) model simulations. For example, is this information based on the 2001 "average" year, 1939 to 2011, or other time range? Also, the term "water year" is used intermittently throughout the relicensing documents. In the license application, please ensure that all data tables based on the HEC-RAS model output state the time ranges for the data that were used, such as "calendar year 2001" (i.e., January 1 to December 31), "water year" (i.e., October to September 30), or something similar, to facilitate review and analysis of the data.

In addition, in table 8-12, *Results of HEC-RAS Water Temperature Modeling Simulations for Downstream Release Alternatives*, it appears that the temperature data are provided in degrees Celsius, but the unit of measurement is not included. In the license application, please ensure that the units of all measurements in the tables and figures are labeled and consistent with the discussions to facilitate review and analysis of the data.

15. In table 11-12, *Number of Boatable Days in the Tallapoosa River Below Harris Dam by Season*, of the PLP, a "boatable day" is defined as one in which the flow at the USGS Wadley gage does not drop below 450 cfs or rise above 2,000 cfs between sunrise and sunset. The PLP indicates that the majority of boaters on the river find the water levels acceptable at flows between 499 cfs and 6,110 cfs. In the license application, please discuss the origin and rationale for defining a boatable day using the 450-cfs and 2,000-cfs values.

16. In section 4.3.3 of the Final Downstream Release Alternative (Phase 1) Study Report, it states that "The 150-cfs continuous minimum flow scenario was created by

amending the Pre-Green Plan scenario such that no hourly interval had less than a 150 cfs discharge from Harris Dam." In the license application, please clarify whether this was done by changing the rules in the Hydrologic Engineering Center's Reservoir Simulation (HEC-ResSim) model to re-allocate the water, or by simply revising the HEC-RAS upstream hydrograph to increase the inflows less than 150 cfs to 150 cfs.

17. Section 4.3.3 of the Final Downstream Release Alternatives (Phase 1) Study Report states that 2001 was selected as a "normal" water year as inflows to the Harris Project were closest to the median. In the license application, please clarify whether any of the alternatives were analyzed using a "wet" year or a "dry" year, and if there were any significant floods or droughts during 2001 that would not be representative of a "normal" water year.

18. Figures 4-4 through 4-7 in the Final Downstream Release Alternatives (Phase 1) Study Report show releases from Harris Dam during the four seasons. There is considerable overlapping of the data series in these figures, making them difficult to interpret. In the license application, please provide the flow duration curves with the 3 data series on one chart, to highlight differences between the alternatives.

19. In Section 2.1.1.1 of the Final Downstream Release Alternatives (Phase 1) Study Report, tables 4-8 through 4-11 show that that the intervening peak flows at Wadley are greater than the intervening peak flows at Horseshoe Bend even though the drainage area for the 14-mile section of the Wadley reach (Harris Dam to Wadley) is less than the drainage area for the 29-mile section of the Horseshoe Bend reach (Wadley to Horseshoe Bend). Please clarify why the intervening peak flows at Wadley are greater even though the flow in this reach originates from a smaller drainage area than Horseshoe Bend.

20. Section 4.3.4 in the Final Downstream Release Alternatives (Phase 1) Study Report states that a constant stage hydrograph at elevation 490.5 feet was used for the downstream boundary condition at the upstream end of Martin Reservoir. In the license application, given that the elevation of Martin Reservoir fluctuates throughout the year, please justify the assumption of a constant stage hydrograph, or revise the model to use a variable stage hydrograph for the HEC-RAS downstream boundary condition.

Developmental Resources

21. Table 5-2 in section 5.4, *Proposed Environmental Measures*, of the PLP includes Alabama Power's proposal to "design, install, operate, and maintain a minimum flow unit to provide a continuous minimum flow between 150 [cfs] and 300 cfs in the Tallapoosa River downstream from Harris Dam." In addition, section 8.2.2, *Environmental Analysis – Lake Harris*, of the PLP, states that "any assessment of potential changes in turbine-induced mortality would have to be performed after design specifications of any minimum flow unit are finalized." Section 5.18(a)(5)(iii) of the

Commission's regulations require that all proposed project facilities, operations, and proposed measures be described. Therefore, for staff to evaluate the proposed effects of installing a minimum flow unit at the Harris Project, the license application should include a detailed description of the minimum flow turbine to be installed at the project (e.g., type, hydraulic capacity, net head, number of runners, operating speed in revolutions per minute, runner diameter, number of blades per runner, runner diameter, blade spacing, and peripheral runner velocity in feet per second).

22. Section 2.1, *Harris Project Facilities*, of the PLP states that the maximum discharge capability for each existing turbine is 8,000 cfs. Given stakeholder concerns regarding peaking operations and the associated downstream effects, please ensure that the license application (Exhibits A and/or B) include: (a) the minimum discharge for each unit; (b) discharge (cfs) versus output (kW or MW) curves for each unit; (c) any physical, electrical, mechanical, or other limitations that may restrict unit operations across the range of minimum to maximum flows; and (d) unit efficiency curves over the operating range of hydraulic head and flows.

23. The Draft Downstream Release Alternative (Phase 2) Study Report includes figures 3-11 and 3-12, which provide average annual energy and average annual revenue curves, respectively, for the Harris Project, and figures 3-13 and 3-14 provide similar information for Alabama Power's hydro system (the Harris Project and other hydroelectric facilities located downstream). In the license application and in accompanying tables in the Final Downstream Release Alternative (Phase 2) Study Report, please also provide the actual values shown in these figures to facilitate stakeholder review and analysis of the actual values from the graphs.

24. Table 4-1 in the Draft Operating Curve Change (Phase 2) Study Report provides estimates of the average annual revenue losses across Alabama Power's hydro fleet associated with each reservoir level alternative. The Draft Downstream Release (Phase 2) Study Report, in figures 3-11 through 3-13, provides generation and revenue losses for Harris and Alabama Power's hydro fleet for each flow release alternative. In the final study reports, please summarize the total project generation and the losses in generation and revenue at Harris, as well as the losses in generation for Alabama Power's hydro fleet for each alternative. In addition, in the figure and table titles, please clarify that the information provided represents the change in generation (i.e. losses or gains) and revenue.

25. In comments on the PLP, some stakeholders have requested starting the summer pool elevation (i.e., 793 feet) earlier in the spring and/or extending the summer pool elevation into October or November. During scoping, extended summer pool alternatives were not considered and were not studied. To facilitate review and analysis of stakeholder-recommended summer pool scenarios, please provide a qualitative discussion of the following alternatives: (1) modify the operating curve to maintain the

summer pool elevation of 793 feet from March 1 through October 31 (7 months) with adjusted winter pool elevation between January 1 and February 28 (2 months) at: (a) 785 feet; (b) 786 feet; (c) 787 feet; (d) 788 feet; and (e) 789 feet; and (2) modify the operating curve to maintain the summer pool elevation of 793 feet from April 1 through October 31 (6 months) with adjusted winter pool elevation between January and March 31 (3 months) at: (a) 785 feet; (b) 786 feet; (c) 787 feet; (d) 788 feet; and (e) 789 feet. Please address the various effects of these alternatives on the following resource areas: (1) structures downstream of Harris Dam; (2) water quality; (3) water use; (4) erosion and sedimentation; (5) aquatic resources; (6) wildlife and threatened and endangered species; (7) terrestrial wetlands; (8) recreation; and (9) cultural resources. Please incorporate all of this information into a revised Draft Operating Curve Change Feasibility Analysis (Phase 2) Report appended to the license application.

Geology and Soil Resources

26. Table 3-4 in section 3.4.2, *Results,* and table 6-6 in section 6.2.3, *Environmental Analysis - Tallapoosa River Downstream of Harris Dam*, of the PLP present the daily average water surface elevation fluctuations (in feet) in the Tallapoosa River downstream from Harris Dam for three operational alternatives: Green Plan; 150-cfs continuous minimum flow; and 300-cfs continuous minimum flow. As highlighted in the table below, the values for sites 4, 14, and 43 river miles downstream from Harris Dam do not follow the pattern shown by the values for the other sites. Please review these numbers and correct them if necessary, or explain the anomalies, in notes to the table. For example, do they represent riffle areas that present a hydraulic control? Is the downstream site influenced by the operation of Lake Martin?

Alternative	MILES BELOW HARRIS DAM										
	0.4	**1**	**2**	**4**	**7**	**10**	**14**	**19**	**23**	**38**	**43**
Green Plan (Baseline)	4.62	4.24	3.99	4.22	3.20	2.56	3.60	3.01	2.01	0.92	1.79
150-cfs Continuous Minimum Flow	4.10	3.94	3.81	4.07	3.15	2.56	3.63	3.02	2.01	0.93	1.80
300-cfs Continuous Minimum Flow	3.59	3.51	3.44	3.72	2.96	2.34	3.54	2.99	1.99	0.92	1.74

Table 3-4. Source: Alabama Power and Kleinschmidt 2021b.

27. The Draft Downstream Release Alternatives (Phase 2) Study Report includes limited channel cross section plots, specifically for 0.4, 0.6, 0.8, 1, 1.5, 2, 3, 4.4, and 6 miles downstream of Harris Dam, respectively. However, section 4.3.1 of the Final

Downstream Release Alternatives (Phase 1) Report stated that the final geometry used for the study included 436 bathymetric cross sections between River Mile (RM) 136.7 at Harris Dam and RM 88 which is the limit of headwaters of the Martin Dam impoundment (Lake Martin). To facilitate the review and analysis of the full 44-mile study reach of the Tallapoosa River from Harris Dam downstream to Horseshoe Bend, please include the full set of plots of from all of the cross sections that were collected as part of study with the license application.

28. Sections 6.1.1 and 6.1.2, *Geology and Soils*, and Appendix D of the PLP provide geology and soil information for the Skyline Wildlife Management Area and the Lake Harris portions of the project area respectively. The heading of section 6.1.3 of the PLP suggests that it includes similar information about the affected environment along the Tallapoosa River downstream of Harris Dam. However, the section only includes a statement that the general characterization for the Lake Harris area in section 6.1.2 is the same as for the river downstream of the dam. Environmental conditions affecting soils downstream from Harris Dam are different from conditions on Harris Lake, and stakeholders with land along the Tallapoosa River have expressed concerns about downstream flooding and erosion. To facilitate review and analysis of the potential effects of proposed project operation and maintenance, in the license application, please provide information comparable in terms of content, level of detail, and accompanying figures and tables of the physiography and soils present in the downstream reach to what is provided in sections 6.1.1 and 6.1.2 and Appendix D for the 44-mile reach downstream of Harris Dam.

Water Resources

29. Table 7-2, in section 7.1.2.1, *Lake Harris – Water Quality*, and table 7-3, in section 7.1.3.1, *Tallapoosa River Downstream of Harris dam – Water Quality*, of the PLP provides a summary of the water quality data sources for Lake Harris the Tallapoosa River, including the Alabama DEM 2018 – 2020 water quality data. In a letter filed with the Commission on June 11, 2021, Alabama DEM indicates that it has collected data on Lake Harris for over two decades. In addition, the Baseline Water Quality Report presents a summary of the water quality data collected by Alabama DEM for Lake Harris and the Tallapoosa River dating back to 2005. Based on the information in the PLP, as well as the Water Quality and Downstream Aquatic Resources Study Reports, there is no indication of what, if any, of Alabama DEM's older data were used in the EFDC model (water quality model), the HEC-ResSim and HEC-RAS models, and the Bioenergetics model developed by Auburn University.[1] Please describe the modeling done to support the relicensing studies in Exhibit E of the

[1] The Downstream Aquatic Resources Report indicates that Alabama Power provided Auburn University with water quality data from 2000 – 2018, but does not specify whether any of that data included data collected by Alabama DEM.

license application, including identifying the sources and dates (i.e., years) for the data used in each of the models.

30. In a June 29, 2009 response to public comments for the State Triennial Review of Water Quality Standards, Alabama DEM clarified the hydroelectric generation portion of the state water quality standards at 335-6-10-.09 regarding hydroelectric impoundments. During periods when there is no discharge from the impoundment, the applicable dissolved oxygen (DO) criterion is 5.0 mg/L in waters with the Public Water Supply and Fish and Wildlife designated uses. The applicable DO criterion during periods when the impoundment is discharging is 4.0 mg/L. Section 7.1.3 of the PLP, *Tallapoosa River Downstream of Harris Dam*, indicates “dissolved oxygen levels were above 5 mg/L for a majority of the monitoring period, with less than 1 percent of all measurements falling below 5 mg/L.” While this provides an assessment of the DO conditions downstream of the Harris Project, DO is a parameter that has direct and acute effects on aquatic life. Therefore, to facilitate a complete water quality analysis, Commission staff needs information on instantaneous DO conditions. In the license application, please specify how many days/hours per month from 2017 to 2020 DO values fell below 5.0 mg/L during periods of non-generation and below 4.0 mg/L during periods of generation. Please include measurements taken at the downstream MARE-12 and Malone monitoring locations.

31. In section 7.2.2.2 of the PLP, *Water Quantity,* figure 7-6 presents average elevations of Harris Lake based on the HEC-ResSim model of downstream release alternatives. The difference in reservoir elevations between the Green Plan and the 300-cfs continuous minimum flow appears to be about 0.1 foot. In the license application, please provide the maximum difference in elevations between these two alternatives during the summer and winter seasons. If the difference is less than 0.1 foot, then indicate so in the discussion of potential effects of proposed project operation on water quantity.

32. Section 4.1.1 of the Final Downstream Release (Phase 1) Study Report, states “Records at some gage sites only contained average daily flows. Hourly flows were interpolated at these sites by combining the average daily flows with the estimated instantaneous peak values.” In the license application, please explain this method of calculation in greater detail and provide one month’s worth of average daily flows from the summer of 2007, with the corresponding hourly “interpolated” flows, for comparison.

33. The Draft Downstream Release (Phase 2) Study Report includes figures 3-1 and 3-2, which display the estimated effects of each operating alternative on reservoir elevations. These graphs indicate that the Pre-Green Plan, 150-cfs continuous minimum flow, and 300-cfs continuous minimum flow alternatives have negligible effects on average reservoir elevations and the 300-cfs continuous minimum flow +

Green Plan, 600-cfs continuous minimum flow, and 800-cfs continuous minimum flow begin to lower reservoir levels. In comments on the PLP, some stakeholders have requested that Alabama Power identify the level of continuous minimum flow (with or without Green Plan pulsing) that initially affects reservoir levels (i.e., what continuous minimum flow between 300 cfs and 600 cfs would lead to a more than negligible impact on reservoir elevations). To facilitate review and analysis of the water management issues at the project, in the license application, please identify what continuous minimum flow would begin to affect Harris Lake levels.

Fisheries

34. Table 5-2 indicates that Alabama Power proposes to provide fish habitat improvements by adding habitat enhancements to Harris Reservoir. Please include the details of these habitat improvements in the license application.

35. Table 8-11 in section 8.2.3, *Environmental Analysis - Tallapoosa River Downstream of Harris Dam*, of the PLP, presents a comparison of percent difference from the Green Plan in daily wetted perimeter fluctuation in the Tallapoosa River downstream from Harris Dam for three operational alternatives: Green Plan; 150 cfs continuous minimum flow; and 300 cfs continuous minimum flow. As highlighted in the table below, the values for sites 19 and 23 river miles downstream from Harris Dam do not follow the pattern shown by the values for the other sites. Please review these numbers and correct them in the license application, if necessary, or revise the table to explain the anomalies in notes to the table.

Alternative	**MILES BELOW HARRIS DAM & HABITAT TYPE**										
	0.4	**1**	**2**	**4**	**7**	**10**	**14**	**19**	**23**	**38**	**43**
	Riffle	**Riffle**	**Riffle**	**Pool**	**Pool**	**Riffle**	**Run-Pool**	**Riffle-Run**	**Riffle**	**Riffle**	**Pool**
Green Plan	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
150-cfs Continuous Minimum Flow	-20%	-7%	-31%	-7%	-11%	-3%	-5%	1%	1%	-3%	-2%
300-cfs Continuous Minimum Flow	-37%	-23%	-68%	-14%	-31%	-13%	-13%	0%	3%	-9%	-9%

Table 8-11. Source: Alabama Power and Kleinschmidt 2021b.

36. Section 8.1.3.1, *Tallapoosa River Downstream of Harris Dam – Fish Community*, of the PLP presents a summary of the fish collected in the Tallapoosa River from 2005 through 2020, including the Alabama Cooperative Fish and Wildlife Research Unit's sampling from 2005 to 2015, Alabama Power's sampling in 2017 and 2018, and

Auburn University's sampling in 2019 and 2020. The sampling protocols used varied among these sampling efforts. In Exhibit E of the license application, please: (a) discuss how the various sampling protocols may affect the sampling results (e.g., what are the implications for describing the species caught, the size and condition of fish caught, etc.?); and (b) describe any consultation that occurred among Auburn University, Alabama Power, and stakeholders regarding the change from back-pack electrofishing (30+2 approach) to a barge mounted electrofishing apparatus.

37. Section 8.2.3, *Environmental Analysis – Tallapoosa River Downstream of Harris Dam*, of the PLP presents a brief analysis of Auburn University's Bioenergetics model and the effects of temperature reductions on spawning and growth of aquatic resources downstream from Harris Dam. Please expand this discussion in the license application to include a brief description of the Bioenergetics model and how the data used in the model were collected. Please include any adjustments made during the model's development, including in the data collection methods (e.g., switch from electromyogram telemetry tags to acoustic/radio tags) and the implications of those adjustments. In addition, please describe any consultation that occurred among Auburn University, Alabama Power, and the stakeholders regarding any of the adjustments made. Finally, please present and discuss the results for any other species, or surrogate species, that were tested.

Terrestrial Resources

38. In section 9.1.2.4, *Lake Harris—Wetlands*, of the PLP, table 9-3 lists the extents (i.e., in linear feet and miles or acres), and the quality of each wetland type at Harris Reservoir (i.e., "poor", "moderate", and "good" condition). Table 9-3 states that some lacustrine/littoral and shoreline/alluvial wetlands were deemed to be in poor, moderate, and good condition. However, the section does not include the criteria for determining the quality of the wetlands. Please include these criteria with the license application, along with a description of any ongoing or potential project-related effects on these wetlands based on their existing qualities and the effects of current and proposed operation. In addition, please include with the license application maps showing the locations of each of the wetlands in the Harris Lake and Skyline portions of the project area with their wetland types and quality identified.

39. Section 9.2, *Environmental Analysis*, of the PLP states that "FERC did not identify terrestrial and wildlife resources as an affected resource in the [Scoping Document 2] SD2…". However, on page 25 of SD2, Commission staff identified the following terrestrial (including vegetation and wildlife) resource issues:

- Effects of the frequency, timing, amplitude, and duration of lake fluctuations and flow releases from the project on riparian, wetland, and littoral vegetation community types;

- Effects of project operation and maintenance activities (*e.g.*, road and facility maintenance) and project-related recreation on vegetation and wildlife habitat, ***including rare plant communities on granite outcrops***;
- Effects of project operation and maintenance on avian species, including avian electrocution and collision with project transmission facilities; and
- Effects of project operation and maintenance activities and project-related recreation on non-native invasive botanical and wildlife species.[2]

In the license application, please correct this statement and/or recognize that these terrestrial resources will be included in the Commission staff's environmental review and discussed in the environmental document.

40. Table 3-1 of the PLP and section 3.1 of the draft Wildlife Management Plan (WMP) state that Alabama Power currently manages 180 acres of right-of-way (ROW) on project lands to provide diverse habitat that benefits both game and non-game species. However, the PLP and WMP do not provide the methods of regular vegetation management within the ROWs, around Harris Dam and other project facilities. In the license application, please provide a description of specific vegetation management practices including the methods (e.g., planting for wildlife, mowing, trimming, cutting, use of herbicides) and the frequency of these activities.

41. Section 7.0, *Timber Management*, of the draft WMP includes tables 7-1 and 7-2 and figures 7-1 and 7-2 describing the timber stand compositions at Lake Harris and Skyline, respectively. The acreages for some of the stand types in the tables and figures do not match. Please check the total acreage of each stand type and include corrected and consistent acreages in the tables, figures, and discussion of a revised WMP, with the license application.

Threatened and Endangered Species

42. Section 10, *Threatened and Endangered Species*, of the PLP, includes natural history information about, and discussions of potential project effects on some, but not all, of the federally listed species on the U.S. Fish and Wildlife Service's (FWS) official species lists for the Harris Lake and Skyline Wildlife Management Area (WMA) portions of the project area. The PLP did not include information about the endangered Alabama lampmussel, Cumberland bean mussel, finerayed pigtoe mussel, pale lilliput (pearlymussel), shiny pigtoe mussel, snuffbox mussel, and the threatened spotfin chub, rabbitsfoot mussel that may occur within the Harris Project boundary, in the vicinity of

[2] Federally listed plants and wildlife species will also be addressed in the Commission staff's environmental review and environmental document, as shown on pages 25 and 26 of SD2, including species that have been added to the official species lists since SD2 was issued on November 16, 2018.

Skyline WMA. The PLP also did not include information about the endangered southern pigtoe mussel or the threatened little amphianthus, that may occur within the Harris Project boundary, in the vicinity of Harris Lake.[3]

In addition, on September 28, 2021, Commission staff filed updated official species lists for both the Harris Lake and Skyline portions of the project area.[4] The endangered slabside pearlymussel and Morefield's leather flower, the threatened American Hart's-tongue fern, and the candidate monarch butterfly were added to the species list for the Skyline WMA portion of the project area. The updated species list for the Harris Lake portion of the project also includes the candidate monarch butterfly. Please ensure that the license application includes natural history information, discussions of potential project effects, and proposed PM&E measures (if any) for all the federally listed species on the updated official species lists.

43. In figure 10-19 of the PLP, five of the survey sites described for the white fringeless orchid are near the northeast end of Lake Harris. However, according to figure 10-18, these sites are outside this species' current habitat range. In the license application, please clarify why the survey area for this species extended beyond its range.

44. Section 3.3.2, *Botanical Resources*, of the draft WMP states that although recent surveys did not detect it, a small portion of one of the known populations of the federally listed Price's potato bean may still occur within the Skyline portion of the project area. The draft WMP also states that Alabama Power proposes to conduct additional surveys for Price's potato bean in the area of the known population prior to any timber management activities to ensure that the known population would not be impacted if it is still present. This PM&E measure is not included in the PM&E tables or described in the PLP. Please ensure that this measure is included in the list of PM&Es to protect federally listed species in the license application.

Cultural Resources

45. Sections 13.1.1 and 13.1.2, *Cultural Resources – Affected Environment*, of the PLP state that not all of the sites identified during record searches conducted for the project (both at Lake Harris and Skyline portions of the project area) were selected for preliminary assessment. At Lake Harris, 101 of 330 sites were selected and at Skyline, 29 of 141 sites were selected. While the draft Historic Properties Management Plan

[3] The original species lists were generated on FWS's ECOS-IPaC website (https://ecos.fws.gov/ipac/) on July 27, 2018, and filed on July 30, 2018.

[4] The updated species lists were generated on September 27, 2021 and filed on September 28, 2021.

(HPMP) provides additional information regarding the selection process, this document is Privileged and those without access to the HPMP may wish to understand why some sites were selected and others were not. Please ensure that the license application contains details explaining why these particular sites, and not all sites, were chosen and includes a discussion and documentation of the consultation that occurred to select these sites.

46. While the two cultural resources assessment reports filed with the draft HPMP (Appendix C, Lake Harris; Appendix D, Skyline WMA) include tables providing descriptions of all known cultural resource sites at Lake Harris and Skyline WMA, these comprehensive tables are not provided in the HPMP itself, which will be a stand-alone document when it is finalized. Please ensure that the license application and HPMP contain updated information regarding all cultural resource sites throughout the project areas (Skyline WMA, Lake Harris, and the Tallapoosa River downstream from Harris Dam within the area of potential effects [APE]). Please provide the information in summary form, suitable for the Commission's public (i.e., non-privileged) classification, in the license application and in more detailed, tabular form in the HPMP. In the HPMP tables, please include: (a) descriptions of all resources within the APE, including any sites not chosen for assessment; (b) the current National Register status of all resources; (c) a description of all potential project-related effects (including but not limited to, project operation activities, inundation, recreation, public access, and vandalism); (d) property ownership (e.g., Alabama Power, federal and state, private); and (e) a description of the proposed treatment for each site (e.g., monitoring, National Register evaluation, mitigation, etc.).

Document Content(s)

Attachment 2

Comments and Responses on the Draft Operating Curve Change Feasibility Analysis Phase 2 Report

Commenting Entity	Date of Comment & FERC Accession Number	Comment – Phase 2 Operating Curve Change Feasibility Analysis	Alabama Power Response
Lake Wedowee Property Owners Association (LWPOA) Note: footnotes included in the original letter have been omitted from this table	5/19/2021 20210519-5060	The LWPOA asks that Alabama Power and FERC approve raising the winter pool from the current 785' to 786' msl. a. A winter pool of 786' would result in an increase of 193 usable private lakeshore structures, from 449 to 642 (Table 3.13, pg 74 of DRA), and make one additional public launch (Lonnie White ramp) available (Table 3.14, pg 74 of DRA) at winter pool. Further, many LWPOA members report that a rise of one foot would make their private structure far more usable, though not technically meeting Alabama Power's definition of usable. b. As LWPOA reads the data, the only potential negative environmental impact at 786' is Submerged Aquatic Vegetation in the reservoir. According to the study results SAV is largely non-existent in sedimentation areas now after nearly 40 years of reservoir operations (Section 3.5.7, pg 28, OCCA) so a threat of vegetation increasing at a one foot higher winter pool is assumed to be low. c. Fish spawning in the reservoir would be enhanced (Section 3.6.2, pg 32, OCCA). d. Raising the winter level one foot to 786' would have negligible impact on the river environment or downstream landowners in the event of a 100 year flood. Table 3-2, pg 14, OCCA shows no more inundated structures downstream at 786' than 785'. Table 3-4 pg 15, OCCA shows the duration of inundation downstream actually decreases, since flood releases would end earlier at a higher pool level.	Any increase in the winter operating curve would result in an increase in downstream flooding, including both an increase in downstream acres inundated and an increase in downstream flood depth. Alabama Power determined from the modeled 100-Year Design Flood that increases in downstream flooding were not reasonable; therefore, Alabama Power eliminated these operating alternatives from further consideration.
LWPOA		While it is not the official position of the LWPOA, many property owners around R.L. Harris reservoir support raising the winter level two feet to 787'. Table 3-2, pg 14, OCCA shows that at 787' four additional structures downstream would be inundated during a 100 year flood event for a shorter duration. Benefits of raising the winter pool two feet are the same as raising the level one foot as detailed above, making even more lakeshore structures and recreational opportunities available year round. Table 3-13, pg 73, DRA shows the number of usable lakeshore structures increases by 377, from 449 to 826.	Any increase in the winter operating curve would result in an increase in downstream flooding, including both an increase in downstream acres inundated and an increase in downstream flood depth. Alabama Power determined from the modeled 100-Year Design Flood that increases in downstream flooding were not reasonable; therefore, Alabama Power eliminated these operating alternatives from further consideration.
LWPOA		The Lake Wedowee Property Owners Association supports the tenet that everyone has equal rights to Tallapoosa River waters, and desires to be a good neighbor to the entire basin community. Based on the data in the referenced study reports, the Association asks for nothing that would substantially harm any other stakeholder group with whom it shares the Tallapoosa River system.	Comment noted.

Commenting Entity	Date of Comment & FERC Accession Number	Comment – Phase 2 Operating Curve Change Feasibility Analysis	Alabama Power Response
Alabama Department of Conservation and Natural Resources (ADCNR) Note: footnotes included in the original letter have been omitted from this table	05/27/2021 20210527-5024	ADCNR has no additional comments or recommendations at this time other than to reiterate our support of having combinations of operating curve scenarios and downstream release alternatives modeled together for further analyses.	Comment noted.
Federal Energy Regulatory Commission (FERC) Note: footnotes included in the original letter have been omitted from this table	06/09/2021 20210609-3045	The HEC-ResSim Model developed during Phase 1 of the Operating Curve Change Feasibility Analysis includes a minimum release provision that is based on flow at the upstream Heflin gage, which is located on the mainstem Tallapoosa River. There is also a streamflow gage (Newell) located on the Little Tallapoosa River Arm of Lake Harris, which was not used to develop the minimum release provision. Alabama Power's response to a Commission staff's additional information request regarding these streamflow gages, indicates that during the development of the Green Plan, the stakeholders involved in the process considered the Heflin gage "the gage that best mimicked the unregulated, natural flow of the Tallapoosa River;" thus the Newell gage was not considered in developing the Green Plan and the minimum release provision. However, it remains unclear how flow from the Little Tallapoosa River is accounted for by the HEC-ResSim Model developed during Phase 1 of the study and its relationship to the minimum release provision. Because the HEC-ResSim Model is a mass balance model, it should account for all inflow coming into Lake Harris (i.e., the output from the HEC-SSP model). Therefore, to better understand how the HEC-ResSim Model works, please revise the Draft Operating Curve Change Feasibility Analysis (Phase 2) Report to include an explanation for how flow from the Little Tallapoosa River is accounted for in the model, including describing (a) the model's assumptions related to the Little Tallapoosa River and its flow entering the R.L. Harris Project, and (b) the relationship between the Little Tallapoosa River flow and the minimum release requirement included in the HEC ResSim model.	As discussed in the Phase 1 report, the HEC-ResSim Model accounts for all flow coming into Harris Reservoir (i.e., inflows) through its use of the ACT unimpaired flow database, including inflows into the Little Tallapoosa River Arm. The use of the unimpaired flow dataset as a model input is different from the rule contained in the HEC-ResSim Model related to the Green Plan, which uses the upstream Heflin gage only to determine Green Plan releases for daily operations. As indicated in Section 2.0, the details regarding the HEC-ResSim Model, both data inputs and rules, are contained in the Phase 1 Report and Alabama Power does not see the need to repeat that information in the Phase 2 Report.
Alabama Rivers Alliance (ARA) Note: footnotes included in the original letter have been omitted from this table	06/11/2021 20210611-5096[1]	The Operating Curve Change Feasibility Analysis Draft Phase 2 Report ("Operative Curve Phase 2 Report") applies the hydrologic models and modeling results developed for the Phase 1 Report to quantitatively and qualitatively describe possible impacts to resources that would result from raises in the winter pool level. Under the current operating curve, winter pool elevation is 785 feet msl, and the Phase 2 Report evaluates raising the winter pool level to either 786, 787, 788, or 789 feet msl.	Alabama Power disagrees with the assertion that "since beginning operations, the Harris Project has highly altered hydrologic processes and flow regime characteristics and created frequent large flow fluctuations that can lead to more intense flooding than the ecosystem would experience in its natural state." One of the primary purposes of the Harris Project is to provide flood control to for the downstream Tallapoosa River. Based on pre-

[1] In addition to comments filed with FERC concerning the Operating Curve Feasibility Analysis Phase 2 Report, ARA provided similar comments to Alabama Power via email dated 05/27/2021. The 05/27/2021 comments are included within the stakeholder consultation record for reference.

Commenting Entity	Date of Comment & FERC Accession Number	Comment – Phase 2 Operating Curve Change Feasibility Analysis	Alabama Power Response
		Elevating the winter pool level could benefit recreation on Lake Wedowee in the winter months by making some structures and boat ramps more accessible, however, increased recreation opportunities must be weighed against exacerbated downstream flooding that could result from a raise in the winter pool elevation. As the Operating Curve Phase 2 Report summarizes: "The primary adverse effect of raising the winter pool is on downstream resources in the form of an increase in flooding….The primary beneficial effect of raising the winter pool is in the number of reservoir recreational structures (boat slips, docks, etc.) that are available for private recreational use/access during the winter months." Impacts to Downstream Residents and River Users The modeling results summarized in Table 3-2 and Table 3-3 of the Operating Curve Phase 2 Report show that once the winter pool is raised by two feet and reaches 787 feet msl, more downstream structures become inundated during the 100-year design flood, including single family and mobile homes. With any amount of raise in the winter pool level, flooding becomes shorter in duration, but more intense in magnitude with a more rapid rise due to less storage being available in the reservoir and a quicker release of water. Throughout the relicensing, many river users and downstream property owners have voiced concern about unpredictable flooding, property damage, and risks to personal safety caused by rapid and unannounced rises in river levels. ARA highly recommends that Licensee pay careful attention to these very real concerns of people living below Harris and those who recreate on the river. These flood events not only harm property but also present a threat to public safety. Recreation downstream of Harris could also suffer with a higher winter pool level. Table 3-16 of the Operating Curve Phase 2 Report shows that the seven existing recreation sites below the dam would have a greater maximum depth of inundation, ranging from roughly 0.5 foot of depth increase with a 1-foot raise up to approximately 2.5 feet of depth increase with a four-foot raise in the winter pool. This additional inundation could make the recreation access points below the dam less accessible. Impacts to Aquatic Resources and Habitat Periodic flooding on the Tallapoosa River, particularly in the spring, is part of natural riverine processes. However, since beginning operations, the Harris Project has highly altered hydrologic processes and flow regime characteristics and created frequent large flow fluctuations that can lead to more intense flooding than the ecosystem would experience in its natural state. The modeling in the Operating Curve Phase 2 Report	Harris Dam flow records, the Project has reduced the magnitude and frequency of flood events as shown at the Wadley gage. Alabama Power agrees that the effects of raising the winter pool on Harris Reservoir to downstream resources are not reasonable and has eliminated these operating alternatives from further consideration.

Commenting Entity	Date of Comment & FERC Accession Number	Comment – Phase 2 Operating Curve Change Feasibility Analysis	Alabama Power Response
		shows that raising the winter pool level "results in greater outflow from Harris Dam and subsequent flooding" due to increases in spill frequency and the amount of time spent at turbine capacity. While the percentage increases may appear small, more time spent at turbine capacity could have further repercussions on downstream aquatic resources and affect fish spawning sites and spawning behavior. Infrequent but intense flood events can have considerable negative effects on spawning success. Erosion could also be worsened by raising the winter pool level. Due to steep streambanks and soil conditions, the Operating Curve Phase 2 Report notes that "[i]ncreased scour would occur as velocities increase with the higher channelized flows resulting from the decreased storage in Harris Reservoir associated with higher winter operating curve elevations." Issues of erosion and sedimentation have been frequently cited by river users and property owners downstream of Harris, and any operational changes that could lead to increased erosion should be carefully considered and only adopted with robust mitigation and protection efforts. In deciding whether to change the operating curve to raise the winter pool, Licensee, FERC, and stakeholders must weigh the potential benefits of increased recreation on the reservoir during winter months against possible exacerbated flooding below the dam, increased erosion, and further negative impacts to aquatic life and habitat. Without detailed and robust protection and mitigation plans, ARA would not support a change in the operating curve to raise the winter pool level. Either way, protection and mitigation measures should be taken downstream of Harris to reduce flooding impacts, restore eroded and impaired streambank segments, and provide safer conditions for recreationists and residents.	

Commenting Entity	Date of Comment & FERC Accession Number	Comment – Phase 2 Operating Curve Change Feasibility Analysis	Alabama Power Response
Chris Lunsford	06/11/2021 20210611-5096	Thank you for the opportunity to comment on this proposed change to the RL Harris Reservoir. As a 29 year resident on RL Harris Reservoir, I have observed the entities in charge of it's operation. They have done a good job servicing the needs of those around the reservoir and those downstream. The options of retaining a higher water level through winter months is a good idea. While I would support as much as a 4 foot increase in winter pool levels, I understand the concerns of downstream flood control but I believe a revised winter level combined with any increases due to heavier than normal rains can be managed. In my 29 years of residing here, there have been only a few incidents of major flooding, one of which was Hurricane Opal. I did notice a lesser amount of floating debris in the reservoir this spring compared to previous springs. This was avoided by a more stationary winter level prohibiting objects from becoming dislodged along shorelines. An idea to consider is testing each of the potential winter increases over the next 4 years whereby each 1 foot increase can be experienced and tested for abilities to support each increase. This would provide credible data for each of the potential level increases. I appreciate the open mindedness of all the entities involved with this possible change. Making common sense decisions with the updating of the water control manuals can satisfy everyone's needs for this important water resource. Thank you again for allowing public input on this proposed change.	Any increase in the winter operating curve would result in an increase in downstream flooding, including both an increase in downstream acres inundated and an increase in downstream flood depth. Alabama Power determined from the modeled 100-Year Design Flood that increases in downstream flooding were not reasonable; therefore, Alabama Power eliminated these operating alternatives from further consideration. Even if these alternatives were “tested”, these adverse effects could be seen.

Attachment 3

Final Operating Curve Change Feasibility Analysis Phase 2 Report

OPERATING CURVE CHANGE FEASIBILITY ANALYSIS

PHASE 2 REPORT

R.L. HARRIS HYDROELECTRIC PROJECT

FERC No. 2628

Prepared by:

Alabama Power Company

and

Kleinschmidt Associates

November 2021

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1.0 INTRODUCTION

Alabama Power Company (Alabama Power) owns and operates the R.L. Harris Hydroelectric Project (Harris Project), licensed by the Federal Energy Regulatory Commission (FERC or Commission) (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.

Harris Reservoir is maintained at or below the elevations specified by the Harris operating curve, except when storing floodwater. From May 1 through October 1, Harris Reservoir is maintained at or below elevation 793 feet mean sea level (msl), depending on inflow conditions. Between October 1 and December 1, the operating curve elevation drops to elevation 785 feet msl. The pool level remains at or below elevation 785 feet msl until April 1. From April 1 to May 1, the operating curve elevation rises to full pool at elevation 793 feet msl. During high flow conditions, U.S. Army Corps of Engineers (USACE)-approved flood control procedures in the Harris Water Control Manual (WCM) are implemented. During low flow conditions, the drought contingency curve (the red line in Figure 1-1) is intended to be used as one of several factors in evaluating reservoir operations consistent with approved drought plans.

Alabama Power is using the Integrated Licensing Process (ILP) to obtain a new license for the Harris Project from FERC. During stakeholder one-on-one meetings and at an October 19, 2017 Issue Identification Workshop, stakeholders requested that Alabama Power investigate changing the winter operating curve for the Harris Project. Stakeholders believe that a higher winter operating curve will enhance recreation opportunities on Harris Reservoir during the winter, or typical drawdown period. Based on this request, Alabama Power filed the Operating Curve Change Feasibility Analysis Study Plan (Study Plan) to evaluate, in increments of one foot from 786 feet msl to 789 feet msl (i.e., 786, 787, 788, and 789 feet msl; collectively "winter pool alternatives" or "alternatives"), Alabama Power's ability to increase the winter pool elevation and continue to meet Project purposes (Figure 1-1).

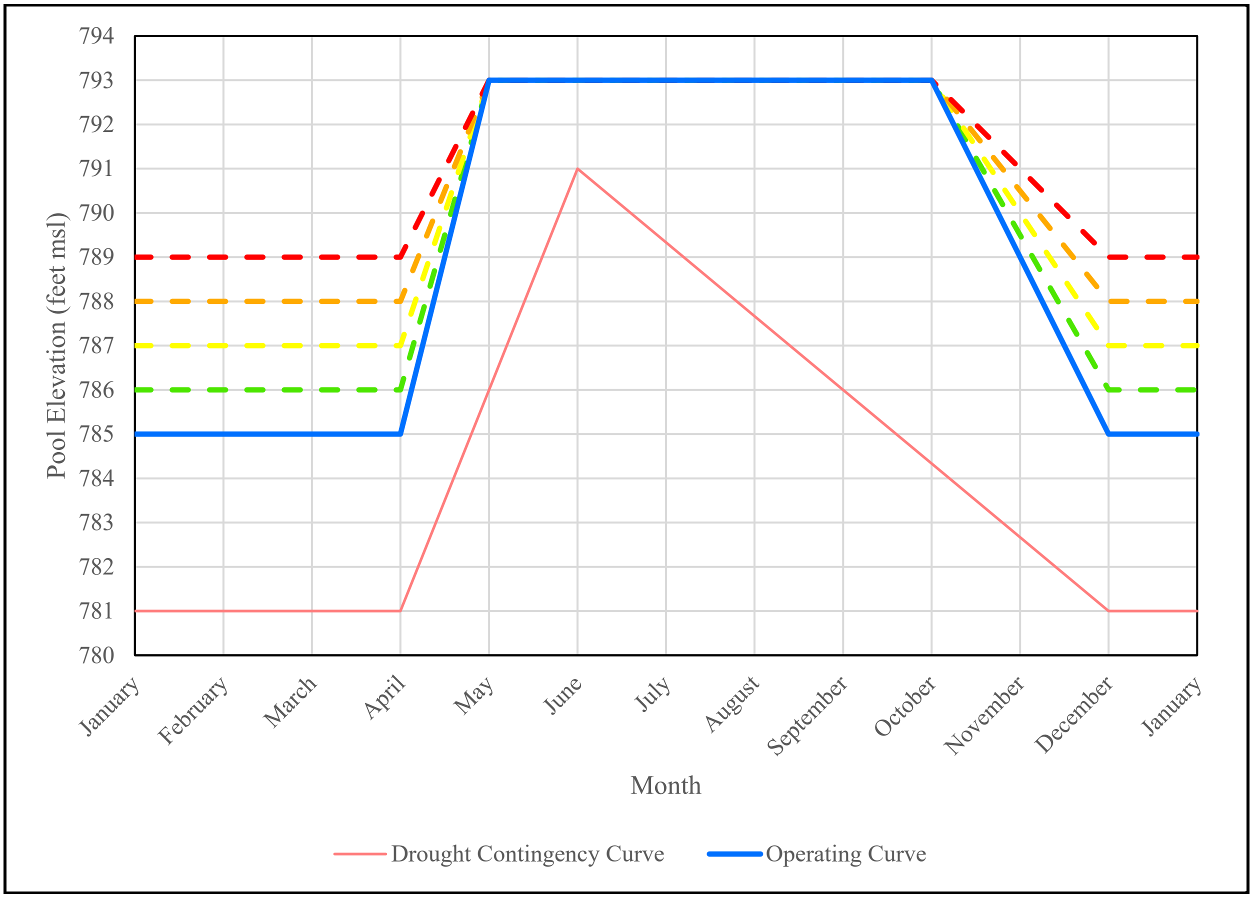

FIGURE 1–1 HARRIS OPERATING CURVE WITH PROPOSED 1-FOOT INCREMENTAL CHANGES

In the Study Plan, the evaluation of the alternatives was divided into two "phases". Consistent with the Study Plan, Alabama Power issued the Operating Curve Change Feasibility Analysis Phase 1 Report (Phase 1 Report) in August 2020 (Alabama Power and Kleinschmidt 2020). The Phase 1 Report described the hydrologic models (HEC-ResSim and HEC-RAS) developed for evaluating the alternatives and presented the Phase 1 results of the potential impacts of a winter operating curve change on hydropower generation, flood control, navigation, drought operations, Green Plan flows, and downstream release alternatives.[1]

[1] Due to timing of the development of the Phase 1 Report, the only downstream release alternatives evaluated in that report were pre-Green Plan, Green Plan, and a 150 cubic feet per second (cfs) continuous minimum flow. Shortly after Alabama Power finalized the Phase 1 Report, FERC required Alabama Power to evaluate additional downstream release alternatives. Because of the timing, these additional alternatives are analyzed in this report.

The purpose of this report is to present the Phase 2 analyses, consistent with the Study Plan. The Phase 2 analyses use the modeling results from Phase 1 along with FERC-approved relicensing study results and existing information to conduct quantitative and qualitative evaluations of potential resource impacts. These resources, and a summary of the methods used to analyze impacts are presented in Table 1-1.

Section 2.0 of this report provides a brief overview of the models developed and described in the Phase 1 Report. Section 3.0 presents the methods and results of analysis for each resource area. Section 4.0 provides a summary of all results, including those from the Phase 1 Report.

TABLE 1–1 SUMMARY OF THE RESOURCES AND STUDY METHODS USED IN PHASE 2 ANALYSES OF PROPOSED OPERATING CURVE CHANGES AT HARRIS DAM

Resource	Method	
	Lake Harris	**Tallapoosa River Downstream of Harris Dam through Horseshoe Bend**
Downstream Release Alternatives	• HEC-ResSim	• N/A
Structures Downstream of Harris Dam	• N/A	• Phase 1 results • LIDAR data • County tax parcel data
Water Quality	• Phase 1 results • Baseline Water Quality Report (Kleinschmidt 2018c) • FERC-approved Water Quality Study • EFDC and HEC-ResSim	• Baseline Water Quality Report (Alabama Power and Kleinschmidt 2018) • FERC-approved Water Quality Study • EFDC to evaluate potential effects on dissolved oxygen from unit discharge in the tailrace
Water Use	• Phase 1 results • Existing information - Water Quantity, Water Use, and Discharges Report	• Phase 1 results • Existing information - Water Quantity, Water Use, and Discharges Report
Erosion and Sedimentation (including invasive species)	• Phase 1 results • FERC-approved Erosion and Sedimentation Study • LIDAR, aerial imagery, historic photos, GIS • Quantitative and qualitative evaluation of areas most susceptible to increase in nuisance aquatic vegetation	• Phase 1 results • FERC-approved Erosion and Sedimentation Study • LIDAR, aerial imagery, historic photos, GIS
Aquatics	• Phase 1 results • Existing information on the Harris Reservoir fishery	• Phase 1 results • Other FERC approved studies as appropriate
Wildlife and Terrestrial Resources- including Threatened, and Endangered Species	• Phase 1 results • FERC-approved Threatened and Endangered Species Study • GIS	• Phase 1 results • FERC-approved Threatened and Endangered Species Study • GIS
Terrestrial Wetlands	• Existing reservoir wetland data • Phase 1 results • LIDAR, aerial imagery, expert opinions, and GIS	• Existing wetlands data • National Wetland Inventory maps • Phase 1 results • LIDAR, aerial imagery, expert opinions, and GIS
Recreation Resources	• Phase 1 results • FERC-approved Recreation Evaluation Study • LIDAR data	• Phase 1 results • FERC-approved Recreation Evaluation Study • LIDAR data
Cultural Resources	• Phase 1 results • LIDAR, aerial imagery, expert opinions, and GIS	• Phase 1 results • LIDAR, aerial imagery, expert opinions, and GIS

2.0 HYDROLOGIC MODEL SUMMARY

The following data and models were used to conduct the operating curve change feasibility analysis. More details are contained in the Phase 1 Report. In addition, the models, assumptions, and their ability to address the study questions were presented to HAT 1 on September 20, 2018 and September 11, 2019.

Data

1. Alabama-Coosa-Tallapoosa (ACT) unimpaired flow database – this database was developed by the USACE with input and data from other stakeholders in the ACT comprehensive study, including both the states of Georgia and Alabama, Alabama Power, and others. These data include average daily flows from 1939 – 2011[2] with regulation influences removed. This dataset was utilized in Hydrologic Engineering Center's Reservoir System Simulation (HEC-ResSim). An unsmoothed version of this dataset for 1939-2005 was utilized in the HEC-Flood Frequency Analysis (HEC-FFA).
2. Other data – Other data sources include USGS, USACE, and Alabama Power records.

Models

3. HEC-Flood Frequency Analysis (HEC-FFA) – This USACE model conforms with Technical Bulletin #17B in determining flood flow frequency. This model was used to determine the statistical frequency of flooding for one, three, and five-day flow volumes.

    Note that the Study Plan stated that HEC-Statistical Software Package (HEC-SSP) is the USACE's newest version of the Flood Frequency Analysis. HEC-SSP combines the capabilities of HEC-FFA with other HEC software, allowing for further statistical analysis of the data. The procedures used for analyzing the flow frequency (Bulletin #17B) did not change with the development of HEC-SSP. There has been no update to the inputs used in the HEC-FFA study of the Tallapoosa River; therefore, it was not necessary to use HEC-SSP for the purposes of this study.

[2] Although when developing the study plan Alabama Power anticipated the dataset to include the years 1939-2016, the unimpaired dataset provided by the USACE includes 1939-2011.

4. HEC-River Analysis System (HEC-RAS) – This model was used in the flood study portion of evaluating the operating curve. It routes flows in the unsteady state[3] along the river.
5. HEC-ResSim – This model looked at operational changes at the Harris Project in conjunction with operating curve changes on a daily timestep. It was used to focus on the hourly flood study operations. This model, in conjunction with the HEC-RAS model, shows impacts, if applicable, to the Martin Dam Project operations.
6. HEC-Data Storage System and Viewer (HEC-DSSVue) – This is the USACE's Data Storage System, which is designed to efficiently store and retrieve scientific data that is typically sequential. Data in HEC-DSS database files can be graphed, tabulated, edited, and manipulated with HEC-DSSVue. This program was used to display some of the output of the other HEC models.
7. Alabama Power Hydro Energy (HydroBudget) Model – This model is a proprietary model that was used to evaluate the net economic gains or losses that could result from proposed operating curve changes at the Harris Project.
8. Environmental Fluid Dynamics Code (EFDC) – The EFDC is a water quality and hydrodynamic model in 2D (longitudinal-vertical) for rivers, estuaries, lakes, reservoirs, and river basin systems. The EFDC models can be used to evaluate basic eutrophication processes such as temperature-nutrient-algae-dissolved oxygen-organic matter and sediment relationships in stratified and non-stratified systems.

[3] In hydraulic modeling, simulations run in the unsteady state consider the variance of flow with respect to time.

3.0 EFFECTS OF OPERATING CURVE CHANGES ON RESOURCES

3.1 Downstream Release Alternatives

As indicated in the Phase 1 Report, model results indicated that raising the winter operating curve would not affect Alabama Power's ability to return to Pre-Green Plan operations or to pass a continuous minimum flow of 150 cfs from Harris Dam due to an increase in the winter operating curve. Because Alabama Power is evaluating additional downstream release alternatives in the relicensing process, these additional alternatives were modeled to determine if raising the winter operating curve would affect the ability to pass these downstream release alternatives through Harris Dam.

3.1.1 Methods

The HEC-ResSim model developed for the Phase 1 Report was used to determine if raising the winter operating curve would affect Alabama Power's ability to pass a Modified Green Plan (changing the time of day in which the Green Plan pulses are released), 300 cfs continuous minimum flow (CMF), 600 cfs CMF, 800 cfs CMF, and four "hybrid" Green Plan alternatives that incorporate both a base minimum flow of 150 cfs, 300 cfs, 600 cfs, or 800 cfs, and the pulsing laid out in the existing Green Plan release criteria.

It should be noted that FERC also required an evaluation of a variation of the existing Green Plan where the daily volume of Harris Dam releases are 100% of the prior day's flow at the USGS Heflin stream gauge. As explained in a Harris Action Team (HAT) 3 meeting on November 5, 2020, Alabama Power already releases approximately 100% of the prior day's flow at the USGS Heflin stream gauge under the Green Plan. The Green Plan criteria states that Harris Dam release at least 75% of the prior day's flow at Heflin; translating that minimum requirement into the 10, 15, and 30 minute pulsing operations results in releases well above 75% of the prior day's Heflin flow (Figure 3-1). Therefore, there was no need to further evaluate this alternative because there is no discernible difference between these two alternatives.

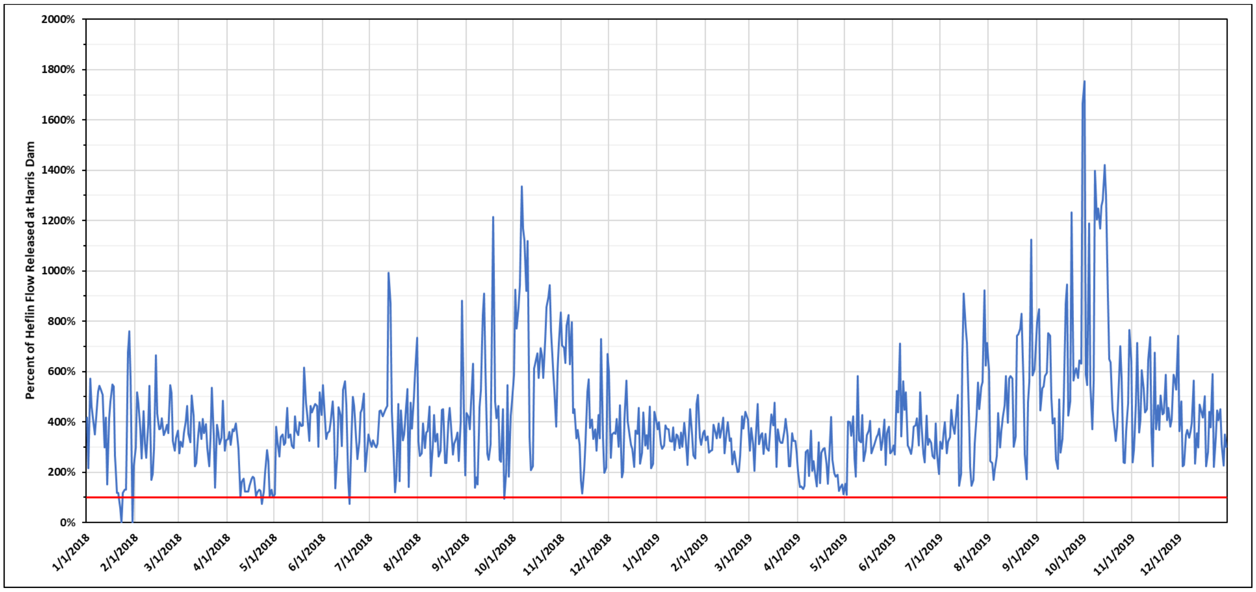

FIGURE 3–1 RELEASES FROM HARRIS DAM IN 2018 AND 2019 COMPARED TO 100% FLOW AT THE USGS HEFLIN GAGE

Note: Alabama Power suspended releases on two days in January 2018 to facilitate collecting LIDAR data around the Tallapoosa River below Harris Dam.

3.1.2 Results

Model results indicated that raising the winter operating curve would not affect Alabama Power's ability to pass any of the additional downstream release alternatives. The effect of downstream release alternatives on the reservoir level is analyzed in the Downstream Release Alternatives Phase 2 Report.

3.2 Effects on Structures Downstream of Harris Dam

As indicated in the Phase 1 Report, additional acres of land are inundated downstream of Harris Dam during the modeled 100-Year Design Flood[4] resulting from a change in winter operating curve (Appendix B, Table B-1). In addition, the depth and duration of flood above baseline elevation from the modeled 100-Year Design Flood also increases (Appendix B, Tables B-2 and B-3). Because of these effects, additional analysis was conducted to determine the potential impacts to structures affected by the modeled 100-Year Design Flood.

[4] For additional details on the 100-Year Design Flood, see the Phase 1 Report.

3.2.1 Methods

The methods for evaluating the effect of the winter pool alternatives on structures downstream of Harris Dam included:

1. Object Based Image Analysis (OBIA) with heads-up digitizing to identify structures downstream of Harris Dam,
2. An overlay analysis to find those structures affected by the operating curve alternatives,
3. A spatial join to associate affected structures with tax parcel data,
4. Summarizing the structures by tax-parcel use category (e.g., Agricultural, Forestry, Single Family, etc.), and
5. Counting the number of HEC-RAS model timesteps (hours) that each structure is inundated and summarizing by alternative.

The OBIA analysis incorporated Light Detection and Ranging (LIDAR) derived elevation products and the National Agriculture Imagery Program (NAIP) 1 m, 4 band (R,G,B,NIR) orthoimagery (USDA 2015) (Figure 3-2). When combined, the data sources provided valuable training data for an image classification algorithm that attempted to distinguish built-structures from their surroundings. The data were preprocessed by adding a height band to the NAIP image. Height was calculated as the first return (digital surface model) minus the ground (digital elevation model). A combination of automated LIDAR building classification tools and an OBIA workflow in ArcGIS Pro was used to identify structures and/or compounds of structures, and the exercise was completed with manual heads-up digitizing.[5]

[5] This method involves scanning a map or image into a computer. The digitizer then traces the points, lines and polygons using digitizing software. This method of digitizing has been named "heads-up" digitizing because the focus of the user is up on the screen, rather than down on a digitizing tablet.

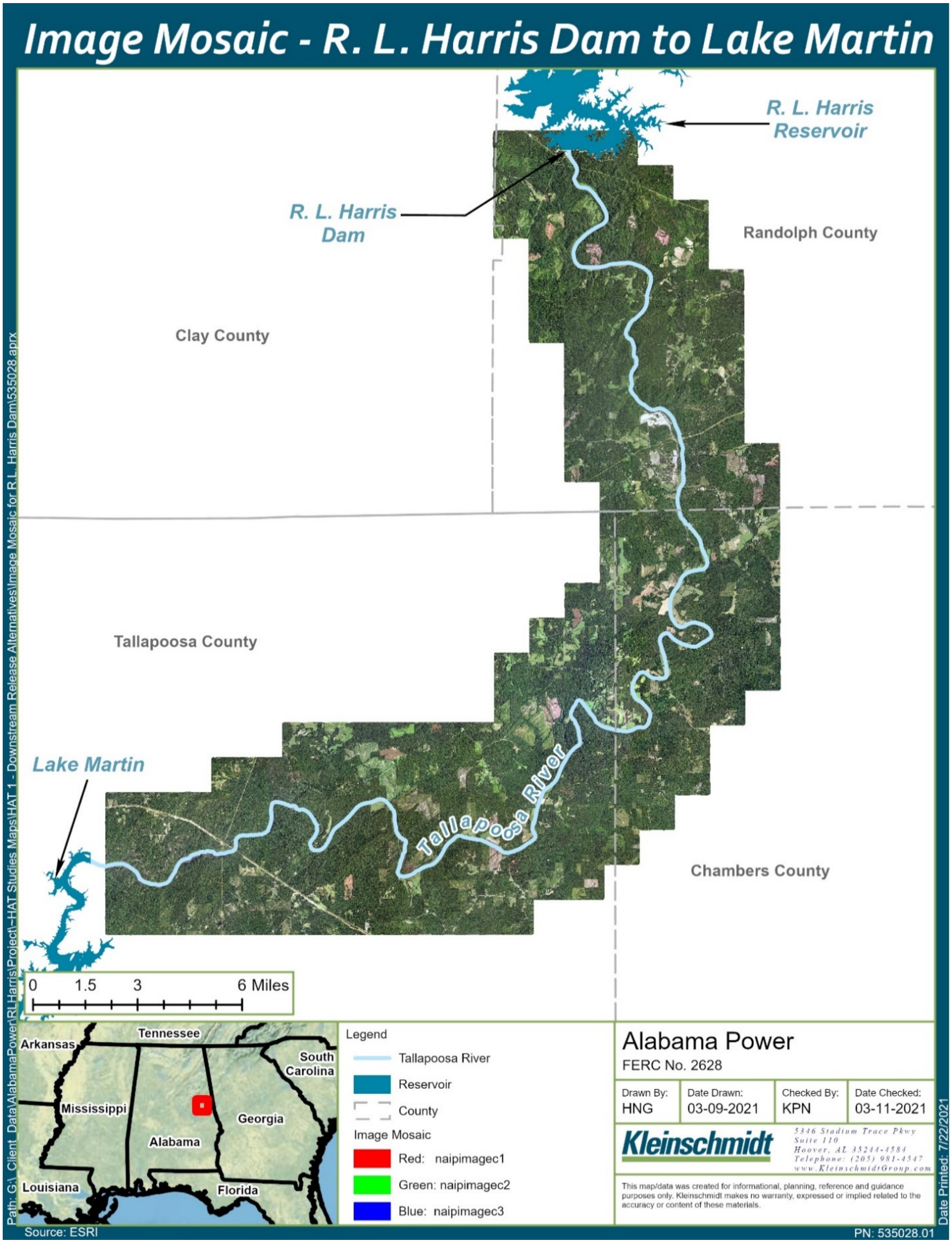

FIGURE 3–2 IMAGE MOSAIC FOR THE TALLAPOOSA RIVER BELOW HARRIS DAM

3.2.2 Results

The original intent of collecting LIDAR data was to provide data with appropriate resolution for elevation modeling. While the point cloud had at least 4 returns per square meter, the density of points was too low to accurately extract buildings returns, which prompted the use of the OBIA method.

The overall accuracy (Overall: 63%, Kappa: 56%)[6] of the OBIA classification method suffered from false positive building classifications. An examination of the confusion matrix (Table 3-1) found the user accuracy for structures at 100%, but the producer accuracy was very low at only 8%. In other words, the algorithm was able to correctly classify 100% of the training data classified as structures, but it falsely attributed other image pixels to buildings as well. The algorithm was primarily getting confused with water, shadows, and fields/bare ground and classifying them as buildings. Most likely, these classes shared similar spectral qualities to buildings. The low producer accuracy for our land cover classification of interest prompted the need for an in-depth heads-up digitizing exercise, where building classifications were manually scrutinized and adjusted as needed.

Following the heads-up digitizing exercise, 1,991 structures (Figure 3-3) were found within the study area. Table 3-2 includes the number of structures inundated (flood elevation above ground elevation) by the modeled 100-year Design Flood for the baseline and winter pool alternatives. Increasing the winter operating curve to 789 feet msl would potentially impact nine more structures during the modeled 100-Year Design Flood than the current winter operating curve.

[6] Kappa measures the degree of agreement between the training data and classifications made by the algorithm. It is an accuracy measure; generally the higher the Kappa, the better the model.

TABLE 3–1 CONFUSION MATRIX FOR OBJECT BASED IMAGE ANALYSIS (OBIA) ALGORITHM

	Structure	Vegetation	Water	Shadow	Field/Bare	Roads	User Accuracy
Structure	388	0	0	0	0	0	1
Vegetation	0	4992	12	256	167	15	0.91
Water	385	0	4684	653	51	0	0.81
Shadow	247	2	298	4010	1	0	0.88
Field/Bare	3980	5	6	81	4735	4908	0.34
Roads	0	1	0	0	46	77	0.63
Producer Accuracy	0.08	0.99	0.93	0.80	0.95	0.02	

Note the perfect user accuracy for structures, but poor producer accuracy, which created the need for heads up digitizing.

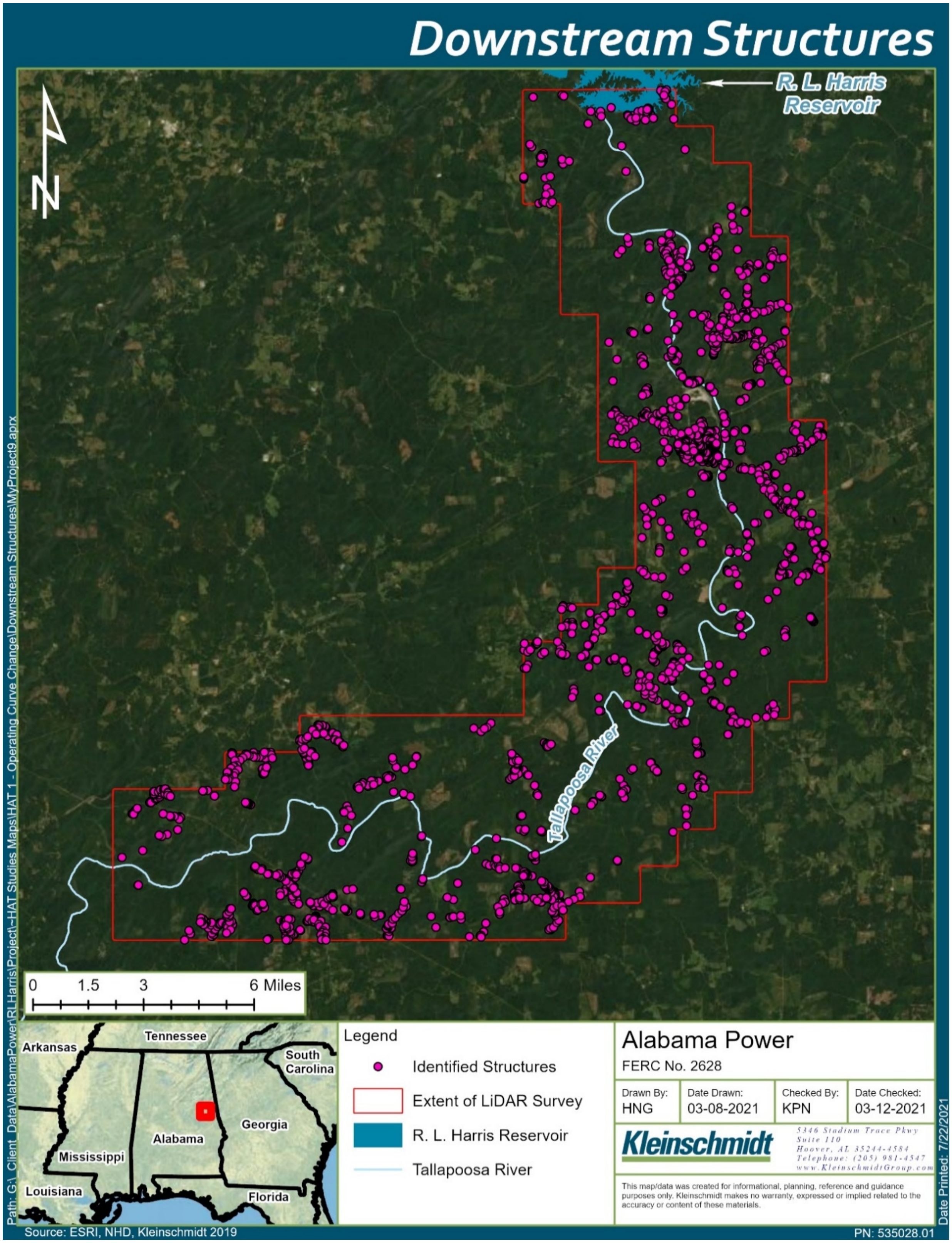

FIGURE 3–3 STRUCTURES IDENTIFIED BELOW HARRIS DAM WITHIN THE LIDAR DATA EXTENT

TABLE 3–2 NUMBER OF DOWNSTREAM STRUCTURES INUNDATED DURING THE MODELED 100-YEAR DESIGN FLOOD BY EACH WINTER POOL ALTERNATIVE

Alternative	No. of Structures Inundated
Baseline (785 feet msl)	79
+1 foot	79
+2 feet	83
+3 feet	83
+4 feet	88

After identifying the structures potentially impacted by the modeled 100-Year Design Flood, a spatial join associated the structures to each county's tax parcel database. Table 3-3 provides the number of structures by tax parcel type effected by each winter pool alternative. As the table shows, the number of single family structures and mobile homes impacted by the modeled 100-Year Design Flood increases as the winter pool alternatives increase.

TABLE 3–3 NUMBER OF DOWNSTREAM STRUCTURES BY TAX PARCEL USE TYPE IMPACTED BY THE 100-YEAR DESIGN FLOOD FOR EACH WINTER POOL ALTERNATIVE

Tax Parcel Use	Winter Pool Alternative				
	785 feet msl (Baseline)	786 feet msl	787 feet msl	788 feet msl	789 feet msl
Residential	1	1	1	1	1
Vacant Agricultural	2	2	2	2	2
Cabin	2	2	2	2	2
Unknown	2	2	2	2	3
Agricultural	4	4	4	4	4
Forestry	6	6	6	6	6
Commercial	6	6	6	6	6
Mobile Home	8	8	9	9	10
Vacant	24	24	25	25	25
Single Family	24	24	26	26	29
Total	79	79	83	83	88

With structures impacted by an increase in the winter operating curve identified, it was possible to count the number of HEC-RAS model timesteps that each structure was inundated. Each time step is an hour in duration; therefore, the count of all timesteps a structure is inundated is a measure of the number of hours it is inundated. Using GIS, the elevation and river mile for each structure was determined, which was then associated to the closest HEC-RAS cross section. Once every model time step was completed, it was determined if the modeled water surface elevation is greater than the ground elevation of the structure. Therefore, for each time step, the structure was considered inundated for one hour. Table 3-4 provides a descriptive summary of the number of hours (timesteps) structures were inundated and Table 3-5 has the number of hours inundated broken down by tax parcel type.

TABLE 3–4 NUMBER OF HOURS (TIMESTEPS) DOWNSTREAM STRUCTURES ARE INUNDATED BY THE MODELED 100-YEAR DESIGN FLOOD FOR EACH WINTER POOL ALTERNATIVE

Alternative	Minimum	25%	Median	75%	Maximum
Baseline (785 feet msl)	3.0	113.0	119.5	130.5	191.0
+1 foot	15.0	107.0	114.0	124.5	191.0
+2 feet	37.0	100.0	108.0	122.25	191.0
+3 feet	59.0	92.0	103.0	122.25	191.0
+4 feet	64.0	85.75	102.0	122.25	191.0

TABLE 3–5 NUMBER OF HOURS (TIMESTEPS) DOWNSTREAM STRUCTURES ARE INUNDATED BY THE MODELED 100-YEAR DESIGN FLOOD FOR EACH WINTER POOL ALTERNATIVE BY TAX PARCEL TYPE

Alternative	Tax Parcel Use	Number	Hours Inundated				
			Minimum	25%	Median	75%	Maximum
Baseline (785 feet msl)	Agricultural	4	132	134.25	138.5	144	150
	Vacant Agricultural	2	126	142.25	158.5	174.75	191
	Cabin	2	93	99	105	111	117
	Forestry	6	113	113.75	117	118	175
	Commercial	6	119	123.25	135	140	143
	Mobile Home	8	37	115.25	125.5	138.25	172
	Residential	1	121	121	121	121	121
	Single Family	24	3	110	119	125	177
	Vacant	24	36	114	119	124	191
	Unknown	2	74	86.5	99	124.5	150
	TOTAL	79					
+1 Foot	Agricultural	4	126	128.25	132.5	138	144
	Vacant Agricultural	2	120	137.75	155.5	173.25	191
	Cabin	2	103	105	107	109	111
	Forestry	6	107	107.5	110	111.75	173
	Commercial	6	113	116.5	129	134	136
	Mobile Home	8	58	109.25	119.5	132.25	171
	Residential	1	115	115	115	115	115
	Single Family	24	15	104	113	119	177
	Vacant	24	51	108	114	118	191
	Unknown	2	95	99	103	122	141
	TOTAL	79					

Alternative	Tax Parcel Use	Number	Hours Inundated				
			Minimum	25%	Median	75%	Maximum
+2 Feet	Agricultural	4	123	125.25	129.5	135.25	142
	Vacant Agricultural	2	116	134.75	153.5	172.25	191
	Cabin	2	95	97.5	100	102.5	105
	Forestry	6	100	100.5	103.5	105.75	173
	Commercial	6	106	113	127.5	133	136
	Mobile Home	9	63	103.25	115.5	131.75	171
	Residential	1	109	109	109	109	109
	Single Family	26	37	98	106	116	177
	Vacant	25	59	101	108	116	191
	Unknown	2	94	95	96	117	138
	TOTAL	83					
+3 Feet	Agricultural	4	123	124.5	129	135.25	142
	Vacant Agricultural	2	115	134	153	172	191
	Cabin	2	88	90.25	92.5	94.75	97
	Forestry	6	92	92.25	94.5	99	173
	Commercial	6	104	113	127.5	133	136
	Mobile Home	9	77	94.25	115.5	131.75	171
	Residential	1	101	101	101	101	101
	Single Family	26	59	90	101	116	177
	Vacant	25	64	92	98	116	191
	Unknown	2	87	87.5	88	112.5	137
	TOTAL	83					
+4 Feet	Agricultural	4	123	124.5	129	135.25	142
	Vacant Agricultural	2	113	132.5	152	171.5	191
	Cabin	2	82	84.25	86.5	88.75	91
	Forestry	6	85	85.75	90	96.5	173
	Commercial	6	104	113.75	127.5	133	136
	Mobile Home	10	76	89.25	114	131.75	171
	Residential	1	96	96	96	96	96
	Single Family	29	64	83	95	116	177
	Vacant	25	73	87	94	116	191
	Unknown	3	79	80.5	82	109.5	137
	TOTAL	88					

Table 3-4 and Table 3-5 show that although the four foot winter pool increase has the largest impact in terms of number of structures inundated, the median duration of inundation was the lowest. This phenomenon occurs because changes to the winter operating curve increase the starting pool elevation and Harris has less storage available in the reservoir to store floodwaters before Alabama Power must begin releasing water. Therefore, the downstream flood is more intense in terms of magnitude (greater rise) since water is released more quickly due to the higher reservoir elevation and less storage (Appendix B, Figure B-1). Additionally, after the flood, the reservoir returns to a water level that is 4 feet higher than the baseline elevation, which means Alabama Power can stop releasing water sooner than under the baseline. In other words, under existing conditions (baseline), Harris Reservoir is able to absorb more flood water because there is more storage available to use for flood control. Therefore, currently the magnitude of the inundation for each structure is lower because the peak of the flood hydrograph is attenuated by having smaller magnitude floodwaters released over a longer time.

The analysis of the duration of inundation of downstream structures is different than increases in flood duration presented in the Phase 1 Report. The Phase 1 Report provided the results of how the flood duration for each operating curve alternative exceeded the maximum existing conditions (baseline) flood elevation. The Phase 1 Report showed that the greater the proposed change in the winter operating curve, the longer the duration that downstream flooding exceeds the maximum flood elevation under existing conditions.

To further illustrate this, Figures 3-4 and 3-5 show the river stage hydrographs for the different winter pool alternatives at the Malone and Wadley cross sections, respectively. Both figures show two horizontal dotted lines; the upper line represents the maximum flood elevation under existing conditions (baseline), and the lower line represents the elevation of a hypothetical downstream structure. Both figures indicate that any of the winter pool alternatives would result in peak flood elevations greater than baseline, but the river stage drops below the ground elevation of the structure sooner for the winter pool alternatives compared to baseline.

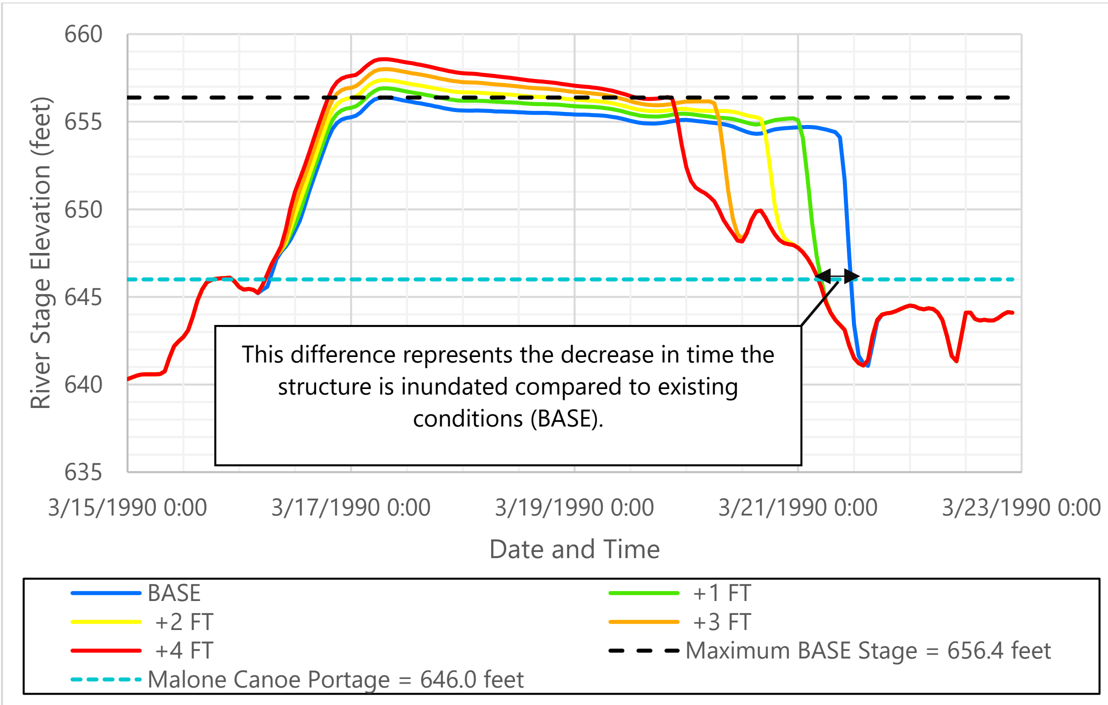

FIGURE 3–4 TALLAPOOSA RIVER STAGE HYDROGRAPHS AT RM 129.7 (MALONE) FROM RESULTS OF 100-YEAR DESIGN FLOOD IN HARRIS-MARTIN HEC-RAS MODEL

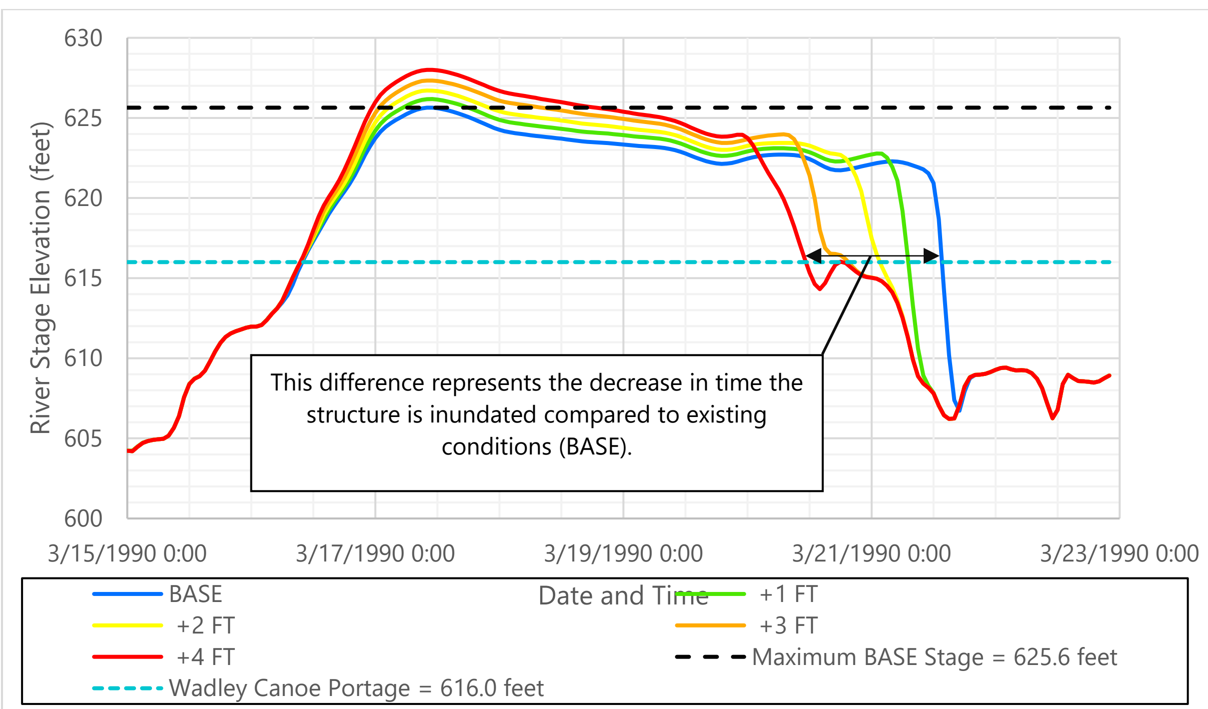

FIGURE 3–5 TALLAPOOSA RIVER STAGE HYDROGRAPHS AT RM 122.7 (WADLEY) FROM RESULTS OF 100-YEAR DESIGN FLOOD IN HARRIS-MARTIN HEC-RAS MODEL

3.3 Water Quality

As indicated in the Study Plan, water quality was assessed using existing information, Phase 1 Results, and an additional water quality model developed for the Phase 2 analysis.

3.3.1 Methods

Alabama Power commissioned the development of a three-dimensional Environmental Fluid Dynamics Code (EFDC) hydrodynamic and water quality model for Lake Harris (Dynamic Solutions 2020). A report detailing the development, calibration, and validation of the model is provided as Appendix C. It should be noted that the EFDC model was used to evaluate the potential effects of an operating curve change on water quality and it does not reflect Alabama Power's ability to meet state water quality standards. The calibrated and validated EFDC model of Harris Reservoir was used to evaluate the effects of each winter pool alternative on water temperature and dissolved oxygen in the forebay area of Harris Reservoir. Further, the effects of each winter pool alternative on Harris Dam discharge were evaluated based on temperature and dissolved oxygen changes at the intake elevation of the penstock. For all winter pool alternatives, the EFDC model of Lake Harris was run for the 6-year period from January 1, 2014 to December 31, 2019.

3.3.2 Results

Harris Reservoir

Since retention time is a function of reservoir volume and release rate, increasing the winter pool elevation would result in increased winter reservoir volume thereby increasing retention time. Since the EFDC model simulation showed little difference in water temperature and dissolved oxygen in the forebay between the baseline and the four winter pool alternatives, it is likely that other areas of the reservoir would also exhibit minimal differences among the winter pool alternatives.

Tallapoosa River Downstream of Harris Dam

The EFDC model indicated only small differences in simulated water temperature and dissolved oxygen in the withdrawal zone of the forebay between the baseline and the four winter pool alternatives. The model simulation results indicated that raising the winter operating curve up to four feet would result in only minor differences in water temperature and dissolved oxygen in the dam discharge (Dynamic Solutions 2020).

3.4 Water Use

As indicated in the Study Plan, water use was assessed using existing information and Phase 1 Results.

3.4.1 Methods

The effects of the winter pool alternatives on existing and potential water withdrawals in Harris Reservoir and the Tallapoosa River downstream of Harris Dam were qualitatively assessed. The Water Quantity, Water Use, and Discharge Report for the R.L. Harris Project (Kleinschmidt 2018b) provided locations of water users and average maximum daily volumes of water discharged or withdrawn by water users. HEC-ResSim was used to determine the effect of an increase in winter operating curve on available water in Harris Reservoir. HEC-RAS modeling was used to assess how changes in outflow from Harris Dam could affect water users in tributaries and the mainstem of the Tallapoosa River downstream of Harris Dam.

3.4.2 Results

Harris Reservoir

The Lakeside Campground and Marina withdraws groundwater near Cohobadiah Creek, a tributary to Harris Reservoir (Kleinschmidt 2018b); however, the well is located at an elevation greater than 793 feet msl, which is outside of Harris Reservoir and the Harris Project Boundary (Project Boundary). The Wedowee Water, Sewer, and Gas Board (WSGB) withdraws from and discharges to the upper Little Tallapoosa River (Kleinschmidt 2018b) and is the only water user that withdraws within the Project Boundary.

The Wedowee WSGB withdraws from the upper Little Tallapoosa River a daily average of 0.411 million gallons per day (mgd) (0.636 cfs) and a permitted daily maximum of 0.50 mgd (0.774 cfs) and discharges a daily average of 0.045 mgd (0.070 cfs) and a daily maximum of 0.150 mgd (0.232 cfs) (Kleinschmidt 2018b).

A potential increase in the winter operating curve is expected to have no negative impact on current or potential future water users. Each one foot winter operating curve increase provides additional water available for use during the winter. While Alabama Power does not guarantee any amount of water to be available for withdrawal at any time, increased winter operating curve elevations could increase peak elevation in drought years and store more water into the dry season. An increase in the winter operating curve would also increase the assimilative capacity of the Little Tallapoosa River arm of Harris Reservoir, which the Wedowee Water, Sewer, and Gas Board discharges into; however, this increase may be negligible and there are no reported issues with the existing assimilative capacity.

Tallapoosa River Downstream of Harris Dam

The Roanoke Utilities Board has two surface water intakes and one discharge point in Highpine Creek (Kleinschmidt 2018b), a tributary leading to the Tallapoosa River downstream of the Harris Project. Water use by the Roanoke Utilities Board would not be impacted by changes to the winter operating curve, because the intakes are located over 14 miles upstream of the confluence of Highpine Creek and the Tallapoosa River. The Town of Wadley Water System has one discharge in Hutton Creek (Kleinschmidt 2018b), a tributary leading to the Tallapoosa River downstream of the Harris Project. Because the amount of water available for assimilative capacity will not decrease due to a change in the winter operating curve, there would be no impact to the Town of Wadley Water System's discharge.

3.5 Erosion and Sedimentation

As indicated in the Study Plan, erosion and sedimentation were assessed using existing information and Phase 1 Results.

3.5.1 Methods

Harris Reservoir

Data (e.g., soil types, slope) were reviewed from the Erosion and Sedimentation Study (Kleinschmidt 2021a) to evaluate the potential effects of each winter pool alternative on erosion and sedimentation areas. Information from the Recreation Evaluation Report (Kleinschmidt 2020) was also used to determine the potential increase in recreation from higher winter operating curve elevations and its effect on erosion and sedimentation areas. Finally, the results of the Erosion and Sedimentation Study were used to determine the risk for occurrence of nuisance aquatic vegetation due to changes in erosion and sedimentation areas resulting from changes to the operating curve. Areas of sedimentation in the reservoir and near creek mouths were qualitatively assessed, and LIDAR data and a Geographic Information System (GIS) were used for Harris Reservoir to estimate the area that could be impacted at each site by each winter pool alternative. While use of historic photos was mentioned in the Study Plan, photos could not be used to assess the effects of the winter pool alternatives due to the limited resolution of publicly available historical photos needed to assess individual erosion areas.

<u>Tallapoosa River Downstream of Harris Dam</u>

The information gathered in the Tallapoosa River from Harris Dam through Horseshoe Bend in the Erosion and Sedimentation Study along with existing LIDAR data and results from the Phase 1 Report 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. While use of historic photos was mentioned in the Study Plan, photos could not be used to assess the downstream effects of the winter pool alternatives due to the limited resolution of publicly available historical photos needed to assess individual erosion areas.

3.5.2 Results

<u>Harris Reservoir</u>

Erosion

The Erosion and Sedimentation Study identified 22 sites on Harris Reservoir that were either experiencing or susceptible to erosion (Appendix D). Because soil types and their associated characteristics can lend to their erodibility, soil types at each of these sites is summarized below (Table 3-6).

TABLE 3–6 HARRIS RESERVOIR EROSION SITES AND ASSOCIATED SOIL TYPES AND CHARACTERISTICS

Erosion Site[1]	Latitude	Longitude	Potential Cause(s) of Erosion/Sedimentation	Description of Exposed Soils	Approximate Slopes (%)	Soil Group Associated Landform Location
E1	33.39649	-85.44412	Natural Factor Independent of Operations, Land Use	Oc, Ochlockonee fine sandy loam	0-2	Floodplains
E2	33.39618	-85.44512	Natural Factor Independent of Operations, Land Use	Oc, Ochlockonee fine sandy loam	0-2	Floodplains
E3	33.39448	-85.44763	Land Use	Oc, Ochlockonee fine sandy loam	0-2	Floodplains
E4	33.39253	-85.44797	Land Use	Oc, Ochlockonee fine sandy loam	0-2	Floodplains
E5	33.38870	-85.44677	Anthropogenic	Oc, Ochlockonee fine sandy loam	0-2	Floodplains
E6	33.38817	-85.45264	No active erosion	Oc, Ochlockonee fine sandy loam	0-2	Floodplains
E7	33.38399	-85.45285	Natural Factor Independent of Operations, Land Use	Bu, Buncombe loamy sand	0-5	Levees
E8	33.37972	-85.45260	Natural Factor Independent of Operations, Land Use	Bu, Buncombe loamy sand	0-5	Levees
E9	33.37732	-85.45879	Natural Factor Independent of Operations, Land Use	LtE, Louisa stony sandy loam	15-40	Overlay weathered bedrock on hillslopes
E10	33.37785	-85.45851	Natural Factor Independent of Operations, Land Use	Oc, Ochlockonee fine sandy loam	0-2	Floodplains
E11	33.38727	-85.47761	No active erosion	Mantachie fine sandy loam	0-2	Floodplains

Erosion Site[1]	Latitude	Longitude	Potential Cause(s) of Erosion/Sedimentation	Description of Exposed Soils	Approximate Slopes (%)	Soil Group Associated Landform Location
E12	33.36759	-85.47331	No active erosion	Oc, Ochlockonee fine sandy loam	0-2	Floodplains
E13	33.36509	-85.47680	No active erosion	MaD3, Madison gravelly clay loam	10-15	Hillslopes
E14	33.36407	-85.47728	Natural Factor Independent of Operations, Land Use	Oc, Ochlockonee fine sandy loam	0-2	Floodplains
E15	33.37197	-85.49914	No active erosion	LgE, Louisa gravelly sandy loam	15-40	Hillslopes
E16	33.37216	-85.50173	No active erosion	LtE, Louisa stony sandy loam	15-40	Overlay weathered bedrock on hillslopes
E17	33.37371	-85.50122	No active erosion	Mt, Mantachie fine sandy loam	0-2	Floodplains
E18	33.35833	-85.49693	Land Use, Anthropogenic	LtE, Louisa stony sandy loam	15-40	Overlay weathered bedrock on hillslopes
E19	33.35334	-85.50611	Land Use, Anthropogenic	LtE, Louisa stony sandy loam	15-40	Overlay weathered bedrock on hillslopes

Erosion Site[1]	Latitude	Longitude	Potential Cause(s) of Erosion/Sedimentation	Description of Exposed Soils	Approximate Slopes (%)	Soil Group Associated Landform Location
E20	33.35544	-85.51280	No active erosion	LtE, Louisa stony sandy loam	15-40	Overlay weathered bedrock on hillslopes
E21	33.33941	-85.55814	Anthropogenic	MdC2, Madison gravelly fine sandy loam	6-10	Hillslopes
E24	33.34779	-85.51483	Anthropogenic	DaD3, Davidson gravelly clay loam	10-15	Hillslopes

[1] Note that sites E22 and E23 are located downstream of Harris Dam.

Review of LIDAR information at these sites shows that none of the winter pool alternatives would likely affect existing erosion, as water levels will remain below where the erosion is taking place at these sites. Most of the existing erosion sites exhibited hard clay, bedrock, or increased amounts of larger rock (i.e., cobble/boulders) substrates below the current summer pool elevation of 793 feet msl. Because the substrates below summer pool at the erosion sites are stable, there should be no increase in erosion as a result of a winter operating curve change. One primary cause of erosion on Harris Reservoir noted in the Erosion and Sedimentation Study was the impact created by anthropogenic disturbance (Kleinschmidt 2021a). Examples of this type of disturbance include bank clearing/clear-cutting and boat-induced wave action. With an increase in the operating curve during the winter, the lake could experience an increase in recreation/boating activity. This is a result of fewer boating hazards introduced during low water periods and more dock and boat ramp access. Section 3.9 of this report assesses the expected increase in lake recreation structure access as a result of each winter pool alternative.

With each incremental increase in the winter operating curve, increased numbers of recreation structures around the lake become available for use. These structures include: boardwalks, boathouses, floats, piers, and wet slips. This likely will correlate with incremental increases to boater recreation during the winter months. With the expected increase in boater recreation during "off-season" periods (i.e., winter months), boat wave action may increase, and reservoir banks could endure an increase in exposure to erosive forces. However, none of the identified erosion sites will be affected as the erosion at these sites occurs well above the winter pool alternative elevations.

Sedimentation and Invasive Aquatic Vegetation

Nine sedimentation areas were identified in the Erosion and Sedimentation Study. Approximate surface area was calculated for the identified sedimentation areas using the 2015 LIDAR data (Table 3-7). The acreage for each winter pool alternative was also calculated using the 2015 LIDAR.

TABLE 3–7 INCREASE IN SURFACE AREA OF SEDIMENTATION SITES ON HARRIS RESERVOIR FOR EACH WINTER POOL ALTERNATIVE

Site	Latitude	Longitude	Baseline Acreage	+1 foot	+2 feet	+3 feet	+4 feet
S1	33.3763	-85.472	23.83	3.95	5.66	4.25	5.95
S2	33.3672	-85.478	4.96	1.93	0.93	0.27	0.15
S3	33.3659	-85.482	10.51	4.42	1.01	1.62	2.94
S4	33.3662	-85.485	5.49	1.51	1.27	2.34	0.13
S5	33.3605	-85.486	6.68	2.57	2.70	0.73	0.23
S6	33.3743	-85.514	13.55	7.11	2.14	1.18	0.83
S7	33.3264	-85.489	26.14	7.07	5.46	5.15	3.13
S8	33.4538	-85.61	10.59	0.93	1.32	1.46	1.78
S9	33.3065	-85.629	18.25	6.54	2.57	1.90	1.81

The sedimentation areas were also surveyed for the growth of invasive aquatic vegetation. Field surveillance conducted during 2020 did not detect any submerged aquatic vegetation (SAV) populations on the reservoir. The survey did identify some emergent vegetation growing in some of the areas. Results of the 2020 survey are found in Table 3-8.

Sedimentation rates on the reservoir will be relatively unchanged by a higher winter operative curve, while changes to depositional patterns could result; however, methods to predict these changes do not exist. Sedimentation areas will continue to be most prevalent in upstream areas of the major tributaries. Because sedimentation rates are entirely dependent on upstream, non-project related forces, changes to the operating curve will not affect reservoir sedimentation rates. Higher winter operating curve elevations could contribute to increased sedimentation area size over time. Drawdown periods that expose areas of accumulated sediment allow for winter and early spring rains to flush sediment to deeper depths, reducing overall size.

Risk of establishment of SAV populations is increased as a result of increased “habitat” in the sedimentation areas. Higher winter pool elevations will result in less acreage of exposed sediments during winter. This exposure helps manage any SAV introduced by killing seeds due to freezing, drying, or soil compaction. Furthermore, higher winter operating curve elevations will not allow for winter and early spring rains to flush accumulated sediments to deeper depths, resulting in more shallow water habitat for SAV.

TABLE 3–8 PRESENCE AND SIZE (IN ACRES) OF EMERGENT AQUATIC VEGETATION ON HARRIS RESERVOIR

Site	Location Description	Sedimentation Acreage	American Water-willow	Pickerel Weed	Alligator Weed	Juncus Grass
S1	Little Tallapoosa River	23.83	<0.25	<0.10		
S2	Little Tallapoosa River	4.96	<0.10			
S3	Little Tallapoosa River	6.61	<0.10			
S4	Little Tallapoosa River	5.49				
S5	Little Tallapoosa River	6.68				
S6	Pineywood Creek	13.55	< .25			
S7	Wedowee Creek	26.14	<.25			
S8	Tallapoosa River	10.58	1.00		<0.50	
S9	Fox Creek	18.25	<0.25			<0.25

Tallapoosa River Downstream of Harris Dam

Erosion

The Erosion and Sedimentation Study identified twenty-four sites that were either experiencing or susceptible to erosion (Appendix D). Two of these sites, E22 and E23, were located along the Tallapoosa River downstream of the dam. In addition, the downstream streambank assessment (Trutta 2019) identified (by river mile downstream of Harris Dam) additional streambank segments scoring as "slightly impaired" or worse (Table 3-9). A slightly impaired segment is defined as banks showing moderate erosion impact or some impact from human development. Impaired banks are defined as areas with a surrounding area consisting of more than 50% exposed soil with low riparian diversity or surface protection. Obvious impacts are from cattle, agriculture, industry, and poorly protected streambanks (Trutta 2019).

TABLE 3–9 MOST IMPAIRED STREAMBANK SEGMENTS ON THE TALLAPOOSA RIVER DOWNSTREAM OF HARRIS DAM

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

[1] Left bank or right bank is a reference to the side of the river when traveling downstream.
[2] Bank Condition Scores: 1-Fully Functional, 2-Functional, 3-Slightly Impaired, 4-Impaired, 5-Non-Functional.
Source: Trutta 2019

Consistent with much of the streambank along the Tallapoosa River between Lake Harris and Lake Martin, many of these banks are steep sided and, as identified in the Phase 1 Report, are more apt to contain higher flood flows. Soils in these areas are more susceptible to erosion when streambank vegetation is disturbed or clear-cut, as identified in the Erosion and Sedimentation Study. Soils at sites E22 and E23, along with large portions of the streambanks between Harris Dam and Lake Martin are constituted of sand and loam, which are more susceptible to erosion. Because steeper banks contain the higher flood flows and do not overtop as easily, streambanks could experience increased scour. Increased scour would occur as velocities increase with the higher channelized flows resulting from the decreased storage in Harris Reservoir associated with higher winter operating curve elevations (for example, see the percent increase in spillway operations and at turbine capacity resulting from the winter operating curve alternatives in Appendix B, Table B-4).

Sedimentation

The Erosion and Sedimentation Study did not identify any sedimentation areas downstream of the Harris Dam. Subsequent agency and stakeholder consultation identified sedimentation at the Cornhouse Creek and No Business Creek confluences. Sandbar or delta sediment accumulation is a common natural process found at stream confluences. Because the creeks are free flowing, these creeks likely carry a considerably higher sediment load than the impounded Tallapoosa River. Sediment accumulation will ebb and flow as seasonal higher flows in the Tallapoosa River remobilize the deposited sediments downstream.

3.6 Aquatic Resources

As indicated in the Study Plan, the effects of increasing the winter operating curve on aquatic resources (fish spawning and fish entrainment) were assessed using existing information and Phase 1 Results.

3.6.1 Methods

Fish Spawning

The effects of increasing the winter operating curve on fish spawning in Harris Reservoir and the Tallapoosa River downstream of Harris Dam were qualitatively and quantitively assessed. The HEC-ResSim model and LIDAR were used to determine the effects of increasing the winter operating curve on wetted perimeter and littoral area of Harris Reservoir. The HEC-RAS model was used to determine the effects of winter pool alternatives on time spent in spillway operations and at turbine capacity.

Fish Entrainment

The Desktop Fish Entrainment and Turbine Mortality Report (Kleinschmidt 2018a) estimated the rate of fish entrainment at Harris Dam under current operations using a database of fish entrainment information by the Electric Power Research Institute (EPRI 1992). Information used for the study were derived from specific studies on projects that are similar to Harris with regard to geographic location, station hydraulic capacity, station operation, and fish information (species, assemblage, water quality) and that had available entrainment data (Kleinschmidt 2018a). Estimated turbine-induced mortality rates were then applied to fish entrainment estimates to determine potential fish mortality.

Turbine-induced mortality rates can vary based on the volume or velocity of water passing through turbines. The effects of an operating curve change on fish entrainment at Harris Dam were assessed based on changes in volume and velocity of water passing the turbines.

3.6.2 Results

<u>Fish Spawning</u>

Harris Reservoir

Harris Reservoir contains many primarily warm water species and many popular sport fishes, such as Largemouth Bass (*Micropterus salmoides*), Alabama Bass (*Micropterus henshalli*), Black Crappie (*Pomoxis nigromaculatus*), Redear Sunfish (*Lepomis microlophus*), Bluegill Sunfish (*Lepomis macrochirus*), White Bass (*Morone chrysops*), Flathead Catfish (*Pylodictis olivaris*), Blue Catfish (*Ictalurus furcatus*), and Channel Catfish (*Ictalurus punctatus*). During the spring, Alabama Power coordinates with the Alabama Department of Conservation and Natural Resources (ADCNR) to manage Harris Reservoir levels for the benefit of fish species (e.g., Largemouth Bass and crappie) that spawn in littoral (near-shore) areas. Based on input from ADCNR and when conditions permit, Alabama Power voluntarily maintains the lake at a stable or a slightly rising elevation for a period of 14 days to increase the spawning success of these species. An increase in the winter operating curve would increase the littoral area used by spawning fish in the early spring. At the existing winter operating curve of 785 feet msl, approximately 1,622 acres of shoreline are exposed. Winter operating curves of 786, 787, 788, and 789 feet msl would create an additional 276, 506, 804, and 944 acres of wetted area, respectively (Table 3-10). Additional wetted perimeter could provide additional spawning area during drought years.

TABLE 3–10 INCREASE IN RESERVOIR SURFACE AREA FOR EACH WINTER POOL ALTERNATIVE

Alternative	Reservoir Area (Acres)	Area Increase Compared to Baseline (Acres)
Baseline (785 feet msl)	8,341.78	0
+1 foot	8,618.13	276.35
+2 feet	8,848.22	506.44
+3 feet	9,145.52	803.74
+4 feet	9,285.35	943.57

Additional wetted area in Harris Reservoir would reduce desiccation of aquatic plants in littoral areas during winter drawdown and would be subject to increased aquatic plant growth, which could have a positive effect on the fishery (Durocher 1984; Bettoli et al. 1993) by increasing spawning areas and structure for young-of-year fish and benthic invertebrates. However, the increased aquatic plant growth associated with additional wetted area could have adverse effects, such as the establishment of invasive species (Spencer 2003) and necessitate the increased use of herbicidal controls.

Tallapoosa River Downstream of the Harris Project

Modeling results show that increasing the winter operating curve results in greater outflow from Harris Dam and subsequent flooding associated with outflow (Appendix B, Table B-4). Spill occurs at Harris 0.2 percent of the time under baseline operations. Winter operating curves of 786, 787, and 788 feet msl increased the frequency of spill to 0.3 percent of the time. A winter pool of 789 feet msl increased the frequency of spill to 0.4 percent. Percent of time spent at turbine capacity is 0.7 percent under baseline operations, increases to 0.8 percent at winter operating curves of 787 and 788 feet msl, and increases to 1.0 percent at a winter operating curve of 789 feet msl. Operating at turbine capacity can impact spawning sites and spawning behavior (Irwin et al. 2001; Martin 2008), but the increases in time spent in spillway operations and at turbine capacity are small and would likely occur most often in the winter, outside of spawning season.

Fish Entrainment

The volume and velocity of water passing through the turbines would not change under a different winter operating curve; therefore, fish entrainment is not expected to change under any of the winter pool alternatives.

3.7 Wildlife, Threatened and Endangered Species

As indicated in the Study Plan, the effects of increasing the winter operating curve on wildlife resources and threatened and endangered species were assessed using existing information and Phase 1 Results.

3.7.1 Methods

Wildlife and Terrestrial

Data were reviewed from the Pre-Application Document (PAD) (Alabama Power and Kleinschmidt 2018) to evaluate the potential effects of each winter pool alternative on Wildlife and Terrestrial Resources.

Threatened and Endangered Species

Data (e.g., species habitat range, species surveys, etc.) were reviewed from the Threatened and Endangered Species Study (Kleinschmidt 2021b) to evaluate the potential effects of each incremental winter operating curve elevation on threatened and endangered species (T&E).

3.7.2 Results

Wildlife and Terrestrial

Harris Reservoir

The proposed one to four foot increase in the winter operating curve would increase availability of shallow littoral habitats in coves and sloughs, which may increase availability of cover and feeding sites for overwintering resident and migratory waterfowl (Appendix E). The proposed higher winter operating curve elevations may similarly increase winter foraging habitat for wading birds (Appendix E). The increased wetted area in coves and sloughs during the winter months may result in marginal increases in availability of shallow breeding sites for early spring breeding amphibians, such as southern leopard frog (*Rana pipiens sphenocephala*), bullfrog (*Rana catesbeiana*), and spotted salamander (*Ambystoma maculatum*) (Mirarchi et al. 2004, as cited in Alabama Power and Kleinschmidt 2018) (Appendix F).

Tallapoosa River Downstream of Harris Dam

Temporary, short-term effects on wetted areas downstream of Harris Dam are expected to occur as a result of a one to four foot increase in the winter operating curve. Although a greater number of flood days are expected due to the one to four foot increase, no long-term effects to wildlife downstream are expected.

Threatened and Endangered Species

Harris Reservoir

An increase in the winter operating curve elevation in Lake Harris of one to four feet would increase the reservoir size by approximately 276 to 944 acres (one foot to four feet, respectively) (Table 3-10). Occupied and critical habitats of T&E species were examined to determine if they may potentially be affected by the one to four foot elevation increase. Habitat ranges of 20 federally-listed T&E species were identified within the Lake Harris Project Vicinity (Table 3-11). Of these species, only the Finelined Pocketbook (*Hamiota altilis*) was determined to have a critical habitat bordering the northernmost portion of the Lake Harris Project Boundary. The U.S. Fish and Wildlife Service (USFWS) recommended field surveys for Finelined Pocketbook, which were subsequently conducted in areas of critical habitat, in the Little Tallapoosa River, and in nearby tributaries in 2019 and 2020. The change in the winter operating curve elevation is not expected to affect the Finelined Pocketbook because no water elevation change is expected to occur within its critical habitat range (Figure 3-6). At the maximum proposed winter operating curve (789 feet msl), water elevation is expected to increase 1.47 RMs upstream when compared to the baseline winter operating curve (785 feet msl) (Figure 3-5). Survey results indicated that much of the critical habitat near the Lake Harris Project Boundary was degraded by siltation, and no Finelined Pocketbook were collected during the November 2019 and 2020 surveys (Kleinschmidt 2021b). No occupied or critical habitat was identified for any other T&E species within the Lake Harris Project Boundary

(Kleinschmidt 2021b). A one to four foot operating curve elevation increase is not expected to have an effect on T&E species within the Lake Harris Project Boundary.

TABLE 3–11 FEDERALLY THREATENED AND ENDANGERED SPECIES POTENTIALLY OCCURRING IN HARRIS PROJECT VICINITY

Scientific Name	Common Name	Federal Status[1]	State Protected	County of Occurrence	Occurrence	Documented Historic Range in Al
Picoides borealis	Red-cockaded Woodpecker	E	Yes	Clay & Randolph	No	Statewide in appropriate habitat
Notropis albizonatus	Palezone Shiner	E	Yes	Jackson	No	Tennessee River system
Erimonax monachus	Spotfin Chub	T	Yes	Jackson	No	Tennessee River system
Hamiota altilis	Finelined Pocketbook	T	Yes	Cleburne	No	Coosa, Tallapoosa, Cahaba River systems
Lampsilis virescens	Alabama Lampmussel	E	Yes	Jackson	No	Tennessee River system
Venustaconcha trabalis	Cumberland Bean	E	Yes	Jackson	No	Tennessee River system
Fusconaia cuneolus	Fine-rayed Pigtoe	E	Yes	Jackson	No	Tennessee River system
Toxolasma cylindrellus	Pale Lilliput	E	Yes	Jackson	No	Tennessee River system
Theliderma cylindrica	Rabbitsfoot	T	Yes	Jackson	No	Tennessee River system
Fusconaia cor	Shiny Pigtoe	E	Yes	Jackson	No	Tennessee River system
Epioblasma triquetra	Snuffbox	E	Yes	Jackson	No	Tennessee River system
Pleurobema georgianum	Southern Pigtoe	E	Yes	Clay & Cleburne	No	Coosa River system
Pleuronaia dolabelloides	Slabside Pearlymussel	E	Yes	Jackson	No	Tennessee River system
Myotis sodalis	Indiana Bat	E	Yes	Clay, Cleburne, Randolph, Chambers, Tallapoosa, & Jackson	Yes	Statewide in appropriate habitat
Myotis septentrionalis	Northern Long-eared Bat	T	Yes	Clay, Cleburne, Randolph, Chambers, Tallapoosa, & Jackson	Yes	Piedmont and Cumberland regions
Myotis grisescens	Gray Bat	E	Yes	Jackson	Yes	Statewide in appropriate habitat
Gratiola ampthiantha	Little Amphianthus	T	No	Randolph, Chambers, & Tallapoosa	Yes	Piedmont region (Bridges 1988)
Platanthera integrilabia	White Fringeless Orchid	T	No	Clay, Cleburne, Jackson, Chambers, & Tallapoosa	No	Talladega National Forest
Apios priceana	Price's Potato-bean	T	No	Jackson	Yes	Statewide in appropriate habitat
Clematis morefieldii	Morefield's Leather Flower	E	No	Jackson	No	Northern regions of state (USFWS 2007)

[1] E = Federally listed as Endangered, T = Federally listed as Threatened
Source: Mirarchi et.al. 2004, USFWS 2016a, USFWS 2016b, Williams et.al. 2008, FERC 2018; as cited in Kleinschmidt 2021b

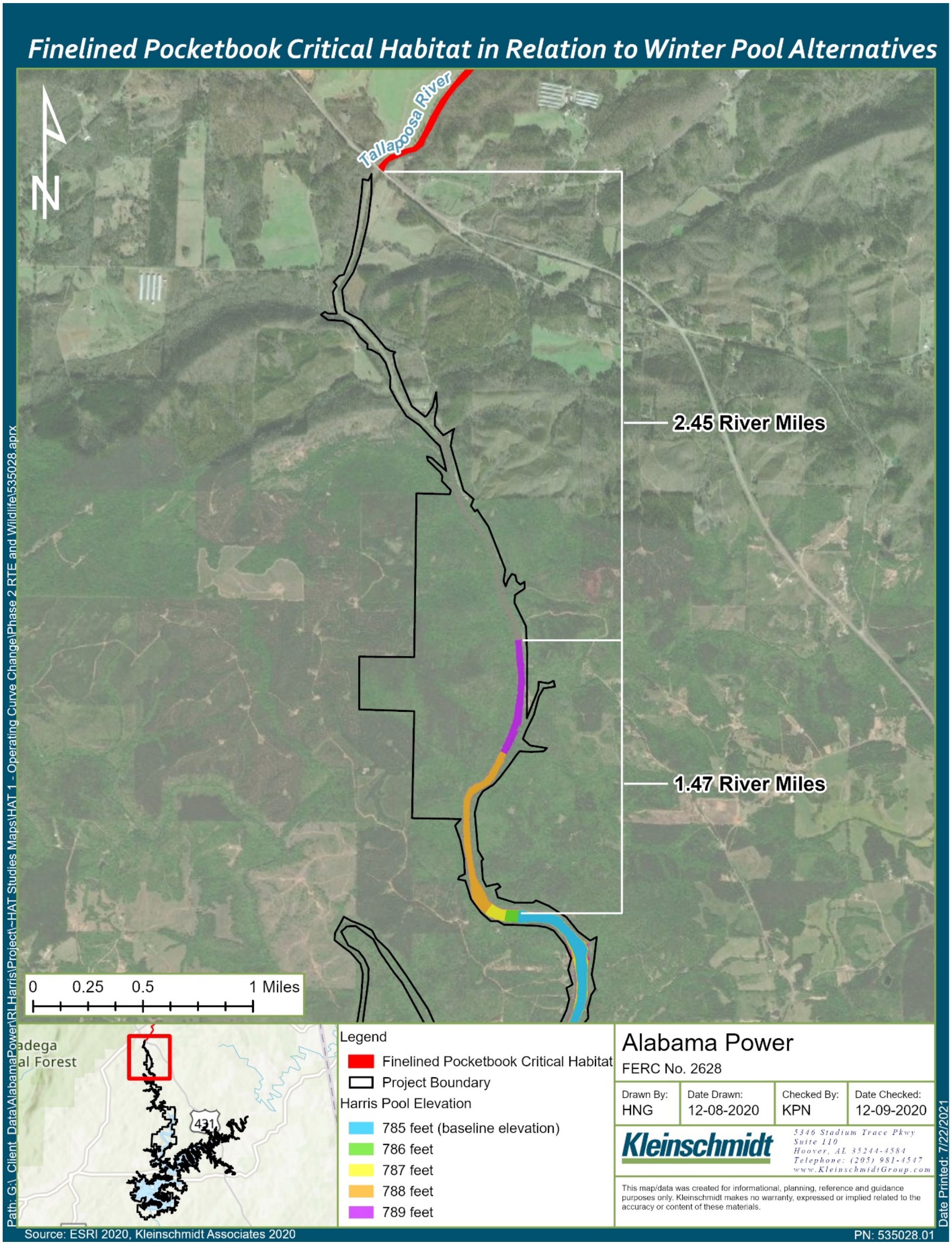

FIGURE 3–6 FINELINED POCKETBOOK CRITICAL HABITAT IN RELATION TO WINTER POOL ALTERNATIVES

Tallapoosa River Downstream of Harris Dam

No T&E species or critical habitats are present in the Tallapoosa River from Harris Dam through the Horseshoe Bend. Therefore, there would be no effects on T&E species from any of the winter pool alternatives.

3.8 Terrestrial Wetlands

As indicated in the Study Plan, the effects of increasing the winter operating curve on terrestrial resources (wetlands) were assessed using existing wetland data and Phase 1 Results.

3.8.1 Methods

Existing wetlands data in and around Harris Reservoir and downstream of Harris Dam in the Tallapoosa River through Horseshoe Bend were obtained. These data were incorporated into GIS, and the evaluation of changes to the winter operating curve indicated if the reservoir wetland areas were inundated or dry based on the winter operating curve alternative. For the Tallapoosa River downstream of Harris Dam, identified wetlands were analyzed based on changes in magnitude and frequency of flood events for each of the winter pool alternatives.

3.8.2 Results

Harris Reservoir

Existing National Wetland Inventory (NWI) data within the Lake Harris Project Boundary depict wetlands present prior to Project construction (Alabama Power and Kleinschmidt 2018). To document post-inundation wetlands, Cahaba Consulting, LLC (2016) conducted a wetland assessment in the winter of 2012 and the spring of 2013 at a pool elevation of 786 feet msl and 793 feet msl, respectively. Detailed methodology for the wetland assessment is presented in Appendix O of the PAD (Alabama Power and Kleinschmidt 2018). A total of 189 wetlands were identified throughout the impoundment's 271 miles of shoreline and islands, totaling 11.35 miles (14.98 acres) of wetland habitat (Alabama Power and Kleinschmidt 2018). Linear feet, quality and type of wetland recorded is provided in Table 3-12.

TABLE 3–12 HARRIS RESERVOIR WETLANDS

Quality	Lacustrine/Littoral on Shoreline		Shoreline and Alluvial Wetlands
	Linear Feet	Miles	Wetland Acres
Poor	5,268	1.00	2.16
Moderate	24,258	4.59	3.45
Good	30,430	5.76	9.28
Total	59,956	11.35	14.98

Source: Cahaba Consulting 2016, as cited in Alabama Power and Kleinschmidt 2018

A one to four foot increase in the winter operating curve elevation could potentially alter the dominant vegetation composition of wetlands bordering Harris Reservoir. Generally, as wetlands become more wetted, trends have involved a shift in dominant vegetation from woody vegetation to more herbaceous vegetation. For example, a freshwater forested/shrub wetland dominated by trees may shift toward a more shrub-dominated wetland. Wetlands bordering between a forested/shrub wetland and an emergent wetland may become more emergent, and emergent wetlands may shift toward ponds. Although these wetlands have a potential to change composition, they are not expected to reduce in size or diminish current habitat because wetland inundation is not expected to occur as a result of a higher winter pool elevation or a more wetted littoral environment. Because a one to four foot increase in elevation of the winter operating curve would increase the acreage of Harris Reservoir (Table 3-10), existing wetlands may also increase in size.

Tallapoosa River Downstream of Harris Dam

Although the modeled 100-Year Design Flood increased inundated acres downstream of Harris Dam for each of the winter pool alternatives, no long-term effects to wetlands downstream are expected from these short term events.

3.9 Recreation

The potential effects of a change in the winter operating curve on recreational use in Lake Harris were examined by using data on recreational access points (the number of private docks useable during the current winter drawdown and the lowest possible elevation that public boat ramps can be used). The number of access points (both private docks and public boat ramps) available at each one foot increment change in winter operating curve elevation were then compared. Further, downstream access sites on the Tallapoosa River were evaluated for any effects from the winter pool alternatives.

3.9.1 Methods

Harris Reservoir

The two key components of determining the usability of a structure are: 1) water depth and 2) the location on the structure at which water depth is measured. Elevation data was gathered during winter pool using LIDAR, a remote sensing method that uses pulsed lasers to measure distances. The elevation data was overlain with aerial imagery of the area so that each pixel of the imagery had an elevation value. Using the elevation data, imagery of the winter operating curve contours was developed (Figure 3-7). These data were used to determine at what elevation water reaches a structure.

FIGURE 3–7 EXAMPLE ELEVATION CONTOURS FOR EACH WINTER POOL ALTERNATIVE

Alabama Power keeps and maintains an inventory of recreation structures on Lake Harris by gathering GPS data near or at each recreation structure and classifying those structures by type (e.g., boathouses, floats, piers, wet slips, and boardwalks). GPS data were converted to a shapefile, which is a file type used to mark geographic locations and provide information on geographic features. Each GPS point, represented by a yellow circle (marker), was then moved to a location on the structure where depth was measured to determine usability.

Depth was calculated using elevation data for each marker that was placed on or upland of the 785 feet msl contour (Figure 3-8). For example, a marker placed at 785.5 feet msl is at a depth of 0.5 feet at a lake surface elevation of 786 feet msl. Because LIDAR cannot penetrate the water's surface, the elevation of markers placed below the 785 feet msl contour (Figure 3-8) was estimated using the slope of the nearby bank to interpolate the slope under the lake's surface.

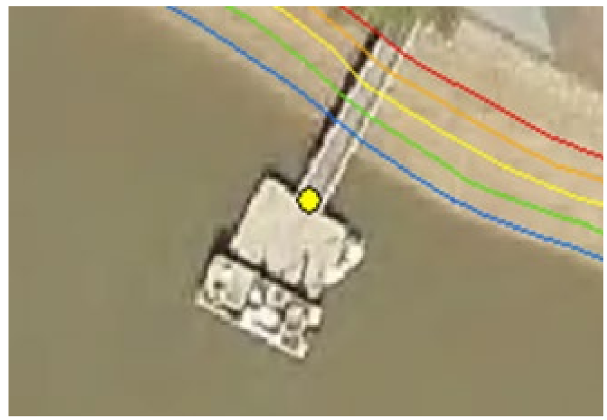

FIGURE 3–8 EXAMPLE OF POINTS USED TO DETERMINE DEPTH OF WATER
The image to the left shows a point on the upland side of a structure; depth was determined from the elevation contour. The image to the right shows a point where the slope of the bank was used to determine depth. The blue elevation contour is the 785 ft msl contour.

Structure Type

Different types of structures may become usable during different conditions; therefore, a single method of analysis could not be applied to all structure types. The amount of depth and location on the structure at which depth was measured was determined separately for each type of private structure (i.e., boathouses, floats, piers, wet slips, and boardwalks) and for public boat ramps.

Boathouses

Boathouses require a certain amount of water to moor a boat and may be oriented allowing boats to enter the structure either parallel or perpendicular to the bank. Regardless of which direction these structures are oriented, a marker was placed at the edge of the structure nearest to the bank (back edge) (Figure 3-9). A depth of two feet at this marker was required to classify these structures as usable.

Floats

Floats are often used to moor boats and are not fixed to the lake bottom, but float on the water's surface. A depth of two feet at the back edge of the structure was required to classify these structures as usable (Figure 3-9); a two foot depth is sufficient to moor a boat on most of the floats. Floats located in shallow areas that have a very gradual sloping lake bottom may not be usable using these standards, but a minimum of two feet at the back edge would keep the structure from resting on dry ground during the winter, preventing possible damage.

Piers

Piers are built in a variety of shapes and lengths and were therefore classified into three sub-categories and analyzed separately. "Platform" piers (Figure 3-9) look similar to floats and are characterized by a long walkway often ending in a square-shaped platform used to moor boats. A depth of two feet at the back edge of this platform was required to classify "platform" piers as usable.

Piers that have no definable platform on the end and therefore no obvious place to measure depth were classified as mooring and fishing piers. Mooring piers were defined as greater than 30 feet in length. The marker was moved 30 feet from the front edge of the pier to provide a sufficient amount of scope to moor a boat (Figure 3-9).

Fishing piers were defined as 30 feet or less in length. The marker was moved midway from the front edge of the pier (away from the bank) to ensure that anglers could fish off the front or could cast underneath the pier (Figure 3-9). A depth of two feet was required to classify the mooring and fishing piers as usable.

Wet Slips

Wet slips are similar to boathouses in purpose and appearance but are not enclosed with walls and a roof. Therefore, wet slips were analyzed similarly to boathouses, with a requirement of two feet of depth at the back edge of the structure regardless of the direction the structure is oriented (Figure 3-9). Wet slips with multiple slips were classified as usable when all slips are usable (Figure 3-9).

Boardwalks

Although boardwalks are not used for access to the reservoir, they are used by visitors to enjoy the scenery or access other structures. The objective analysis on boardwalks is to improve aesthetics during the winter months. A depth of one foot at the front edge of boardwalks was required to classify these structures as usable and to reduce the amount of dry ground around boardwalks (Figure 3-9).

Public Boat Ramps

The ADCNR builds the majority of public boat ramps on Harris Reservoir to be usable at low winter pool. Specifically, most boat ramps are constructed with a 15 percent grade as the bottom edge enters the water at the current winter operating curve of 785 feet msl. This means the bottom edge of the concrete boat ramp is at a depth of 4.5 feet. This standard allows boats up to 26 feet in length to be launched with minimal effort at low winter pool.

The ADCNR was consulted and aerial imagery of Harris Reservoir at winter pool was used to determine which ramps are usable at the current low winter pool. The remaining ramps were analyzed by placing the point at the bottom edge of the concrete ramp and were determined to be usable at a depth of 4.5 feet (Figure 3-9). The lowest elevation at which public ramps are usable was assessed to the nearest 0.5 foot. It is worth noting that a criteria of 4.5 feet of depth at the end of the ramp was applied to all ramps, regardless of the percent grade.

	
Boathouse	Float
	
Platform Pier	Mooring Pier
	
Fishing Pier	Boardwalk

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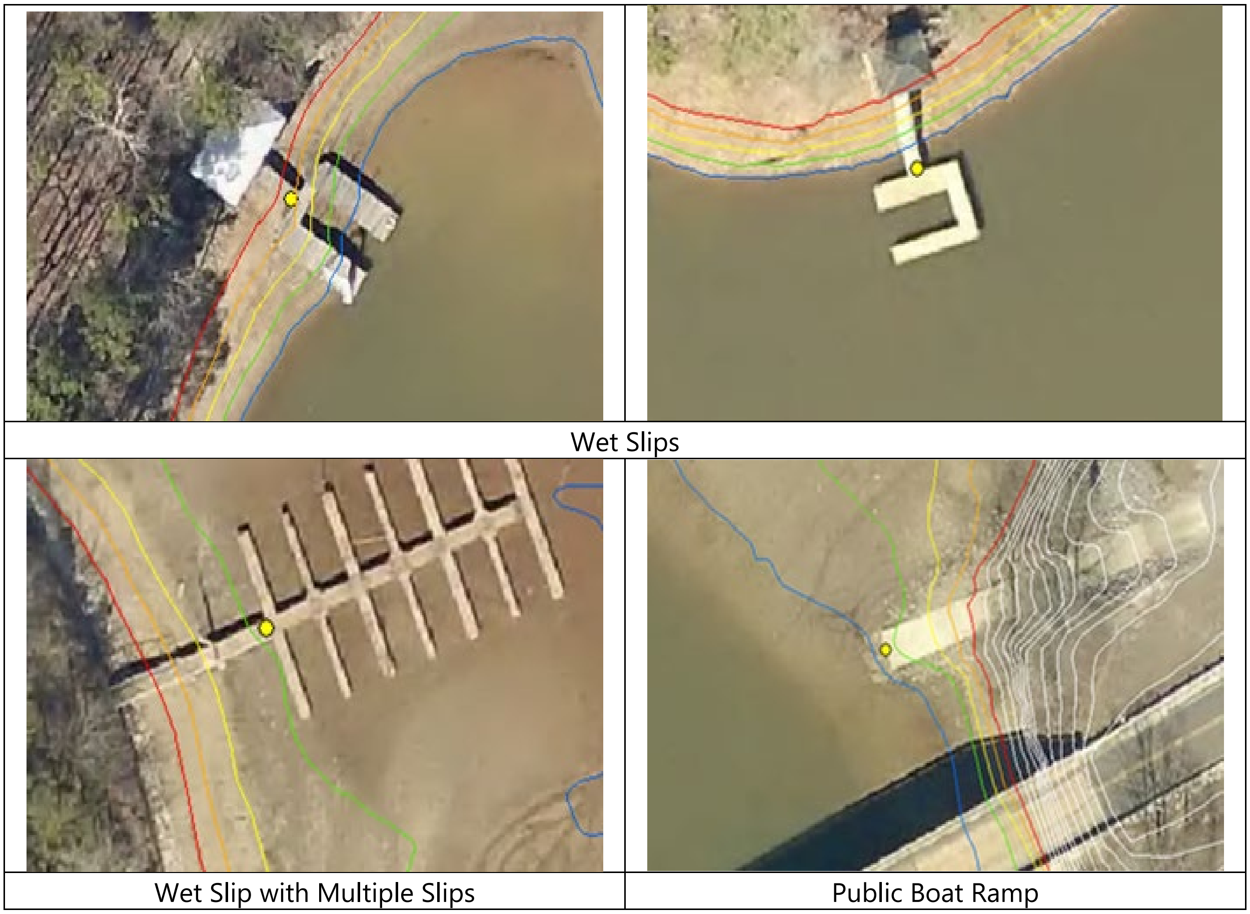

FIGURE 3–9 STRUCTURE TYPES AND THE POINTS AT WHICH USABILITY WAS DETERMINED

Field Assessment

Field confirmation was required for certain structures because: 1) some structures were constructed after the aerial imagery used for analysis was acquired (Figure 3-10) and 2) other structures were not clearly visible on the aerial imagery (i.e., structure is obscured by foliage or shadow on the imagery) (Figure 3-10). During July 2020, the location for depth analysis for these structures was confirmed in the field by acquiring a GPS reading at the physical location on the structure where depth at winter pool alternatives would be calculated. Field confirmation was also used to determine whether some structures were still operational or in use.

FIGURE 3–10 STRUCTURES BUILT AFTER IMAGERY WAS OBTAINED (LEFT) AND STRUCTURES COVERED BY FOLIAGE OR SHADOW (RIGHT)

Tallapoosa River Downstream of Harris Dam

Alabama Power evaluated the change in flood depth and duration at seven recreation sites downstream from Harris Dam. Using LIDAR data, the ground elevations at the access points were identified and, using the HEC-RAS model results from the Phase 1 Report, the peak flood elevation at each location for each winter pool alternative was compared to the ground elevation to determine depth of flooding above that point and the duration that the flood depth was higher than the ground elevation.

3.9.2 Results

Harris Reservoir

Private Structures

There were 2,282 private structures identified on Lake Harris; however, structures that appeared to be severely damaged, abandoned, unmaintained, or that were under construction were omitted from analysis. Omitting these structures resulted in 2,123 private recreation structures. Of these 2,123 structures, the elevation of the marker was estimated for 742 structures, and depths were obtained during the field assessment for 211 structures.

There are 449 usable structures at the current winter operating curve of 785 feet msl (21.1 percent of analyzed structures). This number increases to 642 at 786 feet msl (30.2 percent of total structures), to 826 at 787 feet msl (38.9 percent of total structures), to 1,112 at

788 feet msl (52.4 percent of analyzed structures), and to 1,327 at 789 feet msl (62.5 percent of analyzed structures). Total structure usability is summarized in Table 3-13.

TABLE 3-13 USABILITY OF ALL STRUCTURE TYPES ON HARRIS RESERVOIR AT EACH WINTER POOL ALTERNATIVE

Alternative	Number of Usable Structures[1]	Percentage of Usable Structures	Incremental Percentage Increase
Baseline (785 feet msl)	449	21.1	-
+1 foot	642	30.2	9.1
+2 feet	826	38.9	8.7
+3 feet	1112	52.4	13.5
+4 feet	1327	62.5	10.1

[1] There are 796 structures that would not be usable at any of the proposed alternatives.

A total of 25 boardwalks were analyzed. No boardwalks are usable at the current winter pool, and usability does not increase until lake level reaches 789 feet msl, at which level one boardwalk becomes usable. A total of 929 boathouses were analyzed, 303 of which are usable at the current winter operating curve (2.6 percent of analyzed boathouses). Percentage of usable boathouses increases an average of 12.4 percent (standard error = 1.4) with each one foot increase in winter operating curve. A total of 393 floats were analyzed, 101 of which are usable at the current winter operating curve (25.7 percent of analyzed floats). Percentage of usable floats increases an average of 14.7 percent (standard error = 1.8) with each one foot increase in winter operating curve. A total of 689 piers were analyzed, 37 of which are usable at the current winter operating curve (5.4 percent of analyzed piers). Percentage of usable piers increases an average of 5.1 percent (standard error = 1.7) with each one foot increase in winter operating curve. A total of 87 wet slips were analyzed, eight of which are usable at the current winter operating curve (9.2 percent of analyzed wet slips). Percentage of usable wet slips increases an average of 12.9 percent (standard error = 1.7) with each one foot increase in winter operating curve. Usability by structure type is summarized in Table 3-14.

TABLE 3–14 USABILITY OF ALL STRUCTURES ON HARRIS RESERVOIR BY STRUCTURE TYPE FOR EACH WINTER POOL ALTERNATIVE

Structure Type	Alternative	Number of Usable Structures	Percentage of Usable Structures	Incremental Percentage Increase
Boardwalks (n=25)	Baseline (785 feet msl)	0	0.0	-
	+1 foot	0	0.0	0.0
	+2 feet	0	0.0	0.0
	+3 feet	0	0.0	0.0
	+4 feet	1	4.0	4.0
Boathouses (n=929)	Baseline (785 feet msl)	303	32.6	-
	+1 foot	417	44.9	12.3
	+2 feet	526	56.6	11.7
	+3 feet	675	72.7	16.1
	+4 feet	762	82.0	9.3
Floats (n=393)	Baseline (785 feet msl)	101	25.7	-
	+1 foot	157	39.9	14.2
	+2 feet	204	51.9	12.0
	+3 feet	282	71.8	19.9
	+4 feet	332	84.5	12.7
Piers (n=689)	Baseline (785 feet msl)	37	5.4	-
	+1 foot	52	7.5	2.1
	+2 feet	71	10.3	2.8
	+3 feet	114	16.5	6.2
	+4 feet	178	25.8	9.3
Wet Slips (n=87)	Baseline (785 feet msl)	8	9.2	-
	+1 foot	16	18.4	9.2
	+2 feet	26	29.9	11.5
	+3 feet	41	47.1	17.2
	+4 feet	53	60.9	13.8

Public Boat Ramps

Boat ramps determined to be usable at the current winter operating curve were the Highway 48 Bridge, Big Fox Creek, Crescent Crest, and Foster's Boat Ramps. In addition, Lonnie White Boat Ramp is currently used by recreators during winter pool (Figure 3-11). Although Lonnie White is currently in use at winter pool, the ramp does not extend far into the reservoir and it may not be possible to launch larger boats without backing the trailer off the edge of the concrete slab. The ramp currently extends about 15 feet into the reservoir and the edge of the concrete slab is approximately 2.5 feet deep at current winter pool. The ADCNR is currently extending the Lonnie White Boat Ramp an additional 15 feet so that it can be fully usable at winter pool by the winter of 2021. The lowest elevation Lonnie White Boat Ramp is usable is about 787.5 feet msl currently.

Aerial imagery shows Swagg Boat Ramp in use by multiple recreators during winter pool, but it appears only a small portion of the ramp is submerged and launching under winter conditions does not appear ideal (Figure 3-12). Swagg Boat Ramp does not become usable under the criteria of this study until lake elevation reaches 790 feet msl. Lee's Bridge and Little Fox Creek Boat Ramps become usable at 790 and 791.5 feet msl, respectively. The elevations at which public ramps become usable is summarized in Table 3-15.

FIGURE 3–11 AERIAL IMAGE OF LONNIE WHITE BOAT RAMP AT A RESERVOIR LEVEL OF APPROXIMATELY 785 FEET MSL

Note: Lonnie White is frequently used during winter pool, but improvements will lengthen the ramp and increase usability by the drawdown of 2021.

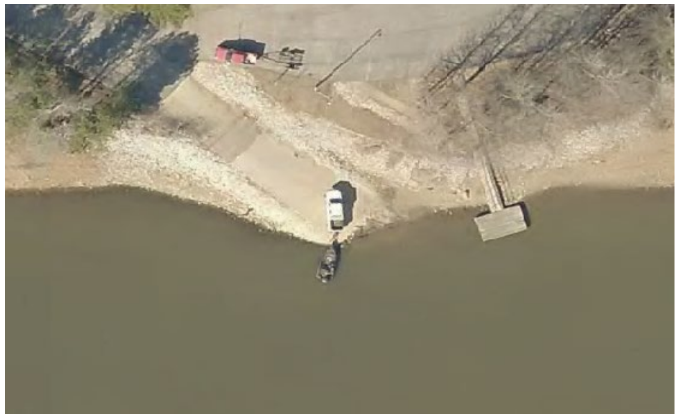

FIGURE 3–12 EXAMPLE OF LIMITED WINTER USE AT SWAGG BOAT RAMP AT A RESERVOIR LEVEL OF APPROXIMATELY 785 FEET MSL

TABLE 3–15 PUBLIC BOAT RAMP USABILITY AT THE LOWEST POSSIBLE RESERVOIR ELEVATION

Boat Ramp	Lowest Reservoir Elevation Usable (feet msl)
Big Fox Creek	785.0
Crescent Crest	785.0
Foster's Bridge	785.0
Hwy 48 Bridge	785.0
Lee's Bridge	791.5
Little Fox Creek	790.0
Lonnie White*	787.5
Swagg**	790.0

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

Tallapoosa River Downstream of Harris Dam

The depth increases and duration of flooding at the seven recreation sites located downstream of Harris Dam are presented in Table 3-16. Table 3-16 shows that the maximum depth of inundation at each recreation site increases as the winter pool alternatives increase. However, the duration of time above the ground elevation that each recreation site is inundated tends to decrease as the winter pool alternatives increase. As explained in Section 3.2.2, this is due to the decreasing amount of storage available in Harris Reservoir for each winter pool alternative compared to existing conditions (baseline).

TABLE 3–16 RECREATION ACCESS SITES BELOW HARRIS DAM AND THE EFFECT OF FLOODING DEPTH AND DURATION FROM EACH WINTER POOL ALTERNATIVE

Location	Type of Access	Approximate Ground Elevation at Access (feet msl)	Baseline Flood Elevation (feet msl)	Depth Increase Above Base (feet)				Flood Duration (hours)				
				+1 foot	+2 feet	+3 feet	+4 feet	Baseline (785 feet msl)	+1 foot	+2 feet	+3 feet	+4 feet
R.L. Harris Dam	Tailwater Fishing	670.0	678.3	0.6	1.1	1.8	2.4	117	110	104	104	104
Malone	Canoe Portage	646.0	655.5	0.5	1.0	1.6	2.1	123	116.5	113.5	113.5	113.5
Wadley Bridge	Canoe Portage	616.0	625.9	0.5	1.1	1.7	2.4	123.5	117.5	112.5	106.5	98
Bibby's Ferry	Canoe Portage	582.0	597.0	0.6	1.1	1.8	2.5	130	124.5	121	120	119.5
Germany's Ferry	Boat Launch Area	569.0	579.9	0.4	0.8	1.2	1.6	148	140	137	136	136
Horseshoe Bend National Military Park	Boat Launch Area	537.0	543.5	0.3	0.5	0.8	1.1	144	137	133.5	132.5	132.5
Jaybird Landing	Boat Launch Area	494.0	503.9	0.4	0.7	1.2	1.6	150	140.5	138	137	137

Note: Flood duration is the time that the water surface elevation exceeds the ground elevation of each access point. An elevation for each access point was obtained using the digital elevation.

3.10 Cultural Resources

As indicated in the Study Plan, the effects of increasing the winter operating curve on cultural resources were assessed using existing information and Phase 1 Results.

3.10.1 Methods

Existing information (LIDAR, aerial imagery) was used, along with expert opinion, to evaluate cultural resources that may be impacted by reservoir fluctuation. Ninety-six cultural resources on Harris Reservoir were reviewed for possible effects from the winter pool alternatives.[7] A primary point of interest is the Miller Covered Bridge pier located at Horseshoe Bend National Military Park.[8] Qualitative information is used in the analysis below (rather than quantitative information noted in the Study Plan) as the cultural resources on Harris Reservoir are still being reviewed.

3.10.2 Results

Harris Reservoir

The most common adverse effects to historic properties, disregarding shoreline modifications, is reservoir fluctuation (raising and lowering) and watercraft activities (Faye 1987; Gage and Herrmann 2009; Keown et al. 1977; Thorne et al. 1987). Minimizing these fluctuations also minimizes periods when archaeological deposits are exposed or lie within the wave-action zone of the reservoir's shoreline. While keeping the water level higher during the winter may provide some benefits through increased inundation and minimizing periods of fluctuation, cultural resources along the shoreline of the Harris Reservoir may also be susceptible to damage as a result of changes in water levels. Effects can result from forces such as wind erosion, recreational activities, and vandalism. The

[7] The Harris PAD identified 327 cultural resources in and around Lake Harris. Harris Action Team (HAT) 6 worked together to identify 96 cultural resources that may be eligible for listing in the National Register for Historic Places (NRHP) and may be affected by Harris Project operations. These 96 cultural resources are still under review and this number may be revised in the final Historic Properties Management Plan.

[8] Miller Covered Bridge was built in 1908 and was once the longest covered bridge in the United States at 600 feet in length. It has become recognized as a significant cultural resource associated with Horseshoe Bend Military Park and, as such, the National Park Service requested specific consideration be taken to the effects of changes to downstream flow. The remnants of the bridge include abutments on the left and right banks of the Tallapoosa River, as well as four stone and masonry piers within the river that are constantly affected by the flow of the river as the piers stand on the riverbed (OAR Personal Communication December 2020).

type and level of effects on cultural resources can vary widely, depending on the setting, size, and visibility of the resource, as well as whether there is public knowledge about the location of the resource (OAR Personal Communication December 2020).

At 785 feet msl, there would be no changes to the impacts to cultural resources on Harris Reservoir. A change to the operating curve above 785 feet msl would leave otherwise exposed cultural resources inundated and less susceptible to water fluctuation, wind erosion, recreational activities, and looting (vandalism), but more susceptible to erosion from variations in currents, general flow pattern fluctuations, and aquatic species nesting activities. With each one foot increase of a higher winter operating curve, potential negative effects on cultural resources would slightly decrease (OAR Personal Communications December 2020).

Tallapoosa River Downstream of Harris Dam

Changing the winter operating curve may result in a change to releases to the Tallapoosa River downstream of Harris Dam. A higher operating curve in the winter may result in more frequent high flow events downstream of Harris Dam. These releases have the potential to impact cultural resources downstream, including the Miller Covered Bridge, exposing them to additional fluctuations and erosion. These releases would be sporadic and would result in irregular inundation periods for the cultural resources downstream of Harris Dam.

4.0 SUMMARY

The purpose of this report is to present the Phase 2 analyses of the winter pool alternatives. In the preceding section, effects on resources were analyzed using the Phase 1 modeling results along with other FERC-approved relicensing study results; both quantitative and qualitative results were presented. The Phase 1 Report included effects on generation, navigation, flood control, drought management, and reservoir level. The primary adverse effect of raising the winter pool is on downstream resources in the form of an increase in flooding as shown by the modeled 100-Year Design Flood (an increase in acres inundated and an increase in flood depth). The primary beneficial effect of raising the winter pool is in the number of reservoir recreational structures (boat slips, docks, etc.) that are available for private recreational use/access during the winter months.

The effects of the winter pool alternatives on all resources are summarized in Table 4-1.

TABLE 4–1 SUMMARY OF EFFECTS OF WINTER POOL ALTERNATIVES

Resource	+1 Foot	+2 Feet	+3 Feet	+ 4 Feet	Notes
Hydro Generation (Revenue)	$(19,400)	$(40,600)	$(52,100)	$(124,900)	Average annual revenue loss across Alabama Power's hydro fleet.
Hydro Generation (Megawatt Hours)	1,448	941	1,671	110	Average annual generation gain across Alabama Power's hydro fleet
Hydro Generation (Revenue)	$(27,100)	$(26,200)	$(24,000	$(60,804)	Average annual revenue loss at the Harris Project
Hydro Generation (Megawatt Hours)	(531)	(418)	(229)	(941)	Average annual generation loss at the Harris Project
Harris Reservoir Elevations	Over the period of record, increasing the winter pool elevation did not affect the amount of time the reservoir was at or above the full summer pool elevation of 793 feet msl.				Increasing the winter pool elevation can result in higher elevations during low flow years compared to the existing operating curve (i.e., baseline).
Downstream Effects of 100-Year Design Flood (Increase in inundated acres and percent increase over baseline)	298 acres (4.9%)	485 acres (7.9%)	686 acres (11.2%)	889 acres (14.6%)	Each incremental increase in winter pool results in an increase in flood depth.

Resource	+1 Foot	+2 Feet	+3 Feet	+ 4 Feet	Notes
Spillway Operation (Number of additional days of spill and percent increase over baseline)	12 (0.1%)	13 (0.1%)	20 (0.1%)	37 (0.2%)	Over the period of record.
Turbine Capacity Operation (Number of additional days of capacity operations and percent increase over baseline)	15 (0.0%)	29 (0.1%)	54 (0.1%)	103 (0.3%)	Over the period of record.
Navigation	No Effect				
Drought Operations	No Effect				
Green Plan Flows (Ability to release GP flows)	No Effect				
Downstream Release Alternatives[9] (Alabama Power's ability to release downstream flow alternatives)	No Effect				
Structures Downstream of Harris Dam (Number of additional structures affected over baseline)	0	4	4	9	

[9] Note that only the Pre-Green Plan, Green Plan, and 150 cfs continuous minimum flow were evaluated in the Phase 1 Report. The modified Green Plan and the other downstream release alternatives were analyzed in this report.

Resource	+1 Foot	+2 Feet	+3 Feet	+ 4 Feet	Notes
Water Quality – Harris Reservoir	No Effect				
Water Quality – Harris Dam Discharge	No Effect				Minor differences in water temperature and dissolved oxygen
Water Use – Harris Reservoir	Minor Beneficial Effect				Increase in winter pool would mean more water is available during the winter and could help reach full pool in the summer
Water Use – Tallapoosa River	No Effect				
Erosion – Harris Reservoir	Minor Adverse Effect				Potential increase in boating during winter may result in additional erosion
Sedimentation – Harris Reservoir	Adverse Effect				Could increase size of sedimentation areas over time due to decreased “flushing” effect; this increase would also provide “habitat” for aquatic vegetation
Erosion – Tallapoosa River	Minor Adverse Effect				Increased potential for scour associated with higher flows and higher spill days due to a decrease in reservoir storage

Resource	+1 Foot	+2 Feet	+3 Feet	+ 4 Feet	Notes
Sedimentation – Tallapoosa River	No Effect				
Aquatic Resources – Harris Reservoir	Beneficial Effect				Increase in wetted area of reservoir would lead to increased productivity
Aquatic Resources – Tallapoosa River	No Effect				
Wildlife – Harris Reservoir	Beneficial Effect				Increase in shallow littoral habitats
Wildlife – Tallapoosa River	No Effect				
T&E Species – Harris Reservoir	No Effect				No species present
T&E Species – Tallapoosa River	No Effect				No species present
Terrestrial Wetlands – Harris Reservoir	Beneficial Effect				Could alter composition of existing wetlands and increase their size
Terrestrial Wetlands – Tallapoosa River	No Effect				
Recreation – Harris Reservoir (Percent increase in usable structures over baseline)	9.1%	17.8%	31.3%	41.4%	

Resource	+1 Foot	+2 Feet	+3 Feet	+ 4 Feet	Notes
Recreation – Tallapoosa River	Minor Adverse Effect				Maximum depth of inundation at formal recreation sites would increase; duration of time above ground elevation would decrease
Cultural Resources – Harris Reservoir	Minor Beneficial Effect				Higher winter pool would leave more cultural resources inundated year round
Cultural Resources – Tallapoosa River	Potential to Adverse Effect				Increased fluctuation of river could adversely affect known cultural resources

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APPENDIX A

ACRONYMS AND ABBREVIATIONS

ACRONYMS AND ABBREVIATIONS

A

A&I	Agricultural and Industrial
ACFWRU	Alabama Cooperative Fish and Wildlife Research Unit
ACF	Apalachicola-Chattahoochee-Flint (River Basin)
ACT	Alabama-Coosa-Tallapoosa (River Basin)
ADCNR	Alabama Department of Conservation and Natural Resources
ADECA	Alabama Department of Economic and Community Affairs
ADEM	Alabama Department of Environmental Management
ADROP	Alabama-ACT Drought Response Operations Plan
AHC	Alabama Historical Commission
Alabama Power	Alabama Power Company
AMP	Adaptive Management Plan
ALNHP	Alabama Natural Heritage Program
APE	Area of Potential Effects
ARA	Alabama Rivers Alliance
ASSF	Alabama State Site File
ATV	All-Terrain Vehicle
AWIC	Alabama Water Improvement Commission
AWW	Alabama Water Watch

B

BA	Biological Assessment
B.A.S.S.	Bass Anglers Sportsmen Society
BCC	Birds of Conservation Concern
BLM	U.S. Bureau of Land Management
BOD	Biological Oxygen Demand

C

°C	Degrees Celsius or Centrigrade
CEII	Critical Energy Infrastructure Information
CFR	Code of Federal Regulation
cfs	Cubic Feet per Second
cfu	Colony Forming Unit
CLEAR	Community Livability for the East Alabama Region
CPUE	Catch-per-unit-effort
CWA	Clean Water Act

D

DEM	Digital Elevation Model
DIL	Drought Intensity Level
DO	Dissolved Oxygen
dsf	day-second-feet

E

EAP	Emergency Action Plan
ECOS	Environmental Conservation Online System
EFDC	Environmental Fluid Dynamics Code
EFH	Essential Fish Habitat
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act

F

°F	Degrees Fahrenheit
ft	Feet
F&W	Fish and Wildlife
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FNU	Formazin Nephelometric Unit
FOIA	Freedom of Information Act
FPA	Federal Power Act

G

GCN	Greatest Conservation Need
GIS	Geographic Information System
GNSS	Global Navigation Satellite System
GPS	Global Positioning Systems
GSA	Geological Survey of Alabama

H

Harris Project	R.L. Harris Hydroelectric Project
HAT	Harris Action Team
HEC	Hydrologic Engineering Center
HEC-DSSVue	HEC-Data Storage System and Viewer
HEC-FFA	HEC-Flood Frequency Analysis
HEC-RAS	HEC-River Analysis System
HEC-ResSim	HEC-Reservoir System Simulation Model
HEC-SSP	HEC-Statistical Software Package

HDSS	High Definition Stream Survey
hp	Horsepower
HPMP	Historic Properties Management Plan
HPUE	Harvest-per-unit-effort
HSB	Horseshoe Bend National Military Park

I

IBI	Index of Biological Integrity
IDP	Inadvertent Discovery Plan
IIC	Intercompany Interchange Contract
IVM	Integrated Vegetation Management
ILP	Integrated Licensing Process
IPaC	Information Planning and Conservation
ISR	Initial Study Report

J

JTU	Jackson Turbidity Units

K

kV	Kilovolt
kva	Kilovolt-amp
kHz	Kilohertz

L

LIDAR	Light Detection and Ranging
LWF	Limited Warm-water Fishery
LWPOA	Lake Wedowee Property Owners' Association

M

m	Meter
m^3	Cubic Meter
M&I	Municipal and Industrial
mg/L	Milligrams per liter
ml	Milliliter
mgd	Million Gallons per Day
µg/L	Microgram per liter
µs/cm	Microsiemens per centimeter
mi^2	Square Miles
MOU	Memorandum of Understanding

MPN	Most Probable Number
MRLC	Multi-Resolution Land Characteristics
msl	Mean Sea Level
MW	Megawatt
MWh	Megawatt Hour

N

n	Number of Samples
NEPA	National Environmental Policy Act
NGO	Non-governmental Organization
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanographic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NTU	Nephelometric Turbidity Unit
NWI	National Wetlands Inventory

O

OAR	Office of Archaeological Resources
OAW	Outstanding Alabama Water
ORV	Off-road Vehicle
OWR	Office of Water Resources

P

PA	Programmatic Agreement
PAD	Pre-Application Document
PDF	Portable Document Format
pH	Potential of Hydrogen
PID	Preliminary Information Document
PLP	Preliminary Licensing Proposal
Project	R.L. Harris Hydroelectric Project
PUB	Palustrine Unconsolidated Bottom
PURPA	Public Utility Regulatory Policies Act
PWC	Personal Watercraft
PWS	Public Water Supply

Q

QA/QC	Quality Assurance/Quality Control

R

RM	River Mile
RTE	Rare, Threatened and Endangered
RV	Recreational Vehicle

S

S	Swimming
SCORP	State Comprehensive Outdoor Recreation Plan
SCP	Shoreline Compliance Program
SD1	Scoping Document 1
SH	Shellfish Harvesting
SHPO	State Historic Preservation Office
Skyline WMA	James D. Martin-Skyline Wildlife Management Area
SMP	Shoreline Management Plan
SU	Standard Units

T

T&E	Threatened and Endangered
TCP	Traditional Cultural Properties
TMDL	Total Maximum Daily Load
TNC	The Nature Conservancy
TRB	Tallapoosa River Basin
TSI	Trophic State Index
TSS	Total Suspended Soils
TVA	Tennessee Valley Authority

U

USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

W

WCM	Water Control Manual
WMA	Wildlife Management Area
WMP	Wildlife Management Plan
WQC	Water Quality Certification

APPENDIX B

RELEVANT TABLES AND FIGURES FROM THE PHASE 1 REPORT

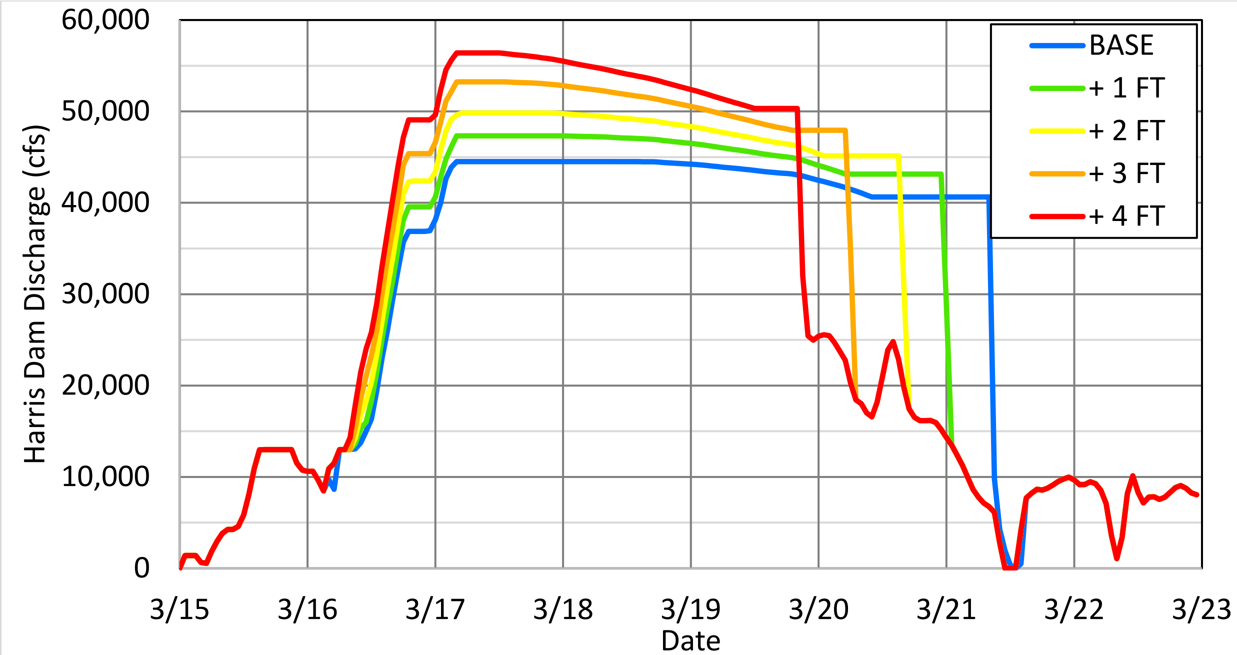

FIGURE B–1 OUTFLOW HYDROGRAPHS FROM THE 100-YEAR DESIGN FLOOD ROUTED THROUGH THE HARRIS RESERVOIR RESSIM MODEL

TABLE B–1 TOTAL ACRES INUNDATED DOWNSTREAM OF HARRIS DAM BASED ON RESULTS OF 100-YEAR DESIGN FLOOD IN HARRIS-MARTIN HEC-RAS MODEL

Elevation	Total Inundation Area (acres)	Increase over Baseline (acres)	Percent Increase over Baseline
Baseline (785 feet msl)	6,105	-	-
+ 1 foot	6,403	298	4.9%
+ 2 feet	6,590	485	7.9%
+ 3 feet	6,791	686	11.2%
+ 4 feet	6,995	889	14.6%

TABLE B–2 CHANGES IN MAXIMUM DOWNSTREAM WATER SURFACE ELEVATIONS RESULTING FROM CHANGE IN WINTER OPERATING CURVE

Location	Distance from Dam (miles)	Max Water Surface Rise (feet)			
		+ 1 foot	+ 2 feet	+ 3 feet	+ 4 feet
RM 129.7 (Malone, AL)	7	0.5	1.0	1.6	2.2
RM 122.7 (Wadley, AL)	14	0.5	1.1	1.7	2.4
RM 115.7	21	0.6	1.1	1.8	2.5
RM 108.7	28	0.5	1.0	1.6	2.2
RM 101.7	35	0.4	0.7	1.1	1.4
RM 93.7 (Horseshoe Bend)	43	0.3	0.7	1.0	1.4

TABLE B–3 CHANGES IN FLOOD DURATION RESULTING FROM CHANGE IN WINTER OPERATING CURVE

Location	Distance from Dam (miles)	Duration above Baseline Condition Max Elevation (hours)			
		+ 1 foot	+ 2 feet	+ 3 feet	+ 4 feet
RM 129.7 (Malone, AL)	7	15	43	61	67
RM 122.7 (Wadley, AL)	14	12	19	32	43
RM 115.7	21	13	21	35	46
RM 108.7	28	14	26	38	48
RM 101.7	35	17	27	40	48
RM 93.7 (Horseshoe Bend)	43	18	29	39	47

TABLE B–4 PERCENT OF TIME OVER THE PERIOD OF RECORD (1939 TO 2011) SPENT IN TURBINE CAPACITY AND SPILLWAY OPERATIONS FOR EACH WINTER POOL ALTERNATIVE

Elevation	Spillway Operations	Turbine Capacity
Baseline (785 feet msl)	0.2%	0.7%
+ 1 foot	0.3%	0.7%
+ 2 feet	0.3%	0.8%
+ 3 feet	0.3%	0.8%
+ 4 feet	0.4%	1.0%

APPENDIX C

3-DIMENSIONAL HYDRODYNAMIC AND WATER QUALITY MODEL OF LAKE HARRIS, ALABAMA

3-Dimensional Hydrodynamic and Water Quality Model of Lake Harris, Alabama

Prepared for:

Alabama Power Company

600 18th St N, Birmingham, AL 35203

November 25, 2020

DYNAMIC SOLUTIONS, LLC
6421 DEANE HILL DRIVE
KNOXVILLE, TENNESSEE 37919

Executive Summary

The purpose of this modeling effort was to calibrate and validate an EFDC model of hydrodynamics, sediment transport and water quality for Lake Harris to provide a technically credible modeling framework to support an evaluation of the simulated effects of raising the winter pool elevation on water temperature and dissolved oxygen in the forebay area of Lake Harris.

The Lake Harris EFDC model simulation period covered the 6-year period from 1 January 2014 through 31 December 2019. Results generated for the first year (2014) were used to spin-up the model to eliminate the effects of the initial conditions assigned for model setup. The model was calibrated using data collected during the 2-year period from 1 January 2018 to 31 December 2019 and the model was validated to data collected during the 3-year period from 1 January 2015 to 31 December 2017.

The calibrated and validated state variables of the EFDC model included stage, water temperature, total suspended solids, dissolved oxygen, algae biomass (as chlorophyll a), total organic carbon, nitrogen species (ammonia, nitrite/nitrate, total organic nitrogen, and total nitrogen), and phosphorus species (total phosphate, total organic phosphorus, and total phosphorus). The model was also calibrated and validated to Secchi depth as a derived output variable for water clarity.

Modeled water surface elevation showed excellent agreement with the observed stage data for both calibration and validation periods. Model performance for water temperature was very good with simulated water temperature following the seasonal trend of observed water temperature data very well as surface and bottom layer time series and vertical profiles. The water quality results for dissolved oxygen, total suspended solids, secchi depth, algae biomass (as chlorophyll a) and the inorganic and organic forms of nitrogen and phosphorus also demonstrated good agreement with the observed data sets over the entire domain.

The calibrated and validated EFDC model of Lake Harris was applied to evaluate the effects of raising the existing winter pool level on water temperature and dissolved oxygen in the forebay area of the lake. Comparison of the baseline conditions with the results of the scenario analysis clearly indicated that raising the winter pool elevation by up to 4 ft showed only minor impacts on water temperature and dissolved oxygen concentrations in the dam discharge flow.

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1. Introduction and Background

Lake Harris, located on the Tallapoosa River near Lineville, Alabama, has a length of 29 miles, a maximum depth of 121 feet at the dam and covers an area of approximately 9,870 acres with 367 miles of shoreline. The Tallapoosa River and the Little Tallapoosa River are the two main tributaries to the lake as shown in Figure 1-1. Lake Harris, also known as Lake Wedowee, was impounded on April 20, 1983 and the R.L. Harris Dam is one of the 14 hydroelectric power plants operated by Alabama Power Company (APC). The Federal Energy Regulatory Commission (FERC) issued an operating license to Alabama Power on December 27, 1973 and the 50-year license will expire on November 30, 2023. In order for Alabama Power to continue operating the Harris hydroelectric Project, the company must obtain a new operating license from FERC.

As part of the FERC relicensing process, stakeholders have requested that APC evaluate the feasibility of modifying the operating curve for seasonal elevation of Lake Harris. Specifically, stakeholders requested that APC evaluate raising the winter pool level from the current pool level by up to four feet. Currently, the operating curve consists of a target summer pool elevation of 793 ft (NGVD29) from May 1 to October 1, a drawdown to 785 ft (NGVD29) from October 1 to December 1, a target winter pool elevation of 785 ft (NGVD29) from December 1 to April 1, and a refilling to summer pool elevation of 793 ft (NGVD29) from April 1 to May 1, as shown in Figure 1-2.

In order to assess the potential effects of a higher winter pool elevation on water temperature and water quality, APC solicited technical assistance from Dynamic Solutions, LLC (DSLLC) to develop, calibrate, and validate a 3-dimensional Environmental Fluid Dynamic Code (EFDC) hydrodynamic and water quality model. The calibrated and validated EFDC model was then applied to evaluate the effects of increasing the winter pool elevation on water temperature and water quality, especially with regards to dissolved oxygen (DO) in the reservoir forebay and how increasing the winter pool elevation may impact water temperature and DO immediately downstream.

This report presents a summary of data sources used to setup the EFDC lake model, model calibration and validation results, and model performance results. Based on a range of winter elevation scenarios generated with the calibrated and validated lake model, the report presents assessments of the effects of increasing the winter pool elevation on water temperature and dissolved oxygen in the forebay area of Lake Harris.

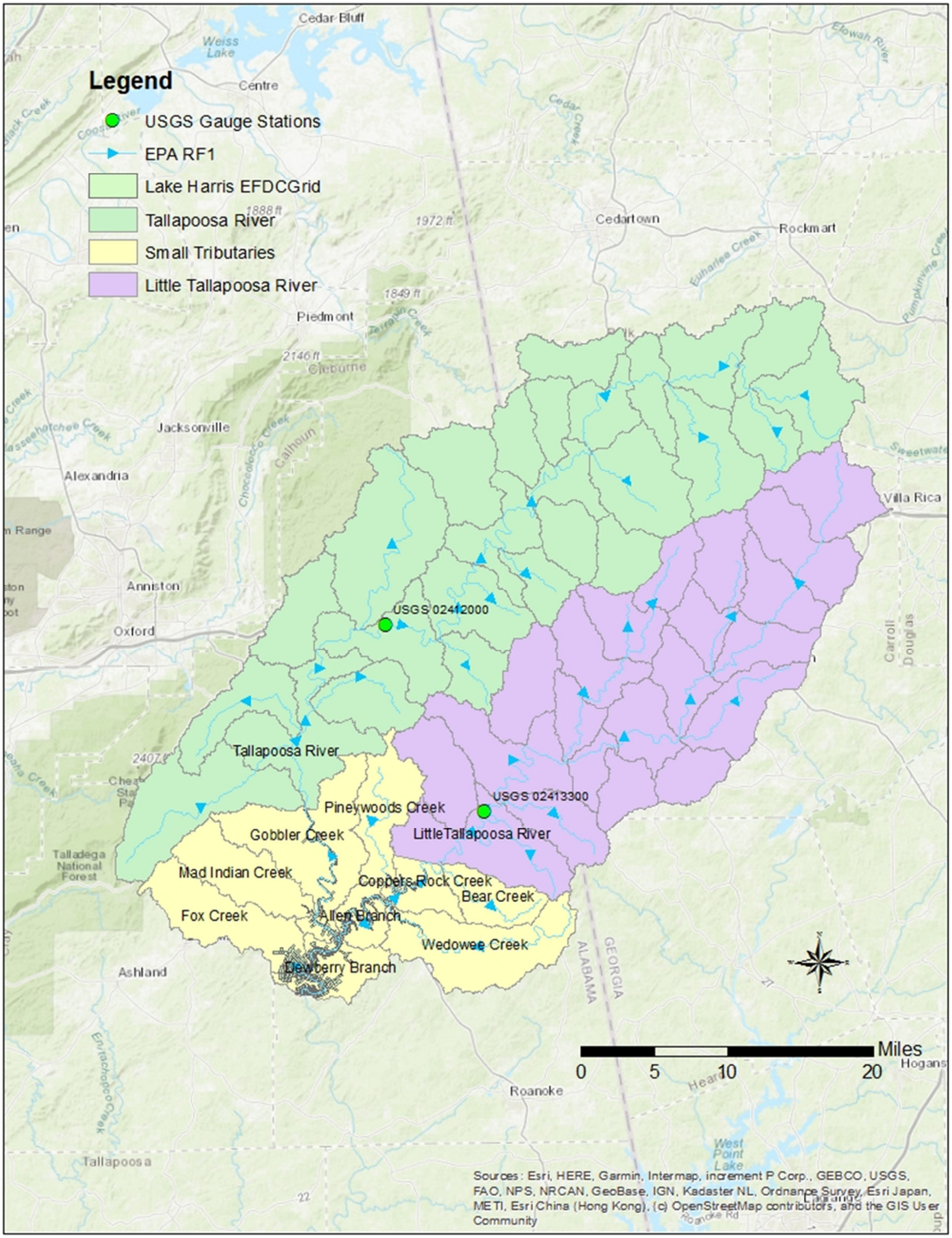

Figure 1-1 Location of Lake Harris

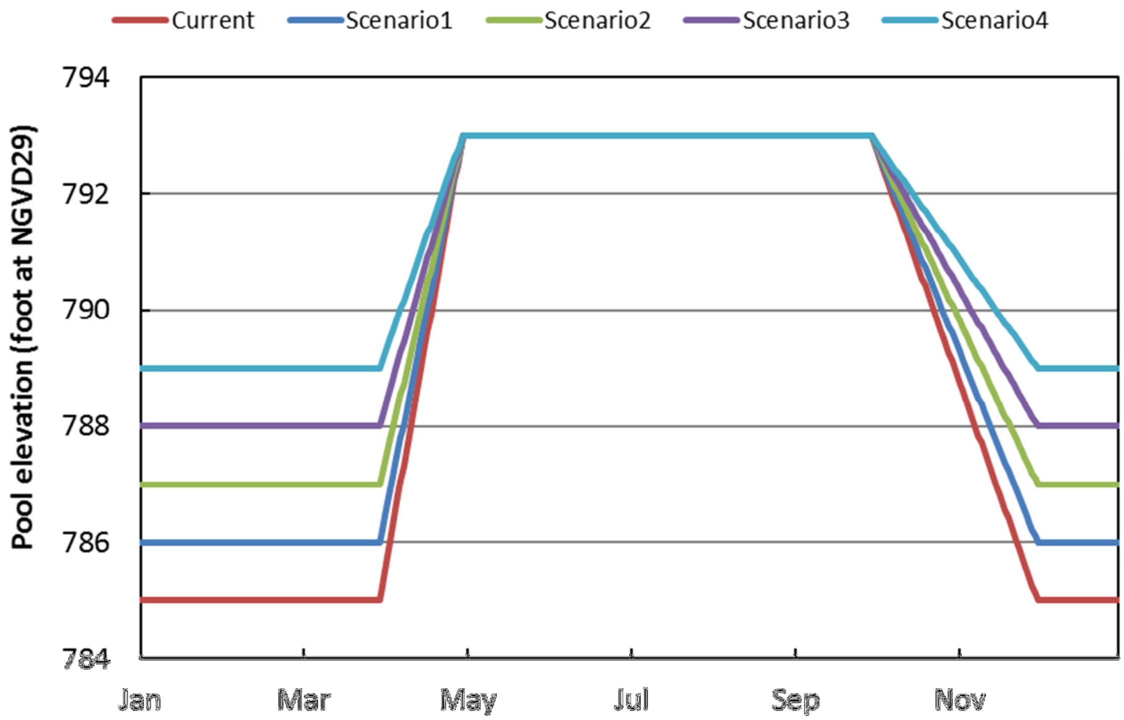

Figure 1-2 Operating Curves of Lake Harris Dam

2. Development of EFDC model

2.1 Overview of the EFDC Model

The Environmental Fluid Dynamics Code (EFDC) is a general-purpose surface water modeling package for simulating three-dimensional (3-D) circulation, mass transport, sediments and biogeochemical processes in surface waters including rivers, lakes, estuaries, reservoirs, nearshore and continental shelf-scale coastal systems. The EFDC model was originally developed at the Virginia Institute of Marine Science for estuarine and coastal applications (Hamrick, 1992; 1996). Over the past decade, the US Environmental Protection Agency (EPA) has continued to support its development and EFDC is now part of a family of public domain surface water models recommended by EPA to support water quality investigations including TMDL studies. In addition to state of the art hydrodynamics with salinity, water temperature and dye tracer simulation capabilities, EFDC can also simulate cohesive and non-cohesive sediment transport, the transport and fate of toxic contaminants in the water and sediment bed, and water quality interactions that include dissolved oxygen, nutrients, organic carbon, algae and bacteria. A state of the art sediment diagenesis model (Di Toro, 2001) is internally coupled with the water quality model (Park et al., 2000; Hamrick, 2007). Special enhancements to the hydrodynamic code, such as vegetation resistance, drying and wetting, hydraulic structure representation, wave current boundary layer interaction, and wave-induced currents, allow refined modeling of tidal systems, wetland and marsh systems, controlled-flow systems, and near-shore wave-induced currents and sediment transport. The EFDC code has been extensively tested, documented and used in more than 100 surface water modeling studies (Ji, 2017). The EFDC model is currently used by university, government, engineering and environmental consulting organizations worldwide.

2.2 Model Simulation Period

The Lake Harris EFDC model simulation period covered the 6-year period from 1 January 2014 through 31 December 2019. The model was calibrated for the period from 1 January 2018 through 31 December 2019 and the model was validated for the period from 1 January 2015 through 31 December 2017. The initial 1-year period for 2014 was used as the spin-up period to diminish the impact of the initial conditions on model results. The lake model was run continuously for the entire period from 1 January 2014 to 31 December 2019 and results were split out to present results for model calibration and model validation.

Hydrologic conditions were based on long-term annual rainfall data collected from the National Oceanic and Atmospheric Agency (NOAA) stations in the vicinity of Lake Harris, as shown in Figure 2-1. Historical annual rainfall data, compiled for the long-term period record from 1937 to 2019, was used to calculate summary statistics given in Table 2-1. Based on the long-term percentiles statistics and annual rainfall data compiled for 2015-2019 shown in Table 2-2, the calibration and validation periods covered the range of all three hydrological conditions representing a mix of dry, average, and wet years.

Table 2-1 Percentile Statistics of Annual Rainfall around Lake Harris: 1937-2019

Statistics	Annual rainfall (inch)
Minimum	29.61
10 Percentile	45.62
25 Percentile	50.24
50 Percentile	55.89
Average	56.19
75 Percentile	61.86
90 Percentile	71.13
Maximum	76.06

Table 2-2 Hydrological Conditions of the Calibration and Validation Periods

Year	Annual rainfall (inch)	Hydrological condition
2015	58.28	Average
2016	37.21	Dry
2017	68.34	Wet
2018	63.70	Wet
2019	60.13	Average to wet

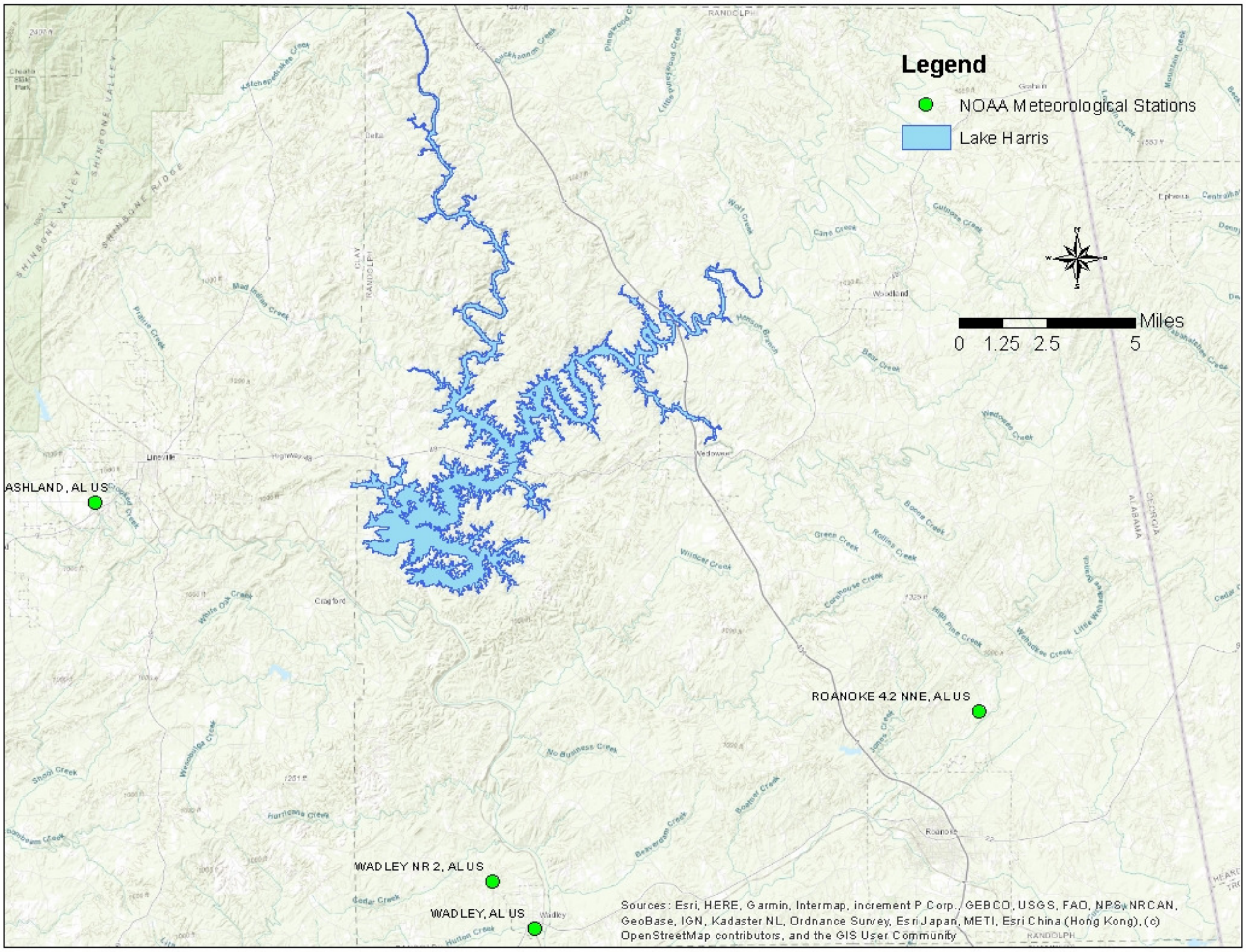

Figure 2-1 Location of the NOAA Meteorological Stations

The modeled state variable constituents for the Lake Harris EFDC hydrodynamic and water quality model are given below.

- **<u>Hydrodynamics</u>**
- Flow
- Water surface elevation
- Water temperature
- **<u>Sediment Transport and Water Quality</u>**
- Total suspended solids (TSS)
- Nitrogen (TN, NO_2+NO_3, Organic N, NH_3/NH_4)
- Phosphorus (TP, Organic P, Ortho-Phosphate)
- Total organic carbon (TOC)
- Phytoplankton (as Chl-a)
- Dissolved oxygen (DO)

2.3 Grid Development

Shoreline and bathymetry data available from aerial imagery and GIS data were used to generate the curvilinear orthogonal grid for the Lake Harris EFDC model. Data was transformed, as needed, to a horizontal coordinate system based on NAD1983 UTM Zone_16N (as meters). The computational grid is defined by a total of 912 horizontal grid cells covering a surface area of 8,948.6 acres as shown in Figure 2-2. Vertical layers for each grid cell were generated using the Sigma-Zed (SGZ) layering method. In the SGZ option for the EFDC model, the vertical layering scheme allows the number of layers to vary spatially over the model domain to differentiate shallow and deep areas of the lake. All bathymetry and water surface elevation data has been converted to NAVD88 with the units of meters to develop a consistent vertical datum, as shown in Figure 2-3. Due to the SGZ layering method, the bottom active cell can be associated with any layer in the model depending on the bathymetry. As water depth becomes shallower, the bottom active cell layer increases until only the top most layer in the model domain contains active cells in the shallower areas of the lake.

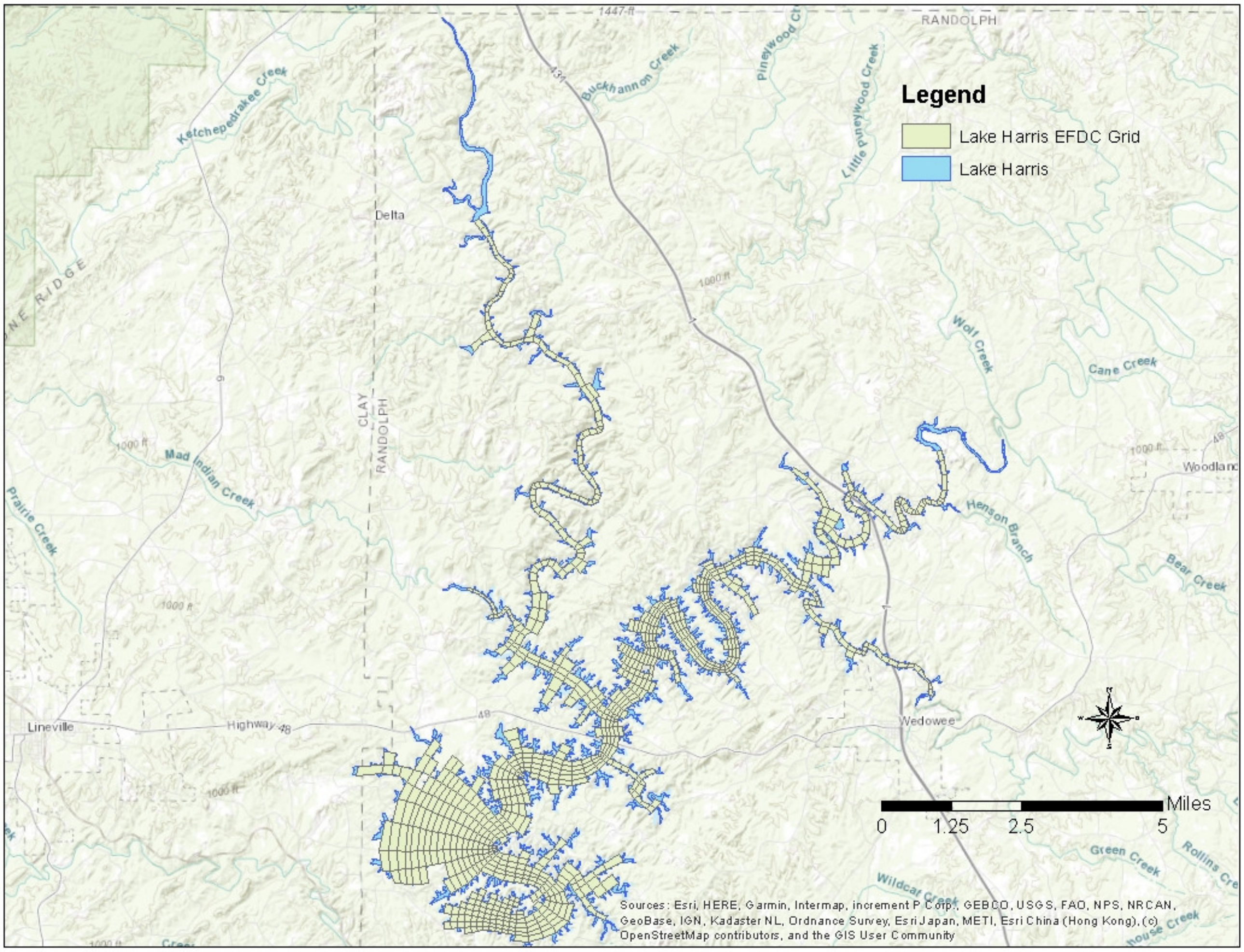

Figure 2-2 EFDC Model Grid for Lake Harris

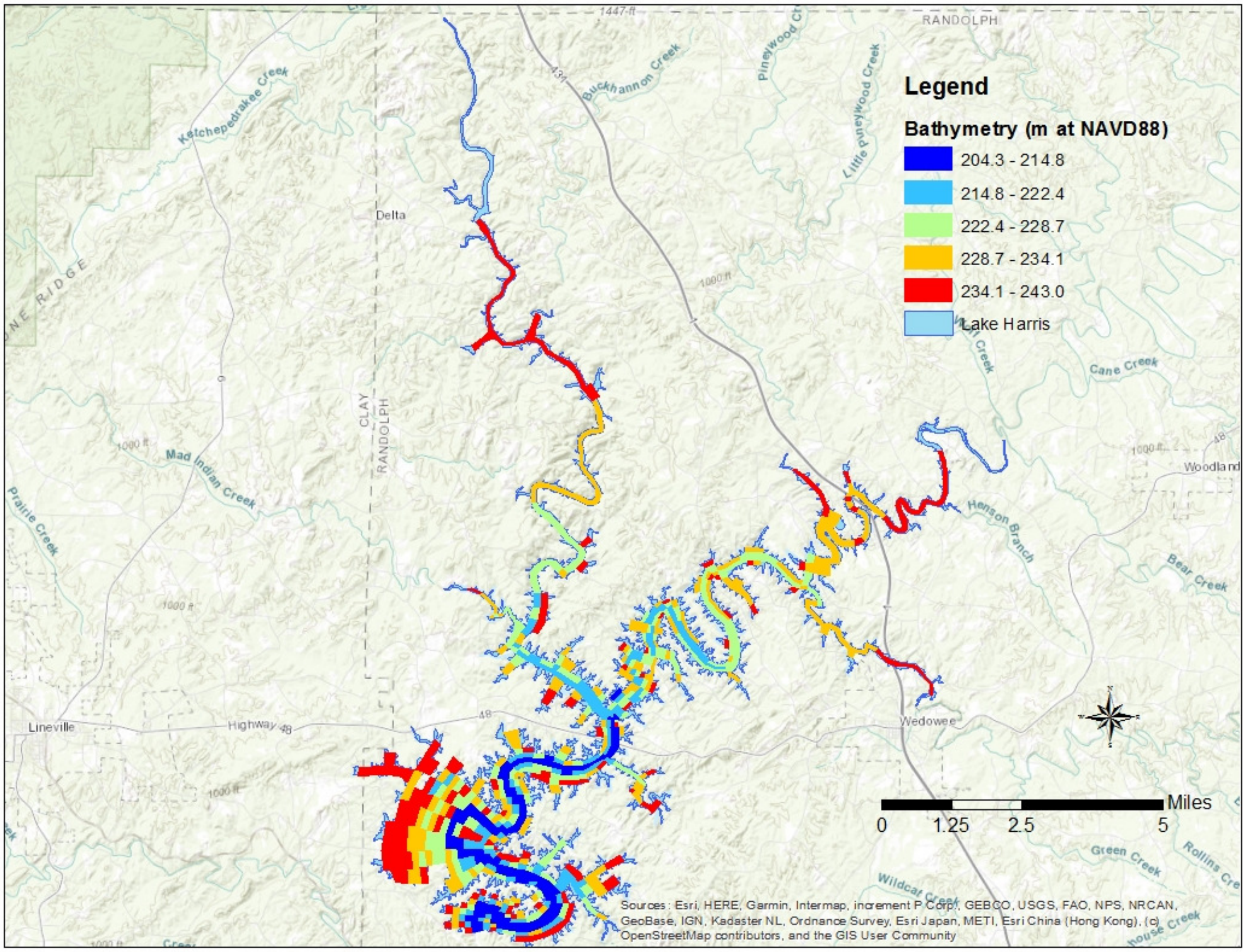

Figure 2-3 Bathymetry Data in the Lake Harris EFDC Model Domain

2.4 Meteorological Data

Meteorological data used in the EFDC hydrodynamic model included rainfall, wind speed and direction, relative humidity, atmospheric pressure, cloud cover, solar radiation, and air temperature. These data sets were used to calculate the impact of atmospheric forcing on water temperature and physical transport processes in the lake.

Hourly meteorological data was available at four NOAA meteorological stations, as shown in Figure 2-4. Anniston Metropolitan Airport is located in the west of Talladega National Forest while Lake Harris is located east of the Talladega National Forest in the valley. Thomas C Russell Field Airport has a more complete data set than does the stations located at the West Georgia Regional Airport and Lagrange Callaway Airport. The primary station used in the EFDC model to describe atmospheric forcing was, therefore, the Thomas C Russell Field Airport and the data sets from the other three stations were used to fill in missing data gaps from the records obtained for the Thomas C Russell Field Airport station. Short wave solar radiation data was estimated using a cloud-cover adjustment of latitude-dependent theoretical clear sky radiation. Evapotranspiration data used for input to the Lake Harris model was calculated internally by the EFDC model.

Table 2-3 Meteorological Stations Used in the EFDC Model

Station Name	Station ID	Agency	Latitude (N)	Longitude (W)
ANNISTON METROPOLITAN ARPT	WBAN 13871	NOAA	33.587	-85.856
WEST GEORGIA REGIONAL AIRPORT	WBAN 00249	NOAA	33.633	-85.150
THOMAS C RUSSELL FLD ARPT	WBAN 63833	NOAA	32.915	-85.963
LAGRANGE-CALLAWAY AIRPORT	WBAN 03821	NOAA	33.017	-85.067

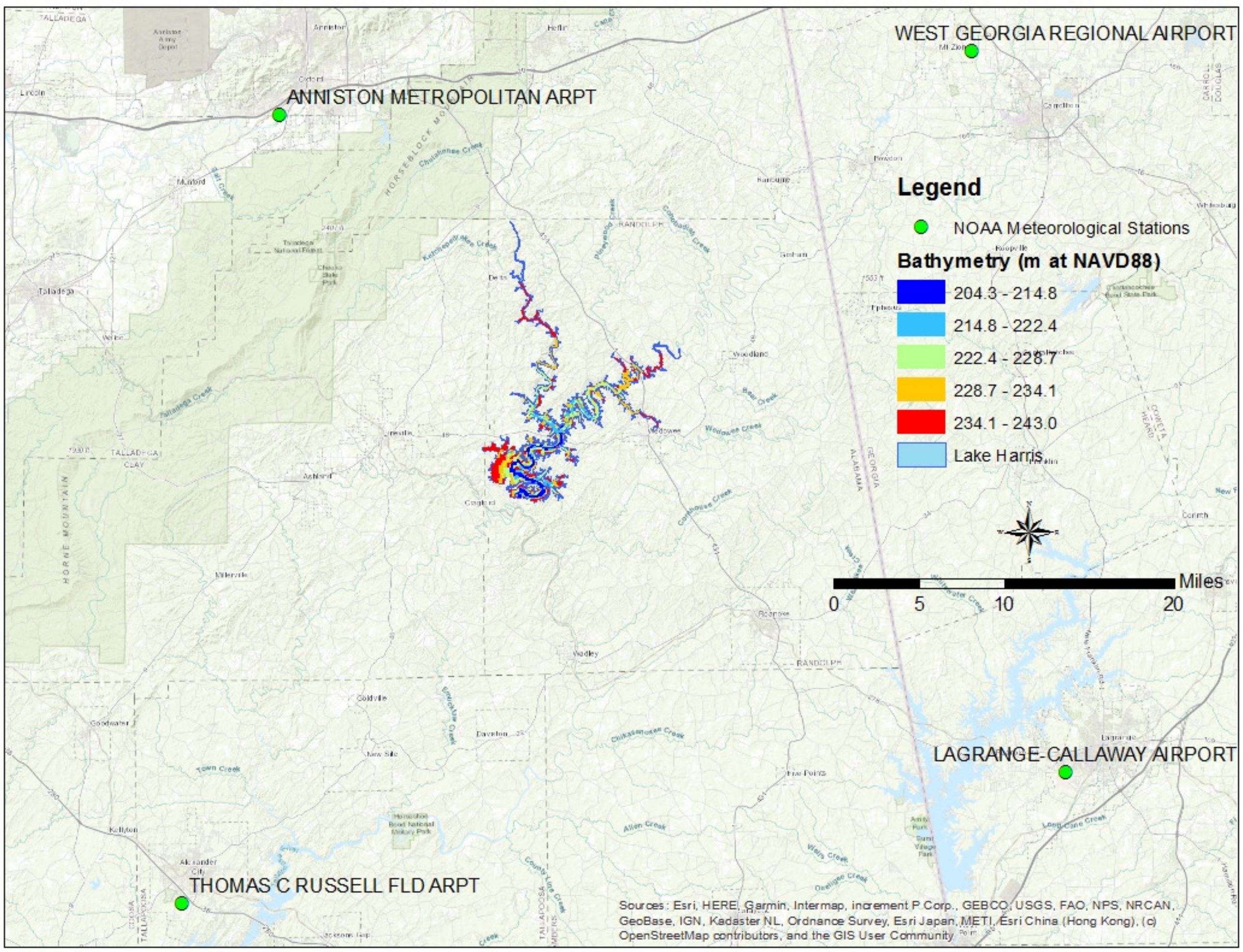

Figure 2-4 Location of the NOAA Meteorological Stations

2.5 Boundary Conditions

Boundary conditions for the EFDC model must be specified for flow boundary conditions to define external inflows of water and mass loading into the EFDC model domain. Flow boundary datasets required for input to EFDC include time series of flow, water temperature, suspended solids and water quality constituents to define mass loading inputs to the lake.

The Lake Harris EFDC model was developed with eleven (11) flow boundaries to define water coming into the lake from the tributaries, one (1) flow boundary to define release of water at the dam, and one (1) flow boundary to define a flow balance developed to account for water removed from the lake by water supply withdrawals and other unknown flows such as groundwater seepage and leakage from the dam. Table 2-4 listed the thirteen (13) model flow boundary indexes with the number of EFDC cells assigned to each boundary location. External flow boundary conditions were assigned to grid cells based on physical location and the specific boundary condition represented in the lake model (Figure 2-5).

Continuous observed flow data is available at two USGS gauge stations: (1) Tallapoosa River near Heflin (ID: USGS 02412000) and (2) Little Tallapoosa River near Newell (ID: USGS 02313300), as shown in Figure 2-5. The contributing areas of USGS 02412000 and USGS 02413300 stations are 448 and 406 square miles, respectively. The flow at each tributary, as shown in Figure 2-5, was estimated using a drainage area-weighted approach as follows. The ratio of the contributing area of each tributary to the target USGS gauge was first calculated (Table 2-5 and Table 2-6) and then the flow for each tributary was estimated as the product of the USGS flow and the drainage area ratio.

As a hydroelectric generating station, flow release records at the dam are maintained and were available from the APC. A flow balance was estimated using all inflows from rainfall and tributary flows and all outflows from evaporation and flow releases at the dam. As data for water supply withdrawals, groundwater seepage and leakage at the dam are either not readily available or are unknown, a flow balance is needed to account for these undocumented flows to ensure that the EFDC model simulated lake stage time series results match the observed lake stage.

Table 2-4 Lake Harris EFDC Model Flow Boundaries

BC	Boundary Group Name	Cells
1	Tallapoosa River	1
2	Little Tallapoosa River	1
3	Dam Discharge	1
4	Bear Creek	1
5	Copper Rock Creek	1
6	Wedowee Creek	1
7	Pineywoods Creek	1
8	Allen Branch	1
9	Dewberry Branch	2
10	Fox Creek	1
11	Mad Indian Creek	1
12	Gobbler Creek	2
13	Balance Flow	10

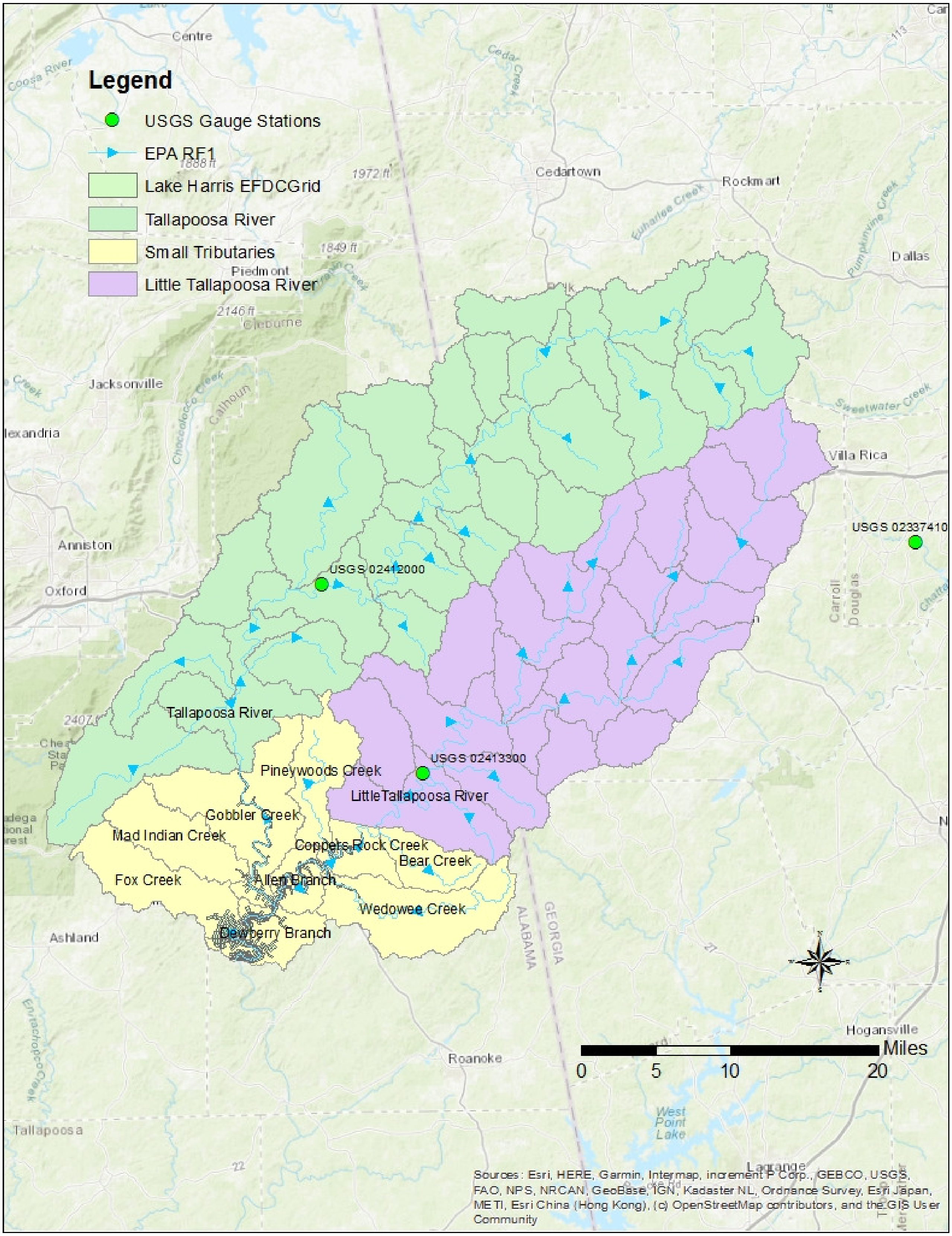

Figure 2-5 Location of the Tributary Boundary inflows to Lake Harris and USGS Stations

Table 2-5 Drainage Area Ratios of Tributary to Tallapoosa River USGS 02412000

Tributary Name	Contributing Area ($mile^2$)	Ratio
Tallapoosa River	705.528	1.574839
Gobbler Creek	54.654	0.121996
Fox Creek	36.043	0.080453
Mad Indian Creek	30.840	0.068839
Total	827.065	

Table 2-6 Drainage Area Ratios of Tributary to Little Tallapoosa River USGS 02413300

Tributary Name	Contributing Area ($mile^2$)	Ratio
Little Tallapoosa River	473.003	1.165032
Pineywoods Creek	27.636	0.068069
Bear Creek	19.344	0.047645
Wedowee Creek	50.628	0.124700
Allen Branch	10.316	0.025409
Dewberry Branch	15.280	0.037635
Coppers Rock Creek	14.646	0.036075
Total	610.853	

Observed water temperature data is available at two USGS gauge stations: (1) Tallapoosa River near Heflin (ID: USGS 02412000) and (2) Little Tallapoosa River near Newell (ID: USGS 02413300), as shown in Figure 2-5. The time interval of the observed temperature data set is 15-minute. The observed water temperature data, however, is only available from 5 December 2017 to the present at both USGS stations. The water temperature data prior to 5 December 2017 at both USGS stations, therefore, needs to be estimated to fill in this data gap.

The water temperature data at USGS 02412000 and USGS 02413300 prior to 5 December 2017 was estimated using a linear regression approach. Based on an assessment of the USGS stations close to Lake Harris, it was found that the water temperature data available from USGS gauge 02337410 (DOG RIVER AT GA 5, NEAR FAIRPLAY, GA) had the best linear relationship with the water temperature data recorded at USGS 02412000 and USGS 02413300, as shown in Figure 2-6 and Figure 2-7. The calculated regression coefficients (r^2) were higher than 0.97 demonstrating a strong relationship for both of these regressions. After filling in the data gaps in the long-term record, the complete water temperature time series data set from 2014 to 2019 was developed for both USGS 02412000 and USGS 02413300 stations. Water temperature boundary data associated with each tributary was then assigned to the USGS gauge data set as shown on Table 2-7.

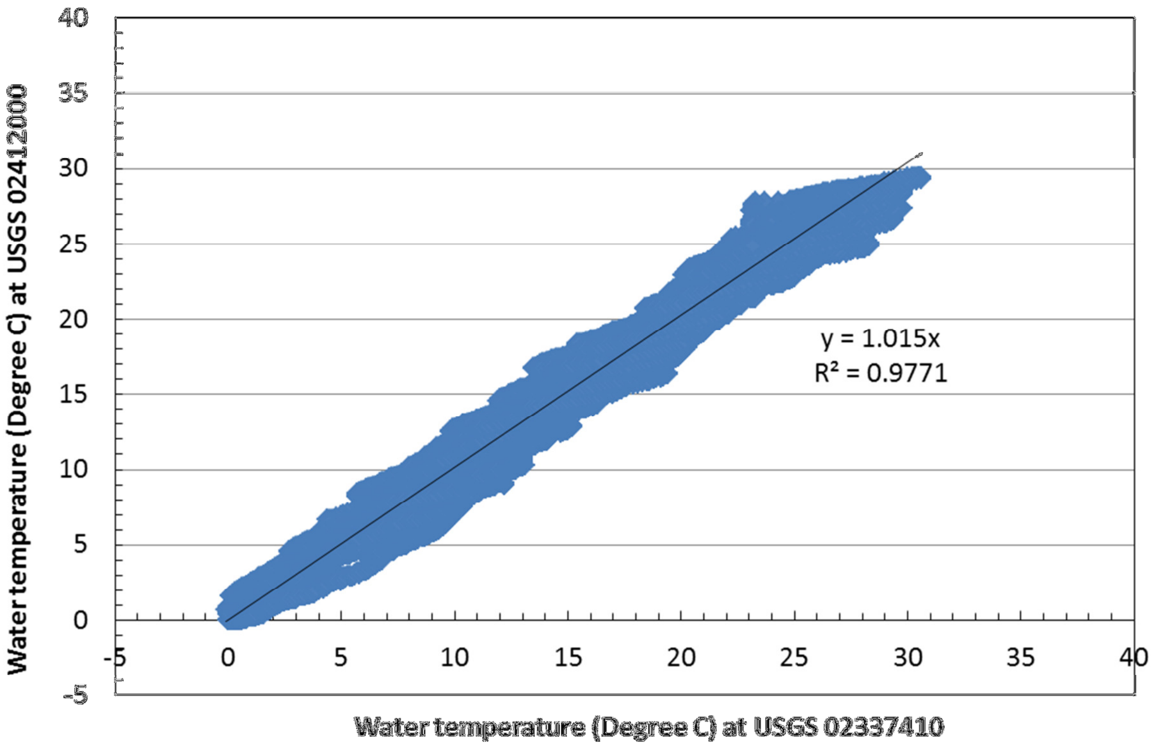

Figure 2-6 Linear Regression of Water Temperature Data between USGS 02412000 and USGS 02337410

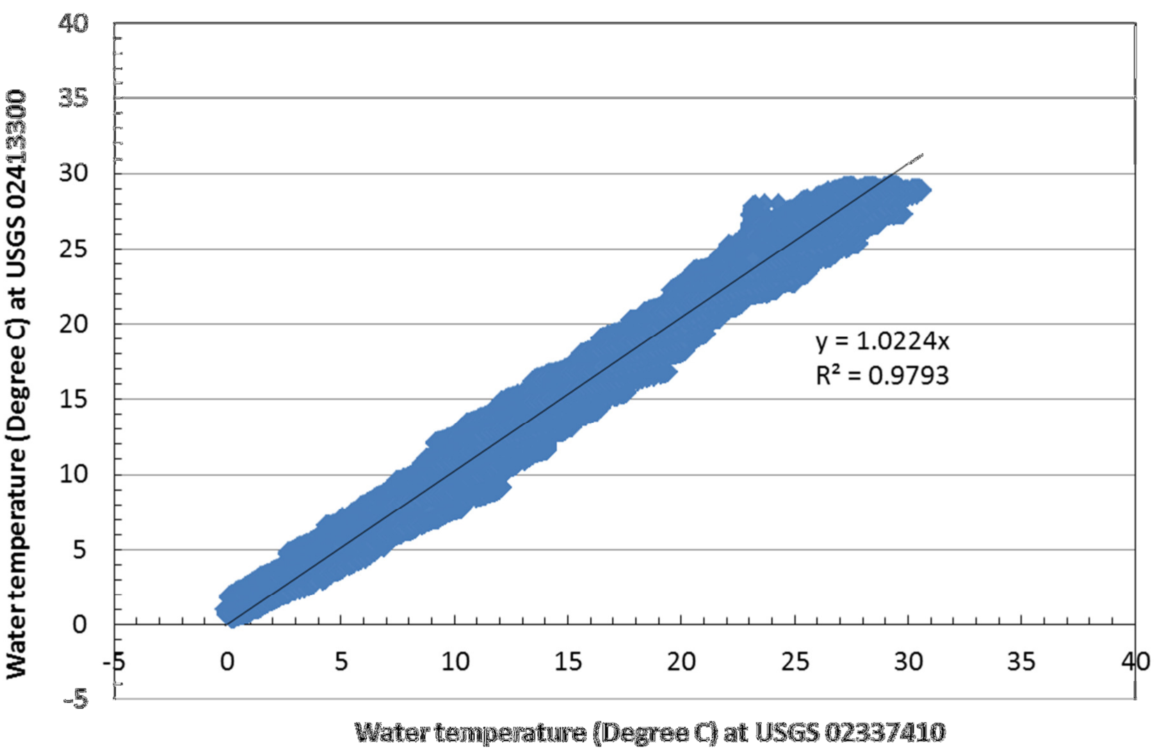

Figure 2-7 Linear Regression of Water Temperature Data between USGS 02413300 and USGS 02337410

Table 2-7 Assignment of Water Temperature Boundary

Tributary Name	Assigned Water Temperature Time Series
Tallapoosa River	USGS 02412000
Gobbler Creek	USGS 02412000
Fox Creek	USGS 02412000
Mad Indian Creek	USGS 02412000
Little Tallapoosa River	USGS 02413300
Pineywoods Creek	USGS 02413300
Bear Creek	USGS 02413300
Wedowee Creek	USGS 02413300
Allen Branch	USGS 02413300
Dewberry Branch	USGS 02413300
Coppers Rock Creek	USGS 02413300

Water quality constituent concentrations including total suspended solids, organic carbon, nutrients (nitrogen and phosphorus), and algae biomass at each of the flow boundary locations were estimated using the USGS LOAD ESTIMATOR (LOADEST) program, linear regression, and other approaches. More detailed information about how water quality boundary data sets were developed can be found in the next Section 2.6 (Estimation of Water Quality Boundaries) of this report.

2.6 Estimation of Water Quality Boundaries

Concentrations of all the water quality constituents at the flow boundaries, as shown in Figure 2-5, were first estimated using the USGS LOADEST program. LOADEST is a FORTRAN program for estimating water quality constituent loads in streams and rivers (Runkel et al., 2004). The LOADEST program assists the user in developing a regression model for the estimation of water quality constituent loads based on stream flow and water quality constituent concentration data. The LOADEST program provides eleven regression equations to estimate water quality constituent loadings. More detailed information about LOADEST, including regression model setup, calibration, and estimation, can be found in the USGS report by Runkel et al. (2004). The approach used for this study is described below as follows.

Paired flow and water quality data available for both the Tallapoosa River and the Little Tallapoosa River were collected and processed with observed water quality data downloaded from the Water Quality Portal website. Water quality stations in the Tallapoosa River and Little Tallapoosa River are given in Table 2-8, Table 2-9 and Figure 2-8. The processed flow-water quality data sets were used to prepare the LOADEST input file (calib.inp).

Paired flow and water quality data from both the Tallapoosa River and the Little Tallapoosa River stations were used to develop the regression model for each water quality constituent using USGS LOADEST with the option chosen for automated model selection. Regression equations developed with the LOADEST option were compared against the criteria to decide whether the developed regression models were acceptable or not based on criteria described below.

As recommended by Runkel et al. (2004), the criteria for acceptance of the regression model were: (1) Probability plot correlation coefficient (PPCC) should be close to a value of 1.0; (2) Absolute value of bias diagnostics (BP) should be close to or less than 25%; and (3) Nash-Sutcliffe efficiency index (E) value should be positive. The LOADEST method assumes a normal distribution of model residuals and a PPCC value close to 1.0 indicates that the model residuals follow a normal distribution. BP is the load bias as a percentage and positive values indicate over-estimation and negative values indicate under-estimation of the regression relationship. A Nash-Sutcliffe index value of E is equal to 1.0 represents a perfect match between observed and simulated data and a negative value of E (<0) indicates that the observed mean provides a better estimation than the LOADEST regression model. The LOADEST regression models for the Tallapoosa River and the Little Tallapoosa River that passed the above criteria for the water quality constituents are listed in Table 2-10 and Table 2-11.

As the final step in the estimation of the water quality boundary data sets, the accepted LOADEST regression models, as shown in Table 2-10 and Table 2-11 were used to estimate daily water quality loadings for the outlets of the Tallapoosa River and Little Tallapoosa River based on daily flow data records from 2014 to 2019. Time series of daily concentrations of the water quality constituent were then calculated from the daily load estimates and observed daily flow data.

Other approaches were used to estimate boundary conditions as time series for the water quality constituents which did not pass the LOADEST regression model criteria. The methods used to estimate water quality constituent daily concentrations for the Tallapoosa River and the Little Tallapoosa River are summarized in Table 2-12 and Table 2-13.

As phosphorus can adsorb to suspended sediment, Total Phosphorus can be significantly influenced by sorption/desorption and settling of suspended sediment. Total Suspended Solids (TSS) concentrations for the Little Tallapoosa River were estimated, therefore, based on a linear regression with Total Phosphorus (TP) data, as shown in Figure 2-9. Daily DO concentrations for both the Tallapoosa River and the Little Tallapoosa River were estimated as the 100% saturation concentration as a function of daily temperature data.

Once the complete water quality boundary conditions were developed at the outlets of the Tallapoosa River and Little Tallapoosa River, the assignment of water quality boundary for the small tributaries was based on Table 2-14.

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Table 2-8 Water Quality Stations in Tallapoosa River

Agency	Data Source	Station_ID	Latitude N	Longitude W
USGS	NWIS	USGS-02412000	33.623	-85.513
EPA	STORET	21AWIC-3132	33.623	-85.513
EPA	STORET	21AWIC-872	33.733	-85.372
EPA	STORET	21AWIC-873	33.606	-85.589
EPA	STORET	21AWIC-874	33.582	-85.592
EPA	STORET	21AWIC-875	33.556	-85.604
EPA	STORET	21AWIC-878	33.509	-85.625

Table 2-9 Water Quality Stations in Little Tallapoosa River

Agency	Data Source	Station_ID	Latitude N	Longitude W
USGS	NWIS	USGS-02413300	33.437	-85.399
EPA	STORET	21AWIC-1089	33.495	-85.338
EPA	STORET	21AWIC-2664	33.437	-85.399
EPA	STORET	21AWIC-4715	33.399	-85.439

Table 2-10 Regression Models Developed for Tallapoosa River

Constituents	LOADEST Model selected	R^2	PPCC	BP	E
BOD	#9	0.8658	0.9918	-1.80%	0.689
TKN	#3	0.6969	0.9892	-9.40%	0.509
NOX	#6	0.8126	0.9563	6.70%	0.467
TP	#6	0.795	0.9675	1.70%	0.964
TSS	#8	0.8772	0.9926	25.30%	0.787

Note: BP value for TSS is very close to 25% and is deemed to pass the criterion.

Table 2-11 Regression Models Developed for Little Tallapoosa River

Constituents	LOADEST Model selected	R^2	PPCC	Bp	E
BOD	#5	0.796	0.9892	-14.90%	0.454
NH4	#1	0.46	0.9826	5.40%	0.323
NO3	#9	0.9656	0.9678	1.10%	0.644
TKN	#6	0.8985	0.9984	6.40%	0.884
TP	#8	0.948	0.9547	-1.00%	0.648
TPO4	#2	0.8286	0.9742	0.60%	0.606

Table 2-12 Estimation of Concentrations of Water Quality Constituents in Tallapoosa River

Water Quality Parameter	Estimation Approach
TSS	LOADEST
TKN	LOADEST
NO3	LOADEST
TP	LOADEST
BOD	LOADEST
Chlorophyll a	a constant of 1.5 µg/L based on the observed data at station 21AWIC-878
NH4	Ratio of NH4:TKN = 0.16 based on the observed data at station 21AWIC-878
TON	TKN-NH4
TPO4	Ratio of TPO4:TP = 0.21 based on the observed data at station 21AWIC-878
TOP	TP – TPO4
TOC	Based on the LOADEST BOD5
DO	Based on water temperature and 100%saturation concentration

Table 2-13 Estimation of Concentrations of Water Quality Constituents in Little Tallapoosa River

Water Quality Parameter	Estimation Approach
TKN	LOADEST
NO3	LOADEST
NH4	LOADEST
TP	LOADEST
TPO4	LOADEST
BOD	LOADEST
Chlorophyll a	a constant of 3.0 µg/L based on the observed data at station 21AWIC-2664
TON	TKN – NH4
TOP	TP – TPO4
TOC	Based on the LOADEST BOD5
TSS	Based on the linear regression with TP
DO	Based on water temperature and 100%saturation concentration

Table 2-14 Assignment of Water Quality Boundary to Small Tributaries

Tributary Name	Assigned Water Temperature Time Series
Tallapoosa River	Tallapoosa River
Gobbler Creek	Tallapoosa River
Fox Creek	Tallapoosa River
Mad Indian Creek	Tallapoosa River
Little Tallapoosa River	Little Tallapoosa River
Pineywoods Creek	Little Tallapoosa River
Bear Creek	Little Tallapoosa River
Wedowee Creek	Little Tallapoosa River
Allen Branch	Little Tallapoosa River
Dewberry Branch	Little Tallapoosa River
Coppers Rock Creek	Little Tallapoosa River

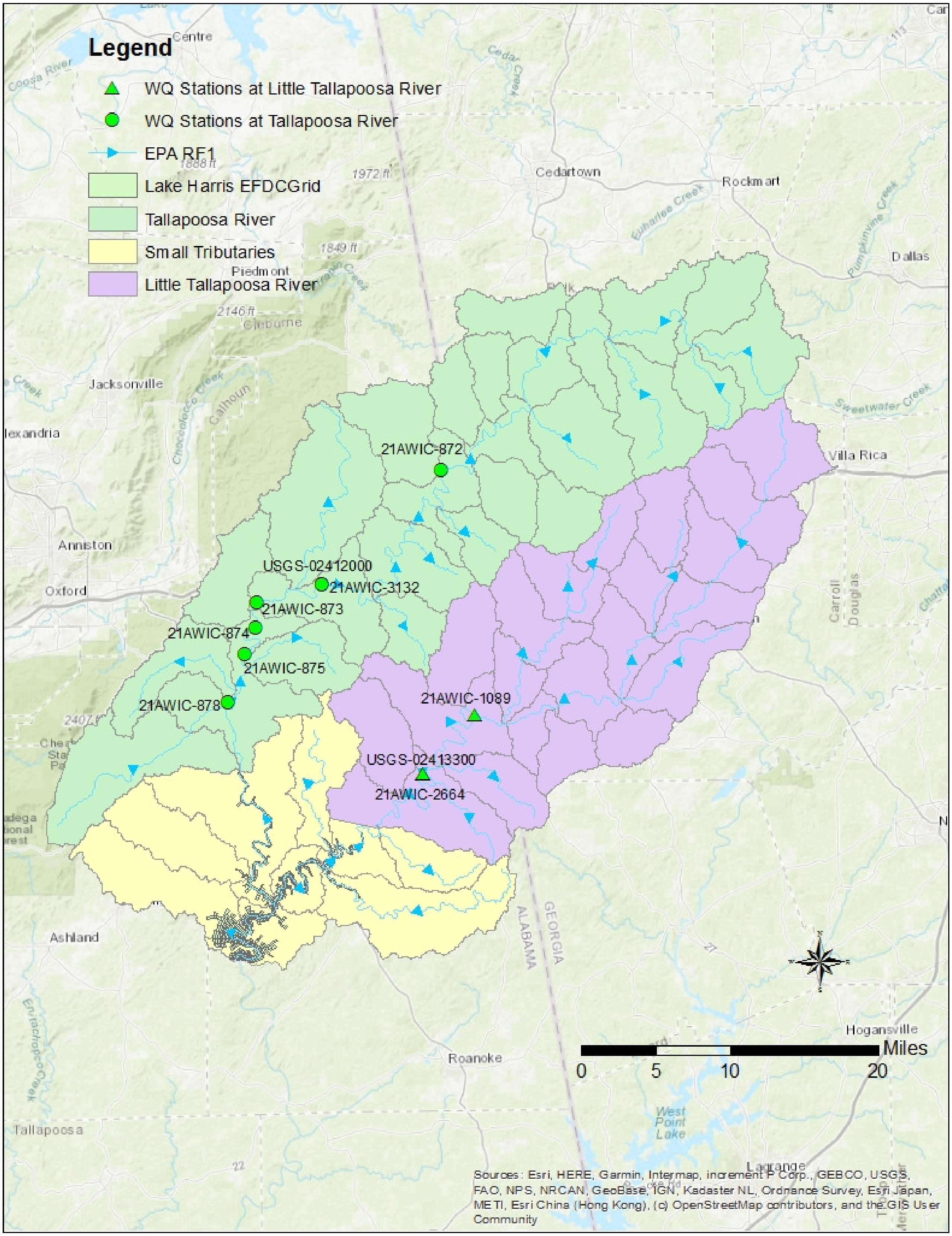

Figure 2-8 Location of Water Quality Stations

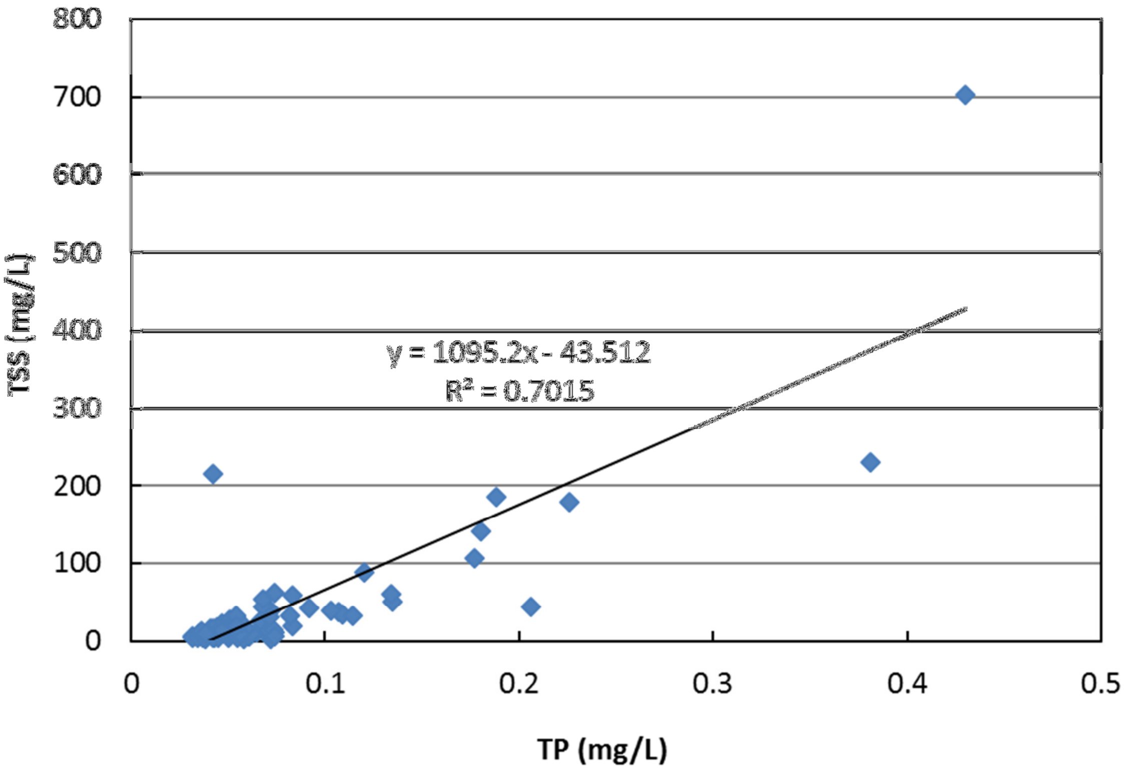

Figure 2-9 Linear Regression between TSS and TP at Little Tallapoosa River

3. Water Quality and Sediment Flux Model

3.1 Water Quality Model

For the Lake Harris EFDC model, the water quality model was internally coupled with the hydrodynamic model and a sediment transport model. The hydrodynamic model described circulation and physical transport processes including turbulent mixing, water column stratification during the summer months, and erosion of stratification during the winter months. The sediment transport model described the water column distribution of inorganic cohesive particles resulting from transport, settling, deposition, and resuspension processes.

State variables of the EFDC hydrodynamic model (water temperature) and sediment transport model (inorganic suspended solids) are internally coupled with the EFDC water quality model. State variables of the EFDC water quality model include one functional group of algae; organic carbon, inorganic phosphorus (orthophosphate), organic phosphorus; inorganic nitrogen (ammonium and nitrite + nitrate), organic nitrogen; chemical oxygen demand (COD) and dissolved oxygen. The state variables represented in the Lake Harris EFDC hydrodynamic and water quality model are listed in Table 3-1.

The formulations of the EFDC water quality model are based on the kinetic processes and interactions developed for the Chesapeake Bay model (Cerco and Cole, 1995; Cerco et al., 2002). An overview of the source and sink terms for each state variable is presented in this section and details of the state variable equations and kinetic terms for each state variable are presented in Park et al. (1995), Hamrick (2007) and Ji (2017).

Table 3-1 EFDC State Variables

	EFDC State Variable		**EFDC UNITS**	**Used in Model**
	Flow	FLOW	cms	Yes
	Water_Temperature	TEM	Deg-C	Yes
	Salinity	SAL	ppt	No
	Cohesive Suspended Solids	COH	mg/L	Yes
	Non-cohesive Suspended Solids	NONCOH	mg/L	No
1	BlueGreen_Algae	CHC	mgC/L	No
2	Diatoms_Algae	CHD	mgC/L	No
3	Green_Algae	CHG	mgC/L	Yes
4	Refractory_Particulate_Org_C	RPOC	mgC/L	Yes
5	Labile_Particulate_Org_C	LPOC	mgC/L	Yes
6	Dissolved_Org_C	DOC	mgC/L	Yes
7	Refractory_Particulate_Org_P	RPOP	mgP/L	Yes
8	Labile_Particulate_Org_P	LPOP	mgP/L	Yes
9	Dissolved_Org_P	DOP	mgP/L	Yes
10	Total_Phosphate (PO4_P)	TPO4	mgP/L	Yes
11	Refractory_Particulate_Org_N	RPON	mgN/L	Yes
12	Labile_Particulate_Org_N	LPON	mgN/L	Yes
13	Dissolved_Org_N	DON	mgN/L	Yes
14	Ammonia_N ($NH4^{+}$)	NH4	mgN/L	Yes
15	Nitrate_N (NO2 + NO3)	NO3	mgN/L	Yes
16	Particulate-Biogenic_Silica	PBSI	mgSi/L	No
17	Available_Silica	SI	mgSi/L	No
18	Chemical_Oxygen_Demand	COD	mg/L	Yes
19	Dissolved_Oxygen	OXY	mgO2/L	Yes
20	Total_Active_Metal	TAM	mg/L	No
21	Fecal_Coliform_Bacteria	FCB	# /100mL	No

Suspended Solids

Suspended solids in the EFDC model can be differentiated by multiple size classes of cohesive and non-cohesive solids. Suspended solids are represented as a single size class of cohesive particles in the Lake Harris model. Cohesive suspended solids are included in the model to account for the inorganic solids component of light attenuation in the water column. Since cohesive particles derived from silts and clays are characterized by a small particle diameter (< 62 microns) and a low settling velocity, cohesive particles can remain suspended in the water column for long periods of time and contribute to light attenuation that can influence algal production. Non-cohesive particles, consisting of fine to coarse size sands, by contrast, are characterized by much larger particles (> 62 microns) with rapid settling velocities that quickly remove any resuspended non-cohesive particles from the water column to the sediment bed.

The key processes that control the distribution of cohesive particles are transport in the water column, flocculation and settling, deposition to the sediment bed, consolidation within the bed, and resuspension or erosion of the sediment bed. In the EFDC model for Lake Harris, cohesive settling is defined by a constant settling velocity that is determined by model calibration. Deposition and erosion are controlled by the assignment of critical stresses for deposition and erosion and the bottom layer velocity and shear stress computed by the hydrodynamic model. Initial critical stresses for deposition and erosion of cohesive particles are taken from parameter values defined by Ji (2017) for a sediment transport model of Lake Okeechobee and then adjusted as needed during model calibration. Parameter values for deposition and erosion assigned for the calibration of cohesive solids are summarized in Table 3-2.

Table 3-2 EFDC Model Parameter Values for Cohesive Solids

Variable	Value	Description	Units
SDEN	3.7736E-07	Sediment Specific Volume	m^3/g
SSG	2.65	Sediment Specific Gravity	--
WSEDO	7.0E-06	Constant Sediment Settling Velocity	m/s
TAUD	3.00E-03	Critical Stress for Deposition	$(m/s)^2$
WRSPO	5.00E-06	Reference Surface Erosion Rate	$g/m^2/s$
TAUR	4.00E-03	Critical Stress for Erosion	$(m/s)^2$

Algae

Phytoplankton in the EFDC model can be represented by three different functional groups of algae as (1) blue-green cyanobacteria; (2) diatoms; and (3) green algae. The Lake Harris EFDC model was developed to simulate only green algae as a “generic” group since there was no observed data available to characterize seasonal phytoplankton composition. Kinetic processes represented for algal groups include photosynthetic production, basal metabolism (respiration and excretion), settling and predation. Photosynthetic production is described by a growth rate that is functionally dependent on a maximum growth rate, water temperature, the availability of sunlight at the surface, light extinction in the water column, the optimum light level for growth, and half-saturation dependent nutrient limitation by either nitrogen or phosphorus. Growth and basal metabolism are temperature dependent processes while settling and predation losses are assigned as constant parameter values.

Organic Carbon

Total organic carbon is represented in the model with three state variables as dissolved organic carbon (DOC) and refractory and labile forms of particulate organic carbon (RPOC and LPOC). The time scale for decomposition of particulate organic matter (POM) is used to differentiate refractory and labile POM with labile matter decomposing rapidly (weeks to months) while decay of refractory POM takes much longer (years). Although DOC is not termed "labile", DOC is considered to react with a rapid time scale for decomposition (weeks to months).

Kinetic processes represented in the model for particulate organic carbon (POC) include algal predation, dissolution of RPOC and LPOC to DOC, and settling. Kinetic processes for DOC include sources from algal excretion, predation and dissolution of POC and losses from decomposition and denitrification. With the exception of settling of POC, all the kinetic reaction processes are temperature dependent.

Phosphorus

The organic and inorganic forms of phosphorus are represented in the model. Total organic phosphorus is represented in the model with three state variables as dissolved organic phosphorus (DOP) and refractory and labile forms of particulate organic phosphorus (RPOP and LPOP). As with organic carbon, the time scale for decomposition of particulate organic matter (POM) is used to differentiate refractory and labile POP. Kinetic processes represented in the model for POP include algal metabolism, predation, dissolution of RPOP and LPOP to DOP, and settling. Kinetic processes for DOP include sources from algal metabolism, predation and dissolution of POP to DOP with losses of DOP from mineralization to phosphate. With the exception of settling of POP, the kinetic reaction processes are all temperature dependent.

Inorganic phosphorus is represented as a single state variable for total phosphate which accounts for both the dissolved and particulate sorbed forms of phosphate. Adsorption and desorption of phosphate is defined on the basis of equilibrium partitioning using an assigned phosphate partition coefficient for suspended solids. Kinetic terms for total phosphate include sources from algal metabolism, predation and mineralization from DOP while losses for phosphate include settling of the sorbed fraction of total phosphate and uptake by phytoplankton growth. Depending on the concentration gradient between the bottom layer of the water column and sediment bed porewater phosphate, the sediment-water interface can serve as either a source or a loss term for phosphate in the water column. With the exception of the partition coefficient and the settling of sorbed phosphate, the kinetic reaction processes for phosphate are all temperature dependent.

Nitrogen

The organic and inorganic forms of nitrogen are represented in the model. Total organic nitrogen is represented in the model with three state variables as dissolved organic nitrogen (DON) and refractory and labile forms of particulate organic nitrogen (RPON and LPON). As with organic carbon, the time scale for decomposition of particulate organic matter (POM) is used to differentiate refractory and labile PON. Kinetic processes represented in the model for PON include algal metabolism, predation, dissolution of RPON and LPON to DON, and settling. Kinetic processes for DON include sources from algal metabolism and predation, dissolution of PON to DON and losses of DON from mineralization of PON to ammonium. With the exception of settling of PON, the kinetic reaction processes are all temperature dependent.

Inorganic nitrogen is represented by two state variables as (1) ammonia and (2) nitrite+nitrate. In natural waters total ammonia exists in two forms as the ammonium ion ($NH4^+$) and as un-ionized (NH3) ammonia. The ammonium ion ($NH4^+$) is the form of ammonia that is oxidized by nitrifying bacteria to nitrite and nitrate and used by phytoplankton for photosynthetic growth. Un-ionized ammonia (NH3) is the form of ammonia that is toxic to fish and other aquatic species. The toxic level of ammonia (NH3) is water temperature and pH dependent and toxicity increases as water temperature and/or pH increase. In most natural waters, where pH is relatively stable (~6 to 8), the ionized form of ammonia ($NH4^+$) typically has a much larger concentration than the un-ionized form of ammonia (NH3) (Ji, 2017). In most water quality models, the ammonium ion ($NH4^+$) is the form of ammonia that is commonly simulated as shown in Table 3-1 (Cerco and Cole, 1994; Tetra Tech, 2007; Ji, 2017).

Kinetic terms for ammonia include sources from algal metabolism and predation and mineralization from DON. Losses for ammonia include bacterially mediated transformation to nitrite and nitrate by nitrification and uptake by phytoplankton growth. Depending on the concentration gradient between the bottom layer of the water column and sediment bed porewater ammonia, the sediment-water interface can serve as either a source or a loss term for ammonia in the water column. The kinetic reaction processes for ammonia are all temperature dependent.

Since the time scale for conversion of nitrite to nitrate is very rapid, the concentration of nitrite in natural waters is much smaller than nitrate concentrations. In almost all water quality models, nitrite and nitrate are combined as a single state variable representing the sum of these two forms of inorganic nitrogen (nitrite+nitrate). Kinetic terms for nitrite/nitrate include sources from nitrification from ammonia to nitrite and nitrate. Losses include photosynthetic uptake by phytoplankton and denitrification to nitrogen gas. Depending on the concentration gradient between the bottom layer of the water column and sediment bed porewater nitrite/nitrate, the sediment-water interface can serve as either a source or a loss term for nitrite/nitrate in the water column. The kinetic reaction processes for nitrite/nitrate are all water temperature dependent.

Chemical Oxygen Demand (COD)

In the EFDC water quality model, chemical oxygen demand (COD) represents the concentration of reduced substances that can be oxidized through inorganic processes. The principal source of COD in freshwater is methane released from oxidation of organic carbon in the sediment bed across the sediment-water interface. Since sediment bed decomposition is accounted for in the water quality model, the only source of COD to the water column is the flux of methane across the sediment-water interface. Sources from the open water boundaries and upstream flow boundaries are set to zero for COD. The loss term in the water column is defined by a temperature dependent first order oxidation rate.

Dissolved Oxygen

Dissolved oxygen is a key state variable in the water quality model since several kinetic processes interact with, and can be controlled by, dissolved oxygen. Kinetic processes represented in the dissolved oxygen model include sources from atmospheric reaeration in the surface layer and algal photosynthetic production. Kinetic loss terms include algal respiration, nitrification, decomposition of DOC, oxidation of COD, and in the bottom layer of the water column, consumption of dissolved oxygen from sediment oxygen demand. Sediment oxygen demand is internally simulated with the sediment flux model by coupling particulate organic carbon deposition from the water column and decomposition of organic matter in the sediment bed. The kinetic reaction processes for dissolved oxygen are all temperature dependent.

Kinetic Coefficients

Most of the water quality parameters and coefficients needed by the EFDC water quality model were initialized with default values as indicated in the user’s manual (Hamrick, 2007). These default values are, in general, the same as the parameter values determined for the

Chesapeake Bay model (Cerco and Cole, 1995). Models developed for Lake Washington (Arhonditsis and Brett, 2005) and Chesapeake Bay tributaries (Cerco et al., 2002) also provided kinetic coefficients needed for the EFDC water quality model. Kinetic coefficients and model parameters were adjusted, as needed, within ranges reported in the literature, during model calibration to obtain the most reasonable agreement between observed and simulated water quality concentrations such as total suspended solids, algal biomass, organic carbon, dissolved oxygen and nutrients. A large body of literature is available from numerous advanced modeling studies developed over the past decade to provide information on reported ranges of parameter values that can be assigned for site-specific modeling projects (see Ji, 2017; Park et al, 1995; Hamrick, 2007; Dynamic Solutions, 2012; Dynamic Solutions, 2016).

Kinetic coefficients and model parameters assigned for the water quality model are assigned as either global or spatially dependent zone parameters for the Lake Harris EFDC model. Nine zones were used to represent the spatial variation in algae kinetics in the Lake Harris model (Figure 3-1).

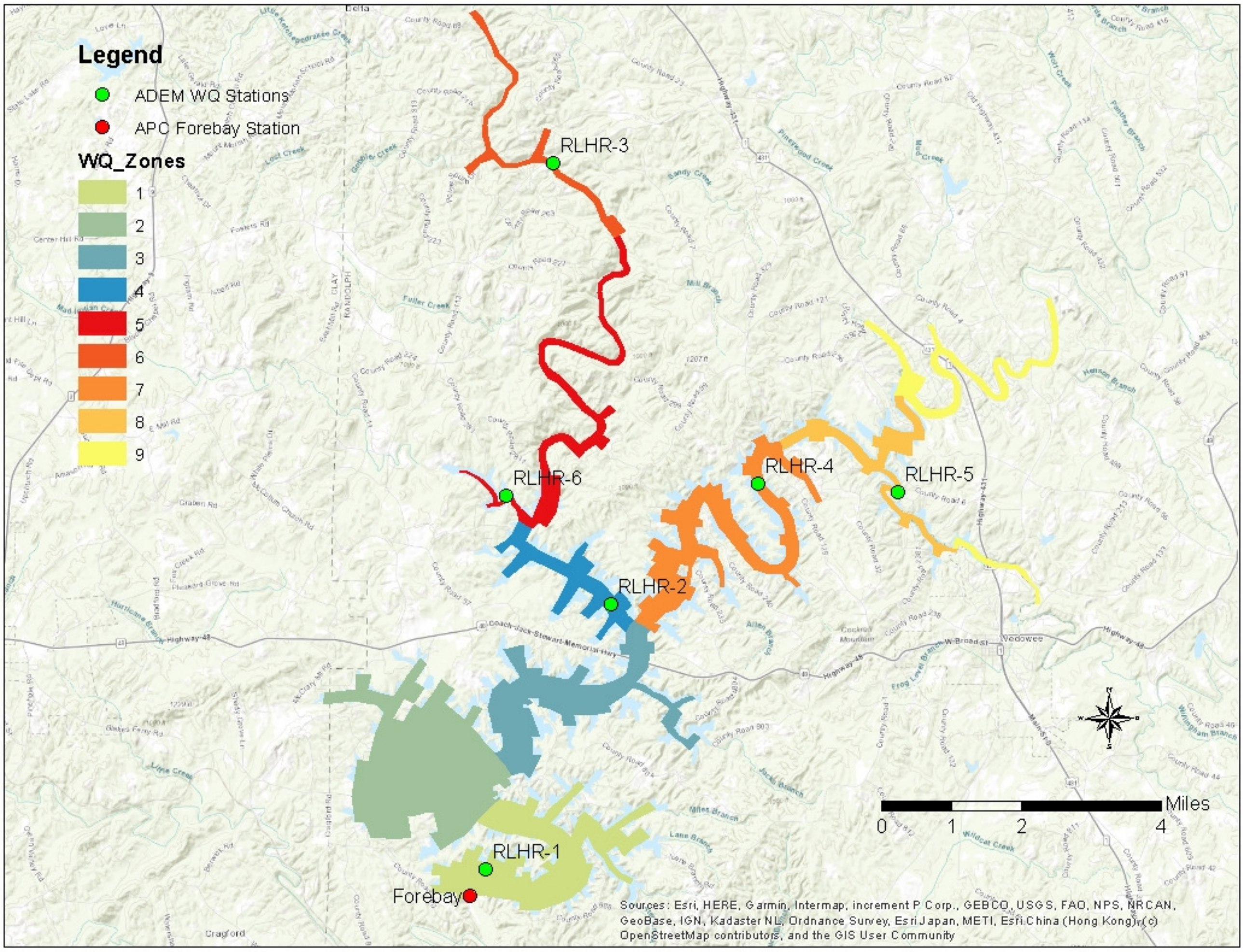

Figure 3-1 Spatial water quality kinetic zones defined for Lake Harris

Atmospheric Deposition

Atmospheric deposition is represented in the EFDC model with separate source terms for dry deposition and wet deposition. Dry deposition is defined by a constant mass flux rate (as g/m^2-day) for a constituent that settles out as dust or is deposited on a dry surface during a period of no precipitation. Wet deposition is defined by a constant concentration (as mg/L) of water quality constituents in rainfall and the time series of precipitation assigned for input to the hydrodynamic model. For the Lake Harris model, wet and dry deposition data (Table 3-3) was assigned as the average of annual data from 2015-2019 for ammonia and nitrate from the National Atmospheric Deposition Program (NADP) for Station GA41 (Georgia Station, Lat 33.18 N; Lon -84.41 W) and the Clean Air Status and Trends Network (CASTNET) Station GAS153 (Georgia Station, Lat 33.18 N; Lon -84.41 W) (Figure 3-2). As data was not available from the CASTNET and NADP sites for phosphate, dry deposition for phosphate was estimated using annual average N/P ratios for atmospheric deposition of N and P reported for 6 monitoring sites in Iowa (Anderson and Downing, 2006) and the ammonia and nitrate data obtained from the NADP and CASTNET data sources.

Table 3-3 Dry and Wet Atmospheric Deposition for Nutrients

	Dry	Wet	Data Source
	g/m^2-day	mg/L	
TPO4	6.00E-06	0.000566	Anderson & Downing (2006), Table VII
NH4	3.80E-05	0.175933	Dry (CASTNET, GAS 153); Wet (NADP, GA 41); average 2015-2019
NO3	7.80E-05	0.08531	Dry (CASTNET, GAS 153); Wet (NADP, GA 41); average 2015-2019

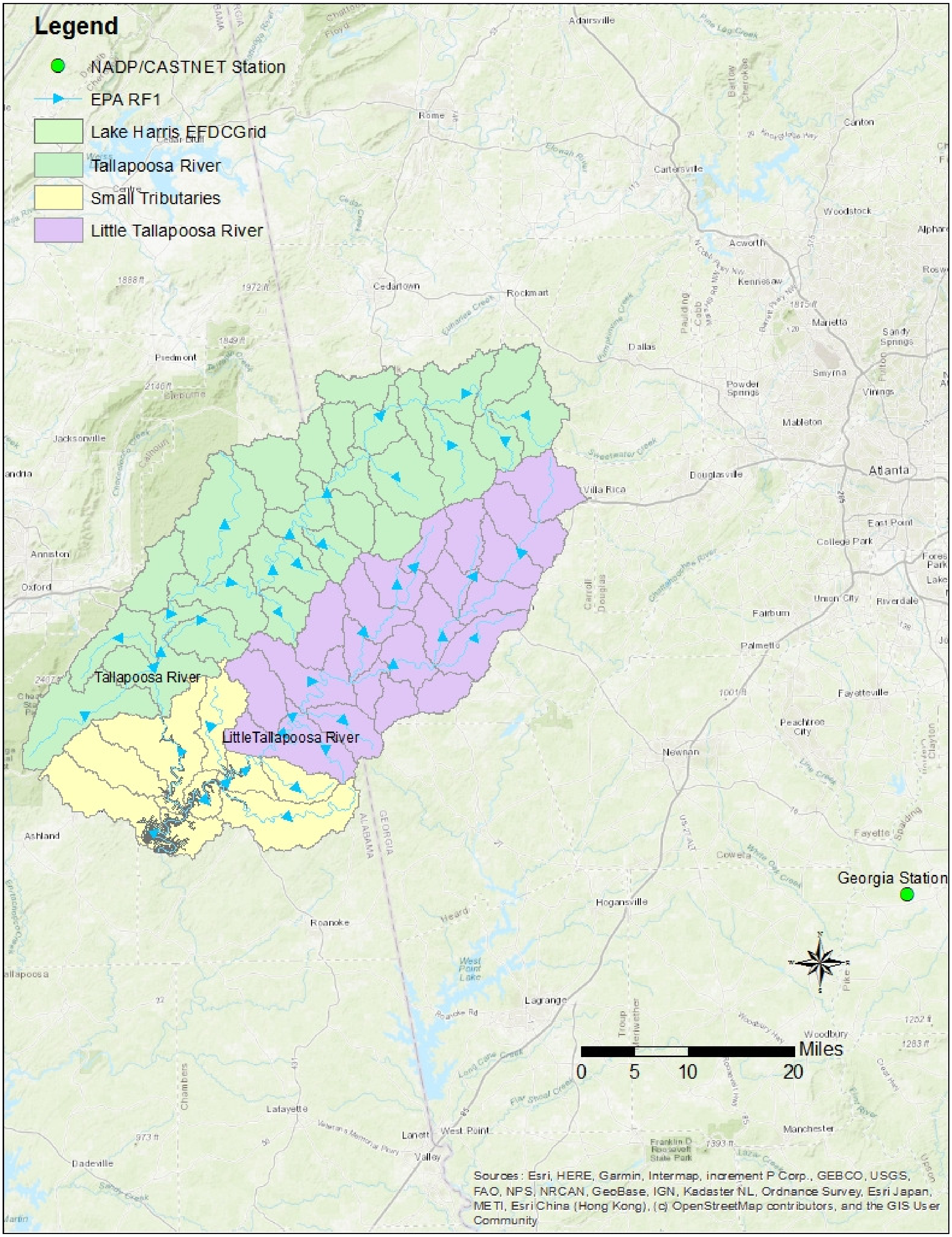

Figure 3-2 Locations of the EPA CASTNET Station and NADP/NTP Station

3.2 Sediment Flux Model

The EFDC water quality model provides three options for defining the sediment-water interface fluxes for nutrients and dissolved oxygen. The options are: (1) externally forced spatially and temporally constant fluxes; (2) externally forced spatially and temporally variable fluxes; and (3) internally coupled fluxes simulated with the sediment diagenesis model. The water quality state variables that are controlled by diffusive exchange across the sediment-water interface include phosphate, ammonia, nitrate, silica, chemical oxygen demand and dissolved oxygen. The first two options require that the sediment fluxes be assigned as spatial/temporal forcing functions based on either observed site-specific data from field surveys or best estimates based on the literature and sediment bed characteristics. The third option is the activation of the full sediment diagenesis model developed by Di Toro (2001).

For the Lake Harris EFDC model, the second option was selected because observed sediment bed chemistry data was not available. The initial sediment oxygen demand (SOD) values and nutrient fluxes (NH4 and PO4) for each spatial zone were based on measured SOD values in Weiss Lake in 2001 by the Environmental Protection Agency (EPA) (Tetra Tech, 2007). Location of the nine water quality zones is shown in Figure 3-1. During the calibration process, the SOD values and nutrient fluxes were adjusted as needed to best match the dissolved oxygen and nutrient observations. The seasonal pattern of SOD was initially based on the observed data reported by Cowan et al. (1996). The final calibrated data set for monthly SOD rates are given in Table 3-4. The highest monthly SOD value of 1.12 g/m^2-day determined by calibration was very close to the observed SOD values in Browns Lake in Mississippi collected by the USACE (Price et al., 1994).

Table 3-4 Monthly SOD Values Calibrated for Lake Harris EFDC Model (g/m^2-day)

Month	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9
January	-0.65	-0.65	-0.65	-0.65	-0.65	-0.28	-0.65	-0.65	-0.28
February	-0.85	-0.85	-0.65	-0.65	-0.65	-0.28	-0.65	-0.65	-0.28
March	-0.85	-0.85	-0.65	-0.65	-0.65	-0.28	-0.65	-0.65	-0.28
April	-0.85	-0.85	-0.85	-0.85	-0.85	-0.28	-0.85	-0.85	-0.28
May	-1.00	-1.00	-1.00	-1.00	-1.00	-0.28	-1.00	-1.00	-0.28
June	-1.12	-1.12	-1.12	-1.12	-1.12	-0.28	-1.12	-1.12	-0.28
July	-1.12	-1.12	-1.12	-1.12	-1.12	-0.28	-1.12	-1.12	-0.28
August	-1.00	-1.00	-1.00	-1.00	-1.00	-0.28	-0.85	-0.85	-0.28
September	-0.85	-0.85	-0.85	-0.85	-0.85	-0.28	-0.85	-0.65	-0.28
October	-0.65	-0.65	-0.65	-0.65	-0.65	-0.28	-0.65	-0.65	-0.28
November	-0.65	-0.65	-0.65	-0.65	-0.65	-0.28	-0.65	-0.65	-0.28
December	-0.65	-0.65	-0.65	-0.65	-0.65	-0.28	-0.65	-0.65	-0.28

4. Calibration and Validation Stations

4.1 Stage Calibration and Validation Stations

The observed stage data in Lake Harris is available from APC at the forebay station shown in Figure 2-5.

4.2 Water Quality Calibration and Validation Stations

The Lake Harris EFDC model was calibrated and validated at one (1) APC station at the forebay and six (6) Alabama Department of Environmental Management (ADEM) stations: RLHR-1, RLHR-2, RLHR-3, RLHR-4, RLHR-5, and RLHR-6. Station identification information for these stations is listed in Table 4-1 and station locations are shown in Figure 4-1.

Table 4-1 Water Quality Calibration and Validation Stations for Lake Harris

Station Code	Location Description	Latitude (N)	Longitude (W)
Forebay	Dam site, most downstream site of the lake	33.25856	-85.6166
RLHR-1	Lower reservoir. Deepest point, main river channel, dam forebay	33.26406	-85.6127
RLHR-2	Mid reservoir. Deepest point, main river channel, immediate upstream of Tallapoosa River/Little Tallapoosa River confluence.	33.31843	-85.5811
RLHR-3	Upper reservoir. Deepest point, main river channel, immediate downstream of Randolph Co. Hwy 82 bridge.	33.41002	-85.5939
RLHR-4	Deepest point, Little Tallapoosa River channel, immediate downstream of Randolph Co. Hwy 29.	33.34314	-85.5444
RLHR-5	Deepest point, main creek channel, Wedowee Creek embayment, approx. 0.5 miles upstream of lake confluence.	33.34083	-85.5097
RLHR-6	Deepest point, main creek channel, Mad Indian Creek embayment, approx. 0.5 miles upstream of lake confluence.	33.34139	-85.6064

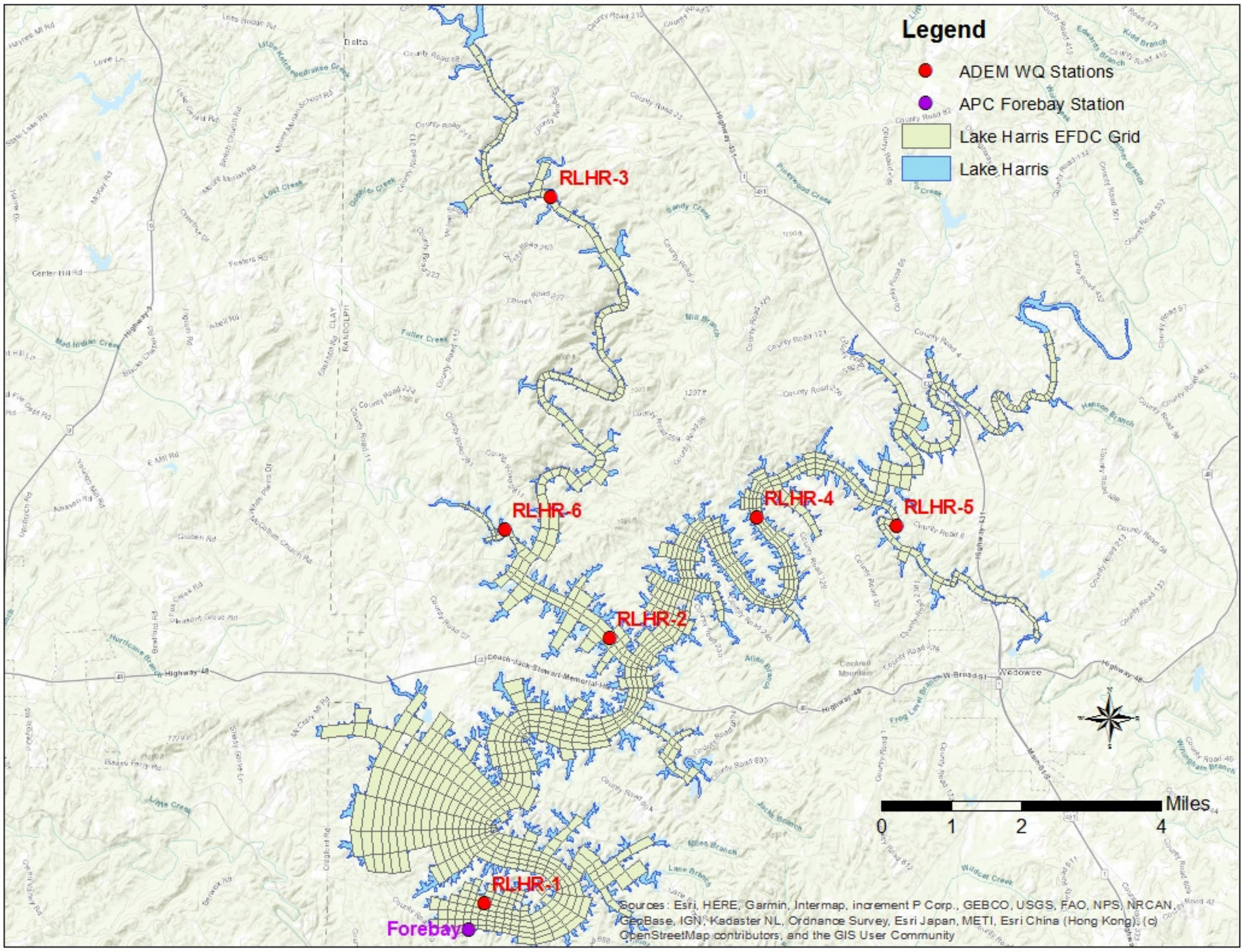

Figure 4-1 Locations of the APC and ADEM Water Quality Stations in Lake Harris

5. Model Performance Statistics

Observed station data was processed to define time series for each station location for the surface layer and bottom layer of the water column. Observed data was assigned to a vertical layer based on surface water elevation, station bottom elevation and the total depth of the water column estimated for the sampling date and time. Station locations were overlaid on the model grid to define a set of discrete grid cells that correspond to each monitoring site for extraction of model results.

The model-data model performance statistic selected for calibration of the hydrodynamic and water quality model was the Root Mean Square Error (RMSE). The units of the RMSE are defined by the units of each state variable of the model.

The equation for the RMSE is,

$$\mathrm{RMSE} = \sqrt{\frac{1}{N}\Sigma(O-P)^2} \qquad \text{Equation (1)}$$

Where

N is the number of paired records of observed measurements and EFDC model results,

O is the observed water quality measurement,

P is the predicted EFDC model result.

6. Hydrodynamic Model Calibration and Validation

6.1 Lake Stage Calibration

The hydrodynamic model was calibrated for the 2-year time period from 1 January 2018 to 31 December 2019. Figure 6-1 shows the comparison of observed lake water surface elevation at the APC forebay station and simulated water surface elevation extracted from a grid cell at that location. Water level data for the lake were based on the NAVD88 vertical datum with units of meters.

Simulated lake elevation was in excellent agreement with the measured lake elevation for the calibration period from January 2018 through December 2019. The summary of model performance statistics between observed and simulated water surface elevation for the calibration period is given in Table 6-1. The simulated average stage was 240.613 m, which was very close to the averaged observed stage of 240.612 m. The calculated RMS error was 0.016 m (Table 6-1).

Table 6-1 Model Performance Statistics for Hydrodynamic Model for Lake Stage (NAVD88, m)

Station ID	Parameter	Simulation Periods	Starting	Ending	# Pairs	RMS (m)	Data Average (m)	Model Average (m)
Forebay	Stage (m)	Calibration	1/1/2018 0:00	12/31/2019 0:00	17,473	0.016	240.612	240.613
Forebay	Stage (m)	Validation	1/1/2015 0:00	12/31/2017 0:00	26,297	0.019	240.603	240.606

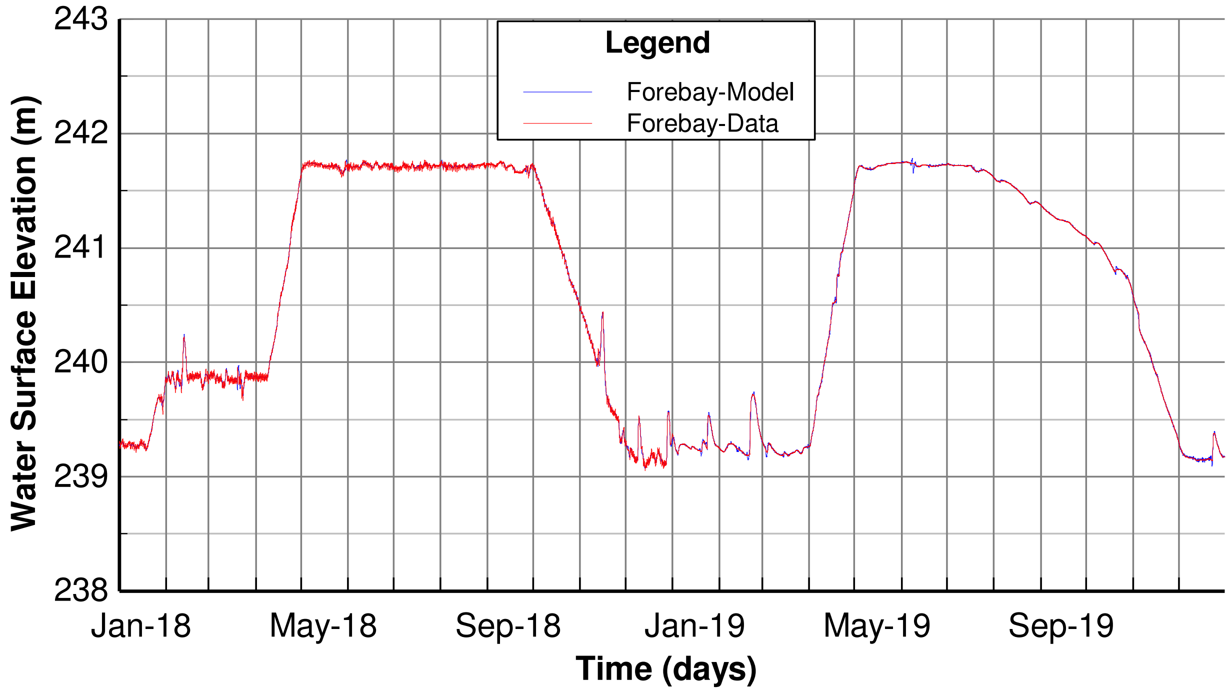

Figure 6-1 Calibration Plot of Water Surface Elevation at APC Forebay Station

6.2 Lake Stage Validation

The Lake Harris EFDC model was validated for the 3-year time period from 1 January 2015 to 31 December 2017. The validation plot for surface water elevation at the APC forebay station (NAVD88) is shown in Figure 6-2. The summary of model performance statistics between observed and simulated water surface elevation for the validation period is given in Table 6-1. Simulated lake elevation was again in excellent agreement with the measured lake elevation for the entire validation period. The simulated average stage was 240.606 m, which, again, was very close to the averaged observed stage of 240.603 m. The calculated RMS error was 0.019 m (Table 6-1).

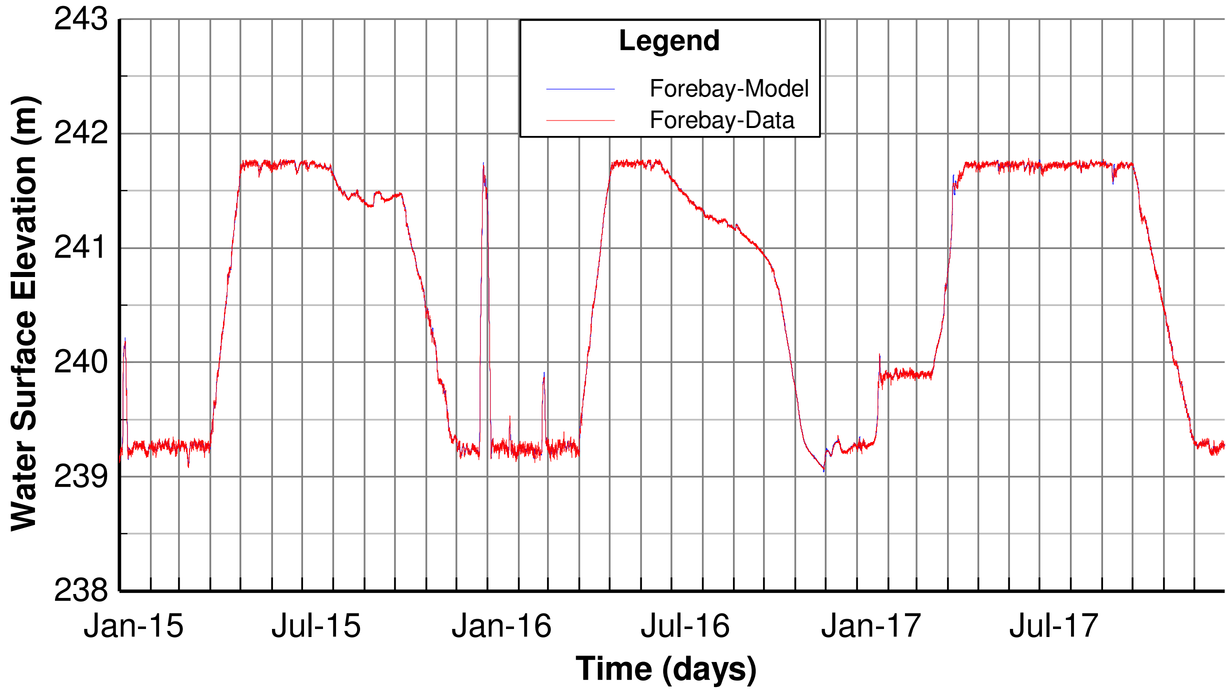

Figure 6-2 Validation Plot of Water Surface Elevation at APC Forebay Station

7. Water Quality Model Calibration and Validation

Prior to model calibration and validation, a one-year model spin-up run was conducted to eliminate the impact of initial water quality conditions on model results. Calibration of the lake model is demonstrated with model-data comparisons for water temperature, total suspended solids, secchi depth, dissolved oxygen, nutrients, and algae biomass as station time series. Vertical profiles are presented for water temperature and dissolved oxygen.

Observed data collected near the surface was compared to lake model results for the EFDC surface layer and data collected near the bottom was compared to model results for the EFDC bottom layer. Observed data at the bottom layer was available only for water temperature and dissolved oxygen (DO). Station results are presented in this section to show model calibration and validation for the selected water quality stations in Lake Harris as shown in Figure 4-1.

During the calibration and validation periods, the availability of observed data sets were very limited. In many cases the sample size of the observed data set for either the calibration period or validation period was less than 10 records. Hence, summary statistics for model performance were computed for the entire calibraton and validation periods. Model-data comparison plots are, however, shown separately for the calibration and validation periods.

7.1 Water Temperature Calibration and Validation

Procedures used to calibrate water temperature included: (1) check the boundary conditions assigned for water temperature; (2) check the meteorological data to make sure that the solar radiation data are in a reasonable range; and (3) adjust the key parameters within reasonable ranges to best match the observed water temperature data.

Modeled water temperature results are presented for comparison to the observed data for the surface layer and bottom layer. Water temperature calibration plots at the APC forebay station are shown in Figure 7-1 and Figure 7-2 and water temperature validation plots at the APC forebay station are shown in Figure 7-3 and Figure 7-4. The water temperature surface and bottom layer calibration and validation plots at the ADEM stations RLHR-2, RLHR-3, RLHR-4, RLHR-5, and RLHR-6 are presented in Appendix A. Summary statistics for model performance for water temperature are given in Table 7-1.

As can be seen in the model-data plots, the model results for the surface and bottom layer are in very good agreement with measured water temperature for both the calibration and validation periods. Modeled water temperature closely followed the seasonal trends of the observed data in both the surface and bottom layers. The calculated RMS errors ranged from 0.71 ºC in the bottom layer for station RLHR-4 to 1.98 ºC in the bottom layer for station RLHR-3, as shown in Table 7-1.

Table 7-1 Hydrodynamic Model Performance Statistics for Time Series of Water Temperature (℃)

Station ID	Layer	Starting	Ending	# Pairs	RMS	Data Average	Model Average
Forebay	Surface	5/25/2016 13:59	10/2/2019 13:15	37	1.35	25.00	24.53
Forebay	Bottom	5/25/2016 13:59	10/2/2019 13:15	37	0.96	10.18	9.44
RLHR-2	Surface	4/29/2015 7:47	10/24/2018 9:51	14	1.02	26.20	26.25
RLHR-2	Bottom	4/29/2015 7:47	10/24/2018 9:51	11	0.84	9.26	9.05
RLHR-3	Surface	4/29/2015 8:25	10/24/2018 10:42	16	1.23	24.72	25.22
RLHR-3	Bottom	4/29/2015 8:25	10/24/2018 10:42	11	1.98	23.59	22.05
RLHR-4	Surface	4/29/2015 9:35	10/24/2018 11:26	14	1.03	26.40	26.67
RLHR-4	Bottom	4/29/2015 9:35	10/24/2018 11:26	13	0.71	12.68	13.00
RLHR-5	Surface	4/29/2015 9:56	10/24/2018 11:46	14	1.05	26.52	27.02
RLHR-5	Bottom	4/29/2015 9:56	10/24/2018 11:46	9	1.74	17.23	18.64
RLHR-6	Surface	4/29/2015 9:05	10/24/2018 10:15	14	1.03	26.16	26.26
RLHR-6	Bottom	4/29/2015 9:05	10/24/2018 10:15	12	1.61	17.45	16.75

Vertical profiles comparisons of water temperature at the APC forebay station are shown in Figure 7-5 through Figure 7-9 while comparisons of the water temperature vertical profiles at the ADEM stations RLHR-2, RLHR-3, RLHR-4, RLHR-5, and RLHR-6 are given in Appendix B. Vertical profiles show the model results extracted as “snapshots” for a time interval of the simulation that matches the observed date and time records for the hydrographic survey profile. As can be seen in the model-data vertical profile plots, the simulated water temperature profiles are in excellent agreement with the observed temperature measurements in most cases. Summary statistics for model performance of the set of water temperature vertical profiles are given in Table 7-2. Calculated RMS errors ranged from 0.95 ºC at station RLHR-4 to 1.17 ºC at APC forebay station, as shown in Table 7-2.

Table 7-2 Hydrodynamic Model Performance Statistics for Vertical Profiles of Water Temperature (℃)

Station ID	Starting	Ending	# Pairs	RMS	Data Average	Model Average
Forebay	5/25/2016	10/2/2019	518	1.17	17.74	17.73
RLHR-2	4/29/2015	10/24/2018	413	1.03	17.54	17.49
RLHR-3	4/29/2015	10/24/2018	161	1.08	24.06	23.73
RLHR-4	4/29/2015	10/24/2018	298	0.95	20.68	20.82
RLHR-5	4/29/2015	10/24/2018	207	1.10	23.16	23.64
RLHR-6	4/29/2015	10/24/2018	220	0.96	22.79	22.62

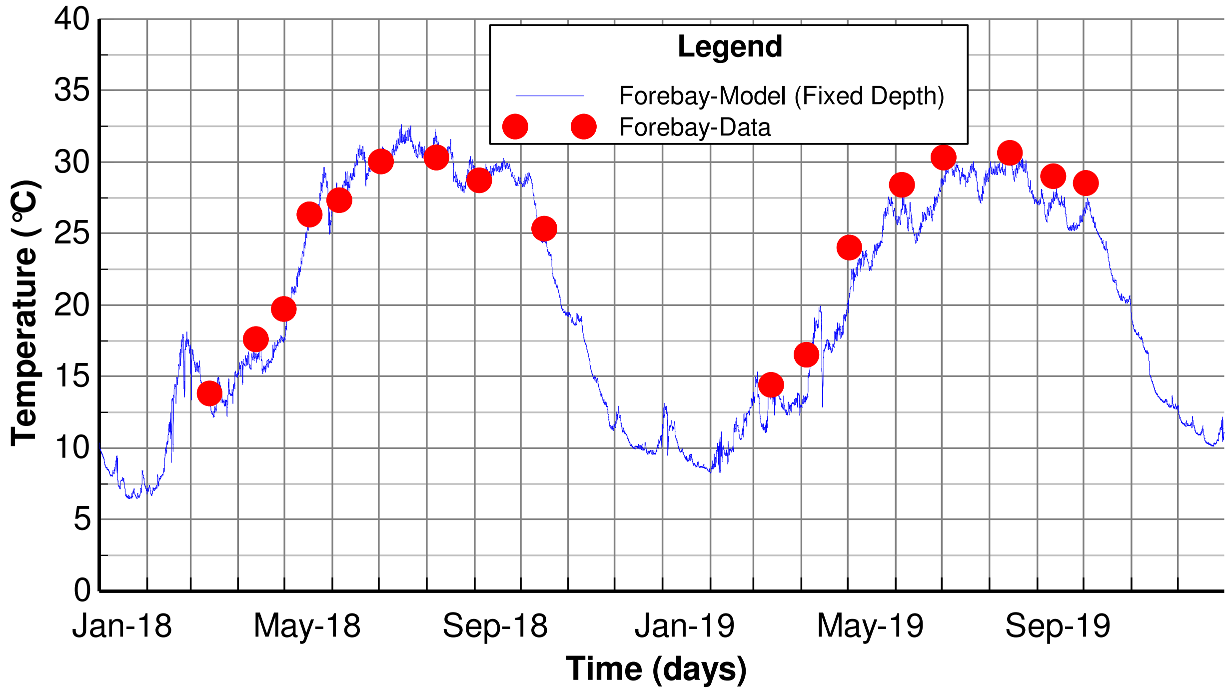

Figure 7-1 Calibration Plot of Surface Layer Water Temperature at APC Forebay Station

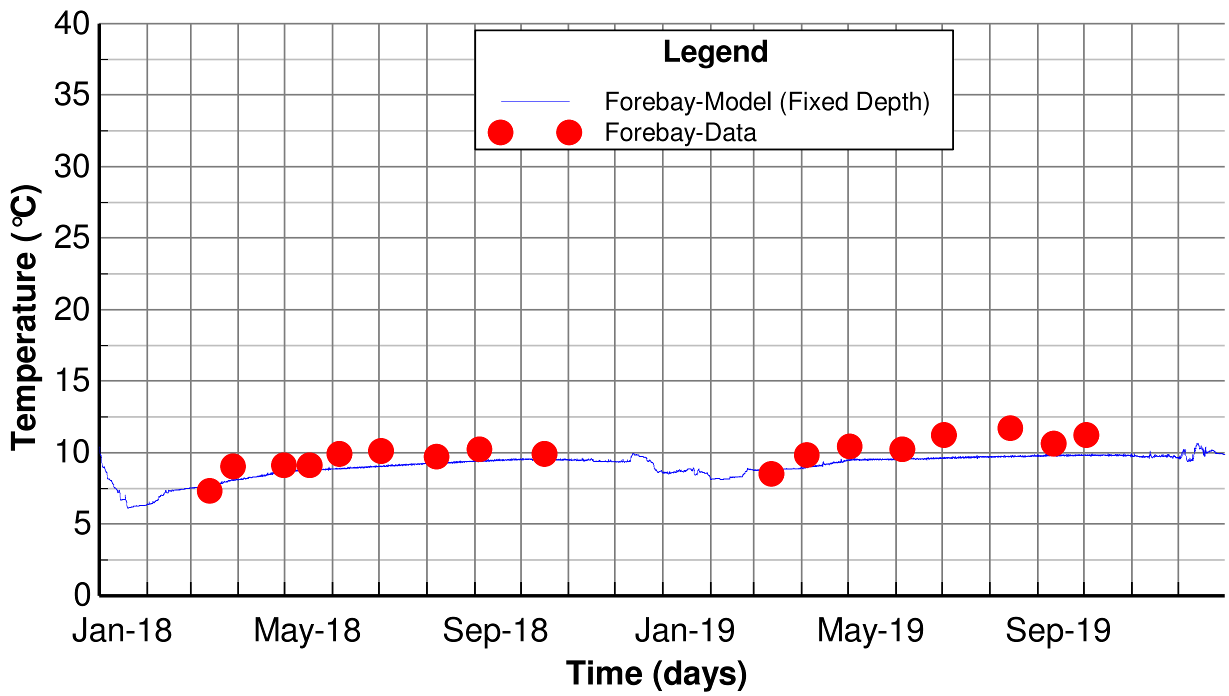

Figure 7-2 Calibration Plot of Bottom Layer Water Temperature at APC Forebay Station

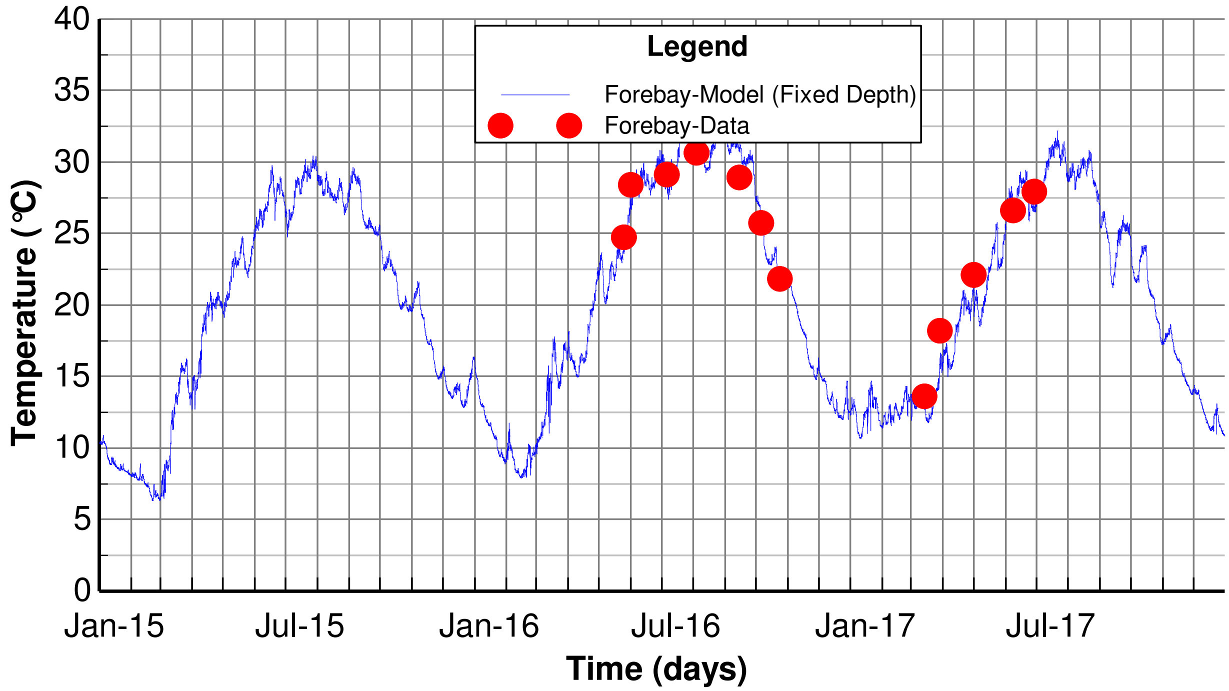

Figure 7-3 Validation Plot of Surface Layer Water Temperature at APC Forebay Station

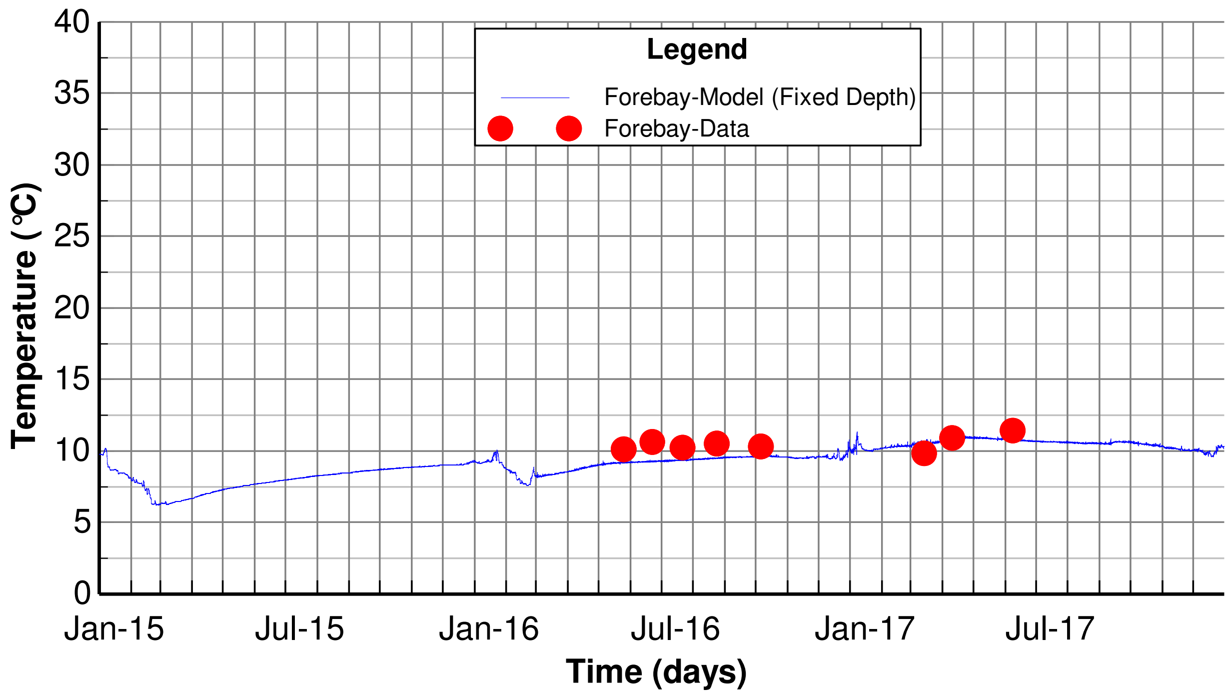

Figure 7-4 Validation Plot of Bottom Layer Water Temperature at APC Forebay Station

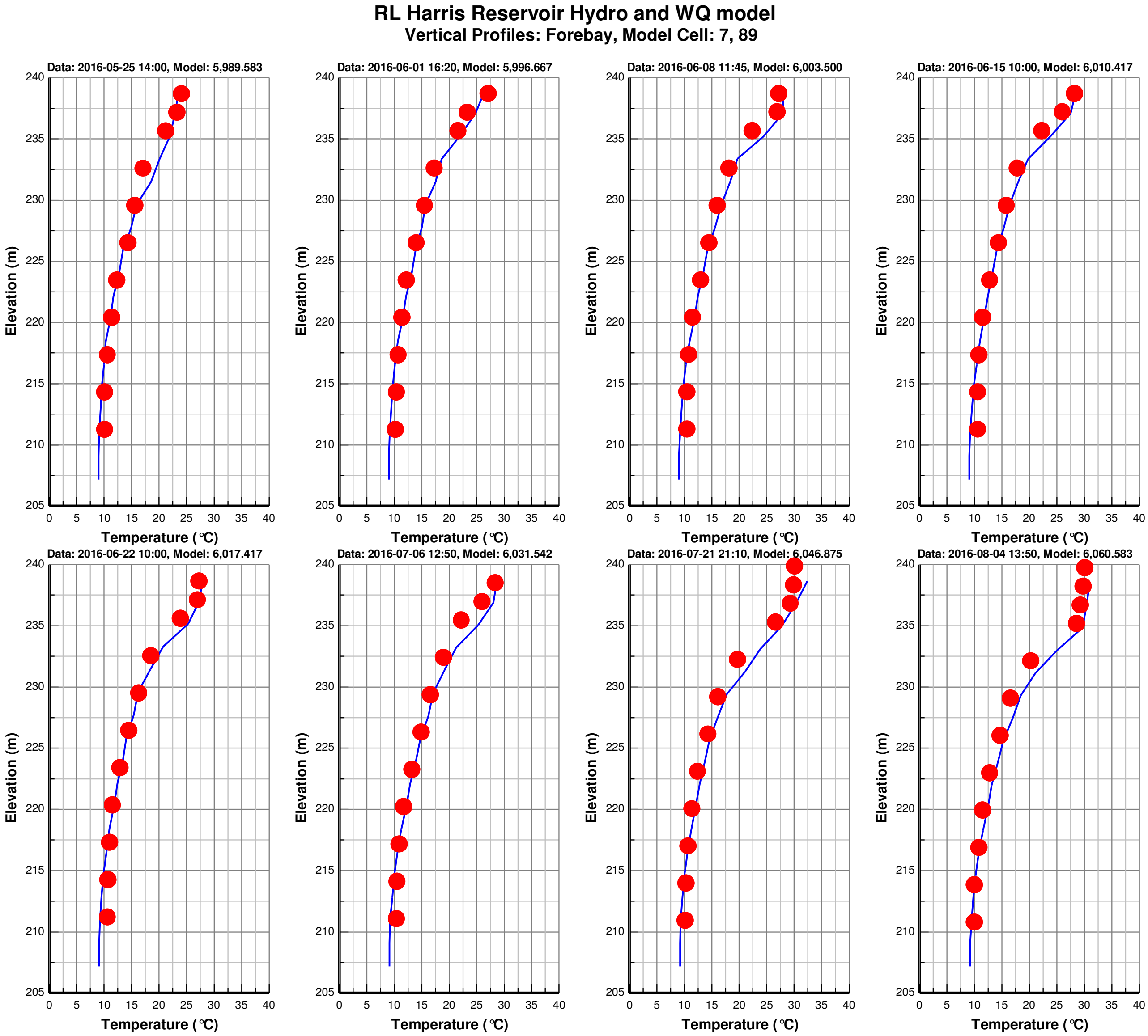

Figure 7-5 Water Temperature Vertical Profile Comparison Plot at APC Forebay Station (25 May 2016 – 4 August 2016)

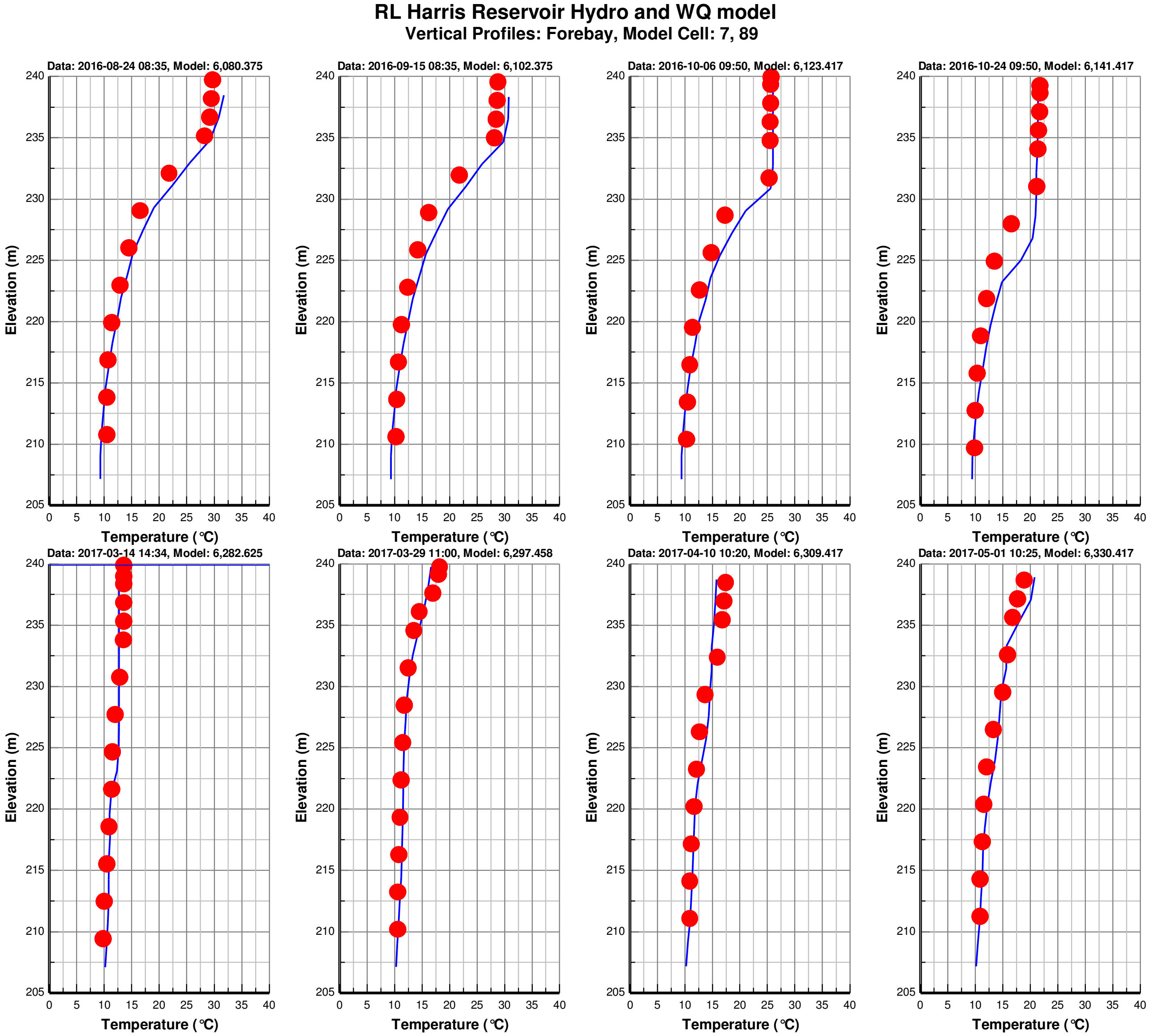

Figure 7-6 Water Temperature Vertical Profile Comparison Plot at APC Forebay Station (24 August 2016 – 1 May 2017)

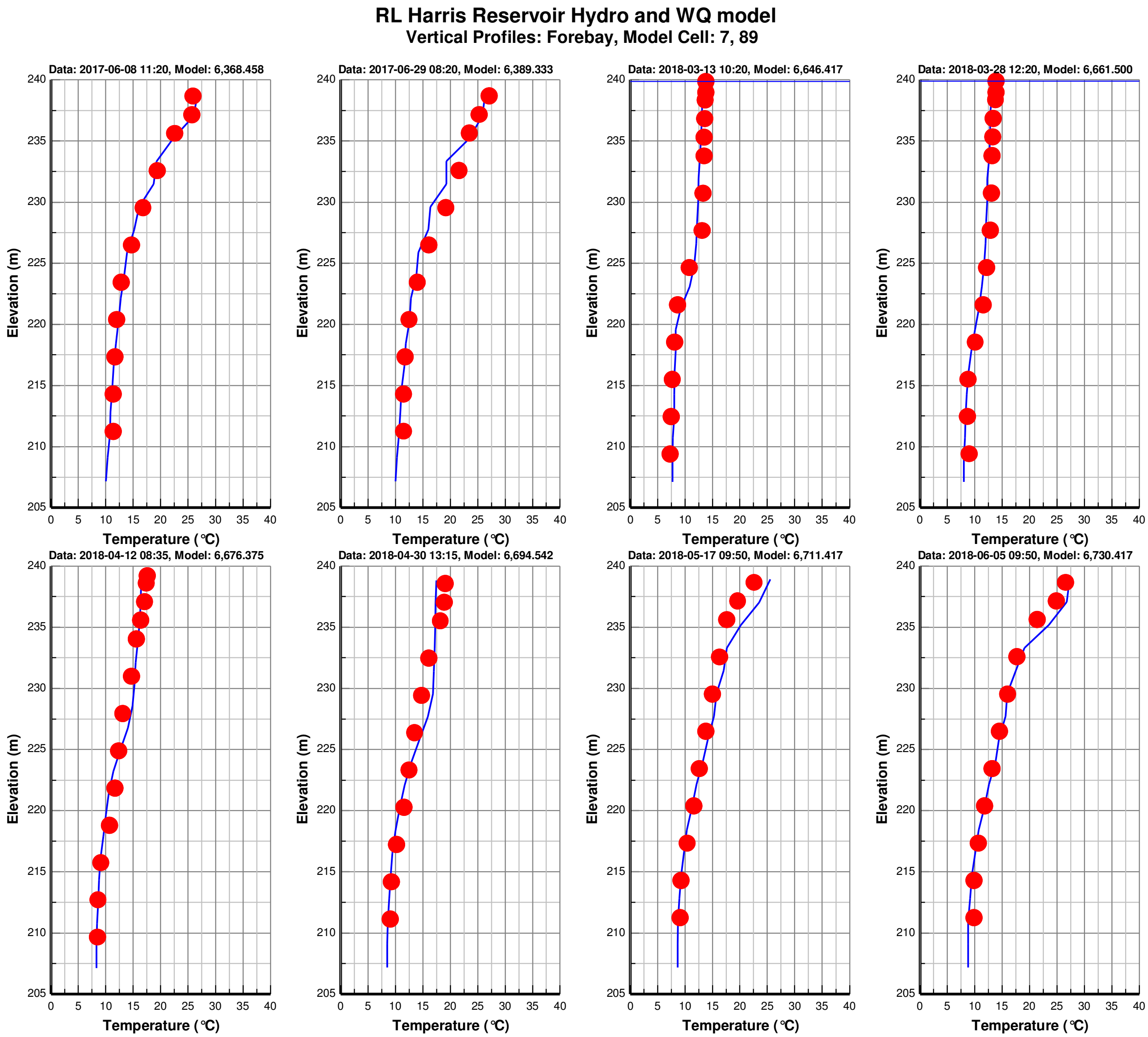

Figure 7-7 Water Temperature Vertical Profile Comparison Plot at APC Forebay Station (8 June 2017 – 5 June 2018)

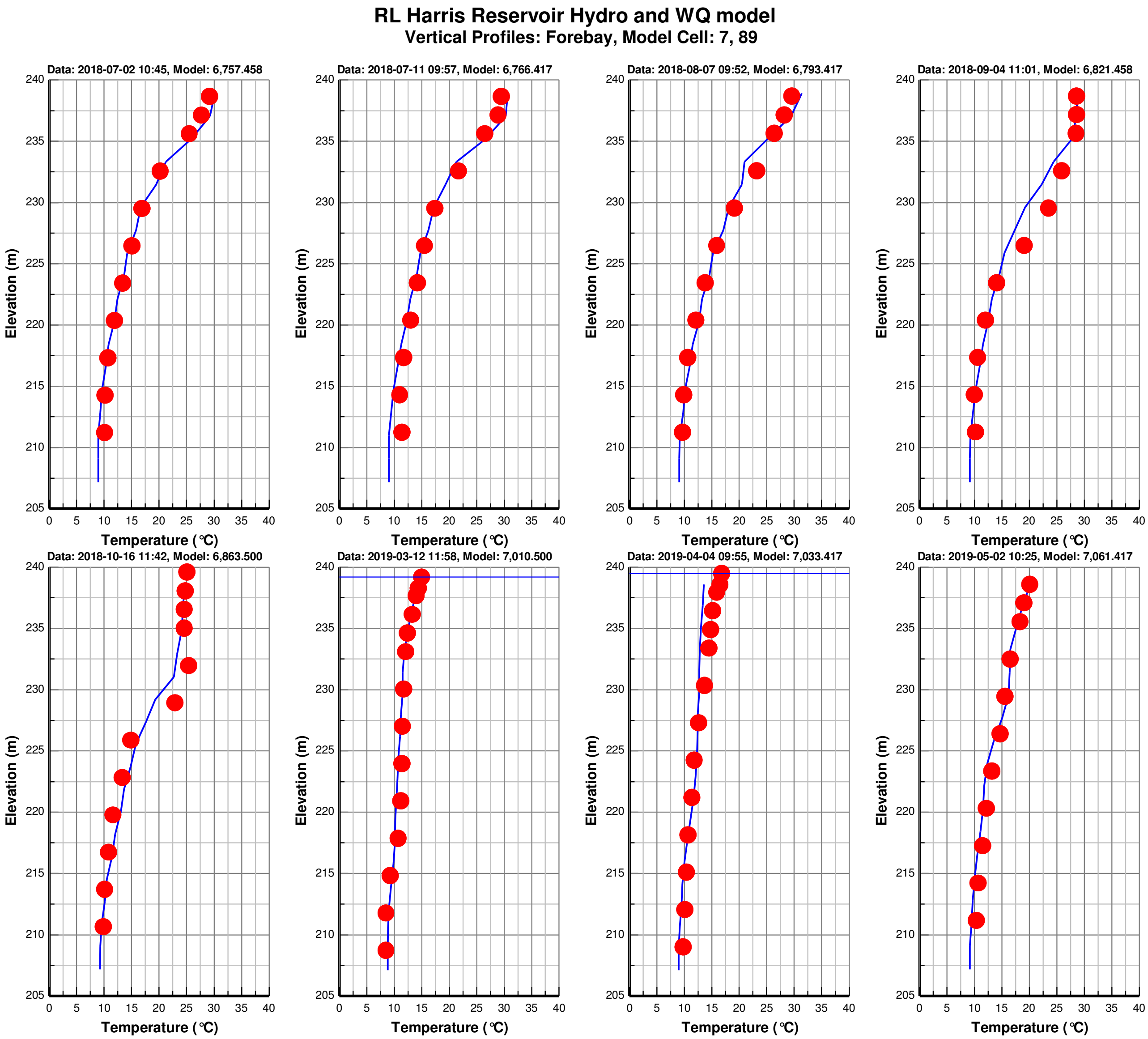

Figure 7-8 Water Temperature Vertical Profile Comparison Plot at APC Forebay Station (2 July 2018 – 2 May 2019)

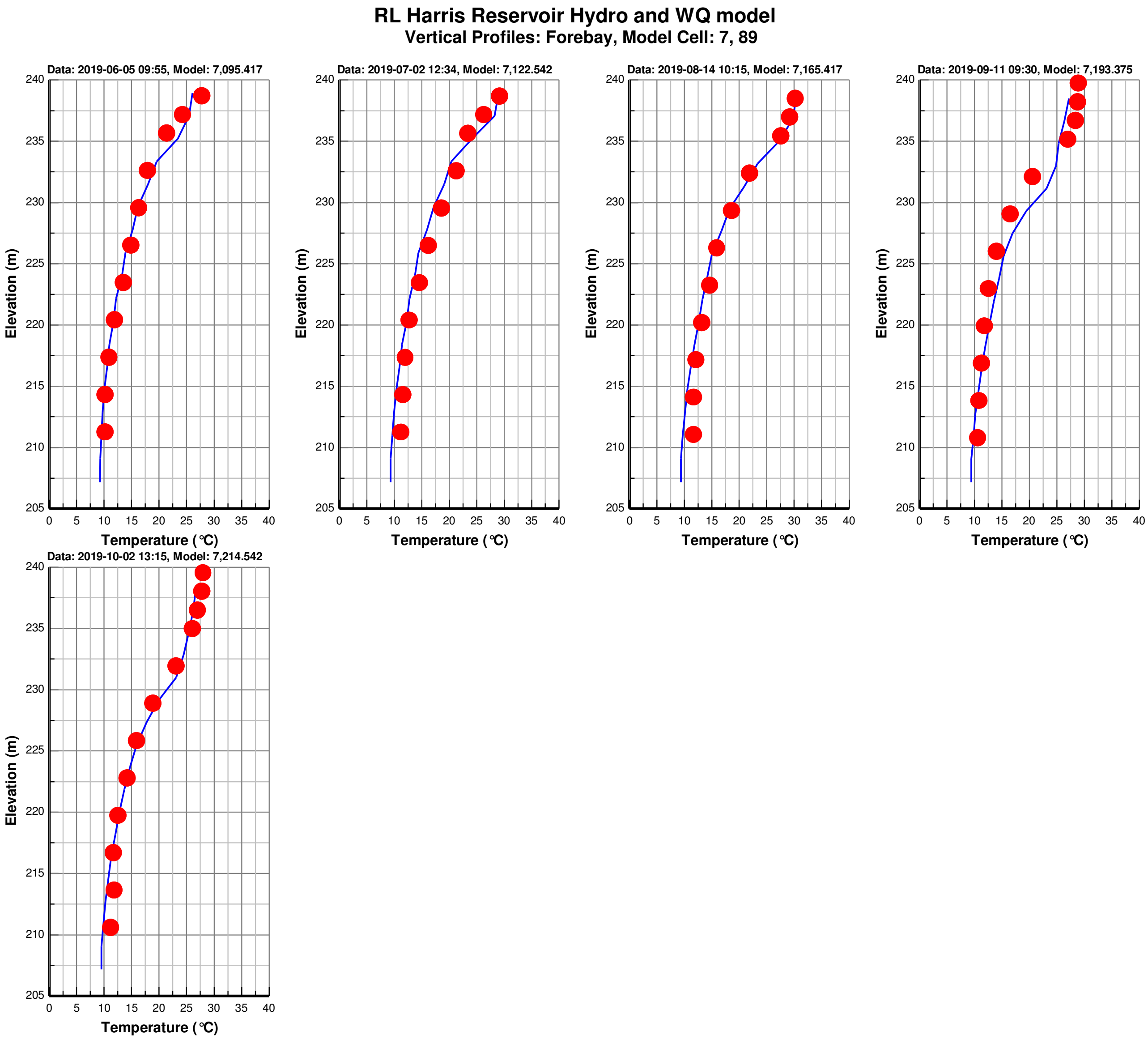

Figure 7-9 Water Temperature Vertical Profile Comparison Plot at APC Forebay Station (5 June 2019 – 2 October 2019)

7.2 Total Suspended Solids Calibration and Validation

Procedures used to calibrate total suspended solids included: (1) check the TSS boundary conditions; and (2) adjust the key parameters within reasonable ranges to best match the observed data.

As observed TSS data was available only for the surface layer, modeled TSS results were presented for comparison to the observed data only for the surface layer. Total suspended solids calibration and validation plots at ADEM Station RLHR-1 are given in Figure 7-10 and Figure 7-11, respectively. Total suspended solids calibration and validation plots at ADEM stations RLHR-2, RLHR-3, RLHR-4, RLHR-5, and RLHR-6 are given in Appendix A. Summary statistics for model performance of total suspended solids are given in Table 7-3.

As can be seen in these model-data plots, the model results for the surface layer are in reasonable agreement with observed TSS. The calculated RMS errors for model performance ranged from 1.91 mg/L at station RLHR-1 to 7.01 mg/L at station RLHR-6. In most of the cases, the Lake Harris EFDC model results overestimated the observed data with the exception of station RLHR-1 (Table 7-3).

The purpose of the total suspended solids calibration was to simulate a reasonable amount of suspended solids in the water column to ensure that light extinction due to inorganic suspended solids provides a good representation of the effects of light attenuation on both water temperature and water clarity. As suspended solids were reasonably well simulated and the model performance of water temperature was very good, the sediment transport model results based on TSS calibration were deemed to be acceptable.

Table 7-3 Model Performance Statistics for Total Suspended Solids (mg/L)

Station ID	Layer	Starting	Ending	# Pairs	RMS	Data Average	Model Average
RLHR-1	Surface	4/29/2015 7:05	10/24/2018 9:11	14	1.91	1.86	0.65
RLHR-2	Surface	4/29/2015 7:47	10/24/2018 9:51	14	6.27	1.96	3.59
RLHR-3	Surface	4/29/2015 8:25	10/24/2018 10:42	15	9.87	4.93	10.17
RLHR-4	Surface	4/29/2015 9:35	10/24/2018 11:26	14	6.04	2.61	4.17
RLHR-5	Surface	4/29/2015 9:56	10/24/2018 11:46	14	6.89	2.75	4.13
RLHR-6	Surface	4/29/2015 9:05	10/24/2018 10:15	14	7.01	2.50	4.89

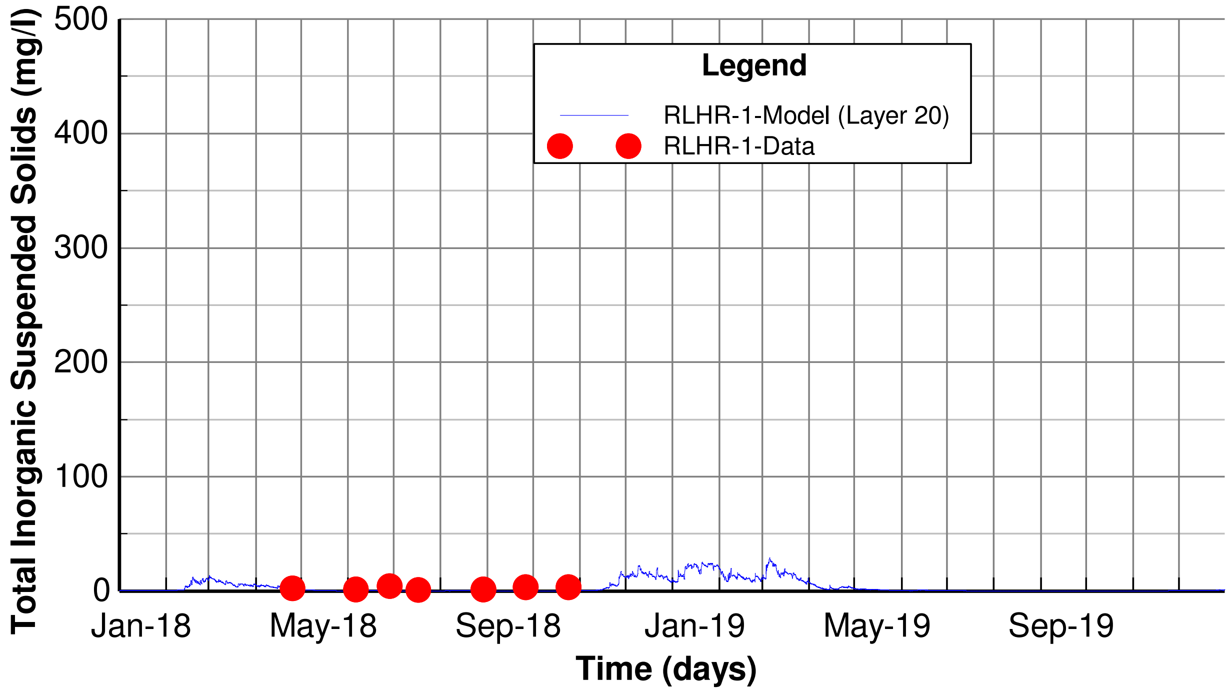

Figure 7-10 Calibration Plot of Surface Layer Total Suspended Solids at Station RLHR-1

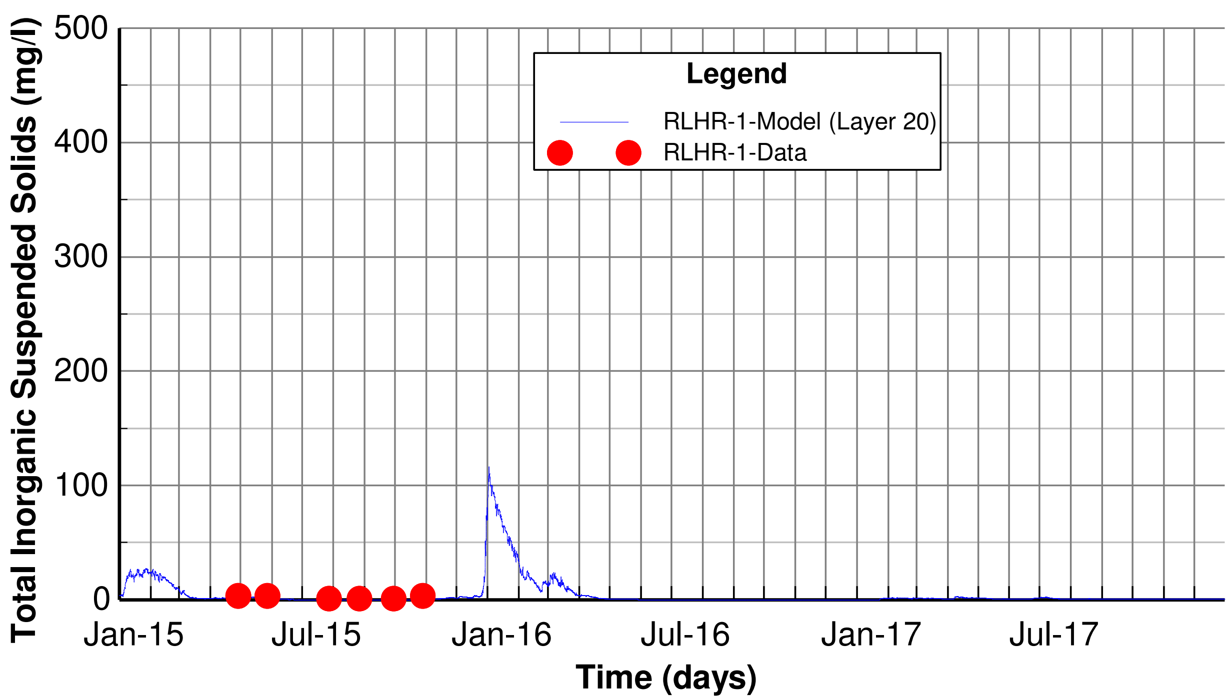

Figure 7-11 Validation Plot of Surface Layer Total Suspended Solids at Station RLHR-1

7.3 Secchi Depth Calibration and Validation

Secchi depth provides simple yet very meaningful measurements to characterize water clarity in a waterbody such as Lake Harris. In the EFDC model, Secchi depth is a derived output variable that represents the overall effect of light extinction by algal biomass (as chlorophyll a) and the concentrations of inorganic suspended solids, POC, DOC, and background effects of light attenuation not related to these state variables. In the EFDC hydrodynamic and water quality model, water quality-dependent light extinction in the water column also strongly impacts the simulation of water temperature in the hydrodynamic model.

Modeled Secchi depth results compared to the observed data sets collected during the calibration and validation periods at ADEM station RLHR-1 are shown in Figure 7-12 and Figure 7-13. Secchi depth calibration and validation plots at ADEM stations RLHR-2, RLHR-3, RLHR-4, RLHR-5, and RLHR-6 are given in Appendix A. Summary statistics for model performance of Secchi depth are given in Table 7-4.

As can be seen in the model-observed data plots, the modeled Secchi depth results fell within the range of the measured Secchi depth records. The calculated RMS errors ranged from 0.30 m at ADEM station RLHR-3 to 0.67 m at ADEM station RLHR-1. In addition, as suspended solids and Secchi depth were both reasonably well simulated and the model performance of water temperature was very good, it was deemed that the Secchi depth simulation provided an acceptable representation of light attenuation in Lake Harris.

Table 7-4 Model Performance Statistics for Secchi Depth (meter)

Station ID	Layer	Starting	Ending	# Pairs	RMS	Data Average	Model Average
RLHR-1	Surface	4/29/2015 7:05	10/24/2018 9:11	14	0.67	2.69	2.53
RLHR-2	Surface	4/29/2015 7:47	10/24/2018 9:51	14	0.55	2.19	1.81
RLHR-3	Surface	4/29/2015 8:25	10/24/2018 10:42	15	0.30	1.34	1.16
RLHR-4	Surface	4/29/2015 9:35	10/24/2018 11:26	14	0.50	1.99	1.72
RLHR-5	Surface	4/29/2015 9:56	10/24/2018 11:46	14	0.47	1.82	1.50
RLHR-6	Surface	4/29/2015 9:05	10/24/2018 10:15	14	0.39	1.96	1.70

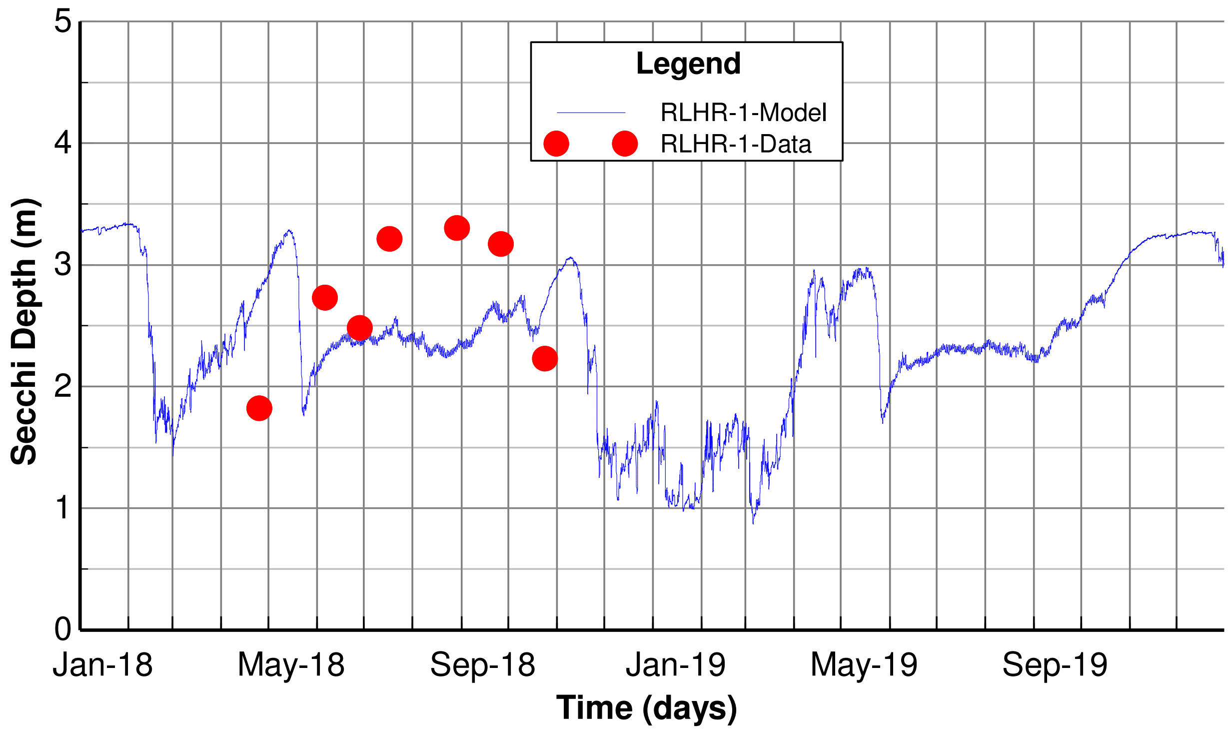

Figure 7-12 Calibration Plot of Modeled and Observed Secchi Depth at Station RLHR-1

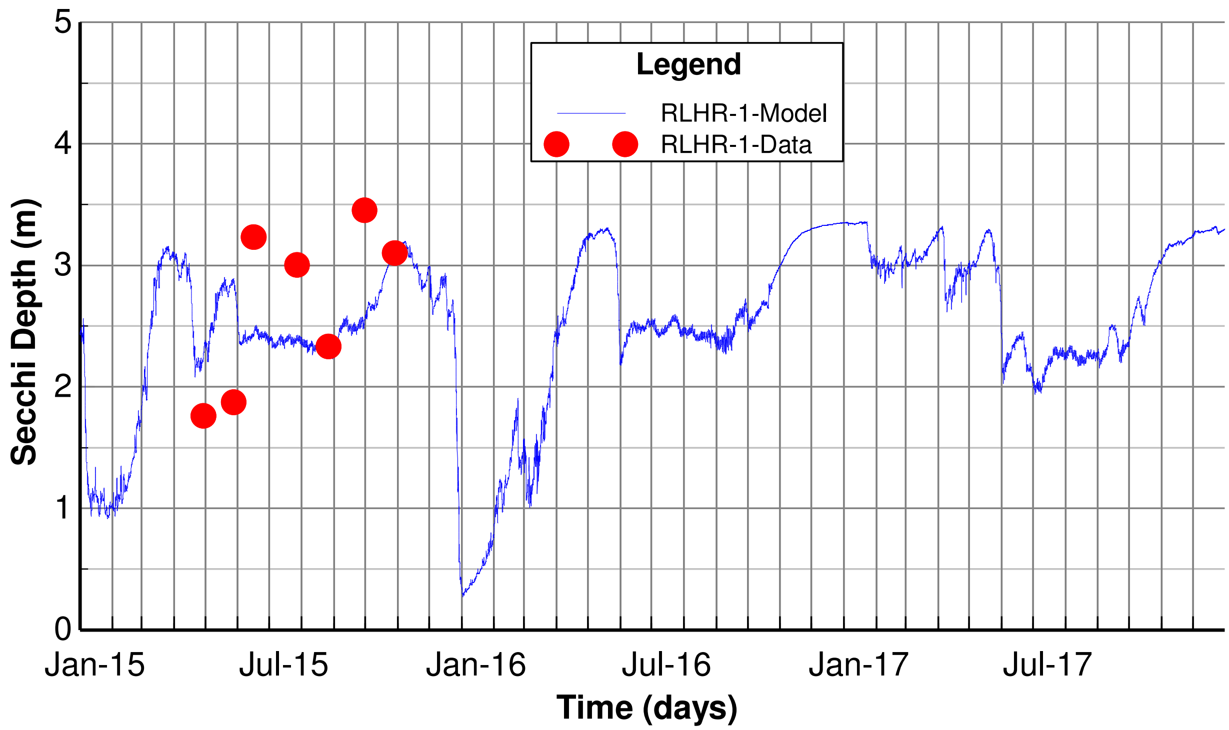

Figure 7-13 Validation Plot of Modeled and Observed Secchi Depth at Station RLHR-1

7.4 Dissolved Oxygen Calibration and Validation

Procedures used to calibrate dissolved oxygen included: (1) check the dissolved oxygen boundary conditions asigned for the EFDC model; and (2) adjust the key parameters within reasonable ranges to obtain the best match with the observed data.

Modeled oxygen results are presented for comparison to the observed data for the surface layer and bottom layer. Dissolved oxygen time series calibration plots at the APC forebay station are shown in Figure 7-14 and Figure 7-15, respectively. Dissolved oxygen time series validation plots at the APC forebay station are shown in Figure 7-16 and Figure 7-17, respectively. The dissolved oxygen surface and bottom layer calibration and validation plots at ADEM stations RLHR-2, RLHR-3, RLHR-4, RLHR-5, and RLHR-6 are given in Appendix A. In general, the model results for both the surface and bottom layers followed the seasonal patterns of the measured dissolved oxygen data reasonably well as can be seen in the model-data plots.

The model results for calibration and validation of the bottom layer, for the most part, demonstrate good agreement with the observed seasonal depletion of dissolved oxygen to summer hypoxic and anoxic levels in response to water column stratification. The exception to the good agreeement, however, are the model validation results for spring-summer months of 2017 where the model results, although decreasing because of stratification,.are about 2-3 mg/L higher than the observed oxygen measurements (see Figure 7-17). The over-estimation of bottom DO concentrations in 2017 might be caused by the APC operating procedures that were implemented to deal with the the drought conditions of 2016 (annual rainfall of 37.21 inch).

Following the drought of 2016, Lake Harris was filled 2 ft higher than the normal operation schedule starting in mid-January 2017 which led to reduced dam release discharges in March. Full summer pool elevation (793 ft NGVD29) was then reached almost a month early in 2017. This could have ended up storing more oxygen-consuming organic matter that would have been discharged downstream out of the lake during a normal spring. In addition, the Lake EFDC sediment flux model used the same assigned monthly SOD values for each year of the calibration and validation periods, as discussed in Section 3.2. This approach was considered to be reasonable because observed sediment bed chemistry data was not available for application of the fully coupled water column-bed sediment diagenesis module. Confirmation of the this empirical approach was demonstrated with the EFDC model results for bottom DO concentrations that compared very well with observations for the 2018-2019 calibration period and the 2015-2016 validation period, as shown in Figure 7-15 and Figure 7-17.

Summary statistics for model performance for dissolved oxygen are given in Table 7-5. The calculated RMS errors ranged from 0.39 mg/L at the bottom layer of ADEM station RLHR-4 to 2.65 mg/L at the bottom layer of ADEM station RLHR-5, as shown in Table 7-5. If the 2017 observed data was excluded from the model performance analysis, the calculated RMS error for bottom DO at APC forebay station would have decreased considerably from 1.66 to 1.04 mg/L.

Table 7-5 Model Performance Statistics for Time Series of Dissolved Oxygen (mg/L)

Station ID	Layer	Starting	Ending	# Pairs	RMS	Data Average	Model Average
Forebay	Surface	5/25/2016 13:59	10/2/2019 13:15	37	0.82	8.83	8.46
Forebay	Bottom	5/25/2016 13:59	10/2/2019 13:15	37	1.66	2.00	2.63
RLHR-2	Surface	4/29/2015 7:47	10/24/2018 9:51	14	1.04	8.12	7.94
RLHR-2	Bottom	4/29/2015 7:47	10/24/2018 9:51	11	0.42	0.63	0.48
RLHR-3	Surface	4/29/2015 8:25	10/24/2018 10:42	16	1.00	8.19	8.67
RLHR-3	Bottom	4/29/2015 8:25	10/24/2018 10:42	11	1.64	4.48	4.65
RLHR-4	Surface	4/29/2015 9:35	10/24/2018 11:26	14	1.16	8.55	8.08
RLHR-4	Bottom	4/29/2015 9:35	10/24/2018 11:26	13	0.39	0.28	0.00
RLHR-5	Surface	4/29/2015 9:56	10/24/2018 11:46	14	1.24	8.71	8.08
RLHR-5	Bottom	4/29/2015 9:56	10/24/2018 11:46	9	2.65	1.27	1.94
RLHR-6	Surface	4/29/2015 9:05	10/24/2018 10:15	14	0.82	8.45	8.09
RLHR-6	Bottom	4/29/2015 9:05	10/24/2018 10:15	12	1.79	1.57	1.88

The model-data comparisons for dissolved oxygen vertical profiles at the APC forebay station are given in Figure 7-18 through Figure 7-22. The comparisons for vertical profiles of dissolved oxygen at ADEM stations RLHR-2, RLHR-3, RLHR-4, RLHR-5, and RLHR-6 are given in Appendix B. Vertical profiles show the model results extracted as “snapshots” for a time interval of the simulation that matches the observed date and time records for the hydrographic survey profile. As can be seen in these model-data plots of vertical profiles, the model results were reasonably consistent with the observed dissolved oxygen in most cases, especially for the well-mixed winter conditions. Similar to the time series plot comparison of bottom DO, the vertical profile comparisdn of DO in 2017 was not as good as the other years. Summary statistics for model performance of the vertical profiles for dissolved oxygen are given in Table 7-6. The calculated RMS errors ranged from 1.45 mg/L at ADEM station RLHR-2 to 2.14 mg/L at ADEM station RLHR-5, as shown in Table 7-6.

Table 7-6 Model Performance Statistics for Vertical Profiles of Dissolved Oxygen (mg/L)

Station ID	Starting	Ending	# Pairs	RMS	Data Average	Model Average
Forebay	5/25/2016	10/2/2019	518	2.06	5.23	6.28
RLHR-2	4/29/2015	10/24/2018	413	1.45	3.28	3.91
RLHR-3	4/29/2015	10/24/2018	161	1.80	6.63	7.96
RLHR-4	4/29/2015	10/24/2018	298	1.73	3.57	4.43
RLHR-5	4/29/2015	10/24/2018	207	2.14	4.77	5.89
RLHR-6	4/29/2015	10/24/2018	220	1.27	5.64	5.89

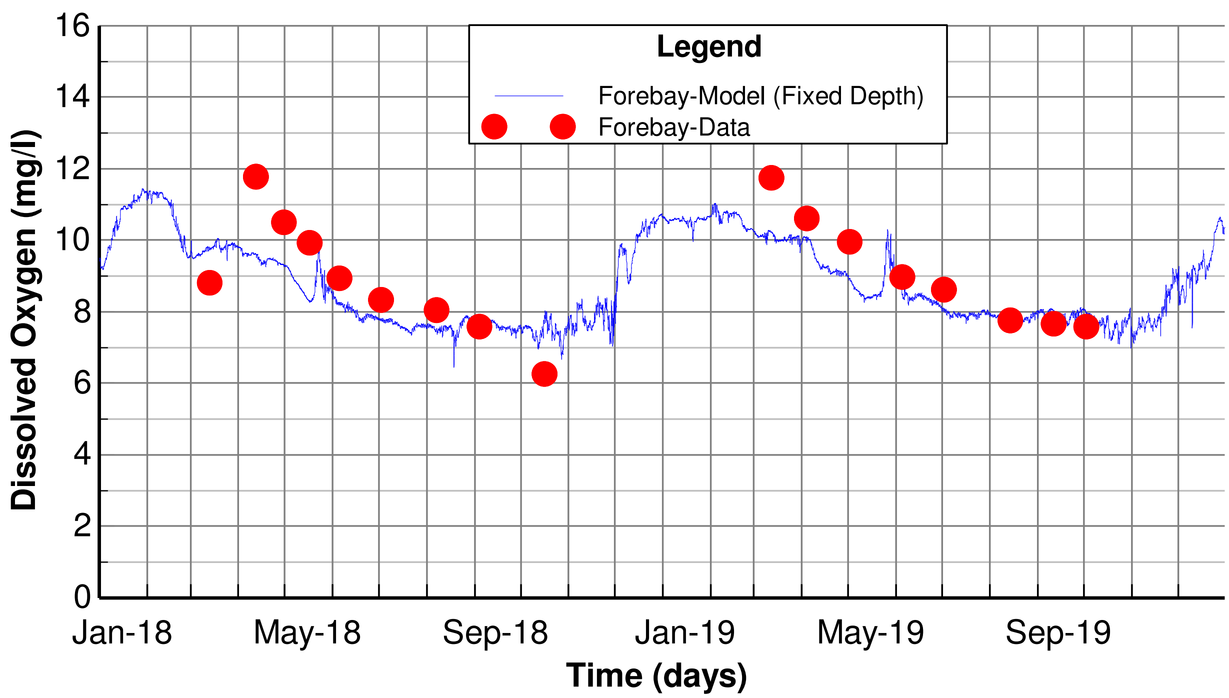

Figure 7-14 Calibration Plot of Surface Layer Dissolved Oxygen at APC Forebay Station

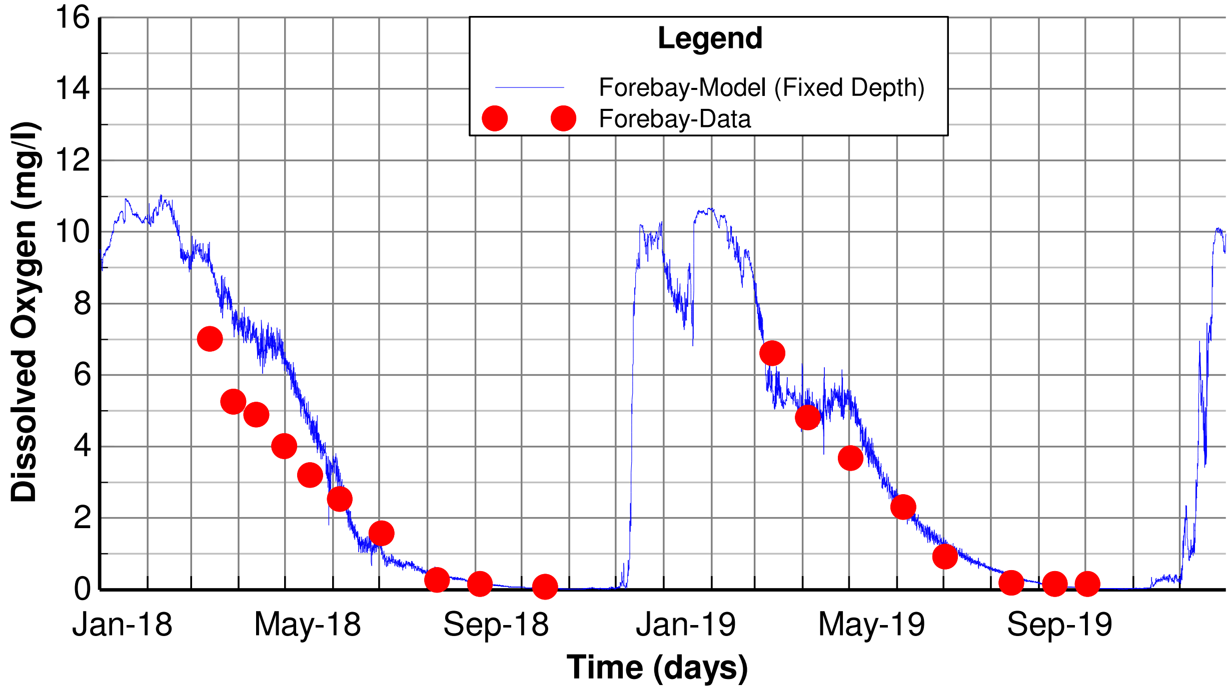

Figure 7-15 Calibration Plot of Bottom Layer Dissolved Oxygen at APC Forebay Station.

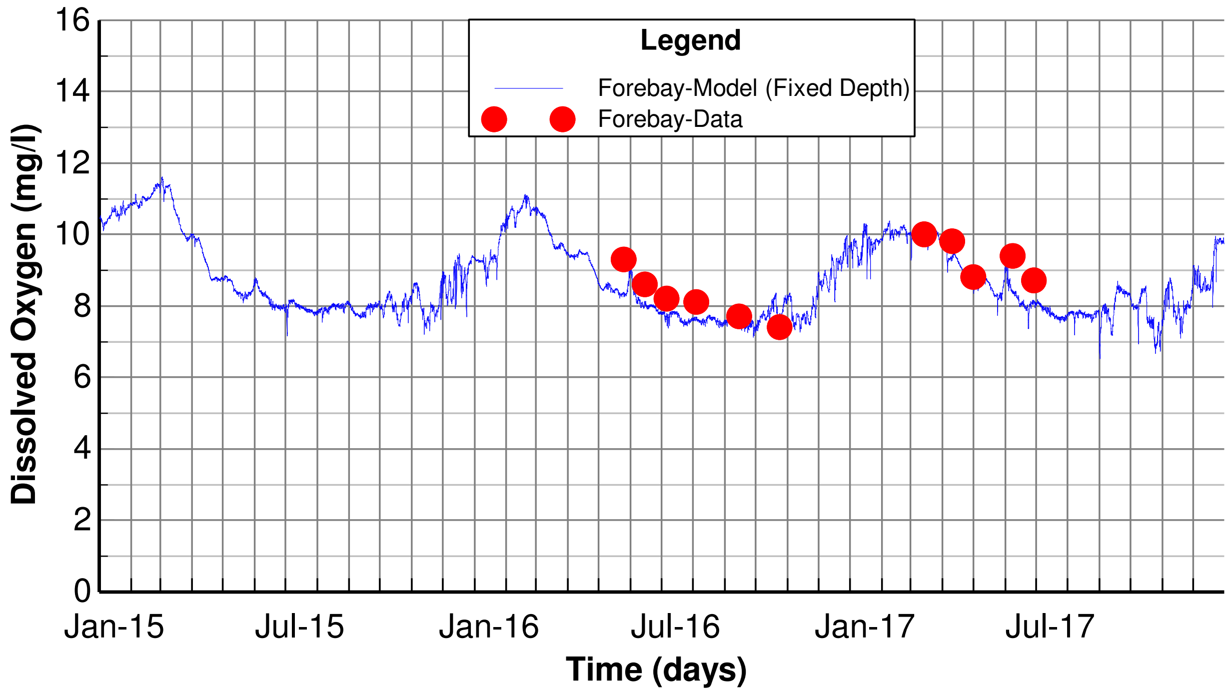

Figure 7-16 Validation Plot of Surface Layer Dissolved Oxygen at APC Forebay Station

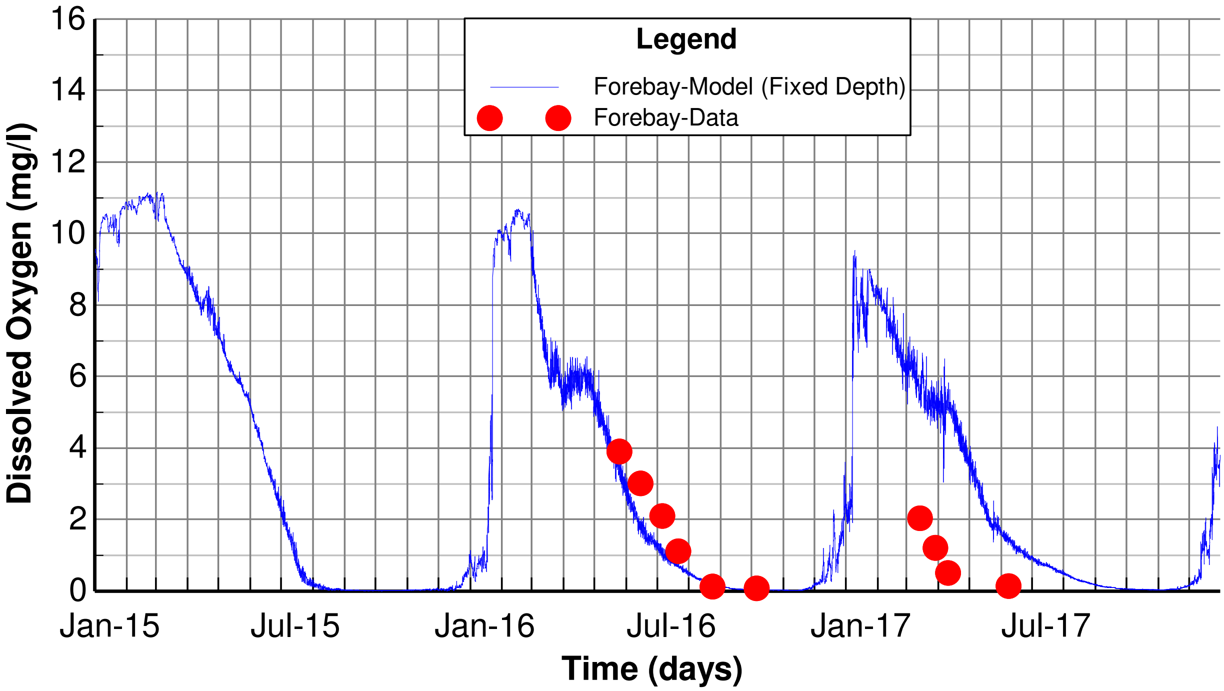

Figure 7-17 Validation Plot of Bottom Layer Dissolved Oxygen at APC Forebay Station

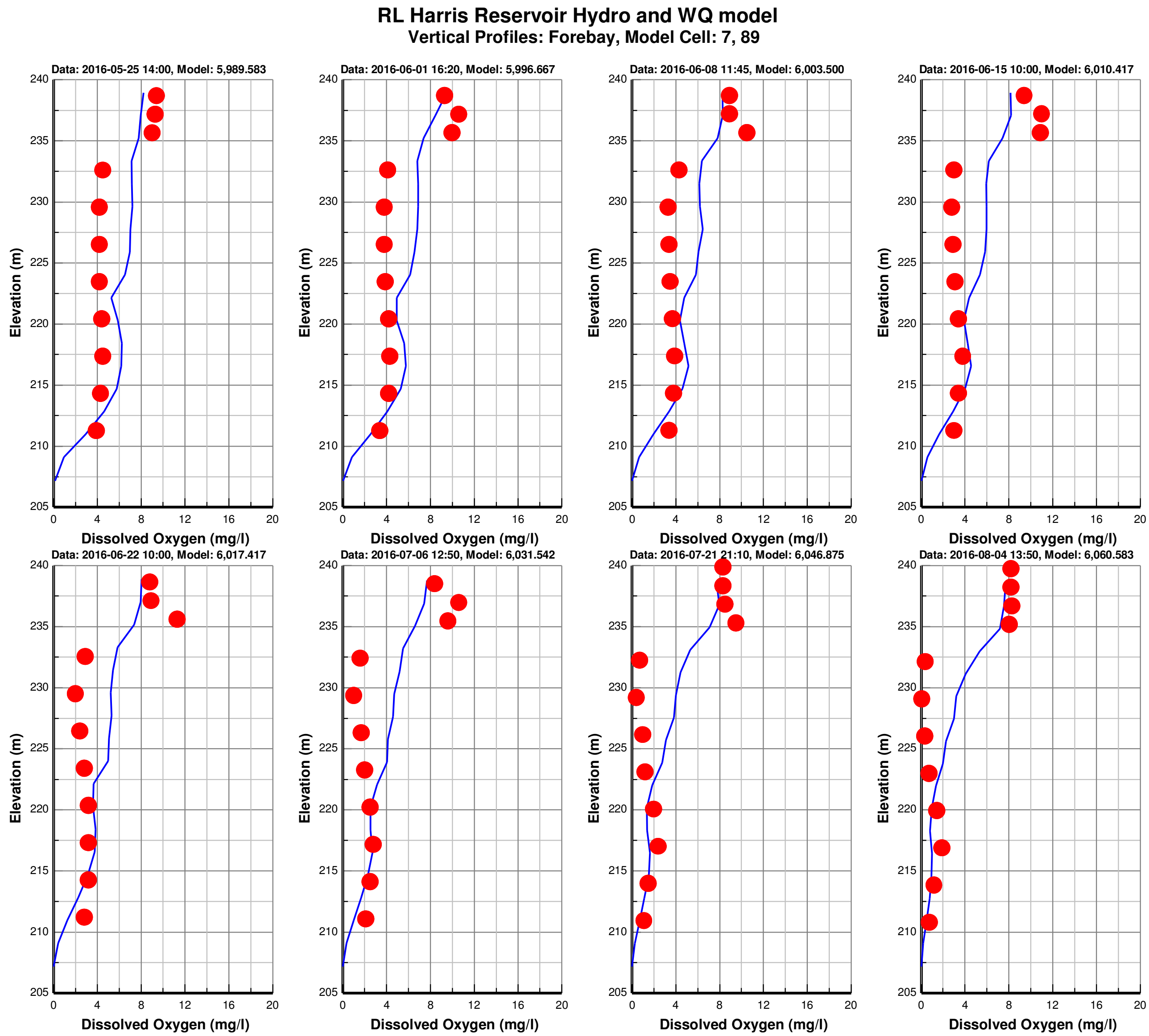

Figure 7-18 Dissolved Oxygen Vertical Profile Comparison Plot at APC Forebay Station (25 May 2016 – 4 August 2016)

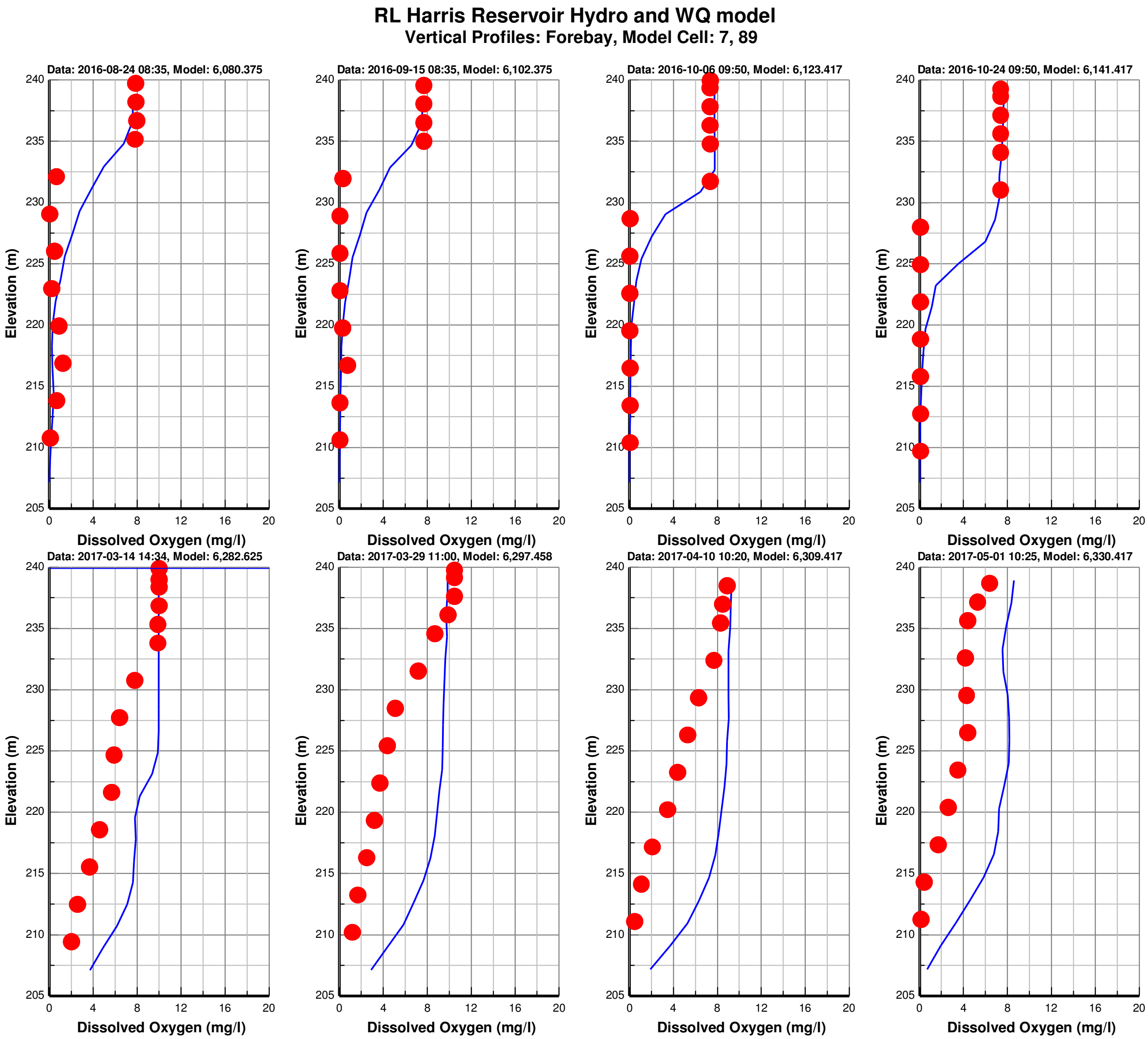

Figure 7-19 Dissolved Oxygen Vertical Profile Comparison Plot at APC Forebay Station (24 August 2016 – 1 May 2017)

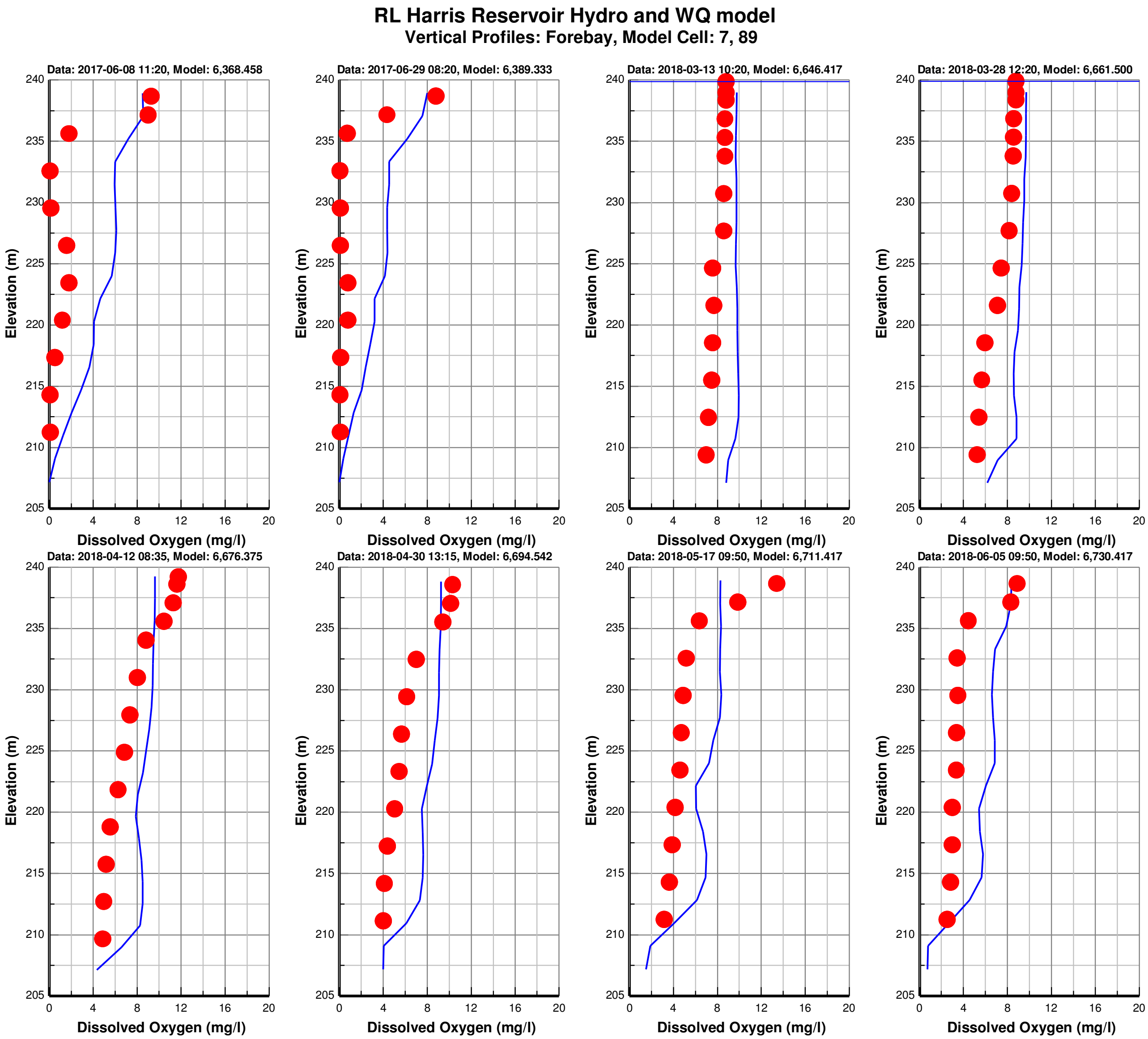

Figure 7-20 Dissolved Oxygen Vertical Profile Comparison Plot at APC Forebay Station (8 June 2017 – 5 June 2018)

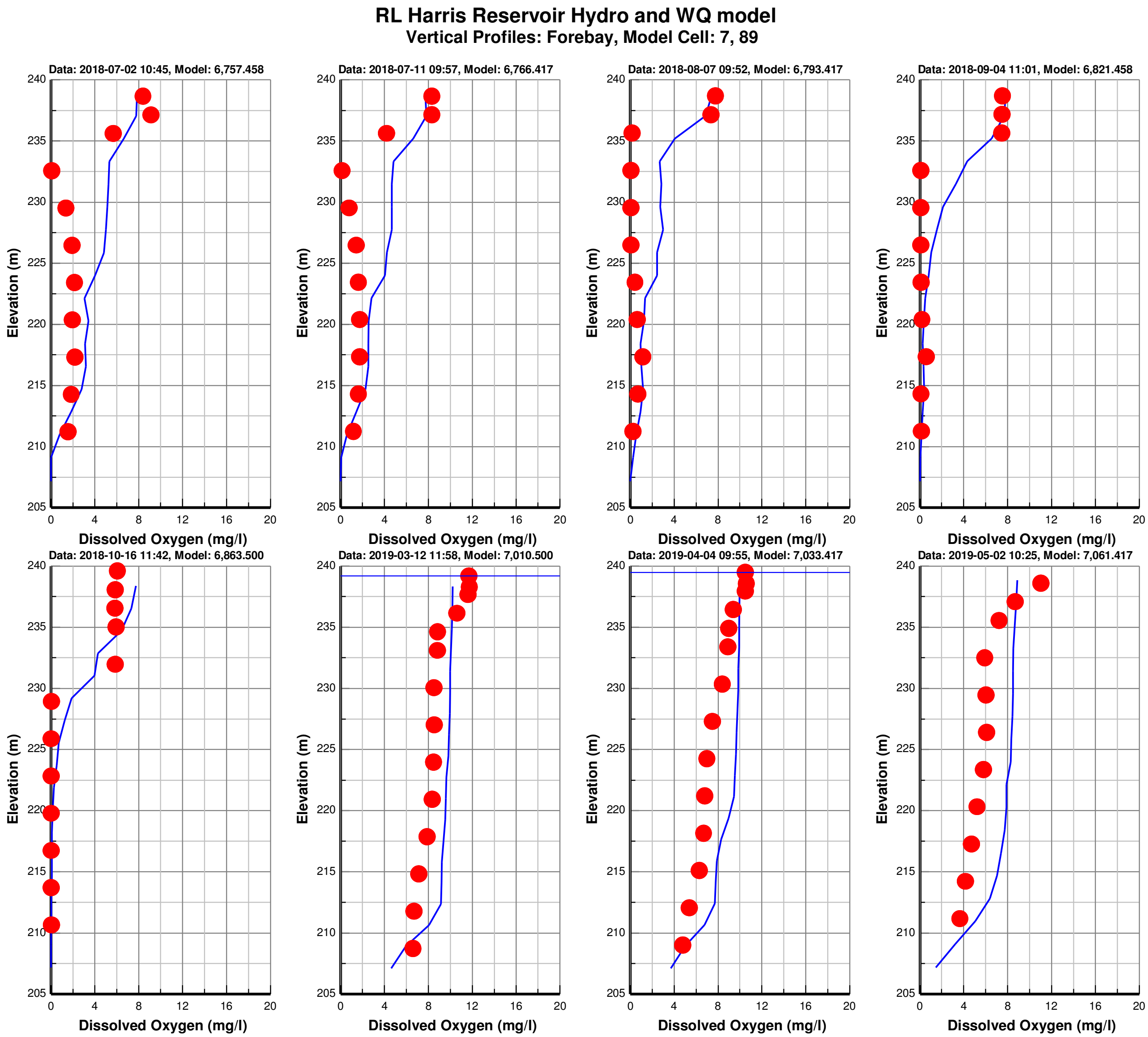

Figure 7-21 Dissolved Oxygen Vertical Profile Comparison Plot at APC Forebay Station (2 July 2018 – 2 May 2019)

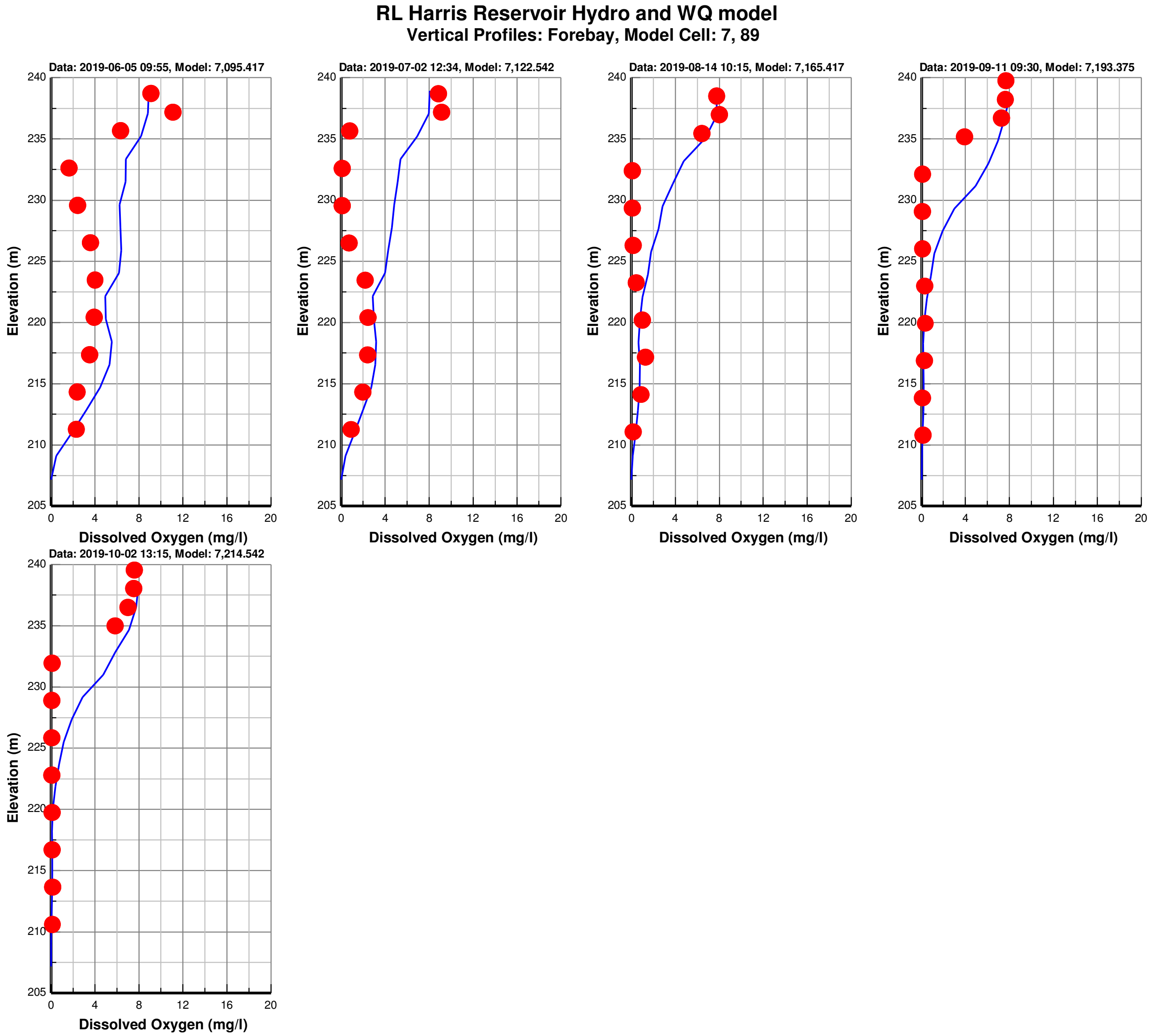

Figure 7-22 Dissolved Oxygen Vertical Profile Comparison Plot at APC Forebay Station (5 June 2019 – 2 October 2019)

7.5 Algae Calibration and Validation

Procedures used to calibrate algae (as chlorophyll a) included: (1) check the algae boundary conditions of the EFDC model; and (2) adjust the key parameters within reasonable ranges to match the observed data.

Modeled algae biomass results (as chlorophyll a) were presented for comparison to the observed data for the surface layer. In the Lake Harris model, green algae was simulated as a the functional group to derive total algae biomass for comparison to chlorophyll a observations. Chlorophyll a calibration and validation plots at ADEM station RLHR-1 are given in Figure 7-23 and Figure 7-24, respectively. The chlorophyll a surface layer calibration and validation plots at ADEM stations RLHR-2, RLHR-3, RLHR-4, RLHR-5, and RLHR-6 are given in Appendix A. As can be seen in these model-data plots, the model results are in fairly good agreement with measured algal biomass. In particular, the EFDC-simulated chlorophyll a concentrations followed the seasonal trend of observed chlorophyll a at these ADEM monitoring stations.

Summary statistics for model performance for chlorophyll a are given in Table 7-7. The calculated RMS errors ranged from 2.30 µg/L at the surface layer of ADEM station RLHR-3 to 8.16 µg/L at the surface layer of ADEM station RLHR-6, as shown in Table 7-7.

Table 7-7 Model Performance Statistics for Chlorophyll a (µg/L)

Station ID	Layer	Starting	Ending	# Pairs	RMS	Data Average	Model Average
RLHR-1	Surface	4/29/2015 7:05	10/24/2018 9:11	14	5.94	5.24	4.60
RLHR-2	Surface	4/29/2015 7:47	10/24/2018 9:51	14	4.52	4.06	5.61
RLHR-3	Surface	4/29/2015 8:25	10/24/2018 10:42	15	2.30	11.02	7.28
RLHR-4	Surface	4/29/2015 9:35	10/24/2018 11:26	14	5.81	7.51	8.23
RLHR-5	Surface	4/29/2015 9:56	10/24/2018 11:46	14	7.08	6.81	8.33
RLHR-6	Surface	4/29/2015 9:05	10/24/2018 10:15	14	8.16	5.46	6.26

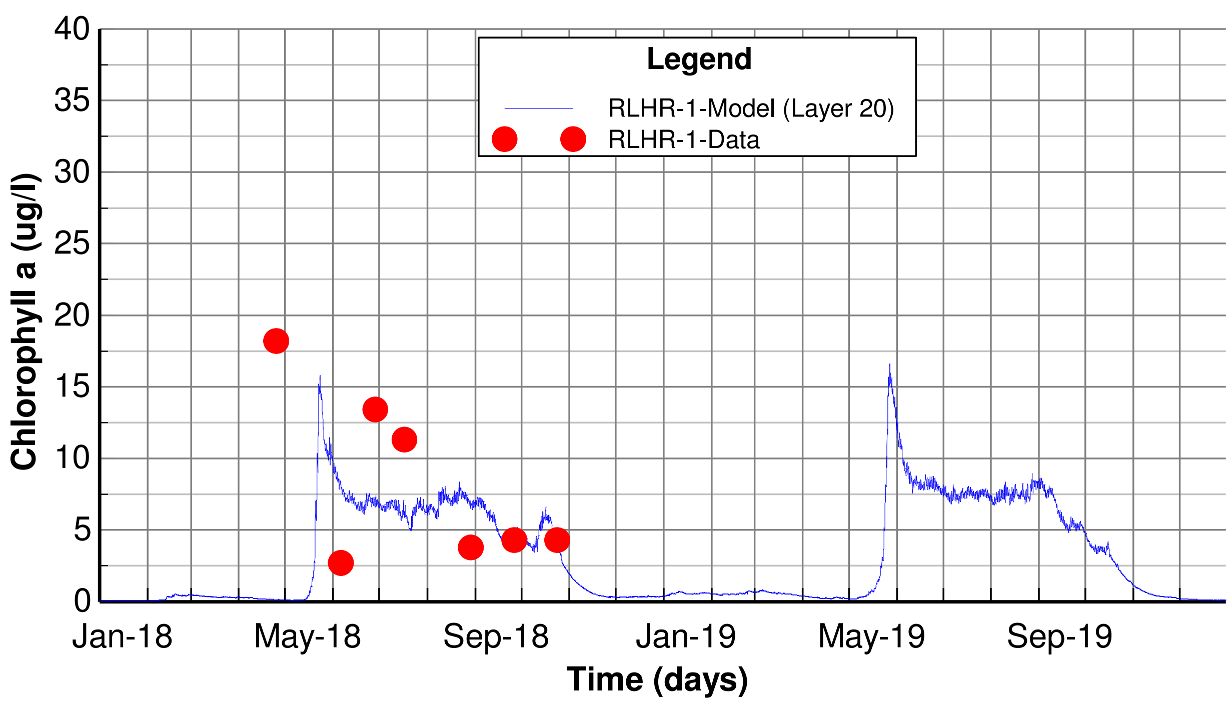

Figure 7-23 Calibration Plot of Surface Layer Chlorophyll a at Station RLHR-1

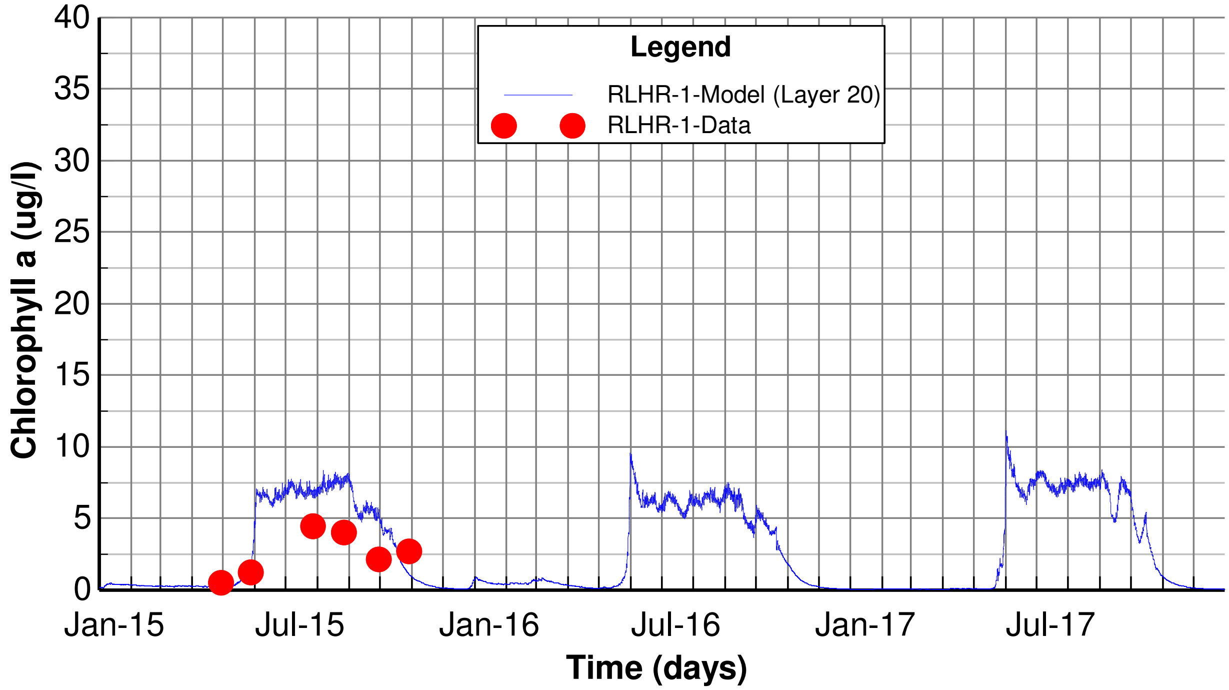

Figure 7-24 Validation Plot of Surface Layer Chlorophyll a at Station RLHR-1

7.6 Nitrogen Calibration and Validation

Procedures used to calibrate nitrogen state variables included: (1) check the boundary conditions of the EFDC model; and (2) adjust the key parameters within reasonable ranges to match the observed data.

Ammonia-N ($NH4^{+}$), nitrate-N (NO2+NO3), total organic nitrogen (TON) and total nitrogen (TN) model results at ADEM station RLHR-1 are presented for comparison to the observed data for the surface layer. The ammonia calibration and validation plots are given in Figure 7-25 and Figure 7-26, respectively. The nitrite/nitrate calibration and validation plots are given in Figure 7-27 and Figure 7-28, respectively. The TON calibration and validation plots are given in Figure 7-29 and Figure 7-30, respectively and the TN calibration and validation plots are given in Figure 7-31 and Figure 7-32, respectively. The ammonia, nitrite/nitrate, TON and TN surface layer calibration and validation plots at ADEM stations RLHR-2, RLHR-3, RLHR-4, RLHR-5, and RLHR-6 are given in Appendix A.

The summary statistics for model performance of ammonia are given in Table 7-8.The calculated RMS errors ranged from 0.043 mg/L at the surface layer of ADEM station RLHR-4 to 0.075 mg/L at the surface layer of ADEM station RLHR-2, as shown in Table 7-8.

Table 7-8 Model Performance Statistics for Ammonia (mg N/L)

Station ID	Layer	Starting	Ending	# Pairs	RMS	Data Average	Model Average
RLHR-1	Surface	4/29/2015 7:05	10/24/2018 9:11	14	0.072	0.04	0.031
RLHR-2	Surface	4/29/2015 7:47	10/24/2018 9:51	14	0.075	0.043	0.022
RLHR-3	Surface	4/29/2015 8:25	10/24/2018 10:42	15	0.064	0.044	0.027
RLHR-4	Surface	4/29/2015 9:35	10/24/2018 11:26	14	0.043	0.022	0.023
RLHR-5	Surface	4/29/2015 9:56	10/24/2018 11:46	14	0.047	0.022	0.023
RLHR-6	Surface	4/29/2015 9:05	10/24/2018 10:15	14	0.072	0.035	0.019

The summary statistics for model performance of nitrate are given in Table 7-9. The calculated RMS errors ranged from 0.039 mg/L at the surface layer of ADEM station RLHR-6 to 0.054 mg/L at the surface layer of ADEM station RLHR-3 as shown in Table 7-9.

Table 7-9 Model Performance Statistics for Nitrate (mg N/L)

Station ID	Layer	Starting	Ending	# Pairs	RMS	Data Average	Model Average
RLHR-1	Surface	4/29/2015 7:05	10/24/2018 9:11	14	0.029	0.022	0.02
RLHR-2	Surface	4/29/2015 7:47	10/24/2018 9:51	14	0.046	0.023	0.021
RLHR-3	Surface	4/29/2015 8:25	10/24/2018 10:42	15	0.054	0.045	0.078
RLHR-4	Surface	4/29/2015 9:35	10/24/2018 11:26	14	0.05	0.066	0.046
RLHR-5	Surface	4/29/2015 9:56	10/24/2018 11:46	14	0.042	0.062	0.048
RLHR-6	Surface	4/29/2015 9:05	10/24/2018 10:15	14	0.039	0.021	0.022

The summary statistics for model performance of Total Organic Nitrogen are given in Table 7-10. The calculated RMS errors ranged from 0.027 mg/L at the surface layer of ADEM station RLHR-3 to 0.336 mg/L at the bottom layer of ADEM station RLHR-4 as shown in Table 7-10.

Table 7-10 Model Performance Statistics for Total Organic Nitrogen (mg N/L)

Station ID	Layer	Starting	Ending	# Pairs	RMS	Data Average	Model Average
RLHR-1	Surface	4/29/2015 7:05	10/24/2018 9:11	14	0.229	0.244	0.433
RLHR-2	Surface	4/29/2015 7:47	10/24/2018 9:51	14	0.28	0.278	0.454
RLHR-3	Surface	4/29/2015 8:25	10/24/2018 10:42	15	0.207	0.325	0.379
RLHR-4	Surface	4/29/2015 9:35	10/24/2018 11:26	14	0.336	0.344	0.614
RLHR-5	Surface	4/29/2015 9:56	10/24/2018 11:46	14	0.318	0.409	0.631
RLHR-6	Surface	4/29/2015 9:05	10/24/2018 10:15	14	0.222	0.319	0.42

The summary statistics for model performance of total nitrogen are given in Table 7-11. The calculated RMS errors ranged from 0.213 mg/L at the surface layer of ADEM station RLHR-3 to 0.32 mg/L at the surface layer of ADEM station RLHRL-4, as shown in Table 7-11.

Table 7-11 Model Performance Statistics for Total Nitrogen (mg N/L)

Station ID	Layer	Starting	Ending	# Pairs	RMS	Data Average	Model Average
RLHR-1	Surface	4/29/2015 7:05	10/24/2018 9:11	14	0.228	0.306	0.483
RLHR-2	Surface	4/29/2015 7:47	10/24/2018 9:51	14	0.246	0.343	0.497
RLHR-3	Surface	4/29/2015 8:25	10/24/2018 10:42	15	0.213	0.412	0.483
RLHR-4	Surface	4/29/2015 9:35	10/24/2018 11:26	14	0.32	0.433	0.683
RLHR-5	Surface	4/29/2015 9:56	10/24/2018 11:46	14	0.315	0.494	0.702
RLHR-6	Surface	4/29/2015 9:05	10/24/2018 10:15	14	0.179	0.375	0.461

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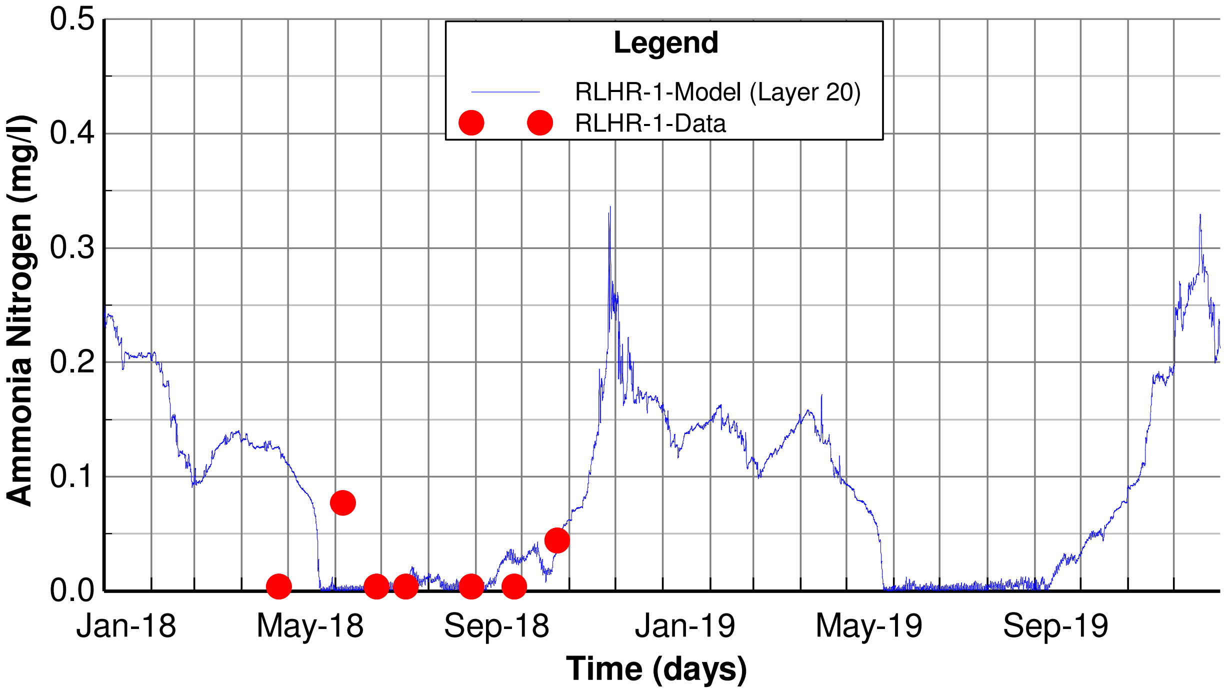

Figure 7-25 Calibration Plot of Surface Layer Ammonia at Station RLHR-1

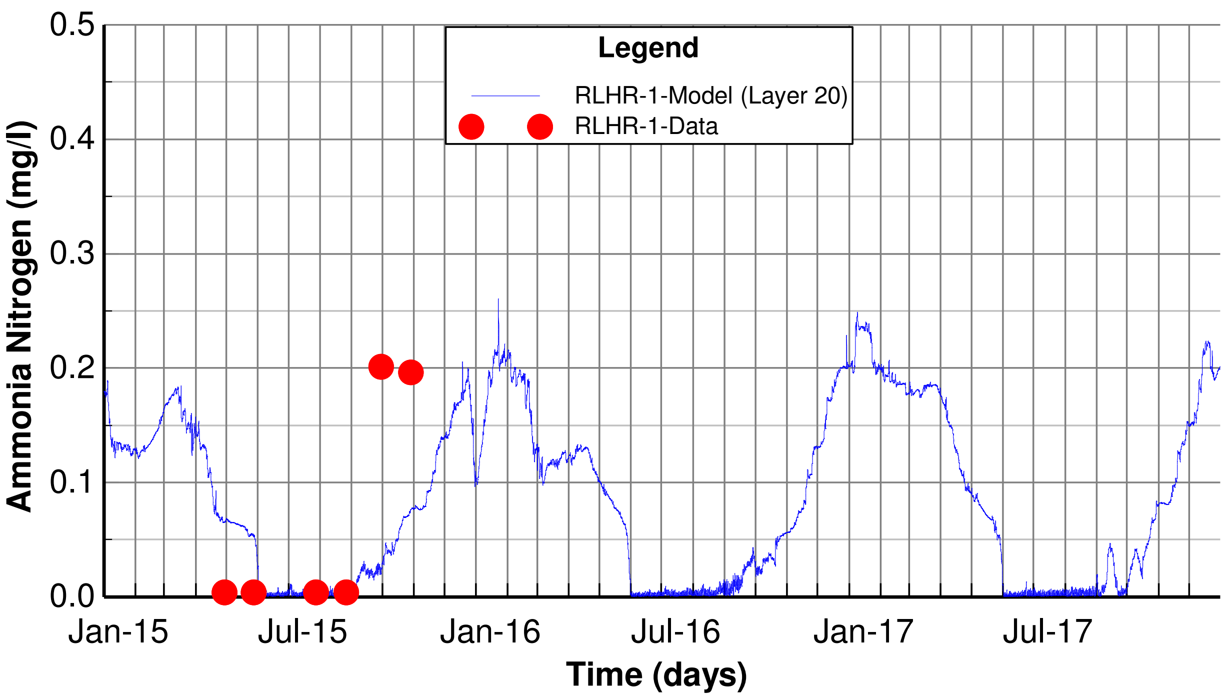

Figure 7-26 Validation Plot of Surface Layer Ammonia at Station RLHR-1

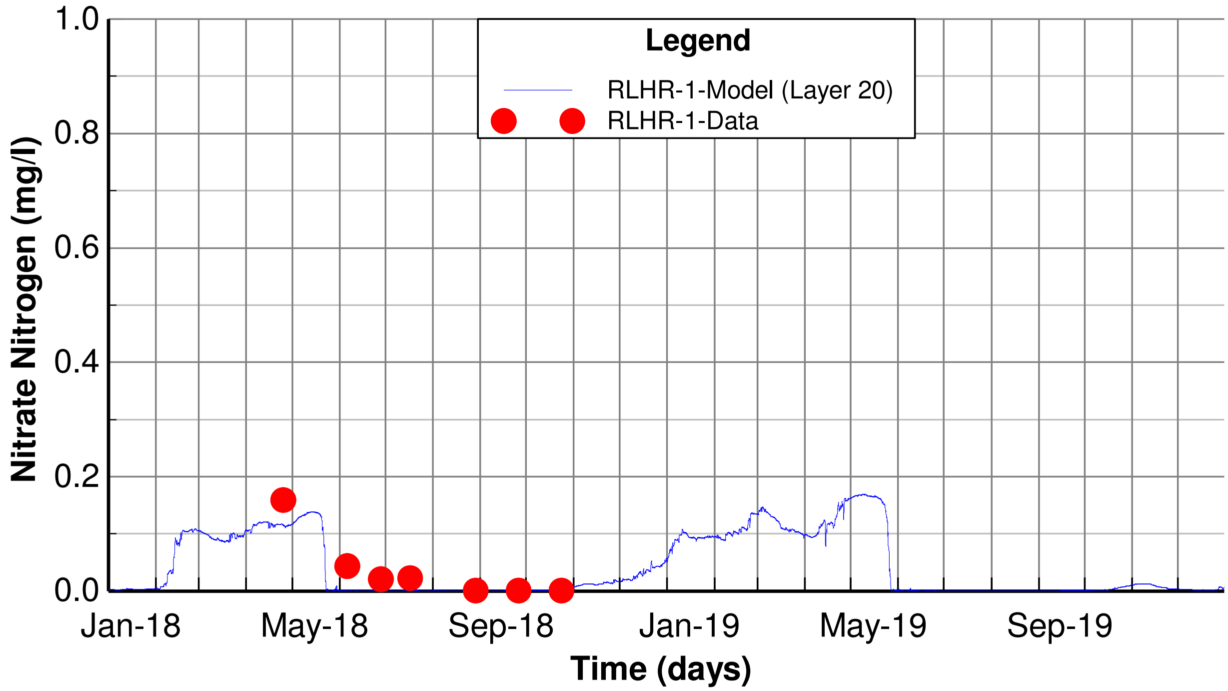

Figure 7-27 Calibration Plot of Surface Layer Nitrate at Station RLHR-1

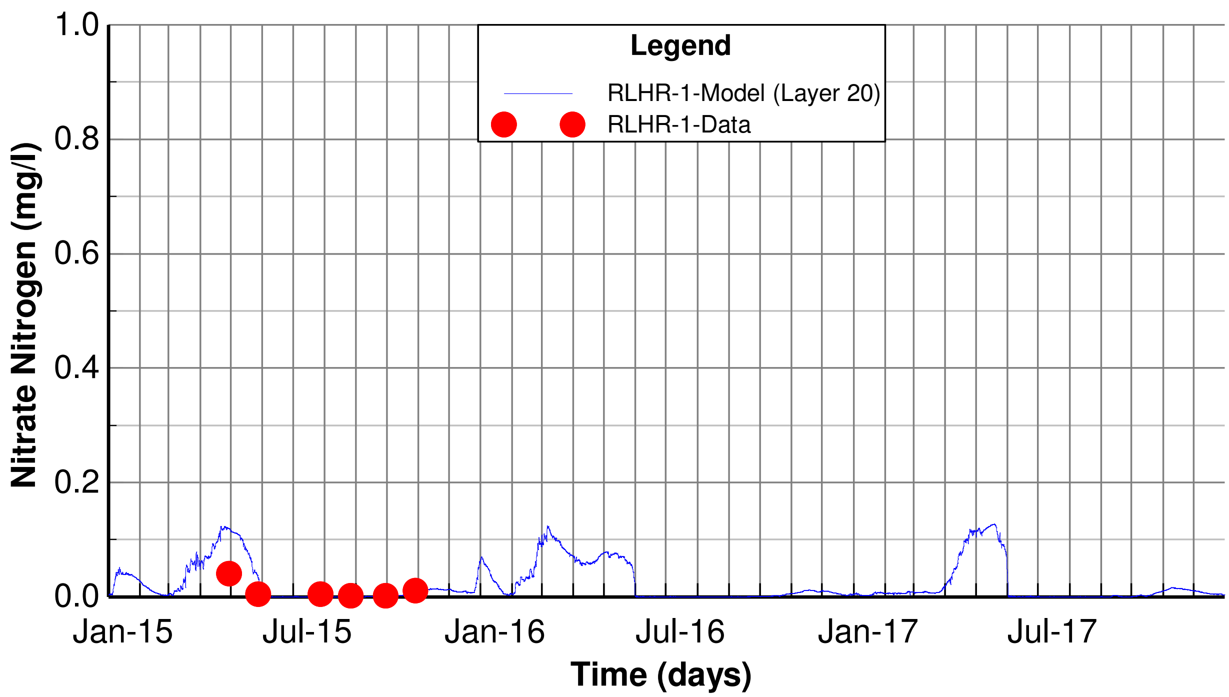

Figure 7-28 Validation Plot of Surface Layer Nitrate at Station RLHR-1

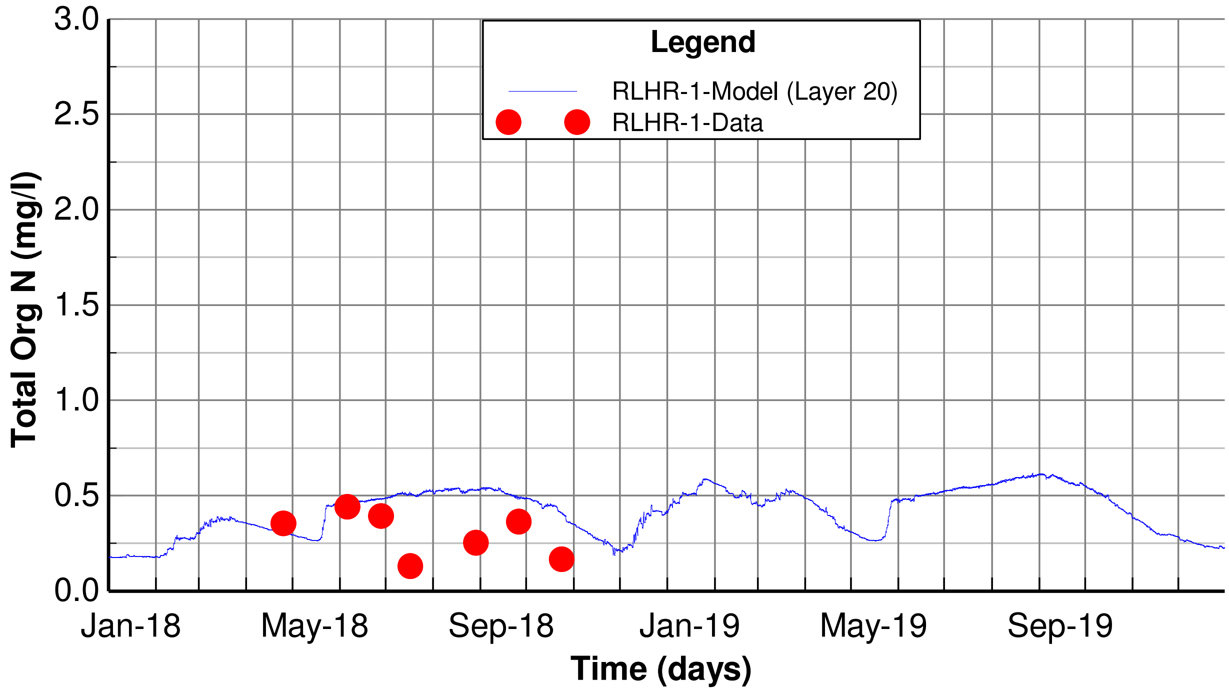

Figure 7-29 Calibration Plot of Surface Layer Total Organic Nitrogen at Station RLHR-1

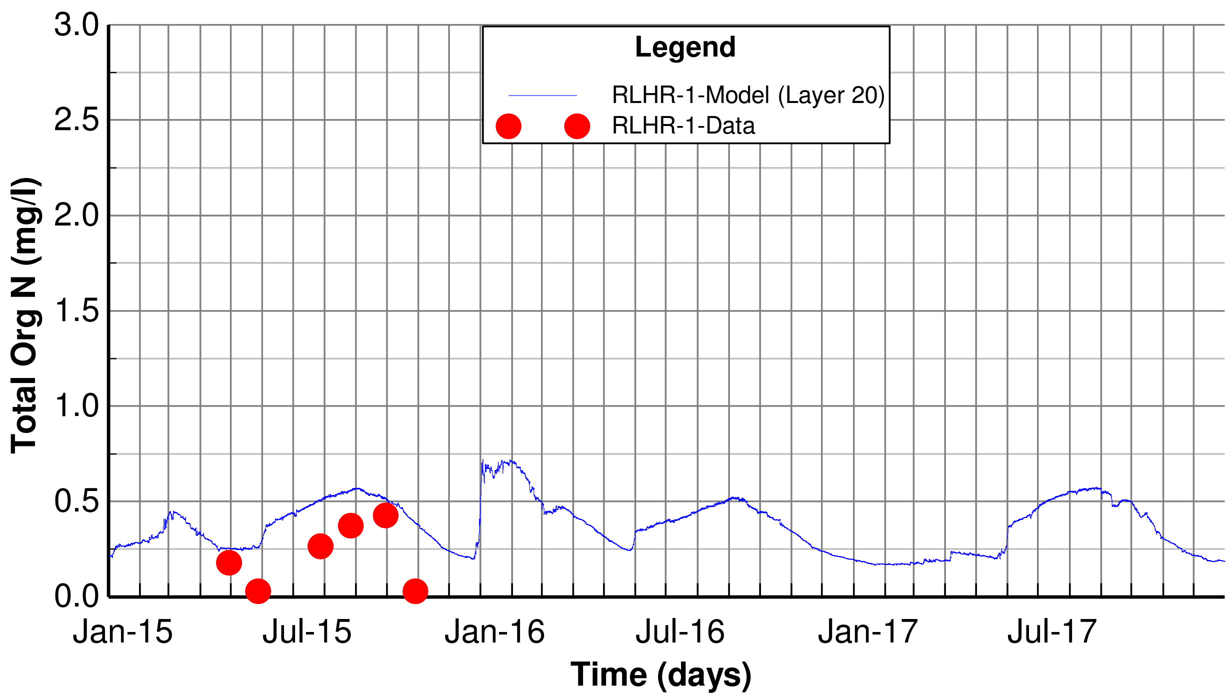

Figure 7-30 Validation Plot of Surface Layer Total Organic Nitrogen at Station RLHR-1

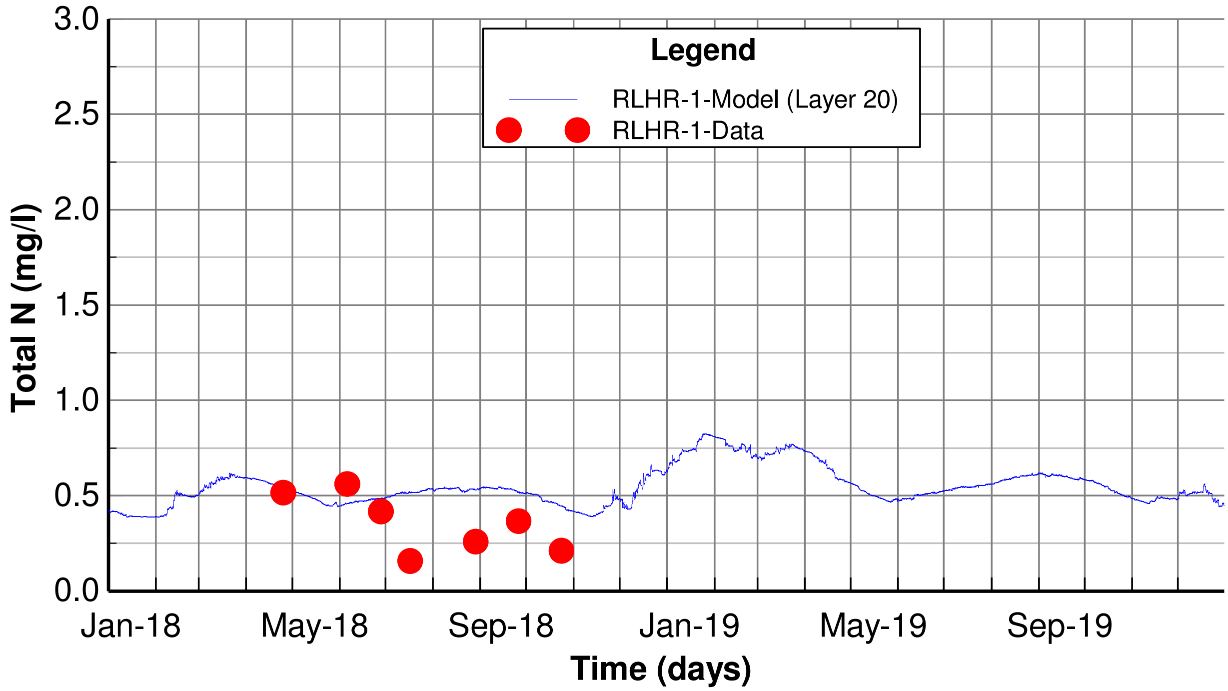

Figure 7-31 Calibration Plot of Surface Layer Total Nitrogen at Station RLHR-1

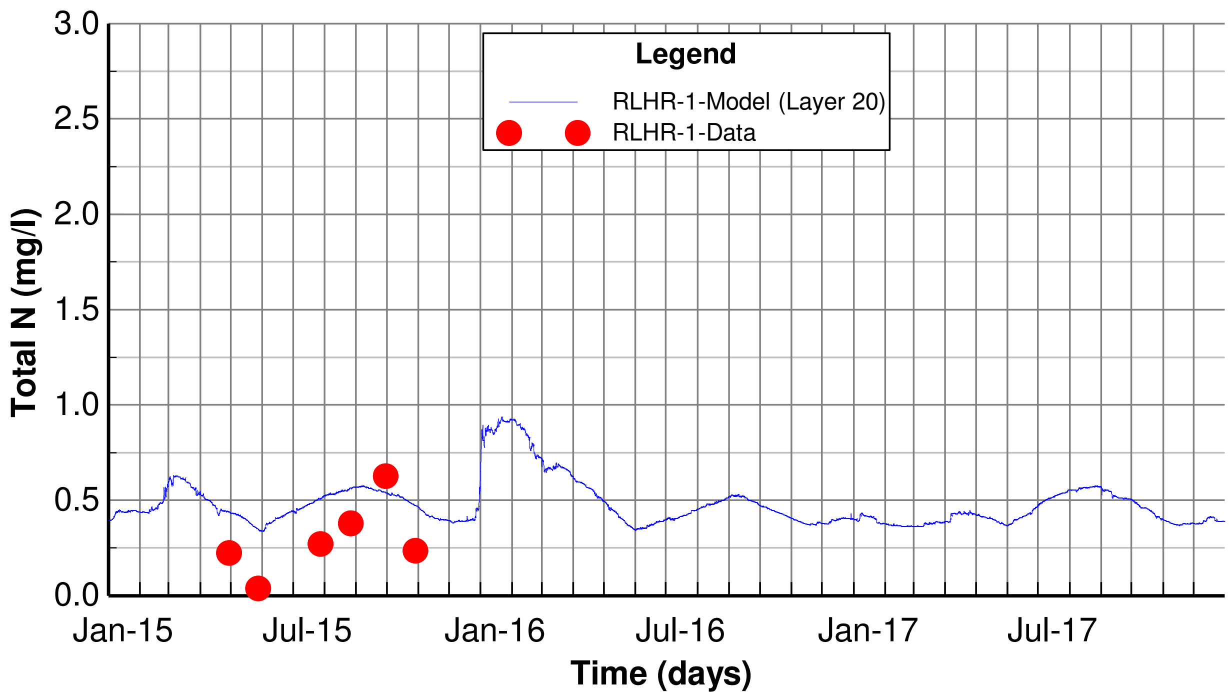

Figure 7-32 Validation Plot of Surface Layer Total Nitrogen at Station RLHR-1

7.7 Phosphorus Calibration and Validation

Procedures used to calibrate phosphorus state variables include: (1) check the phosphorus boundary conditions of the EFDC model; and (2) adjust the key parameters within reasonable ranges to match the observed data.

Total phosphate (TPO4), total organic phosphorus (TOP), and total phosphorus (TP) model results at ADEM station RLHR-1 are presented for comparison to the observed data for the surface layer. The TPO4 calibration and validation plots are given in Figure 7-33 and Figure 7-34, repectviely. The TOP calibration and validation plots are given in Figure 7-35 and Figure 7-36, respectively. The TP calibration and validation plots are given in Figure 7-37 and Figure 7-38, respectively. The total phosphate, total organic phosphorus, and total phosphorus surface layer calibration and validation plots at ADEM stations RLHR-2, RLHR-3, RLHR-4, RLHR-5, and RLHR-6 are given in Appendix A.

The summary statistics for model performance of total phosphate are given in Table 7-12. The calculated RMS errors ranged from 0.008 mg/L at the surface layer of ADEM station RLHR-3 to 0.01 mg/L at the surface layer of ADEM stations RLHR-4 and RLHR-5, as shown in Table 7-12.

Table 7-12 Model Performance Statistics for Total Phosphate (mg P/L)

Station ID	Layer	Starting	Ending	# Pairs	RMS	Data Average	Model Average
RLHR-1	Surface	4/29/2015 7:05	10/24/2018 9:11	14	0.009	0.002	0.006
RLHR-2	Surface	4/29/2015 7:47	10/24/2018 9:51	14	0.009	0.002	0.007
RLHR-3	Surface	4/29/2015 8:25	10/24/2018 10:42	15	0.008	0.003	0.007
RLHR-4	Surface	4/29/2015 9:35	10/24/2018 11:26	14	0.01	0.002	0.007
RLHR-5	Surface	4/29/2015 9:56	10/24/2018 11:46	14	0.01	0.002	0.006
RLHR-6	Surface	4/29/2015 9:05	10/24/2018 10:15	14	0.009	0.002	0.007

The summary statistics for model performance of total organic phosphorus are given in Table 7-13. The calculated RMS errors ranged from 0.008 mg/L at the surface layer of ADEM station RLHR-4 to 0.028 mg/L at the surface layer of ADEM station RLHR-3, as shown in Table 7-13.

Table 7-13 Model Performance Statistics for Total Organic Phosphorus (mg P/L)

Station ID	Layer	Starting	Ending	# Pairs	RMS	Data Average	Model Average
RLHR-1	Surface	4/29/2015 7:05	10/24/2018 9:11	14	0.005	0.009	0.01
RLHR-2	Surface	4/29/2015 7:47	10/24/2018 9:51	14	0.01	0.011	0.015
RLHR-3	Surface	4/29/2015 8:25	10/24/2018 10:42	15	0.021	0.02	0.03
RLHR-4	Surface	4/29/2015 9:35	10/24/2018 11:26	14	0.008	0.014	0.018
RLHR-5	Surface	4/29/2015 9:56	10/24/2018 11:46	14	0.01	0.018	0.018
RLHR-6	Surface	4/29/2015 9:05	10/24/2018 10:15	14	0.012	0.011	0.019

The summary statistics for model performance of total phosphorus are given in Table 7-14. The calculated RMS errors ranged from 0.008 mg/L at the surface layer of ADEM station RLHR-1 to 0.028 mg/L at the bottom layer of ADEM station RLHR-3, as shown in Table 7-14.

Table 7-14 Model Performance Statistics for Total Phosphorus (mg P/L)

Station ID	Layer	Starting	Ending	# Pairs	RMS	Data Average	Model Average
RLHR-1	Surface	4/29/2015 7:05	10/24/2018 9:11	14	0.008	0.01	0.016
RLHR-2	Surface	4/29/2015 7:47	10/24/2018 9:51	14	0.018	0.013	0.022
RLHR-3	Surface	4/29/2015 8:25	10/24/2018 10:42	15	0.028	0.023	0.037
RLHR-4	Surface	4/29/2015 9:35	10/24/2018 11:26	14	0.015	0.016	0.024
RLHR-5	Surface	4/29/2015 9:56	10/24/2018 11:46	14	0.017	0.02	0.024
RLHR-6	Surface	4/29/2015 9:05	10/24/2018 10:15	14	0.019	0.014	0.025

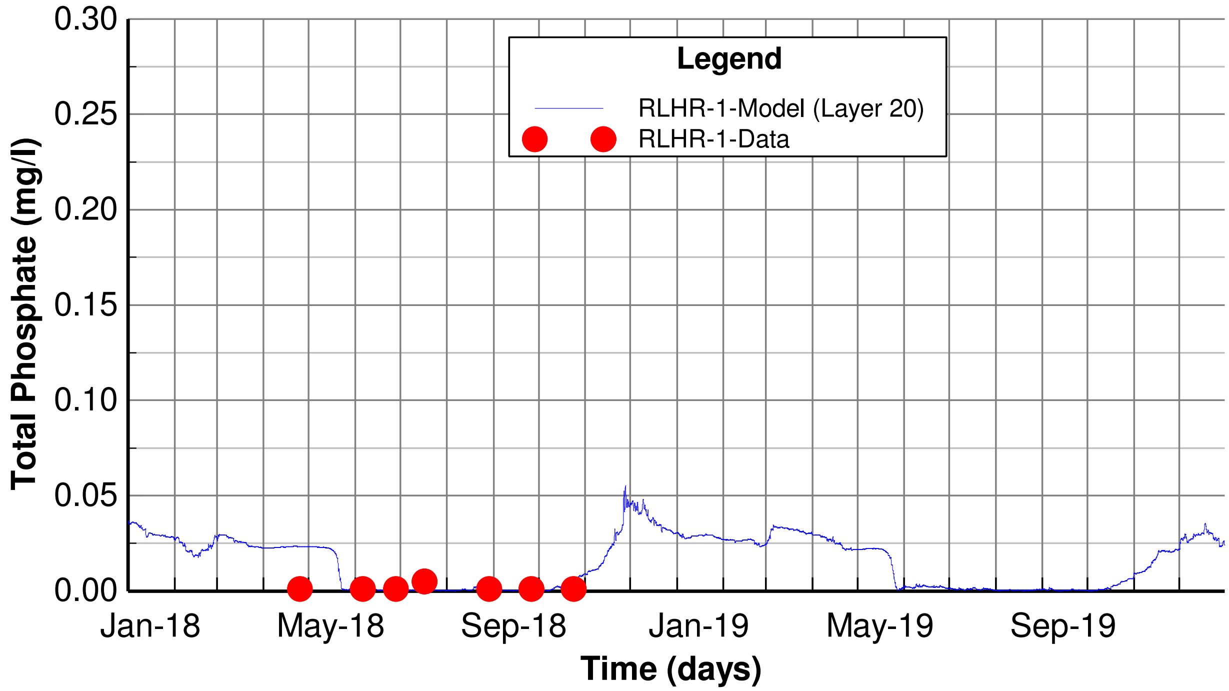

Figure 7-33 Calibration Plot of Surface Layer Total Phosphate at Station RLHR-1

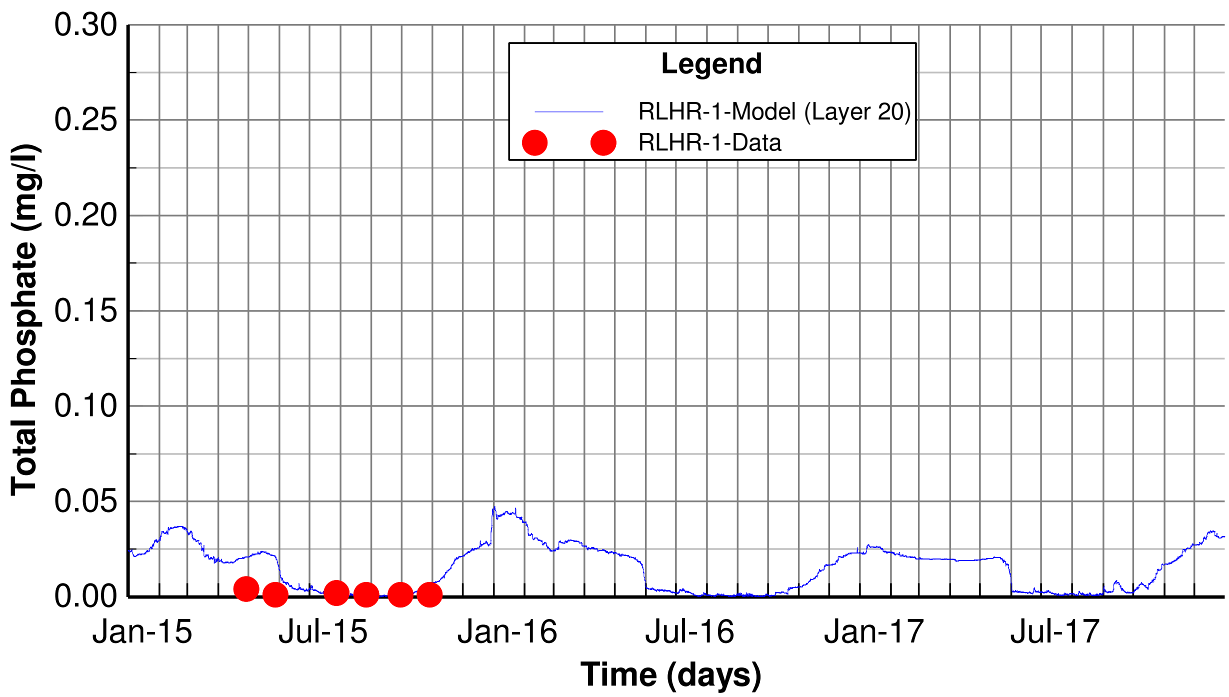

Figure 7-34 Validation Plot of Surface Layer Total Phosphate at Station RLHR-1

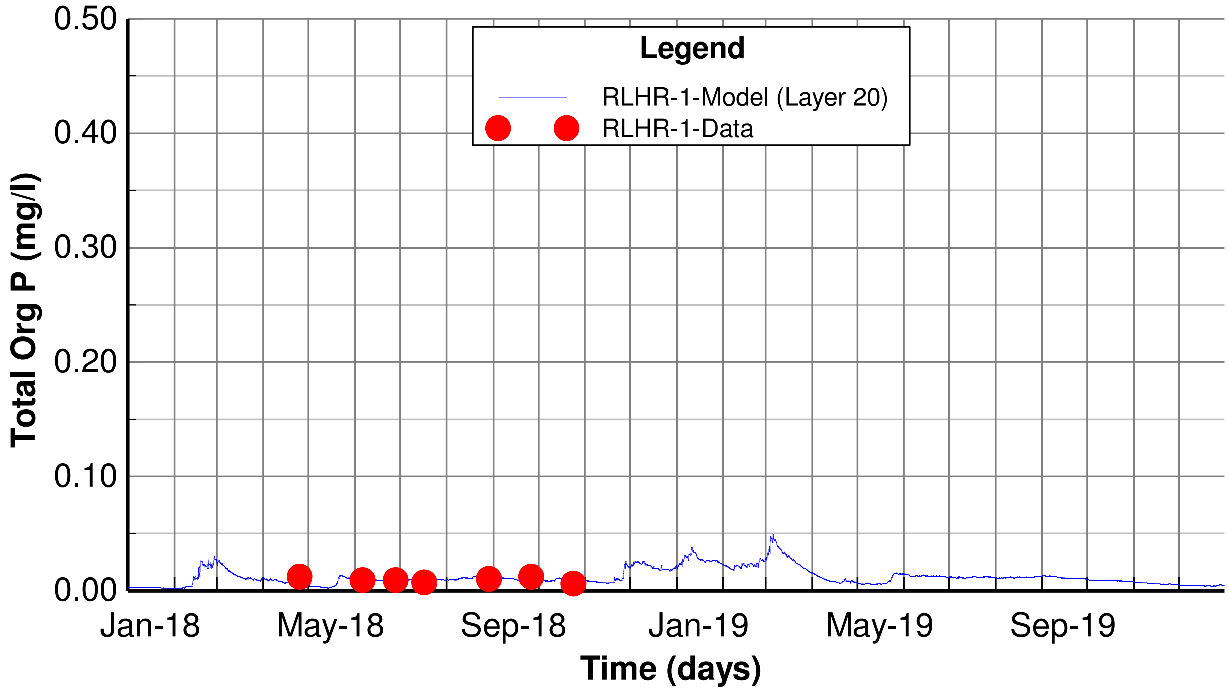

Figure 7-35 Calibration Plot of Surface Layer Total Organic Phosphorus at Station RLHR-1

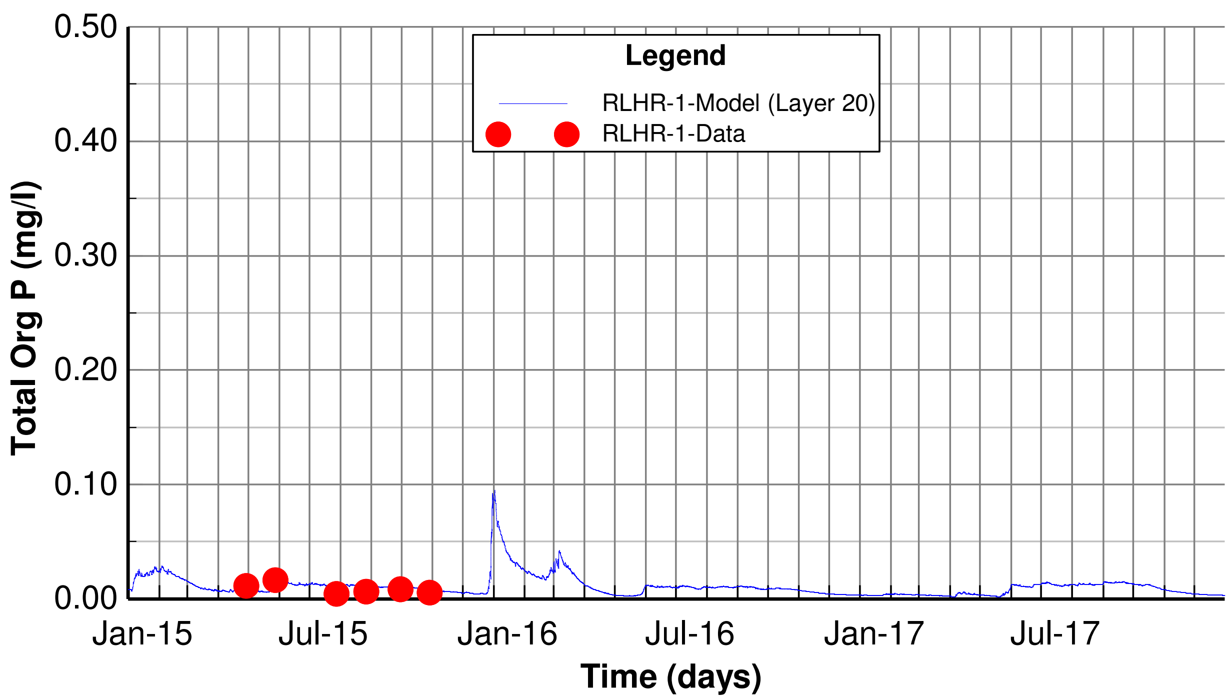

Figure 7-36 Validation Plot of Surface Layer Total Organic Phosphorus at Station RLHR-1

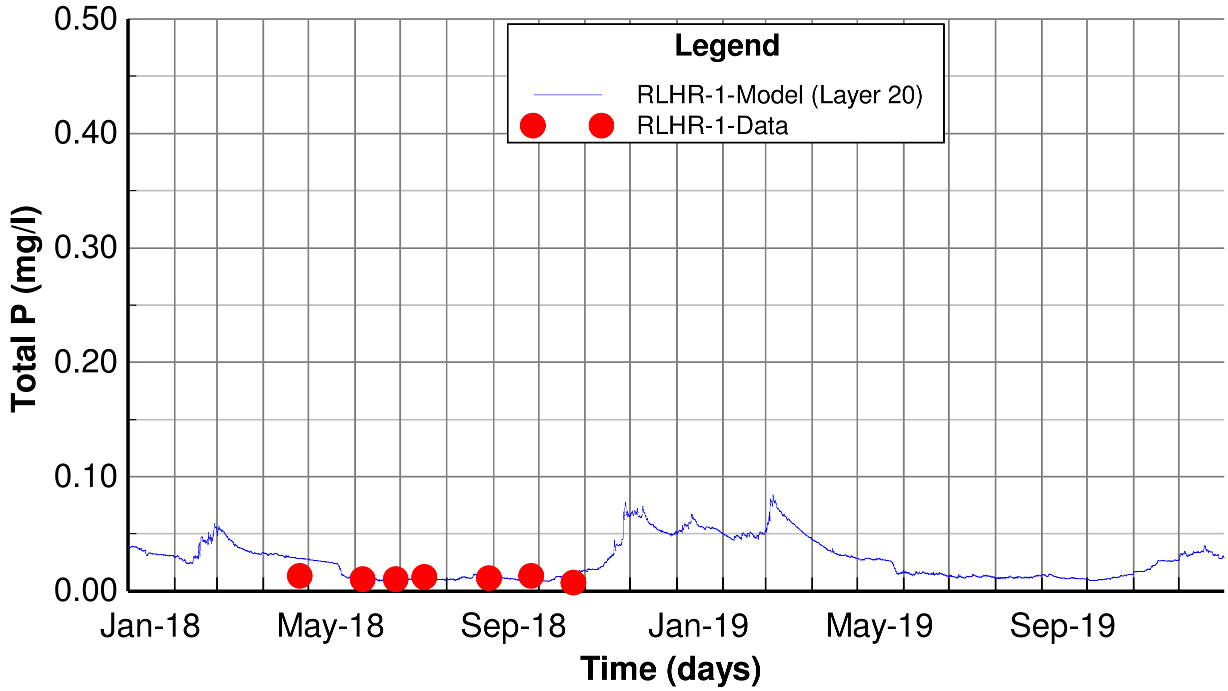

Figure 7-37 Calibration Plot of Surface Layer Total Phosphorus at Station RLHR-1

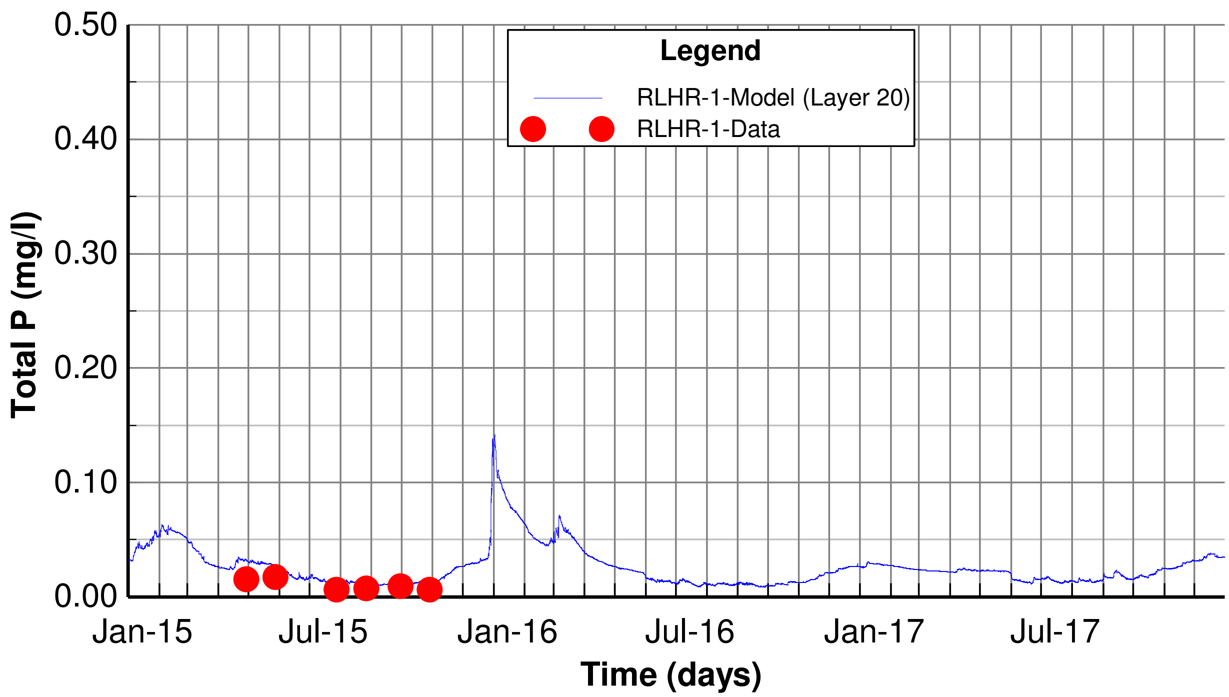

Figure 7-38 Validation Plot of Surface Layer Total Phosphorus at Station RLHR-1

8. Scenario Analysis

The calibrated and validated EFDC model of Lake Harris was used to evaluate the effects of a range of scenarios designed to raise the winter pool elevation by up to four feet on water temperature and dissolved oxygen in the forebay area of Lake Harris. The operating curves of the lake stages are shown in Table 8-1 and Figure 1-2.

Table 8-1 Operating Curves of Lake Harris Dam

Scenarios	Winter Pool Elevation (ft NGVD29)
Baseline	785
Scenario 1	786
Scenario 2	787
Scenario 3	788
Scenario 4	789

For each scenario run, the initial water surface elevation was adjusted and a scenario flow balance was re-calculated to make sure the simulated water surface elevation at the forebay followed the scheduled operation curves. For all four scenarios, the EFDC model of Lake Harris was run for the 6-year period from 1 January 2014 to 31 December 2019.

Since the dam discharge was released from the top four layers of the model, water temperature and dissolved oxygen data simulated in the top four layers were extracted for the period from 2015 to 2019 for all four scenarios and the baseline simulation. The baseline EFDC model refers to the calibrated and validated EFDC model results that represent the existing operating schedule. Data from the top four layers were pooled to compute average values for water temperature and dissolved oxygen for each of the four scenarios and the baseline run. Average water temperature and dissolved oxygen scenario results were then compared with the baseline results.

The simulated water surface elevation at the forebay area for the four scenarios and baseline run are shown in Figure 8-1. The simulated water surface elevation results for all four scenarios followed the scheduled operation curves, as specified in Table 8-1 and shown in Figure 1-2. The comparison of the time series plots of simulated water temperature and dissolved oxygen concentration of the dam discharge between the baseline and scenarios are shown in Figure 8-2 and Figure 8-3, respectively. Hourly water temperature and dissolved oxygen results for baseline and scenarios were also extracted from the EFDC models to calculated the statistics including minimum, 10 percentile, 25 percentile, 50 percentile, 75 percentile, 90 percentile, maximum, and mean values. The summary statistics of water temperature and dissolved oxygen for the baseline and scenarios are given in Table 8-2 and Table 8-3, respectively. As can be seen, there are only small differences in simulated water temperature and dissolved oxygen between the baseline run and the four scenarios. The model simulation results clearly indicate that raising the winter pool water level by up to 4 ft would lead to only minor differences in water temperature and dissolved oxygen in the dam discharge flow.

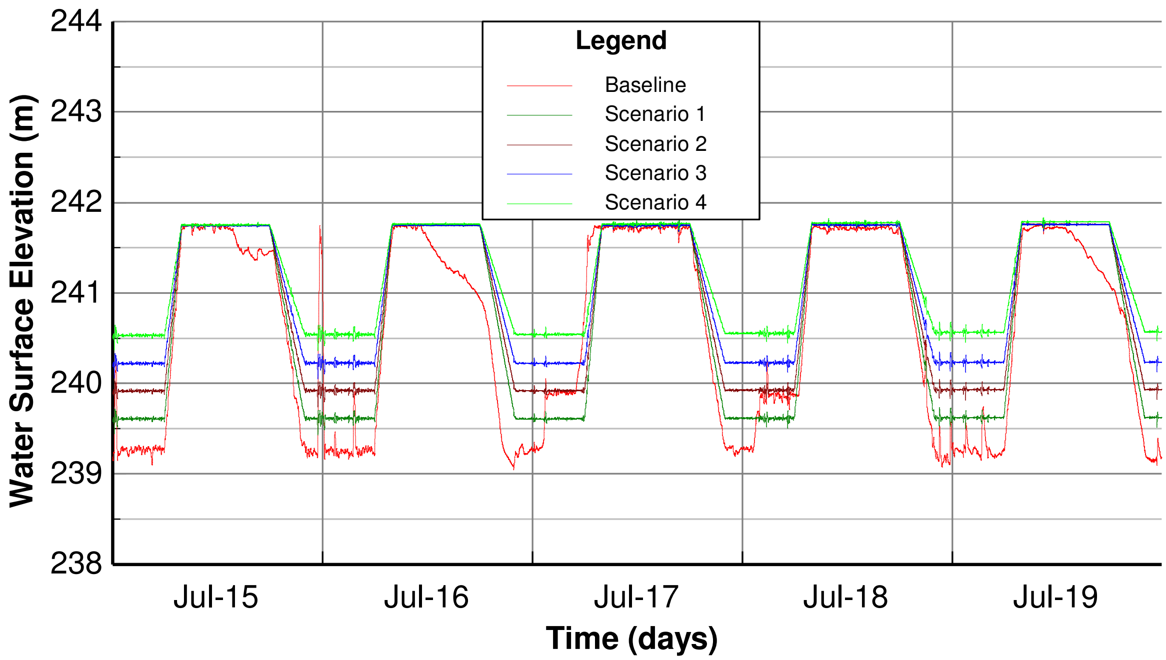

Figure 8-1 Comparison of Simulated Water Surface Elevation at the APC Forebay Station between Baseline and Scenarios

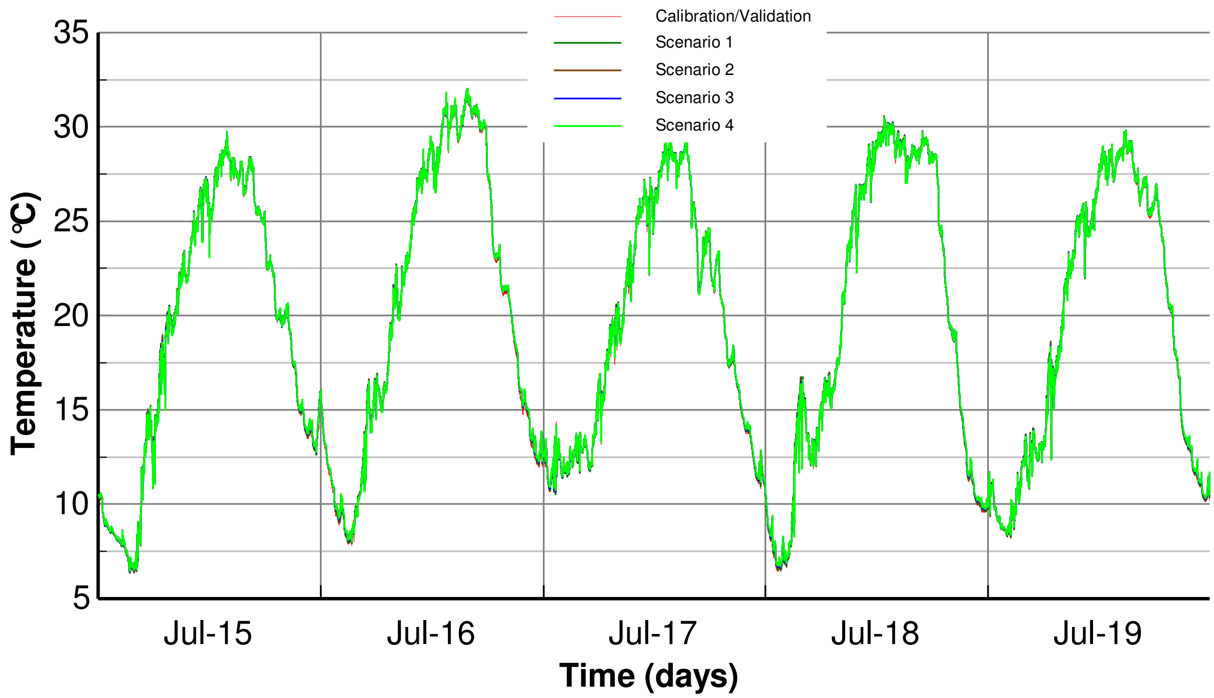

Figure 8-2 Comparison of Water Temperature of Dam Discharge between Baseline and Scenarios

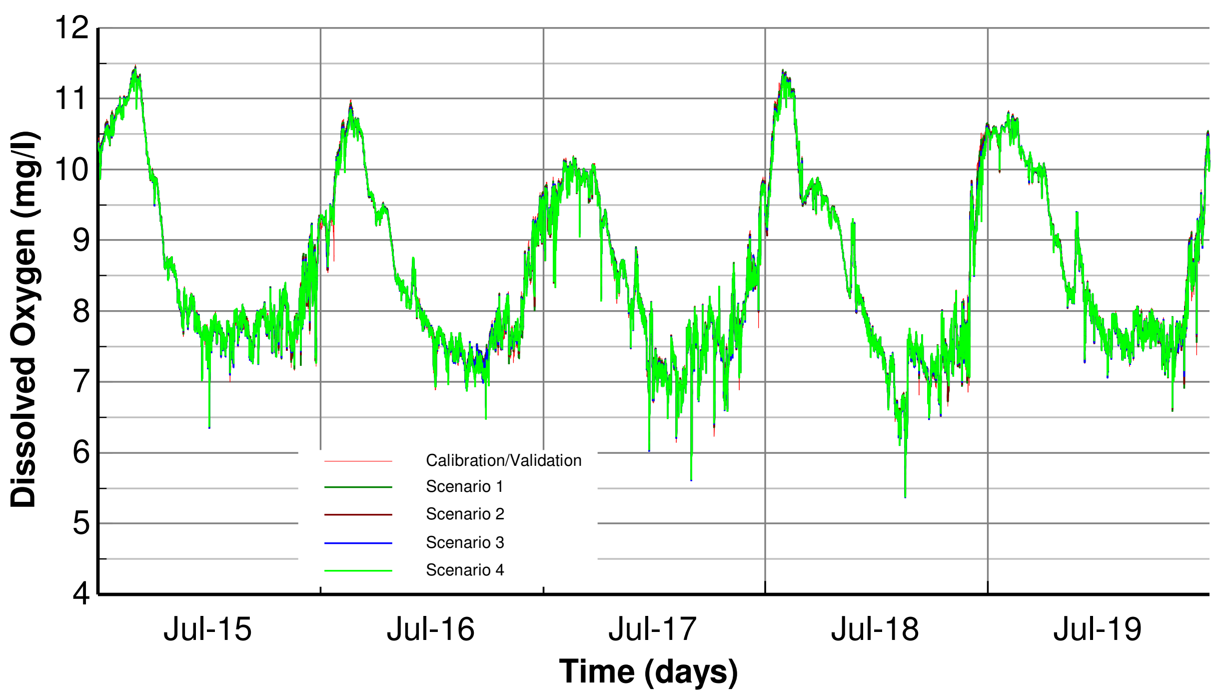

Figure 8-3 Comparison of Dissolved Oxygen of Dam Discharge between Baseline and Scenarios

Table 8-2 Summary Statistics of Water Temperature for Baseline and Scenarios

Statistics	Calibration/Validation	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Minimum	6.322	6.360	6.395	6.395	6.439
10 percentile	9.749	9.802	9.823	9.840	9.882
25 percentile	12.978	13.013	13.027	13.035	13.053
50 percentile	19.688	19.709	19.691	19.684	19.677
75 percentile	26.566	26.586	26.568	26.557	26.545
90 percentile	28.680	28.704	28.693	28.686	28.680
Maximum	31.998	32.028	32.031	32.018	32.038
Mean	19.493	19.534	19.535	19.535	19.541

Table 8-3 Summary Statistics of Dissolved Oxygen for Baseline and Scenarios

Statistics	Calibration/Validation	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Minimum	5.385	5.385	5.408	5.358	5.369
10 percentile	7.288	7.296	7.291	7.287	7.272
25 percentile	7.623	7.625	7.621	7.625	7.626
50 percentile	8.197	8.191	8.184	8.187	8.188
75 percentile	9.602	9.600	9.596	9.592	9.585
90 percentile	10.495	10.478	10.464	10.454	10.443
Maximum	11.480	11.462	11.445	11.433	11.423
Mean	8.587	8.584	8.577	8.573	8.569

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APPENDIX D

EROSION AND SEDIMENTATION SITES IDENTIFIED IN EROSION AND SEDIMENTATION STUDY

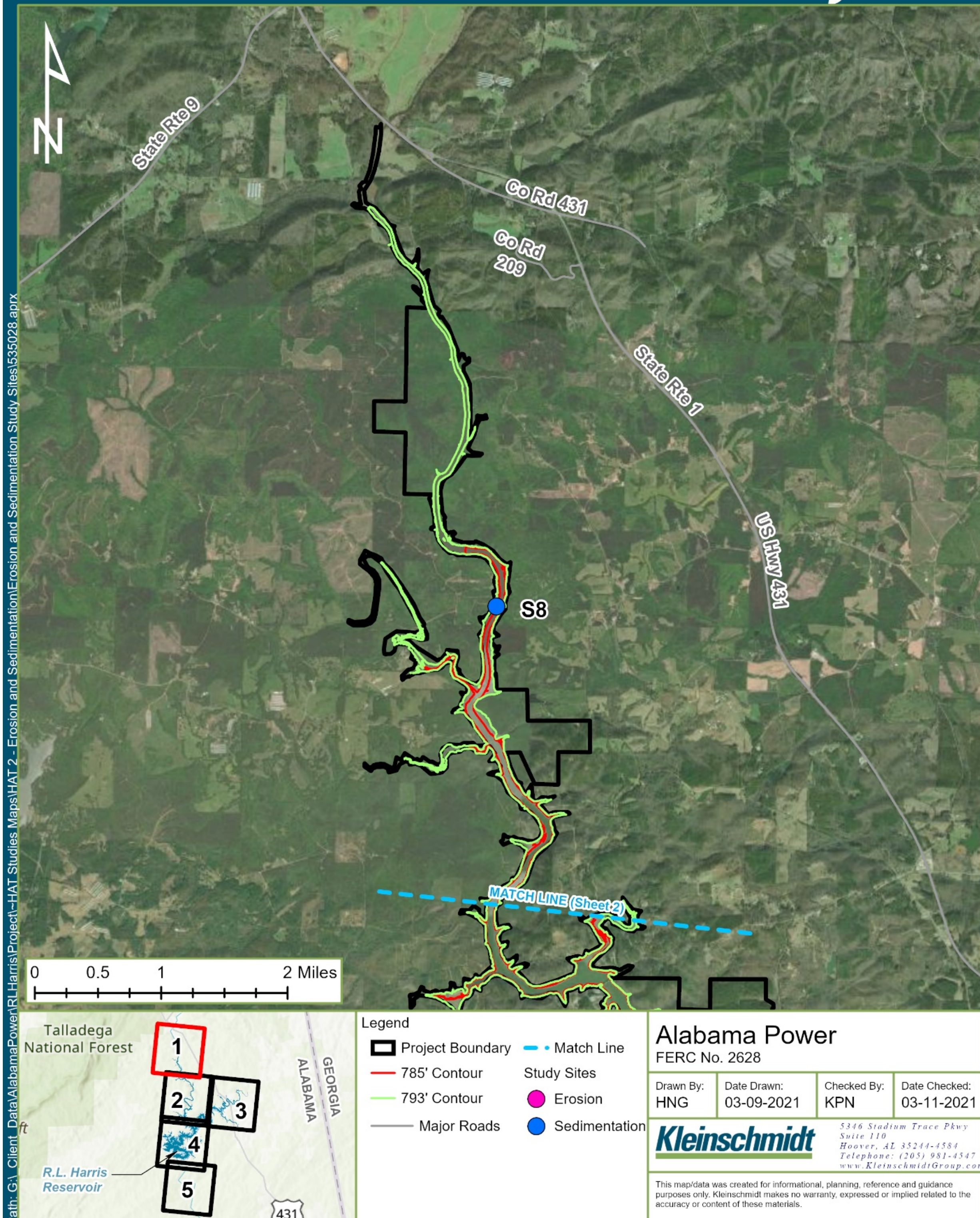
Erosion Site	Latitude	Longitude	Potential Cause of Erosion/ Sedimentation	Length (feet)	Width (feet)	Description of Exposed Soils	Adjacent Land Use
E1	33.39649	-85.44412	Natural Factor Independent of Operations, Land Use	100	20	Oc, Ochlockonee fine sandy loam	Agricultural, Exposed Roots or Root Undercutting, Leaning or Fallen Trees
E2	33.39618	-85.44512	Natural Factor Independent of Operations, Land Use	150	20	Oc, Ochlockonee fine sandy loam	Agricultural
E3	33.39448	-85.44763	Land Use	50	30	Oc, Ochlockonee fine sandy loam	Agricultural
E4	33.39253	-85.44797	Land Use	varying	N/A	Oc, Ochlockonee fine sandy loam	Early Successional Vegetation, Developed, Residential
E5	33.38870	-85.44677	Anthropogenic	100	10	Oc, Ochlockonee fine sandy loam	Unvegetated, Exposed Roots or Root Undercutting, Leaning or Fallen Trees, Residential
E6	33.38817	-85.45264	No active erosion	N/A	N/A	Oc, Ochlockonee fine sandy loam	N/A
E7	33.38399	-85.45285	Natural Factor Independent of Operations, Land Use	75	5	Bu, Buncombe loamy sand	Undeveloped Wooded, Exposed Roots or Root Undercutting, Leaning or Fallen Trees
E8	33.37972	-85.45260	Natural Factor Independent of Operations, Land Use	100	10	Bu, Buncombe loamy sand	Undeveloped Grassy
E9	33.37732	-85.45879	Natural Factor Independent of Operations, Land Use	450	5	LtE, Louisa stony sandy loam	Early Successional Vegetation, Exposed Roots or Root Undercutting, Leaning or Fallen Trees, Residential

Erosion Site	Latitude	Longitude	Potential Cause of Erosion/ Sedimentation	Length (feet)	Width (feet)	Description of Exposed Soils	Adjacent Land Use
E10	33.37785	-85.45851	Natural Factor Independent of Operations, Land Use	150	5	Oc, Ochlockonee fine sandy loam	Early Successional Vegetation, Exposed Roots or Root Undercutting, Leaning or Fallen Trees, Residential
E11	33.38727	-85.47761	No active erosion	N/A	N/A	Mt, Mantachie fine sandy loam	N/A
E12	33.36759	-85.47331	No active erosion	N/A	N/A	Oc, Ochlockonee fine sandy loam	Developed
E13	33.36509	-85.47680	No active erosion	N/A	N/A	MaD3, Madison gravelly clay loam	Undeveloped Grassy, Roadway Embankment
E14	33.36407	-85.47728	Natural Factor Independent of Operations, Anthropogenic	N/A	N/A	Oc, Ochlockonee fine sandy loam	Undeveloped Wooded, Roadway Embankment
E15	33.37197	-85.49914	No active erosion	N/A	N/A	LgE, Louisa gravelly sandy loam	Developed, Wooded and Grassy, Residential
E16	33.37216	-85.50173	No active erosion	N/A	N/A	LtE, Louisa stony sandy loam	Undeveloped Grassy
E17	33.37371	-85.50122	No active erosion	N/A	N/A	Mt, Mantachie fine sandy loam	Undeveloped Grassy, Exposed Roots or Root Undercutting, Power Line Crossing
E18	33.35833	-85.49693	Land Use, Anthropogenic	300	5	LtE, Louisa stony sandy loam	Developed, Grassy
E19	33.35334	-85.50611	Land Use, Anthropogenic	150	3	LtE, Louisa stony sandy loam	Early Successional Vegetation, Exposed Roots or Root Undercutting, Developed Grassy
E20	33.35544	-85.51280	No active erosion			LtE, Louisa stony sandy loam	Undeveloped Grassy
E21	33.33941	-85.55814	Anthropogenic	100	2	MdC2, Madison gravelly fine sandy loam	Exposed Roots or Root Undercutting, Residential Grass Cutting

Erosion Site	Latitude	Longitude	Potential Cause of Erosion/ Sedimentation	Length (feet)	Width (feet)	Description of Exposed Soils	Adjacent Land Use
E22*	33.19603	-85.57649	Natural Factor Independent of Operations, Land Use	30	4	Oc, Ochlockonee fine sandy loam	Developed, Grassy, Early Successional Vegetation, Exposed Roots or Root Undercutting, Leaning or Fallen Trees
E23*	33.18490	-85.58503	Land Use	400	10	Oc, Ochlockonee fine sandy loam	Agricultural, Grassy, Early Successional Vegetation, Exposed Roots or Root Undercutting, Leaning or Fallen Trees
E24	33.34779	-85.51483	Anthropogenic	30	5	DaD3, Davidson gravelly clay loam	Undeveloped Wooded, Exposed Roots or Root Undercutting, Leaning or Fallen Trees

* Located downstream of Harris Dam

Erosion and Sedimentation Study Sites



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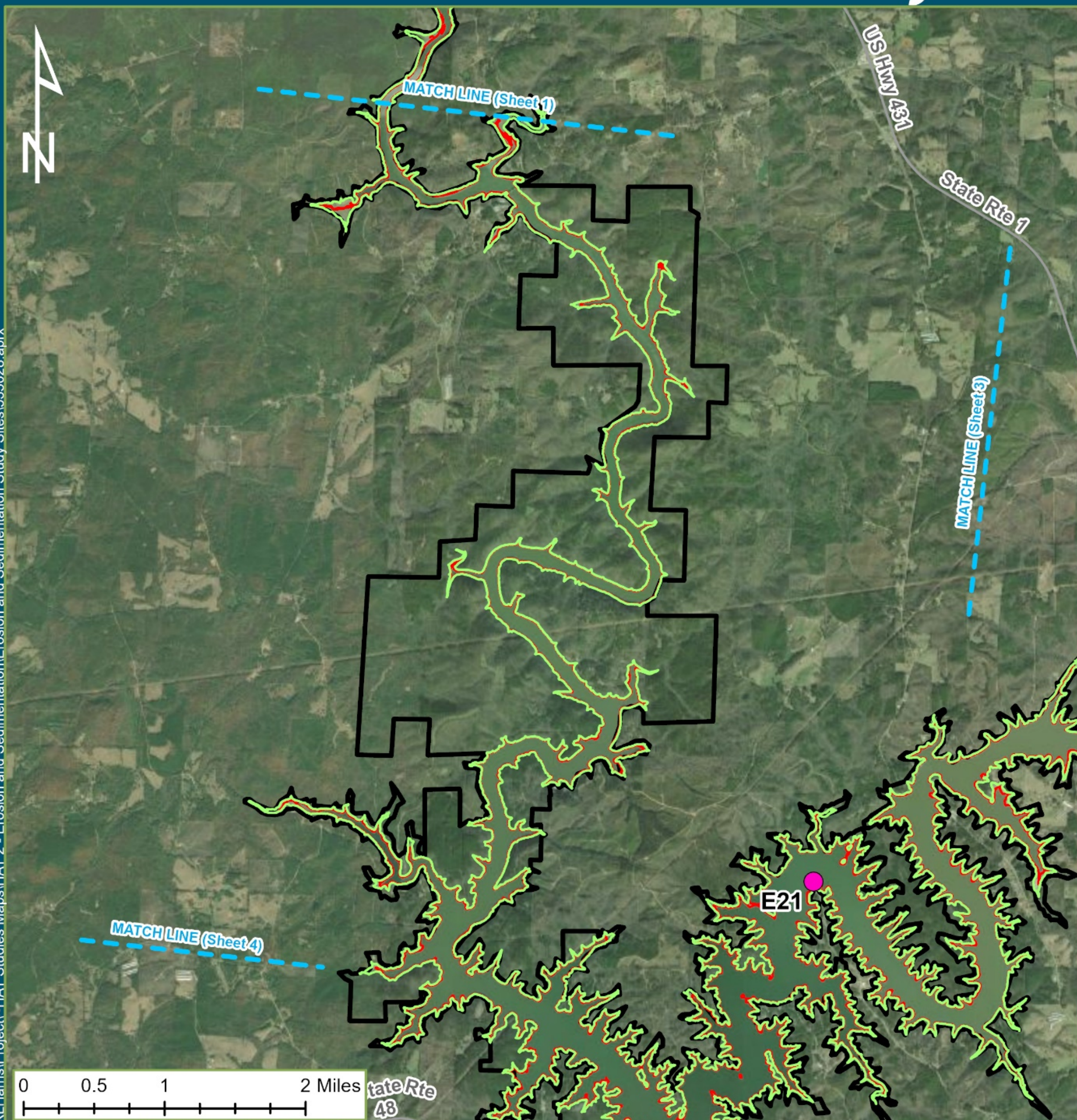
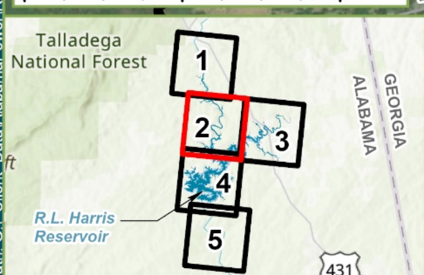
Erosion and Sedimentation Study Sites





Legend

- Project Boundary
- 785' Contour
- 793' Contour
- Major Roads
- Match Line

Study Sites

- Erosion
- Sedimentation

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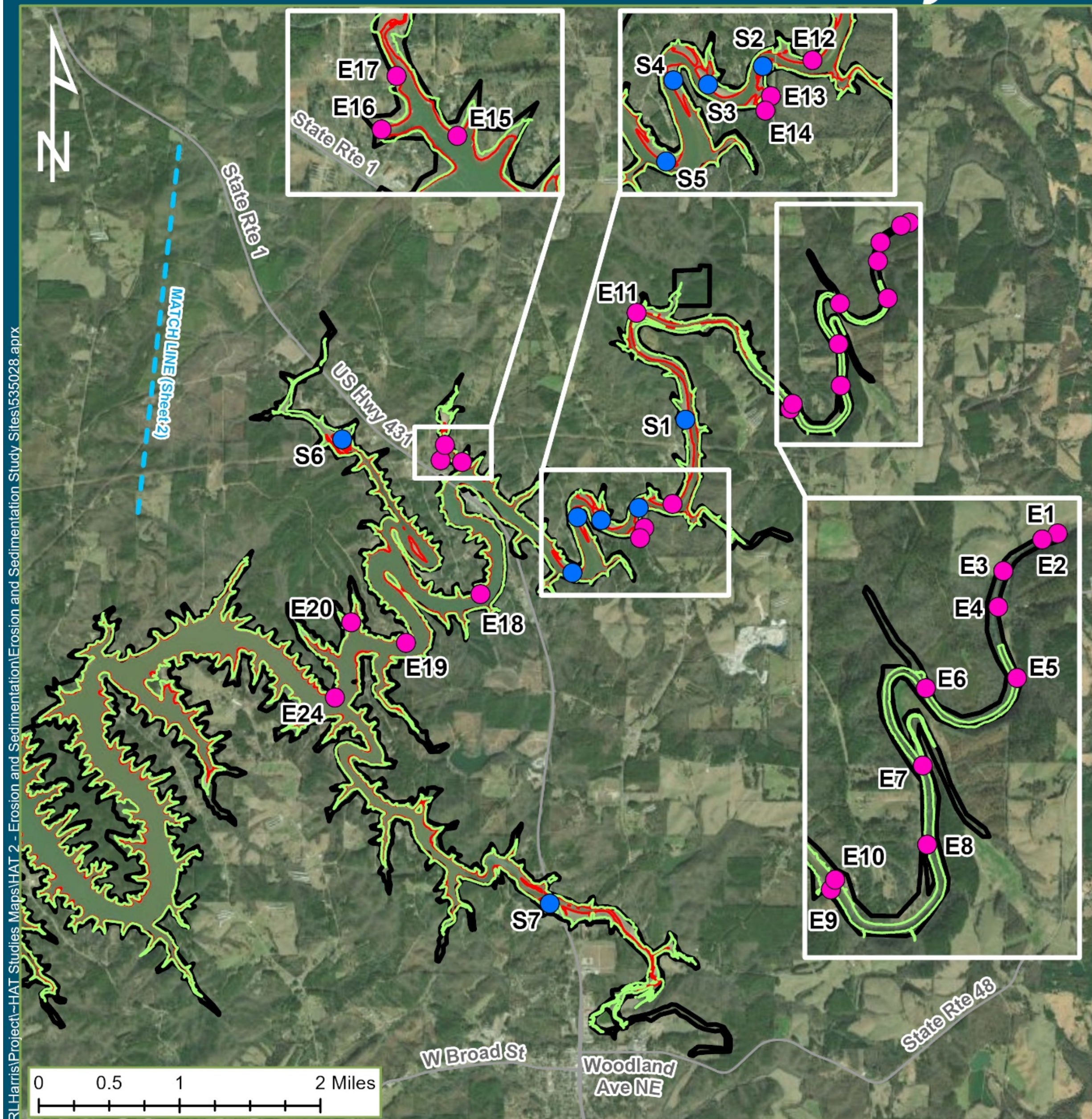

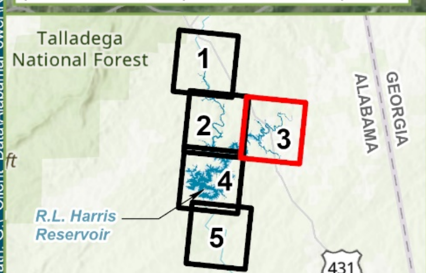

Legend

Project Boundary	Match Line
785' Contour	Study Sites
793' Contour	Erosion
Major Roads	Sedimentation

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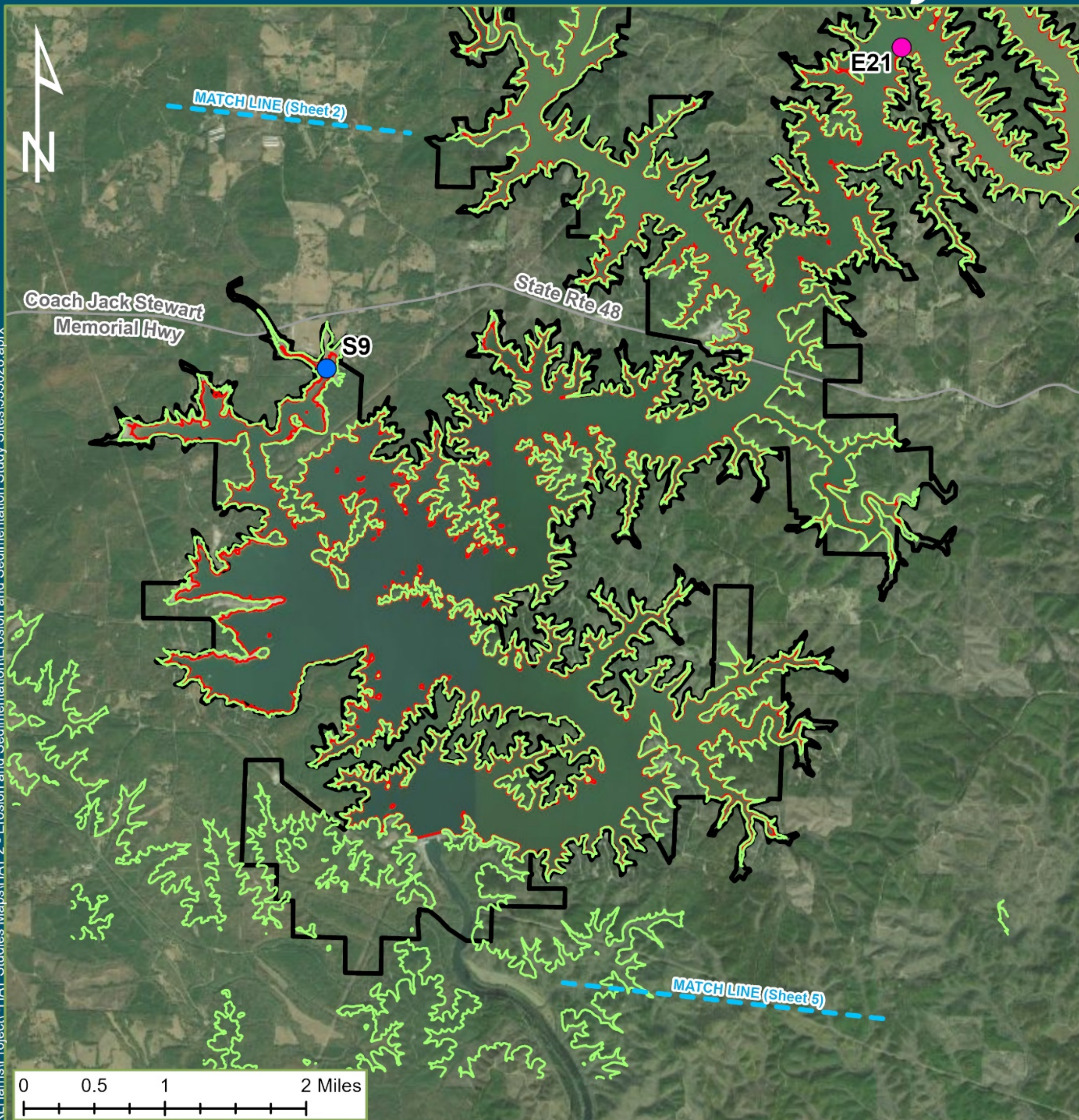

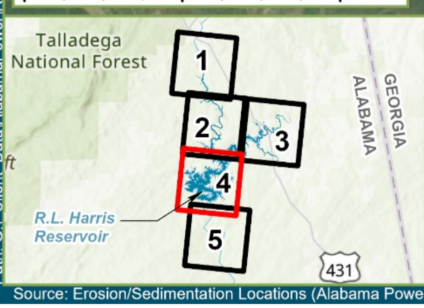

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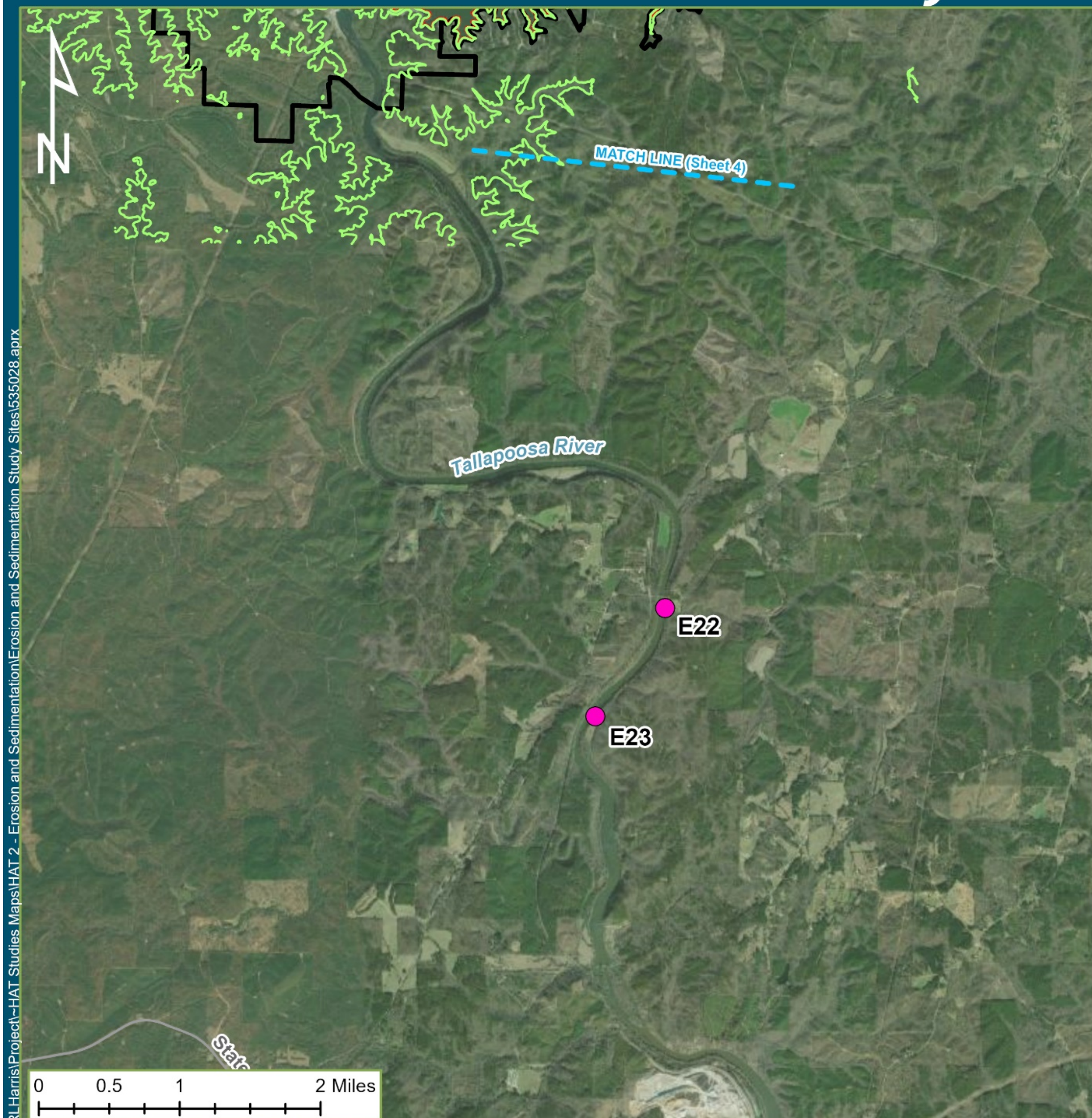

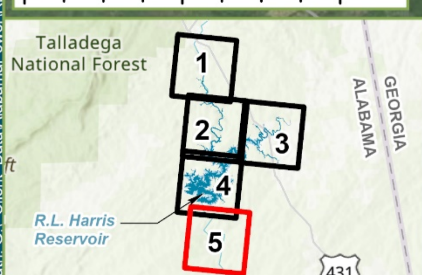

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APPENDIX E

WADING AND/OR OVERWINTERING BIRD SPECIES POTENTIALLY OCCURRING IN THE HARRIS PROJECT VICINITY

Family	Common Name	Scientific Name	Breeds in Project Area	Abundance/ Seasonality	Habitat
Anatidae	Canada Goose	*Branta Canadensis*	X	Fairly common in all seasons	Freshwater marshes, agricultural fields, and on lakes
Anatidae	Wood Duck	*Aix sponsa*	X	Common in all seasons	Wooded swamps, beaver ponds, bottomlands, creeks, and lakes
Anatidae	Gadwall	*Anas strepera*		Fairly common in winter and uncommon in fall and spring	Shallow freshwater ponds and lakes with abundant aquatic vegetation
Anatidae	American Wigeon	*Anas Americana*		Fairly common in winter, spring, and fall	Shallow freshwater ponds and lakes with abundant aquatic vegetation
Anatidae	Mallard	*Anas platyrhynchos*	X	Common in winter, fairly common in spring and fall, and uncommon in summer	Shallow water of ponds, lakes, and flooded fields
Anatidae	Blue-winged Teal	*Anas discors*		Common to fairly common in spring and fall	Shallow freshwater ponds, sloughs, creeks, and on lake mudflats
Anatidae	Northern Shoveler	*Anas clypeata*		Common in winter, spring, and fall	Freshwater ponds, swamps, and on lakes
Anatidae	Northern Pintail	*Anas acuta*		Fairly common in winter, spring, and fall	Freshwater marshes, agricultural fields, and shallow portions of lakes, ponds, and rivers
Anatidae	Green-winged Teal	*Anas cerci*		Common in winter, spring, and fall	Shallow freshwater marshes, and on creeks, lakes, and mudflats
Anatidae	Ring-necked Duck	*Aythya collaris*		Common in winter, early spring, and late fall	Shallow, wooded, freshwater ponds, swamps, and lakes
Anatidae	Lesser Scaup	*Aythya affinisthrus*		Fairly common in winter, spring, and fall	Larger lakes and rivers
Anatidae	Bufflehead	*Bucephala albeola*		Common in winter, early spring, and late fall	Larger lakes and slow-moving rivers
Anatidae	Hooded Merganser	*Lophodytes cucullatus*	X	Fairly common in winter, spring, and fall, and rare in summer	Wooded freshwater ponds, lakes, and slow water river systems
Anatidae	Ruddy Duck	*Oxyura jamaicensis*		Fairly common in winter	Freshwater ponds, lakes, and slow-moving rivers

Family	Common Name	Scientific Name	Breeds in Project Area	Abundance/ Seasonality	Habitat
Phasianidae	Wild Turkey	*Meleagris gallopavo*	X	Fairly common in all seasons	Forested and partially forested habitats
Odontophoridae	Northern Bobwhite	*Colinus virginianus*	X	Fairly common in all seasons in early successional habitats	Farms, along woodland edges, recently cut-over forest land, and in open country habitats dominated by old fields
Podicipedidae	Pied-billed Grebe	*Podilymbus podiceps*	X	Fairly common in spring, winter, and fall	Lakes and marshy ponds
Phalacrocoracidae	Double-crested Cormorant	*Phalacrocorax auritus*		Fairly common in fall, winter, and spring and uncommon in summer	Larger lakes, ponds, and rivers
Ardeidae	Great Blue Heron	*Ardea herodias*	X	Common in all seasons	Shallow water of ponds, lakes, and rivers
Ardeidae	Great Egret	*Ardea alba*	X	Common to fairly common in spring, summer, but uncommon to rare in winter	Shallow water of ponds, lakes, and rivers
Ardeidae	Little Blue Heron	*Egretta caerulea*	X	Rare to uncommon in spring to mid-summer, but fairly common in late summer and early fall	Shallow water of ponds, lakes, and rivers
Ardeidae	Green Heron	*Butorides virescens*	X	Common in spring, summer, and fall, but rare in winter	Edge of ponds, lakes, and rivers
Cathartidae	Black Vulture	*Coragyps atratus*	X	Common throughout year	Agricultural and livestock areas
Cathartidae	Turkey Vulture	*Cathartes aura*	X	Common in all seasons and regions	Wooded as well as open areas
Accipitridae	Northern Harrier	*Circus cyaneus*		Fairly common in winter, spring, and fall	In and over old fields, marshes, meadows, and grasslands
Accipitradae	Red-shouldered Hawk	*Buteo lineatus*	X	Fairly common in all seasons	Moist woodlands and swamps
Accipitradae	Red-tailed Hawk	*Buteo jamaicensis*	X	Common winter and fairly common in spring, summer, and fall	Open country and woodland edges
Falconidae	American Kestrel	*Falco sparverius*	X	Common in winter, fairly common in spring and fall, but rare in summer	Open fields and woodland edges

Family	Common Name	Scientific Name	Breeds in Project Area	Abundance/ Seasonality	Habitat
Rallidae	American Coot	*Fulica Americana*		Common in winter, common to uncommon in spring and fall, and rare in summer	Rivers, ponds, lakes, and swamps
Charadriidae	American Golden-Plover	*Pluvialis dominica*		Fairly common in spring and uncommon to rare in fall	Short grasslands, flooded fields and on mudflats of lakes, ponds, and rivers
Charadriidae	Semipalmated Plover	*Charadrius semipalmatus*		Fairly common in spring and fall, and occasional in early winter	Mudflats of lakes, ponds, and rivers
Charadriidae	Killdeer	*Charadrius vociferous*	X	Common in all seasons	Short-grass fields, and mudflats and shorelines of lakes, ponds, and rivers
Scolopacidae	Greater Yellowlegs	*Tringa melanoleuca*		Fairly common in spring and fall, but uncommon in winter and late summer	Along shorelines of shallow ponds and lakes, marsh edges, in flooded fields, and on mudflats
Scolopacidae	Lesser Yellowlegs	*Tringa flavipes*		Common in spring and fall, rare in winter, uncommon to rare in summer	Along shorelines of shallow ponds and lakes, marsh edges, in flooded fields and on mudflats
Scolopacidae	Spotted Sandpiper	*Actitis macularius*	X	Common in spring, late summer, and fall, but rare in winter	Along pond and lake margins, stream banks, and on mudflats
Scolopacidae	Solitary Sandpiper	*Tringa solitaria*		Common in spring, late summer, and fall	Along lake borders, stream banks, ponds, and marsh edges
Scolopacidae	Semipalmated Sandpiper	*Calidris pusilla*		Fairly common in spring and fall, and uncommon in late summer	On mudflats, and along pond edges and lakeshores
Scolopacidae	Least Sandpiper	*Calidris minutilla*		Common in spring, fairly common in fall, uncommon in winter and late summer, and occasional in early summer	On mudflats, and along pond edges and lakeshores
Scolopacidae	Pectoral Sandpiper	*Calidris melanotos*		Common in spring and fall, and uncommon in late summer	Wet meadows, flooded fields, on mudflats, and along shores of ponds, pools, and lakes
Scolopacidae	Common Snipe	*Gallinago*		Common in winter, spring, and fall	Marshes and wet grassy areas
Scolopacidae	American Woodcock	*Scolopax minor*	X	Fairly common in fall and winter, and occasional in spring	Moist shrubby woods, floodplains, thickets, and at edges of swamps

Family	Common Name	Scientific Name	Breeds in Project Area	Abundance/ Seasonality	Habitat
Laridae	Ring-billed Gull	*Larus delawarensis*		Fairly common in winter, spring, and fall, and occasional in summer	Summer rivers, lakes, irrigated and plowed fields, and garbage dumps
Columbidae	Rock Pigeon	*Columba livia Exotic*	X	Common in all seasons	In cities, and on farms, bridges, cliffs
Columbidae	Mourning Dove	*Zenaida macroura*	X	Common in all seasons	Farms, and in towns, woodlots, agricultural fields, and grasslands
Strigidae	Eastern Screech-Owl	*Megascops asio*	X	Common in all seasons	Woodlands, especially near open areas
Strigidae	Great Horned Owl	*Bubo virginianus*	X	Fairly common in all seasons	Woodlands, parklands, and occasionally in wooded suburbs
Strigidae	Barred Owl	*Strix varia*	X	Common in all seasons	Moist woodlands and wooded swamps
Alcedinidae	Belted Kingfisher	*Ceryle alcyon*	X	Common in all seasons	Along wooded rivers, streams, lakes, ponds, and in marshes
Picidae	Red-bellied Woodpecker	*Melanerpes carolinus*	X	Common in all seasons	Woodlands
Picidae	Yellow-bellied Sapsucker	*Sphyrapicus varius*		Fairly common in winter, spring, and fall	Mixed hardwood and conifer forests
Picidae	Downy Woodpecker	*Picoides pubescens*	X	Common in all seasons	Woodlands, orchards, suburban areas, parks, and farm woodlots
Picidae	Red-cockaded Woodpecker	*Picoides borealis*	X	Rare and isolated in all seasons	Old growth pine with open mid-story
Picidae	Northern Flicker	*Colaptes auratus*	X	Fairly common in all seasons and regions	Open woodlands and fields, and on lawns and open meadows with large trees
Picidae	Pileated Woodpecker	*Dryocopus pileatus*	X	Fairly common in all seasons	Mature woodlands with coniferous and hardwood trees
Tyrannidae	Eastern Wood-Pewee	*Contopus virens*	X	Common to fairly common in spring, summer, and fall	Open woodlands, parks, and along forest edges
Tyrannidae	Eastern Phoebe	*Sayornis phoebe*	X	Common in winter, spring, and fall	Open deciduous woodlands near bridges, cliffs, and eaves

Family	Common Name	Scientific Name	Breeds in Project Area	Abundance/ Seasonality	Habitat
Laniidae	Loggerhead Shrike	*Lanius ludovicianus*	X	Fairly common in winter, spring, and fall, and uncommon in summer	Open country with scattered trees and shrubs, and in hedgerows along agricultural fields
Corvidae	Blue Jay	*Cyanocitta cristata*	X	Common in all seasons	Forests, open woodlands, wooded residential areas, and parks
Corvidae	American Crow	*Corvus brachyrhynchos*	X	Common	All woodlands, farmlands, and suburban areas
Corvidae	Fish Crow	*Corvus ossifragus*	X	Fairly common to locally common in all seasons	Around swamplands, riverine areas, large lakes, urban and suburban areas, and farmlands
Hirundinidae	Tree Swallow	*Tachycineta bicolor*	X	Common in fall, fairly common in spring, and rare in winter and summer	Open areas, and over ponds and lakes; nests in cavities in dead, standing timber and boxes
Paridae	Carolina Chickadee	*Poecile carolinensis*	X	Common in all seasons	Woodlands and wooded suburbs
Paridae	Tufted Titmouse	*Baeolophus bicolor*	X	Common in all seasons	Woodlands and wooded suburbs
Sittidae	Brown-headed Nuthatch	*Sitta pusilla*	X	Locally common in all seasons	Open pine forests
Troglodytidae	Carolina Wren	*Thryothorus ludovicianus*	X	Common in all seasons	Thickets in woodlands, farmlands, and suburbs
Troglodytidae	House Wren	*Troglodytes aedon*	X	Fairly common in fall, uncommon in spring, and rare in winter and summer	Farmlands, thickets, and suburban yards with dense hedgerows
Regulidae	Golden-crowned Kinglet	*Regulus satrapa*		Common in winter, spring, and fall	Woodlands, especially with conifers
Regulidae	Ruby-crowned Kinglet	*Regulus calendula*		Common in winter, spring, and fall	Woodlands
Sylviidae	Blue-gray Gnatcatcher	*Polioptila caerulea*	X	Common in spring, summer, and fall, and rare in winter	Open woodlands, forest edges, and tree-lined fence rows

Family	Common Name	Scientific Name	Breeds in Project Area	Abundance/ Seasonality	Habitat
Turdidae	Eastern Bluebird	*Sialia sialis*	X	Common in all seasons	Open rural areas, farmlands, fence rows, open suburban areas, and parks with scattered trees
Turdidae	Hermit Thrush	*Catharus guttatus*		Common in winter, spring, and fall	Woodlands with dense undergrowth
Turdidae	American Robin	*Turdus migratorius*	X	Common in all seasons	Short grass areas with scattered trees
Mimidae	Northern Mockingbird	*Mimus polyglottos*	X	Common in all seasons	Openings with short grass, scattered shrubs, and trees
Mimidae	Brown Thrasher	*Toxostoma rufum*	X	Common in all seasons	Short ground cover vegetation near dense thickets, hedgerows, and shrubs
Motacillidae	American Pipit	*Anthus rubescens*		Fairly common in winter, spring, and fall	Open country, especially on plowed fields and mudflats
Bombycillidae	Cedar Waxwing	*Bombycilla cedrorum*	X	Common in winter, spring, and fall, and occasional in summer	Areas with trees and shrubs that produce fruits, such as hackberry, mulberry, cedar, cherry, and holly
Parulidae	Yellow-throated Warbler	*Dendroica dominica*	X	Fairly common in spring, summer, and fall, and occasional in winter	Older pine forests, and woodlands with sycamores, especially near water; in migration, found in woodlands
Parulidae	Pine Warbler	*Dendroica pinus*	X	Common in all seasons	Mature pine woodlands
Parulidae	Prairie Warbler	*Setophaga discolor*	X	Common in spring, summer, and fall, and occasional in winter	Brushy early successional growth, particularly regenerating clear cuts
Parulidae	Palm Warbler	*Dendroica palmarum*		Common in spring, fairly common in fall, and rare in winter	Open areas with scattered shrubs and trees
Parulidae	Common Yellowthroat	*Geothlypis trichas*	X	Common in spring, summer, and fall, and rare in winter	Along woodland edges, and in hedgerows, thickets, marshes, and wet meadows
Parulidae	Yellow-breasted Chat	*Icteria virens*	X	Common in spring, summer, and fall, and occasional in winter	Early successional growth areas
Thraupidae	Summer Tanager	*Piranga rubra*	X	Common in spring, summer, and fall, and occasional in winter	In breeding season, found in open, mixed hardwood-coniferous forests and along forest edges

Family	Common Name	Scientific Name	Breeds in Project Area	Abundance/ Seasonality	Habitat
Emberizidae	Eastern Towhee	*Pipilo erythrophthalmus*	X	Common in all seasons	Brushy woodlands and early successional growth
Emberizidae	Chipping Sparrow	*Spizella passerine*	X	Common in all seasons	Open areas with short grass and scattered trees, especially conifers
Emberizidae	Field Sparrow	*Spizella pusilla*	X	Common to fairly common in all seasons	Early successional growth areas, especially with dense ground cover
Emberizidae	Savannah Sparrow	*Passerculus sandwichensis*		Common in winter, spring, and fall	Open grassy fields
Emberizidae	Song Sparrow	*Melospiza melodia*	X	Common in winter, spring, and fall, and uncommon to rare in summer	Open brushy and weedy areas
Emberizidae	Swamp Sparrow	*Melospiza Georgiana*		Common to fairly common in winter, spring, and fall	Freshwater marshes, and shrubby and weedy areas, especially near water
Emberizidae	White-throated Sparrow	*Zonotrichia albicollis*		Common in winter, spring, and fall, and rare in summer	Thickets and shrubby areas
Emberizidae	Dark-eyed Junco	*Junco hyemalis*		Common in winter, spring, and fall, and occasional in summer	Open woodlands, and brushy and grassy areas
Cardinalidae	Northern Cardinal	*Cardinalis*	X	Common in all seasons	Shrubby areas, hedgerows, thickets, and suburban gardens
Cardinalidae	Indigo Bunting	*Passerina cyanea*	X	Common in spring, summer, and fall, and occasional in winter	Brushy and weedy area, in early successional stages and woodland openings, and along woodland and field borders
Icteridae	Red-winged Blackbird	*Agelaius phoeniceus*	X	Common in all seasons	Marshes, and brushy, weedy, and grassy areas, especially when wet
Icteridae	Eastern Meadowlark	*Sturnella magna*	X	Common in all seasons	Grassy, weedy fields, especially high grass
Icteridae	Common Grackle	*Quiscalus quiscula*	X	Common in all seasons	Open woodlands, especially those with pines and grassy areas; also fields with short grasses or in cultivated fields
Icteridae	Brown-headed Cowbird	*Molothrus ater*	X	Common in all seasons	Open areas, especially with livestock

Family	Common Name	Scientific Name	Breeds in Project Area	Abundance/ Seasonality	Habitat
Icteridae	Baltimore Oriole	*Icterus galbula*	X	Fairly common in spring and fall, but rare in summer and winter	In breeding season, found in open areas, with scattered trees, especially near water. In migration, found in woodlands
Fringillidae	House Finch	*Carpodacus mexicanus*	X	Common in all seasons	Open woodlands
Fringillidae	American Goldfinch	*Carduelis tristis*	X	Common in winter, spring, and fall	Open woodlands, brushy areas, and willow thickets
Passeridae	House Sparrow	*Passer domesticus Exotic*	X	Common in all seasons	Urban and suburban areas, and open farmland

Source: Alabama Power and Kleinschmidt 2018

APPENDIX F

AMPHIBIAN SPECIES POTENTIALLY OCCURRING IN THE HARRIS PROJECT VICINITY

Family	Common Name	Scientific Name	Abundance in Project Area	Habitat
Amphibians				
Bufonidae	American Toad	*Bufo americanus*	Common	Upland forests, suburban areas
Bufonidae	Fowler's Toad	*Bufo woodhousii*	Common	Sandy areas around shores of lakes, or in river valleys
Hylidae	Northern Cricket Frog	*Acris crepitans*	Common	Creekbanks, lakeshores, and mudflats
Hylidae	Cope's Gray Treefrog	*Hyla chrysoscelis*	Common	Small trees or shrubs, typically over standing water; on ground or at water's edge during breeding season
Hylidae	Green Treefrog	*Hyla cinerea*	Moderately common	Permanent aquatic habitats
Hylidae	Mountain Chorus Frog	*Pseudacris brachyphona*	Moderately common	Forested areas in most of northern Alabama
Hylidae	Northern Spring Peeper	*Pseudacris crucifer*	Common	Ponds, pools, and swamps
Hylidae	Upland Chorus Frog	*Pseudacris triseriata feriarum*	Moderately common	Grassy swales, moist woodlands, river-bottom swamps, and environs of ponds, bogs, and marshes
Microhylidae	Eastern Narrow-mouthed Toad	*Gastrophyrne carolinensis*	Common	Variety of habitats providing suitable cover and moisture, including under logs and or leaf litter
Pelobatidae	Eastern Spadefoot Toad	*Scaphiopus holbrooki*	Moderately	Forested areas of sandy or loose soil
Ranidae	Bullfrog	*Rana catesbeiana*	Common	Permanent aquatic habitats
Ranidae	Bronze Frog	*Rana clamitans spp.*	Moderately common	Rocks, stumps, limestone crevices of stream environs, bayheads and swamps
Ranidae	Wood Frog	*Rana sylvatica*	Uncommon	Moist wooded areas
Ranidae	Southern Leopard Frog	*Rana pipiens sphenocephala*	Moderately common, believed to be declining	All types of aquatic to slightly brackish habitats
Ambystomatidae	Spotted Salamander	*Ambystoma maculatum*	Moderately common, believed to be declining	Bottomland hardwoods, woodland pools
Ambystomatidae	Marbled Salamander	*Ambystoma opacum*	Common	Bottomland hardwoods, woodland pools

Family	Common Name	Scientific Name	Abundance in Project Area	Habitat
Plethodontidae	Spotted Dusky Salamander	*Desmongnathus conanti*	Common	Damp habitats, seepage areas
Plethodontidae	Southern Two-lined Salamander	*Eurycea cirrigera*	Common	Shaded aquatic habitats
Plethodontidae	Three-lined Salamander	*Eurycea guttolineata*	Common	Shaded aquatic habitats, forested floodplains
Plethodontidae	Webster's Salamander	*Plethodon websteri*	Moderately common	Damp deciduous forest
Plethodontidae	Northern Slimy Salamander	*Plethodon glutinosus*	Common	Wide variety of habitats
Plethodontidae	Northern Red Salamander	*Pseudotriton ruber*	Common	Aquatic margins in forested areas
Salamandridae	Eastern Newt	*Notophthalmus viridescens louisianensis*	Moderately common	Terrestrial or aquatic habitats, depending on life stage
Salamandridae	Central Newt	*Notophthalmus viridescens*	Moderately common	Terrestrial or aquatic habitats, depending on life stage

Source: Alabama Power and Kleinschmidt 2018

APPENDIX G

QUALITATIVE DISCUSSION OF “EXTENDED SUMMER POOL” ALTERNATIVES

In an October 1, 2021 letter[1], FERC staff requested that Alabama Power provide a qualitative analysis of two additional operating curve alternatives in order to facilitate their review of stakeholder-recommended summer pool scenarios. The alternatives, as requested by FERC are:

(1) modify the operating curve to maintain the summer pool elevation of 793 feet from March 1 through October 31 (7 months) with adjusted winter pool elevation between January 1 and February 28 (2 months) at: (a) 785 feet; (b) 786 feet; (c) 787 feet; (d) 788 feet; and (e) 789 feet; and

(2) modify the operating curve to maintain the summer pool elevation of 793 feet from April 1 through October 31 (6 months) with adjusted winter pool elevation between January and March 31 (3 months) at: (a) 785 feet; (b) 786 feet; (c) 787 feet; (d) 788 feet; and (e) 789 feet.

FERC further requested that Alabama Power address the effects of these alternatives on: (1) structures downstream of Harris Dam; (2) water quality; (3) water use; (4) erosion and sedimentation; (5) aquatic resources; (6) wildlife and threatened and endangered species; (7) terrestrial wetlands; (8) recreation; and (9) cultural resources. Finally, FERC requested that the information be presented in an appendix to the Final *Operating Curve Change Feasibility Analysis (Phase 2) Report*.

As described by FERC in these two alternatives, the winter pool would last until February 28 and March 31, respectively and be full the following day, March 1 and April 1, respectively, which is not hydrologically possible. Therefore, for the following analysis, it is assumed that FERC intended the winter pool duration to be from December 1 until February 1 for the first alternative and December 1 until March 1 for the second alternative.

Figure 1 depicts the first alternative for an operating curve where the summer pool elevation of 793-ft msl is maintained from March 1 (begin filling on February 1) through October 31, along with a winter pool elevation of 785-ft msl through 789-ft msl (in 1-foot increments). The first alternative would result in a higher reservoir level compared to baseline during the month of February, as well as two additional months (March and April) when the reservoir would be maintained at its summer pool elevation. In addition, there

[1] Accession No. 20211001-3009.

would be a higher reservoir level for October through November, with reservoir levels declining during the month of November.

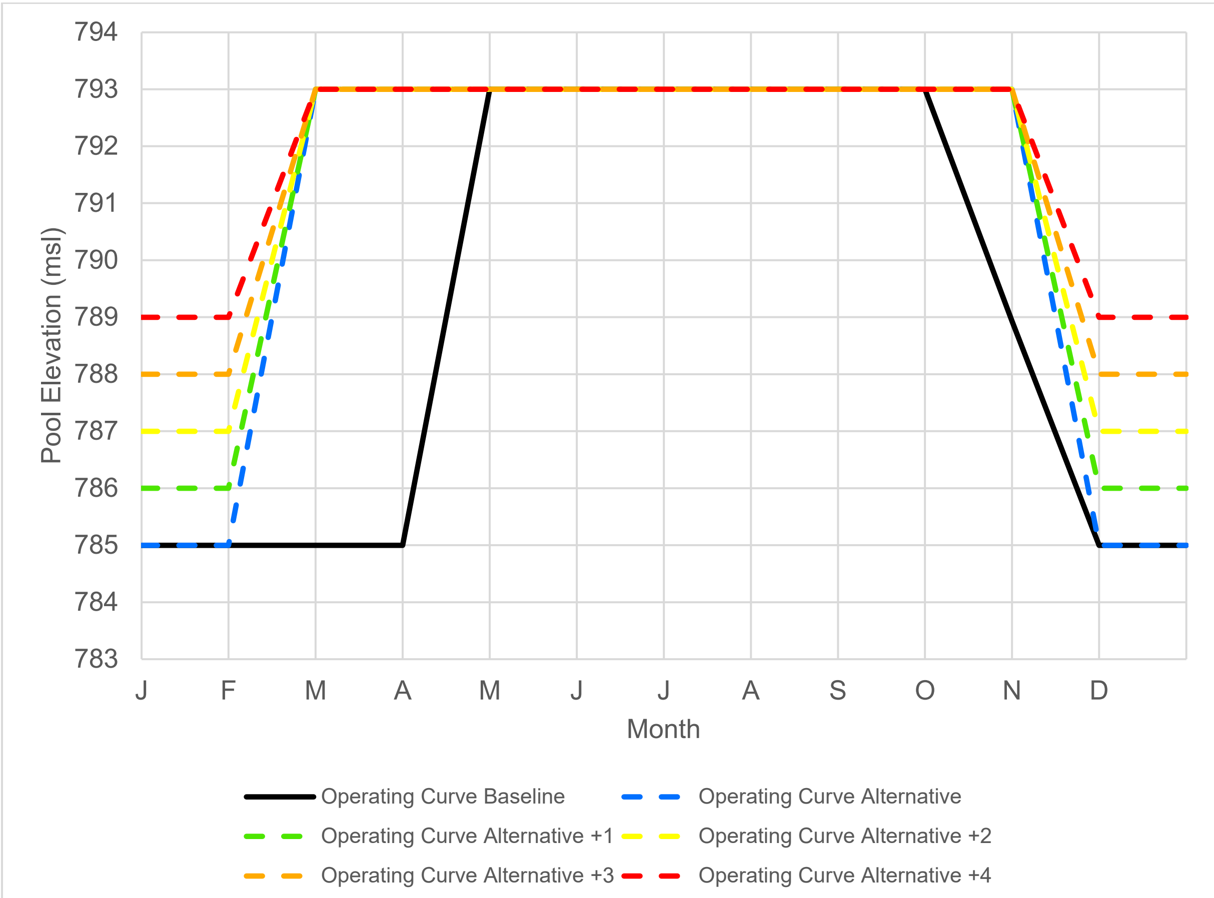

Figure 1 Summer Pool Extension Operating Curve Alternative 1

Figure 2 depicts the second alternative for an operating curve where the summer pool elevation of 793-ft msl is maintained from April 1 (begin filling on March 1) through October 31, along with a winter pool elevation of 785-ft msl through 789-ft msl (in 1-foot increments). The second alternative would result in a higher reservoir level compared to baseline reservoir elevation during the month of March, as well as one additional month (April) when the reservoir would be maintained at its summer pool elevation. In addition, there would be a higher reservoir level for October through November, with reservoir levels declining during the month of November.

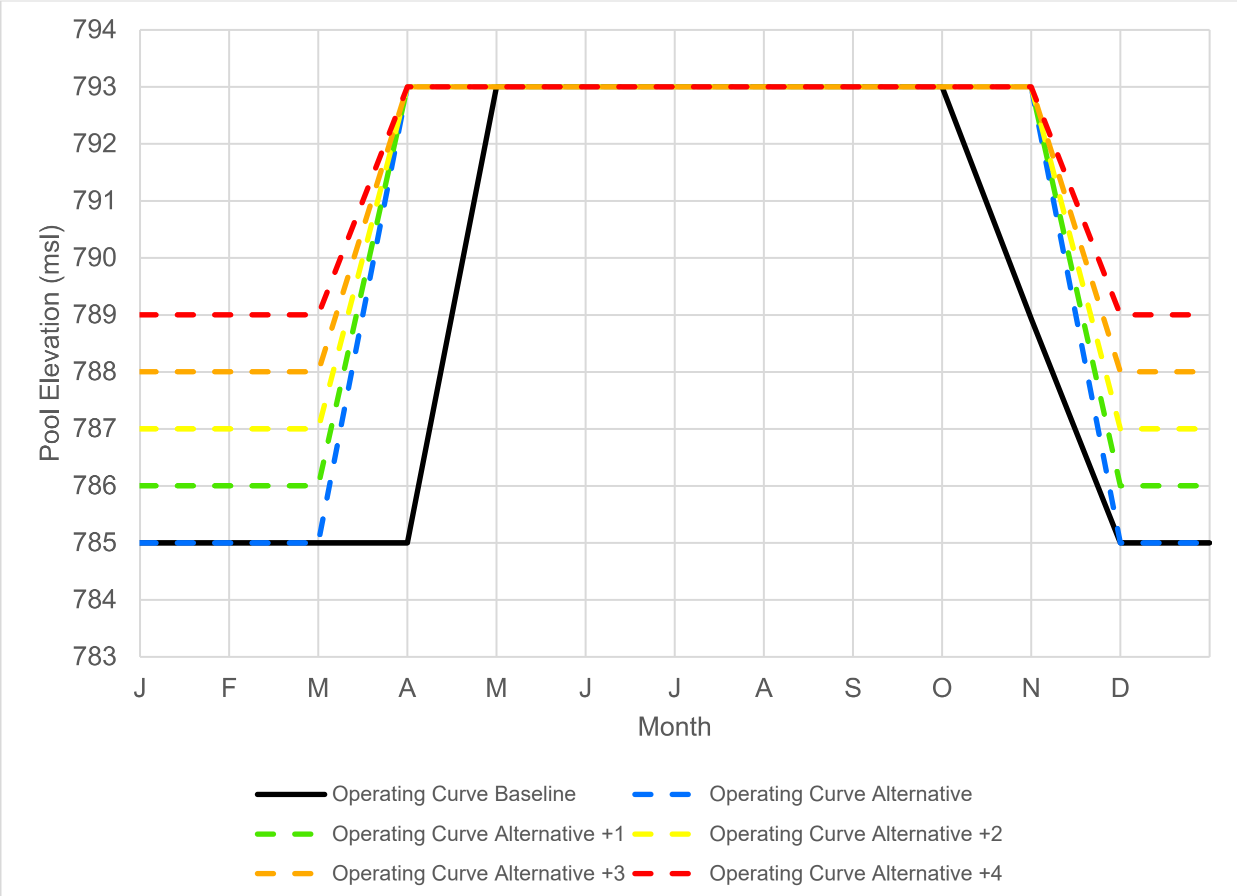

Figure 2 Summer Pool Extension Operating Curve Alternative 2

Filling the Harris Reservoir earlier in the year is problematic for two reasons: increased magnitude of flooding below Harris Dam and decreased ability of the reservoir to accommodate high flow events, resulting in an increase in the frequency of spillway operations and/or operating at plant capacity (i.e., 16,000 cfs or greater). During the months of March and April, the 1 percent chance of exceedance flow[2] is over 17,000 cfs. February and March also have the highest average monthly rainfall in the Tallapoosa River Basin (Figure 3). Approximately 80 percent of the flood-producing storms in the Tallapoosa Basin occur in the winter and spring months, of which approximately 27 percent occur in the month of March (Alabama Power 2020). Further, three of the largest storms on record, as recorded at the Heflin gage, occurred during March (see Appendix B of *the Operating Curve Feasibility Analysis Phase 1 Report*). Therefore, because in both alternatives the reservoir starts at a higher elevation during a spring rain event, there is a

[2] This refers to a flood level or peak that has a one in a hundred, or 1%, chance of being equaled or exceeded in any year.

greater probability of increased frequency of spillway operations and/or operating at plant capacity than would occur under the existing operating curve. Therefore, effects on downstream resources would be more likely to occur more frequently for these extended summer reservoir elevation alternatives compared to baseline. For example, downstream erosion could be exacerbated due to increased scour from higher channelized flows that would occur more frequently with Alternative 1 or 2.

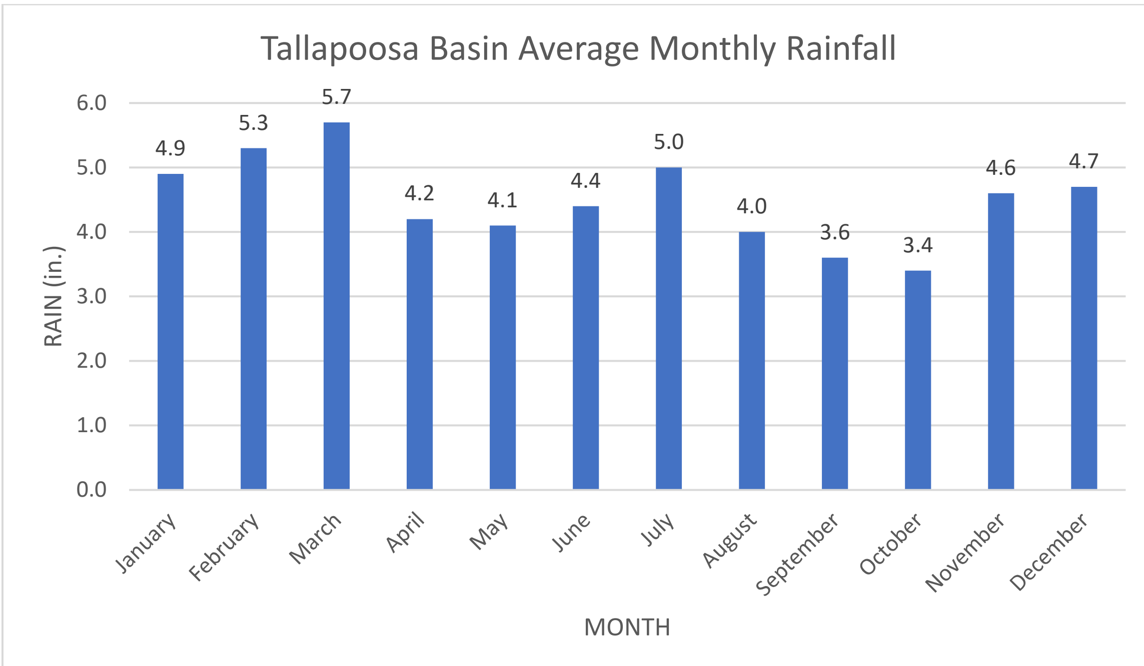

Figure 3 Tallapoosa Basin Average Monthly Rainfall

In the Operating Curve Change Feasibility Analysis Study, downstream flooding effects were calculated using the 100-Year Design Flood and the reservoir being at each of the higher winter pool alternatives. (786, 787, 788, and 789-ft msl). This design flood resulted in increased area, depth, and duration of flooding at points downstream of Harris Dam for each of these winter pool alternatives. If the design flood were to occur in February, March, or April (or October or November), when the reservoir would be higher due to an earlier fill or extended summer pool, the downstream flooding effects would be worse with additional acres inundated and potentially more structures affected. In other words, if the reservoir is higher than the highest starting reservoir elevation (789-ft msl), the downstream flooding effects would be worse than those modeled and calculated as part of the Study.

Holding the reservoir higher through October 31 may provide some benefit to reservoir related recreation. However, it is unlikely that, even if the operating curve was extended, the actual reservoir elevation in most years would be higher during the month of October due to the lack of inflow in the basin during July through September. In fact, September and October have the lowest average monthly rainfall for the Tallapoosa River Basin. Even with a higher winter operating curve, modeled average daily elevations were identical on October 1, as shown in Figure 4. Note that in higher inflow years, Alabama Power does maintain Harris reservoir at full pool until October 1. However, shortening the drawdown period to only one month (November 1 to December 1) may not allow adequate time to ensure the winter pool level is met by December 1, particularly in high inflow years.

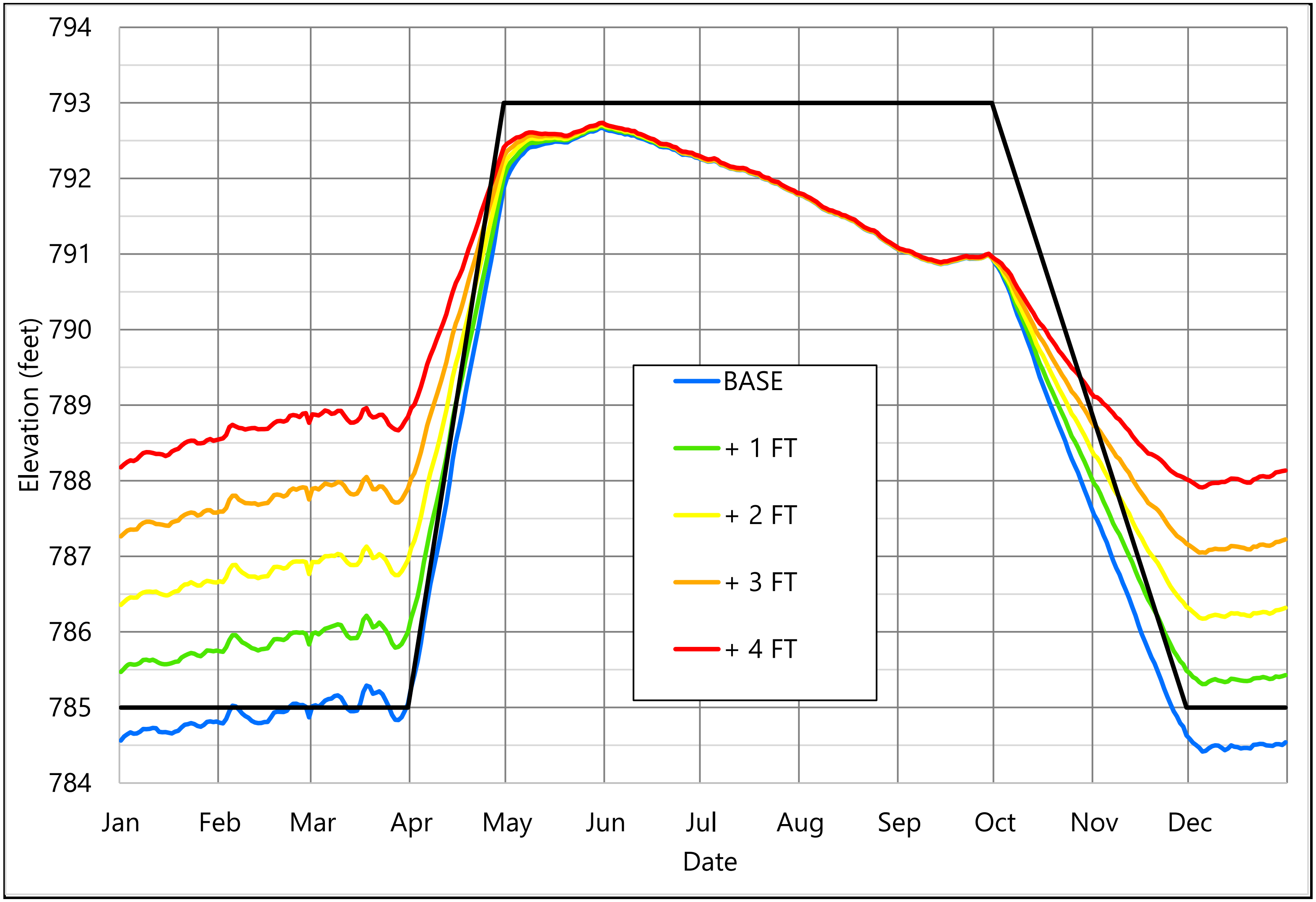

Figure 4 Average Daily Elevations for Operating Curve Alternatives

For all of these extended summer pool alternatives, the effects on resources would be the same as those analyzed and described in the *Operating Curve Change Feasibility Analysis Phase 1 and Phase 2 Reports*; however, these effects would be more likely to occur more frequently because the reservoir elevation would be higher during the wetter months of the year, resulting in an increase in the frequency of spillway operations and/or operating at plant capacity. A summary of the effects on resources from these extended summer pool alternatives is provided in Table 2.

Table 1 Effects on Resources from Extended Reservoir Elevation Alternatives

RESOURCE	SUMMARY OF EFFECT ON HARRIS RESERVOIR	SUMMARY OF EFFECT ON TALLAPOOSA RIVER DOWNSTREAM OF HARRIS DAM
Structures Downstream of Harris Dam	N/A	Additional acres inundated and potentially more structures affected during 100-Year Design Flood if starting reservoir elevation is higher than 789-ft msl
Water Quality	An increase in pool or extension of time at the full pool elevation could raise or keep the thermocline higher in the reservoir for longer compared to baseline.	An increase in elevation of the thermocline over baseline in the reservoir could result in the average temperature of the discharge being lower. This could also result in lower dissolved oxygen in releases from the Project.
Water Use	Increase in pool would mean more water is available during the winter and spring and could help reach full pool in the summer in dry years (e.g., years where the water level is low because of low flow or drought conditions).	No effect
Erosion and Sedimentation	Potential increase in boating in the winter and spring months may result in additional erosion; could increase size of sedimentation areas over time due to decreased "flushing" effect; an increase in sedimentation would also provide "habitat" for aquatic vegetation, some of which may be nuisance aquatic vegetation	Increased potential for scour associated with decreased ability of the reservoir to accommodate high flow events, resulting in an increase in the frequency of spillway operations and/or operating at plant capacity; no effect on sedimentation
Aquatic Resources	Increase in wetted area of reservoir could lead to increased productivity	The decreased ability of the reservoir to accommodate high flow events during the spring months, resulting in an increase in the frequency of spillway

Resource	**Summary of Effect on Harris Reservoir**	**Summary of Effect on Tallapoosa River Downstream of Harris Dam**
		operations and/or operating at plant capacity, could impact spawning sites and spawning behavior.
Wildlife and Threatened and Endangered Species	Increase in shallow littoral habitats	No effect
Terrestrial Wetlands	Could alter composition of existing wetlands and increase their size	No effect
Recreation	Increase in usable structures during February, March, April, October, and November depending on reservoir elevation	Maximum depth of inundation at formal recreation sites would increase; duration of time above baseline ground elevation would decrease (during 100-Year Design Flood if starting reservoir elevation is higher than 789-ft msl)
Cultural Resources	Otherwise exposed cultural resources would be inundated at higher reservoir elevations and less susceptible to water fluctuation, wind erosion, recreational activities, and looting (vandalism), but more susceptible to erosion from variations in currents, general flow pattern fluctuations, and aquatic species nesting activities	Based on the decreased ability of the reservoir to accommodate high flow events during the spring months, results in an increase in the frequency of spillway operations and/or operating at plant capacity; known cultural resources could experience scour and removal of overlying protective vegetation due to increased inundation

References

Alabama Power Company (Alabama Power). 2020. R.L. Harris Hydro Electric Plant Supporting Technical Information Revision 3 – September 2020. Alabama Power Company, Birmingham, AL.