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 Draft Downstream Release Alternatives Phase 1 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[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 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 filed its Harris Project Initial Study Report (ISR) on April 10,2020. Concurrently, and consistent with FERC's April 12, 2019 SPD, Alabama Power is filing the Draft Downstream Release Alternatives Phase 1 Report (Draft Report) (Attachment 1). This filing also includes the stakeholder consultation for this study beginning May 2019 through March 2020 (Attachment 2). Stakeholders have until June 11, 2020 to submit their comments to Alabama Power on the Draft Report. Comments should be sent directly to harrisrelicensing@southernco.com.

Stakeholders may access the ISR, this Draft Report, and other 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.

---

[1] Accession Number 20190412-3000

[2] Accession Number 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

Attachment 1 – Draft Downstream Release Alternatives Phase 1 Report
Attachment 2 – Downstream Release Alternatives Consultation Record (May 2019-March 2020)

cc: Harris Stakeholder List

Attachment 1

Draft Downstream Release Alternatives Phase 1 Report

DRAFT
DOWNSTREAM RELEASE ALTERNATIVES PHASE 1 REPORT

R. L. HARRIS PROJECT

FERC NO. 2628

Prepared by:

ALABAMA POWER COMPANY
BIRMINGHAM, ALABAMA

APRIL 2020

DRAFT
DOWNSTREAM RELEASE ALTERNATIVES
PHASE 1 REPORT

R.L. HARRIS PROJECT
FERC NO. 2628

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

DRAFT
DOWNSTREAM RELEASE ALTERNATIVES
PHASE 1 REPORT

R.L. HARRIS HYDROELECTRIC PROJECT
FERC NO. 2628

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.

Alabama Power began operating the Harris Project in 1983. Initially, the Harris Project operated in peaking mode with no intermittent flows between peaks. Agencies and non-governmental organizations requested that Alabama Power modify operations to potentially enhance downstream aquatic habitat. In 2005, based on recommendations developed in cooperation with stakeholders, Alabama Power implemented a pulsing scheme for releases from Harris Dam known as the Green Plan (Kleinschmidt 2018a). The purpose of the Green Plan was to reduce the effects of peaking operations on the aquatic community downstream. Although Green Plan operations are not required by the existing license, Alabama Power has operated Harris Dam according to its guidelines since 2005. A copy of the Green Plan Release Criteria is provided in Appendix B.

The purpose of the Green Plan was to, within the physical and regulatory limits of the plant and equipment, reduce the effects of various hydropower operations on the downstream aquatic and environmental resources. From 2005 to 2017, the Alabama Cooperative Fish and Wildlife Research Unit (ACFWRU) conducted monitoring of shallow-water fish and benthic macroinvertebrate communities which has indicated a positive fish community response and increased shoal habitat availability (Irwin et al. 2011). 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.

1.1 STUDY BACKGROUND

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 evaluate Green Plan releases compared to the pre-Green Plan peaking flows. Stakeholders also commented that alternative downstream release scenarios should be evaluated as part of the relicensing process. On November 13, 2018, Alabama Power filed ten proposed study plans for the Harris Project, including a study plan for downstream release alternatives. 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.

Alabama Power formed the Harris Action Team (HAT) 1 to evaluate downstream release alternatives in the Tallapoosa River downstream of Harris Dam. Alabama Power held a HAT 1 meeting on September 11, 2019, to discuss the models, the methods, and the model inputs and outputs (how the model will be used) for the Downstream Release Alternatives Study.

Based on stakeholder input, 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[1] (i.e., changing the time of day in which Green Plan pulses are released) on Harris Project resources.

This study is being conducted in two phases. In Phase 1, Alabama Power has used models developed in other Harris Project FERC-approved relicensing 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 each downstream release alternative on other resources, including water quality, water use, erosion and sedimentation (including invasive species),

[1] 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 resources (temperature and habitat), wildlife and terrestrial resources, threatened and endangered species, recreation, and cultural resources. This report describes the results of Phase 1 of this study.

2.0 GEOGRAPHIC SCOPE AND MODEL BOUNDARIES

The FERC-approved geographic scope (i.e., the study area) of this study corresponds with the physical area and/or resources influenced by the proposed operational change, which may or may not be consistent with the Harris Project boundary. The Harris Project operations have direct, indirect, and potential cumulative effects on Harris Lake and downstream Tallapoosa River resources. The area of project influence is the Harris Reservoir and Tallapoosa River downstream of Harris Dam through Horseshoe Bend. Because the Alabama-Coosa-Tallapoosa (ACT) is operated as a system and is set up as such in the various models, the impacts of the release alternatives on operational parameters must be evaluated accordingly. The geographic scope of analyses for each operational parameter for Phase 1 is listed in Table 2-1. Section 2.1 describes the model boundaries, which represent a physical area included in the various models used in the study.

TABLE 2-1 SUMMARY OF OPERATIONAL PARAMETERS, GEOGRAPHIC SCOPE, AND RATIONALE

OPERATIONAL PARAMETER	GEOGRAPHIC SCOPE	RATIONALE
Harris Operating Curve	Harris Reservoir	Effects on Harris Reservoir levels
Hydropower Generation	Alabama Power's Coosa and Tallapoosa Projects	Effects on hydropower generation would impact system-wide operations
Flood Control	Lake Harris and Harris Dam to Montgomery Water Works	Model parameters are set to evaluate flood operation effects to Montgomery Water Works
Navigation	ACT Basin	Model parameters are set to evaluate effects on the ACT Basin per the USACE Master Water Control Manual
Drought Operations	ACT Basin	Model parameters are set to evaluate effects on the ACT Basin per the USACE Master Water Control Manual

2.1 MODEL BOUNDARIES

The following sections describe the ACT river basin as used in the various models used in this study. The ACT network extends from Carters Dam and Allatoona Dam, both upstream of Alabama Power's hydroelectric projects on the Coosa River, and from Harris Dam, on the Tallapoosa River, to the tailwater of Claiborne Lock and Dam on the Alabama River. Regulation in the upper portion of the basin is provided by Carters and Allatoona Dams. The middle of the watershed is represented by eleven Alabama Power hydroelectric projects on the Coosa and Tallapoosa Rivers. The three additional federal projects on the Alabama River were also included where needed in the models.

2.1.1 TALLAPOOSA RIVER

2.1.1.1 HARRIS RESERVOIR

The Harris Reservoir extends up the Tallapoosa River 29 miles from Harris Dam, which is located at River Mile (RM) 136.7 of the Tallapoosa River, with an arm also extending up the Little Tallapoosa River. There are no other major impoundments upstream of Harris Dam. There are two operating United States Geological Survey (USGS) gages upstream of Harris Dam. The Heflin gage (No. 02412000; located approximately 26 miles upstream of Harris Dam) has sixty-eight years of discharge and stage data. The Newell gage (No. 02413300; located 35.5 river miles upstream of the confluence of the Little Tallapoosa and Tallapoosa Rivers) has forty-five years of daily average discharge and stage data. Harris Reservoir receives inflows from approximately 1,454 square miles of drainage.

2.1.1.2 HARRIS DAM TO MARTIN POOL

The Tallapoosa River below Harris Dam (RM 136.7[2]) is an upper basin type stream with steep slopes and narrow floodplains that include rapids. It also contains two currently operating USGS gage sites, the Wadley (No. 02414500; RM 122.79) and Horseshoe Bend (No. 02414715; RM 93.7) gages. The Wadley gage has ninety-seven years of daily flow and stage data and Horseshoe Bend has thirty-five years of daily flow and stage data. The stream channel is characterized by rock outcrops and a few sand bars. The stream is crossed by four highway bridges and two railroad bridges. The most populated community along this reach of the Tallapoosa River is the City of Wadley at RM 122.97. This free-flowing reach of the Tallapoosa River ends at the Martin Dam Project (FERC No. 349) reservoir near RM 88.0.

---

[2] River miles in this report are consistent with the georeferenced locations in the models used for the study. This resulted in slightly different river mile values than were referenced in the Harris PAD, which were based on USACE stream mileage tables.

2.1.1.3 Martin Reservoir

The Martin Reservoir ranges from RM 88 to the Martin Dam at RM 60. The primary purpose of Martin Dam is hydropower generation. The Martin Reservoir receives inflows from the Tallapoosa River, representing 2,131 square miles of drainage, and local inflows from an additional 853 square miles of tributaries that flow directly into the lake.

2.1.1.4 Yates and Thurlow Reservoirs

The Yates and Thurlow Project (FERC No. 2407) Dams impound the Tallapoosa River from RM 60 to RM 49.7, with the Yates pool backing up to the toe of Martin Dam. Thurlow Dam is the most downstream dam on the Tallapoosa River. These dams are located at the base of the fall line of the Tallapoosa basin. These reservoirs provide very minimal storage and simply generate power from releases at Martin Dam along with local inflows and are operated at constant levels, except during major floods. During some periods, the local inflows to these lakes are sufficient to satisfy downstream minimum flow requirements. Yates Reservoir receives inflows from approximately 3293 square miles of drainage and Thurlow Reservoir receives inflows from approximately 3308 square miles of drainage.

2.1.1.5 Lower Tallapoosa River

The reach of river below Thurlow Dam is a free-flowing system that enters the alluvial plain with widening floodplains and much flatter slopes. This reach of the Tallapoosa River contains approximately forty-nine miles of stream and is crossed by at least three major road bridges. Alabama Highway 229 crosses at RM 39.8; a county road bridge crosses the river at RM 18.5; and U.S. Highway 231 crosses the river at RM 9.8 and is a four-lane highway. Three USGS gage sites have data on this reach. The Tallassee (RM 47.98) gage (No. 02418500) is approximately one mile downstream of Thurlow Dam. The Milstead gage (No. 02419500) is located on the Alabama Highway 229 Bridge (RM 39.8), and the most downstream gage on the Tallapoosa River is located at the Montgomery Water Works plant (No. 02419890) at RM 12.9. A major pipeline crosses the river at RM 48.99 and the reach from the tailwaters of Thurlow to just below the pipeline remains relatively steep. The entire Tallapoosa River basin is approximately 4,687 square miles.

2.1.2 ALABAMA AND COOSA RIVERS

The Tallapoosa and Coosa Rivers merge near Montgomery to form the Alabama River. Drainage area of the Coosa, at its mouth, is approximately 10,161 square miles and the Tallapoosa is 4,675 square miles at its mouth. Therefore, the Coosa River has the greatest influence on the total flows in the Alabama River with 68 percent of the drainage area. Flows from the Coosa enter the Alabama River from two sources, Jordan and Bouldin Dams. Jordan Dam was constructed on the mainstem of the Coosa River and Bouldin Dam is a diversion lake with hydroelectric power facilities that simply draw flows from Jordan Reservoir. Jordan Dam is 19 miles upstream of the confluence of the Coosa and Tallapoosa rivers. The Alabama River flows from Montgomery west to converge with the Tombigbee River forming the Mobile River. The USACE's Robert F. Henry Lock and Dam on the Alabama River at RM 245.4, is located approximately 69 miles downstream of the confluence of the Tallapoosa and Coosa Rivers. Two USGS gages are located on the Alabama River in this 69-mile reach. These gages are identified as the "near Montgomery gage" (No. 02420000) at RM 287.7 and the "Montgomery gage" (No. 02419988) at RM 296.9.

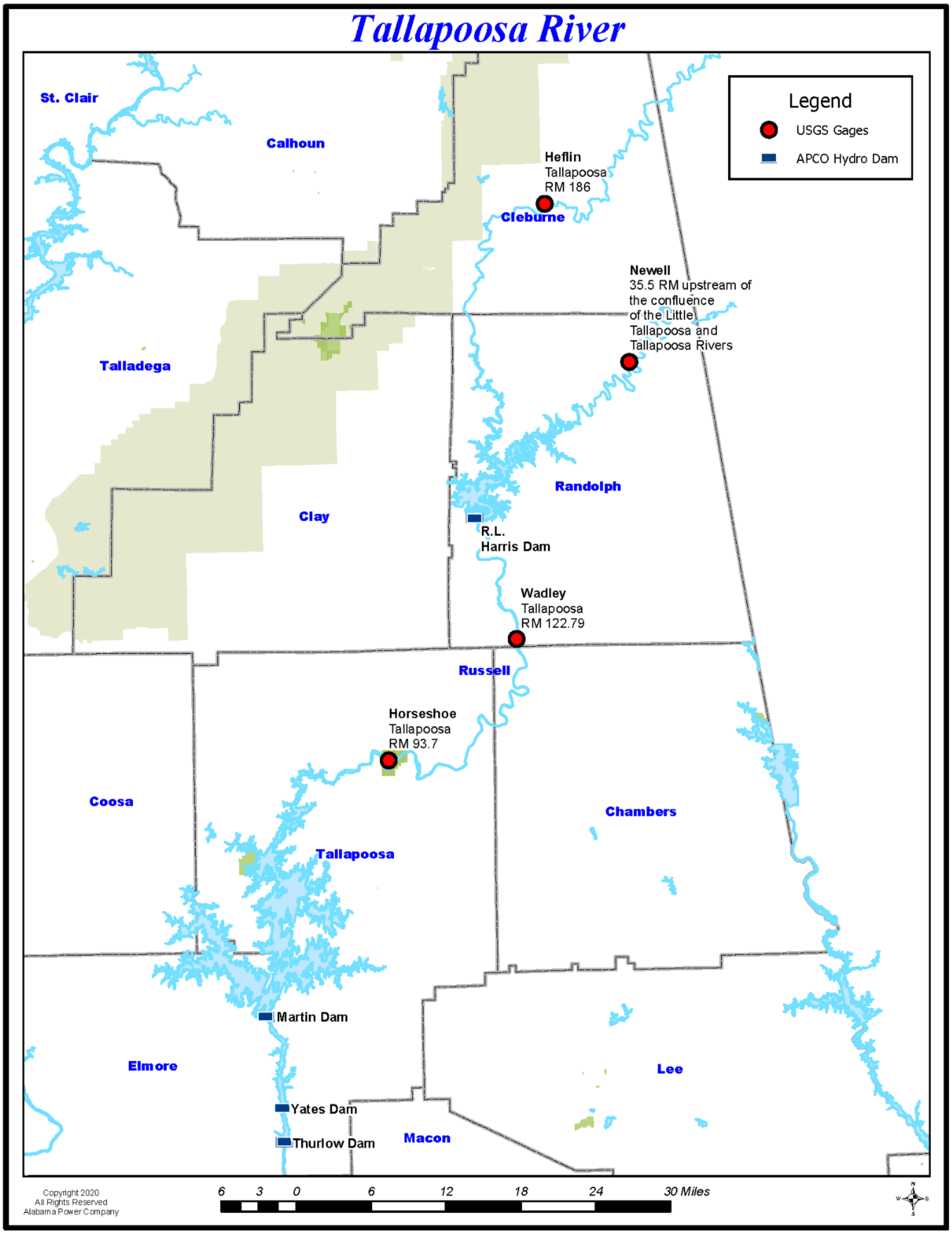


FIGURE 2-1 TALLAPOOSA RIVER MAP

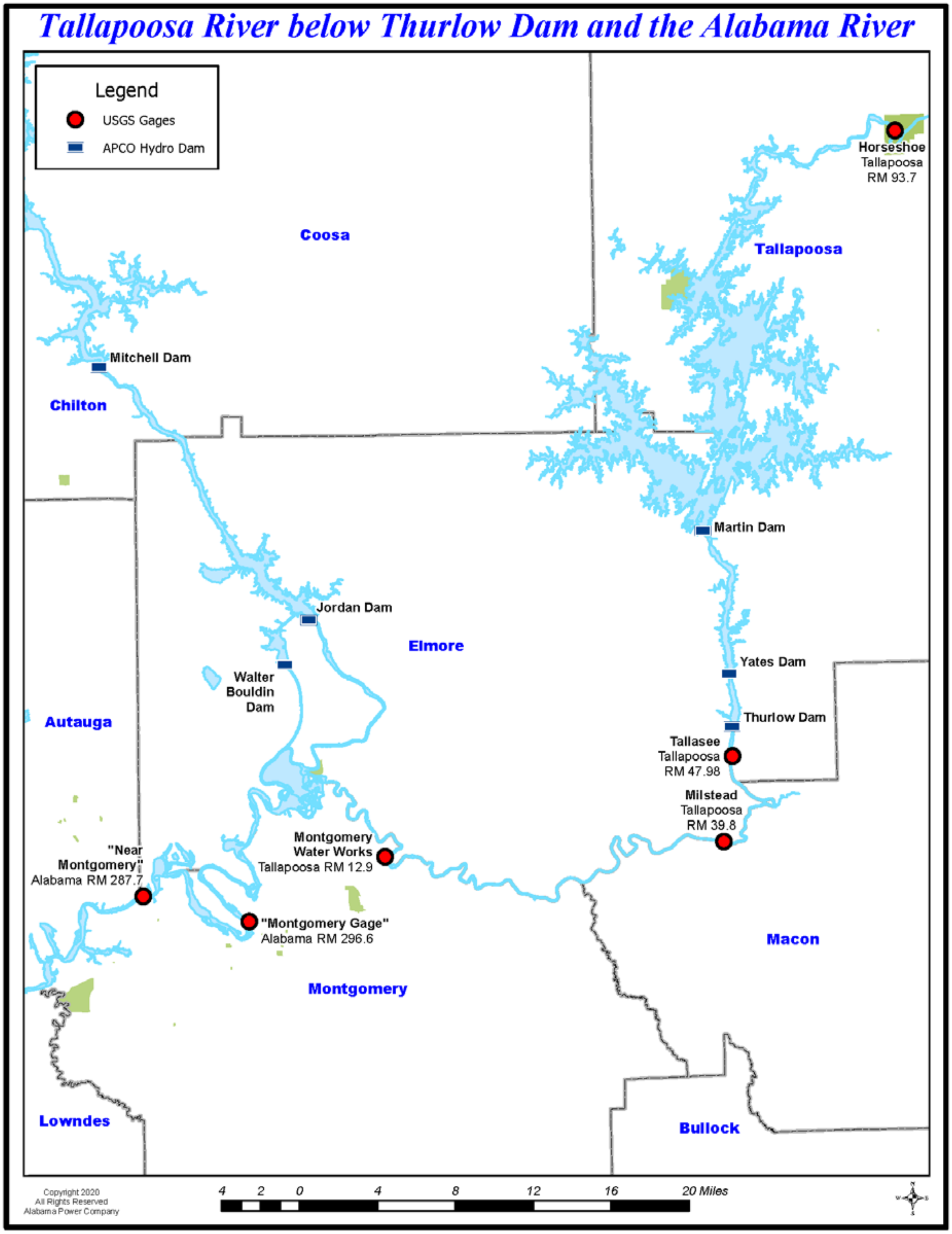


FIGURE 2-2 MAP OF THE TALLAPOOSA RIVER BELOW THURLOW DAM AND THE ALABAMA RIVER

3.0 MODEL SUMMARY

3.1 OVERVIEW

Study methods included using existing data (hydrologic record and baseline information) in order to develop the appropriate simulation models to conduct the analysis of the downstream release alternatives. The primary tool for this study is HEC-River Analysis System (HEC-RAS); however, Alabama Power used other HEC models to address the effects of downstream release alternatives.

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

Alabama Power used the following data and models to conduct the analysis of the downstream release alternatives.

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. The unimpaired flow data set that served as a basis for the 2010 critical yield analysis for the ACT Basin included data for the period from 1939 through 2008. Subsequently, the unimpaired flow dataset has been extended through 2011[3]. This dataset includes average daily flows from 1939 – 2011 with regulation influences removed.
2) Other data – Other data sources include daily and hourly USGS, USACE, and Alabama Power records.

Models

1) HEC-River Analysis System (HEC-RAS) – This hourly time step model was used to route flows in the unsteady state[4] along the river. This model will be used to assess effects of alternative release scenarios on boatable days, wetted perimeter, and temperature. During Phase 2, model inputs will also include data from other ongoing studies.

[3] 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] In hydraulic modeling, simulations run in the unsteady state consider the variance of flow with respect to time.

2) HEC-ResSim – This model was used, on a daily timestep, to evaluate the ability of Alabama Power to maintain the operating curve at the Harris Reservoir under the various downstream release alternatives. In Phase 2 of this study, this model will look at, if applicable, operational changes at the Harris Project in conjunction with operating curve changes on an hourly timestep. It will focus on the hourly flood study operations. This model, in conjunction with the HEC-RAS model, will show impacts, if applicable, to the Martin Dam Project operations.
3) 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.
4) Alabama Power Hydro Energy (HydroBudget) Model – This model is a proprietary daily model that is used to evaluate the net economic gains or losses that could result from downstream flow alternatives at the Harris Project.

4.0 MODEL DEVELOPMENT

The respective models summarized in Section 3.0 were developed to analyze the impacts of the downstream release alternatives on operational parameters and other resources. This section discusses how the models were developed, calibrated, and/or verified.

4.1 DATA SOURCES AND DESCRIPTIONS

4.1.1 HYDROLOGIC DATA

Hydrologic data was collected in the form of stream flow historic records at established gage sites. This included Alabama Power's records of releases from its dams, the ACT unimpaired flow data, and USGS published flow records at its established gage sites. Due to the extensive stream gage data, determination of runoff hydrographs from rainfall records was not necessary. For long term evaluations, average daily flows primarily from the ACT unimpaired flow data were utilized; and, for short term evaluations, hourly flows were used. 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.

4.1.2 HYDRAULIC DATA

Hydraulic data consisted of stream gage historical stage records, highwater marks during flood events, spillway and gage ratings at the dams, and gate operation schedules for the respective structures. Seasonal reservoir levels for Harris and Martin were represented by the published flood control guide curves.

4.1.3 TOPOGRAPHIC AND GEOMETRIC DATA

Channel geometry of the streams used in the HEC-RAS model was represented by surveys of channel cross sections at selected sites. Bathymetry data from RM 136.7 to RM 123.0 was collected by survey during two different field efforts in 1999 and 2003. The 1999 surveying effort was completed by Sublett Surveying, LLC and extended from RM 136.7 to RM 130. The 2003 surveying effort was completed by Alabama Power and extended from approximately RM 130 to RM 123. Trutta Environmental Solutions collected bathymetry data for the reach of the Tallapoosa between Wadley and the Martin reservoir in 2019 using two different survey methods. In areas with sufficient depth for boating, a Global Positional System (GPS)/Global Navigation Satellite System (GNSS) rover antenna (Trimble R10) mounted above an 200 kHz echosounder (CEE-LINE, CEE Hydrosystems) was mounted to a kayak and used to collect river bottom elevations at 1-second intervals as the surveyor paddled in a path across the river channel perpendicular to the flow. In areas where there was insufficient depth for boating, the GPS/GNSS rover antenna was mounted on a 2-meter survey rod and river bottom elevations were collected manually at approximately 10-foot intervals in a path across the river channel perpendicular to the flow. The average horizontal and vertical accuracy of these survey data was 0.08 feet and 0.15 feet, respectively. A total of 120 bathymetric cross sections between Wadley and the Martin reservoir were surveyed. Additionally, in January 2006, Alabama Power contracted Lasermap Image Plus to collect LiDAR and imagery for the reach of the Tallapoosa River from just below Tallassee to the Montgomery Water Works, and, in 2018, contracted EagleView to collect LiDAR and imagery for the Tallapoosa River downstream from Harris Dam through Horseshoe Bend.

In HEC-RAS, cross sections were drawn along the river at each location where a bathymetric cross section was collected. The data from the bathymetric cross section was imported into the model for each cross section, and LiDAR data was used for areas outside of the stream channel. Combining both datasets provided accurate representations of the terrain for the entire cross section. Dimensions of the four highway bridges spanning the Tallapoosa River between Harris Dam and Martin Reservoir were obtained from engineering drawings from the Alabama Department of Transportation. Drawings for a railroad bridge located at RM 120.9 were not available; thus, its dimensions were estimated using aerial photos and LiDAR data.

4.2 HEC-RESSIM DAILY MODEL

The ACT HEC-ResSim model was initially developed in conjunction with USACE to replace the HEC-5 model of the basin. To calibrate the HEC-ResSim model, the HEC office and USACE Mobile District entered conditions from 1977, 1995, and 2006 in both HEC-ResSim and HEC-5. Adjustments were made to the model and network until the ResSim model was able to reproduce the HEC-5 results. Working with the USACE Mobile District and HEC office, a reservoir network was developed that contained current physical and operational rules for each project in the ACT basin. The ACT reservoir network, described in Section 2.0, was further refined during the recent WCM update process. Version 3.4.1 of HEC-ResSim was used to simulate the current operations, providing a baseline condition in the model.

The ACT unimpaired flow database was used for flow data from 1939 through 2011[5]. These data include inflow and diversions for junctions in the network, along with evaporation for each reservoir. A daily time step was used in the model, which limits some operational flexibility when compared to an hourly model but allows for many alternatives to be evaluated over a long simulation period.

Harris Dam is modeled in HEC-ResSim with both a minimum requirement and a maximum constraint at the downstream gage at Wadley. This maximum limit can be exceeded when Harris Reservoir is in flood control operations and follows the induced surcharge function. There is also a minimum release requirement based on the flow at the upstream gage of Heflin. A power generation rule applies during normal and flood operations. The project is operated in tandem with the downstream reservoir, Martin, for minimum flow operations when the pool is not being operated for flood control.

4.2.1 Operational Features

4.2.1.1 Minimum Flow Operations

The reservoir network defined by the Mobile District and Alabama Power includes the current operations for all the reservoirs in the basin as best captured by a daily model. Downstream flow requirements were included in the network. To meet these requirements, the storage projects on each river act as a system. On the Tallapoosa River, Harris and Martin work in tandem to provide the Thurlow minimum flow requirement. On the Coosa River, Logan Martin, in tandem with Weiss and H. Neely Henry developments, operates through the run-of-river reservoirs to meet the flow requirement at Jordan Dam. For each of these river systems, the projects release water based on maintaining an approximately equal percentage of available storage at each project. The downstream flow requirement does include the intervening flows between the storage project discharge and the flow requirement location so that reservoir releases may be less than the measured downstream required flows.

[5] 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.

The minimum flow requirement at Thurlow is included in the model as an operational rule at Martin, which Harris also supports by operating in tandem with Martin. This is because Yates and Thurlow are entered as flow-through projects with no operational rules, that is, the flow that enters the project also exits. The flow rule is programmed to allow a cutback during drought conditions. Depending on the month and drought intensity, the minimum flow requirement ranges from 1,200 cfs to 350 cfs. Flows at the Tallassee gage were found to meet or exceed 350 cfs for the entire period of record.

There are two minimum flows modeled at Harris Dam - a minimum flow of 45 cfs at Wadley and a release based on the previous day's Heflin flow, representing the Green Plan. The downstream minimum flow at Wadley is met with a with a flow rule of 45 cfs measured at Wadley throughout the entire year. The Green Plan is represented by a daily minimum release from Harris Dam based on the previous day's flow at the Heflin gage. The required release ranges from 85 cfs, when Heflin flows are less than 50 cfs, to 1,067 cfs, when Heflin flows are 900 cfs or higher. The Green Plan does include provisions for cutbacks in releases during periods of drought.

4.2.1.2 Drought Operations

The Alabama-ACT Drought Response Operations Plan (ADROP) provides for three incremental drought intensity level responses based on the severity of drought conditions in the basin. The drought intensity level (DIL), ranging from 0 to 3, is based on three triggers – basin inflow, state line flows, and composite storage.

- The basin inflow computation differs from the navigation basin inflow, because it does not include releases from Allatoona Lake and Carters Lake.
- A low state line flow trigger occurs when the Mayo's Bar USGS gage (Gage No. 02397000) measures a flow below the monthly historical 7Q10[6] flow.
- Low composite conservation storage occurs when the Alabama Power projects' composite conservation storage is less than or equal to the storage available within the drought contingency curves for the Alabama Power reservoirs.

These thresholds are evaluated on the 1st and 15th of every month in the model. The DIL increases as more of the drought indicator thresholds (or triggers) are met. The ADROP matrix

[6] The lowest 7-day average flow that occurs, on average, once every 10 years.

defines monthly minimum flow requirements for the Coosa, Tallapoosa, and Alabama Rivers as function of DIL and time of year. Such flow requirements are modeled as daily averages. The storage volumes in the Alabama Power Coosa and Tallapoosa projects are balanced to support this release. Once a drought operation is triggered, the DIL can only recover from drought condition at a rate of one level per period.

4.2.1.3 Navigation Operations

Navigation operations in HEC-ResSim are based on basin inflows and the historical average storage usage from Alabama Power projects during a given month. Releases are made from Alabama Power projects on the Coosa and Tallapoosa Rivers, along with local inflow, in order to provide the navigation flows in the model. Basin inflow targets are designed to provide channel depths of 9.0 ft and 7.5 ft in the Alabama River below the Claiborne Lock and Dam. If a 9.0 ft channel cannot be made available due to inflows, a 7.5 ft channel is attempted, which would allow light loaded barges to move through the system. If basin inflows do not support a 7.5 ft channel, navigation releases are suspended. During drought operations, releases to support navigation would be discontinued until the DIL is equal to zero.

4.2.1.4 Flood Control Operations

The flood control procedures in the 1972 agreement between the USACE and Alabama Power referenced in Article 13 of the existing Harris license are incorporated into the daily HEC-ResSim model. The flood control zone is defined as the area below the top of the dam and above the operating curve, ranging from 785 ft to 793 ft depending on the date. The elevation 790 ft serves as a transition elevation for flood control operations. When the reservoir elevation is above the operating curve and below 790 ft, Harris is operated to keep the Wadley gage at or below a stage of 13.0 ft, with a maximum release of 13,000 cfs. If the pool elevation exceeds 790 ft and the operating curve, releases are 16,000 cfs or greater if determined by induced surcharge curves. The 45 cfs minimum flow at the Wadley site and power operations are included in the flood control operating zone.

4.2.1.5 Spillway Operations

The spillway at Harris is included in the HEC-ResSim model to capture releases from the project that exceed the turbine capacity. With the Harris flood control procedures and spillway characteristics in the daily model, spill frequency and duration can be determined. Although there is a slight underestimation of the frequency of spill (0.5 percent difference), HEC-ResSim satisfactorily models the flood control operations at Harris.

4.2.1.6 Hydropower Operations

A power guide factor was used in the HEC-ResSim model to simulate the existing generation at Harris. The power guide factor relates plant factors to the percentage of power storage remaining in the reservoir. The factors represent the hours of generation per day as a function of the remaining power storage. With full power storage available, Harris is programmed to generate 3.84 hours per day. The power guide factor creates a zone for utilizing hydropower and is comparable to the zone between the existing operating guide curve and the drought curve. Generation is employed after all flow requirements have been met.

4.3 Harris-Martin HEC-RAS Model

As part of Phase 1, Alabama Power developed a HEC-RAS model. This model will be used during Phase 2 of the study to assess downstream impacts.

The USACE HEC-RAS software was used to develop a hydraulic model of the Tallapoosa River from immediately downstream of Harris Dam (RM 136.7) to Martin Dam (RM 60). Significant updates were made to the Tallapoosa HEC-RAS model in 2017 with, at a minimum, version 5.0.4 of HEC-RAS. Further revisions to the model were made in 2019 using the most recent version of the software, version 5.0.7.

4.3.1 HEC-RAS Model Geometry

The 2017 model was comprised of 306 1-dimensional (1D) cross sections and 6 storage areas. The storage areas were those that can backwater during flood conditions, allowing for out-of-river storage of flood waters. In the HEC-RAS model software, storage areas are represented by stage-storage relationships. The 1D cross sections included the bathymetric data collected in 1999 and 2003 for RM 136.7 to RM 123.0; however, all other cross section bathymetry downstream of RM 123.0 only had an estimated thalweg elevation and an assumed trapezoidal or triangular shape. All cross sections' overbank areas out of the river had elevation data based on coarse USGS digital elevation model (DEM) raster data.

The 2019 model geometry incorporated the recently acquired terrain data and bathymetry. As discussed in Section 4.1.3, Trutta collected bathymetry data in 2019 from RM 123.0 to RM 88.0, which, in addition to the 1999 and 2003 data, provided bathymetry from the tailwater of Harris Dam (RM 136.7) to the beginning of the Martin Pool (RM 88.0). The original cross sections between RM 123.0 and RM 88.0 were removed and replaced with new cross sections placed at each of the locations where bathymetric cross sections were surveyed in 2019. The cross sections located between RM 136.7 and RM 123.0 had bathymetric data from the previous surveys and were not removed. However, the overbank areas outside of the river channel were resampled using the LiDAR data collected in 2006 to replace the less detailed USGS DEM data for all cross sections. Artificial cross sections were interpolated between the surveyed cross sections as needed to provide adequate model stability. When cross sections were interpolated, the bathymetric data within the banks of the channel was retained but the overbank terrain was updated to match the actual overbank terrain under the interpolated cross section. This was done because the bathymetry between the surveyed cross sections was unknown and interpolating between known data was a reasonable assumption, but the overland data was available from the LiDAR and did not need to be interpolated. The final geometry with all the newly surveyed and interpolated cross sections included a total of 436 cross sections.

In addition to the changes to the cross sections, two of the storage areas located between RM 136.7 and RM 88.0 were replaced with 2-dimensional (2D) mesh areas and additional 2D mesh areas were added in areas that can backwater during floods. The 2D mesh areas perform the same function as the storage areas, which is to allow for flood waters to be stored outside of the main river during floods. However, unlike storage areas, 2D meshes are composed of many cells in a connected grid with attribute data obtained from the terrain data underlying the cells. Because the storage areas are represented by stage-storage relationships, any water contained within a storage area can immediately flow back into the river no matter how large the storage area is. Unlike storage areas, the model computes the flow into and out of each cell in each 2D mesh as the river rises and falls, and water flowing into the mesh takes time to travel out of the mesh back into the river, which more accurately simulates flood routing. Due to the improved resolution of the LiDAR data that was available, the total number of offline storage where 2D meshes were used between RM 136.7 and RM 88 was 25. The 4 remaining storage areas included in the geometry are located downstream of RM 88.0 where LiDAR data was not available.

The model includes 4 highway bridges and 1 railroad bridge spanning the Tallapoosa River. Data for the 4 highway bridges was obtained from drawings provided to Alabama Power by the Alabama Department of Transportation. Data for the railroad bridge was obtained by examining aerial imagery and the LiDAR data.

4.3.2 HEC-RAS Model Calibration

Historical flow and stage data were available from the two USGS streamflow gages between the Harris Dam and start of the Martin Pool; the gage at Wadley (RM 122.79) and the gage at Horseshoe Bend (RM 93.7). Stage-discharge rating curves for the gages were obtained from the USGS website for comparison with the model results. An unsteady state rating curve flow plan was created in the HEC-RAS model that increased flow in the river from 2,000 cfs up to approximately 80,000 cfs, which provided stage data for flows in that range at the two USGS gage locations. Model calibration was completed by adjusting the Manning's roughness values in the channel and overbanks until the model matched the historical data as closely as possible over the range of flows modeled, and flow roughness factors were used to adjust the selected Manning's values in the river with flow, since roughness typically decreases as flow increases. The HEC-RAS model results of flow versus stage at the USGS gage locations for the calibration are plotted against the historical flow versus stage data of the gages and shown in Figures 4-1 and 4-2.

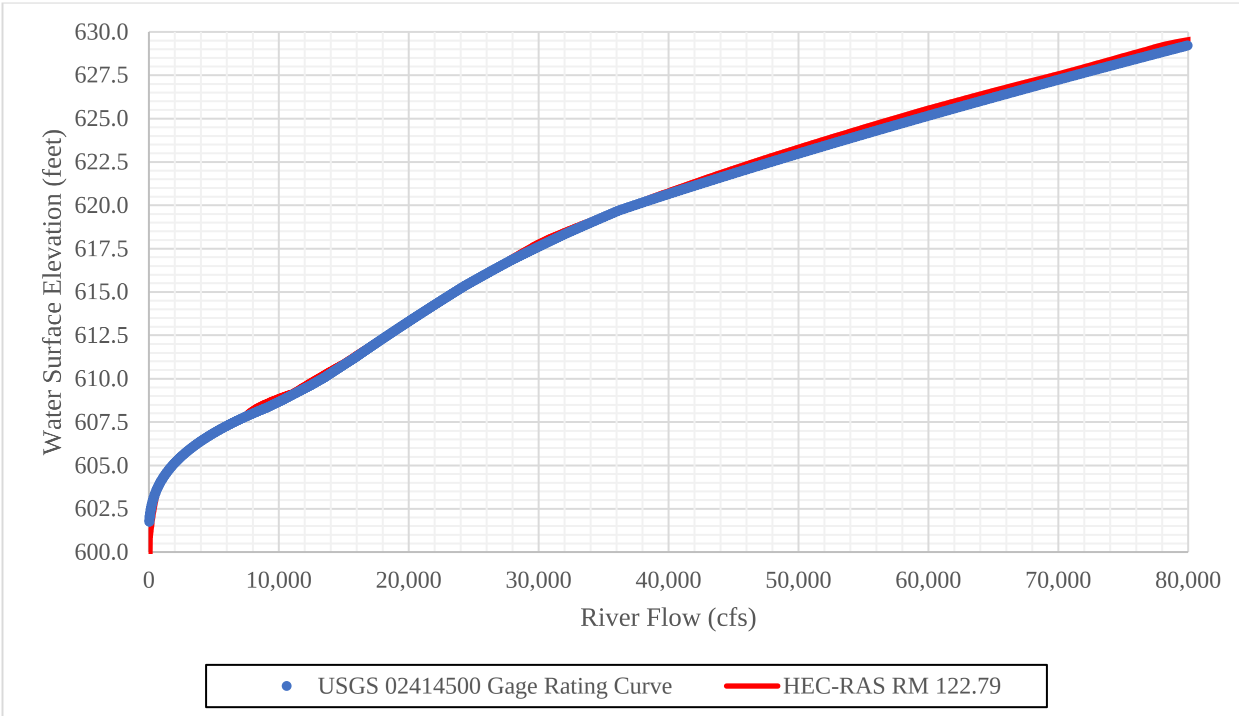


FIGURE 4-1 HARRIS-MARTIN HEC-RAS MODEL RESULTS VERSUS USGS WADLEY GAGE NO. 02414500

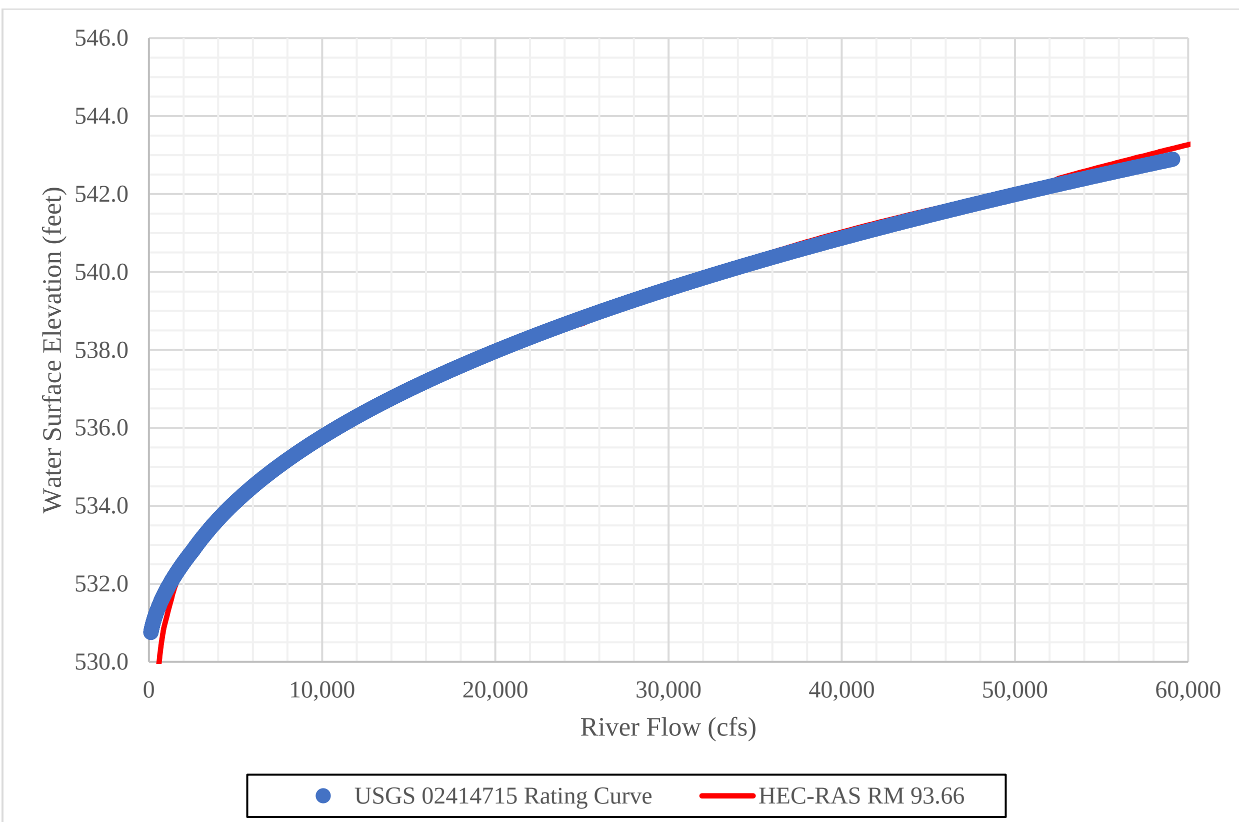


FIGURE 4-2 HARRIS-MARTIN HEC-RAS MODEL RESULTS VERSUS USGS HORSESHOE BEND GAGE NO. 02414715

4.3.3 MODEL FLOW DATA

Based on analysis of the unimpaired flow dataset, 2001 was selected as a "normal" water year as inflows to the Harris Project were closest to the median, and hourly flow data was available for that year. Since 2001 pre-dated Green Plan implementation, hourly discharge records for Harris Dam were used to model the Pre-Green Plan scenario. The Green Plan scenario was created by applying existing Green Plan rules to the Pre-Green Plan releases. 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. Figure 4-3 shows a portion of all three annual hydrographs, showing the general differences between the three different outflows from Harris Dam (the entire year is not shown because it is not possible to identify three different curves with so much data displayed).

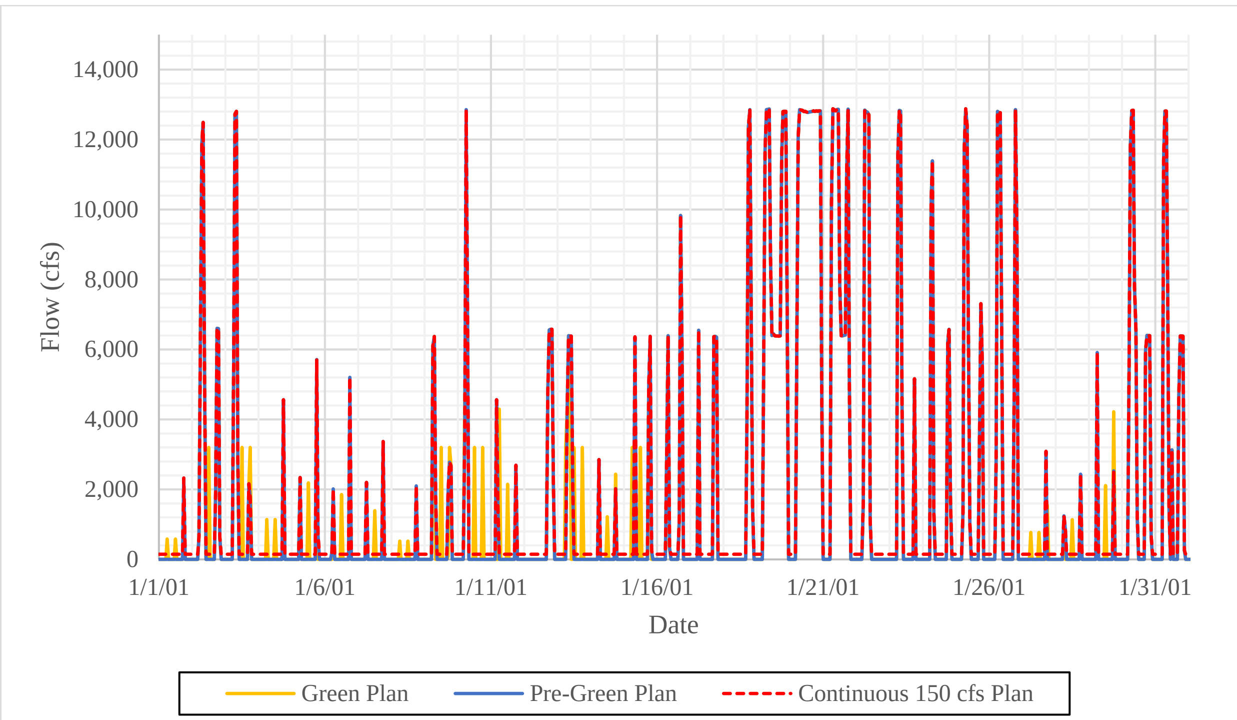


FIGURE 4-3 HARRIS DAM DISCHARGES

For all three downstream alternatives simulations, the flow data input to the model domain included the following:

- An inflow hydrograph to the Tallapoosa River at the upstream end of the model (RM 136.7) from the Harris Dam (described above);

- A uniform lateral inflow hydrograph added to the river between RM 136.6 and RM 122.7, which represented the intervening flow from the watershed between Harris Dam and the USGS gage at Wadley; and

- A uniform lateral inflow hydrograph added to the river between RM 122.7 and RM 93.7, which represented the intervening flow from the watershed between the USGS gage at Wadley and the USGS gage at Horseshoe Bend.

Data for the intervening flow hydrographs was obtained from the two USGS gages for the year 2001. Data were available in 15- and 30-minute measurements at Wadley and Horseshoe Bend, respectively, which were resampled to 1-hour measurements to match the Harris Dam discharges. The intervening flow for the watershed between the dam and the Wadley gage was determined by subtracting the Pre-Green Plan flows from Harris Dam from the discharge measured at the Wadley gage. Review of historical data found that there is an approximately 3-hour lag between the time that flow leaves Harris Dam and arrives at Wadley and was accounted for in determining the intervening flow. The intervening flow between the Wadley USGS gage and the Horseshoe Bend gage was determined by subtracting the historical Wadley flows from the flows measured at Horseshoe Bend. Review of the historical data found that there is an approximately 7-hour lag between flows leaving Wadley and arriving at the Horseshoe Bend gage. The lag time was accounted for in the determination of the intervening flow. All three downstream release alternatives hydrographs are very similar; therefore, the same intervening flows were used for the three alternatives. Figure 4-4 shows a portion of the intervening flow hydrographs at Wadley and Horseshoe Bend (the entire year is not shown because it is not possible to identify the different curves with so much data displayed).

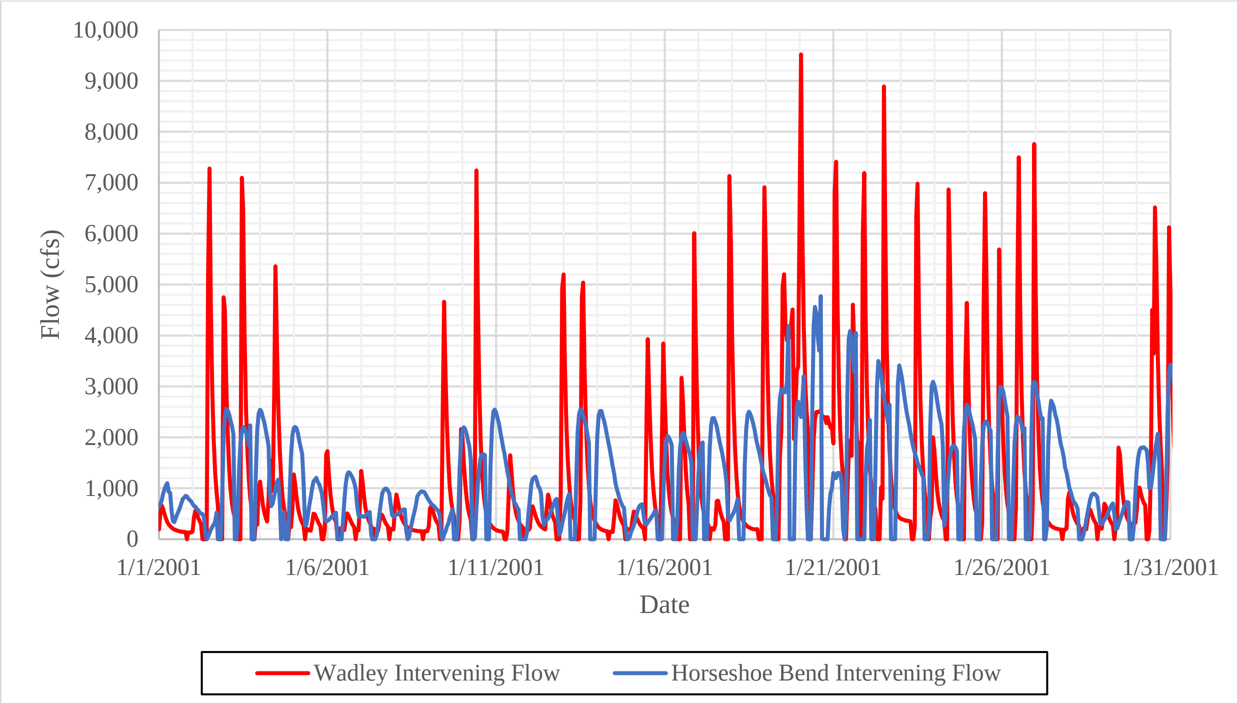


FIGURE 4-4 WADLEY AND HORSESHOE BEND INTERVENING HYDROGRAPHS

4.3.4 MODEL LOGIC AND OPERATION

All simulations were computed using the unsteady flow analysis in the HEC-RAS model. The simulation modeled 365 days of real time based on the data for the year 2001. The computational timestep was 3 minutes, which provided model stability and accuracy. Data was output from the model at an hourly timestep.

The upstream model boundary is located at RM 136.7, immediately downstream from the Harris Dam, and is an inflow hydrograph as described in Section 4.3.3. All 2D mesh areas did not have any storage volume initially, however, the 4 storage areas that are located in the Martin pool between RM 88.0 and RM 60 required an initial storage and were set to elevation 490.5 feet msl to match the downstream stage hydrograph. Two uniformly distributed lateral inflow hydrographs were included as described in Section 4.3.3. The downstream model boundary of the model is located at RM 60.8. For all simulations, a constant stage hydrograph equal to elevation 490.5 feet msl was used, which is the normal operating elevation in the Martin Pool.

4.4 HYDROBUDGET MODEL

The HydroBudget Model is an analytical daily model for the determination of power production and its value by simulating actual reservoir operation. By using the HydroBudget model rather than actual generation records, Alabama Power has developed an accurate estimate of annual generation under existing conditions (baseline) to which alternatives can be compared. The model assumes that all dams are in place for the 1940-2018 period of record.

FERC has recognized the validity of this HydroBudget Model approach in estimating annual generation by accepting this method in the context of Alabama Power's relicensing of the Yates and Thurlow Project (P-2407) in the early 1990's. Alabama Power has submitted the same method to evaluate the changes for the recent Martin Relicensing.

The parameters for the model include turbine discharge ratings and efficiencies, generator efficiencies, head loss, and operating guidelines. In addition, hourly power system marginal costs (lambdas) are used to calculate the most valuable use of inflows. There are no specific power requirements; therefore, when there is flow available the model will stay on the flood control guide curves. To meet flow targets downstream, Martin and Logan Martin, in tandem with the other Alabama Power storage projects, are operated as a system. This operation allows for a balanced contribution from the Tallapoosa and Coosa rivers.

5.0 RESULTS

5.1 HARRIS RESERVOIR ELEVATIONS

Because each downstream release alternative uses the same daily volume of water as current operations, there is no effect on the ability of Alabama Power to maintain the operating curve at the Harris Reservoir.

5.2 HYDROPOWER GENERATION

Alabama Power's HydroBudget model was used to evaluate the energy produced and value related to pre-Green Plan and Green Plan downstream release alternatives. Each alternative was evaluated to determine the economic impact (loss or gain) to Alabama Power customers from a hydropower generation perspective. Using the 2018 system lambdas, returning to Pre-Green Plan operations would result in an approximate $357,000 average annual economic gain to Alabama Power customers from a hydropower generation perspective. This economic gain results 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, it can be assumed that 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. If the 150 cfs minimum flow is provided through a generation mechanism, there may be a slight economic gain from a hydropower generation perspective compared to Green Plan operations due to efficiency gains. Note that HydroBudget does not evaluate capital and O&M costs, which could be considerable for any additional generating or non-generating mechanism needed to provide a 150 cfs minimum flow. Additional capital and O&M costs associated with such measures will be considered in other economic analyses required by the relicensing process.

5.3 FLOOD CONTROL

The downstream release alternatives were modeled with the current USACE-approved flood control procedures that are incorporated into the daily HEC-ResSim model. The operational rules for flood control prescribe maximum releases from the reservoir based on the date and pool elevation. Modifying the downstream releases would not impact this operation.

5.4 NAVIGATION

Navigation levels are triggered by inflow for the ACT basin. The required basin inflow to support each navigation channel depth includes a volume historically contributed by the storage projects on the Coosa and Tallapoosa Rivers and USACE's assumptions for dredging the navigation channel in the Alabama River. Altering the downstream releases at Harris would not impact this trigger. Therefore, there is no impact to the number of days over the period of record that each alternative would support navigation releases under each of the downstream release alternatives.

5.5 DROUGHT OPERATIONS

Alabama Power evaluated how drought operations may be positively or adversely affected by the downstream release alternatives. Because each alternative uses the same daily volume of water as current operations, there is no effect on ADROP. Two of the three triggers in ADROP are based on factors independent of Harris Reservoir, basin inflow, and state-line flows. The impact of the release alternatives to the volume of water in the Harris reservoir is negligible with respect to the third ADROP trigger, basin-wide composite storage. There is no change in the percentage of time spent over the period of record in each DIL.

6.0 CONCLUSIONS

Alabama Power will use the information in this report and the HEC-RAS model to complete Phase 2 of the Downstream Release Alternatives Study Plan (Table 6–1)[7]. The modeling results combined with other environmental study analyses will result in a final recommendation from Alabama Power on any downstream release at Harris.

The Phase 1 modeling resultsindicate that Pre-Green Plan, Green Plan, and 150 cfs minimum flow have no effect on Harris Reservoir levels, flood control, navigation, or drought (ADROP) operations. Because the mechanism for providing a 150 cfs minimum flow has not been determined at this point, it is unclear at this point what, if any, impacts to hydropower generation may occur.

TABLE 6-1 PHASE 2 RESOURCE IMPACTS ANALYSIS METHODS

Resource	Method
Water Quality	• HEC-RAS model • Existing information – Water Quality Baseline Report • Results from the FERC-approved Water Quality Study • Qualitatively evaluate potential effects on dissolved oxygen in the tailrace
Water Use	• HEC-RAS model • Existing information - Water Quantity, Water Use, and Discharges Report
Erosion	• HEC-RAS model • FERC-approved Erosion and Sedimentation Study (erosion portion only) • LIDAR, aerial imagery, historic photos
Aquatic Resources	• HEC-RAS model • HEC-RAS to evaluate effects on wetted habitat • HEC-RAS to evaluate effects on water temperature in the Tallapoosa River below Harris Dam • FERC-approved Downstream Aquatic Habitat Study • FERC-approved Aquatic Resources Study
Wildlife and Terrestrial Resources - including Threatened, and Endangered Species	• HEC-RAS model • FERC-approved Threatened and Endangered Species Study

[7] The geographic scope for Phase 2 is defined in the FERC SPD.

Resource	Method
Recreation Resources	• HEC-RAS model • FERC-approved Recreation Evaluation Study • Existing information on boatable flows
Cultural Resources	• HEC-RAS model LIDAR, aerial imagery, and expert opinions

7.0 REFERENCES

Irwin, E.R. and T.P. Goar. 2015. Spatial and temporal variation in recruitment and growth of Channel Catfish, Alabama Bass, and Tallapoosa Bass in the Tallapoosa River and associated tributaries. U.S. Department of Interior, Fish and Wildlife Service, Cooperator Science Series FWS/CSS-116, Washington, D.C.

Kleinschmidt Associates. 2018a. Summary of R.L. Harris Downstream Flow Adaptive Management History and Research. R.L. Harris Project, FERC No. 2628. Kleinschmidt Associates, Birmingham, Alabama.

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

GREEN PLAN RELEASE CRITERIA

R L HARRIS RELEASE CRITERIA – *Effective March 1, 2005*

1. Daily Release Schedule
    a. The required Daily Volume Release will be at least 75% of the prior day's flow at the USGS Heflin Gauge.
    b. In the event that the Heflin Gauge is not in service, the required Daily Volume Release will be at least one-fourth of the previous day's inflow into R L Harris Reservoir.
    c. The Daily Volume Release will not to be below 100 DSF.
    d. Operations to ensure that flows at Wadley remain above the 45 cfs minimum mark shall continue.
    e. The required Daily Volume Release will be suspended if R L Harris is engaged in flood control operations.
    f. The required Daily Volume Release will be suspended if it jeopardizes the ability to fill R L Harris.
2. Hourly Release Schedule
    a. If less than two machine hours are scheduled for a given day, then the generation will be scheduled as follows:
        i. One-fourth of the generation will be scheduled at 6 AM.
        ii. One-fourth of the generation will be scheduled at 12 Noon.
        iii. One-half of the generation will be scheduled for the peak load.
        iv. If the peak load is during the morning, one-fourth of the generation will be scheduled at 6 PM.
    b. If two to four machine hours are scheduled for a given day, then generation will be scheduled as follows:
        i. Thirty minutes of generation will be scheduled at 6 AM.
        ii. Thirty minutes of generation will be scheduled at 12 Noon.
        iii. The remaining generation will be scheduled for the peak load.
        iv. If the peak load is during the morning, thirty minutes of the generation will be scheduled at 6 PM.
3. Two Unit Operation
    a. On the average, there will be more than 30 minutes between the start times between the two units.
    b. Two units may come online with less than 30 minute difference in their start times if there is a system emergency need.
4. Spawning Windows

    Spring and Fall spawning windows will scheduled as conditions permit. The operational criteria during spawning windows will supersede the above criteria.

R L HARRIS RELEASE CRITERIA – *Effective March 1, 2005*

1. Daily Release Schedule

   a. The required Daily Volume Release will be at least 75% of the prior day's flow at the USGS Heflin Gauge.

   b. In the event that the Heflin Gauge is not in service, the required Daily Volume Release will be at least one-fourth of the previous day's inflow into R L Harris Reservoir.

   c. The Daily Volume Release will not to be below 100 DSF.

   d. Operations to ensure that flows at Wadley remain above the 45 cfs minimum mark shall continue.

   e. The required Daily Volume Release will be suspended if R L Harris is engaged in flood control operations.

   f. The required Daily Volume Release will be suspended if it jeopardizes the ability to fill R L Harris.

DROUGHT 2007-2008 R L HARRIS RELEASE CRITERIA

a. If the flows at Wadley are at or above 100 cfs, there will be one pulse per day, which will result in a Daily Volume Release of approximately 50 DSF.

b. The flows at Wadley will not be lower than the flows at Heflin.

R L HARRIS MINIMUM FLOW PROCEDURE

STEP 1: CREATE SCHEDULE BASED ON PRIOR DAY'S HEFLIN FLOW

Prior Day's Heflin Flow (DSF)	Generation At 6 AM	Generation At 12 Noon	Generation As System Needs	Total Machine Time	R L Harris Total Disch (DSF)
0 < HEFLIN Q < 150	10 MIN	10 MIN	10 MIN	30 MIN	133
150 < HEFLIN Q < 300	15 MIN	15 MIN	30 MIN	1 HR	267
300 < HEFLIN Q < 600	30 MIN	30 MIN	1 HR	2 HRS	533
600 < HEFLIN Q < 900	30 MIN	30 MIN	2 HRS	3 HRS	800
900 < HEFLIN Q	30 MIN	30 MIN	3 HRS	4 HRS	1,067

STEP 2: ADD ADDITIONAL PEAK GENERATION AS NEEDED

STEP 3: ADJUST SCHEDULE IF NECESSARY

TOTAL SCH GENERATION	Generation At 6 AM	Generation At 12 Noon	Generation As System Needs	Total Machine Time	R L Harris Total Disch (DSF)
IF GENERATION = 1 MACH HR	15 MIN	15 MIN	30 MIN	1 HR	267
IF GENERATION = 2 MACH HRS	30 MIN	30 MIN	1 HR	2 HRS	533
IF GENERATION = 3 MACH HRS	30 MIN	30 MIN	2 HRS	3 HRS	800
IF GENERATION = 4 MACH HRS	30 MIN	30 MIN	3 HRS	4 HRS	1,067
IF GENERATION = 5+ MACH HRS			ALL		

NOTES

1. SCHEDULING OF GENERATION DOES NOT PRECLUDE THE ADDITION OF GENERATION AT ANY TIME.
2. ALL START TIMES ARE APPROXIMATE.
3. WHEN PULSING, IF THE SYSTEM DOES NOT DICTATE GENERATION DURING THE PM, A PULSE WILL BE SCHEDULED AT 6 PM.
4. R L HARRIS MIN FLOW PROCEDURE WILL BE SUSPENDED DURING ANY OF THE FOLLOWING CONDITIONS:
   - A) TALLAPOOSA RIVER HAS BEEN PLACED UNDER FLOOD CONTROL OPERATIONS.
   - B) FISH SPAWNING OPERATIONS HAVE BEEN SCHEDULED.
   - C) APC HAS DECLARED THAT CONDITIONS EXIST THAT THREATEN THE SPRING FILLING OF R L HARRIS RESERVOIR.

Attachment 2
Downstream Release Alternatives Consultation Record
(May 2019-March 2020)

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	Joel 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

September 11, 2019 9:00 AM

	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	~~Katter~~ 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.com
22	Kenneth Odom	kodom@southernco.com
23	Mitch Reid	mitchell.reid@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	Carl 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

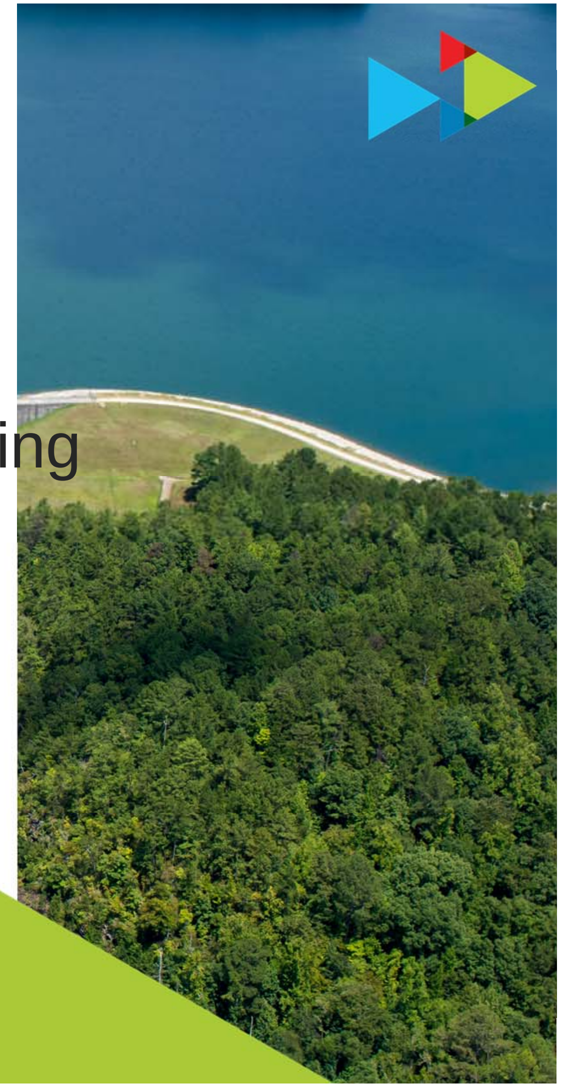
Alabama Power

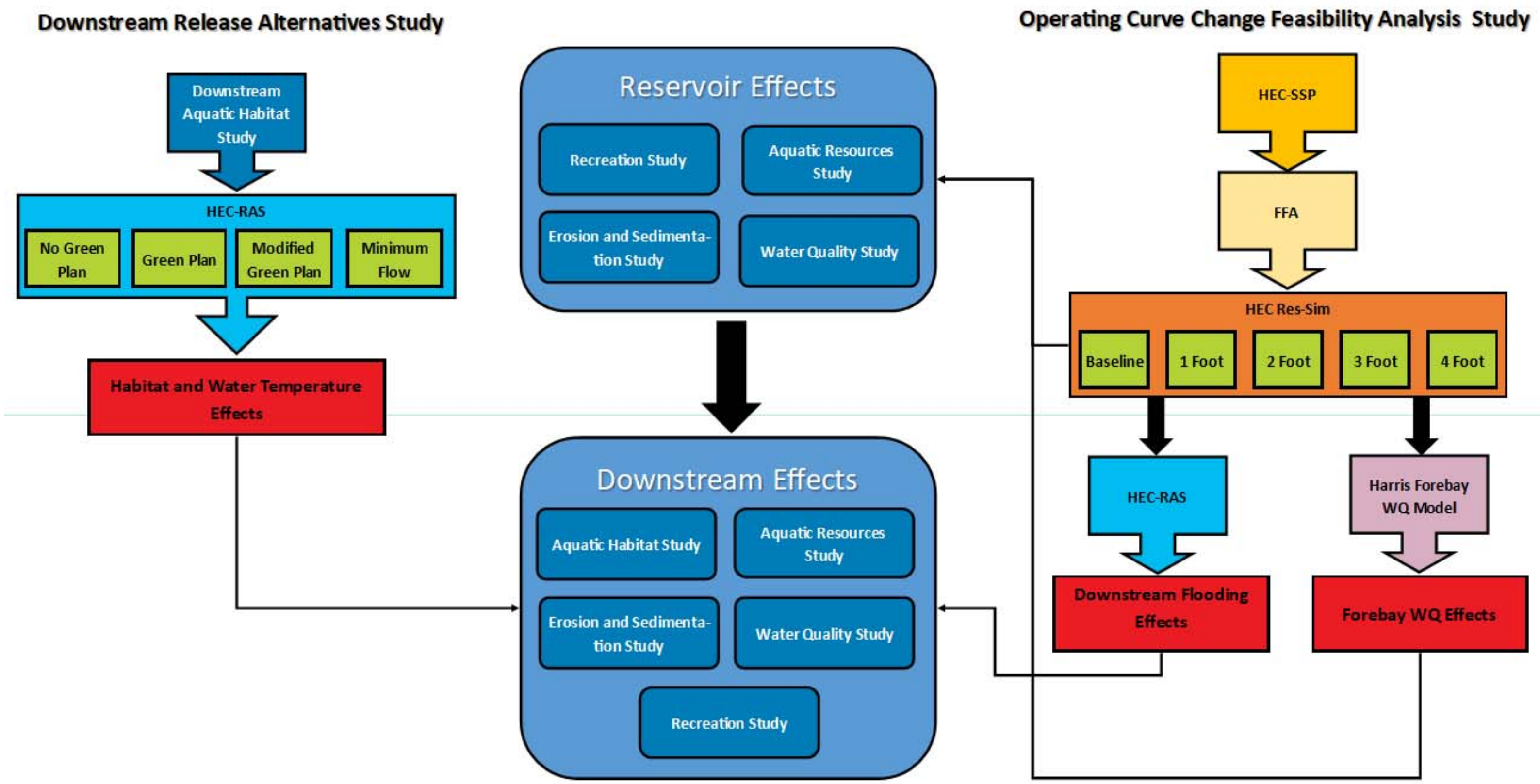
R.L. Harris Project Relicensing

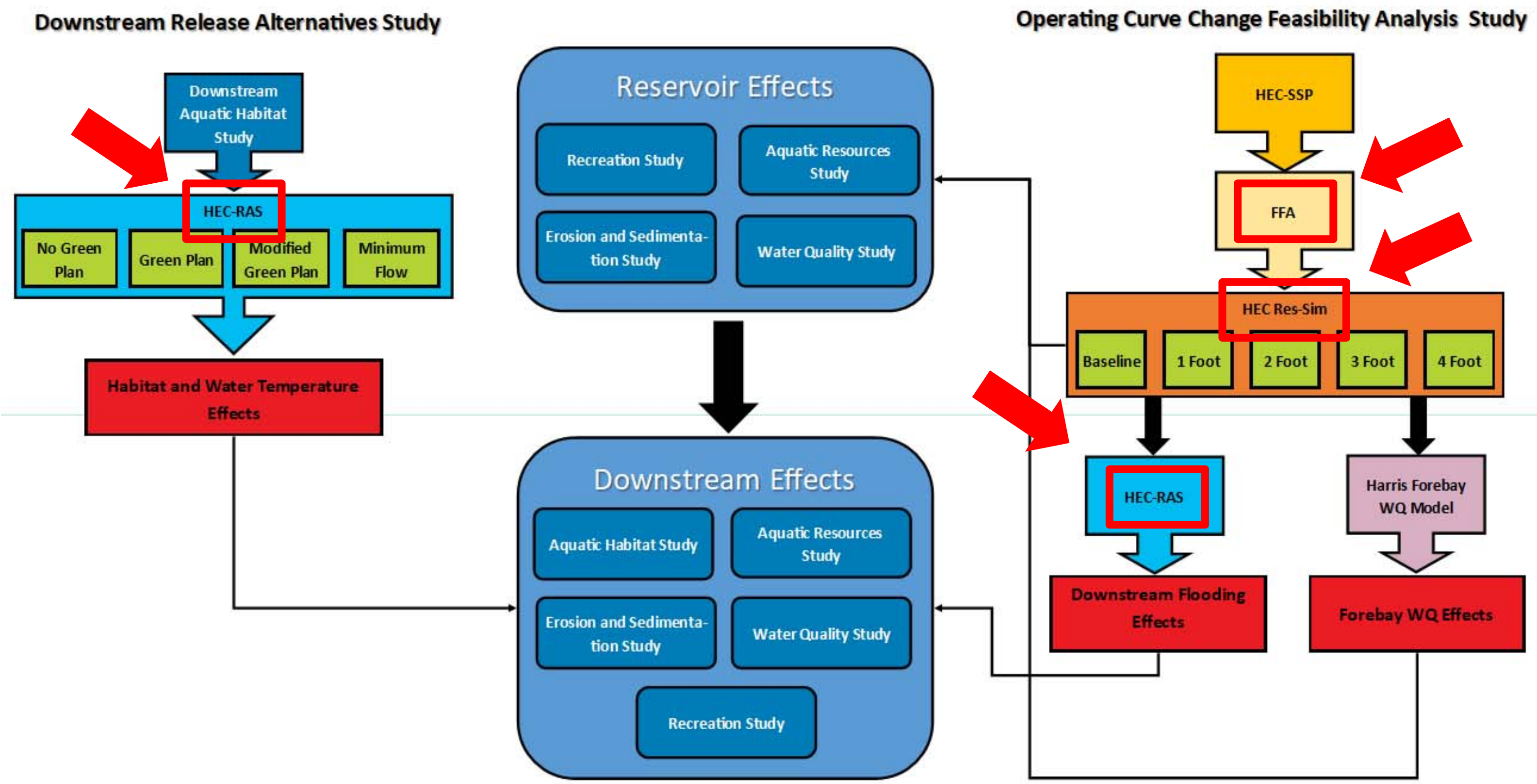
Project Operations – HAT 1

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

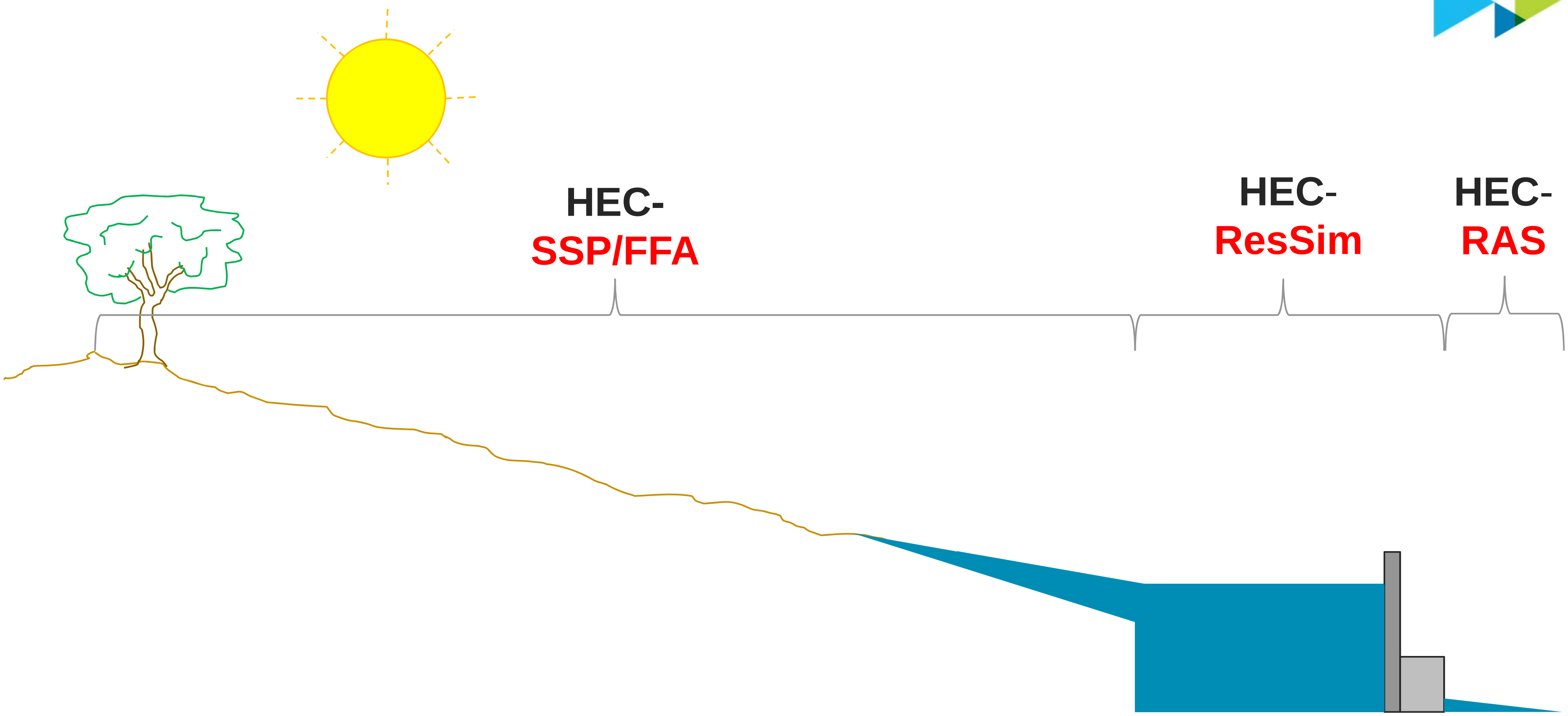
September 11, 2019



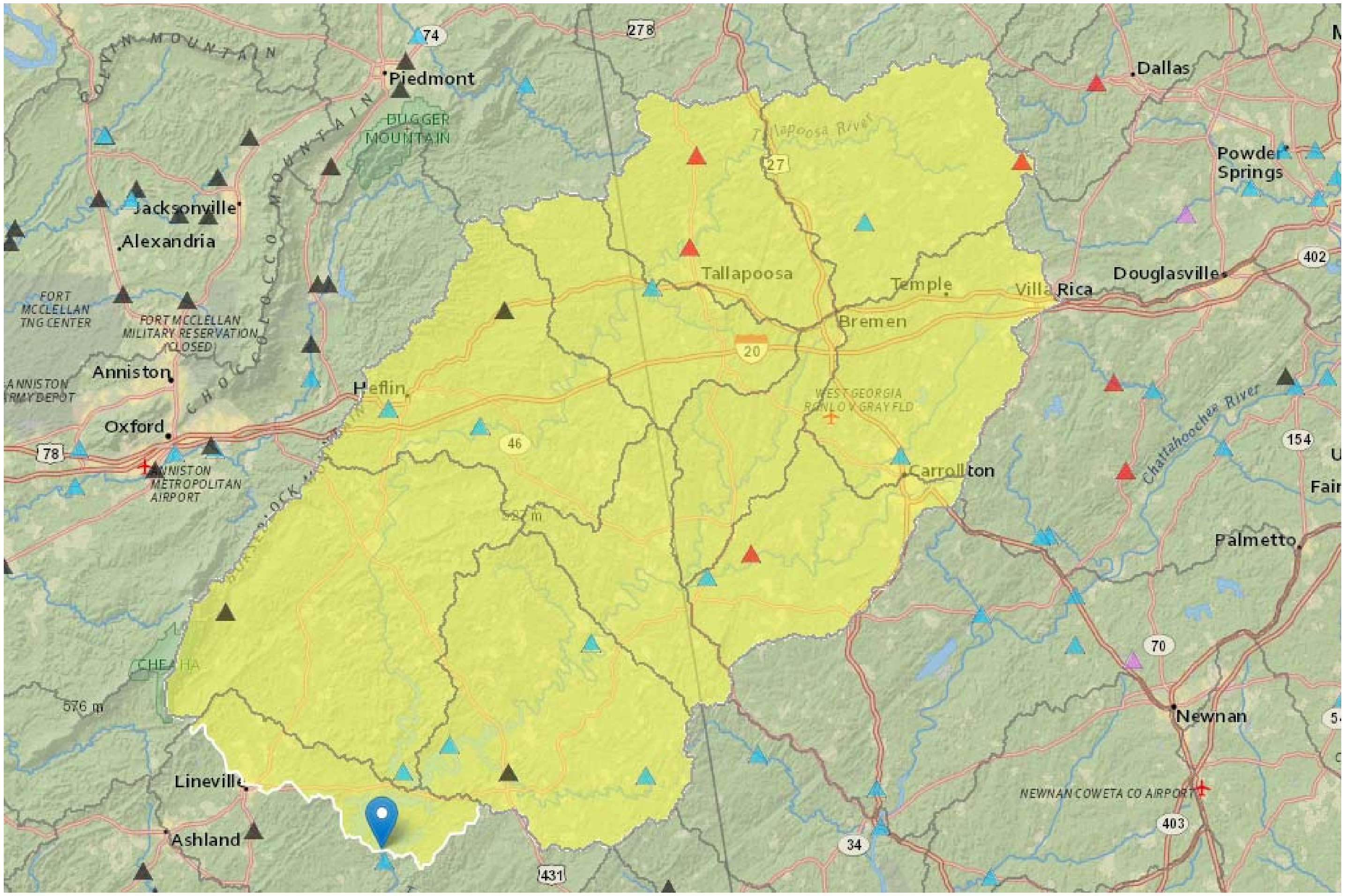

Downstream Release Alternatives Study
Downstream Aquatic Habitat Study
HEC-RAS
No Green Plan
Green Plan
Modified Green Plan
Minimum Flow
Habitat and Water Temperature Effects
Reservoir Effects
Recreation Study
Aquatic Resources Study
Erosion and Sedimentation Study
Water Quality Study
Downstream Effects
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
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

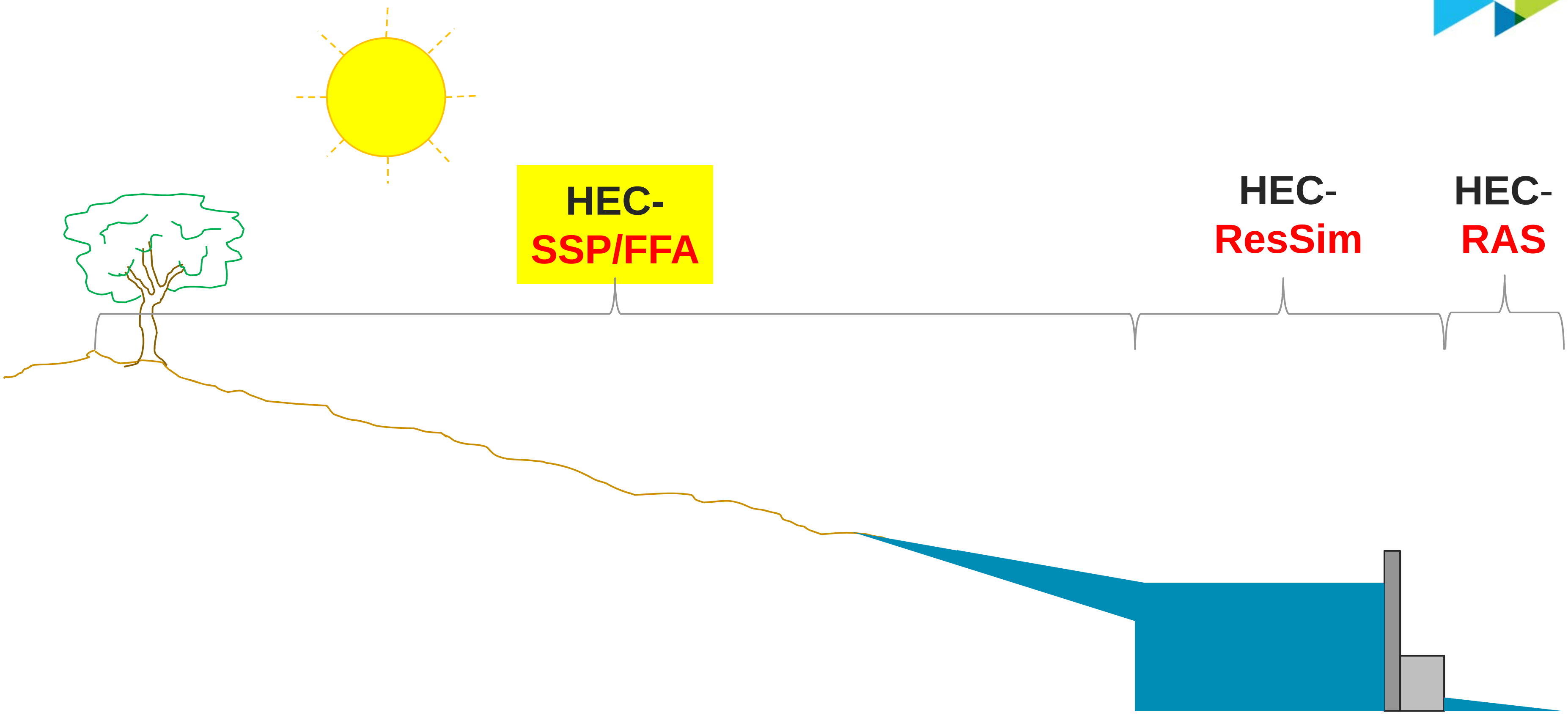
Where the models are used…



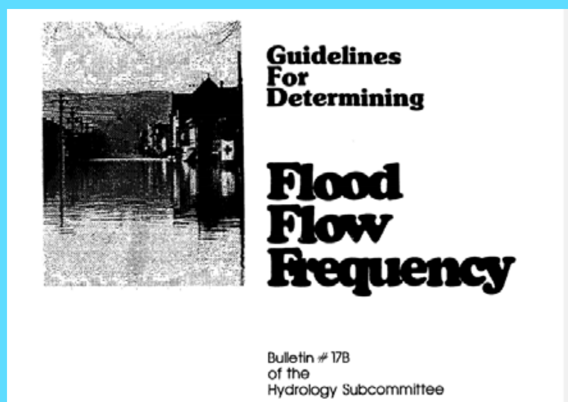
Harris Watershed Boundary



Where the models are used…



HEC-SSP (Statistical Software Package)



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.

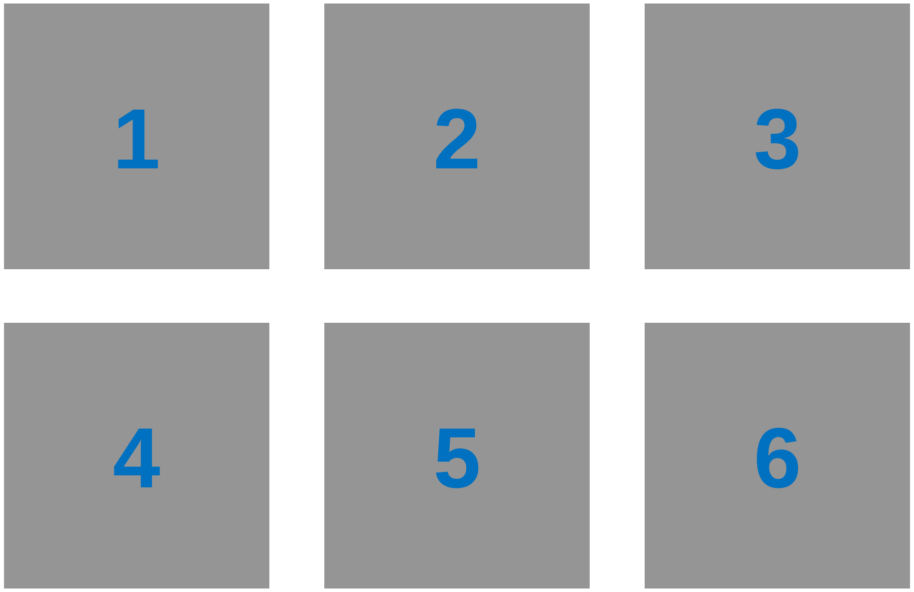
Let’s play a game of “chance.” Pick a number. One card has a dollar sign under it. What are your chances of picking the right one?

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?



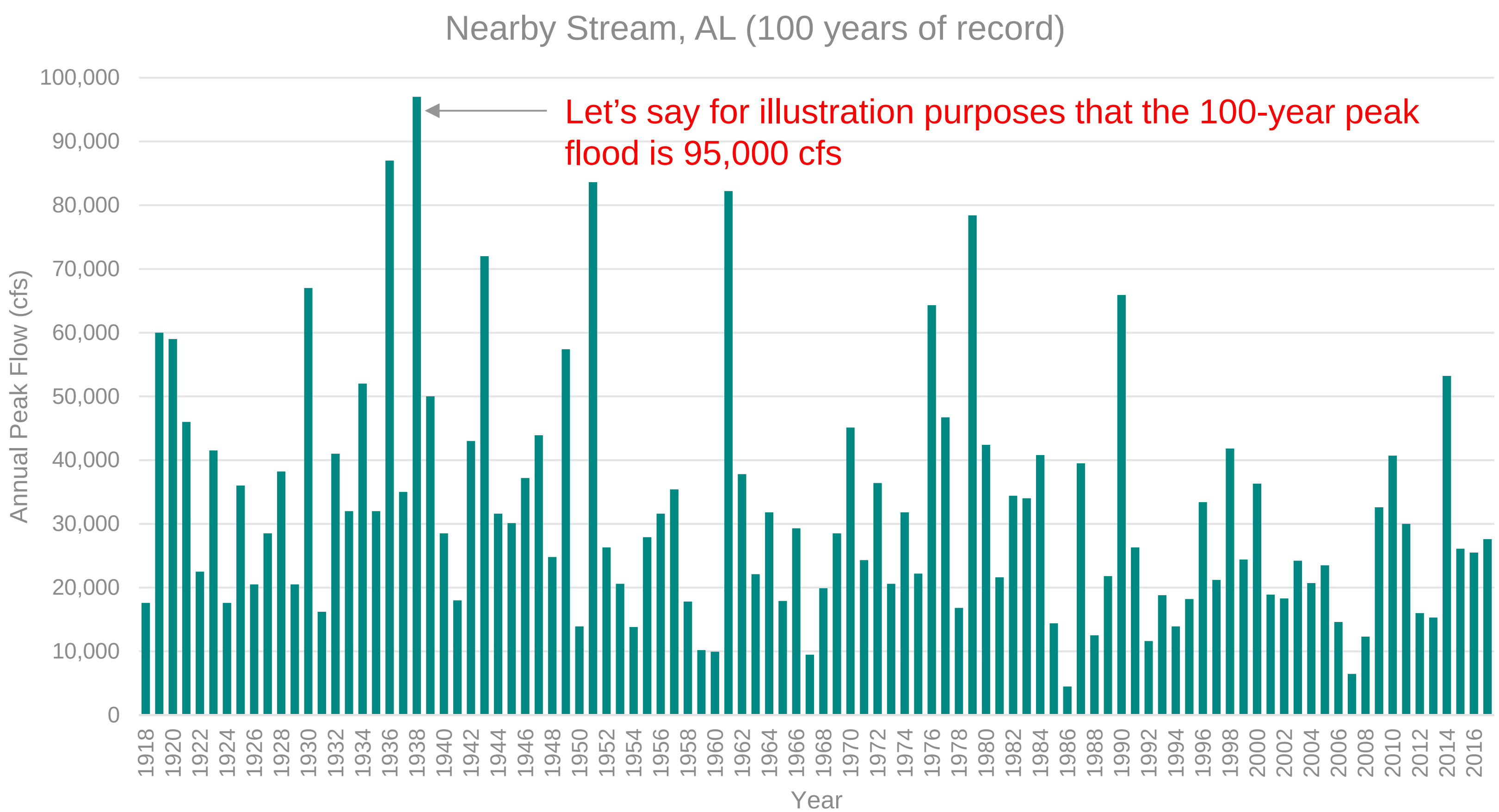
How many would pick a different card because you think that 1, 2, 3, 5, and 6 will have the $ before it can come back around to the 4-Card?

Very Common Misconception

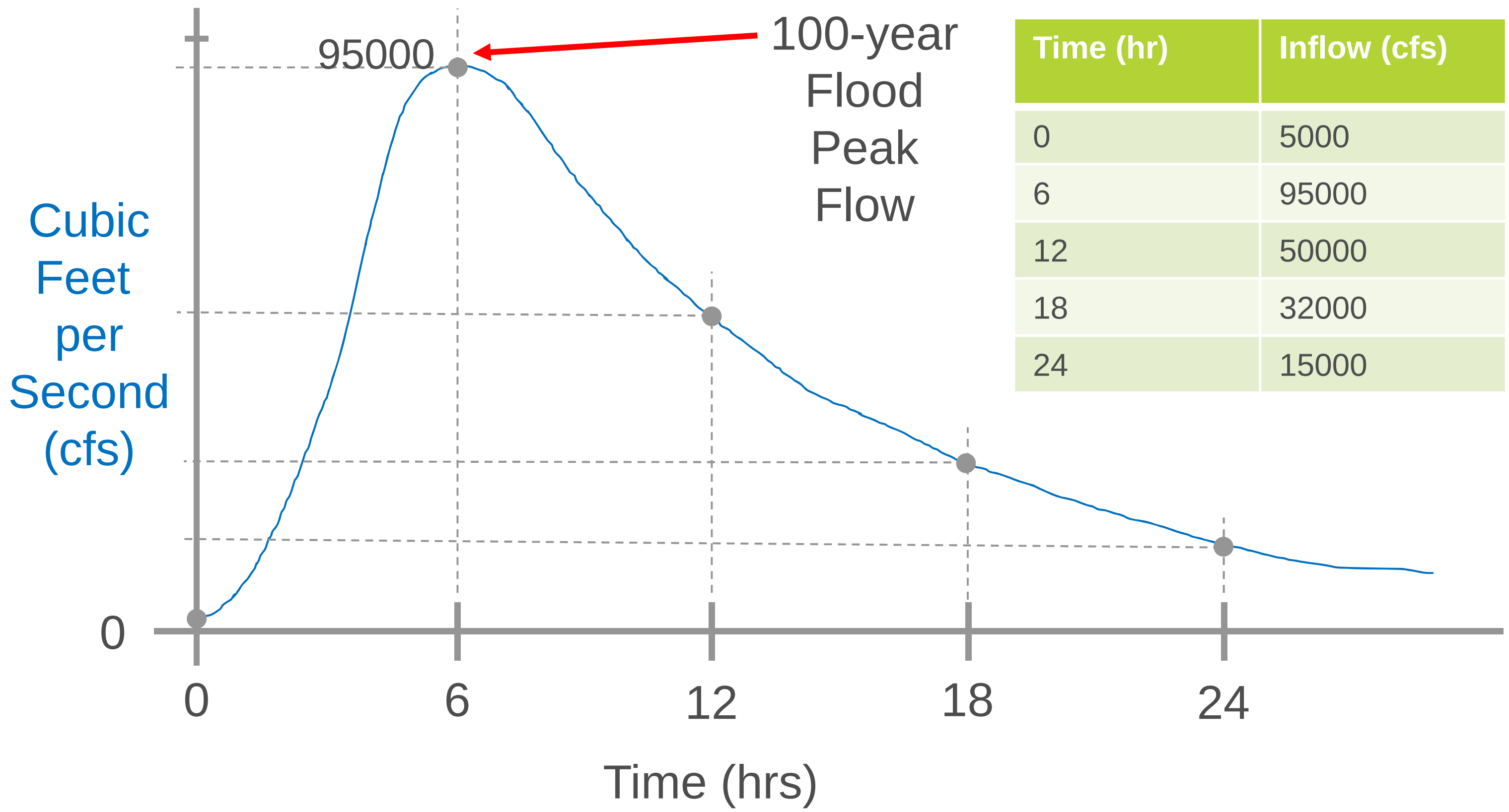
“If the 100-year flood just occurred, then we don’t have to worry about another flood like that for the next 99 years.”

WRONG!!!

(For Illustration Purposes Only)

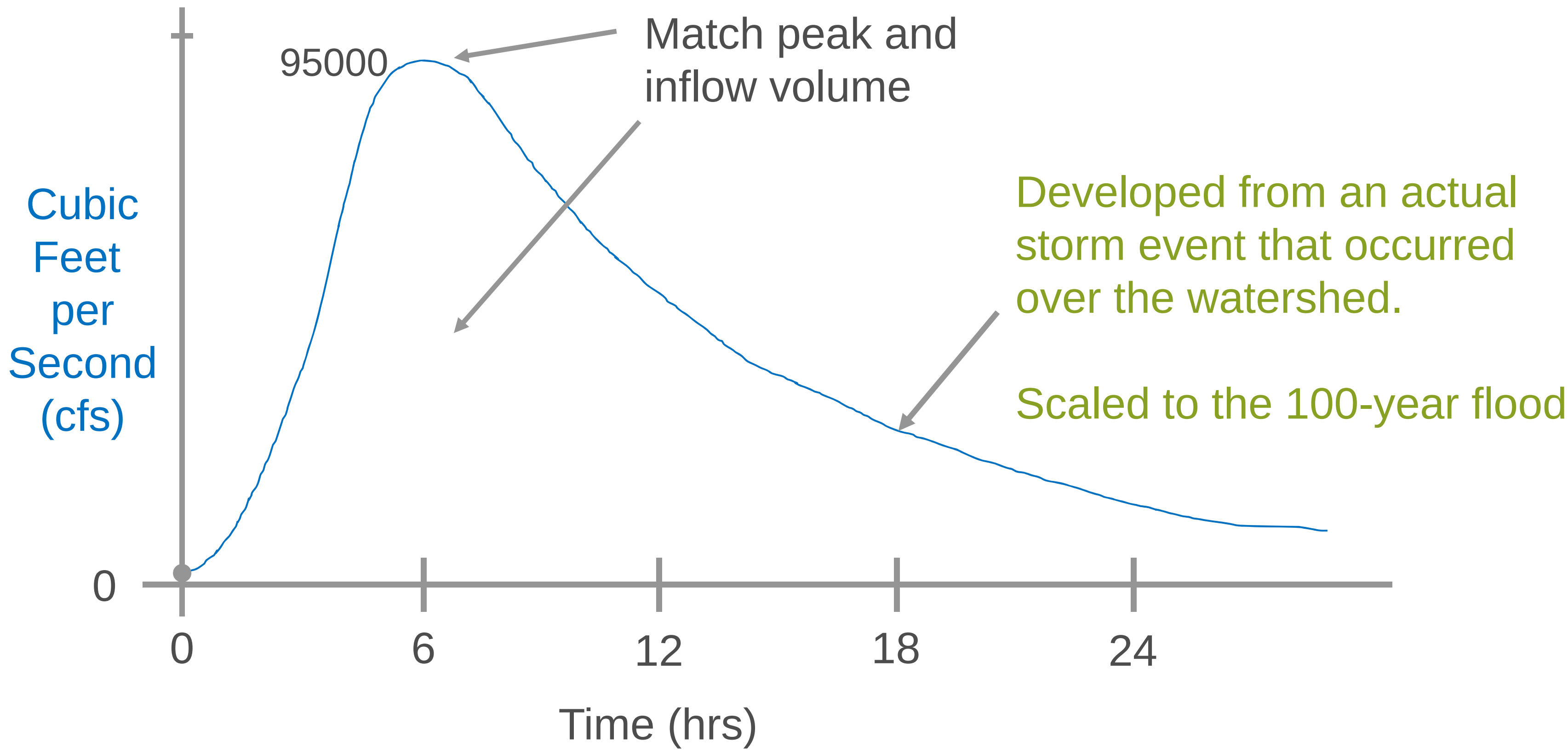


Inflow Hydrograph for Nearby Stream, AL
(For Illustration Purposes Only)

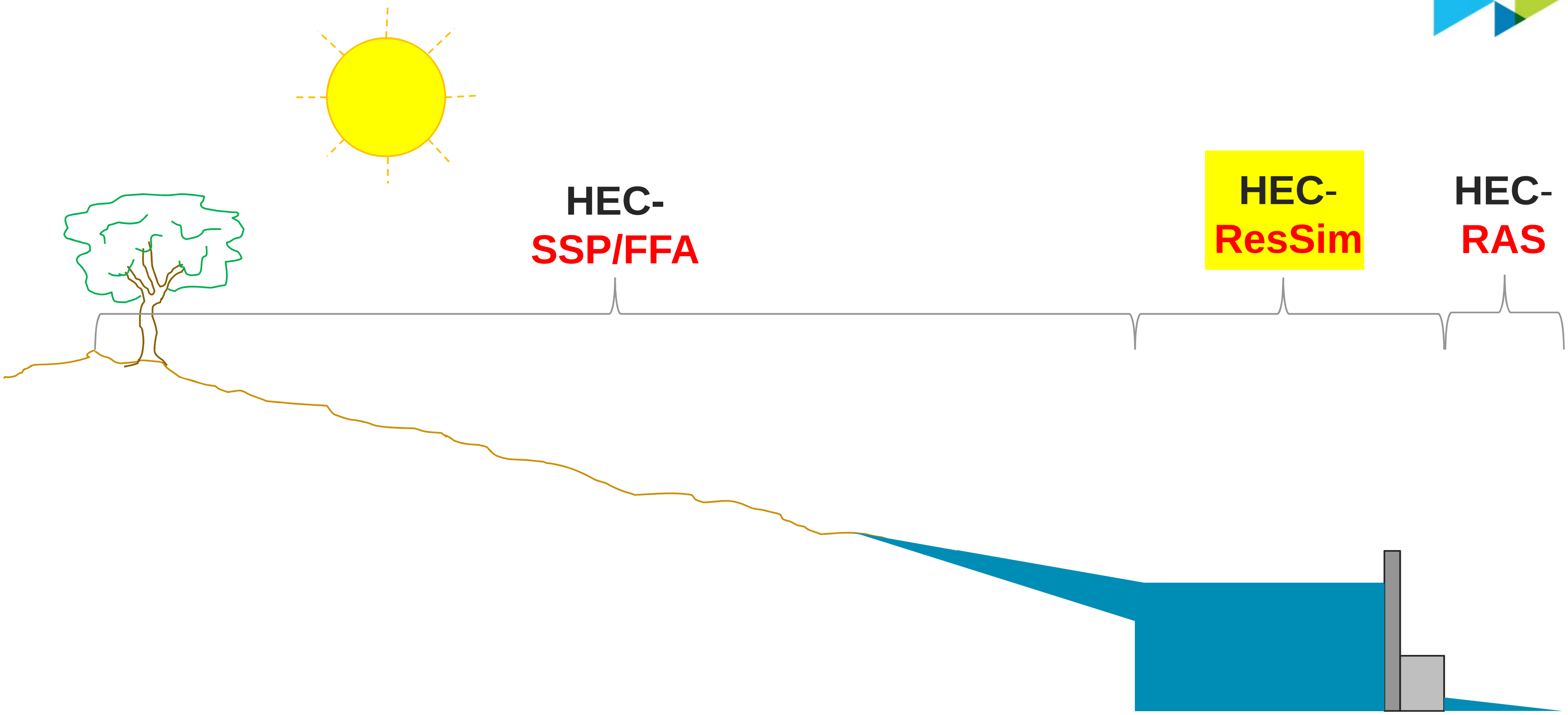


Time (hr)	Inflow (cfs)
0	5000
6	95000
12	50000
18	32000
24	15000

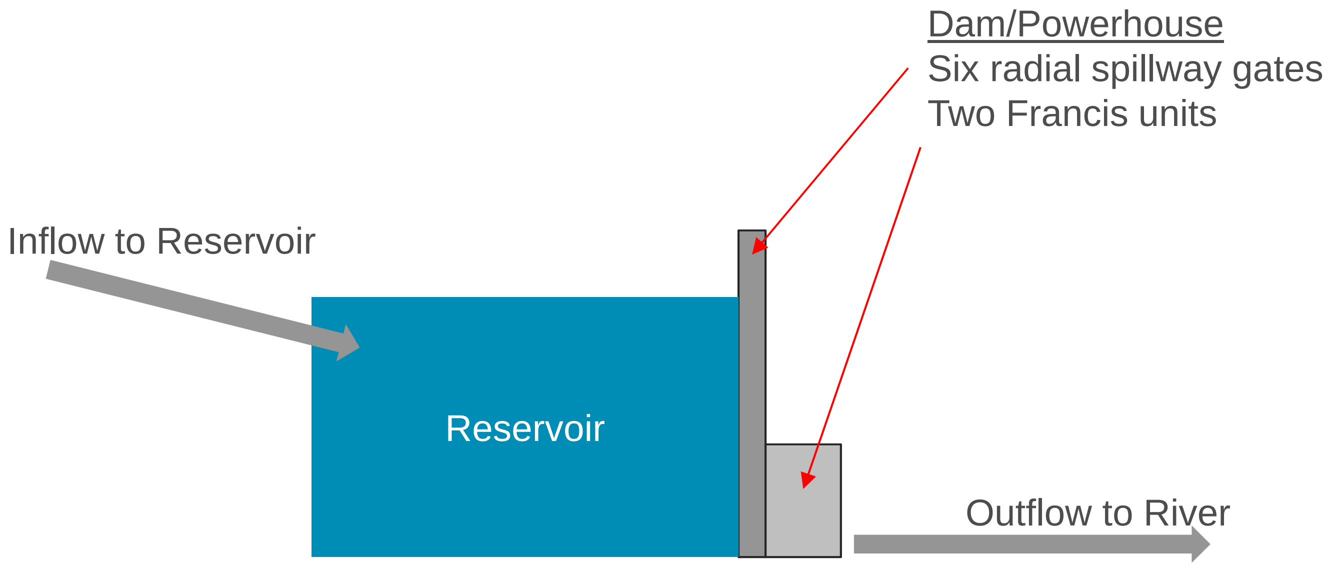
Inflow Hydrograph for Nearby Stream, AL **(For Illustration Purposes Only)**



Where the models are used…

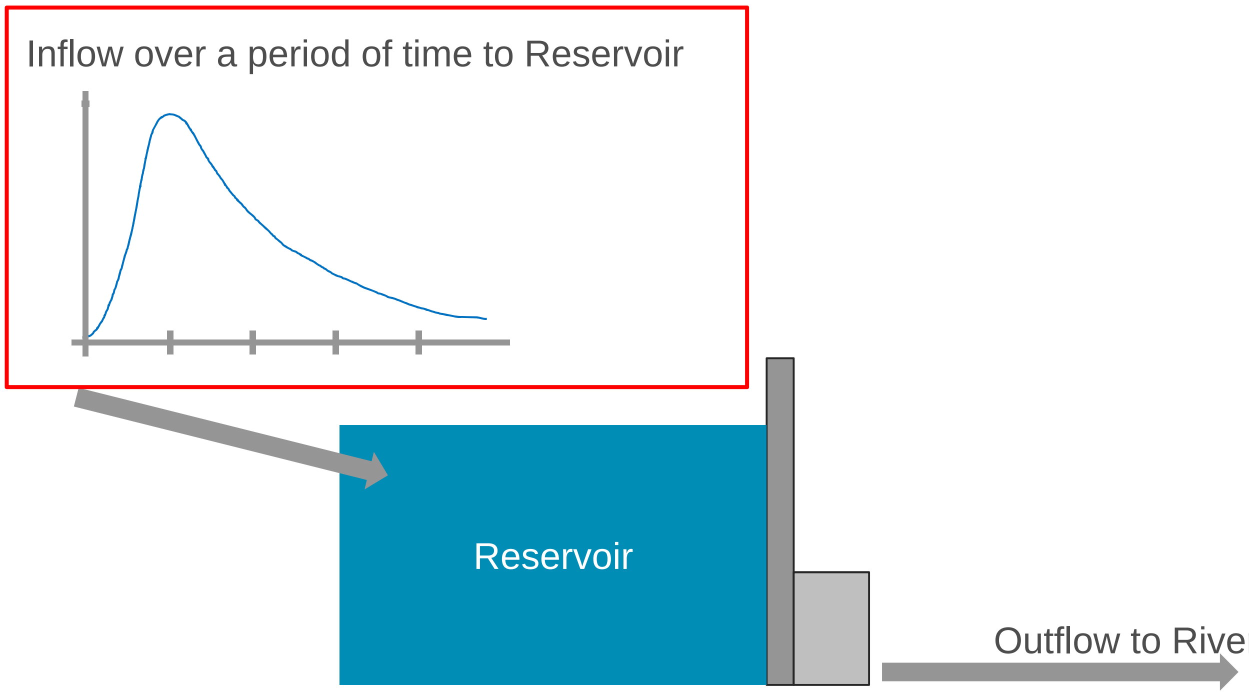


Schematic used to discuss HEC-ResSim



How **HEC-ResSim** sees the Reservoir

1. FFA and "scaled" actual event

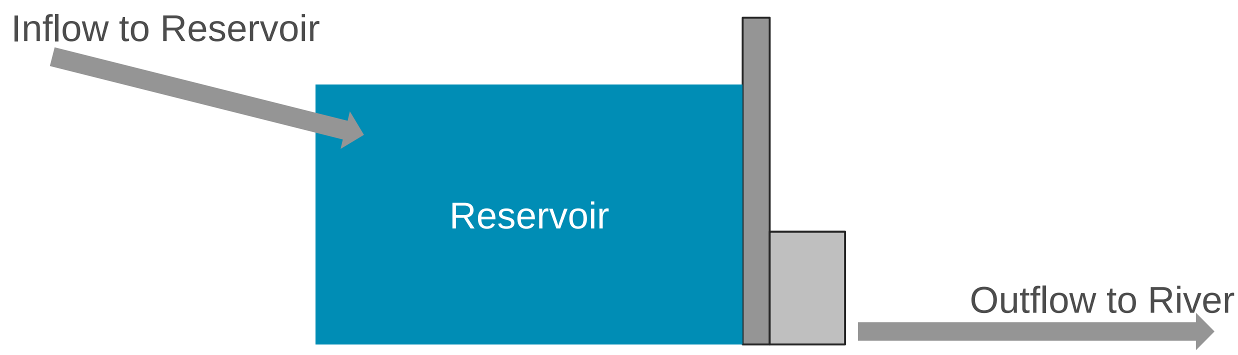


HEC-ResSim

2.

Elevation-Volume Table

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



HEC-ResSim

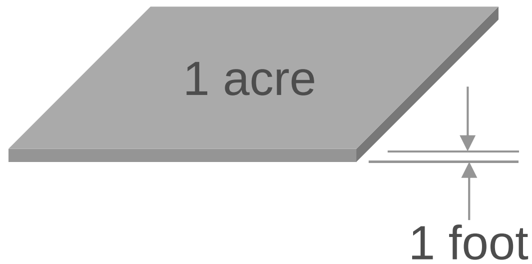
2.

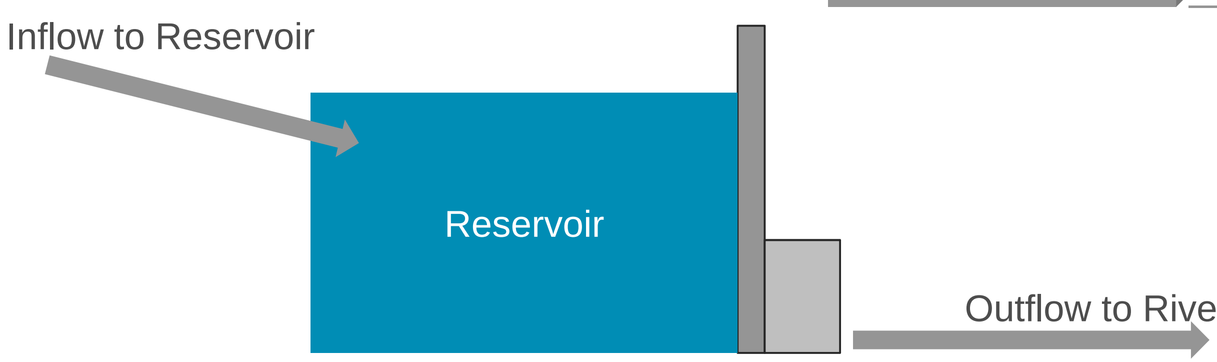
Elevation-Volume Table

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

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

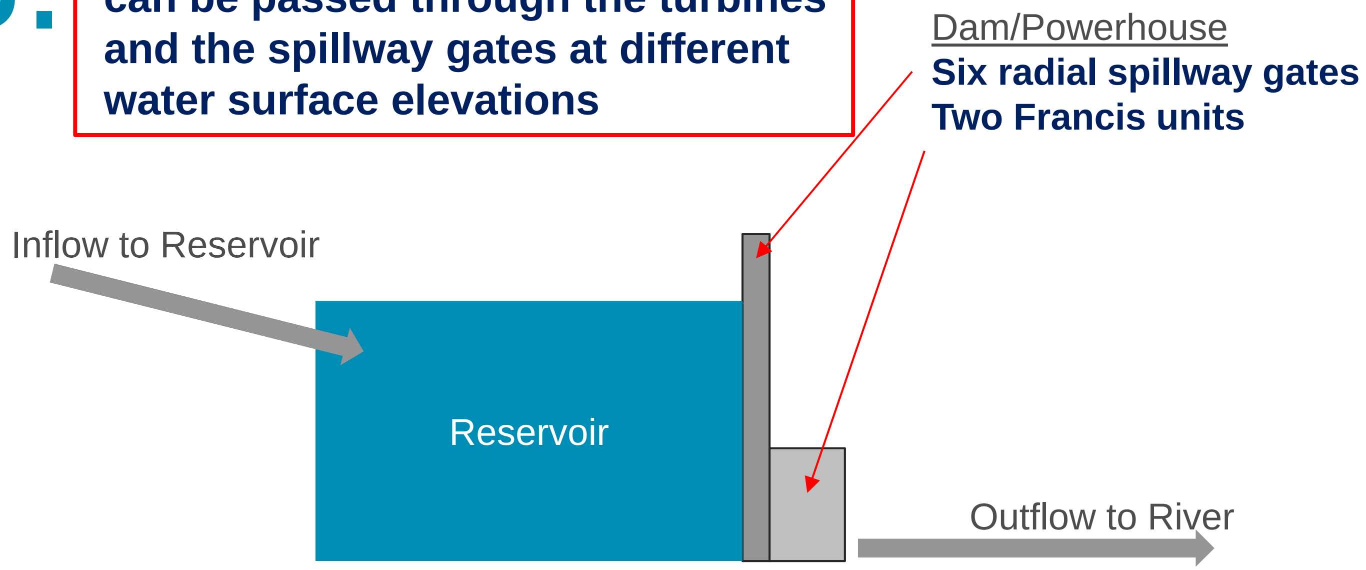
It is a measure of volume where one acre-foot is an area of one acre covered with one foot of water





HEC-ResSim

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



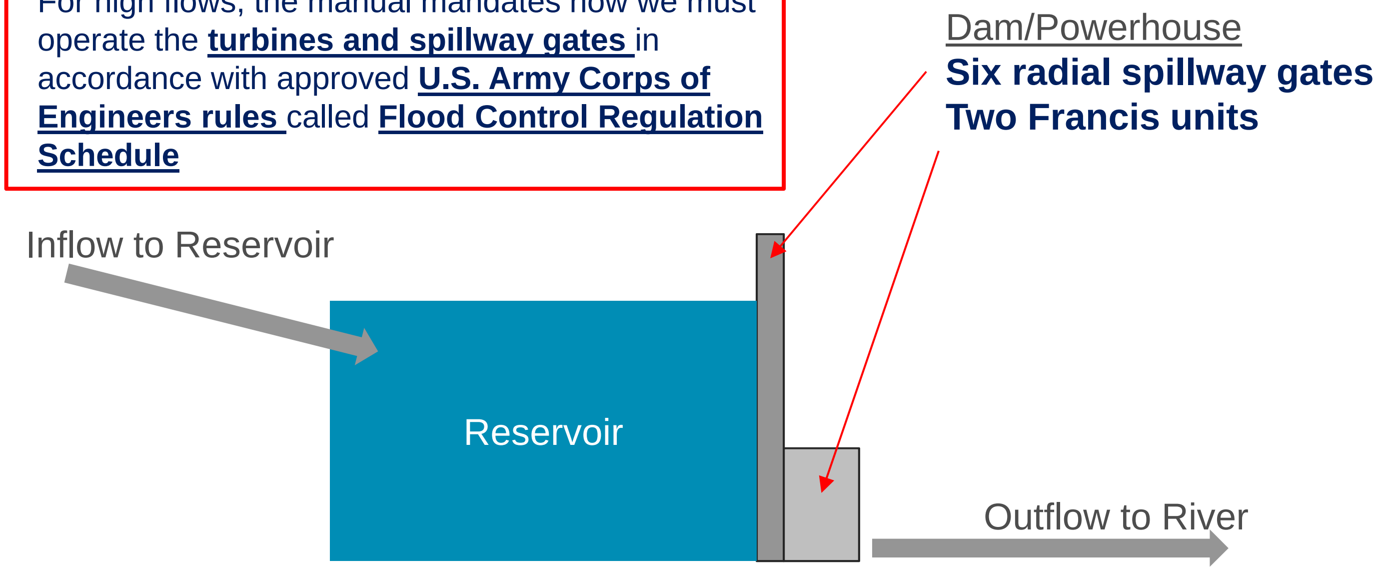
HEC-ResSim

4.

Reservoir Regulation Manual

This tells us how the reservoir must be operated.

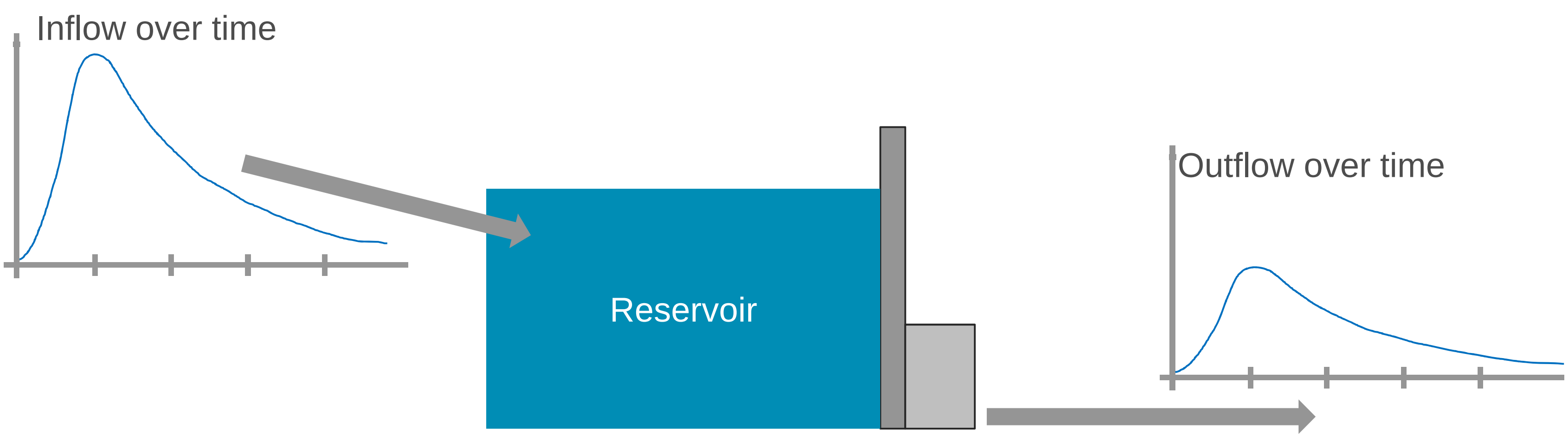
For high flows, the manual mandates how we must operate the **turbines and spillway gates** in accordance with approved **U.S. Army Corps of Engineers rules** called **Flood Control Regulation Schedule**

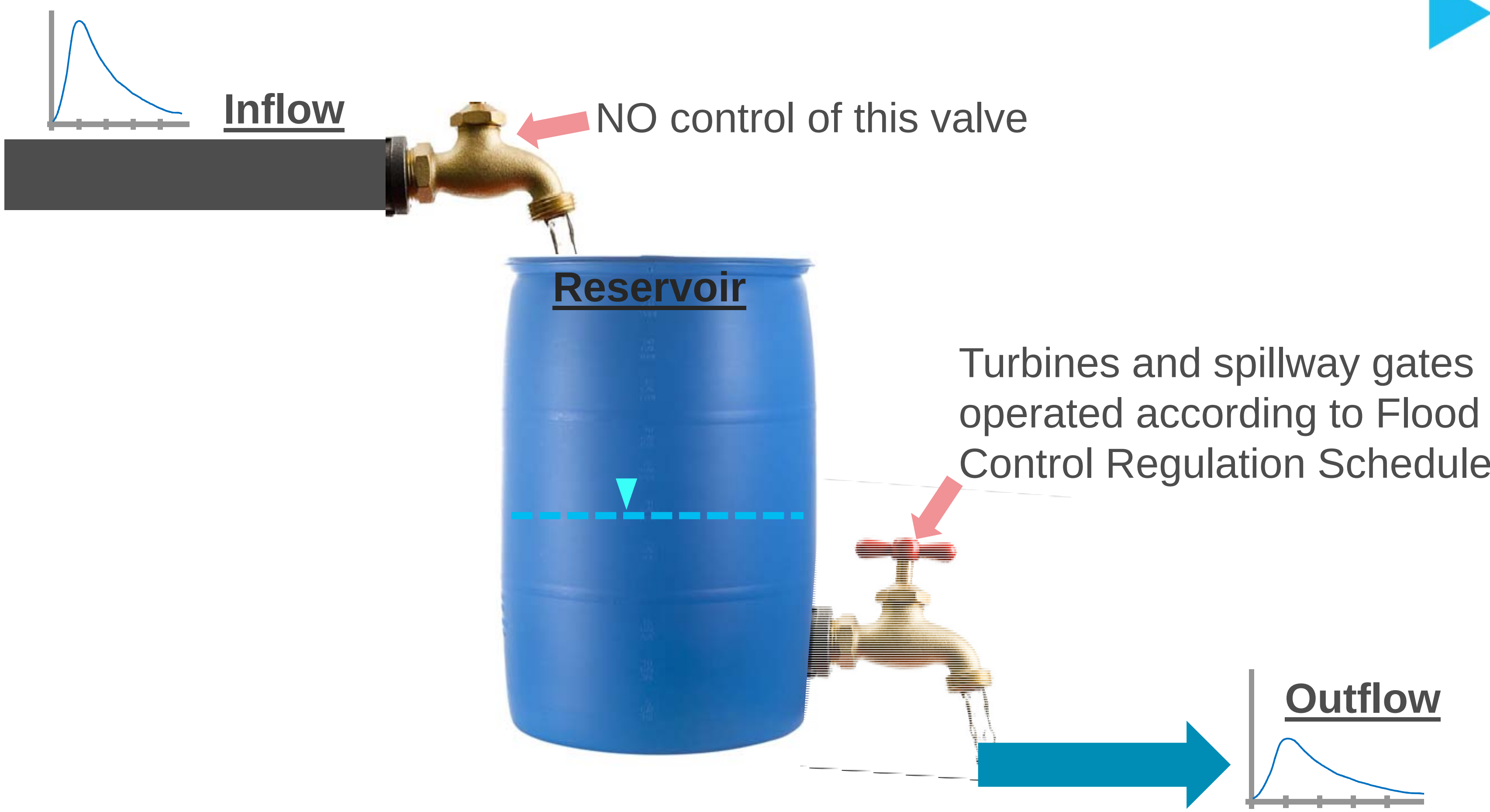


If **INFLOW** is higher than **OUTFLOW**: ELEVATION ⬆

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

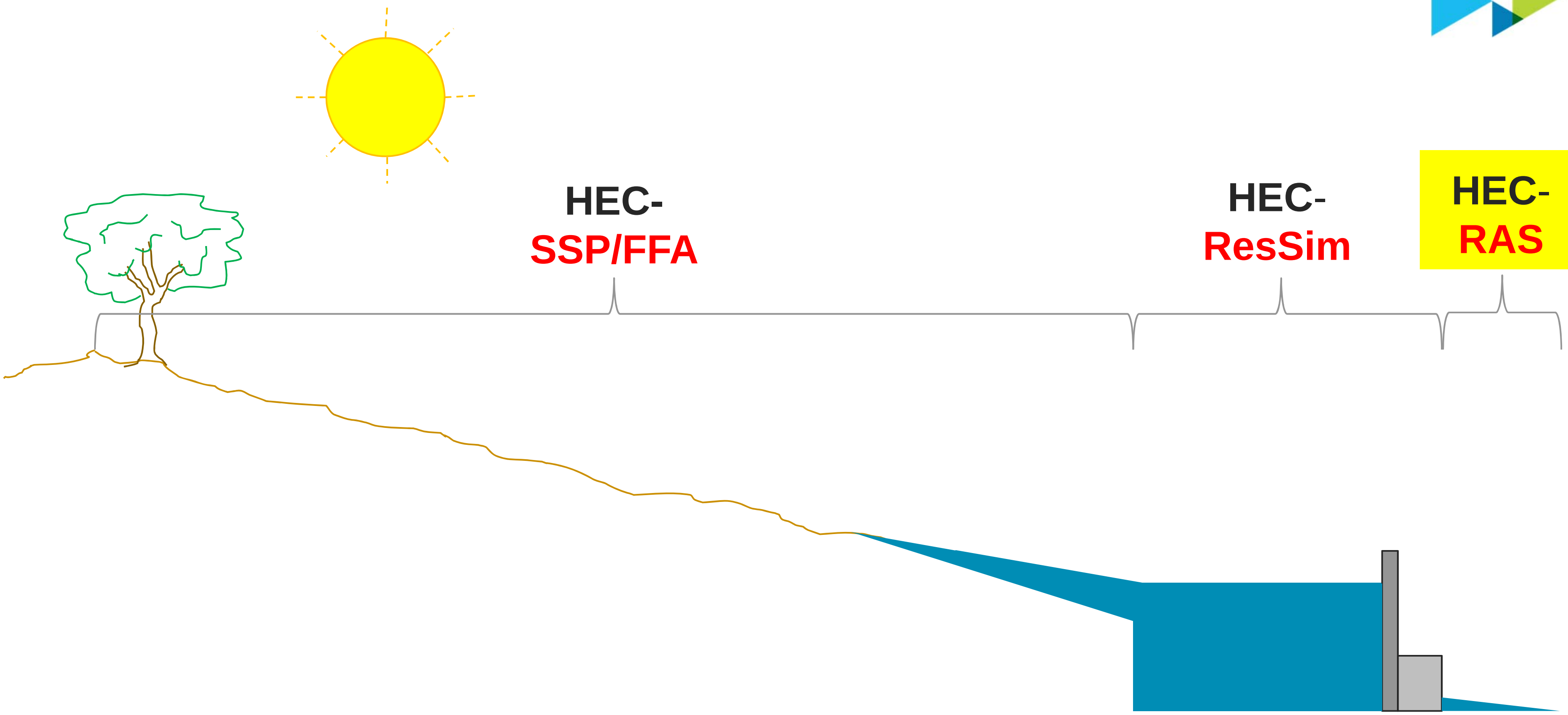
Outputs from HEC-ResSim

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

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

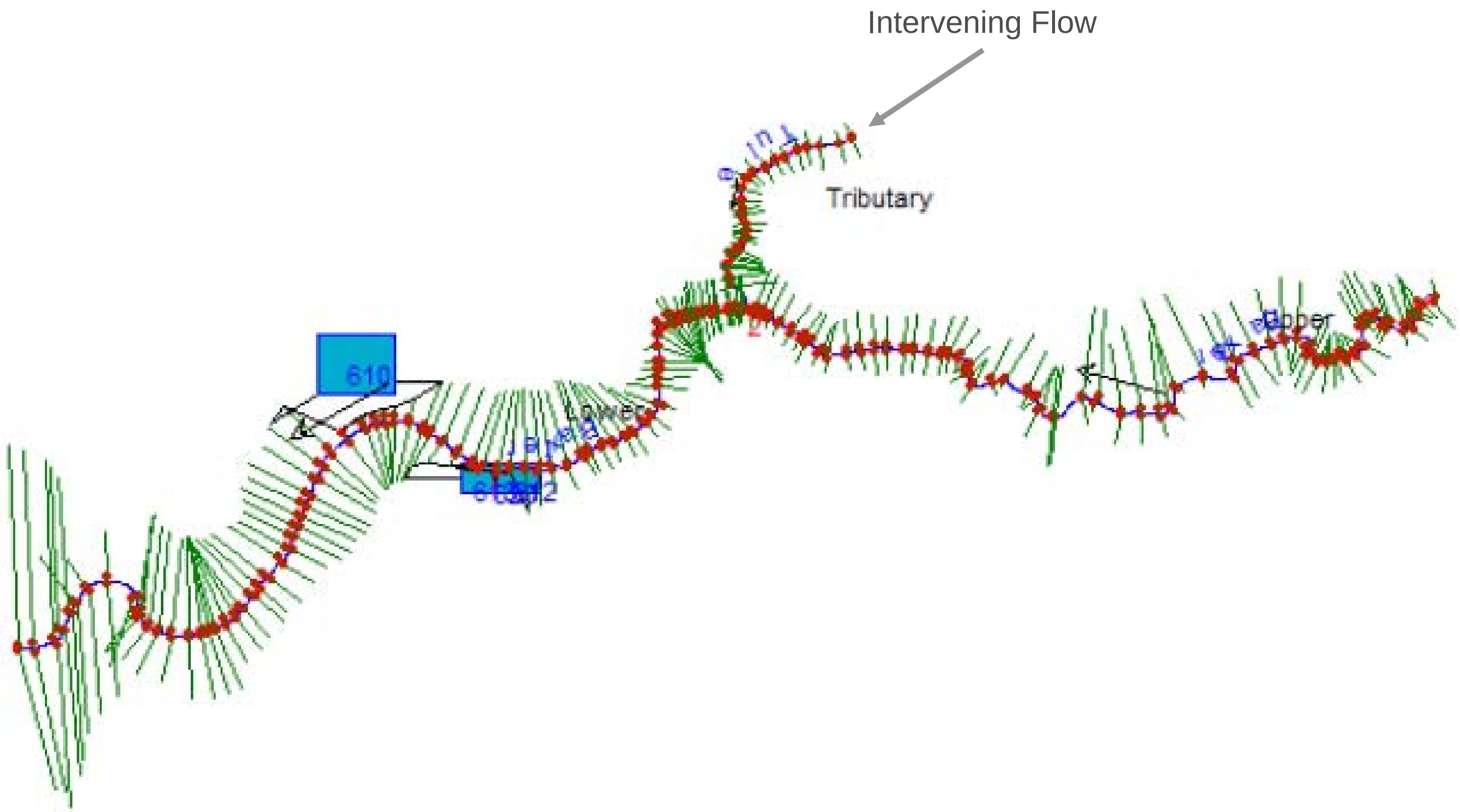
***Both controlled by the Flood Control Regulation Schedule**

Where the models are used…



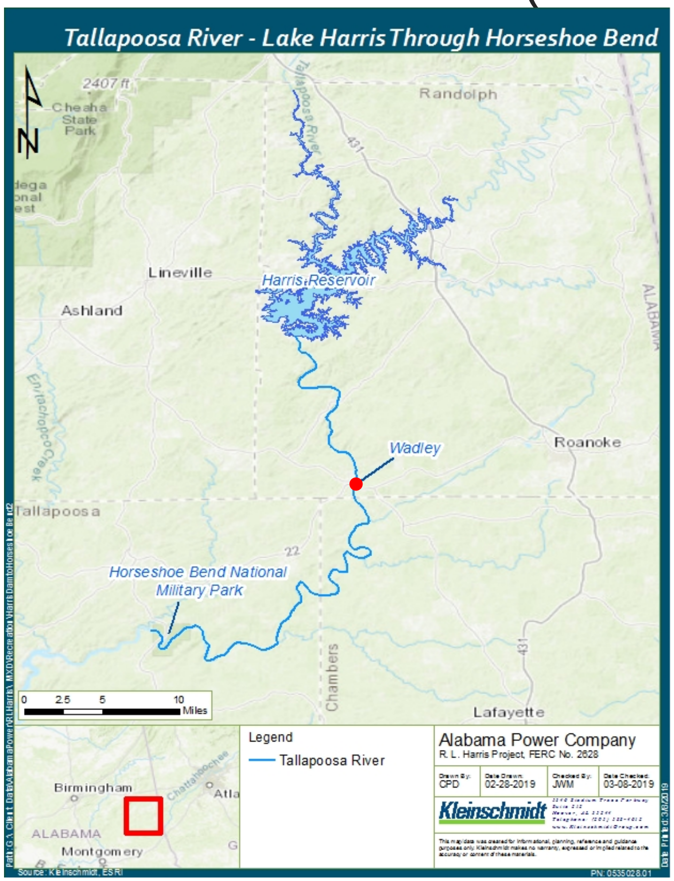
HEC-RAS cross-sections on a river

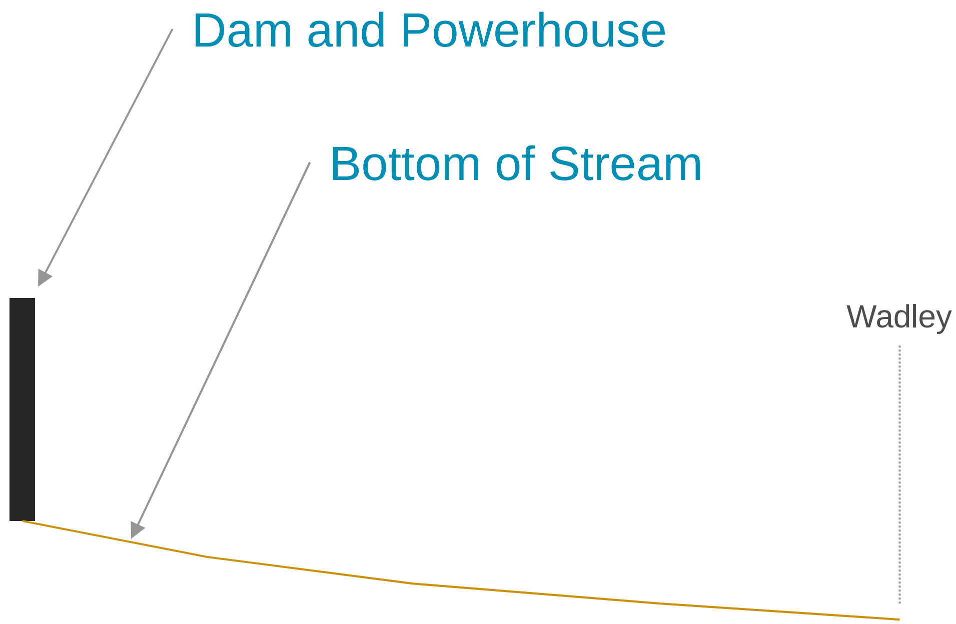
(For Illustration Purposes Only)



Schematic used to discuss HEC-RAS

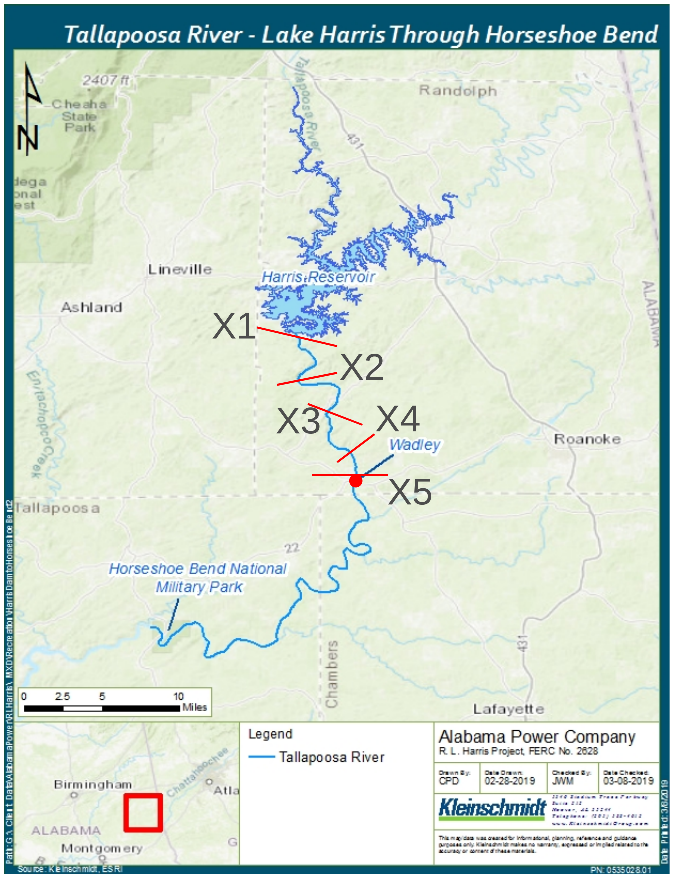
(For Illustrations Purpose Only)



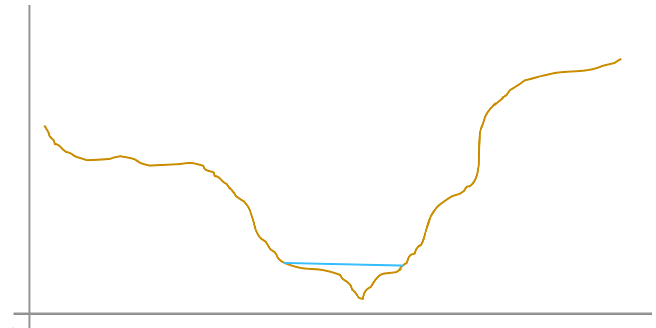


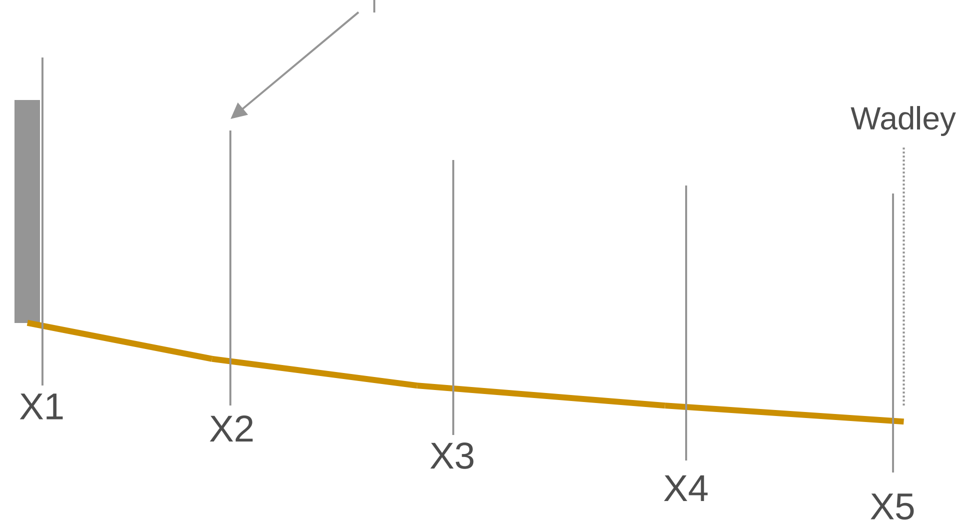
HEC-RAS Stream Cross Sections

(For Illustration Purposes Only)

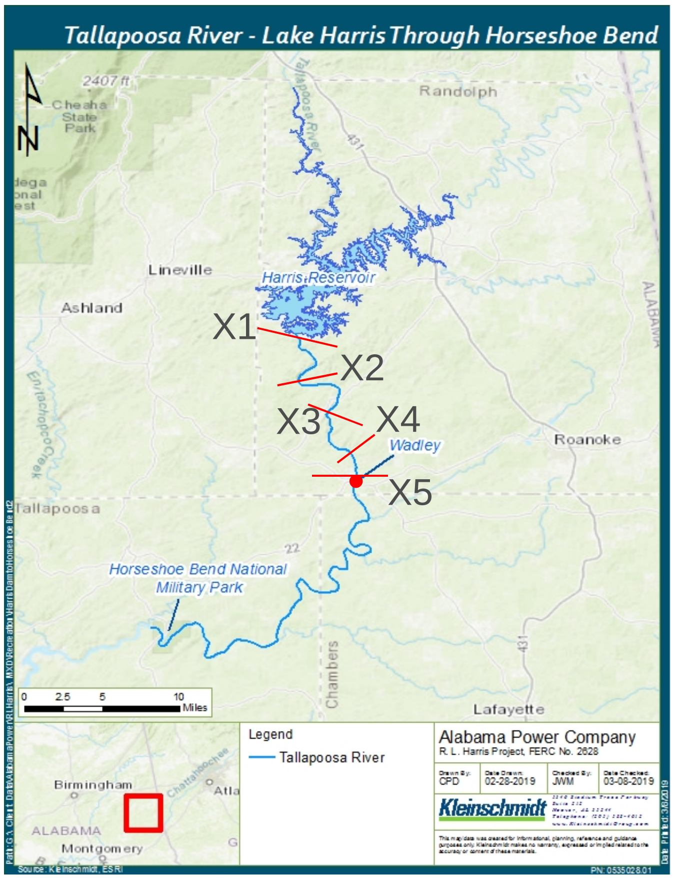


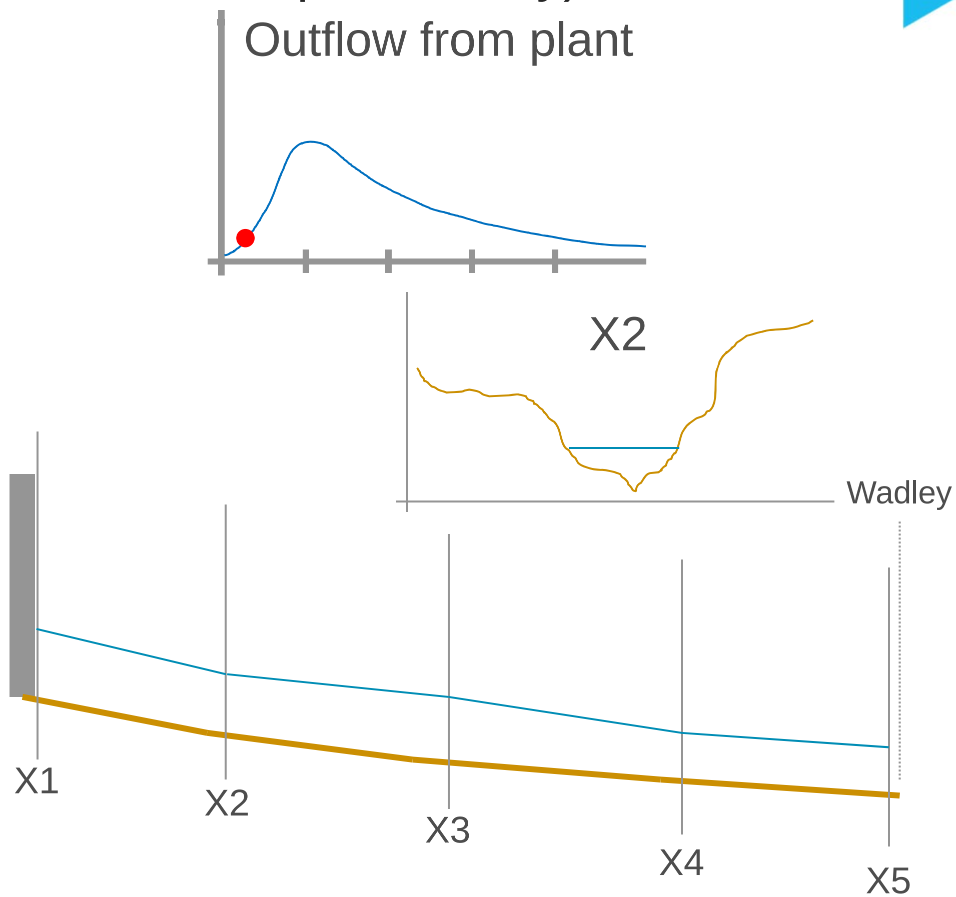
What is a cross section?



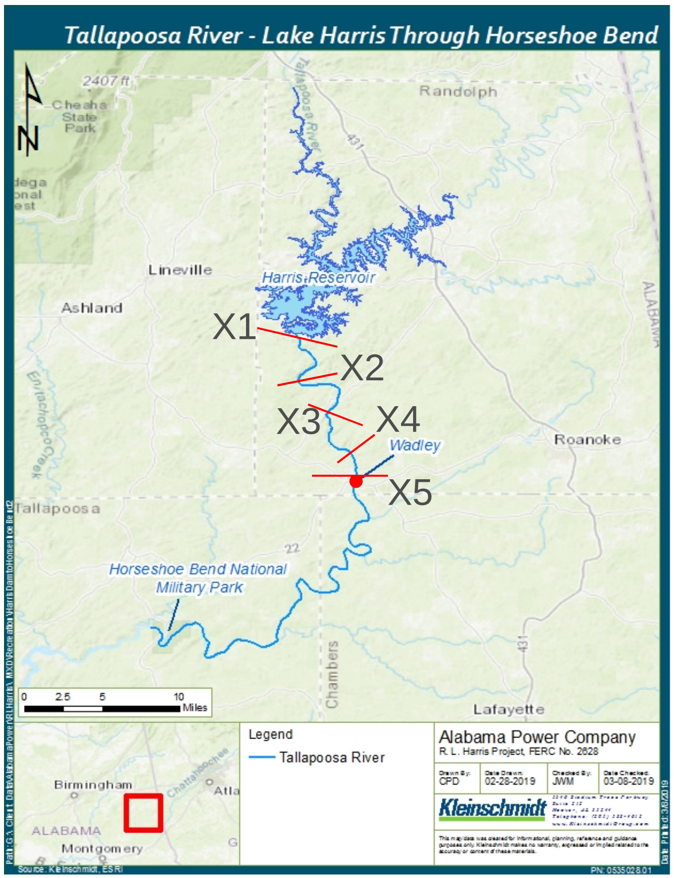


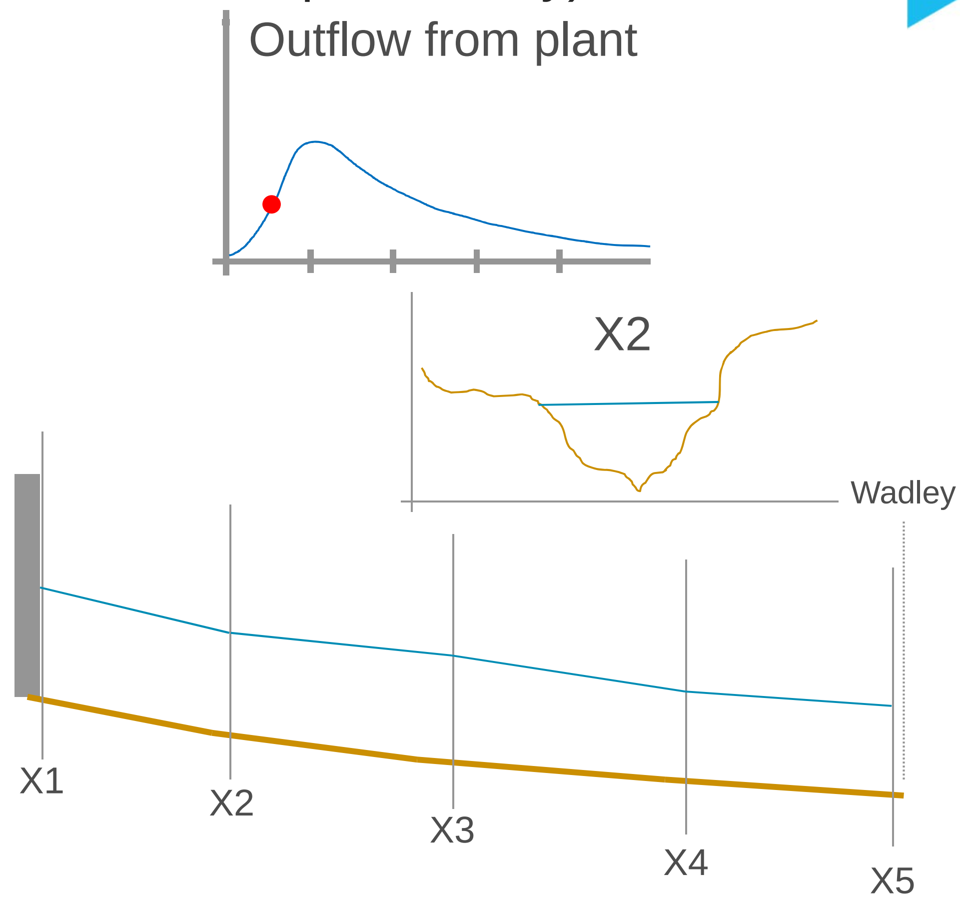
HEC-RAS (For Illustration Purposes Only)



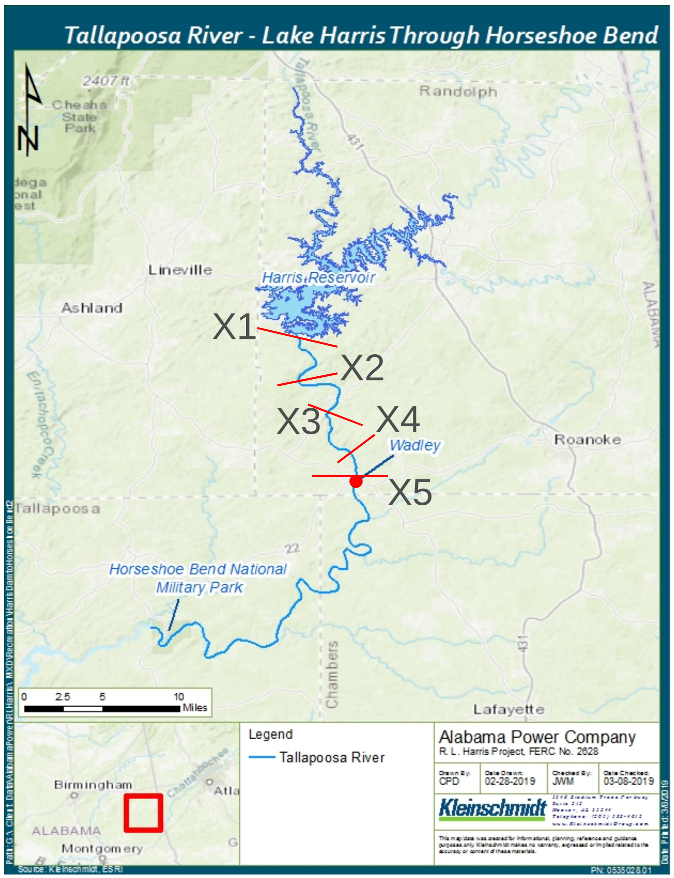


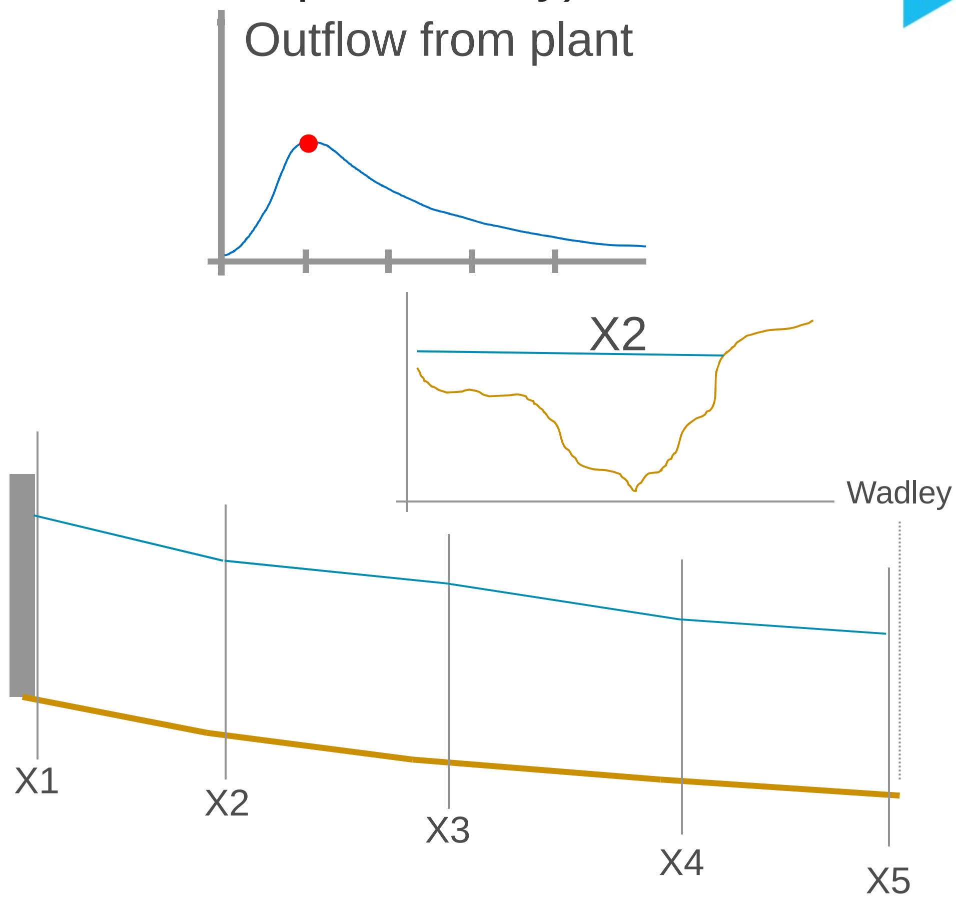
HEC-RAS (For Illustration Purposes Only)



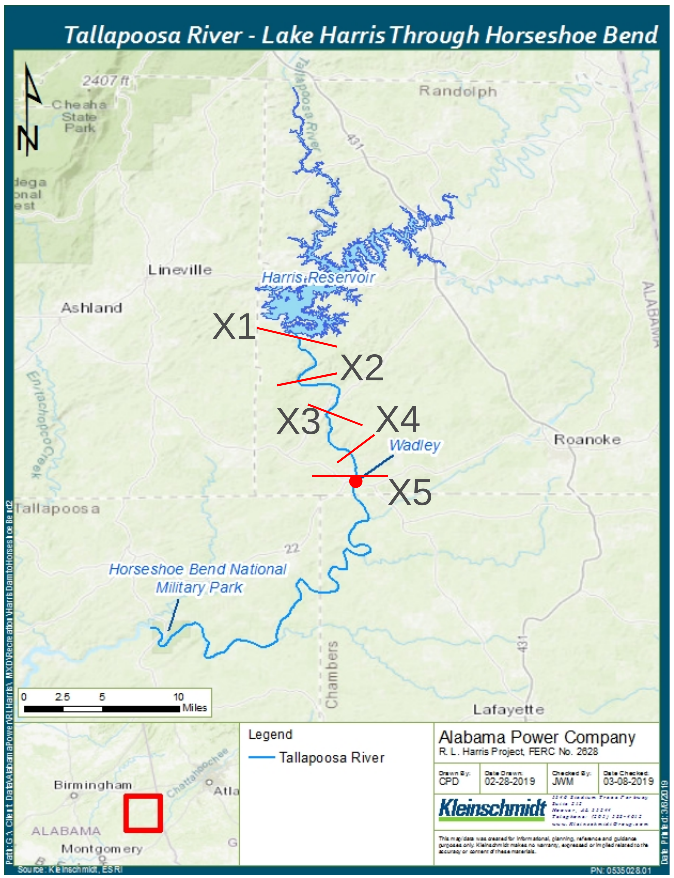


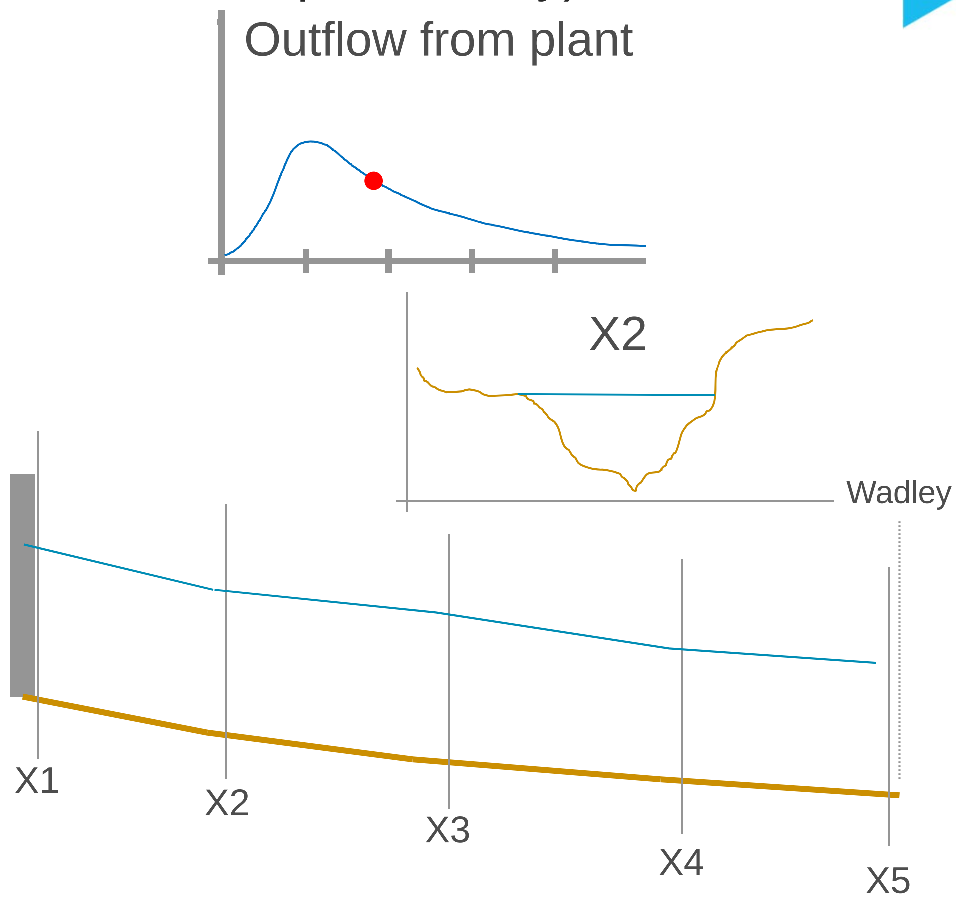
HEC-RAS (For Illustration Purposes Only)



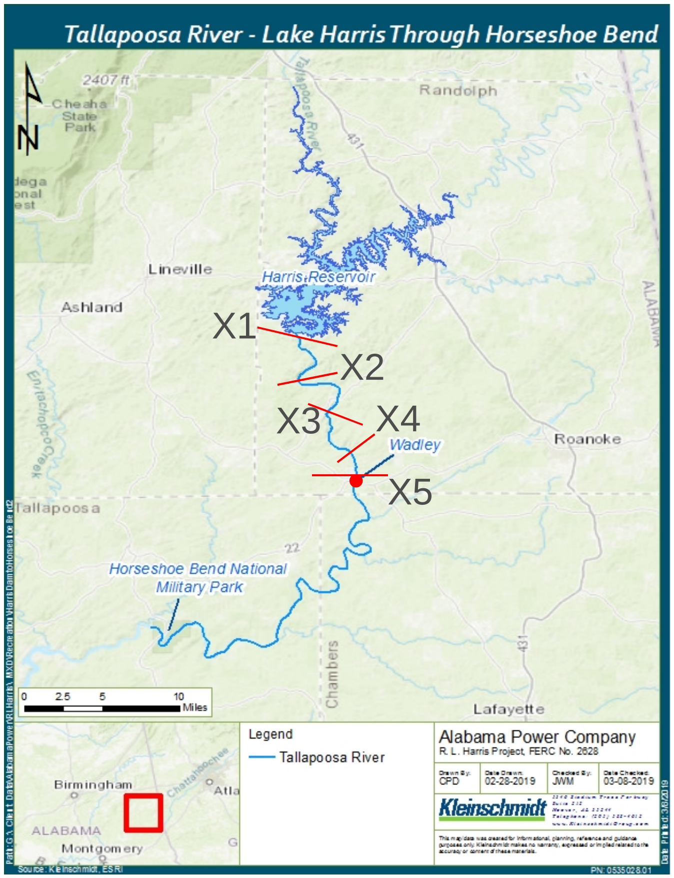


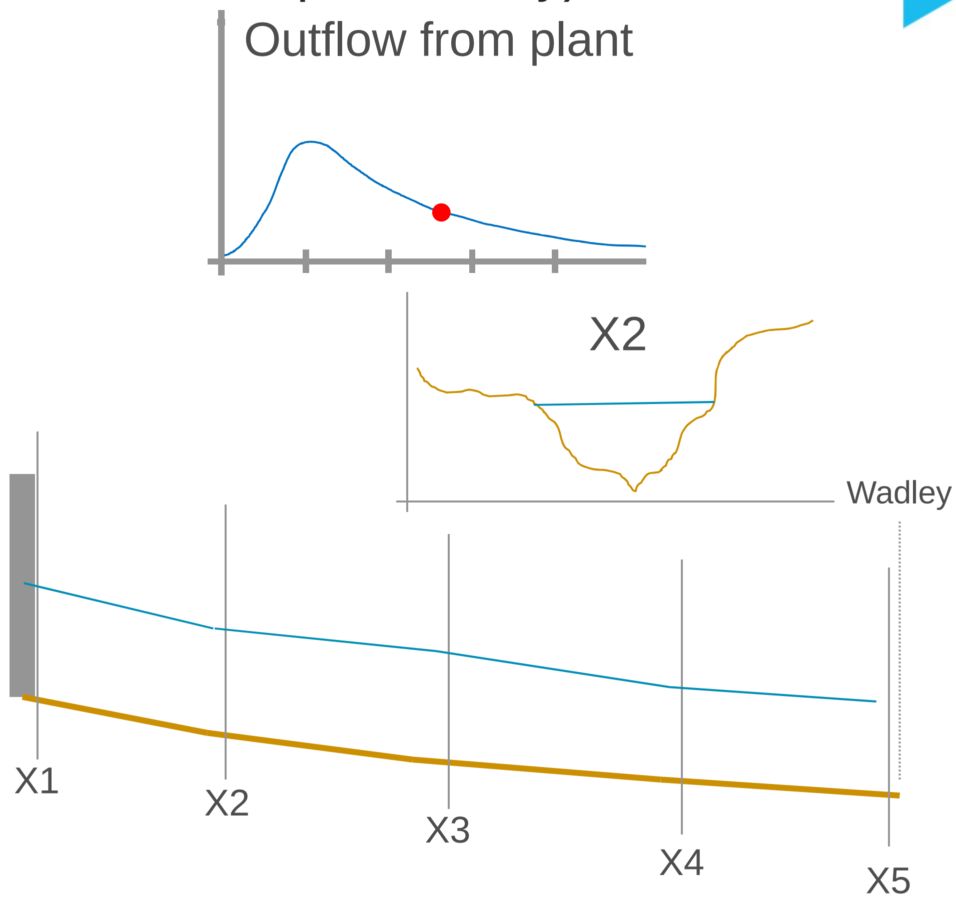
HEC-RAS (For Illustration Purposes Only)



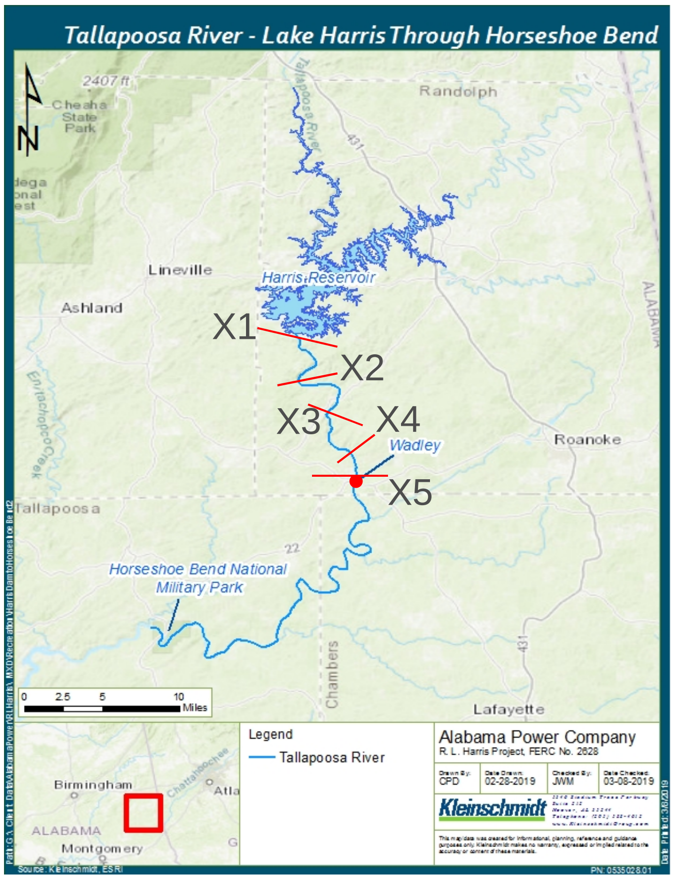


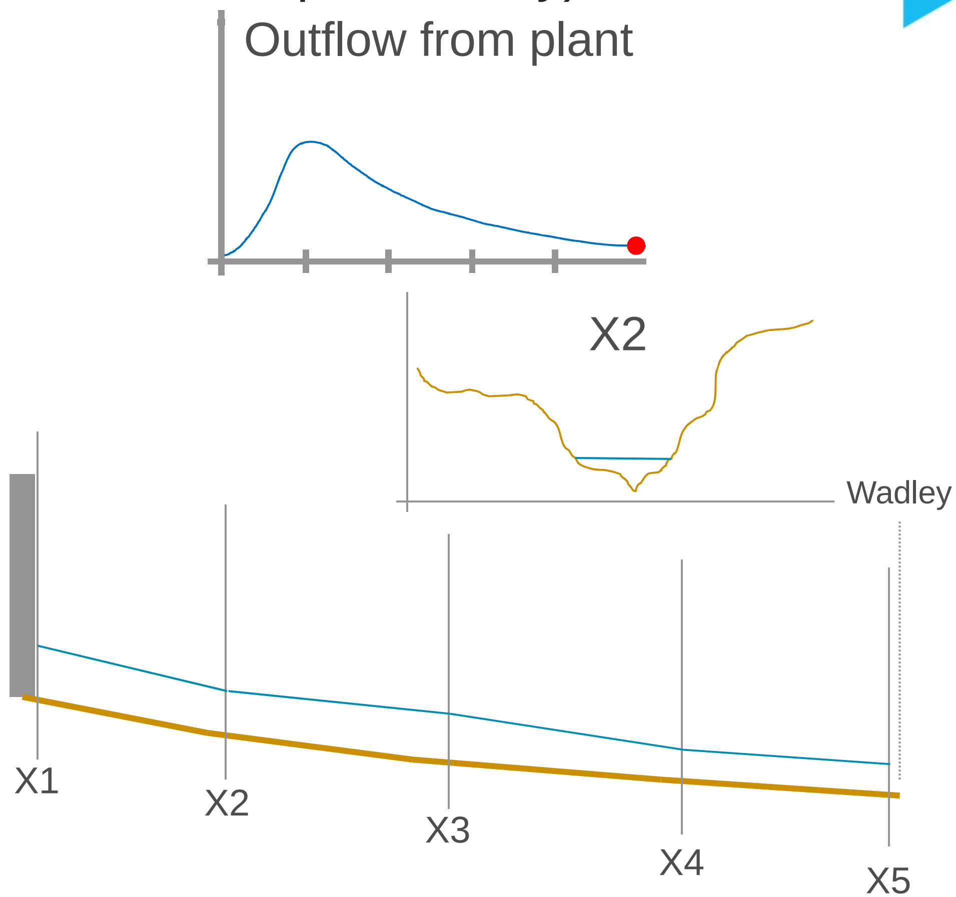
HEC-RAS (For Illustration Purposes Only)



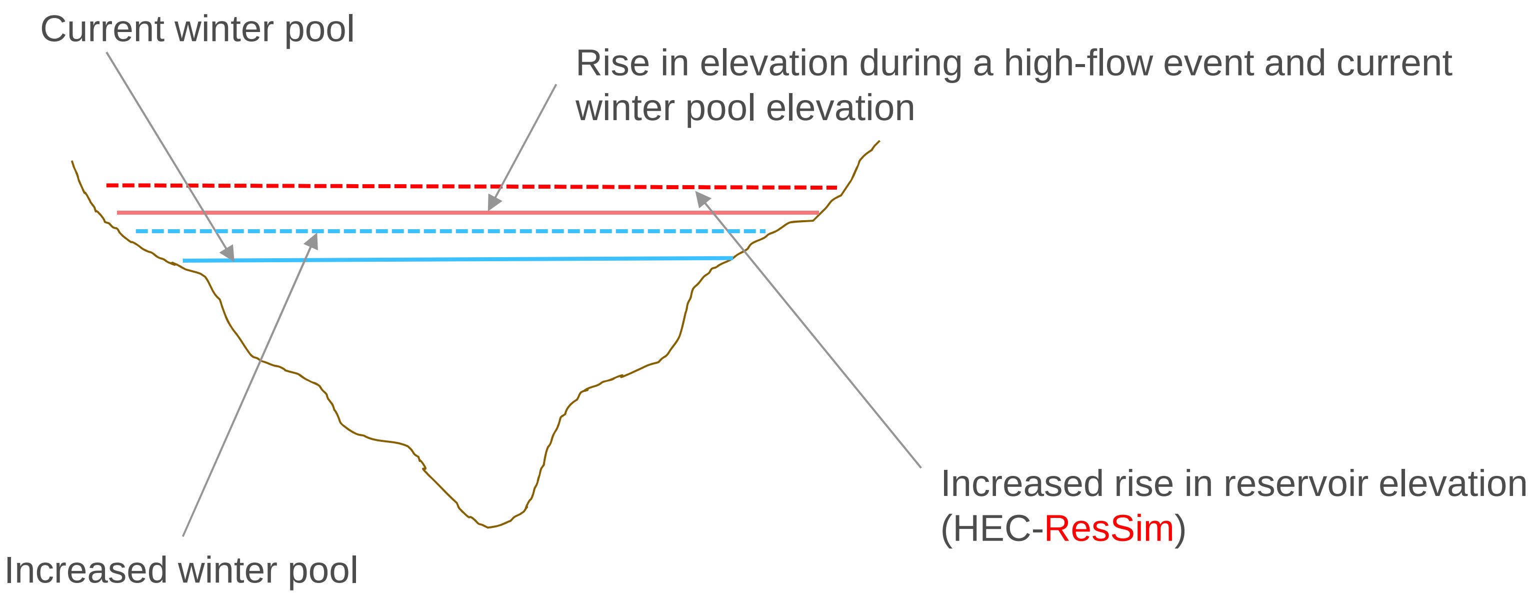


HEC-RAS (For Illustration Purposes Only)



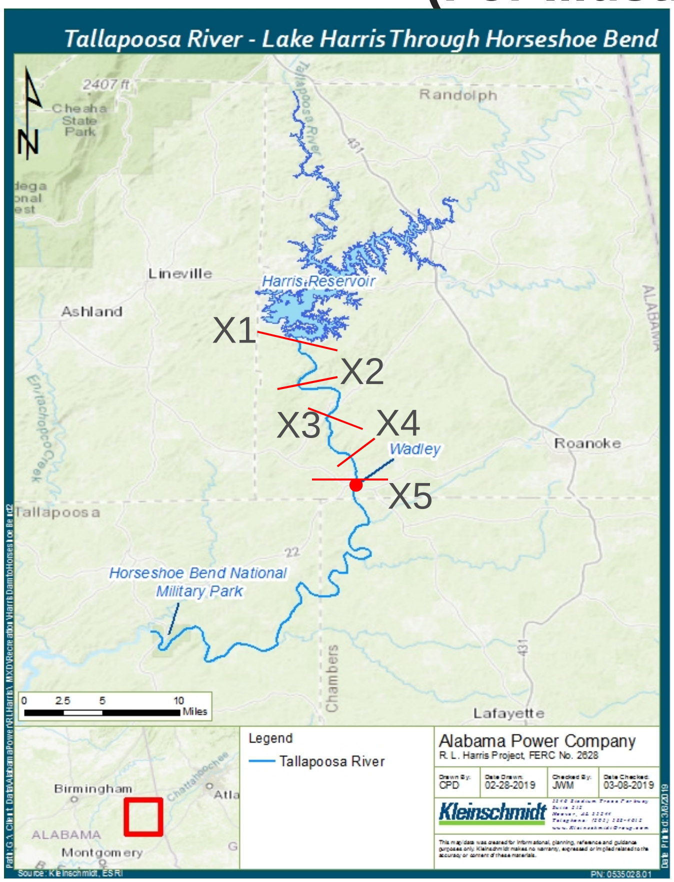


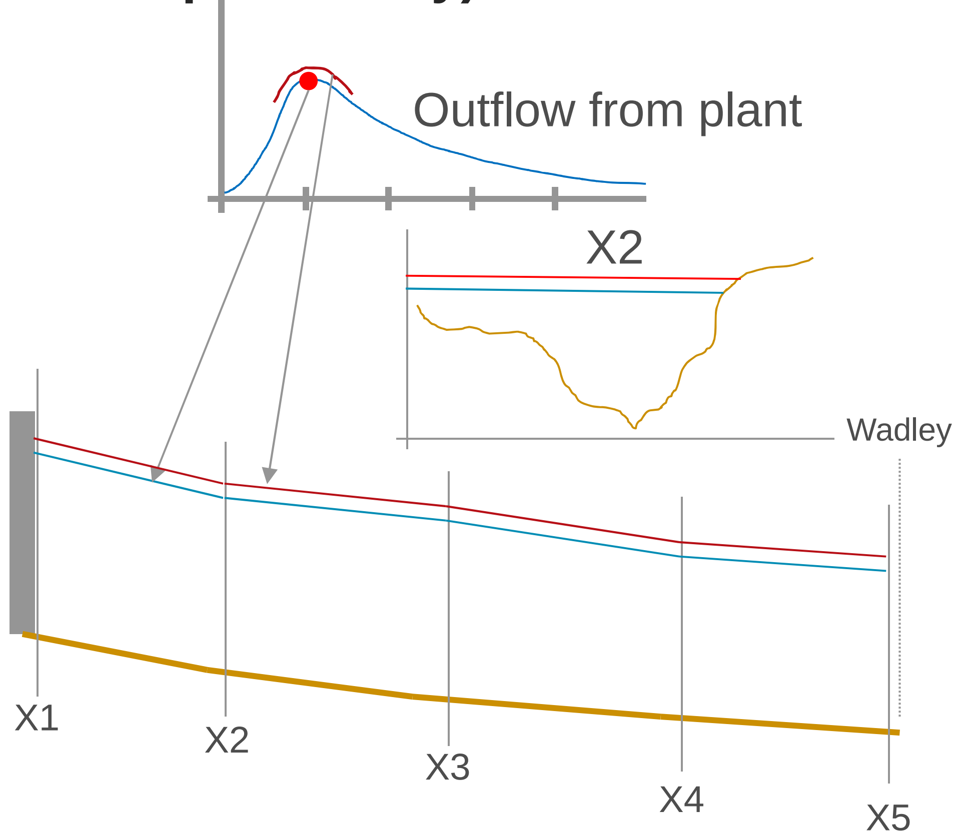
If the winter pool is increased, what happens during a high-flow event?



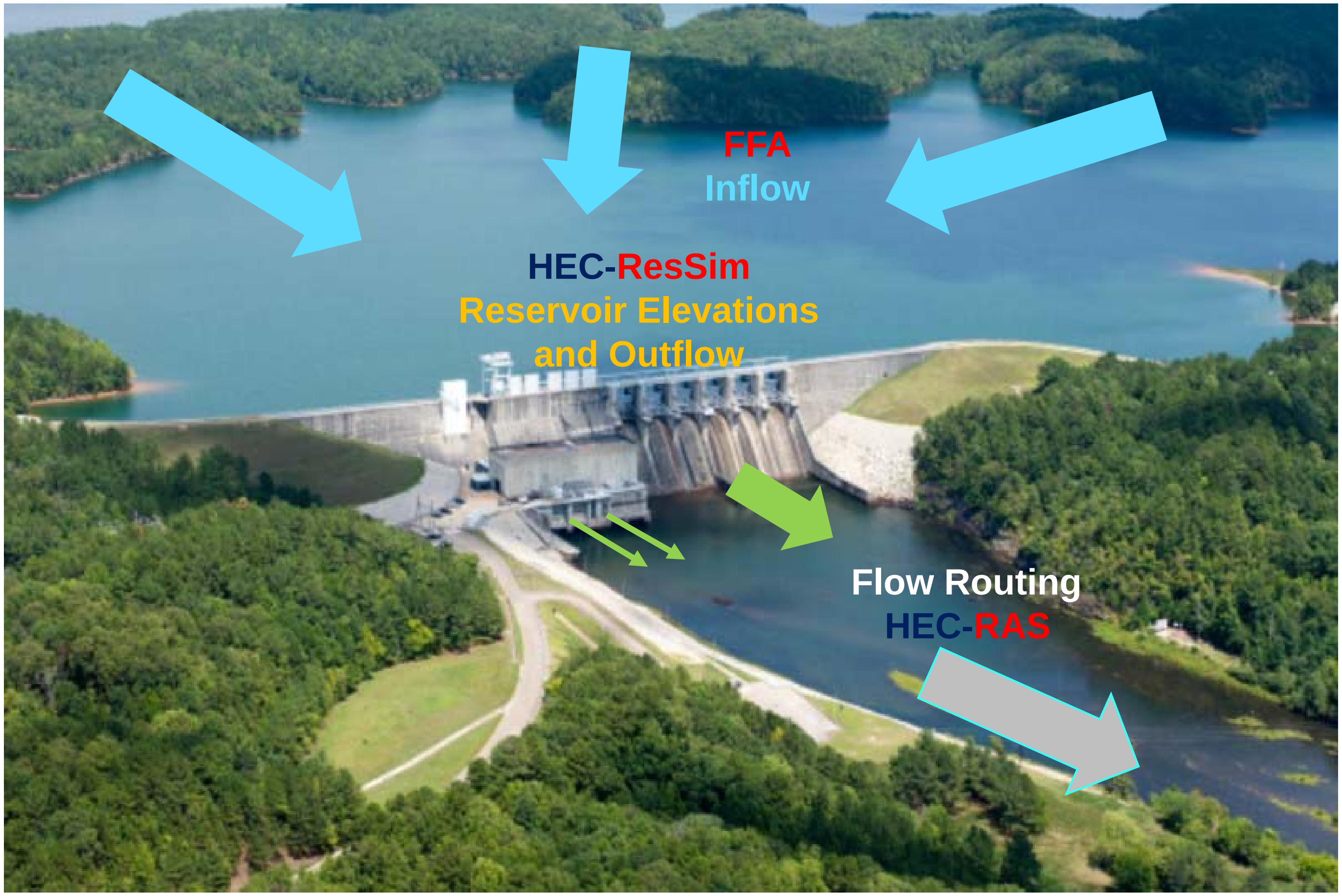
AND…

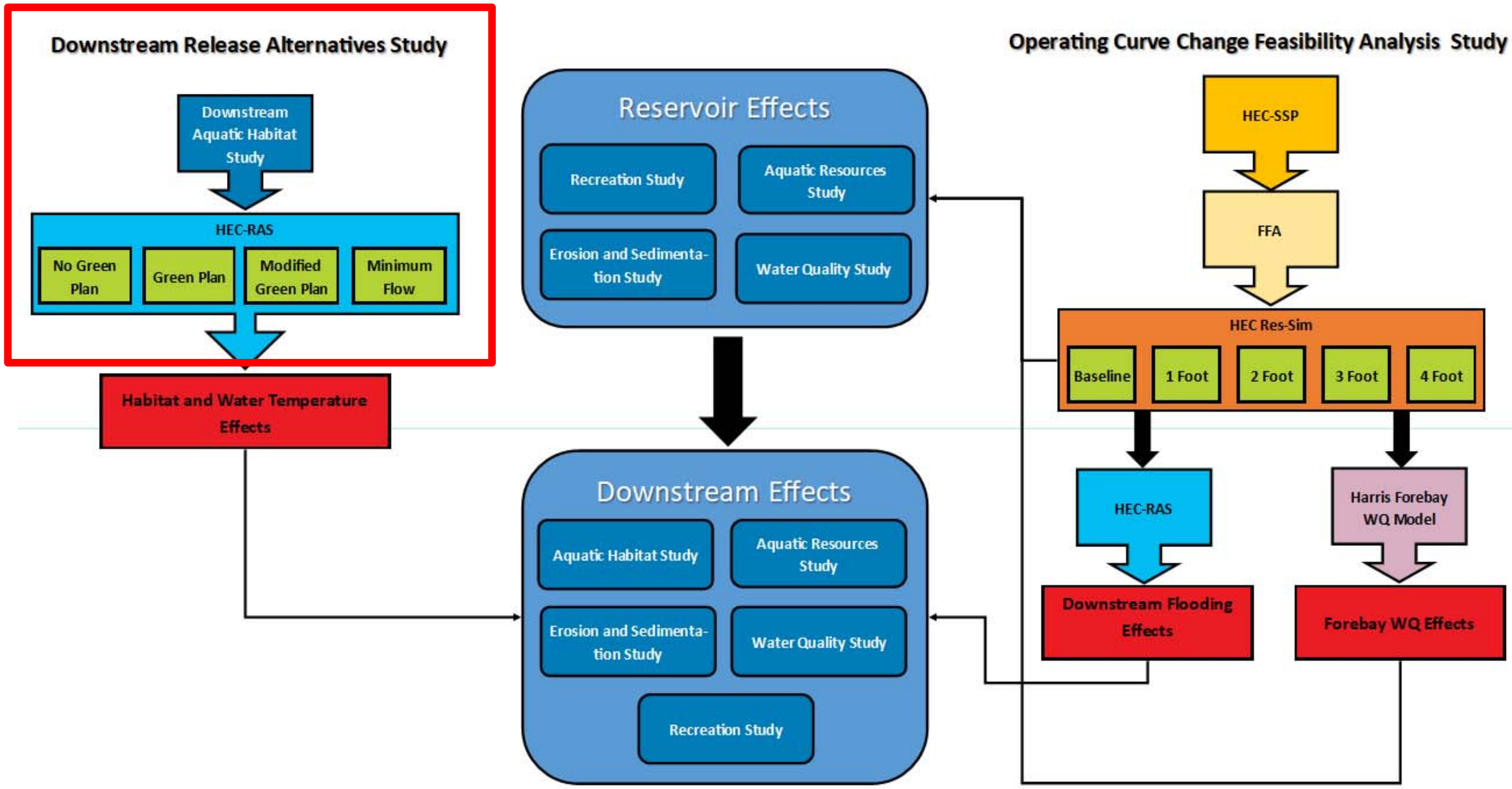
What happens when more water is released?
(For Illustration Purposes only)





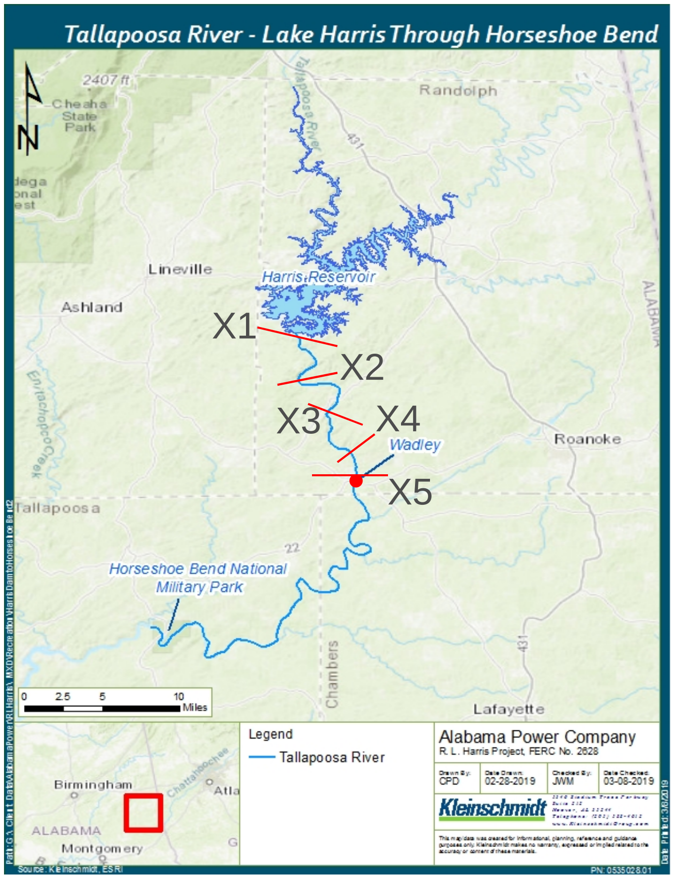
To summarize with a picture…




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 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

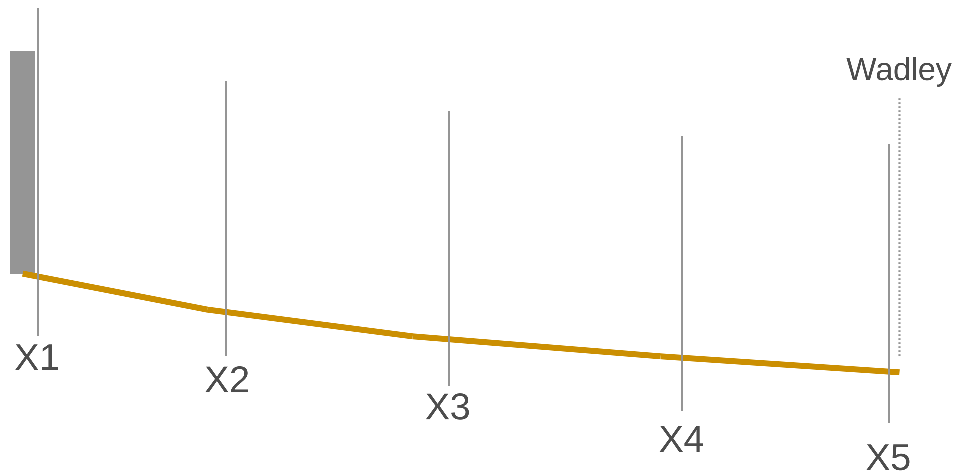
Downstream Release Alternatives Study

HEC-RAS model



Alternatives Studied

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

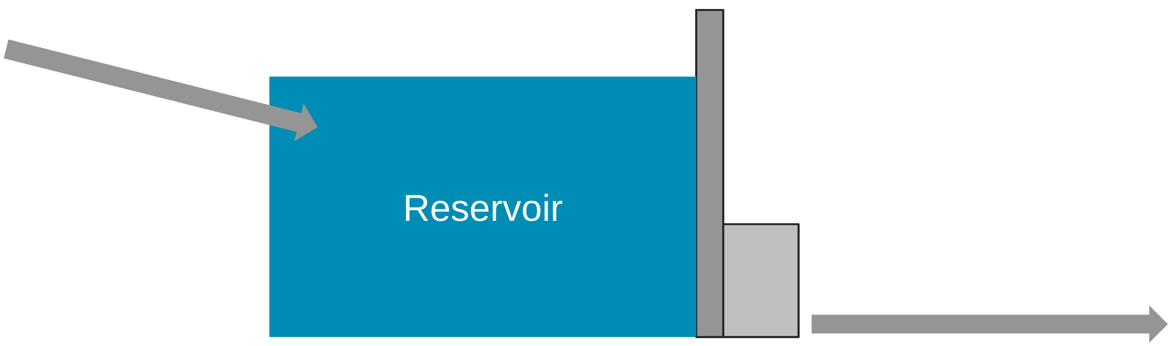


Downstream Release Alternatives Study

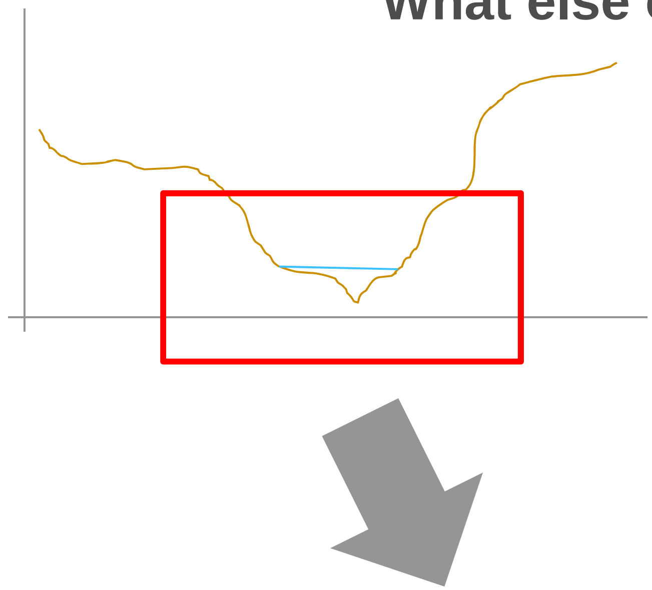
HEC-ResSim model

Alternatives Studied

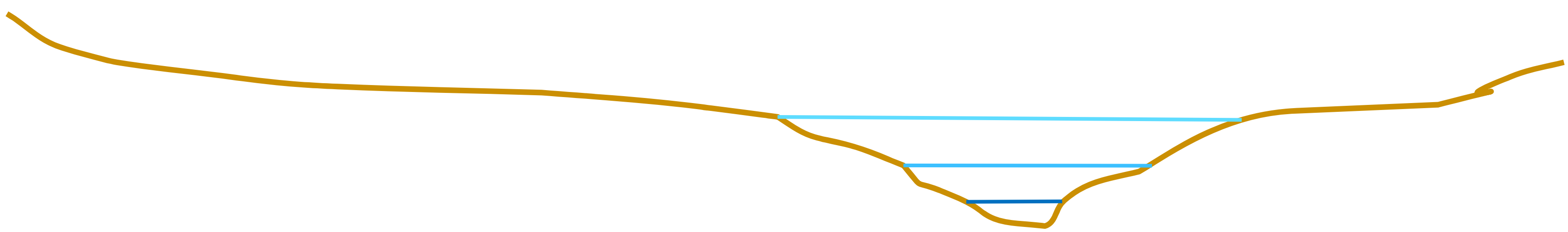
- Green Plan
- No Green Plan
- Modified Green Plan
- 150 cfs continuous minimum flow



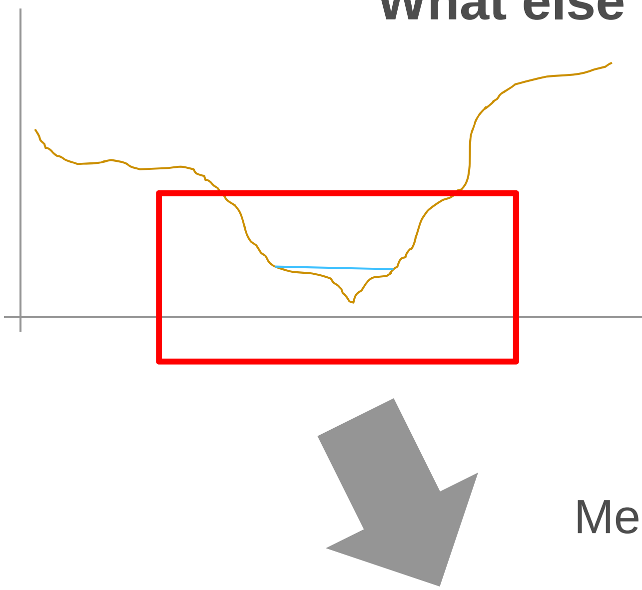
What else can HEC-RAS be used for?



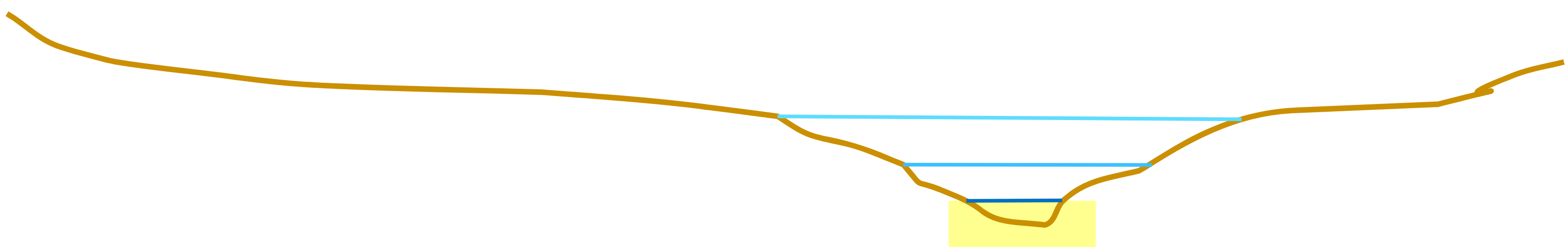
Downstream release alternatives
Water quality
Water Use
Erosion
Aquatic Resources
Wildlife and Terrestrial Resources
Recreation Resources
Cultural Resources



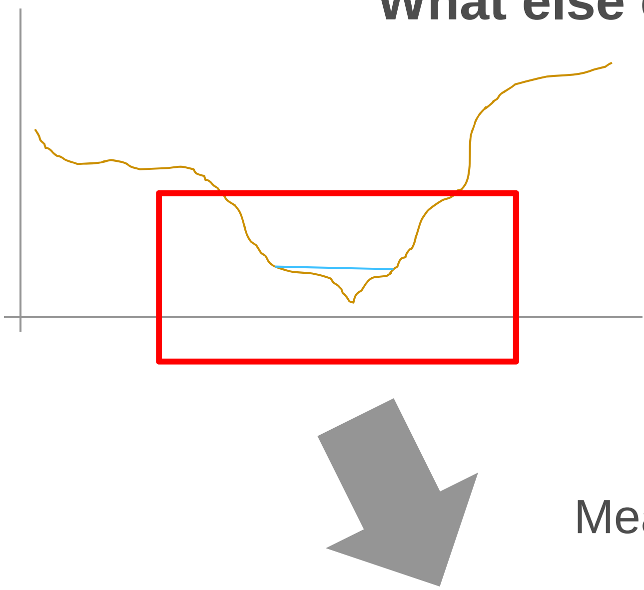
What else can HEC-RAS be used for?



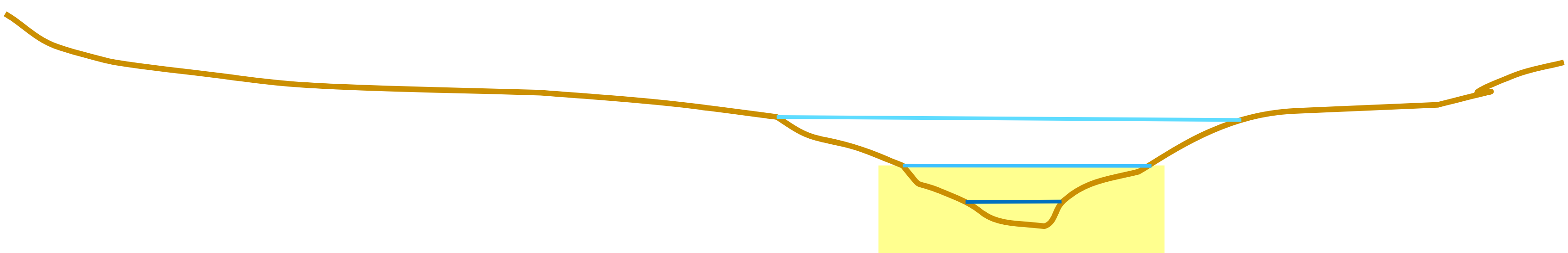
Measure wetted perimeter during low flow scenarios



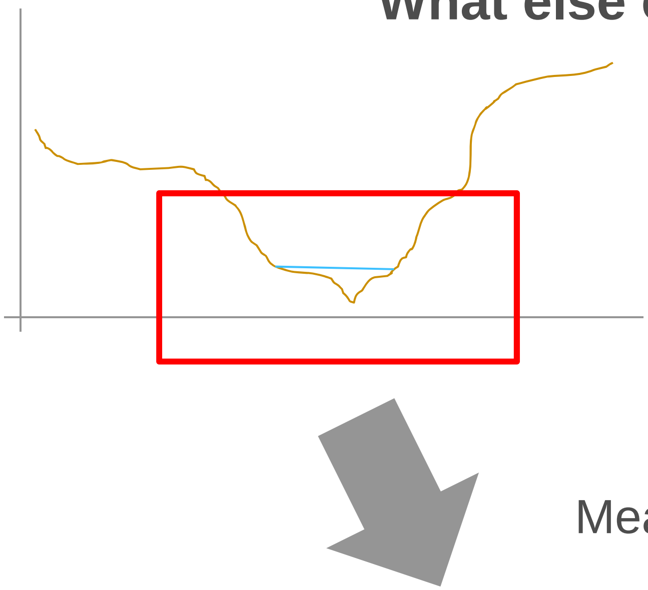
What else can HEC-RAS be used for?



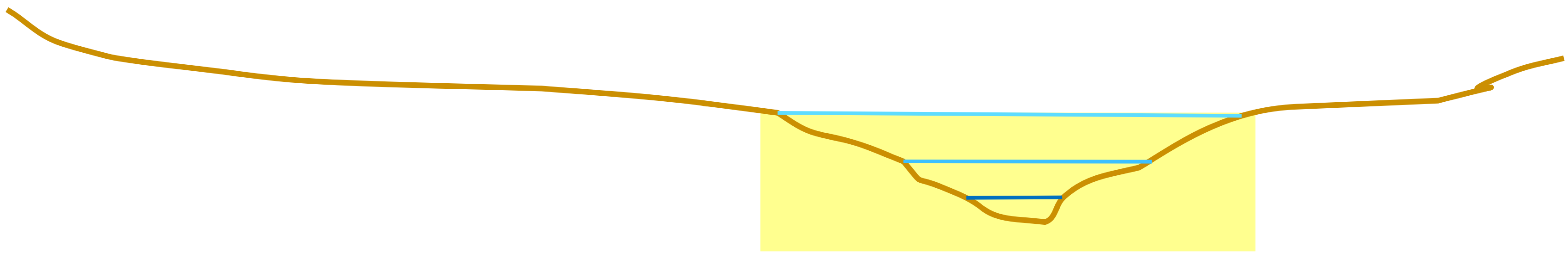
Measure wetted perimeter during low flow scenarios

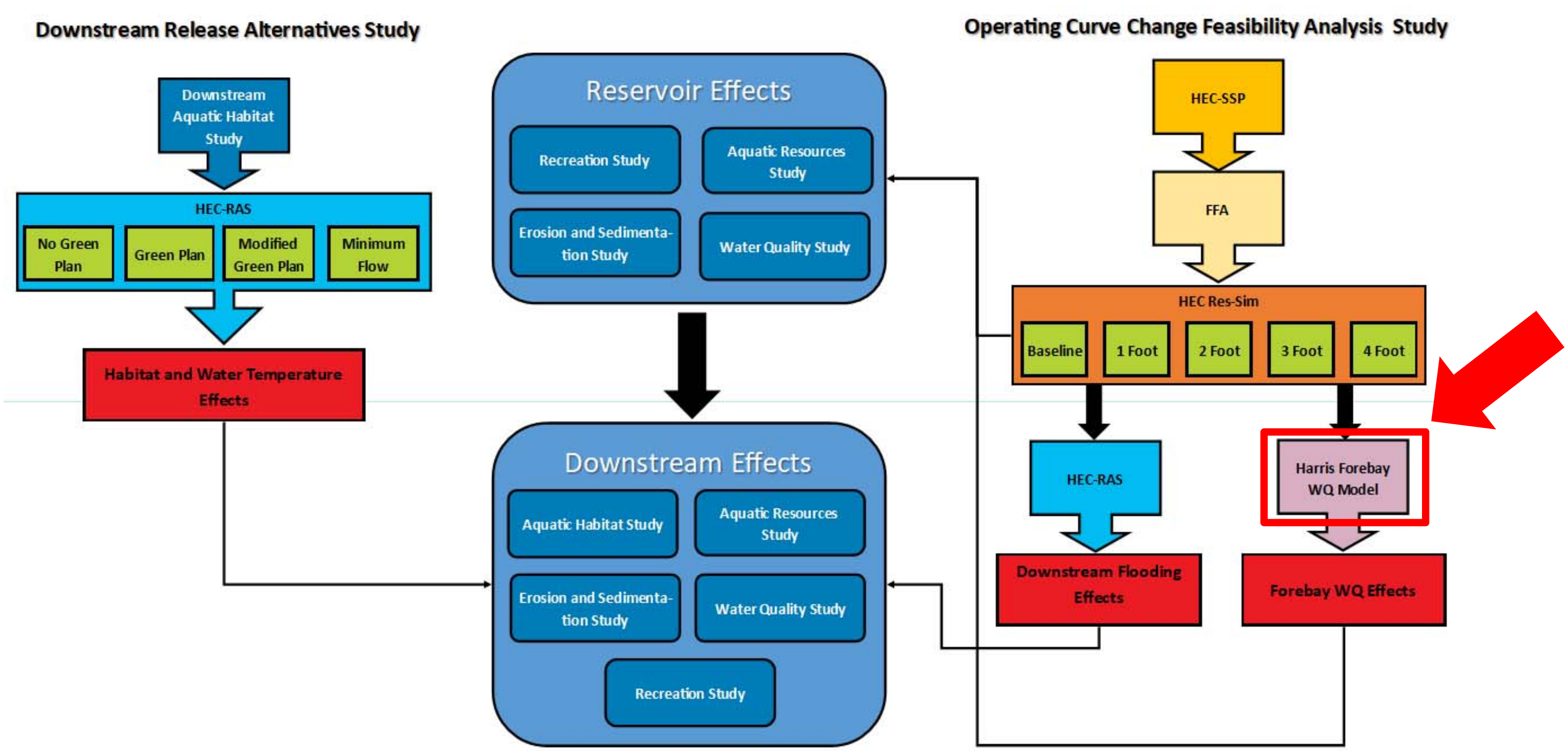


What else can HEC-RAS be used for?



Measure wetted perimeter during low flow scenarios





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

Harris Forebay WQ Model

United States Environmental Protection Agency

Environmental Topics | Laws & Regulations | About EPA | Search EPA.gov

Environmental Modeling Community of Practice

CONTACT US

SHARE

- Environmental Modeling Community of Practice Home
- Modeling Products
- Groundwater Models
- Surface Water Models
- Food Chain Models
- Multimedia Models
- TMDL Models and Tools
- Tools & Data
- Information Sources

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

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>; 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>; 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>; amy.silvano@dcnr.alabama.gov <amy.silvano@dcnr.alabama.gov>; chris.greene@dcnr.alabama.gov <chris.greene@dcnr.alabama.gov>; damon.abernethy@dcnr.alabama.gov <damon.abernethy@dcnr.alabama.gov>; evan.lawrence@dcnr.alabama.gov <evan.lawrence@dcnr.alabama.gov>; keith.henderson@dcnr.alabama.gov <keith.henderson@dcnr.alabama.gov>; mike.holley@dcnr.alabama.gov <mike.holley@dcnr.alabama.gov>; stan.cook@dcnr.alabama.gov <stan.cook@dcnr.alabama.gov>; steve.bryant@dcnr.alabama.gov <steve.bryant@dcnr.alabama.gov>; taconya.goar@dcnr.alabama.gov <taconya.goar@dcnr.alabama.gov>; ken.wills@jcdh.org <ken.wills@jcdh.org>; arsegars@southernco.com <arsegars@southernco.com>; ammcvica@southernco.com <ammcvica@southernco.com>; dkanders@southernco.com <dkanders@southernco.com>; jcarlee@southernco.com <jcarlee@southernco.com>; jefbaker@southernco.com <jefbaker@southernco.com>; kechandl@southernco.com <kechandl@southernco.com>; tlmills@southernco.com <tlmills@southernco.com>; cggoodma@southernco.com <cggoodma@southernco.com>; clowry@alabamarivers.org <clowry@alabamarivers.org>; cchaffin@alabamarivers.org <cchaffin@alabamarivers.org>; gjobsis@americanrivers.org <gjobsis@americanrivers.org>; devridr@auburn.edu <devridr@auburn.edu>; irwiner@auburn.edu <irwiner@auburn.edu>; kmo0025@auburn.edu <kmo0025@auburn.edu>; wrighr2@aces.edu <wrighr2@aces.edu>; jhancock@balch.com <jhancock@balch.com>; lgallen@balch.com <lgallen@balch.com>; chrisoberholster@birminghamaudubon.org <chrisoberholster@birminghamaudubon.org>; sarah.salazar@ferc.gov <sarah.salazar@ferc.gov>; allan.creamer@ferc.gov <allan.creamer@ferc.gov>; rachel.mcnamara@ferc.gov <rachel.mcnamara@ferc.gov>; monte.terhaar@ferc.gov <monte.terhaar@ferc.gov>; amanda.fleming@kleinschmidtgroup.com <amanda.fleming@kleinschmidtgroup.com>; colin.dinken@kleinschmidtgroup.com <colin.dinken@kleinschmidtgroup.com>; henry.mealing@kleinschmidtgroup.com <henry.mealing@kleinschmidtgroup.com>; jason.moak@kleinschmidtgroup.com <jason.moak@kleinschmidtgroup.com>; kate.cosnahan@kleinschmidtgroup.com <kate.cosnahan@kleinschmidtgroup.com>; kelly.schaeffer@kleinschmidtgroup.com <kelly.schaeffer@kleinschmidtgroup.com>; sforehand@russelllands.com <sforehand@russelllands.com>; lgarland68@aol.com <lgarland68@aol.com>; pace.wilber@noaa.gov <pace.wilber@noaa.gov>; mitchell.reid@tnc.org <mitchell.reid@tnc.org>; donnamat@aol.com <donnamat@aol.com>; trayjim@bellsouth.net <trayjim@bellsouth.net>; mhpwedowee@gmail.com <mhpwedowee@gmail.com>; straylor426@bellsouth.net <straylor426@bellsouth.net>; triciastearns@gmail.com <triciastearns@gmail.com>; wmcampbell218@gmail.com <wmcampbell218@gmail.com>; holliman.daniel@epa.gov <holliman.daniel@epa.gov>; decker.chris@epa.gov <decker.chris@epa.gov>; bill_pearson@fws.gov <bill_pearson@fws.gov>; evan_collins@fws.gov <evan_collins@fws.gov>; jeff_powell@fws.gov <jeff_powell@fws.gov>; jennifer_grunewald@fws.gov <jennifer_grunewald@fws.gov>; jeff_duncan@nps.gov <jeff_duncan@nps.gov>

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,

Angie Anderegg
Hydro Services
(205)257-2251

arsegars@southernco.com

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,

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

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