



ALABAMA POWER COMPANY

BIRMINGHAM, ALABAMA

MARTIN HYDROELECTRIC PROJECT

FERC NO. 349

STUDY PLAN 12 (D) – EFFECTS OF A RULE CURVE CHANGE ON LAKE AND DOWNSTREAM EROSION

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Prepared by:



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**STUDY PLAN 12 (D) – EFFECTS OF A RULE CURVE CHANGE
ON LAKE AND DOWNSTREAM EROSION**

1.0 GOALS AND OBJECTIVES OF STUDY

Many stakeholder groups have requested that the Alabama Power Company (Alabama Power) investigate the feasibility of raising the winter rule curve at Martin. In Study Plan 12 (a), Alabama Power is conducting a study that will model an increase in the winter pool elevation in increments of 1 foot from el. 481 ft. msl¹ to el. 486 ft. msl. as well as to examine extending the summer pool level in the shoulder seasons (later winter/early spring and early fall). As a result of this potential rule curve change, Alabama Power must address potential changes to shoreline erosion in Lake Martin, the Martin tailrace and Tallapoosa River downstream of Thurlow Dam that may result from increased frequency, duration and/or magnitude of flooding.

Objectives of this study would be:

- 1) to identify the effect that increased flooding may have on the increase number of shoreline erosion sites that may occur in the Martin tailrace and Tallapoosa River downstream of Thurlow Dam.
- 2) to evaluate the potential for increased or decreased erosion at the current erosion sites identified on Lake Martin in the MIG 2 Erosion Study Plan #3.

2.0 RELEVANT RESOURCE MANAGEMENT GOALS

The consulting agencies regulate recreational fishing and water quality resources on Lake Martin and the Tallapoosa River. As part of that responsibility, they would like to limit project related shoreline erosion and its impacts on the aquatic resources (instream habitat, fish, unionids, and water quality). An additional goal would be to avoid increased levels of erosion and the associated impacts to cultural resources that may occur.

3.0 BACKGROUND AND EXISTING INFORMATION

Project operations related to lake level fluctuations up to 10 feet during the winter drawdown may result in areas of the shoreline that exhibit erosion within the lakebed. These hotspot areas of erosion may increase or decrease (in number and/or erosion rate) with a reduction in the winter drawdown. Lake Martin serves as a flood control reservoir, however periodic flooding still occurs downstream of the Thurlow Dam. A reduction in the flood control ability of Lake Martin could increase the frequency, duration, and/or magnitude of flood events in the Martin tailrace and Tallapoosa River downstream of Thurlow Dam. This increased flooding could result in additional shoreline erosion which may impact aquatic resources.

¹ Elevation 481 ft msl is equivalent to el. 480 Martin Datum (MD).

LIDAR information and flyover photography are available for Lake Martin, the Martin tailrace, and the Tallapoosa River downstream of Thurlow Dam to the mouth of the Tallapoosa River. Alabama Power is currently addressing various erosion areas downstream of Thurlow Dam and therefore has some baseline information for that aspect of the issue. This information may be helpful in identifying current and potential areas of erosion within the study area.

4.0 PROJECT NEXUS

Erosion “hotspot” sites related to existing project lake level fluctuation can periodically occur along the Lake Martin shoreline, Martin tailrace, or along the Tallapoosa River downstream of Thurlow Dam to the mouth of the Tallapoosa River. Changes in the project operation rule curve may result in an affect on these existing “hotspots” or create additional areas of erosion. Excessive erosion may adversely affect shoreline and aquatic resources of the project. The Project is licensed by FERC and all proposed operational changes must be disclosed and affects addressed in the license application to FERC.

5.0 STUDY AREA AND STUDY SITES

Alabama Power has identified Martin Project operation-related effects downstream to the USGS river gage at Montgomery Water Works located on the Tallapoosa River at RM 12.9. The proposed geographic scope for this study would include the Tallapoosa River from the Project to the Montgomery Water Works river gage. Alabama Power has selected the Montgomery Water Works location for three primary reasons. Having a geographic scope that includes 30+ miles below the Project will account for the principal effects of Martin's operations downstream. Also, the Montgomery Water works location has 18+ years of gage data that would be available for use in depicting elevations and Martin Project related effects on that gage. Finally, keeping the geographic scope limited to the Montgomery Water Works, compared to expanding the scope to the confluence of the Coosa and Tallapoosa Rivers, would minimize the hydrologic complexity of the Coosa and Alabama Rivers operations and intervening flows. Keeping the geographic scope to the Montgomery Water Works would focus on the effects of the Martin Project operations, including low, normal and high flow operations.

6.0 PROPOSED METHODOLOGY

Alabama Power proposes to evaluate the potential changes to the existing erosion hotspots and the potential increase in the number of erosion hotspots along the Lake Martin shoreline and Tallapoosa River downstream consistent with the geographic scope identified in Section 5.0.

6.1 Lake Martin and Martin Tailrace Erosion Hotspots

To assess changes to the existing erosion hotspots located on the Lake Martin shoreline and Martin tailrace, Alabama Power will perform an evaluation to determine if each hotspot will potentially improve or decline with a change in the winter drawdown.

At each identified erosion site, the investigator will evaluate the substrate type at 1 foot increments from el. 481 ft. msl to el. 486 ft. msl. to estimate if a change in lake level fluctuation would benefit or adversely affect the site. The data for each site will be summarized in a report and shared with the MIG 3 for review and comment.

6.2 Tallapoosa River Erosion Hotspots

To assess changes to the existing erosion hotspots located on the Tallapoosa River downstream of Thurlow Dam (consistent with the geographic scope of analysis identified in Section 5.0), Alabama Power will perform an evaluation to determine how multiple existing erosion hotspots (up to 10) will respond to an increase in flooding. The results of the Rule-Curve Model on downstream flooding resulting from each 1-foot reduction will be overlaid with the existing Alabama Power survey data on the LIDAR data for the study area to estimate how each area will respond. This process will also be used to identify potential increases in the number of erosion sites that may occur with increased flooding associated with each 1-ft increment of lake level change in the winter drawdown. The data from this analysis will be summarized in a report and shared with the MIG 3 for review and comment.

7.0 CONSISTENCY WITH GENERALLY ACCEPTED SCIENTIFIC PRACTICE

The planned study methods discussed above are consistent with typical erosion investigations. These methods will be discussed with the federal and state agencies and other interested stakeholders for comment and revision prior to submittal to FERC.

8.0 PRODUCTS

Upon completion of the study, a draft report of erosion spots, including maps (both hard copy and electronic), of Lake Martin, Martin tailrace, and the Tallapoosa River downstream of Thurlow Dam will be distributed to the MIG 2 for review and comment. Upon review and discussion, Final reports will be filed with the Martin License Application.

9.0 SCHEDULE

This schedule corresponds to Alabama Power’s Process Plan and Schedule filed with FERC on February 16, 2009. Actual consultation meeting dates will be determined with MIG 1 members upon FERC approval of the study plan.

Alabama Power files Final Study Plan	March 2009
FERC Approval	April 2009
Erosion Hotspot Surveys on Lake Martin and Martin Tailrace.....	September 2009 – January 2010
Identify potential levels of downstream flooding from Model.....	September 2009

Downstream flooding	
survey/analysis	October 2009 – January 2010
Initial Study Report.....	November 2009
Initial Study Report Meeting	December 2009
Draft Reports.....	April 2010
Final Reports.....	December 2010
FERC Updated Study Report.....	September 2010
Updated Study Report Meeting	September 2010

10.0 LEVEL OF EFFORT AND COST

Alabama Power estimates that consultation with the MIG 3 and development of models and analysis on the potential rule curve change at Lake Martin will cost approximately \$75,000.

11.0 REFERENCES