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Sent: Friday, November 16, 2007 10:50 AM
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Cc:
Subject: Martin Relicensing - Distribution of Draft MIG 1 (Fish and Wildlife) Study Plans

Attachments: 1 Migratory Fish Study Plan (DRAFT 11-16-07).doc; 2 Shoreline Habitat Assessment Study Plan (DRAFT 11-16-07).doc; 3 Tailrace Minimum Flow Study Plan (DRAFT 11-16-07).doc; 4 Fish Entrainment Study Plan (DRAFT 11-16-07).doc; 5 RTE Surveys Study Plan (DRAFT 11-16-07).doc; 6 Striped Bass Study Plan (DRAFT 11-16-07).doc; 7 Wildlife Management Plan Study Plan (DRAFT 11-16-07).doc; ILP study_criteria.pdf

MIG 1 Members,

At the September 2007 Martin Issue Group (MIG) meetings in Alexander City, we discussed the MIG sheets and provided a summary of the study plans that Alabama Power has developed in consultation with the state and federal resource agencies to address the effects of the Martin Project on the environmental resources. The notes from those meetings and the PowerPoint presentations are available on the Martin Relicensing website at <http://www.alabamapower.com/hydro/martin.asp>. We indicated that the draft study plans were undergoing further revisions and would soon be available for review and discussion by the applicable MIGs.

Accordingly, attached herewith for your review and comment are the following 7 draft study plans associated with MIG 1, Fish and Wildlife. These are the plans Alabama Power is proposing to implement upon FERC approval. As discussed during the September meetings, the study plans will be submitted to FERC in June 2008, and should be approved by FERC and ready for implementation in early 2009. Please review these draft plans and provide any comments/edits you may have to me on or before **December 14, 2007**. (The documents are in Microsoft Word and can be edited easily using track changes.) To facilitate your review, also attached is a copy of FERC's Study Criteria that must be followed in the Integrated Licensing Process.

MIG 1 - Fish and Wildlife Draft Study Plans

1. Migratory Fish - Tallapoosa Basin Literature Review
2. Lake Martin - Assessment of Fish Density and Species Composition Associated with Various Shoreline Types
3. Evaluation of Minimum Flows Downstream of Martin Dam
4. Fish Entrainment and Turbine Mortality
5. Rare, Threatened, and Endangered Species Surveys
6. Striped Bass Tagging - Hydroacoustic Collections
7. Wildlife Management Plan

You may also be aware that on October 23, 2007, Alabama Power filed a request with FERC for approval of a drought-based temporary variance of the Martin rule curve. FERC is currently reviewing our request, and we sincerely appreciate the letters and emails of support that were filed by homeowners and the state and federal resource agencies. We anticipate receiving a favorable ruling from FERC by the end of next

week.

Our next meeting of the MIGs will occur in early February 2008 at the Betty Carol Graham Center in Alexander City. We will focus primarily on the comments received on the draft study plans for each MIG. Once an exact date in February is selected, we will notify you by email and also post the date on our website. As always, if you cannot attend meetings, notes and meeting materials will be posted to the Martin Relicensing website within two weeks following the meeting.

If you have any questions, please send me an email or give me a call at 205-257-4265. We look forward to your continued participation in the Martin relicensing effort. Have a safe and joyous holiday season!



1 Migratory Fish
Study Plan (...)



2 Shoreline Habitat
Assessmen...



3 Tailrace Minimum
Flow Study...



4 Fish Entrainment
Study Plan...



5 RTE Surveys
Study Plan (DRA...



6 Striped Bass
Study Plan (DR...



7 Wildlife
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Jim

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Study Plan 1 - Migratory Fish – Tallapoosa Basin Literature Review

1.0 GOALS AND OBJECTIVES OF STUDY

The U.S. Fish and Wildlife Service (USFWS) is interested in understanding and documenting the migratory species that currently or historically utilized the Tallapoosa River through a literature-based review. American eel is of main concern as this catadromous species has been collected in the Tallapoosa River downstream of the Thurlow Project, and passage of this species through the multiple dams on the Tallapoosa and Alabama Rivers is a concern for completion of its lifecycle.

USFWS is also interested in what other southeast hydroelectric power projects are doing in regard to managing American eels and would like to see a review and summary of other American eel management plans and any recovery plans for diadromous fish species in the Tallapoosa Basin.

2.0 RELEVANT RESOURCE MANAGEMENT GOALS

Impacts to migratory rare, threatened, endangered or commercial fish species (including the American eel) are of concern to the NOAA National Marine Fisheries Service and the USFWS as part of their Section 18 authority provided in the Federal Power Act. The USFWS has expressed a particular interest in southeast management goals for the American eel, and how the operation and relicensing of the Martin Project fits into those goals.

3.0 BACKGROUND AND EXISTING INFORMATION

There is extensive information available on migratory fish species including American eel. Many of these species are rare, threatened, endangered or of commercial value and have been studied on the Atlantic and Gulf coasts. A review of some of the information available is provided at the following internet sites:

- <http://www.fws.gov/southeast/gulfcoast/>
- <http://www.fws.gov/daphne/sturgeon/sturgeon.html>
- <http://www.nefsc.noaa.gov/sos/spsyn/op/eel/>
- http://www.nefsc.noaa.gov/sos/spsyn/op/eel/archives/28_AmericanEel_2006.pdf
- http://www.fws.gov/northeast/ameel/American_Eel_Questions_and_Answers.PDF
- <http://www.fws.gov/southeast/fisheries/SEFishPassage/SE%20FISH%20AND%20AQUATIC%20SPECIES%20BARRIER%20ASSESSMENT%20WORKSHOP%20DAY%202%20Questions.pdf>
- http://nia.ecsu.edu/noaa/0506/noaa_coastal_conference/coastal_agenda_draft.pdf

Additional citations that are available are:

- ASMFC. 2006a. Terms of Reference and Advisory Report to the American Eel stock assessment peer review. ASMFC Stock Assessment Report 06-01. 23 p.
- ASMFC. 2006b. 2006 review of the Atlantic States Marine Fisheries Commission Fishery Management Plan for American Eel (*Anguilla rostrata*). <http://www.asmfc.org/>.
- Collette, B.B. and G. Klein-MacPhee (ed.). 2002. Bigelow and Schroeder's Fishes of the Gulf of Maine. 3rd edition. Smithsonian Inst. Press. Washington, D.C. 748 p.
- Mettee, M. F., P. E. O'Neil, and J. M. Pierson. 1996. Fishes of Alabama and the Mobile basin. Oxmoor House, Birmingham, AL.

- U. S. Fish and Wildlife Service (USFWS) and Gulf States Marine Fisheries Commission (GSMFC). 1995. Gulf sturgeon recovery plan. U. S. Fish and Wildlife Service, Atlanta, GA.
- U. S. Fish and Wildlife Service (USFWS). 2000. Conservation agreement and strategy for the Alabama sturgeon. U. S. Fish and Wildlife Service, Atlanta, GA

As seen in this sampling of information available, information for the Atlantic and Gulf coasts are readily available. Therefore, there should be adequate information available for a literature-review based study for migratory species including American eel.

4.0 PROJECT NEXUS

Because migratory species use rivers as migratory routes between spawning areas in freshwater and saltwater, hydroelectric dams can serve as obstacles to migration. The Martin Project serves as a potential barrier for fish passage on the Tallapoosa River.

5.0 STUDY AREA AND STUDY SITES

This study would focus on the Tallapoosa River with emphasis on the Martin Project and will include the river downstream of the Yates and Thurlow Projects. It will also include, to some extent, the Alabama River.

6.0 PROPOSED METHODOLOGY

The proposed method for implementing this study would be a literature search and review and summary of the information gathered.

- 1) APC will solicit comments from the USFWS and National Marine Fisheries Service (NMFS) regarding the proposed study plan and request any documents they would like included in this literature search.
- 2) APC will review and summarize the historic range of migratory (anadromous, catadromous, and diadromous) fish species with emphasis on those species that are listed as rare, threatened or endangered on the USFWS and/or NOAA list of commercial species. The intent is to perform a thorough review of relevant literature (peer reviewed and “gray” literature).
- 3) APC will develop a bibliography of all documents (PDF copies of papers/reports/relevant documents and documentation of personal communications conducted) to be transmitted with the Draft Study Report. In addition, APC will develop a written summary for each relevant document reviewed as well as all relevant information gained through correspondence with researchers and others. Summaries for each relevant document should highlight the species, its life cycle and its historic range in the study area.
- 4) Use the “concept paper” developed as part of the Coosa Project E9 IAG (see Attachment A). APC will use the concept paper as a template for developing similar process for Martin.
- 5) For the American eel, APC will review other existing recovery plans for information on how other hydroelectric power projects are addressing passage of American eels.

7.0 CONSISTENCY WITH GENERALLY ACCEPTED SCIENTIFIC PRACTICE

This study employs generally accepted practices for conducting literature searches. As noted above, the USFWS and NMFS will have opportunity to comment and edit this plan to include documents that should be reviewed and summarized as part of this study report.

8.0 PRODUCTS

A draft report summarizing the applicable literature of species associated with the Tallapoosa River Basin, specifically the Martin Project, will be distributed to MIG 1 for review and comment within 4 months of the completion of the literature gathering and review. A final report will be provided as part of the draft license application that will include PDF copies of the literature used for the report.

9.0 SCHEDULE

Literature Review	April 2009
Draft Report	September 2009
Final Report	January 2010

10.0 LEVEL OF EFFORT AND COST

APC estimates the cost of consulting on study plan development, conducting a thorough literature review, developing a study report, and discussing the results with all stakeholders is approximately \$50,000.

11.0 REFERENCES

Many references are provided in the previous document sections.

ATTACHMENT A

ALABAMA POWER COMPANY

BIRMINGHAM, AL

COOSA RELICENSING PROJECT

Alabama River Fish Passage Concept Document

July 2004

Prepared by:

Kleinschmidt
Energy & Water Resource Consultants

Martin Project, FERC No. 349
Draft Date: November 14, 2007

MIG 1 – Fish and Wildlife
DRAFT Study Plans



ALABAMA POWER COMPANY
BIRMINGHAM, ALABAMA

COOSA RELICENSING PROJECT
Alabama River Fish Passage Concept Document

July 2004

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MIG 1 – Fish and Wildlife
DRAFT Study Plans



Plans

**ALABAMA POWER COMPANY
BIRMINGHAM, ALABAMA**

**COOSA RELICENSING PROJECT
ALABAMA RIVER FISH PASSAGE CONCEPT DOCUMENT**

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ALABAMA POWER COMPANY BIRMINGHAM, ALABAMA

COOSA RELICENSING PROJECT ALABAMA RIVER FISH PASSAGE CONCEPT DOCUMENT

1.0 INTRODUCTION

The Alabama Power Company (APC) is currently relicensing seven hydroelectric projects on the Coosa River. The relicensing process includes a multi-year cooperative effort between APC and interested stakeholders to address operational, recreational, and ecological concerns associated with hydroelectric project operations. During the initial (scoping) phase of the relicensing process, APC consulted a wide variety of stakeholders, including state and federal resource agencies, non-governmental organizations, and concerned citizens seeking their input on important relicensing issues. Stakeholders identified several issues to be addressed during this relicensing process, including fish passage related to the Coosa and Alabama River basins.

As part of the cooperative process, APC held several meetings with the U.S. Fish and Wildlife Service (USFWS) and other stakeholders to further refine the fish passage issue. As part of these discussions, the USFWS identified the possibility of APC providing assistance with fish passage on the Alabama River in lieu of fish passage on the Coosa River. Fish Passage on the Alabama River would be more beneficial to anadromous, catadromous, and diadromous species since it would open up significantly more miles of contiguous riverine habitat to the ocean than limited fish passage on the Coosa River. The primary purpose of this document is to present the framework for addressing fish passage in the relicensing process. Specifically, it is an Alabama River Fish Passage Concept Document that outlines the information needed to address the fish passage issue:

- What are the identified biological objectives?
- What information do we currently have?
- What information do we need?
- What is a reasonable initial approach for fish passage?

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2.0 BIOLOGICAL OBJECTIVES IDENTIFIED

The biological objectives should address three main areas:

- Which species are targets for fish passage?
- What are the fish passage goals for the selected species?
- What are the long-term restoration goals for the selected species?

The following table provides a list of species from the Section 1135 Preliminary Restoration Plan that the U.S. Army Corp of Engineers (USACE) conducted in response to a request from the World Wildlife Fund (WWF). The plan states that there are 144 species of fish in the Alabama River (Mettee et al. 1996), but the species in the table represent the migratory species that would benefit from fish passage at Claiborne Lock & Dam. Species of special concern are the Gulf sturgeon, Alabama sturgeon, paddlefish, and the Alabama shad.

Species	Species of Special Concern	Movement Characteristics
Gulf sturgeon (<i>Acipenser oxyrinchus desotoi</i>)	x	Anadromous
Alabama sturgeon (<i>Scaphirhynchus suttkusi</i>)	x	Diadromous
mooneye (<i>Hiodon tergisus</i>)		Diadromous
paddlefish (<i>Polyodon spathula</i>)	x	Diadromous
alligator gar (<i>Lepisosteus spatula</i>)		Diadromous
American eel (<i>Anguilla rostrata</i>)		Catadromous
Alabama shad (<i>Alosa alabamae</i>)	x	Anadromous
skipjack herring (<i>Alosa chrysochloris</i>)		Diadromous
gizzard shad (<i>Dorosoma cepedianum</i>)		Diadromous
threadfin shad (<i>Dorosoma petenense</i>)		Diadromous
blue sucker (<i>Cycleptus elongatus</i>)		Diadromous
Alabama hog sucker (<i>Hypentelium etowanum</i>)		Diadromous
smallmouth buffalo (<i>Ictiobus bubalus</i>)		Diadromous
quillback (<i>Carpionodes cyprinus</i>)		Diadromous
highfin carpsucker (<i>Carpionodes velifer</i>)		Diadromous
spotted sucker (<i>Minytrema melanops</i>)		Diadromous
river redhorse (<i>Moxostoma carinatum</i>)		Diadromous
black redhorse (<i>Moxostoma duquesnei</i>)		Diadromous
golden redhorse (<i>Moxostoma erythrurum</i>)		Diadromous
blacktail redhorse (<i>Moxostoma poecilurum</i>)		Diadromous
channel catfish (<i>Ictalurus punctatus</i>)		Diadromous
blue catfish (<i>Ictalurus furcatus</i>)		Diadromous
flathead catfish (<i>Pylodictis olivaris</i>)		Diadromous
Atlantic needlefish (<i>Strongylura marina</i>)		Diadromous
white bass (<i>Morone chrysops</i>)		Diadromous
striped bass (<i>Morone saxatilis</i>)		Anadromous
spotted bass (<i>Micropterus punctulatus</i>)		Diadromous
largemouth bass (<i>Micropterus salmoides</i>)		Diadromous

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Species	Species of Special Concern	Movement Characteristics
southern walleye (<i>Stizostedion vitreum vitreum</i>)		Diadromous
freshwater drum (<i>Aplodinotus grunniens</i>)		Diadromous
hogchoker (<i>Trinectes maculatus</i>)		Diadromous
striped mullet (<i>Mugil cephalus</i>)		Diadromous

Other federally listed species in the lower Alabama River include Alabama red-bellied turtle (*Pseudemys alabamensis*), southern clubshell (*Pleurobema decisum*), heavy pigtoe (*Pleurobema taitianum*), inflated heelsplitter (*Potamilus inflatus*), and fine-lined pocketbook (*Lampsilis altilis*).

Restoration goals should follow approved fishery management plans if they are in place (FERC 2003). A plan is available for the Gulf sturgeon (USFWS and GSMFC 1995), and other documents indicated a reference to a conservation agreement for the Alabama sturgeon (USFWS 2000) and future plans for the Alabama shad.

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3.0 *SCIENTIFIC BACKGROUND*

The purpose of this section is to investigate resources and define the existing information on the fisheries community and their need for migration.

The USACE prepared a Preliminary Restoration Plan (PRP) in 2000 at the request of the WWF, but the WWF withdrew from the project after this plan was completed. It is unclear as to whether the Ecosystem Restoration Report (ERR), a second step of the PRP, was ever completed, and which would have included an environmental impact statement (EIS) as well.

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4.0 SCIENTIFIC UNKNOWNNS

There are several scientific unknowns that will need to be addressed as part of fish passage.

- What information do we need to know about fish biology and fish passage needs (lifts, locks, or ladders) in addition to our current base knowledge?
- Which developments need fish passage facilities?
- What type of effectiveness studies would be needed?

Most of the current effort has focused on Claiborne Lock & Dam, but fish passage should also be considered at the Miller's Ferry Development.

The USACE's PRP specifically proposed three types of fish passage for the Claiborne Lock & Dam: 1) modification of the existing lock gates (installation of sluice gates in the upper and lower gates), 2) construction of a fish lift at the west end of the fixed-crest spillway, and 3) construction of a fish bypass channel around the east end of the dam. The fish lift provides the best opportunity to pass the most species of fish, including sturgeon, but is the most expensive to construct. While the PRP does not mention downstream fish passage, it is assumed that this will be accomplished via periodic flood flows at Claiborne, which has been reported as the most effective at passing downstream migrants (FERC 2003).

During a sampling effort for passage via the lock mechanism, where a small attraction flow was provided for eight hours (starting at midnight), the PRP reports that "large numbers of fish" were collected. Species included: threadfin and gizzard shad, hogchoker, freshwater drum, channel catfish, blue catfish, bluegill, common carp, striped mullet, white and black crappie, skipjack herring, flathead catfish, American eel, paddlefish, smallmouth buffalo, silver chub, silverside shiner, and blacktail shiner.

The PRP notes that additional gill netting below Claiborne was scheduled for FY2000, with plans to provide fish attraction flows, but it is unknown if this effort was completed.

The PRP states that the discussion of the proposed fish passage techniques caused debate among technical experts because of the lack of site-specific information on the species of concern. Specific questions were raised about fish migratory movement timing, swimming performance capabilities, and attraction flow needs.

According to the FERC, the most frequently utilized method for assessing the effectiveness of a fish passage facility is the number of fish utilizing it. This method, while necessary, does not take into account the actual population of fish that are available to utilize the facility. Therefore, FERC recommends measuring effectiveness based on the proportion of the target population that is passed through the facility.

This recommended method will be more problematic for the Claiborne Lock & Dam. Estimates of the population below the dam may need to be determined before the fish passage facilities are in place to adequately measure the effectiveness of these facilities. The effectiveness of the potential facilities at Miller's Ferry will be easier to quantify, as they can be

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expressed as the percentage of fish that pass through these facilities as a function of the number of fish that pass through the facility immediately downstream (*e.g.*, the effectiveness of a facility at Miller's Ferry will be equal to the number of fish passing at Miller's Ferry divided by the number of fish passing at Claiborne). Effectiveness of downstream fish passage will be measured by mark and recapture techniques.

Additionally, the FERC (2003) recommends the following in the effectiveness plan: 1) including an effectiveness plan in all license articles requiring upstream or downstream fish passage as part of the requirement, and 2) defining the duration of monitoring the effectiveness (typically 2-4 years depending on flow conditions).

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5.0 INITIAL APPROACH

As part of setting an initial approach for examining fish passage needs, we need to consider what the sequence of events should be for fish passage, culture of stocks, restocking specific species of concern.

According to the July 10, 2003 E9 IAG meeting notes, due to the costs of constructing the passage facility at Claiborne, the U.S. Congress would have to take action (General Investigative Authority) to release funds for the project. The USACE and USFWS are prohibited from lobbying for such action, but have agreed to assist APC to prepare a formal request. It is unclear as to whether an ecosystem restoration report (ERR) was ever completed. If not, an ERR would need to be completed as part of this request. The USACE completed a cost-benefit analysis for the Claiborne project. The estimated cost for the Claiborne facilities was \$19,234,000 in the PRP, and the meeting notes report that the benefits would be approximately \$2 million annually.

Once the paperwork is completed and construction can actually begin, a schedule should be completed for all three projects. It is logical that the facilities at Claiborne be completed before work at Miller's Ferry begins. This provides the benefits of easily gauging the effectiveness of the facilities at Miller's Ferry without additional study needs beyond fish counts at the facility at both projects.

As for culture and restocking, these would have to be developed with the assistance of the ADCNR. There are two Alabama sturgeon in captivity; however, both fish are males. Restocking could take place once a successful propagation program is in place for this species. It is unlikely that other species would have to be restocked as there are viable populations below Claiborne which should increase as more spawning grounds are made available due to the passage facilities.

Following construction, a possible concern is the annual O&M costs of the upstream fish passage facility. Operations and maintenance are assumed to be handled by the USACE. Furthermore, it is possible that a developer could construct a hydroelectric facility at Claiborne once fish passage is in place. For instance, AMG Energy, LLC has filed a preliminary permit (P-12485-000) for Claiborne on January 5, 2004. The presence of the passage facility will mean that the project could be more attractive to potential hydroelectric developers since the costs of the fish passage facility has already been borne by the parties involved in this agreement.

Note to the Fish Passage Working Group: The group should explore the possibility of recouping costs of constructing and operating the fish passage devices from a potential hydroelectric developer (excluding the USACE), should this situation arise.

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6.0 *INFORMATION SOURCES/LITERATURE CITED*

Federal Energy Regulatory Commission (FERC). 2003. Evaluation of mitigation effectiveness at hydropower projects: Fish passage, draft report. Federal Energy Regulatory Commission, Washington, D. C.

Mettee, M. F., P. E. O'Neil, and J. M. Pierson. 1996. Fishes of Alabama and the Mobile basin. Oxmoor House, Birmingham, AL.

U. S. Fish and Wildlife Service (USFWS) and Gulf States Marine Fisheries Commission (GSMFC). 1995. Gulf sturgeon recovery plan. U. S. Fish and Wildlife Service, Atlanta, GA.

U. S. Fish and Wildlife Service (USFWS). 2000. Conservation agreement and strategy for the Alabama sturgeon. U. S. Fish and Wildlife Service, Atlanta, GA.

Study Plan 2 – Lake Martin Assessment of Fish Density and Species Composition
Associated with Various Shoreline Types

1.0 GOALS AND OBJECTIVES OF STUDY

The Alabama Department of Natural Resources (ADCNR) has historically recommended that, for protection of aquatic resources, shoreline habitat not be altered as a property is developed. When a property owner has requested to alter the natural habitat by building a sea wall, the ADCNR has promoted the use of rip rap by itself or in addition to the sea wall to provide a “better” habitat for aquatic species. The ADCNR wishes to investigate the value of this historic recommendation to determine its effectiveness in meeting their goals for aquatic habitat. The ADCNR is especially interested in learning what type structure/material currently used on the lake is the most effective in providing shoreline refuge, habitat, etc., for aquatic species.

2.0 RELEVANT RESOURCE MANAGEMENT GOALS

ADCNR manages the recreational fishery of Lake Martin. Part of that management includes an effort to preserve and protect aquatic habitats of the lake. ADCNR recommendations to homeowners and developers of shoreline habitats on the lake should be accurate, cost-effective, and help the agency meet their overall goals.

3.0 BACKGROUND AND EXISTING INFORMATION

During fishery collections in the southeast, many biologists have observed a marked increase in the number of fish (abundance and diversity) associated with rip-rap areas of lakes when compared with sea wall areas. This has typically been accounted for by the diversity of habitats (interstitial spaces, irregular surface, gradual drop-off, etc.) associated with rip-rap areas vs. the straight, flat wall of a sea wall.

No studies of this issue in the southeast are currently known.

4.0 PROJECT NEXUS

APC implements shoreline management plans and permitting regulations that allow modification of the natural shoreline and include and/or promote the use of rip rap in front of traditional sea walls. APC and the ADCNR want to make sure that they are recommending a shoreline structure that protects the shoreline and also protects or enhances fishery habitat.

5.0 STUDY AREA AND STUDY SITES

The study area for this issue would include selected shoreline areas of Lake Martin. Six study sites will be selected including three on the main stem, 2 on the Kowaliga arm and 1 in Blue Creek. The six sites will each contain typical habitat types observed on Lake Martin – natural undeveloped, traditional sea wall, and sea wall with rip rap.

6.0 PROPOSED METHODOLOGY

The proposed method for implementing this study would include a review of literature on various shoreline structures (*i.e.*, rip rap, whatever else is common) followed by a field study at selected sites that represent the types of structures found on Lake Martin. APC will work with ADCNR to identify sampling sites and analysis techniques.

6.1 Data Collection Techniques

Initially, six study areas on Lake Martin will be selected by APC and ADCNR. Three of the sites will be located on the main stem, 2 on the Kowaliga arm, and 1 in Blue Creek. The six sites will each contain typical habitat types observed on Lake Martin – natural undeveloped, traditional sea wall, and sea wall with rip rap. Other types of shoreline stabilization may be evaluated instead of these types. Each site will be geo-referenced upon selection.

Field collections will be performed at each site and will include electrofishing. Effort for each of these methods will be developed in consultation between APC and the ADCNR.

6.2 Data Analysis

Collected data will be analyzed to evaluate abundance and species diversity at each habitat type. Based on the findings, recommendations will be made regarding future development of shoreline sites on Lake Martin.

7.0 CONSISTENCY WITH GENERALLY ACCEPTED SCIENTIFIC PRACTICE

This study employs generally accepted practices for evaluating fish abundance and diversity along shoreline areas of reservoirs. The study methodology is consistent with generally accepted sampling principles and practices.

8.0 PRODUCTS

Once this study is completed, a draft report of the findings will be available to the MIG 1. Upon review and discussion, a Final report will be filed with the Martin License Application.

9.0 SCHEDULE

Field Study (Spring)	March - April 2009
(Summer)	July - August 2009
Draft Report	December 2009
Final Report	April 2010

10.0 LEVEL OF EFFORT AND COST

APC estimates the cost of consulting on study plan development, conducting the study, and developing a study report is approximately \$100,000.

Study Plan 3 – Evaluation of Minimum Flows Downstream of Martin Dam

1.0 GOALS AND OBJECTIVES OF STUDY

Operation of hydroelectric projects in a peaking mode could result in impacts downstream of the project in the tailrace area. The Alabama Department of Conservation and Natural Resources (ADCNR) and U.S. Fish and Wildlife Service (USFWS) would like to understand the relationship of project operation and the potential impacts of hydro peaking on the aquatic fauna and aquatic habitat in the tailrace area downstream of the Martin Project. In particular, the ADCNR is concerned about the need for a minimum flow to offset any impacts of hydro peaking on the tailrace area and the possibility of enhancing or creating “riverine” type habitat in the tailrace.

2.0 RELEVANT RESOURCE MANAGEMENT GOALS

The ADCNR manages recreational fisheries in the Martin tailrace area. Knowledge of impacts to the Lake Martin tailrace due to hydro peaking and the need for a minimum flow will allow them to work with APC to develop strategies to offset these impacts where practical.

3.0 BACKGROUND AND EXISTING INFORMATION

There is limited data available for the Martin tailrace in terms of water quality, fisheries, rare, threatened, or endangered (RTE) species, and habitat parameters. Tailrace information for fish populations may be available through the ADCNR Reservoir Management Reports. Other recent information is presented in the Preliminary Application Document for the Martin Hydroelectric Project (APC, 2008).

4.0 PROJECT NEXUS

Operation of the Martin project affects the tailrace aquatic habitat downstream of the Martin Dam. This study will help to determine the magnitude of impacts (related to hydro peaking) on the Martin Project tailrace area and the need for a minimum flow to enhance current aquatic habitat conditions and lessen project related impacts.

5.0 STUDY AREA AND STUDY SITES

The study area for this issue would include the immediate tailrace area and ½ mile downstream of the Martin Dam.

6.0 PROPOSED METHODOLOGY

The methodology for this study will follow those used to determine potential tailrace impacts for the Logan Martin and Neely Henry hydroelectric projects on the Coosa River as part of the Coosa relicensing process. This will include field sampling to determine the current species inhabiting the tailrace, review or collection of tailrace water quality data, and observation of the tailrace under various flows.

Selection of Sampling Stations

Reconnaissance surveys will be conducted during the Winter of 2008 in the Martin tailrace. The reconnaissance will begin near the dam and proceed downstream for approximately ½ mile. The reconnaissance survey will be conducted under a low or no flow scenario. One sampling reach will be selected in the Martin tailrace area. An additional site will be selected further downstream within the “½ -mile” reconnaissance area.

Fish Sampling

Beginning in 2009, fish community data will be collected at the designated sampling sites once per year (during mid-March to early April) as specified in the study schedule. Fish sampling will be qualitative in nature and used to characterize the species present in each sampling reach. Because habitat types are quite deep (*i.e.*, lack of wadeable areas), sampling will primarily consist of boat electrofishing. Qualitative collection efforts will focus on the detection and distribution of the fish species present. Collections will be performed during generation to detect riverine type species that would use the area.

Boat daytime electrofishing will be used at each sampling reach to sample the fish community. Sampling will include six 10 minute samples in each reach. Boat electrofishing sampling will commence at the beginning of each reach with a shoreline (10 min.) and an open-water/mid-channel (10 min.) sample. Each of these samples will be collected and processed as a separate sample. After processing the samples, another shoreline (10 min) and mid-channel (10 min) sample will be collected until the reach has been sampled for a total of 60 minutes. Within each sampling reach, all microhabitats (pools, riffles, runs, brush piles, stumps, boulders, etc.) will be sampled in an attempt to clearly describe the fishery community present.

All stunned fish will be collected during sampling, placed in a live well or collection container, identified to species, total length measured, weighed to the nearest gram, and released as described below. Problematic species identifications will be preserved in 10% formalin or stored on ice and returned to the APC lab for identification and enumeration. Other information pertinent to collections will also be recorded (date, time, weather conditions, sample location, collection technique, sampling effort, water temperature, DO, and secchi disc, *etc.*) as directed on each data sheet.

Collect Length and Weight on all:

- 1) spotted bass, largemouth bass, freshwater drum, black and white crappie, striped and hybrid-striped bass, white bass, and all Catostomidae species;
- 2) Bluegill larger than 150 mm (Collect length only on all individuals smaller than 150 mm);
- 3) Centrarchids (sunfish other than bluegill);
- 4) Catfish larger than 300 mm (Collect length only on all individuals smaller than 300 mm); and
- 5) Collect length and weight on any species not specifically listed in these procedures.

Collect Length only:

- 1) yellow bass and yellow perch;
- 2) minnows/shiners, darters, sculpins, bullhead catfish, & mosquitofish.

Sub-sampling shad species:

- 1) Process threadfin and gizzard shad separately;

- 2) Measure and record up to 10 individuals (for each species collected) and then determine and record the aggregate weight of the 10 individuals;
- 3) On the remaining individuals (of each species), count the total number – measure and record the largest and smallest – and determine and record the aggregate weight.

Collection of carp, gar, and smallmouth buffalo:

- 1) note the total number observed in the sample area, but do not net them.

Mussels and Snail Sampling

Mussel and snail occurrence and distribution will be sampled during the late summer or fall (June to October) due to lower flows typically experienced during this time of the year. Two to three days of field surveys (with one diver on each day) will be expended in the project tailrace and will be conducted by APC contractors. The water depths in the Martin tailrace area will require that either SCUBA and or HOOKA equipment be used to adequately sample most areas. Dive sampling will be performed to gather qualitative data in each sampling reach. Prior to sampling, APC will provide GIS maps of locations sampled and data collected from the Martin tailrace during APC's tailwater mussel surveys in 2007. All searches (*i.e.*, each dive) will be timed and recorded on field sheets. All snails (except for *Tulotoma*, or other species listed as T&E) will be preserved in 95% ethanol and identified at a later date. Mussels will be identified, grouped as sub-adults (approximately 20mm or less) or as adults, counted, and recorded before being released. GPS coordinates will be collected along with each sample.

Crayfish Sampling

Crayfish sampling will likely be qualitative. For example, specimens collected during any fish or mussel/snail sampling trips will be saved and preserved in a voucher collection.

Water Quality Data

Available historical water quality data (as reported in the Martin Water Quality Data Report) including temperature and dissolved oxygen will be reviewed.

Data Analysis and Assessment Criteria

The collected data will be assimilated into a report for review by the agencies. This report will be used for discussing the need for any minimum flows below the project and will be incorporated into the APC license application.

7.0 CONSISTENCY WITH GENERALLY ACCEPTED SCIENTIFIC PRACTICE

This study employs generally accepted practices for evaluating fisheries habitat at hydroelectric projects. The study methodology is consistent with generally accepted fishery sampling principles and practices.

8.0 PRODUCTS

Data and analyses from this study will be shared periodically with the agencies and the MIG 1 during the study phase. A draft report will be distributed to the MIG 1 for review and comment within 6 months of completion of the analysis. A final report will be provided as part

of the draft license application that will include raw data in tabular form, analysis performed, and results and discussion.

9.0 SCHEDULE

Fisheries samples	Mid-March to early April 2009
Mussel and snail samples	June to October 2009
Draft Report	December 2009
Discussion of Data	February 2010
Final Report	April 2010

10.0 LEVEL OF EFFORT AND COST

APC estimates the cost of consulting on study plan development, conducting the study and associated generation losses, developing a study report, and discussing the results with all stakeholders is approximately \$90,000.

11.0 REFERENCES

Alabama Power Company. 2006. Evaluation of Neely Henry Tailrace. Coosa & Warrior Relicensing Studies.

Alabama Power Company. 2006. Evaluation of Logan Martin Tailrace. Coosa & Warrior Relicensing Studies.

Study Plan 4 - Fish Entrainment and Turbine Mortality

1.0 GOALS AND OBJECTIVES OF STUDY

Operation of hydroelectric projects can result in the sporadic entrainment of fish into the project turbines. Passage through the turbines can result in some degree of mortality as well as removal of fish from the project. The Alabama Department of Conservation and Natural Resources (ADCNR) and U.S. Fish and Wildlife Service (USFWS) would like to understand the relationship of project operation and the potential impacts of entrainment and turbine mortality on fish in Lake Martin.

In particular, the ADCNR is concerned about the impacts of fish entrainment on the populations of striped bass (*Morone saxatilis*) and largemouth bass (*Micropterus salmoides*) in Lake Martin, in part, because the stocking rates of these two species can be adjusted to offset entrainment impacts.

2.0 RELEVANT RESOURCE MANAGEMENT GOALS

The ADCNR maintains a population of Gulf-strain striped bass in Lake Martin through an active stocking program. They also regulate the recreational fishing of game species such as largemouth bass. Knowledge of impacts to the Lake Martin fishery due to entrainment can allow them to adjust their management strategies for managing these two fisheries and potentially other recreational fisheries.

3.0 BACKGROUND AND EXISTING INFORMATION

Over fifty site-specific studies of resident fish entrainment and mortality at hydroelectric sites in the United States have been performed and reported on to date. These studies provide order-of-magnitude estimates of annual fish entrainment (FERC, 1995). Descriptive information has been gathered from each entrainment study and includes:

- Location: geographical proximity, river basin;
- Project size: discharge capacity and power production;
- Project operation: e.g., peaking run-of-river, etc.;
- Biological factors: fish species composition;
- Impoundment characteristics: general water quality, impoundment size, flow regime; and
- Physical project characteristics: trash rack spacing, intake velocity, etc.

Extensive turbine mortality study data exists for a range of turbine types and physical characteristics, which can be compared to the Martin project turbines. Descriptive data includes:

- turbine design type;
- operating head;
- runner speed;
- diameter; and
- peripheral runner velocity.

These characteristics are commonly attributed to turbine passage mortality (Cramer and Oligher, 1963; Bell, 1991; Eicher, 1987; EPRI, 1992).

Current information for Lake Martin's fish populations is available through the ADCNR Reservoir Management Reports. Similar study information performed on the recent Coosa and Warrior relicense is also available for use (APC, 2003).

4.0 PROJECT NEXUS

The study will determine the magnitude of impacts related to fish entrainment and turbine mortality related to operation of the Lake Martin project.

5.0 STUDY AREA AND STUDY SITES

The study area for this issue would include the forebay and intake area of the Martin Project.

6.0 PROPOSED METHODOLOGY

The methods for this study will follow those used to determine potential entrainment impacts for hydroelectric projects on the Coosa River as part of the Coosa relicensing process (APC, 2003).

Define the Entrainment Database

For this study, fish entrainment information from other hydroelectric projects will be assembled into a database for analyzing the magnitude of potential entrainment. After review of the database, the most similar projects will be selected and used to develop a Martin entrainment estimate.

Calculate An Estimated Fish Entrainment Rate

The entrainment rate information from the selected entrainment studies will be consolidated to develop fish entrainment rates for the Martin Project. The entrainment rates will be presented both in fish entrained per hour and fish entrained by volume of water passed through the project turbines (fish/million cubic feet). The data will be grouped by season where appropriate to determine an entrainment rate for each season of the year. The seasonal data will be used to develop an estimated seasonal mean entrainment rate for the Martin Project.

Estimate Species Composition and Length Frequency Distribution

The species composition data from the Coosa Entrainment Study (2003), in conjunction with ADCNR data for Lake Martin, will be used to develop species composition for entrainment. Length frequency of fish entrained will be based on information from the entrainment database.

Estimate of Turbine Mortality

As fish move through hydroelectric turbines, a percentage are killed due to turbine mortality (i.e., blade strikes, shear forces, and pressure changes, etc.). Turbine passage survival studies have been performed at numerous hydroelectric projects throughout the country. Characteristics of these projects will be compared to the characteristics of the Martin Project and suitable studies will be selected for the transfer of turbine mortality data for each development.

Selected turbine survival rate data will be obtained from the literature and used to estimate the number of fish killed due to turbine mortality. The following turbine characteristics will be used as criteria for use in this analysis:

- design type;
- operating head;
- runner speed;
- diameter; and
- peripheral runner velocity.

To the extent possible, turbine mortality rate data available from source studies will be related to the species-family group and size class of fish estimated to be entrained at the Martin Project. Where multiple tests are available for a given species-family group/size class, a mean survival rate will be computed. For species-family groups/size classes where no applicable data can be found or accepted, the survival rate reported for a similar group/size class will be substituted.

Once turbine mortality rates are developed from the study database, the rates will be applied to the entrainment estimates for the Martin Project. This will be accomplished by multiplying fish entrainment estimates by the composite mortality rates for each family/genus group and size class (where applicable).

Filters

Due to certain site-specific characteristics of the Martin Project, it may be necessary to adjust entrainment estimates. Factors affecting entrainment rates that may warrant investigation for adjustment of estimates include:

- stratification at the intakes (dissolved oxygen);
- intake velocities;
- fish habitat available at the intakes; and/or
- other factors.

7.0 CONSISTENCY WITH GENERALLY ACCEPTED SCIENTIFIC PRACTICE

This study employs generally accepted practices for evaluating fish entrainment and turbine mortality at hydroelectric projects. The study methodology is consistent with generally accepted fishery sampling principles and practices.

8.0 PRODUCTS

Data and analyses from this study will be included in periodic reports to the ADCNR, USFWS, Alabama Department of Environmental Management (ADEM), and the MIG 1. A draft report will be distributed to the MIG 1 for review and comment within 6 to 8 months of completion of the analysis. A final report will be provided as part of the draft license application that will include raw data in tabular form, analysis performed, and results and discussion.

9.0 SCHEDULE

Develop entrainment and Turbine Mortality databases	May 2009
Draft Report	December 2009
Final Report	April 2010

10.0 LEVEL OF EFFORT AND COST

APC estimates the cost of collecting the fisheries data, analyses and reporting is approximately \$50,000. This is based on development and analysis of a database of existing data and does not include additional field studies.

11.0 REFERENCES

- Alabama Power Company. 2003. Coosa and Warrior River Projects- E11 - Impingement, Entrainment, and Turbine Mortality Study. Alabama Power Company, Birmingham, AL.
- Bell, M. C. 1991. Fisheries Handbook of Engineering Requirements and Biological Criteria. United States Army Corps of Engineers, Fish Passage Development and Evaluation Program, Portland, OR.
- Cramer, F. K., and R. C. Oligher. 1963. Passing fish through hydraulic turbines. Transactions of the American Fisheries Society 93:243-259.
- Eicher Associates, Inc. 1987. Turbine-related fish mortality: Review and evaluation of studies. Research Project 2694-4. Prepared for Electric Power Research Institute, Palo Alto, CA.
- Electric Power Research Institute (EPRI). September 1992. Fish Entrainment and Turbine Mortality Review and Guidelines. TR-101231 Research Project 2694-01. Prepared by Stone & Webster Environmental Services.
- Federal Energy Regulatory Commission (FERC). 1995. Preliminary assessment of fish entrainment at hydropower projects – volume 1 (Paper No. DPR-10). Office of Hydropower Licensing, FERC, Washington, DC.

Study Plan 5 - Rare, Threatened, and Endangered Species Surveys

1.0 GOALS AND OBJECTIVES OF STUDY

The U.S. Fish and Wildlife Service (USFWS) and the Alabama Department of Conservation and Natural Resources (ADCNR) (agencies) are concerned about the presence of any Federal and/or State Rare, Threatened, and Endangered (RTE) species that currently reside within the Martin project boundary.

The goal of this study is to identify the location and abundance of any RTE species within the project boundary and determine if project operation potentially impacts any species present. If there are project related impacts, the agencies would like to determine ways to limit those impacts. The agencies would also like to determine if there are opportunities to enhance or reintroduce species to specific areas within or near the project.

2.0 RELEVANT RESOURCE MANAGEMENT GOALS

The USFWS has mandatory federal authority under Section 7 of the Federal Power Act to identify and limit the impacts of hydropower projects on any Federally protected Threatened or Endangered species within the project boundary. The ADCNR has developed a policy to enhance RTE species through protection of habitat, supplemental stocking, and/or reintroduction of species to historic habitats. Protection and or enhancement of any populations of RTE species within the project boundary would be a positive action for sustaining any RTE species identified.

3.0 BACKGROUND AND EXISTING INFORMATION

Several preliminary surveys have been performed for RTE species within the project boundary and include:

- unionid survey in various main channel and tributary areas of the project,
- red cockaded woodpecker surveys on project properties, and
- annual bald eagle surveys on the lake.

4.0 PROJECT NEXUS

The study would determine if there are existing populations of RTE species within the project boundary and if project operation impacts those populations.

5.0 STUDY AREA AND STUDY SITES

The study area for this issue would include all of the lands and waters located within the project boundary of the Lake Martin project. Additional tributary sites adjacent to the project may also be included if they are significantly influenced by project operations.

6.0 PROPOSED METHODOLOGY

The overall purpose of this study would be to gather additional data for determination of the presence and location of RTE species within the project boundary, to determine if project

operations affect these populations, and to identify potential aquatic restoration areas adjacent to the project. To accomplish this, the study will involve three components:

- 1) A literature search of the USFWS, Natural Heritage Trust, and Alabama Lands Division RTE species databases will be performed to see if any documented populations of RTE species occur within or adjacent to the project boundary.
- 2) Field surveys will be performed in specific areas of the project identified by these databases or by ADCNR or USFWS personnel. These surveys will determine the presence or absence of RTE species within the project boundary. Initial conversations with the USFWS and ADCNR has led to RTE surveys in Manoy Creek, Blue Creek, Sandy Creek, the Tallapoosa River at Irwin Shoals, and the Tallapoosa River in the Martin Tailrace. These conversations have also revealed that an unidentified species of mussel has been observed in Martin Lake near Chimney Rock and there is possibly a non-native species of mussel near Wind Creek State Park (collected by Jeff Garner).
- 3) A review of low head dams located on tributaries to Lake Martin will be performed through review of existing studies (Gangloff). This will provide the agencies with potential restoration areas adjacent to the project boundary.

6.1 Data Collection Techniques

To be developed in cooperation with USFWS based on RTE species distributions data.

6.2 Data Analysis

To be developed in cooperation with USFWS with development of a Biological Assessment as the ultimate goal.

7.0 *CONSISTENCY WITH GENERALLY ACCEPTED SCIENTIFIC PRACTICE*

This study employs generally accepted practices for evaluating RTE distributions at hydroelectric projects. The study methodology is consistent with generally accepted sampling principles and practices.

8.0 *PRODUCTS*

This study will have three products:

- an RTE database for the Lake Martin area;
- a report of RTE locations within and/or adjacent to the Lake Martin Project; and
- a report that identifies potential restoration areas within or adjacent to the project boundary of the Lake Martin Project.

Data and analyses from this study will be included in periodic reports to ADCNR, USFWS, and the MIG 1. Draft reports will be distributed to the MIG 1 for review and comment upon completion of the product. Final reports will be provided for each product as part of the draft license application and will contain all necessary data in tabular and graphic form to depict RTE abundance and/or distribution within the Lake Martin Project.

9.0 SCHEDULE

Conduct Field Surveys	April – June 2009
Develop Database	May 2009
Finalize Database	August 2009
Finalize Report of Surveys	November 2009
Review Restoration Areas	January – April 2010
Draft Report	June 2010
Final Report	September 2010

10.0 LEVEL OF EFFORT AND COST

APC estimates the cost of consulting on the study plan, developing the RTE database, performing field surveys, reviewing and identifying restoration areas, and preparing a report is approximately \$100,000.

11.0 REFERENCES

Alabama Power Company. 2008. Preliminary Application Document for the Martin Hydroelectric Project (FERC No. 349). Alabama Power Company, Birmingham, AL.

Study Plan 6 - Striped Bass Tagging – Hydroacoustic Collections

1.0 GOALS AND OBJECTIVES OF STUDY

The Alabama Department of Conservation and Natural Resources (ADCNR) currently stocks Gulf-strain striped bass (*Morone saxatilis*) in Lake Martin. The ADCNR would like to understand the relationship of project operation and potential impact to striped bass habitat in Lake Martin. If such a relationship is present, the ADCNR would like to determine ways to predict periods of impact and limit their overall effects on the stocks of adult Gulf-strain striped bass in the lake.

2.0 RELEVANT RESOURCE MANAGEMENT GOALS

The ADCNR maintains a population of Gulf-strain striped bass in Lake Martin to create a unique inland recreational fishery and as a source of brood stock for striped bass stocking in the Gulf Coast drainages.

3.0 BACKGROUND AND EXISTING INFORMATION

Indiscriminant stocking of striped bass in the United States over the past 40 years have made it difficult to maintain a “pure strain” in the wild. The ADCNR maintains the Gulf-strain of striped bass in Lake Martin and is concerned with the “die-off” events of striped bass that are sporadically observed on Lake Martin during the summer and early fall. They are concerned that there is limited thermal refuge (cool temperatures/high dissolved oxygen) for striped bass in the lake and that there may be a relationship between project operation/generation and striped bass “die off” events. The ADCNR believes the turbine withdrawals may pull directly from the metalimnion and deplete the cool water/high dissolved oxygen layers of the lake which serve as a thermal refuge, especially for large adult fish.

According to studies in the southeast, adult striped bass prefer dissolved oxygen (DO) levels greater than 2 mg/l and temperatures less than 25°C (Isley, 2002; Moss, 2007; Hill, 1989; Francis-Floyd, 2002). Current information for Lake Martin (ADEM, 2005; APC, 2006), demonstrates the lake stratifies during the hot summer months, which restricts striped bass to the cooler water deeper in the lake. With the onset of stratification during the early summer, DO levels in the hypolimnion and metalimnion decrease due to anaerobic activity and reduced circulation and contact with the atmosphere. The layer of preferred habitat for striped bass naturally grows smaller as stratification intensifies until lake turnover in the fall destratifies the lake. It is believed that as the layers of water with ideal temperature and DO decreases, striped bass either become overcrowded or at times have to sacrifice or choose between temperatures below 25°C and/or DO greater than 2mg/l. In marginal habitats with lower DO levels or higher temperatures, striped bass can become sluggish, feed less, or develop bacterial infections that can lead to increased mortality rates.

In addition to the studies cited above, the ADCNR cited a report by Dr. Steve Miranda (University of Mississippi) which reported that larger adult striped bass have a tendency to sink (not float) to the bottom of lakes upon death. This observation could potentially distort the number of die-offs and the number of fish involved with each die off reported in the past. They

also cited a new study from Smith Lake that deals with the interaction of largemouth, stripers, and spotted bass, which may provide beneficial information.

4.0 PROJECT NEXUS

The study would determine if project operation actually impacts striped bass thermal refuge areas during the summer and fall periods of the year.

5.0 STUDY AREA AND STUDY SITES

The study area for this issue would include the main body and two major arms (Kowaliga and Tallapoosa) of Lake Martin.

6.0 PROPOSED METHODOLOGY

The proposed study for this issue will involve two components:

1) Striped Bass Expert Panel Review: Develop a “striped bass” Expert Panel composed of striped bass anglers, lake guides, and academic experts to discuss the existing Lake Martin striped bass fishery. This component will assist APC and the agencies in developing the scope and purpose of subsequent field studies. This review will also include further review of historic project operations, hydrologic patterns, and their affect on striped bass mortalities.

2) Based on the findings of the Expert Panel, a striped bass tracking study of the larger fish would be implemented using methods similar to the study performed on Smith Lake in the 1990’s. This study would consist of using sonic tags and hydroacoustics to track striped bass movements during the June – October time frame. The addition of hydroacoustics will allow enumeration of additional fish in the same area as the tagged striped bass, will collect information on size ranges of those fish, and depict depth of the fish in relationship to water quality stratification.

The overall purpose of these two studies would be to gather additional data for better understanding the operations/hydrology that trigger the summer die off event and to gather additional data on the size structure of the existing striped bass population.

6.1 Data Collection Techniques

Striped Bass Expert Panel

APC and the agencies will develop a list of experts and will request their help in reviewing this issue. The experts that participate will be provided with existing information on the striped bass fishery, water quality, and hydrology data. A date will be selected to review the information in a question and answer roundtable format. This session will be used to identify areas of the striped bass fishery that need to be investigated through field surveys.

Potential Field Surveys Techniques

Each of these is to be developed based on the findings of the Expert Panel Review.

Tracking Techniques

Adult fish collection - Type of tags – how often and how long do we track them?

Hydroacoustic Collections

Used as supplemental information in combination with tag tracking. Survey of areas where tracked fish are observed. Look for other large targets (striped bass) in vicinity.

Water Quality

Water Quality profile to be collected – DO and Temp in a representative area of tracked fish/Hydroacoustic collections. This is in addition to historical data available.

Project Operation

Gather APC information of turbine operations and compare it with Water Quality profiles. This is in addition to the historical data available.

6.2 Data Analysis

Report of Expert Review Panel Findings

Report of Field Studies

7.0 *CONSISTENCY WITH GENERALLY ACCEPTED SCIENTIFIC PRACTICE*

This study employs generally accepted practices for evaluating fish distributions and stock assessments at hydroelectric projects. The study methodology is consistent with generally accepted fishery sampling principles and practices.

8.0 *PRODUCTS*

Data and analyses from this study will be included in periodic reports to the ADCNR, U.S. Fish and Wildlife Service (USFWS), Alabama Department of Environmental Management (ADEM), and the MIG 1 during the study phase. A draft report will be distributed to the MIG 1 for review and comment within 6 to 8 months of completion of the field study. A final report will be provided as part of the draft license application that will include raw data in tabular form, maps of sample sites, conditions during sampling, and an analysis of striped bass distribution in relation to lake water quality parameters.

9.0 *SCHEDULE*

Expert Panel Review	March 2009
Collect Field Data	April 2009
Review data and finalize	
Report on field studies	November 2009
Draft Report	June 2010
Final Report	September 2010

10.0 LEVEL OF EFFORT AND COST

APC estimates the cost of consulting on the study plan, collecting the fisheries data, analyses, and developing a draft and final report is approximately \$100,000 based on the level of field studies to be performed.

11.0 REFERENCES

Alabama Department of Environmental Management (ADEM). 2005. Water Quality Data for Martin Reservoir. Alabama Department of Environmental Management, Montgomery, AL.

Alabama Power Company, Environmental Compliance. 2006. Water Quality Depth Profiles at Martin Hydroelectric Project. Alabama Power Company, Birmingham, AL.

Francis-Floyd, Ruth. 2002. Dissolved Oxygen for Fish Production. University of Florida, IFAS Extension. [Online] URL: <http://edis.ifas.ufl.edu/FA2002>. Accessed August 10, 2007.

Hill, Jennifer, et al. 1989. Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates. Biological Report 82 (11.118). Completed for U.S. Fish and Wildlife Service and Army Corps of Engineers, Coastal Ecology Group.

Isley, Jeffrey and Shawn Young. 2002. Striped bass annual site fidelity and habitat utilization in J. Strom Thurmond Reservoir, South Carolina-Georgia. Transactions of the American Fisheries Society. Vol. 131, no. 5, pp. 828-837.

Moss, Jerry L. Cool Striped Bass. Alabama Department of Conservation and Natural Resources. [Online] URL: <http://www.outdooralabama.com/fishing/freshwater/fish/bassstriped/striped/cool.cfm>. Accessed February 23, 2007.

Study Plan 7 - Lake Martin – Wildlife Management Plan

1.0 GOALS AND OBJECTIVES OF STUDY

The Alabama Dept. of Conservation and Natural Resources (ADCNR) would like to understand more about the lands that are included within the project boundary of the Martin Project (*i.e.*, quantity, location, timber stands, etc.). ADCNR is especially concerned about lands that would be managed for the red-cockaded woodpecker. ADCNR would like to work with the U.S. Fish and Wildlife Service, Alabama Power, and interested stakeholders to develop a viable wildlife management plan for the Martin Project.

2.0 RELEVANT RESOURCE MANAGEMENT GOALS

The ADCNR manages wildlife throughout the state. Knowledge of the lands included as part of the Martin Project would allow them to work with Alabama Power Company (APC) to develop strategies to enhance the public wildlife resources, protect or enhance rare, threatened, or endangered (RTE) species and offset potential impacts associated with development around the project.

3.0 BACKGROUND AND EXISTING INFORMATION

APC includes approximately 8800 acres of land within their project boundary. These lands are a mixture of both developed and undeveloped property. APC is going to develop a Shoreline Management Plan, which will contain GIS overlays of all lands within the project and includes its current use or designation. APC has land designated as “Natural Undeveloped” that would be of interest to ADCNR for management of wildlife resources. APC is also performing RTE Surveys on the Martin Project lands and some properties adjacent to the project.

ADCNR has management strategies and goals for wildlife resources of the state, including RTE species. A combination of APC data and ADCNR goals would be pooled to determine the best approach for development of a Wildlife Management Plan (WMP) for enhancing wildlife resources within the Martin Project.

4.0 PROJECT NEXUS

The study would result in a WMP that would enhance wildlife resources within the Martin Project. This Plan would also determine management strategies to reduce impacts to and/or enhance habitat quality of RTE wildlife species within the Martin Project.

5.0 STUDY AREA AND STUDY SITES

The primary study area for this issue would include all of the APC owned lands included within the Martin project boundary.

6.0 PROPOSED METHODOLOGY

The methodology for this study will generally follow the methods used to develop the WMP for the Coosa Hydroelectric Projects as part of the Coosa relicensing process. First, APC will develop GIS overlays of:

- all lands within the project boundary;
- current land use classification;
- current timber type and timber management;
- locations of known populations of RTE species.

APC will then host a series of meetings with the ADCNR and other interested stakeholders to review and compare the GIS information and develop a consensus based WMP.

The plan will contain the following structure at a minimum:

- Introduction
- Purpose of the Plan
- Wildlife Management Objectives
- Waterfowl Management Actions (if applicable)
- RTE Management Actions (red-cockaded woodpecker, bald eagle, etc.)
- Timber Management including herbicides, thinning, etc.
- Adjacent Lands – Management Agreements (if applicable)
- Wildlife Openings
- Handicapped Hunting Areas (if applicable)
- General Wildlife Enhancements

7.0 CONSISTENCY WITH GENERALLY ACCEPTED SCIENTIFIC PRACTICE

This study employs generally accepted practices for evaluating wildlife habitat at hydroelectric projects. The study methodology is consistent with accepted practices used during the Coosa and Warrior relicensing studies accepted by state and federal agencies.

8.0 PRODUCTS

Data and analyses from this study will be shared periodically with the agencies and MIG 1 during the study phase. Meetings will be hosted by APC to develop a draft WMP that will be distributed for review and comment to the MIG 1 within 6 months of completion of the WMP. The Final WMP will be provided as part of the draft license application

9.0 SCHEDULE

Develop GIS overlays	April to December 2009
Periodic Meetings with agencies	April to December 2009
Draft WMP	June 2010
Final WMP	November 2010

10.0 LEVEL OF EFFORT AND COST

APC estimates the cost of consulting on the study plan, collecting the field data, analyses, and reporting is approximately \$70,000.

11.0 REFERENCES

Alabama Power Company. 2005. Wildlife Management Plan For The Coosa Hydroelectric Project.



Understanding the Study Criteria

Integrated Licensing Process

*Federal Energy Regulatory Commission
Office of Energy Projects*

April 6, 2005

Understanding the Study Criteria

Reaching agreement on study needs can be difficult and contentious. Historically, deferring resolution of fundamental issues about what information gathering and studies are necessary until after the license has been filed with the Commission has in some cases resulted in lengthy licensing proceedings. The Integrated Licensing Process (ILP) is designed to eliminate that problem. Working collaboratively with the hydro industry, state and federal resource agencies, tribes, and non-governmental organizations, the Commission developed seven criteria that must be addressed by parties requesting studies in the ILP. Following these criteria will help formulate a well structured and thought out request that can help focus discussions about the merits and applicability of a study to evaluate the effects of a project on environmental resources.

This document is intended to explain the study criteria and help stakeholders craft study requests (18 CFR § 5.9(b)) that will clearly identify their information needs and expectations and explain why they need the information. A clear understanding of the study criteria and adherence to these criteria in formulating study requests should facilitate the development of study plans (18 CFR § 5.11 (b)-(e)).

While the reader may wish to use the suggested structure as a template for a request, there are a number of variables that will determine whether a study or a totally different approach would be best suited to a particular project and approved by the Commission.

Study Request Criteria

As specified by CFR 18, § 5.9(b) of FERC's regulations on the ILP, any study request must:

- (1) Describe the goals and objectives of each study proposal and the information to be obtained;
- (2) If applicable, explain the relevant resource management goals of the agencies or Indian tribes with jurisdiction over the resource to be studied;
- (3) If the requester is a not resource agency, explain any relevant public interest considerations in regard to the proposed study;
- (4) Describe existing information concerning the subject of the study proposal, and the need for additional information;
- (5) Explain any nexus between project operations and effects (direct, indirect, and/or cumulative) on the resource to be studied, and how the study results would inform the development of license requirements;
- (6) Explain how any proposed study methodology (including any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate filed season(s) and the duration) is consistent with generally accepted practice in the scientific community or, as appropriate, considers relevant tribal values and knowledge; and
- (7) Describe considerations of level of effort and cost, as applicable, and why any proposed alternative studies would not be sufficient to meet the stated information needs.

Study Plan Criteria

CFR 18 § 5.11 (b)-(e) specifies the following requirements for the applicant's proposed study plan. Note that these requirements closely parallel those described in § 5.9(b).

(b) The potential applicant's proposed study plan must include with respect to each proposed study:

- (1) A detailed description of the study and the methodology to be used;
- (2) A schedule for conducting the study;
- (3) Provisions for periodic progress reports, including the manner and extent to which information will be shared; and sufficient time for technical review of the analysis and results; and

- (4) If the potential applicant does not adopt a requested study, an explanation of why the request was not adopted, with reference to the criteria set forth in [5.9\(b\)](#).

(c) The potential applicant's proposed study plan must also include provisions for the initial and updated study reports and meetings provided for in [5.15](#).

(d) The applicant's proposed study plan must:

- (1) Describe the goals and objectives of each study proposal and the information to be obtained;

- (2) Address any known resource management goals of the agencies or Indian tribes with jurisdiction over the resource to be studied;

- (3) Describe existing information concerning the subject of the study proposal, and the need for additional information;

- (4) Explain any nexus between project operations and effects (direct, indirect, and/or cumulative) on the resource to be studied;

- (5) Explain how any proposed study methodology (including any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate field season(s) and the duration) is consistent with generally accepted practice in the scientific community or, as appropriate, considers any known tribal interests;

- (6) Describe considerations of level of effort and cost, as applicable.

(e) The potential applicant's proposed study plan must be accompanied by a proposal for conducting a study plan meeting or meetings during the 90-day period provided for in [5.12](#) for the purpose of clarifying the potential applicant's proposed study plan and any initial information gathering or study requests, and to resolve any outstanding issues with respect to the proposed study plan. The initial study plan meeting must be held no later than 30 days after the deadline date for filing of the potential applicant's proposed study plan.

Goals and Objectives

§5.9(b)(1) Describe the goals and objectives of each study proposal and the information to be obtained;

This paragraph describes what the study is intended to accomplish, the goals and objectives of the study, and specific information to be obtained. The goals of the study should clearly relate to the need to evaluate the effects of the project on a particular resource. The objectives are the specific information needs to be gathered to allow achievement of the study goal. This section provides the context for why the study is being requested.

Relevant Resource Management Goals

§5.9(b)(2) If applicable, explain the relevant resource management goals of the agencies or Indian tribes with jurisdiction over the resource to be studied;

§5.9(b)(3) If the requester is a not resource agency, explain any relevant public interest considerations in regard to the proposed study;

This discussion should clearly establish the connection between the study request and the management goals of the requesting agency or tribe, or in the case of non-governmental agencies or others without a jurisdictional mandate or obligation, between the study and resource of interest. A statement by an agency connecting its study request to a legal, regulatory, or policy mandate is entitled to appropriate consideration. However, it is much easier to understand the relationship of an information need to a specific management goal than to broadly stated mandates established in law or regulation. Where such mandates are integral to the need for the information, the requester needs to thoroughly explain how the mandate relates to the study request and, in turn, project impacts.

Background and Existing Information

§5.9(b)(4) Describe existing information concerning the subject of the study proposal, and the need for additional information;

The purpose of this discussion is to highlight the gap in existing data, giving full consideration to what has been provided in the PAD or is known from other information sources relevant to the project. This discussion should clearly explain why the existing information is inadequate and the need for additional information.

Project Nexus

§5.9(b)(5) Explain any nexus between project operations and effects (direct, indirect, and/or cumulative) on the resource to be studied, and how the study results would inform the development of license requirements;

This discussion should clearly draw the connection between project operations and the effects (direct, indirect, and/or cumulative) on the applicable resource. Just as important, this discussion should explain how the requester will use the information to develop protection, mitigation, and enhancement measures, including those related to an agency's mandatory conditioning authority under 401 of the Clean Water Act or sections 4(e) and 18 of the Federal Power Act.

Proposed Methodology

§5.9(b)(6) Explain how any proposed study methodology (including any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate field season(s) and the duration) is consistent with generally accepted practice in the scientific community or, as appropriate, considers relevant tribal values and knowledge;

Study requests should be as detailed as possible. It is important to relay to the applicant your expectations on the scope and methods so that an adequate study plan can be developed. The requester may describe the proposed methodology by outlining specific methods to be implemented (e.g. study area, study sites, data collection methods, etc.) or simply by referencing an approved and established study protocol or methodology (e.g. Henderson 1999, or Missouri State Water Quality Sampling Protocols for Lead, 1999). If providing a detailed methodology, the requester should demonstrate how the requested methodology is consistent with generally accepted practice within the scientific community or, as appropriate, considers relevant tribal values and knowledge. The requested study must be generally accepted in the context of how it is being used. For example, just because an IFIM is a generally accepted methodology for determining the relationship of flow to available habitat, it doesn't mean you would use IFIM for answering questions about fish populations.

LEVEL OF EFFORT AND COST

§5.9(b)(7) Describe considerations of level of effort and cost, as applicable, and why any proposed alternative studies would not be sufficient to meet the stated information needs.

This section should describe your expectations of the level of effort and costs associated with the development and implementation of the requested study. This would be used to provide the applicant with a better understanding of your expectations for the completion of the study. Within this section, you should also provide a justification as to why any proposed alternative studies would not be sufficient to meet the stated information needs. Proposed alternative studies could be studies being proposed by the applicant in the PAD or those being requested by other parties.