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October 15, 2007

Jim Crew
Alabama Power Company
600 18th Street North
Birmingham, AL 35203

Subject: World Wildlife Fund comments to Martin Issue Group study planning meetings

Mr. Crew:

Thank you for organizing and convening the Martin Issue Group in Alexander City, Alabama on September 25 and 26, 2007 and for posting the presentations that were given. These recent and previous meetings on issues related to resources potentially affected by the Martin Hydroelectric Project (FERC Project No. 349) are invaluable as we collectively begin the relicensing process. Careful consideration of all parties' input and issues will help develop consensus around the study plans and lead to productive dialogue about project impacts and avoidance, protection, enhancement and mitigation measures.

It is in that spirit of moving forward together that World Wildlife Fund (WWF) submits this letter as initial comments to the draft studies that APC proposed and discussed in the Martin Issue Group meetings. Contained in this letter are our comments, which fall into three broad categories

- Restatement of issues important to WWF;
- General comments to the proposed studies; and
- Draft study requests proposed by WWF based on guidance provided by the April 6, 2005 Federal Energy Regulatory Commission's Study Criteria Guidance document.

WWF INTERESTS

WWF has over 1.2 million members in the United States, over 7,000 of whom call Alabama home. The mission of WWF is,

To stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by:

- *conserving the world's biological diversity*
- *ensuring that the use of renewable natural resources is sustainable*
- *promoting the reduction of pollution and wasteful consumption.*

The Mobile River Basin, because of its biological richness, concentration of locally rare species, and abundance of natural resource threats, is one specific location across the world where WWF works. In

particular, several fishes and mollusks found in the Tallapoosa River are found only in the Tallapoosa River or only in the Mobile River Basin. These endemic animals, and other fishes and mollusks that are protected by federal or state law and the water quality and habitat on which they depend are important to our organization. While we have developed an initial list of the fish and mussel species potentially affected by project impacts (see Attachment A), these lists may not be exhaustive. We foresee APC developing similar lists should be developed for crayfish species and other fauna and floral groups.

Our interest in the Martin Project relicensing proceeding can be summarized in three points:

- Determine and quantify the Project's impacts on resources important to us;
- Identify, with other stakeholders, the measures necessary to protect and enhance those affected resources, avoid impacts, or mitigate impacts;
- Ensure that those avoidance, protection, enhancement, and mitigation measures are included in an operating license moving forward.

Currently, the process is focused on the early stages of the first bullet identified above. Our review of the draft study objectives and geographic scope presented by APC in late September 2007, coupled with our understanding of anticipated future operations, suggest several potential project impacts that may not be addressed. To be clear about our own understanding of the process, we reviewed the following passages from 18 CFR 4.51 (f), the set of regulations set forth to applicants seeking a new license for an existing major hydroelectric facility:

(2) *Report on water use and quality.* The report must discuss the consumptive use of project waters and the impact of the project on water quality; and

(3) *Report on fish, wildlife, and botanical resources.* The report must discuss fish, wildlife, and botanical resources in the vicinity of the project and the impact of the project on those resources.

We believe these are key passages to describing the scope of potential effects Alabama Power Company's continued operation and maintenance of the Martin Hydroelectric Project may have on resources important to WWF. We read these passages to mean *any impacts* the Project has on water quantity, water quality, fishes, wildlife and botanical resources must be discussed.

To guide the need for study as a part of this relicensing proceeding, we have been using the following language from 18 CFR 4.51 (f) as they relate to water quality and quantity and fish, wildlife, and botanical resources (emphases added):

(2) (ii) A description of existing water quality in the project impoundment and downstream water **affected by the project** and the applicable water quality standards and stream segment classifications.

(3) (i) A description of the fish, wildlife, and botanical resources of the project and its vicinity, and of downstream areas affected by the project, including identification of an species listed as threatened or endangered by the U.S. Fish and Wildlife Service, the National Marine Fisheries Service (if the project may affect anadromous fish resources subject to that agency's jurisdiction), and any other state or Federal agency with managerial authority over any part of the project lands.

In summary, WWF is interested in impacts continued operation and maintenance of the Martin Project has on fish, wildlife, plants, and their habitats in the areas affected by the project. Studies must focus on areas demonstrably affected by Project activities to assess the range of Project impact before appropriate measures to avoid Project-related impacts, enhance impacted resources, or mitigate Project-related impacts can be developed.

GENERAL COMMENTS

We have used the “affected by the project” language from above as a threshold to guide the types of studies and the geographic scope of studies addressed in our range of comments. Daily hydrologic patterns downstream of the Martin Project show clear, daily fluctuations in the Tallapoosa River far downstream (see Attachment B). In September of 2007 alone, notwithstanding a 12-day period over which no flow fluctuation occurred, river stage at the USGS Milstead, AL gage (USGS gage 02419500) varied on a daily basis as much as eight feet and frequently by about three feet. At the downstream Montgomery, AL – Montgomery Water Works gaging station (USGS gage 02419890) over the same period, river stage commonly varied by one foot and ranged up to 3.5 foot. These fluctuations, at least in September 2007, include both an up and down ramp within a 24 to 28-hour period. Both gages are located considerably downstream of the Martin Dam.

While two hydroelectric developments are located between the Martin Project and these two gaging stations (Yates and Thurlow, FERC Project No. 2407), these intervening developments are described as run-of-the-river facilities. Therefore, these facilities provide little to no contribution to the flow fluctuations as shown by gaging station data. Examination of gaging records over the same time period in uncontrolled reaches of the Tallapoosa sub-basin show relatively steady flows (Attachment B; Tallapoosa River below Tallapoosa, GA [USGS gage 02411930] and Little Tallapoosa River near Newell, AL [USGS gage 02413300]). While these later gaging stations are on much smaller streams than either the Milstead, AL or Montgomery, AL – Montgomery Water Works gages, they suggest that precipitation patterns likely are not the cause of the fluctuations noted at the Tallapoosa River gages downstream of Martin dam.

We view this hydrologic data as evidence to support two general comments to the study objectives and geographic scopes presented in the Martin Issue Group meetings in September, 2007. Those data in Attachment B appear to show a clear affect of the Project in the Tallapoosa River downstream to Montgomery. Therefore, there is reasonable likelihood for impacts to water quality, aquatic and riparian plants and animals, and the physical habitat needed by aquatic and riparian plants and animals throughout this stretch of the Tallapoosa River. As WWF interprets the Federal Code, Alabama Power Company’s studies must include direct assessment of these potential impacts including:

- Affects to water temperature, dissolved oxygen and other water quality parameters regulated by Alabama Department of Environmental Management;
- Affects to aquatic species and riparian species (fish, mollusks, amphibians, reptiles, mammals and plants including but not limited to Rare, Threatened, Endangered, and Alabama Sensitive Species);
- Increased bank erosion and altered sediment transport characteristics;
- Impacts to wetland and riparian habitat; and
- Stranding / life cycle interruption to aquatic species from flow fluctuations.

The study objectives presented during the Martin Issue Group focus water quality, ramping, and aquatic species and wetland habitat surveys within the FERC project boundary and in the Martin tailwater down to the Yates development pool. Aquatic species surveys included work upstream in the Tallapoosa River to Irwin Shoals, several miles upstream of the full impoundment level. We believe the hydrologic information demonstrated in Attachment B show a clear need to expand the geographic scope of Alabama Power Company’s studies to the mouth of the Tallapoosa River.

Our second general comment focuses on the duration of the studies proposed by Alabama Power Company. Each of the fieldwork dependent studies proposed one field season to collect data. We maintain, as a matter of practice, that each study relying on natural resource field data should include at least two years of collection over multiple seasons and be performed at critical times (e.g. spawning season). Broadening the time of data collection should minimize the impact of unusual conditions that may skew data and preclude fair assessment of the impacts of Project operations. Also, the fauna and flora potentially affected by the Project may be more or less vulnerable to the effects of Project

operations seasonally due to distributional or life history patterns. It will be important to collect data across a range of seasons within each sampling year.

DRAFT STUDY REQUESTS

To better reflect the geographic scope of the area affected by project operations, WWF offers eight proposed study plans in Attachment C. These proposed draft study plans incorporate many of the concepts and objectives included within Alabama Power Company's proposed studies. Moreover, our proposed studies incorporate considerations tied directly to fluctuating flows in the Tallapoosa River from the tailwater of Martin dam to the mouth of the Tallapoosa River. WWF's proposed studies also include consideration of interrupted stream fish connectivity among tributaries within and immediately adjacent to the impounded section of the Tallapoosa River and a broader examination of Project effects on water quality parameters.

The aquatic species and wetland and riparian habitat draft study plan proposals are clearly initial and exploratory investigations. We encourage APC to move forward with these broad surveys and analyze data from them over the near term. We would welcome an opportunity to work with APC to further refine these plans and the data from them. The results from the survey work is meant to identify likely Project-related impacts on particular species or habitats; this information can then be used to formulate specific studies that document the level of impact, if any, to be used to develop avoidance, protection, mitigation or enhancement measures.

Thank you again for the presentations made during the September 25 and 26 Martin Issue Group meetings. WWF appreciates the significant effort APC is undertaking in this relicensing process. We look forward to continued dialogue with both Alabama Power Company and the other stakeholders to this relicensing process over the next several years.

Feel free to contact me at (615) 279-1814 or email at Judy.Takats@wwfus.org if you have any questions or need clarification on these comments.

Sincerely,



Judy Takats

cc: Stan Cook, ADCNR
Jeff Powell, USFWS

Attachments (3)

**FISH AND MUSSEL SPECIES THAT MAY BE AFFECTED BY THE OPERATIONS OF
MARTIN HYDROELECTRIC PROJECT**

FISH SPECIES THAT MAY BE AFFECTED BY OPERATIONS OF MARTIN HYDROELECTRIC PROJECT

Common Name	Scientific Name	Region		Special Concern								Potential Impacts				
		Coastal Plain	Piedmont	Federal				State				Inundated habitat	Unstable flow	Flow & migration	Passage barrier	Interrupted connectivity
				Tallapoosa Endemic	Mobile Endemic	Endangered	Threatened	Candidate	Rare	Priority 1	Priority 2					
Acipenseridae																
Gulf sturgeon	<i>Acipenser oxyrinchus desotoi</i>	X						X				X		X		
Polyodontidae																
Alabama sturgeon	<i>Scaphirhynchus suttkusi</i>	X			X		X			X			X	X		
Paddlefish	<i>Polyodon spathula</i>	X												X		
Anguillidae																
American eel	<i>Anguilla rostrata</i>	X														X
Hiodontidae																
Mooneye	<i>Hiodon tergisus</i>	X											X	X		
Clupeidae																
Alabama shad	<i>Alosa alabamae</i>										X		X	X		
Skipjack herring	<i>Alosa chrysolchloris</i>	X											X	X		
Cyprinidae																
Alabama shiner	<i>Cyprinella callistia</i>		X			X							X			X
Tallapoosa shiner	<i>Cyprinella gibbsi</i>		X		X								X			X
Silverjaw minnow	<i>Ericymba buccata</i>	X	X										X			X
Lined chub	<i>Hypobopsis lineapunctata</i>		X			X							X			X
"Shoal chub"	<i>Machrybopsis sp. cf. M. aestivalis "A"</i>	X									X		X			X
"Shoal chub"	<i>Machrybopsis sp. cf. M. aestivalis "B"</i>		X								X		X			X
Burrhead shiner	<i>Notropis asperifrons</i>		X			X										X
Skygazer shiner	<i>Notropis uranoscopus</i>	X				X							X			
Pugnose minnow	<i>Opsopoeodus emiliae</i>	X	X										X			X
Riffle minnow	<i>Phenacobias catostomus</i>		X			X							X			X
Catostomidae																
Southeastern blue sucker	<i>Cypleptus meridionalis</i>	X													X	X
River redhorse	<i>Moxostoma carinatum</i>	X												X	X	X
Ictaluridae																
Black madtom	<i>Noturus funebris</i>	X	X										X			X
Speckled madtom	<i>Noturus leptacanthus</i>	X	X										X			X
Fundulidae																
Stippled studfish	<i>Fundulus bifax</i>		X		X								X			X
Cottidae																
Tallapoosa sculpin	<i>Cottus sp cf C. bairdi</i>		X		X								X			X
Centrarchidae																
Shadow bass	<i>Ambloplites ariommus</i>	X	X										X			X
Redspotted sunfish	<i>Lepomis miniatus</i>	X	X										X			
Redeye bass	<i>Micropterus coosae</i>		X										X			X
Percidae																
Crystal darter	<i>Crystallaria asprella</i>	X												X		
Lipstick darter	<i>Etheostoma chuckwachatte</i>		X		X						X					X
Harlequin darter	<i>Etheostoma histrio</i>	X							X					X		
Greenbreast darter	<i>Etheostoma jordani</i>	X				X								X		
Speckled darter	<i>Etheostoma stigmaeum</i>	X	X										X			X
Tallapoosa darter	<i>Etheostoma tallapoosae</i>		X		X								X			X
Mobile logperch	<i>Percina kathae</i>	X	X			X							X			X
Freckled darter	<i>Percina lenticula</i>	X							X				X			
Bronze darter	<i>Percina palmaris</i>		X			X							X	X		X
Saddleback darter	<i>Percina vigil</i>	X											X			
Muscadine bridled darter	<i>Percina sp. cf. P. macrocephala</i>		X		X								X	X		X
Priority 1 - Highest Conservation Concern Priority 2 - High Conservation Concern																

Sources:

Boschung, H. T. and R. L. Mayden. 2004. Fishes of Alabama. Smithsonian Books. Washington, D.C. USA.
 Mattee, M. F., P. E. O'Neil, and J. M. Pierson. 1996. Fishes of Alabama and the Mobile Basin. Oxmoor House. Birmingham, Alabama USA.
 Mirarchi, R.E., M.A. Bailey, J.T. Garner, T.M. Haggerty, T.L. Best, M.F. Mettee, and P. O'Neil. 2004. Alabama Wildlife. Volume Four: Conservation and Management Recommendations for Imperiled Wildlife. University of Alabama Press, Tuscaloosa, Alabama. 221 pp.
 Personal Communications.

MUSSEL SPECIES THAT MAY BE AFFECTED BY OPERATIONS OF MARTIN HYDROELECTRIC PROJECT

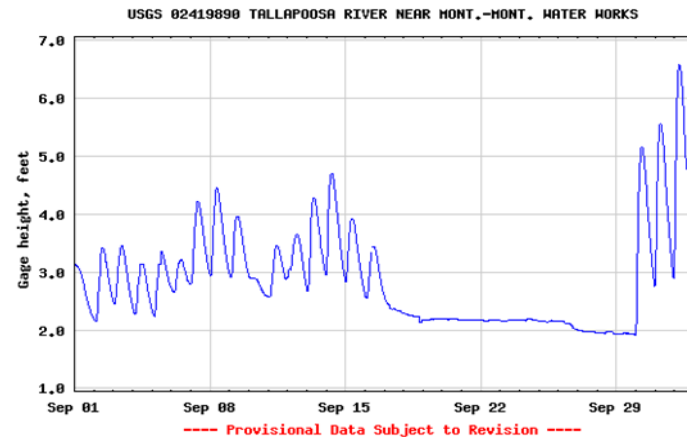
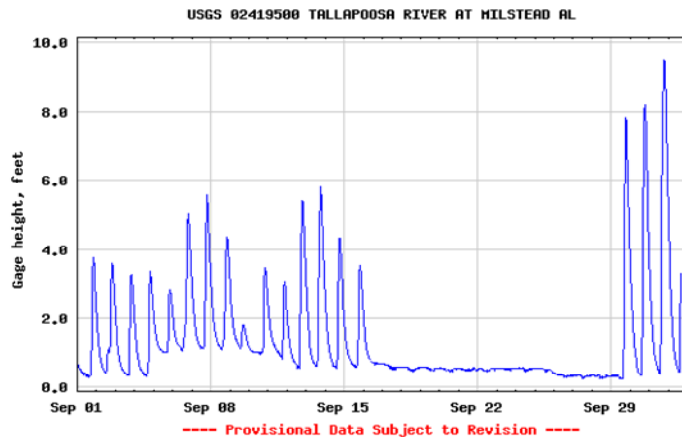
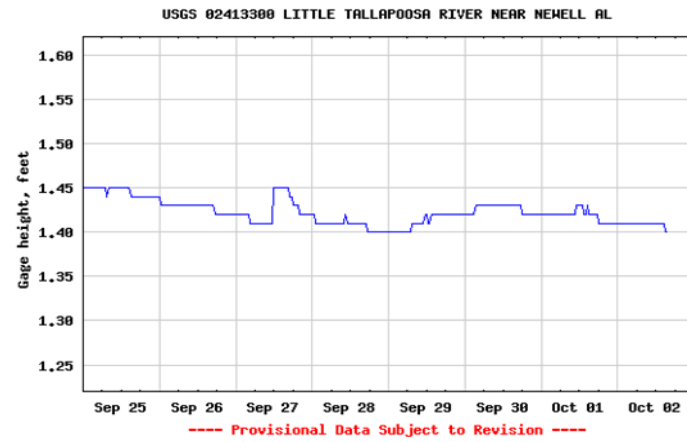
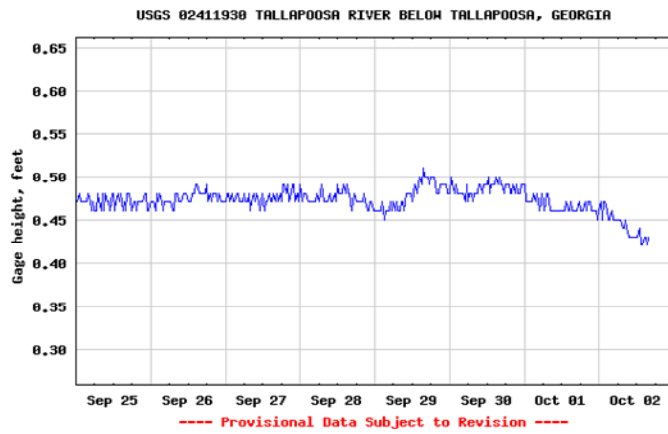
Common Name	Scientific Name	Region		Special Concern							Potential Impacts			
		Coastal Plain	Piedmont	Tallapoosa Endemic	Mobile Endemic	Endangered	Threatened	Candidate	State		Inundated Habitat	Timing and Duration of Flow	Migration and Passage	Interrupted Connectivity
									Priority 1	Priority 2				
Threeridge	<i>Amblema plicata</i>	X									X	X		
Rayed Creekshell	<i>Anodontooides radiatus</i>	X												X
Butterfly	<i>Ellipsaria lineolata</i>	X									X	X		
Alabama Spike	<i>Elliptio arca</i>		X						X		X	X		X
Delicate Spike	<i>Elliptio arcata</i>	X	X						X		X	X		X
Elephantear	<i>Elliptio crassidens</i>	X										X	X	
Gulf Pigtoe	<i>Fusconaia cerina</i>	X	X?								X	X		
Ebony Shell	<i>Fusconaia ebena</i>	X										X	X	X
Finelined Pocketbook	<i>Hamiota altilis</i>	X	X				X			X	X	X		
Southern Pocketbook	<i>Lampsilis ornata</i>	X										X		X
Southern Fatmucket	<i>Lampsilis straminea</i>	X									X	X		
Yellow Sandshell	<i>Lampsilis teres</i>	X										X		
Alabama Heelsplitter	<i>Lasmigona alabamensis</i>	X												
Fragile Papershell	<i>Leptodea fragilis</i>	X												
Black Sandshell	<i>Ligumia recta</i>	X									X	X		
Alabama Moccasinshell	<i>Medionidus acutissimus</i>	X					X			X	X	X		X
Washboard	<i>Megaloniais nervosa</i>	X	X?									X		
Threehorn Wartyback	<i>Obliquaria reflexa</i>	X												
Alabama Hickorynut	<i>Obovaria unicolor</i>	X	X?				X			X	X	X	X	X
Southern Clubshell	<i>Pleurobema decisum</i>	X				X				X	X	X		
Ovate Clubshell	<i>Pleurobema perovatum</i>	X				X			X		X	X		
Bleufer	<i>Potamilus purpuratus</i>	X	X								X	X		
Giant Floater	<i>Pyganodon grandis</i>	X	X											
Southern Mapleleaf	<i>Quadrula apiculata</i>	X												
Alabama Orb	<i>Quadrula asperata asperata</i>	X									X			
Tallapoosa Orb	<i>Quadrula asperata archeri</i>		X								X	X		
Gulf Mapleleaf	<i>Quadrula nobilis</i>	X												
Ridged Mapleleaf	<i>Quadrula rumphiana</i>	X	X								X			
Pistolgrip	<i>Quadrula verrucosa</i>	X									X	X		
Alabama Creekshell	<i>Strophitus connasaugaensis</i>	X								X				
Lilliput	<i>Toxolasma parvum</i>	X	X											
Fawnsfoot	<i>Truncilla donaciformis</i>	X												
Pondhorn	<i>Unio merus tetralasmus</i>	X									X			
Paper Pondshell	<i>Utterbackia imbecillis</i>	X	X											
Little Spectaclecase	<i>Villosa lienosa</i>	X	X								X			X
Southern Rainbow	<i>Villosa vibex</i>	X	X											

Priority 1 - Highest Conservation Concern Priority 2 - High Conservation Concern

Sources:
 Mirarchi, R.E., M.A. Bailey, J.T. Garner, T.M. Haggerty, T.L. Best, M.F. Mettee, and P. O'Neil. 2004. Alabama Wildlife. Volume Four: Conservation and Management Recommendations for Imperiled Wildlife. University of Alabama Press, Tuscaloosa, Alabama. 221 pp.
 Personal Communications.

Attachment B

**TALLAPOOSA RIVER REAL TIME DATA
SEPTEMBER 2007**



PROPOSED STUDY PLAN PROPOSALS FOR MARTIN HYDROELECTRIC PROJECT

HYDROLOGY

Martin dam interrupts the free flow of water in the Project area by impoundment and controlled release to generate electricity and provide flood control.

Goals and Objectives: This study will document the effects of these activities on flow level and timing in the Tallapoosa River downstream as far as they persist, and at least downstream to the mouth of Tallapoosa River. We recognize that two Alabama Power Company hydroelectric projects exist both upstream and downstream of Martin dam. These and other flow control structures impart their impact on hydrology in the Tallapoosa River, complicating the analysis. This study should include evaluation of flows over the course of a day (how do flows at various downstream locations vary in relation to Martin operations) as well as on a seasonal and annual basis (does the hydrograph or mean annual yield in the Tallapoosa River downstream of Martin dam shift as a result of Project operations).

Relevant public interest: The Mobile River Basin is among the most biodiverse temperate freshwater landscapes on the planet. The biodiversity within this river system is dependent upon and adapted to specific hydrologic conditions that, in part, drive water quality conditions and cue various life history requirements of component species. To the degree that project operations may change the hydrology of the Tallapoosa River, water quality characteristics and aquatic species may be impacted negatively. Any such impact would affect Alabamans and others interested in the diversity of life in this river.

Existing information: Existing information includes, but may not be limited to USGS gaging records.

Nexus to project operations and effects: Operation of the Martin dam dramatically alters the otherwise free-flowing, riverine environment of the Tallapoosa River by storing water and releasing it (either through generation or spill) usually in a controlled manner. These operations clearly alter hourly flows in the Tallapoosa River and may alter daily, seasonal, and annual flow patterns in this river system.

Methodology: This study will assess how flows over a range of temporal scales differ from expected flows **but for the project**. We envision a series of comparisons demonstrating how flows downstream of Martin dam diverge from the expected flows over that same time scale (the sum of flows from the Tallapoosa River and its tributaries upstream of Martin dam). Comparing actual to expected flows downstream of Thurlow dam will require more complicated methods (likely some sort of modeling exercise due to the complication of flow control facilities both upstream and downstream of Martin dam in the Tallapoosa system).

Considerations of costs and alternatives: The study methods and scope provided above represent WWF's thoughts on how to determine the potential for Project impact and its magnitude. While WWF does not have alternative methodologies identified at this time, we are interested in and open to exploring other means of answering the questions of "if" and "to what degree" Martin Project operations affect hydrologic resources in the Tallapoosa River with APC and other stakeholders.

WATER QUALITY

Martin dam impounds water for storage and to create head and then uses that water to generate electricity. In some circumstances, water passes the Project via spill (through gates) instead of through the powerhouse. Each of these activities potentially alters the water quality characteristics of the Tallapoosa River.

Goals and Objectives: This study will describe how continued operation of the Martin dam influences a variety of water quality characteristics through the various modes of operation. In particular, we would like to see how water temperature, dissolved oxygen, nutrients, and primary productivity are affected by Project existence and operation. The Project's effect on these water quality parameters for any proposed, future operational configuration must also be evaluated.

Relevant public interest: The Mobile River Basin is among the most biodiverse temperate freshwater landscapes on the planet. The biodiversity within this river system is dependent upon and adapted to the water quality conditions of the streams and rivers within the basin, including the Tallapoosa sub-basin. Alabamans and other visitors to the region also should be able to enjoy the Tallapoosa River for its beneficial uses including contact recreation and its native aquatic fauna.

Existing information: Among the existing data are citizen's groups and Lake Watch of Lake Martin have collected and compiled water quality information over the recent past.

Nexus to project operations and effects: Operation of the Martin dam dramatically alters the otherwise free-flowing, riverine environment of the Tallapoosa River by storing water and releasing it (either through generation or spill), usually in a controlled manner. The Project's existence and operation have a direct impact on water quality through storage, generation, spill, and release patterns that potentially influence water temperature, dissolved oxygen concentrations, total dissolved gas concentrations, nutrient cycling, primary productivity and turbidity.

Methodology: This study will assess how the proposed operation of the project influences water quality characteristics in the Tallapoosa River and in Martin Lake. We recommend that this study examine Project influence on water temperature, dissolved oxygen levels, total dissolved gases, various nutrients, primary productivity, and turbidity for all contemplated operational alternatives.

For the riverine segments of the Project affected areas, actual water quality measures should be compared to conditions in the Tallapoosa River immediately upstream of the Project area, adjusted for expected differences at the current site of Martin dam under a free flowing condition. This will require direct measurement of inflow to Martin Lake including principal tributary streams and likely some form of water quality modeling. The focus of these studies is on reservoir and tailwater conditions. Special consideration should be given to dissolved oxygen and total dissolved gas conditions in the Martin tailwater during a range of generation and spill operational scenarios to include an uncontrolled spill event as would occur during a flood. If total dissolved gas levels are particularly high, researchers should direct effort toward evaluating biotic responses to those conditions in the tailwater. Some fishes and mollusks are susceptible to high dissolved gas levels that may cause direct mortality or interfere with proper physiological and reproductive functions.

Within the reservoir, the study should focus on the timing and “strength” of stratification along the main reservoir body and within tributary “embayments”. Constituents to measure include temperature, dissolved oxygen, chlorophyll α , and various nutrient parameters (ammonia [as N], orthophosphate [as P], total phosphorous, and TKN). Ultimately, there may be a link between overall reservoir water quality, stratification, hypolimnetic water quality, and the performance of certain fishes in the reservoir, particularly those species using open-water habitats such as striped bass, gizzard shad, and threadfin shad.

Considerations of costs and alternatives: The study methods and scope provided above represent WWF’s thoughts on how to determine the potential for Project impact and its magnitude. While WWF does not have alternative methodologies identified at this time, we are interested in and open to exploring other means of answering the questions of “if” and “to what degree” Martin Project operations affect water quality resources in the Tallapoosa River with APC and other stakeholders.

AQUATIC SPECIES SURVEYS

Martin dam interrupts the free flow of water in the Project area by impoundment and controlled release to generate electricity and provide flood control. These activities may affect fish, mollusk, and crayfish populations in the Project area and downstream by altering physical habitat, hydrology, impacting water quality or interrupting movement. Before assessing the potential for the Martin hydroelectric project to impact aquatic species, we have to understand what resources are present within and around the project area.

Goals and Objectives: This proposed survey work will establish the basis for assessing project impacts to the aquatic species of the Tallapoosa River. This survey will document the presence of aquatic species in impounded areas (littoral and open water, coves and main lake areas), tailwater, flowing stream reaches upstream of impounded areas (each tributary and Tallapoosa River), and flowing stream reaches downstream of Martin dam to the mouth of the Tallapoosa River. Survey work will incorporate appropriate effort across seasons to determine the presence of spawning and juvenile life stages within and nearby the project affected area and protocol surveys (or USFWS approved methods) for protected species likely to occur.

Relevant public interest: The Mobile River Basin is among the most biodiverse freshwater landscapes in the temperate world. The Tallapoosa River is home to as many as or slightly more than 130 species of fish, 30 species of mussels and 10 species of crayfish. Among these, 5 species of fish, 2 species of mollusks, and 2 species of crayfish are considered endemic to the Tallapoosa River. Several conservation organizations have designated the Tallapoosa River as a river of conservation concern because of its biodiversity and high levels of aquatic species endemism.

Existing information: WWF recommends the following general sources to aquatic species diversity in the Project area.

Boschung, H. T. and R. L. Mayden. 2004. Fishes of Alabama. Smithsonian Books. Washington, D.C. USA.

Mattee, M. F., P. E. O'Neill, and J. M. Pierson. 1996. Fishes of Alabama and the Mobile Basin. Oxmoor House. Birmingham, Alabama USA.

Mirarchi, R. E., M. A. Bailey, J.T. Garner, T. M. Haggerty, T. L. Best, M. F. Mattee, and P. O'Neil. 2004. Alabama Wildlife. Volume 4: Conservation and Management Recommendations for Imperiled Wildlife. University of Alabama Press. Tuscaloosa, Alabama USA.

Attachment A in the document

Nexus to project operations and effects: The Martin dam, the impoundment it creates, and project operations dramatically alter the otherwise free-flowing, riverine environment of the Tallapoosa River and some of its tributaries. Impoundment converts flowing waters into essentially standing waters, favoring those species adapted to the open water or deep pools and fine substrates over those fishes that thrive in shallow, fast moving habitats with gravel, cobble, or boulder substrates. Seasonal or daily shifts in flow regime and water level (in the tailwater, downstream reaches, and in the impounded reaches) may influence spawning and rearing success of aquatic species. Although the survey work described in this study request may not specifically answer such questions, results from this study will form the basis for asking more specific questions relating project operations to species or "guild" specific effects. In turn,

these more narrowly tailored studies would lead to identification of necessary mitigation or enhancement measures to offset project-related impacts.

Methodology: The survey methodology must be robust to provide meaningful information. We suggest a range of sampling techniques for each habitat type to provide the best opportunity to capture various age classes and target taxonomic groups. This should include:

- Reservoir, Littoral – experimental gill / trammel nets; hoop nets, minnow traps, seines, larval trawls; electrofishing, others
- Reservoir, “pelagic” and deep water – vertical gill nets / trammel nets; trawls, larval trawls, others
- Streams – seines, electrofishing, minnow traps (pools), trap/fyke nets, snorkeling/diving, (other crayfish or mussel survey methods).

Data collectors must survey each site across a range of seasons to document intra-annual use patterns of habitat types by different species or by certain life history stages (spawning/incubation, juvenile, adult, migration). We suggest they conduct surveys in early spring, late spring, summer, and fall to produce a robust understanding of habitat use by season. To document upstream spawning migration run impacts to migratory species such as suckers, striped bass, and Alabama sturgeon (among others), surveyors should make collections in the tailwater of Martin and Thurlow dams every other week from early spring through early summer.

We believe that extant survey information is applicable provided it is recent (collected in last 10 years), and sufficiently robust to include aquatic animals of various sizes, life history phases, and preferred habitats. For any seasons, water bodies, or size / life history phase / habitat that are known or likely to have been missed in an existing survey, Alabama Power Company should collect that missing information to bolster the work previously performed.

These techniques for sampling aquatic species are generally used by the fisheries and aquatic biologist communities to collect fishes, mollusks, and crayfishes. We are not prescribing the exact gear-types to be used in any survey work, only that surveyors utilize a sufficient range of gears to capture animals of various sizes and mobility levels in a range of habitats.

Considerations of costs and alternatives: This survey work is essential baseline information upon which further understanding of potential project impacts will be based. We are asking that Alabama Power Company paint a complete picture of the aquatic animals that are using waters in and around the project area, present that information to the appropriate technical experts over the near term, and design more specific studies to document and quantify Project effects on specific animals if warranted. While WWF does not have alternative methodologies identified at this time, we are interested in and open to exploring other means of answering the questions of “if” and “to what degree” Martin Project operations affect aquatic species in the Tallapoosa sub-basin.

ENTRAINMENT

Martin dam creates an impoundment that provides habitat for fish species that inhabit open water habitats such as striped bass, white bass, gizzard shad, and threadfin shad.

Goals and Objectives: This study will examine the impacts of project operations on fish entrainment and document the impact of fish losses via entrainment to the affected populations.

Relevant public interest: Of the fishes known to inhabit Martin Lake, several are likely highly susceptible to entrainment through the project turbines including two recreationally targeted species (striped and white bass) and two important game fish forage species (gizzard and threadfin shad). Other fish species may also be affected. Entrainment may result in suppressed fish populations affecting recreational opportunities and/or reservoir ecosystem dynamics.

Existing information: WWF is not aware of any entrainment or turbine mortality information for Martin Lake.

Nexus to project operations and effects: Entrainment risk to fishes is an inherent effect of operating a hydroproject. Moreover, Martin dam creates an open-water environment for several species likely to be impacted by entrainment. Other species may also be affected by entrainment at this Project.

Methodology: This study would establish the level of impact from entrainment on affected fish populations. Reservoir population levels and age-class structures of affected species will be established using data collected from Aquatic Species Surveys. Estimates of seasonal and annual entrainment will be collected using some tested form of capture or hydroacoustic survey technique. Hydroacoustic surveys will need to be “ground truthed” – supplemented with some form of capture to verify which species are being entrained and to gauge size estimates of entrained fishes. Entrainment estimates will be compared to population estimates and age-class structures to examine the possible impacts of entrainment on populations.

Considerations of costs and alternatives: The study methods and scope provided above represent WWF’s thoughts on how to determine the potential for Project impact and its magnitude. While WWF does not have alternative methodologies identified at this time, we are interested in and open to exploring other means of answering the questions of “if” and “to what degree” Martin Project operations affect lake fishes via entrainment and turbine mortality in the Martin Reservoir.

AQUATIC SPECIES CONNECTIVITY

Martin dam and the impoundment it creates interrupt the connectivity of stream animal populations.

Goals and Objectives: This study will examine whether interrupted connectivity results in any measurable genetic differences in select stream-dwelling animals.

Relevant public interest: The Mobile River Basin is among the most biodiverse freshwater landscapes in the temperate world. The persistence of many organisms relies on connections among a group of populations, making the species as whole resilient to changing environmental conditions and providing insurance against localized extirpation events (that could arise from natural or anthropogenic disturbance events). Connectivity is particularly important for those taxa endemic to the Tallapoosa River residing in the vicinity of the Project as these populations are, by nature, of limited distribution and may be particularly susceptible to localized disturbances. Some of the fishes residing in the Project area and immediately upstream are hosts for the parasitic juvenile stage of mussels. Mussel populations, therefore, were capable of distribution throughout at least portions of the Project area prior to impoundment. By limiting movement among neighboring populations, genetic bottlenecks are more likely and recovery from local disturbances is compromised. Both of these considerations make tributary fish populations more susceptible to local extirpation.

Existing information: WWF is not aware of any aquatic species connectivity information for the Tallapoosa River in the vicinity of Martin Lake.

Nexus to project operations and effects: Martin dam itself precludes upstream movement of fishes in the Tallapoosa and further prevents small stream dwelling fishes from Channahatchee and Wind Creeks from interacting with populations in Blue, Rocky Ford, and possibly Sandy Creeks. Likewise, it is possible that impounded waters behind Martin dam do not allow fish populations from small streams to periodically connect with one another (e.g., Sandy, Rocky Ford, Blue, and Manoy Creeks; Hillabee, Jay Bird, Timbergut, and Emuckfaw Creeks, among others).

Methodology: This study would establish an expected genetic difference between populations in adjacent and proximal streams based on tributary streams in free-flowing sections of the Tallapoosa River. Researchers would also establish genetic differences for the same or similar species in adjacent and proximal streams upstream and downstream of Martin dam and tributary streams affected by impoundment. These genetic differences would be compared to reveal any genetic isolation resulting from the Project. Alabama Power Company along with select stakeholders would determine the species to study, focusing on species known to move freely among tributary streams or along the longitudinal gradient of the Tallapoosa River or rare / limited distribution species most susceptible to extirpation from localized disturbances.

Considerations of costs and alternatives: The study methods and scope provided above represent WWF's thoughts on how to determine the potential for Project impact and its magnitude. While WWF does not have alternative methodologies identified at this time, we are interested in and open to exploring other means of answering the questions of "if" and "to what degree" the Martin Project affects connectivity of aquatic animals hydrologic resources in the Tallapoosa River and its tributaries in the vicinity of the Martin Project.

SEDIMENT TRANSPORT

Martin dam interrupts the free flowing nature of the Tallapoosa River and the sediments moved by that flow. These sediments include bedload.

Goals and Objectives: The goal of this study is to quantify how the Martin dam impoundment interrupts bedload transport to the Tallapoosa River downstream of the Project.

Relevant public interest: The Tallapoosa River is an important part of the Mobile River Basin — among the most biodiverse freshwater landscapes in the temperate world. The biodiversity within this river system is dependent upon and adapted to specific conditions provided by normative river function including bedload and suspended sediment transport. Maintenance and perpetuation of the aquatic animals found in the Tallapoosa, particularly those that are rare, protected, or endemic. Certain sizes of bedload sediments (especially sands and gravels) provide essential rearing and spawning habitat for some of the aquatic animals that inhabit the Tallapoosa River including crystal darters, many of the substrate spawning river fishes, and all the mussels.

Existing information: WWF is not aware of any sediment transport information in the Tallapoosa River downstream of the Martin Project.

Nexus to project operations and effects: Operation of the Martin dam dramatically alters the otherwise free-flowing, riverine environment of the Tallapoosa River by creating a 40,000-acre impoundment. All bedload transport from the mainstem Tallapoosa and each tributary between the upstream end of the reservoir and the dam is intercepted and prevented from moving to the lower Tallapoosa River.

Methodology: Estimate mean annual contribution of bedload sediments by size class delivered to the impoundment by the Tallapoosa River and all tributaries through delta surveys.

Considerations of costs and alternatives: The study methods and scope provided above represent WWF's thoughts on how to determine the potential for Project impact and its magnitude. While WWF does not have alternative methodologies identified at this time, we are interested in and open to exploring other means of answering the questions of "if" and "to what degree" Martin Project operations affect sediment transport in the Tallapoosa sub-basin.

WETLAND AND RIPARIAN SURVEYS

The impoundment created by Martin dam nourishes riparian flora along the edge of the impoundment. Wetlands of various types likely exist along the lake at high lake levels. These same habitats occur in the Tallapoosa River reaches downstream of the dam.

Goals and Objectives: This study will identify and quantify these habitats; further, it will assess how changing water levels (both in the reservoir and in the river downstream of Martin dam) affect these habitats.

Relevant public interest: The Mobile River Basin is among the most biodiverse freshwater landscapes in the temperate world. Riparian and wetland habitats contribute to habitat diversity and normative river function required to maintain aquatic animal biodiversity.

Existing information: WWF is not aware of any existing habitat surveys along Martin Lake or in the Project affected area.

Nexus to project operations and effects: Operation of the Martin dam dramatically alters the otherwise free-flowing, riverine environment of the Tallapoosa River by storing water and releasing it (either through generation or spill) in a controlled manner. These activities produce hourly, daily, and seasonal variations in river stage downstream of the dam and lake levels throughout the impoundment. These fluctuation water levels can impact wetlands and compromise the health of riparian habitats immediately adjacent to the waterway, particularly in the varial zone (between the typical high and low water marks).

Methodology: Habitat surveys form the basis for this study. Riparian and wetland habitats should be catalogued along the impoundment and as far downstream on the Tallapoosa River as Martin operations impact river stage. Surveyors should repeat surveys to assess how conditions change at low and high reservoir and river levels respectively. The habitat conditions between these conditions (i.e., the varial zone) must be described in detail and assessed for their habitat value and potential impact to riparian / wetland dependent species (flora and terrestrial / amphibious animals) and spawning aquatic animals.

Considerations of costs and alternatives: This survey work is essential baseline information upon which further understanding of potential project impacts may be based. We are asking that Alabama Power Company paint a complete picture of the wetland and riparian habitats along the reaches of the Tallapoosa sub-basin affected by the Martin Project and its operations, present that information to the appropriate technical experts over the near term, and design more specific studies to document and quantify Project effects on specific animals if warranted. While WWF does not have alternative methodologies identified at this time, we are interested in and open to exploring other means of answering the questions of “if” and “to what degree” Martin Project operations affect these critically important habitat types in the Tallapoosa sub-basin.

RAMPING

Martin power generation and water management operations result in fluctuating flows in the Tallapoosa River downstream of Martin dam.

Goals and Objectives: The goal of this study is to describe and quantify the impacts of fluctuating flows on aquatic animals in the affected river reach (the Tallapoosa River and tributary mouths between Martin dam and where river stage changes from Marting Project operation are no longer measurable). In particular, researchers should examine how stage changes impact breeding habitats (nest and egg desiccation) and strand fishes and mollusks.

Relevant public interest: The Mobile River Basin is among the most biodiverse freshwater landscapes in the temperate world. The biodiversity within this river system is dependent upon and adapted to specific flow conditions. The normative flow regime is more stable over an hourly time step than the current condition under project operations.

Existing information: USGS records demonstrate the magnitude of fluctuating flows at two sites downstream of the Martin Project. WWF is not aware of any plant, animal, or water quality sampling or observation regarding possible effects of flow fluctuations on those resources.

Nexus to project operations and effects: Operation of the Martin dam dramatically alters Tallapoosa River stage downstream of Martin dam over a short time step. These daily changes in stage can strand mobile aquatic animals at any season. During spawning, fish behavior may be affected by such fluctuating flows as suitable spawning sites are made more or less available or abundant at different water levels over the course of a day. If animals successfully spawn in habitats within the fluctuation zone, eggs, larval fishes or individuals of mollusk species would likely be subject to periodic desiccation on ensuing days, subjecting them to increased mortality.

Methodology: This study should provide an examination of river stage changes at various locations downstream of Martin dam. The survey will include mouths of tributaries (e.g., Wind Creek) that are influenced by varying flow levels. On the ground surveys should document the amount of habitat of various types inundated / exposed under current and proposed flow releases. Further, survey work will document use of these habitats by spawning or rearing aquatic animals and estimate the impact to these populations by dewatering spawning areas or stranding individuals.

Considerations of costs and alternatives: The study methods and scope provided above represent WWF's thoughts on how to determine the potential for Project impact and its magnitude. While WWF does not have alternative methodologies identified at this time, we are interested in and open to exploring other means of answering the questions of "if" and "to what degree" daily ramping at the Martin Project affects aquatic and riparian habitats, aquatic animals, and riparian plants in the Tallapoosa sub-basin.