

SALUDA HYDROELECTRIC PROJECT (FERC NO. 516) STUDY PLAN

Study Plan Name: Status of the Shortnose Sturgeon in the Lower Saluda and Upper Congaree Rivers

Applicable Hydro Projects: Saluda Hydro FERC No. 516

I. Study Objective

The purpose of this study will be to document shortnose sturgeon (*Acipenser brevirostrum*) usage downstream of the Saluda Hydroelectric Project as part of efforts by SCE&G to acquire a new Federal Energy Regulatory Commission (FERC) operating license for the project. This study responds directly to comments and study requests provided by National Oceanographic and Atmospheric Administration - National Marine Fisheries Service (NMFS) and the South Carolina Department of Natural Resources (SCDNR) during the initial stages of the Saluda Project relicensing.

The objectives of this proposed study are as follows:

- To document whether or not shortnose sturgeon are utilizing areas of the Saluda and Congaree rivers downstream of the Saluda Hydroelectric Project;
- If sturgeon are found to be present, to document their relative abundance and spatial and temporal patterns (i.e., how many there are, where they are located, and at what times of the year);
- If shortnose sturgeon are present, determine whether or not spawning is taking place downstream of the Saluda Hydroelectric Project;
- If possible, to characterize usage of this reach of the Saluda and Congaree relative to water quality and habitat data; and
- Cooperate, to the extent feasible, with population genetics and other studies being conducted by the SCDNR to determine the status of shortnose sturgeon in the Santee River Basin.

II. Basis

The shortnose sturgeon is federally listed as endangered under the Endangered Species Act (ESA) and falls under the jurisdiction of the National Oceanographic and Atmospheric Administration - National Marine Fisheries Service (NMFS). Under Section 18 of the Federal Power Act, the NMFS also has mandatory conditioning authority for fishway prescription at all FERC licensed hydro projects when diadromous species, such as shortnose sturgeon, are involved. In addition, the shortnose sturgeon is among the target species identified by the NMFS, SCDNR, and U.S. Fish and Wildlife Service (USFWS) as target species in the Santee Cooper Basin Diadromous Fish Passage Restoration Plan (USFWS et al. 2001), which has been

submitted to and accepted by FERC as a Comprehensive Plan under Section 10(a)(2)(a) of the Federal Power Act. In addition to providing the baseline information needed to address such regulatory requirements, this study will likely provide valuable information regarding the status of the shortnose sturgeon in a portion of its historic range that has not been sampled in recent history. Sampling directed towards “areas where shortnose sturgeon historically occurred but have not been recorded in recent time” has been cited as an important recovery goal for the species (NMFS 1998).

III. Geographic and Temporal Scope

Temporal Scope: The study is scheduled to begin in February 2006 and continue through 2007 (2 years of study). Based on the findings of the initial 2 years of study and consultation with NMFS and the SCDNR, additional work may be scheduled.

On an annual basis, sampling will be conducted during late-winter and spring (Approximately February 1 through the end of April) when shortnose sturgeon would be expected to migrate into Piedmont rivers to spawn.

Geographic Scope: In consultation with NMFS and SCNDR, it has been determined that sampling likely should focus on the Saluda-Upper Congaree Sub-basin, from the vicinity of the Rosewood Boat Landing (also known as Barney Jordan Landing) adjacent to downtown Columbia, upstream to the Saluda Project Dam on the Saluda River and the Columbia Canal Diversion Dam on the lower Broad River. Within this area, the following potential sampling sites have been identified (Figure 1):

1. Downstream and in the vicinity of the Saluda Project dam;
2. The vicinity of SCE&G’s Gardendale canoe landing on the Saluda River;
3. Upstream of the old Granby Lock and Dam on the Congaree River; and
4. The vicinity of the Rosewood Boat Landing on the Congaree River.

IV. Summary of Existing Data

Much of the Santee Basin, including the portion of the Saluda Basin encompassed by the Saluda Project, is thought to be within the historic range of the shortnose sturgeon (Welch 2000, Newcomb and Fuller 2001). Within the basin, shortnose sturgeon have been documented downstream of the dams associated with the Santee-Cooper Lakes (Marion and Moultrie) in the lower reaches of both the Santee and Cooper rivers (Collins et al. 2003; Cooke et al. 2002, 2004). The Cooper River population is believed to be the most significant, with population estimates over a three-year period yielding an average of approximately 200 fish migrating upstream to the base of the Pinopolis Dam annually (Cooke et al. *in press*). An additional dam-locked population of shortnose sturgeon has been documented within and upstream of the Santee-Cooper Lakes (Collins et al. 2003). While research to date suggests that Lake Marion and its tributaries harbor the most significant population (Collins et al. 2003), no population estimates are currently available for the Santee-Cooper Lakes and its tributaries.

Radio-telemetry studies conducted by the SCDNR have provided significant insight into the movements and habitat use of Santee-Cooper Lakes shortnose sturgeon. Collins et al. (2003) documented migration of Lake Marion shortnose sturgeon to a spawning site on the Congaree River just south of the city of Columbia (approximately 15 miles downstream of the Saluda Project). Further telemetry studies, in which Cooper River sturgeon were captured, radio-tagged, and released upstream in the Santee-Cooper Lakes, documented migration as far upstream as upstream of the old Granby Lock and Dam on the Congaree River and near the town of Wateree, SC on the Wateree River (Isely 2002; Doug Cooke, SCDNR, Pers. Comm.). The old Granby Lock and Dam is located adjacent to downtown Columbia, approximately 11 miles downstream of the Saluda Project and an additional 4 miles upstream of the most upstream migration documented by Collins et al. (2003). Presence of shortnose sturgeon in the vicinity of Granby Lock and Dam was also confirmed by collection of a single specimen during sampling related to relicensing of Duke Power's Catawba-Wateree Project in March 2004 (Duke Power 2004). These studies suggest that shortnose sturgeon have the ability to migrate into Piedmont reaches of the Santee Basin downstream of the Saluda Project; however, no directed sampling effort has been undertaken within recent history to document the species.

The SCDNR has and continues to conduct population genetics studies aimed at delineating distinct population segments and estimated emigration and colonization rates. Collins et al. (2003) found significant genetic differences between Santee-Cooper lakes shortnose sturgeon and samples from three nearby rivers (Ogeechee, Savannah, and Edisto). Although not statistically significant, the study also observed appreciable differences in haplotype frequency between samples collected from reservoir shortnose sturgeon and those collected below the dam in the Cooper River. The authors noted that these results suggest that there may be some degree of genetic isolation between the shortnose sturgeon residing above and below the Santee-Cooper dams, but additional samples are needed from upstream areas.

V. Methodology

Sampling for Adult/Juvenile Shortnose Sturgeon

Adult and juvenile shortnose sturgeon will be sampled weekly (one day per week) during the sampling period using standard gillnetting techniques. Gillnetting will utilize one approximately 100 ft-long monofilament net at each sampling location (Figure 1), with alternating 25 foot-long panels of 5 inch (12.7 cm) and 7-inch (17.8 cm) stretch mesh. Nets will be set beginning at daybreak of each sampling day and fished for approximately 8 hours. During the initial phase of the study, gillnets will be checked every 2 hours. Gillnet soak times may be adjusted based on field experience, but will always fall within the guidelines described by in 'A Protocol for Use of Shortnose and Atlantic Sturgeons' (Protocol, Moser et al. 2000). Individual sturgeon will not be targeted for recapture on an annual basis. As such, gillnets may be repositioned within the general area of each sampling location (i.e. moved 100 to 150 yards) to minimize risk of exposure to the gear.

All captured sturgeon will be examined, measured for total length (mm), weighed (0.1 kg), and scanned for presence of a Passive Integrated Transponder (PIT) tag. If untagged, each fish will be tagged with a PIT tag as recommended in the Protocol. The PIT tags will be injected just under the skin on the left side of the fish, posterior to the dorsal fin, using a syringe equipped with a 12 to 8-gauge needle. PIT tags will not exceed 32 mm x 3.1 mm, and generally will be

smaller (e.g., Biomark model TX1405L, 14 mm x 2.1 mm). In addition, external streamer dart tags (e.g. Floy Tag model FT-1-94) may be attached in the dorsal musculature by puncturing the skin and muscle with an 8-gauge needle. In some instances, a small (1 cm² or less) non-deleterious tissue sample, clipped with surgical scissors from the pelvic fin, may be taken from captured sturgeon to contribute to the SCDNR's population genetics studies (i.e. to determine population of origin). Tissue collection will follow the Protocol, with all samples stored in ethyl alcohol. Any tissue collections will be closely coordinated with the SCDNR, with all tissues archived by:

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All adult and juvenile sturgeon captured will be placed in a live car (or equivalent device as recommended in the Protocol) and processed one at a time before making additional capture attempts. The live car will be constructed as specified in the Protocol, with bilge pumps used for water exchange and an external oxygen supply. The water supply to fill the live car will be taken from the ambient river system and all water quality criteria for the live car will follow NMFS guidelines, as established in the Protocol. Fish will be handled as little as possible and will always be supported in at least two places while out of the water to avoid stress to the vertebral column (as recommended in the Protocol). Processing time for each fish is expected to be 10 minutes or less. Maximum holding time for captured shortnose sturgeon will follow the Protocol, and will not exceed 30 minutes when water temperatures exceed 27°C and 2 hours when water temperatures are 27°C or less. After processing, all captured shortnose sturgeon will be released at the point of capture. A measurement of water temperature (°C) and dissolved oxygen (mg/L) will also be taken at each location.

Results of gillnet sampling, including estimates of relative abundance and Catch per Unit Effort (number of fish/net hours fished), will be compared by date and location and presented in the final report. In addition, a species list will be compiled of all species encountered during the study.

Sampling for Shortnose Sturgeon Larvae and Eggs

Ichthyoplankton nets will be fished in conjunction with gillnets, whenever possible, to sample for the presence of shortnose sturgeon eggs and larvae. Specifically, one D-shaped or rectangular drift net (maximum mesh size 2mm), equipped with flowmeter, will be fished in the general vicinity of each gillnetting location (Figure 1). Nets will be anchored facing upstream in sufficient flow to sample effectively and will be deployed for a maximum of 24 hours (as recommended in the Protocol).

Samples from egg nets will be preserved in ethyl alcohol and returned to the laboratory for identification. All eggs collected will be examined to determine stage and all larval specimens will be measured for standard length (0.1 mm). Larval densities (number / cm³) will be calculated, compared by date and location, and presented in the final report.

VI. Schedule and Required Conditions

Sampling for adult, juvenile, and larval shortnose sturgeon will begin in February 2006. A brief report summarizing the 2006 sampling results will be issued by November 1, 2006, with a more comprehensive final report issued by December 31, 2006. The final report will include all sampling results and conclusions regarding presence and population status of shortnose sturgeon.

VII. Use of Study Results

Results of the shortnose sturgeon sampling will be used as an information resource during discussion of relicensing issues with the SCDNR, NMFS, USFWS, relicensing issue working groups, and other relicensing stakeholders.

VIII. Study Participants

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Applicant Leads	Stephen E. Summer	SCANA Services	(803)217-7357	ssummer@scana.com
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IX. List of Attachments

ATTACHMENT A: Map of Shortnose Sturgeon Sampling Locations on the Lower Saluda and Upper Congaree Rivers

X. List of References

- Collins, M. R., D. Cooke, B. Post, J. Crane, J. Bulak, T. I. J. Smith, T. W. Greig, J. M. Quattro. 2003. *Shortnose Sturgeon in the Santee-Cooper Reservoir System, South Carolina*. Transactions of the American Fisheries Society 132:1244-1250.
- Cooke, D. W. and S. D. Leach. 2004. *Implications of a Migration Impediment on Shortnose Sturgeon Spawning*. North American Journal of Fisheries Management 24: 1460-1468.
- Cooke, D. W., S. D. Leach and J. J. Isely. 2002. *Behavior and lack of upstream passage of shortnose sturgeon at a hydroelectric facility/navigation lock complex*. American Fisheries Society Symposium 28: 101-110.
- Cooke, D. W., J. P. Kirk, J. J.V. Morrow and S. D. Leach. *In Press*. *Population Dynamics of a Migration Limited Shortnose Sturgeon Population*. Proceedings of the Southeastern Association of Fish and Wildlife Agencies.
- Duke Power. 2004. *Catawba – Wateree Hydro Project Study Plan: Diadromous Fish Studies*. Available at <http://www.dukepower.com/community/lakes/cw/library/plans/aquatics3.pdf> Last accessed August 31, 2005.
- Isely, J. J. 2002. *Final Report: Shortnose Sturgeon Movement and Spawning in the Santee Cooper System*. South Carolina Cooperative Fish and Wildlife Research Unit, USGS Biological Resources. Division, Clemson, SC: 37 pp.
- Moser, M.L., M. Bain, M.R. Collins, H. Haley, B. Kynard, J.C. O'Herron II, G. Rogers, and T.S. Squires. 2000. *A Protocol for Use of Shortnose and Atlantic Sturgeons*. NOAA Technical Memorandum NMFS-OPR-18.
- National Marine Fisheries Service (NMFS) 1998. *Final Recovery Plan for the Shortnose Sturgeon (Acipenser brevirostrum)*. National Oceanic and Atmospheric Administration Report. 104 pp.
- Newcomb, T.J. and J.S. Fuller. 2001. *Anadromous and Catadromous Fish Survey of Santee/Cooper Basin in North Carolina and South Carolina*. Department of Fisheries and Wildlife Sciences, Virginia Polytechnic Institute and State University, Blacksburg, VA. Final Report, Prepared for Duke Power, June 25, 2001. 25 pp.
- United States Fish and Wildlife Service, National Marine Fisheries Service, and South Carolina Department of Natural Resources. 2001. *Santee-Cooper Basin Diadromous Fish Passage Restoration Plan*.
- Welch, S.M. 2000. *A Report on the Historical Inland Migrations of Several Diadromous Fishes in South Carolina Rivers*. Department of Aquaculture, Fisheries and Wildlife, Clemson University, Clemson, SC. Report prepared for Mr. Douglas W. Cook, South Carolina Department of Natural Resources. December 4, 2000. 19 pp.

ATTACHMENT A

MAP OF SHORTNOSE STURGEON SAMPLING LOCATIONS ON THE LOWER SALUDA
AND UPPER CONGAREE RIVERS

Attachment A: Preliminary Shortnose Sturgeon Sampling Area

