

**MONTICELLO RESERVOIR FRESHWATER MUSSEL  
RECONNAISSANCE SURVEY  
STUDY PLAN**

**PARR HYDROELECTRIC PROJECT  
(FERC No. 1894)**

*Prepared for:*

**South Carolina Electric & Gas Company  
Cayce, South Carolina**

*Prepared by:*

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**TABLE OF CONTENTS**

|     |  |   |
|-----|--|---|
| 1.0 | INTRODUCTION .....                     | 1 |
| 2.0 | STUDY OBJECTIVE.....                   | 4 |
| 3.0 | GEOGRAPHIC AND TEMPORAL SCOPE.....     | 4 |
| 4.0 | METHODOLOGY .....                      | 4 |
| 5.0 | REPORTING .....                        | 5 |
| 6.0 | SCHEDULE AND REQUIRED CONDITIONS ..... | 5 |
| 7.0 | USE OF STUDY RESULTS .....             | 6 |
| 8.0 | REFERENCES .....                       | 6 |

**LIST OF FIGURES**

|          |                           |   |
|----------|---------------------------|---|
| FIGURE 1 | PROJECT LOCATION MAP..... | 3 |
|----------|---------------------------|---|

# MONTICELLO RESERVOIR FRESHWATER MUSSEL RECONNAISSANCE SURVEY

## PARR HYDROELECTRIC PROJECT (FERC No. 1894)

### SOUTH CAROLINA ELECTRIC & GAS COMPANY

## 1.0 INTRODUCTION

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The Parr-Fairfield Hydro Project (FERC No. 1894) (Project) is a 525 megawatt (MW) licensed hydroelectric facility owned and operated by South Carolina Electric & Gas (SCE&G). The Project consists of the Parr Hydro Development and the Fairfield Pumped Storage Development. Both developments are located along the Broad River in Fairfield and Newberry Counties, South Carolina (Figure 1).

The Parr Hydro Development forms Parr Reservoir along the Broad River. The Development consists of a 37-foot-high, 200-foot-long concrete gravity spillway dam with a powerhouse housing generating units with a combined licensed capacity of 14.9 MW. Parr Hydro operates in a modified run-of-river mode and normally operates to continuously pass Broad River flow. The 13-mile-long Parr Reservoir has a surface area of 4,400 acres at full pool and serves as the lower reservoir for pumped-storage operations.

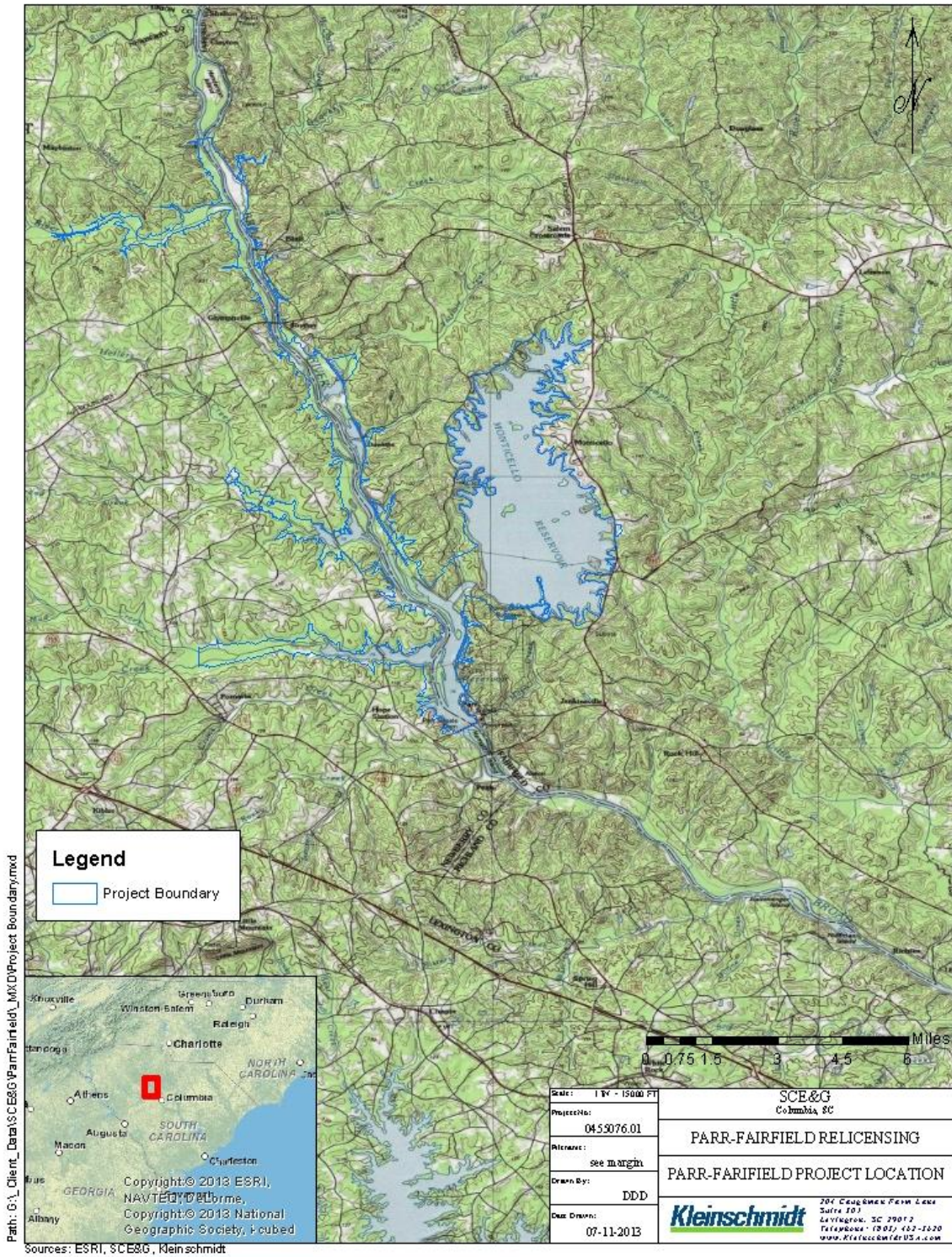
The Fairfield Pumped Storage Development is located directly off of the Broad River and forms the 6,800-acre upper reservoir, Monticello Reservoir, with four earthen dams. As noted, Parr Reservoir serves as the lower reservoir for pumped storage operations. The Fairfield Development has a licensed capacity of 511.2 MW and is primarily used for peaking operations, reserve generation, and power usage.

The Project is currently involved in a relicensing process which involves cooperation and collaboration between SCE&G, as licensee, and a variety of stakeholders including state and federal resource agencies, state and local government, non-governmental organizations (NGO's), and interested individuals. Their collaboration and cooperation is essential to the identification of and treatment of operational, economic, and environmental issues associated with a new operating license for the Project. SCE&G has established several Technical Working

Committees (TWC's) with members from among the interested stakeholders with the objective of achieving consensus regarding the identification and proper treatment of these issues in the context of a new license.

During early meetings aimed at scoping appropriate relicensing studies, the Rare, Threatened and Endangered Species (RT&E) TWC requested information describing the status of freshwater mussels in Parr and Monticello reservoirs, as well as in the downstream reach of the Broad River influenced by Project operations. A subsequent TWC review of existing mussel data for the Project vicinity determined that recent surveys conducted by the South Carolina Department of Natural Resources (SCDNR) (Price, 2010) and Alderman Environmental Services (Alderman and Alderman, 2012) were adequate for characterizing the mussel fauna of Parr Reservoir and the downstream reach of the Broad. The TWC further determined that no such data were available for Monticello Reservoir; thus a qualitative survey would be needed. This Study Plan was prepared pursuant to that determination.

**FIGURE 1 PROJECT LOCATION MAP**



## **2.0 STUDY OBJECTIVE**

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The study objective will be to determine whether native freshwater mussels are present within the pool of Monticello Reservoir, and if so, gather qualitative data describing the diversity, spatial distribution and relative abundance of the mussel fauna inhabiting the lake.

## **3.0 GEOGRAPHIC AND TEMPORAL SCOPE**

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The reconnaissance survey described herein will focus on selected habitats within the Monticello Reservoir pool that are likely to support populations of native freshwater mussels. Surveys will be conducted in 2015, likely during the summer to early fall months when water clarity and temperatures are sufficiently high to support wading and other in-water survey methods.

## **4.0 METHODOLOGY**

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Freshwater mussel surveys in Monticello will utilize qualitative methods that allow for rapid coverage of larger survey areas and have proven more robust at determining diversity of surveyed areas (Miller and Payne, 1993). Qualitative surveys will involve timed visual and/or tactile inspections of suitable habitat for presence of live freshwater mussels and/or shell material and will be conducted by a qualified malacologist with expertise in Broad River fauna. Although the number and specific location of qualitative survey points will likely be refined in the field based on professional judgment of the lead malacologist, it is expected that a minimum of 30 representative sites will be distributed throughout the reservoir<sup>1</sup>. Particular attention will be placed upon the examination of potential Savannah lilliput (*Toxolasma pullus*) (federal At Risk Species and state Species of Concern) habitat within backwater areas of the reservoir.

Exact methods for conducting visual and tactile searches will vary depending on water depth. However, it should be noted that water levels on Monticello Reservoir typically fluctuate up to 4.5 ft daily as a result of pumping operations, and as such, mussel surveys will focus primarily on those areas below the 4.5 ft depth contour where mussels are likely to become established. Depending upon water depths, wading, batiscope, snorkeling, or SCUBA will be used to conduct timed surveys at each of the selected sites:

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<sup>1</sup> It is estimated that each site will require an average of 30 man-minutes to conduct a reconnaissance level survey.

- Wading – Where water is relatively shallow, clear, and flat (no disturbances by wind), a biologist walks over an area to conduct a visual and/or tactile survey for live mussels and shells. This method is typically focused upon examinations of exposed near-shore habitats.
- Batiscope or snorkeling – In clear to slightly turbid waters up to 2 meters deep, or in waters with wind-disturbed surfaces, a batiscope or snorkeling will be used to conduct a visual and/or tactile survey for live mussels and shells.
- SCUBA – In survey areas of Monticello Reservoir with depths from 1 to 8+ meters, a biologist will traverse the lake bottom using SCUBA to conduct a visual and/or tactile survey for mussel species that prefer deeper waters and may not be detected at near-shore sites.

Live and fresh dead mussels collected during the survey will be identified to species, enumerated and returned to their habitat, although some shell material and/or live specimens may be preserved and returned to the laboratory for taxonomic confirmation. All sampling stations, as well as any significant mussel beds found during sampling, will be documented using a Global Positioning System (GPS) receiver. Mussel habitat surveyed at each sample location, as well the species collected during the survey, will also be photo documented. Basic water quality parameters (temperature, dissolved oxygen and conductivity) will be collected near the substrate at representative sample areas.

## **5.0 REPORTING**

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A report will be prepared for TWC review and comment. The report will document methods and results as encountered in the field including:

- A species list documenting the diversity of mussel fauna of Monticello Reservoir.
- GIS maps depicting spatial distribution of mussel populations.
- Tabular summaries comparing Catch per Unit Effort and relative abundance of species encountered.
- Water quality data from the survey period.

## **6.0 SCHEDULE AND REQUIRED CONDITIONS**

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As previously noted, it is expected that field surveys will be conducted during the summer or fall of 2015. It is expected that this effort will require 2-3 days of field work to complete. A final



report summarizing the study findings will be issued subsequent to the completion of field work. The methodology for this survey may be revised or supplemented based on consultation with the RT&E TWC and other interested stakeholders.

## **7.0 USE OF STUDY RESULTS**

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Study findings will be used as an information resource during discussion of RT&E species issues and for developing potential Protection, Mitigation and Enhancement measures with the TWC and other relicensing stakeholders.

## **8.0 REFERENCES**

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- Alderman, J.M. and J.D. Alderman. 2012. Freshwater Mussel Surveys within The Broad River, East of Hampton Island. Prepared by Alderman Environmental Services, Inc. for SCANA Services, Inc. October 29, 2012. 48 pp.
- Miller, A.C. and B.S. Payne. 1993. Qualitative versus quantitative sampling to evaluate population and community characteristics at a large-river mussel bed. *American Midland Naturalist* 130:133-145.
- Price, J. 2010. Fish Passage on the Broad River: an assessment of the benefits to freshwater mussels. Completion Report to the Broad River Mitigation Fund. University of SC and South Carolina Department of Natural Resources. 59 pp.