

# FRESHWATER MUSSEL MONITORING PLAN

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

*Prepared for:*

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

*Prepared by:*

**Kleinschmidt**

Lexington, South Carolina  
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December 2017

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# **FRESHWATER MUSSEL MONITORING PLAN**

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

### **SOUTH CAROLINA ELECTRIC & GAS COMPANY**

## **1.0 INTRODUCTION**

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South Carolina Electric & Gas Company (SCE&G) is the Licensee for the Parr Hydroelectric Project (FERC No. 1894) (Project). The Project consists of the Parr Shoals Development (Parr Development) and the Fairfield Pumped Storage Development (Fairfield Development). Both developments are located along the Broad River in Fairfield and Newberry counties, South Carolina. The current license for the Project is due to expire on June 30, 2020. Therefore, SCE&G will file for a new license with the Federal Energy Regulatory Commission (FERC) on or before June 30, 2018.

During relicensing efforts, the United States Fish and Wildlife Service (USFWS) requested that SCE&G perform periodic assessments of the composition and abundance of freshwater mussel species in or adjacent to the Project throughout the course of the new license. SCE&G and stakeholders have agreed to develop this Freshwater Mussel Monitoring Plan and it will be included as a Protection, Mitigation and Enhancement (PM&E) measure in the Comprehensive Relicensing Settlement Agreement (CRSA).

## 2.0 EXISTING INFORMATION

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Information on the species composition, abundance, and distribution of mussel species in Monticello Reservoir, Parr Reservoir, and upstream and downstream of Parr Reservoir is documented in several studies (Price 2009; Alderman 2012; Three Oaks Engineering 2016; and Price, et.al. 2016).

The South Carolina Department of Natural Resources (SCDNR) conducted surveys in 2007 and 2008 to assess the status of freshwater mussels on the Broad River and in Parr Reservoir (Price 2009). The SCDNR, led by a licensed malacologist, surveyed 60 sites along the Broad River and five sites on adjacent tributaries. Visual search methods including snorkeling, SCUBA diving, and bathyscopes were utilized. The section of the Broad River between Parr Shoals Dam and the Columbia Dam contained dense populations of mussels, with four species collected. Habitat included relatively clear water and stable substrates that are suitable for numerous mussel species (Price 2009). In 2016, North Carolina State University surveyed 14 sites between the Columbia Dam and the Parr Shoals Dam. Six of the 14 sites corresponded with some of the exact locations surveyed in 2007. The report provides a summary of freshwater mussel species occurrence and abundance changes over the ten-year period (Price et.al. 2016).

SCE&G personnel and Alderman Environmental Services, Inc. conducted freshwater mussel surveys on the Broad River downstream of Parr Shoals Dam in 2012. Thirteen areas were surveyed over two days by a team of four malacologists using bathyscopes and tactile techniques. The highest freshwater mussel diversity in the Broad River sub-basin in North and South Carolina upriver of the Columbia Dam was observed. This survey also found the most upriver occurrence of the yellow lampmussel (*Lampsilis cariosa*) within the Broad River sub-basin to date. Roanoke slabshell (*Elliptio roanokensis*) juveniles, which require an anadromous fish host, was also observed in this stretch of the Broad River. A total of nine mussel species were collected (Alderman and Alderman 2012).

SCE&G and Three Oaks Engineering Personnel conducted freshwater mussel surveys in Monticello Reservoir during 2016. A total of 25 sites were surveyed, and five mussel species were collected. Multiple life stages were observed for all species collected, suggesting that recruitment from juvenile to adult lifestages occurs within the reservoir for all five species

(Three Oaks Engineering 2016). During this study, several individuals were tentatively identified as Carolina creekshell (*Villosa vaughaniana*), a species considered to be critically imperiled by the state of South Carolina (SCDNR 2017). In order to confirm this finding, Three Oaks Engineering performed an additional survey and accompanying genetic analysis during the summer of 2017. The genetic testing confirmed that the Carolina creekshell mussel is present in Monticello Reservoir. The survey and genetic analysis also confirmed that Eastern creekshell (*Villosa delumbis*) and Eastern lampmussel (*Lampsilis radiata*) are also located in Monticello Reservoir, which are listed as apparently secure and imperiled, respectively, by the state of South Carolina (SCDNR 2017).

### **3.0 PROPOSED PM&E MEASURE**

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During the new license, SCE&G will perform monitoring of mussel populations in areas of Monticello Reservoir and the Broad River downstream of Parr Shoals Dam. Specific areas of Monticello Reservoir will be monitored with the goal of tracking the distribution and abundance of freshwater mussel species present with an emphasis on Carolina creekshell mussel populations. In addition, more information is required to fully assess how new Project operations of the Parr Shoals Development may influence mussels in the Broad River downstream of the dam. Therefore, freshwater mussels will be monitored for abundance, distribution, and species composition downstream of Parr Shoals Dam during the new license.

A Mussel Review Committee<sup>1</sup> will develop a study plan for these monitoring efforts following issuance of the new license. SCE&G will then submit this study plan to FERC for approval. Preliminary methods for mussel monitoring are included below.

#### **3.1 PRELIMINARY MUSSEL MONITORING METHODS**

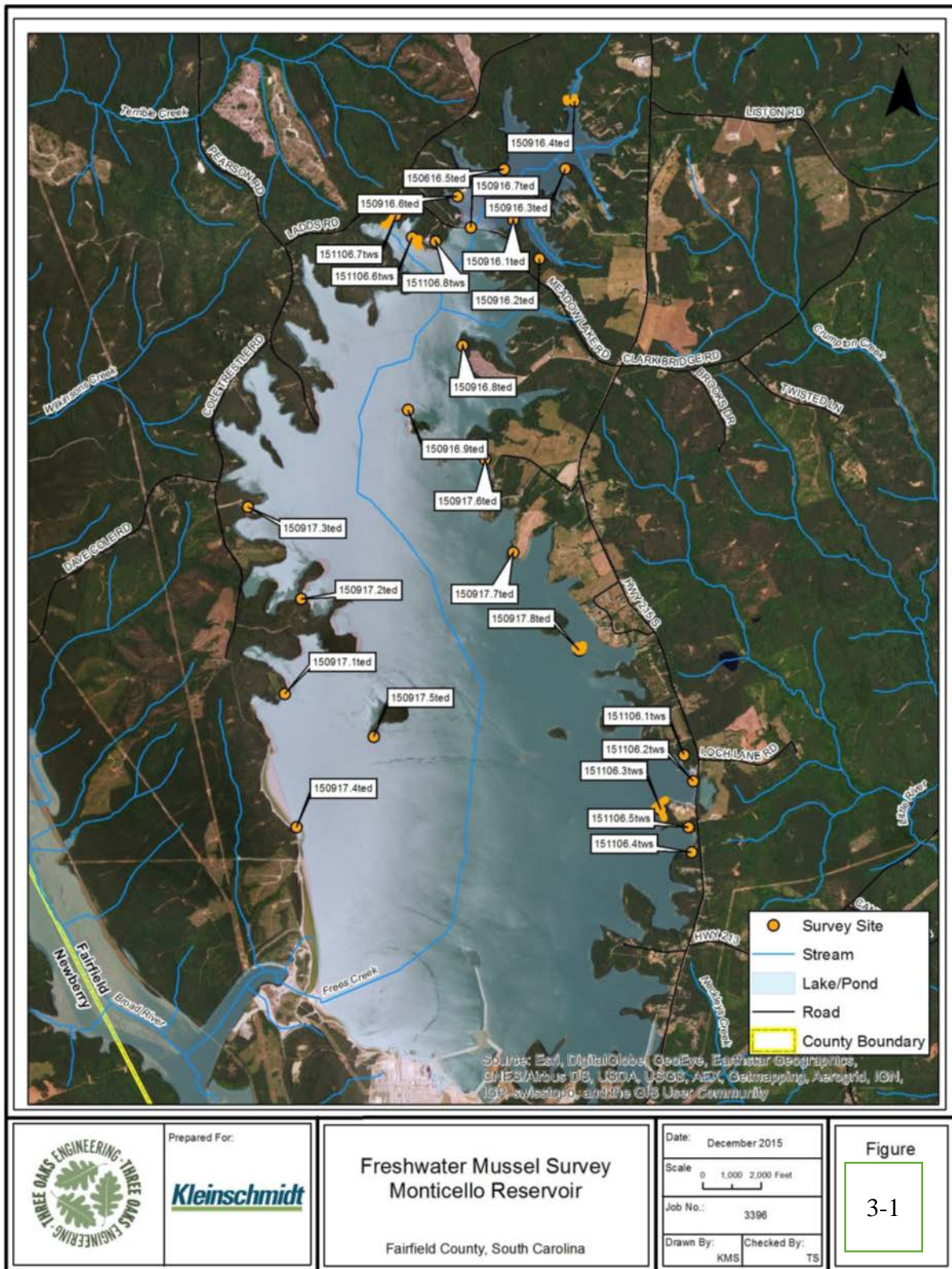
SCE&G will work with a malacologist (agreed upon by the Review Committee) to monitor abundance, distribution, and species composition of mussel species in Monticello Reservoir and the Broad River downstream of Parr Shoals Dam. Sampling efforts in Monticello will focus on

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<sup>1</sup> Members of the Mussel Review Committee must be signatories to the CRSA, with the exception of National Oceanic and Atmospheric Administration (NOAA) Fisheries, USFWS, SCDNR and the South Carolina Department of Health and Environmental Control (SCDHEC).

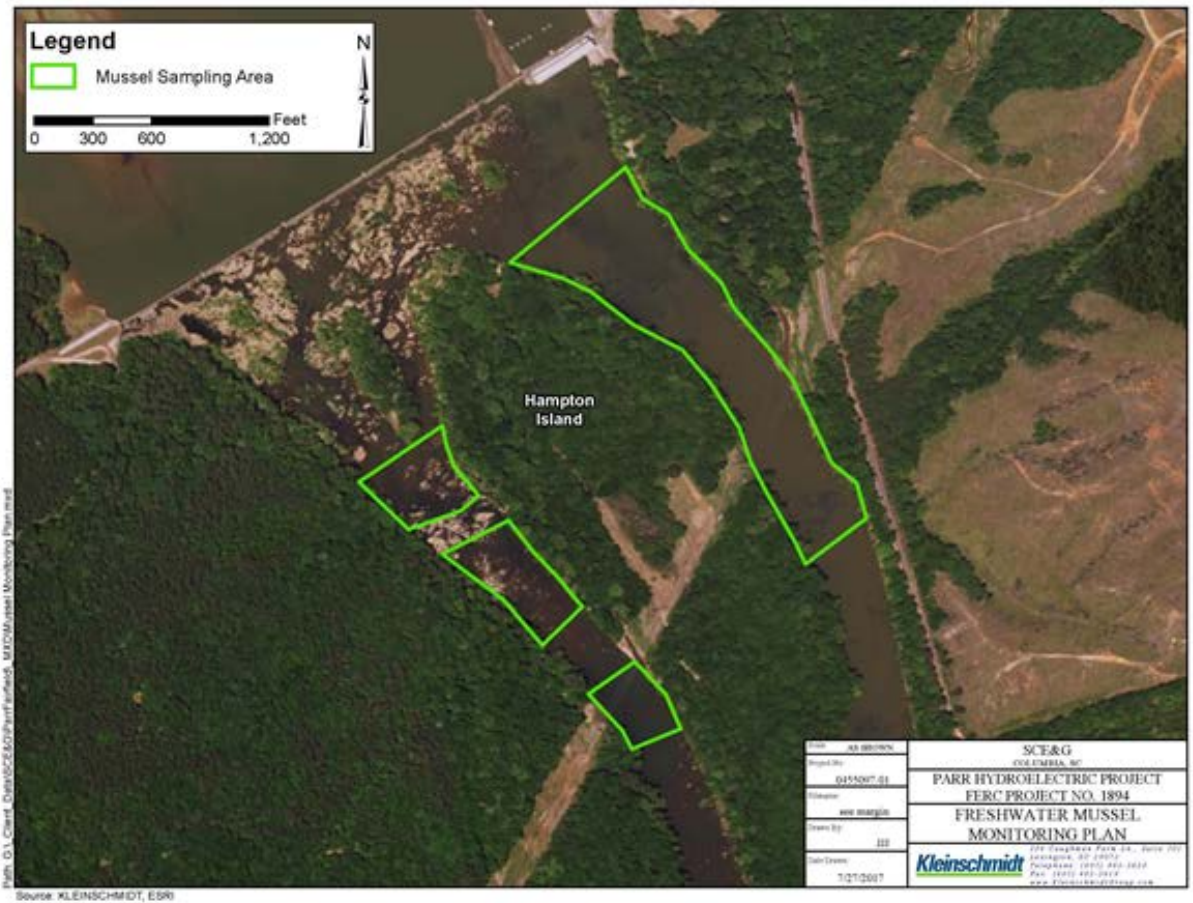
areas identified during the 2016 and 2017 surveys (Figure 3-1). Specifically, each area surveyed will be sampled by utilizing bathyscopes, snorkeling, and/or tactile searches to locate, identify and enumerate mussel species. Sampling will be performed over a two-day period. Surveys will be designed to identify the diversity, abundance, and size distribution of mussel species present.

Sampling in the Broad River downstream of Parr Dam will focus on the reach of river immediately downstream of the Parr powerhouse and several sections of the west channel of the Broad River. Specifically, one segment immediately downstream of the powerhouse will be surveyed along with three smaller segments on the west side of Hampton Island (Figure 3-2). Within each survey segment, sampling will be conducted by utilizing bathyscopes, snorkeling, and/or tactile searches to locate, identify and enumerate mussel species. Timed searches will be conducted for up to 30 minutes in each of the smaller west channel segments and up to 2 hours in the larger segment downstream of the powerhouse. Surveys will be designed to identify the diversity, abundance, and size distribution of mussel species present.



**FIGURE 3-1 MUSSEL SAMPLING LOCATIONS IN MONTICELLO DURING 2016 & 2017.**





**FIGURE 3-2 MUSSEL SAMPLING LOCATIONS IN THE BROAD RIVER DOWNSTREAM OF PARR SHOALS DAM.**

Sampling in Monticello Reservoir and in the Broad River downstream of Parr Shoals Dam will occur on the same schedule. The first (baseline) mussel survey will be conducted during the first year after the license has been issued and the Mussel Monitoring Study Plan has been approved by the FERC. The second survey will occur 6 years later (i.e. 7 years after the license is issued). Additional studies will be conducted 10 years thereafter for the course of the new license term. The Review Committee will meet to adjust the frequency of mussel monitoring if fish passage is implemented at the Project. Monitoring results will be distributed to the Review Committee for review and comment by December 31<sup>st</sup> of each year of sampling. An annual report will be filed with FERC by April 30<sup>th</sup> of the following year.

Survey methods may be altered if the USFWS develops new standard mussel sampling methods during the term of the license. SCE&G will consult with the Review Committee to potentially update the frequency and location of mussel monitoring in the event that fish passage is installed at the Project during the term of the new license. Fish passage installation would potentially increase the range and abundance of host fish species upstream of the Project, and would be a factor in determining updates to the monitoring plan that may include monitoring within Parr and Monticello reservoirs during the remainder of the license. Another factor that would initiate the Review Committee to amend the study schedule would be observed negative changes in mussel populations. The Review Committee would meet to discuss the potential for increasing monitoring frequency in the event that mussel populations decline when compared to historic or new baseline data.

#### **4.0 SCHEDULE**

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The monitoring schedule is described in the table below in relation to the issuance of the license by FERC.

**TABLE 4-1 FRESHWATER MUSSEL MONITORING PLAN SCHEDULE**

<b>PERIOD<sup>2</sup></b>	<b>ITEM</b>
Within 180 days of license issuance	Form Review Committee, review Freshwater Mussel Monitoring Plan and submit Mussel Monitoring Study Plan to FERC
Year 1 of new license	<ul style="list-style-type: none"> <li>• Conduct mussel survey</li> <li>• Report results to Review Committee by December 31<sup>st</sup></li> <li>• Review Committee meeting- February of following year</li> <li>• File Annual Report with FERC by April 30<sup>th</sup> of following year</li> </ul>
Year 7 of new license	<ul style="list-style-type: none"> <li>• Conduct mussel survey</li> <li>• Report results to Review Committee- by December 31<sup>st</sup></li> <li>• Review Committee meeting- February of following year</li> <li>• File Annual Report with FERC by April 30<sup>th</sup> of following year</li> </ul>
Year 17 of new license	<ul style="list-style-type: none"> <li>• Conduct mussel survey</li> <li>• Report results to Review Committee- by December 31<sup>st</sup></li> <li>• Review Committee meeting- February of following year</li> </ul>

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<sup>2</sup> Sampling frequency will be adjusted if fish passage is installed at the Project during the term of the new license. Sampling frequency may also be adjusted if a decline in mussel population is observed.

	<ul style="list-style-type: none"> <li>• File Annual Report with FERC by April 30<sup>th</sup> of following year</li> </ul>
Year 27 of new license <sup>3</sup>	<ul style="list-style-type: none"> <li>• Conduct mussel survey</li> <li>• Report results to Review Committee- by December 31<sup>st</sup></li> <li>• Review Committee meeting- February of following year</li> <li>• File Annual Report with FERC by April 30<sup>th</sup> of following year</li> </ul>

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<sup>3</sup> Sampling will continue throughout the term of the license. This schedule will be adjusted depending on the license term issued by FERC.

## 5.0 LITERATURE CITED

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