

APPENDIX D

ADAPTIVE MANAGEMENT PLANS AND OTHER PLANS

ADAPTIVE MANAGEMENT PLAN

MINIMUM FLOWS DOWNSTREAM OF PARR SHOALS DAM

SOUTH CAROLINA ELECTRIC & GAS COMPANY

FERC No. 1894

Prepared by:

South Carolina Electric & Gas Company

April 2017

ADAPTIVE MANAGEMENT PLAN FOR THE MINIMUM FLOWS DOWNSTREAM OF PARR SHOALS DAM

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**ADAPTIVE MANAGEMENT PLAN
FOR THE
PROJECT MINIMUM FLOW REQUIREMENTS**

1.0 INTRODUCTION

South Carolina Electric & Gas Company (SCE&G) must file an application for a new license for its Parr Hydroelectric Project (Project) (FERC No. 1894) (Project) with the Federal Energy Regulatory Commission (FERC) by June 2018. The relicensing process is a multi-year cooperative effort between SCE&G and stakeholders, including state and federal resource agencies, non-governmental organizations and concerned citizens, to address operational, recreational and ecological concerns associated with Project operations. During the relicensing process, the potential impact of Project operation minimum flows on fishery resources, aquatic habitat, and fish/navigation passage was identified as an issue to address.

SCE&G formed the Instream Flow Technical Working Committee (IFTWC) and the Recreation Technical Working Committee (RTWC) to develop an Instream Flow Incremental Methodology (IFIM) Study and a Downstream Navigational Flow Assessment, respectively, to address the minimum flow issue. The IFTWC includes representatives from SCE&G, South Carolina Department of Natural Resources (SCDNR), South Carolina Department of Health and Environmental Control (SCDHEC), U.S. Fish and Wildlife Service (FWS), National Ocean and Atmospheric Administration (NOAA), American Rivers, and Congaree Riverkeeper. The RTWC includes representatives from SCE&G, SCDNR, SCDHEC, NOAA, American Rivers, Congaree Riverkeeper, and other interested individuals.

During the TWC meetings, a framework for a Minimum Flow Adaptive Management Plan (AMP) was developed to address minimum flows to be released downstream of the Project during the new license term. This AMP describes the minimum flow issue and SCE&G's proposed actions to maintain minimum flows that will support fishery resources, aquatic habitat, and navigation passage downstream of the Project. These actions will be implemented during the new Project license.

1.1 PROJECT DESCRIPTION

The Project includes the 14.88-megawatt (MW) Parr Shoals Development (Parr Development) and the 511.2-MW Fairfield Pumped Storage Development (Fairfield Development) located in Fairfield and Newberry counties, South Carolina. Parr Reservoir is a 4,400-acre impoundment formed by the Parr Shoals Dam on the Broad River and serves as the lower reservoir for the Fairfield Development. Monticello Reservoir is a 6,800-acre impoundment formed by a series of four earthen dams and serves as the upper reservoir for the Fairfield Development. The existing Project license was issued by FERC on August 28, 1974 for a period of 46 years, terminating on June 30, 2020. SCE&G intends to file for a new license with FERC on or before May 31, 2018.

2.0 MINIMUM FLOW AMP REVIEW COMMITTEE

2.1 COMMITTEE MEMBERS

A Review Committee will be formed to direct the implementation of the AMP. Members of the Review Committee must be signatories to the Comprehensive Relicensing Settlement Agreement (CRSA).

SCE&G will serve as chairperson of the Review Committee, and be responsible for organizing meetings and distributing documents to committee members. Each entity will have the opportunity to select a representative to the Review Committee from within their organization.

The Review Committee will ultimately work to guide the decision making processes specified in the Minimum Flow AMP. The Review Committee will not make decisions that supersede state or federal law. The Review Committee's responsibilities may include, but are not limited to:

- Providing overall guidance for the AMP process;
- Evaluating other study (i.e., existing) information or information which becomes available during the time period of evaluations and would be applicable to the AMP;
- Reviewing and considering long term impacts of operational modifications on the Project and Project economics when evaluating the feasibility of implementing modifications;
- Reviewing the Minimum Flow Annual Report which documents the prior year's AMP activities which SCE&G will file with FERC, making it publicly available; and

- Advising on modifications to the AMP to be presented to FERC and advising if any amendment action is necessary during the license.

2.2 BUDGET/RESOURCES

The responsibility for implementing this AMP will rest primarily with SCE&G, as licensee for the Project. SCE&G will also rely on other resources outside of its establishment including, but not limited to, the following:

- federal, state and local grants
- donated services (federal and state agency involvement)
- equipment (purchases and loaners)
- expertise (governmental, non-governmental, private)

2.3 COMMITTEE MEETINGS

The Review Committee is tentatively scheduled to consult once per year via an in-person meeting or conference call. The frequency of meetings may be adjusted based on need. The tentative schedule is provided in Section 6.0 of this plan. Minutes from each meeting, as well as any pertinent materials discussed in the meetings will be filed with FERC as an appendix to the annual report of AMP activities, as described in Section 7.0.

3.0 GOALS AND OBJECTIVES

The overall goal of this AMP is to provide a minimum flow from the Project that considers fishery resources, aquatic habitat, and fish/navigation passage needs. This AMP provides the guidance for releasing minimum flows from the Project that consider these downstream resources. The methods that will be employed under this AMP to achieve this goal and objective are described in Section 5.0.

4.0 INSTREAM FLOW STUDIES

4.1 IFIM STUDY AND IFTWC DISCUSSIONS

SCE&G conducted an IFIM study during 2014-2016 in the Broad River from the Parr Shoals Dam to the downstream end of the Bookman Island complex (Figure 4-1) (Kleinschmidt 2016b). The IFIM study results provided quantitative estimates of habitat area at selected discharges, based on site-specific measurements of stream morphology, cover, substrate, depth, velocity and discharge gathered at transects within predetermined river reaches. These physical measurements were rated for habitat suitability based on habitat use data developed for eleven key aquatic species (and various life stages) and quantified as Weighted Usable Areas (WUA) over a range of flow releases from Parr Shoals Dam (Kleinschmidt 2016b and Meeting Notes Appendix A).

The IFTWC had multiple meetings from September 2016 through July 2017 to discuss the results of the IFIM study and to develop a recommendation for a minimum flow at the Project (Meeting Notes - Appendix A). The IFTWC conducted a float trip in June 2017 to observe target minimum flows at select study sites. After the field observations, the IFTWC met in July 2017 to agree upon the minimum flow recommendations for the Project.

The IFTWC established three minimum flow periods and a series of minimum flow targets for each period (Section 5.0). The recommendation includes a “Target Flow” and a “Compliance Limit”. Because the Project is not a storage project and outflows should be related to inflow to the Project, the Target Flow is a minimum flow based on habitat data from the IFIM study results and the Compliance Limit is based on inflow exceedance values. These two items will be evaluated as part of this AMP, which is anticipated to last for the first 5 years of the new license. The Review Committee will evaluate annually how good SCE&G met the Target Flow and the Compliance Limit in relation to inflows to the Project. It is SCE&G’s goal to improve the instream habitat downstream of Parr Shoals Dam and minimize the number of non-compliance events during the license. The IFTWC also agreed to a series of low flow scenarios within each flow period that would allow for operations during low flow periods. This recommendation provides the basis for a Low Inflow Protocol.

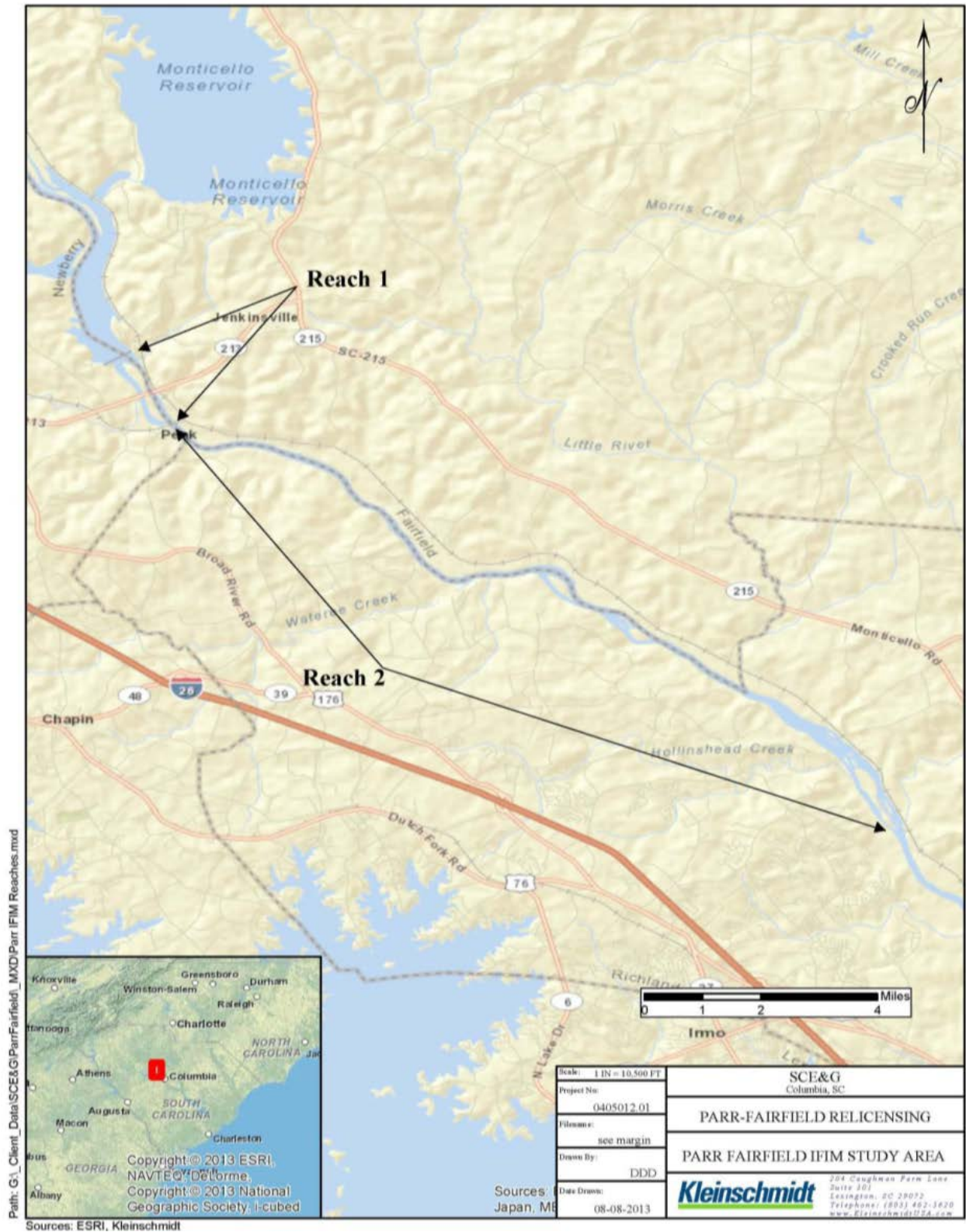


FIGURE 4-1 IFIM STUDY AREA

4.2 DOWNSTREAM NAVIGATIONAL FLOW ASSESSMENT

The Downstream Navigational Flow Assessment was conducted to ensure that the minimum flow recommendation developed during relicensing would consider the flow needed for one-way navigation in the Broad River. The recommendation for one-way navigation is defined as a "minimum depth of one foot across a channel 10 feet wide or across 10 percent of the total stream width, whichever is greater. Minimum depth does not need to occur across a continuous 10 percent of the stream width, but each point of passage must be at least 10 feet wide." One-way navigation recommendations are based on the passage of a 14 foot Jon-boat without a motor in the downstream direction only (SCWRC, 1988).

The navigational analyses evaluated constrictions on the Broad River downstream of the Parr Dam at two areas identified by the Recreation TWC. These areas were identified as "Ledge 1" and "Ledge 2" (Figure 4-2). Ledge 1 (Figure 4-3) consists of a bedrock ledge located approximately 2.4 miles upstream of Haltiwanger Island. Ledge 2 (Figure 4-4) consists of a bedrock ledge located 1.3 miles upstream of Hickory Island and approximately 0.5 miles downstream of the mouth of Little River.

Results of the assessment indicated that a flow of 500 cfs meets the passage recommendation at Ledge 1 with approximately 205 ft of cross-sectional passage provided collectively by two notches. A flow of 1,000 cfs meets the passage recommendation at Ledge 2. The navigation report noted that flows of 700 cfs provide the '1-foot' passage criteria through a notch at Ledge 2 that is 66 ft wide. Although this flow does not meet the exact navigation recommendation of providing navigation across 10 percent of the total stream width, it does provide a passage point that should be sufficient for one-way passage of a 14 ft Jon-boat, canoes, and kayaks. These results were considered along with the results of the IFIM Study in developing a minimum flow recommendation for the new license.

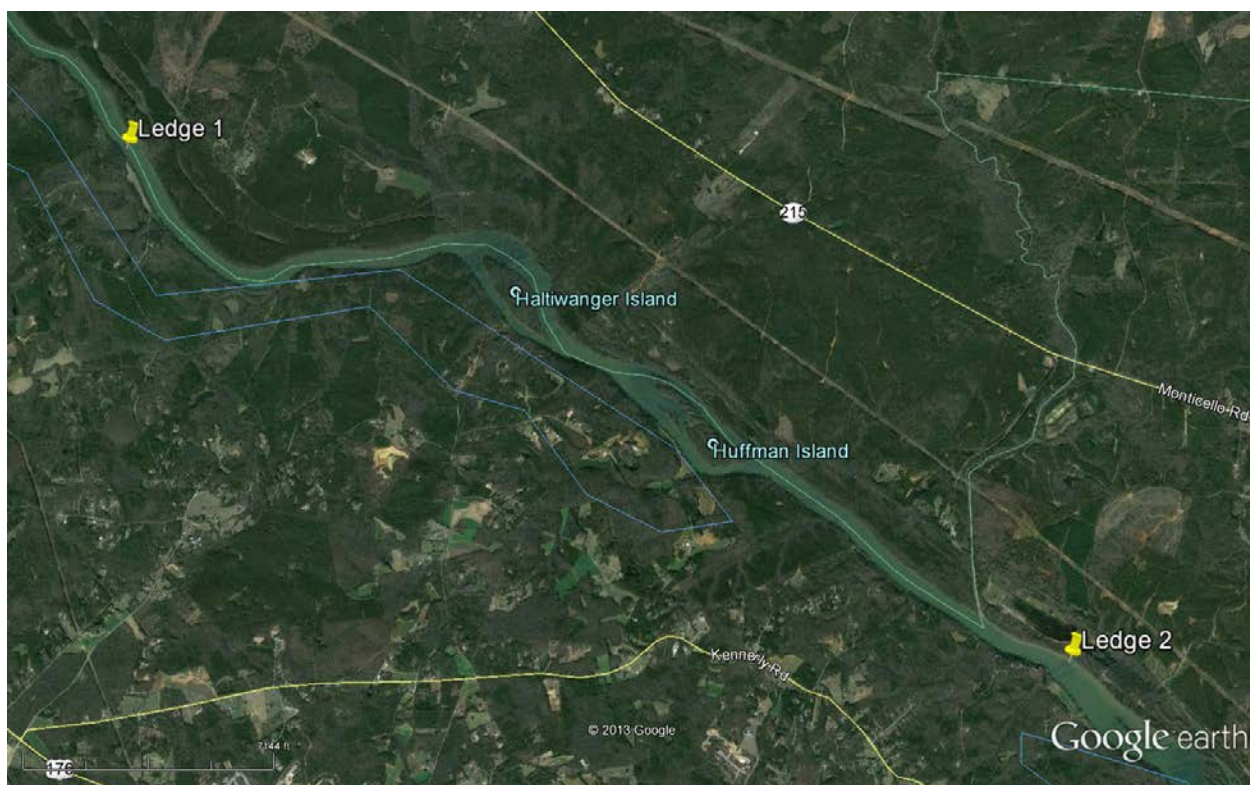


FIGURE 4-2 POINTS OF NAVIGATIONAL CONSTRICTION



FIGURE 4-3 LEDGE 1



FIGURE 4-4 LEDGE 2

5.0 MINIMUM FLOW RECOMMENDATION

The IFTWC identified several measures to implement and monitor the recommended minimum flow regime in the new operating license through the AMP. These measures are described in detail in the sections below. The timing and magnitude of the IFTWC’s recommended “continuous” flows are as follows.

5.1 TARGET FLOW

A Target Flow is defined as the instantaneous minimum flow recommended by the IFTWC to be released from the Project. The Target Flow value will vary seasonally. During this AMP, the Review Committee will evaluate the annual record for meeting the Target Flow.

5.2 COMPLIANCE LIMIT

A Compliance Limit is defined as the instantaneous minimum flow required by FERC to be released from the Project. The Compliance Limit value will vary based on net inflow, but will generally be 100 to 300 cfs lower than the Target Flow. The use of a Compliance Limit will allow for the Project flow releases to dip below the Target Flow for up to several hours per day without triggering a non-compliance event. If flow releases drop below the Compliance Limit for over 24 hours, SCE&G will notify the Review Committee within ten days and will include the deviation and reason for that deviation in the annual report to FERC.

5.3 CALCULATION OF NET INFLOW AND TARGET FLOWS

Net inflow is defined as the previous day’s daily average inflow as calculated using the sum of the three upstream USGS gages¹ minus evaporation from the reservoirs. The previous day’s daily average inflow would be based on midnight to midnight of the previous day, and the new Target Flow would be implemented from noon of the current day to noon of the next day. When the previous day’s net inflow is below the prescribed Target Flow but above the Compliance Limit, the new target flow would be computed as the net inflow. The Compliance Limit would fluctuate based on how low the net inflow is below the prescribed Target Flow as shown in Section 5.4 below.

¹ (USGS 02156500, Broad River near Carlisle, SC; USGS 02160105, Tyger River near Delta, SC; and USGS 02160700, Enoree River at Whitmire, SC)

When inflow falls near or below the prescribed Compliance Limit flow, the new Compliance Limit flow would be computed as net inflow minus a 100 cfs buffer. This step will allow SCE&G some recovery during low flow periods and will take the place of a Low Inflow Protocol.

5.4 MINIMUM FLOW RECOMMENDATION

This section describes the specifics of a Minimum Flow Recommendation for the Project. This recommendation includes specifics of how Target Flow and Compliance Limits would be set in relation to net inflows into the Project.

Low Flow Period

June 1 through November 30 - Target Flow of 900 cfs with a Compliance Limit of 600 cfs

- If net inflow is greater than 900 cfs, then the daily target flow is 900 cfs, but could fall to 600 cfs compliance limit on an infrequent basis (TBD frequency).
- If net inflow is 800 cfs then the new target flow is 800 cfs, but could fall to 600 cfs compliance limit on an infrequent basis (TBD frequency).
- If net inflow is 700 cfs then the new target flow is 700 cfs, but could fall to 600 cfs compliance limit on an infrequent basis (TBD frequency).
- If net inflow is 600 cfs then the new target flow is 600 cfs, but could fall to 500 cfs compliance limit on an infrequent basis (TBD frequency).
- If net inflow is 500 cfs then the new target flow is 500 cfs, but could fall to 400 cfs compliance limit on an infrequent basis (TBD frequency).

Medium Flow Periods

December 1 through January 31 & May 1 through May 31 - Target Flow of 1,500 cfs with a Compliance Limit of 1,200 cfs

- If net inflow is greater than 1,500 cfs then the daily target flow is 1,500 cfs, but could fall to 1,200 cfs compliance limit on an infrequent basis (TBD frequency).
- If net inflow is 1,400 cfs then new target flow is 1,400 cfs, but could fall to 1,200 cfs compliance limit on an infrequent basis (TBD frequency).
- If net inflow is 1,300 cfs then the new target flow is 1,300 cfs, but could fall to 1,200 cfs compliance limit on an infrequent basis (TBD frequency).
- If net inflow is 1,200 cfs then the new target flow is 1,200 cfs, but could fall to 1,100 cfs compliance limit on an infrequent basis (TBD frequency).

- If net inflow is 1,100 cfs then the new target flow is 1,100 cfs, but could fall to 1,000 cfs compliance limit on an infrequent basis (TBD frequency).

High Flow Period

February 1 through April 30 - Target Flow of 2,300 cfs with a Compliance Limit of 2,000 cfs

- If net inflow is greater than 2,300 cfs, then the daily target flow is 2,300 cfs, but could fall to 2,000 cfs compliance limit on an infrequent basis (TBD frequency).
- If net inflow is 2,200 cfs then the new target flow is 2,200 cfs, but could fall to 2,000 cfs compliance limit on an infrequent basis (TBD frequency).
- If net inflow is 2,100 cfs then the new target flow is 2,100 cfs, but could fall to 2,000 cfs compliance limit on an infrequent basis (TBD frequency).
- If net inflow is 2,000 cfs then the new target flow is 2,000 cfs, but could fall to 1,900 cfs compliance limit on an infrequent basis (TBD frequency).
- If net inflow is 1,900 cfs then the new target flow is 1,900 cfs, but could fall to 1,800 cfs compliance limit on an infrequent basis (TBD frequency).

6.0 SCHEDULE

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

TABLE 6-1 AMP IMPLEMENTATION SCHEDULE

Period	Item
Within 90 days of license issuance	Submit Updated Minimum Flow AMP to FERC
120 days of license issuance	Form Review Committee and review Minimum Flow AMP
Year 1 of new license	<ul style="list-style-type: none">• Implementation of Minimum Flow• Review Committee annual meeting February of following year• File Annual Report with FERC – April after Review Committee meeting
Year 2 of new license	<ul style="list-style-type: none">• Implementation of any AMP-Minimum Flow changes• Review Committee annual meeting February of following year• File Annual Report with FERC – April after Review Committee meeting
Year 3 of new license	<ul style="list-style-type: none">• Implementation of any AMP-Minimum Flow changes• Review Committee annual meeting February of following year• File Annual Report with FERC – April after Review Committee meeting
Year 4 of new license	<ul style="list-style-type: none">• Implementation of any AMP-Minimum Flow changes• Review Committee annual meeting February of following year• File Annual Report with FERC – April after Review Committee meeting
Year 5 of new license	<ul style="list-style-type: none">• Implementation of any AMP-Minimum Flow changes• Review Committee annual meeting February of following year• Develop recommendation for completion or continuation of AMP• File Annual Report and Final AMP Recommendations with FERC – April after Review Committee meeting

7.0 COMPLIANCE

Compliance will be based on following the schedule in Section 6.0 and the submission of an annual AMP report to FERC. The annual report will contain a summary of all AMP activities and data, including an assessment of the extent to which goals and objectives were achieved. The report will be made available to appropriate entities for review and comment at least 30 days prior to being submitted to FERC. All comments on the report, pertinent correspondence, and team meeting minutes will be appended to the annual report.

At the end of the 5-year AMP period, the Review Committee will provide final recommendations to FERC on extension or completion of the AMP.

8.0 REFERENCES

Kleinschmidt Associates. 2016a. Downstream Navigational Flow Assessment. September 2016.

Kleinschmidt Associates. 2016b. Instream Flow Study Report. October 2016.

South Carolina Water Resources Commission (SCWRC). 1988. Instream Flow Study Phase II: Determination of Minimum Flow Standards to Protect Instream Uses in Priority Stream Segments: A Report to the South Carolina General Assembly. Available Online [URL]: <http://scwaterlaw.sc.gov/Instream%20Flow%20Study%20ph2.pdf>. Accessed August 2013.

APPENDIX A

SUMMARY OF CONSULTATION

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ADAPTIVE MANAGEMENT PLAN

FLOW FLUCTUATIONS DOWNSTREAM OF PARR SHOALS DAM

SOUTH CAROLINA ELECTRIC & GAS COMPANY

FERC No. 1894

Prepared by:

South Carolina Electric & Gas Company

April 2017

**ADAPTIVE MANAGEMENT PLAN
FOR
FLOW FLUCTUATIONS DOWNSTREAM OF PARR SHOALS DAM**

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**ADAPTIVE MANAGEMENT PLAN
FOR
FLOW FLUCTUATIONS DOWNSTREAM OF PARR SHOALS DAM**

1.0 INTRODUCTION

South Carolina Electric & Gas Company (SCE&G) must file an application for a new license for its Parr Hydroelectric Project (Project) (FERC No. 1894) on the Broad River with the Federal Energy Regulatory Commission (FERC) by June 2018. SCE&G is currently involved in a multi-year relicensing process that requires a cooperative effort between SCE&G and stakeholders, including state and federal resource agencies, non-governmental organizations (NGOs) and concerned citizens, to address operational, recreational and ecological concerns associated with Project operations. During relicensing, the issue of downstream flow fluctuations associated with Project operations was identified by the Instream Flow Technical Working Committee (Instream Flow TWC) as an issue that needed to be resolved. The Instream Flow TWC includes representatives from SCE&G, South Carolina Department of Natural Resources (SCDNR), U.S. Fish and Wildlife Service (FWS), South Carolina Department of Health and Environmental Control (SCDHEC), National Oceanic and Atmospheric Administration (NOAA), American Rivers and Congaree Riverkeeper. The Instream Flow TWC discussed and determined necessary changes to Project operations to stabilize downstream flows. Over the course of several TWC meetings, a framework for a Downstream Flow Fluctuation Adaptive Management Plan (AMP) was developed to address downstream flow stabilization during the new license term (Appendix A). This AMP outlines SCE&G's proposed actions for stabilizing downstream flows and will be implemented during the term of the new Project license.

1.1 PROJECT DESCRIPTION

The Parr Hydroelectric Project includes the 14.88-megawatt (MW) Parr Shoals Development (Parr Development) and the 511.2-MW Fairfield Pumped Storage Development (Fairfield Development) located in Fairfield and Newberry counties, South Carolina. Parr Reservoir is a 4,400-acre impoundment formed by the Broad River and the Parr Shoals Dam and serves as the lower reservoir for the Fairfield Development's pumped storage operations. Monticello Reservoir is a

6,800-acre impoundment formed by a series of four earthen dams and serves as the upper reservoir for the Fairfield Development's pumped storage operations. The existing Project license was issued by FERC on August 28, 1974 for a period of 46 years, terminating on June 30, 2020. SCE&G intends to file for a new license with FERC on or before May 31, 2018.

2.0 DOWNSTREAM FLOW FLUCTUATION AMP REVIEW COMMITTEE

2.1 COMMITTEE MEMBERS

A Review Committee will be formed to direct the implementation of the AMP. Members of the Review Committee must be signatories to the Comprehensive Relicensing Settlement Agreement (CRSA).

SCE&G will serve as chairperson of the Review Committee, and be responsible for organizing meetings and distributing documents to committee members. Each entity will have the opportunity to select a representative to the Review Committee from within their organization.

The Review Committee will ultimately work to guide the decision-making processes specified in the Downstream Flow Fluctuation AMP. The Review Committee will not make decisions that supersede state or federal law. The Review Committee's responsibilities may include, but are not limited to:

- Evaluating baseline information and study plans;
- Providing overall guidance for the AMP process;
- Evaluating other study (i.e., existing) information or information which becomes available during the time period of evaluations and would be applicable to the AMP;
- Establishing and documenting the goals and objectives of each action undertaken as part of the AMP and advising when modifications to metrics used for evaluation purposes are needed;
- Reviewing and considering long term impacts of operational modifications on the Project and Project economics when evaluating the feasibility of implementing modifications; and
- Advising on modifications to the AMP to be presented to FERC and advising if any amendment action is necessary during the term of the license.

2.2 BUDGET/RESOURCES

The responsibility for implementation of this AMP will rest primarily with SCE&G, as licensee for the Parr Project. SCE&G will also rely on other resources outside of its establishment including, but not limited to, the following:

- federal, state and local grants
- donated services (federal and state agency involvement)
- expertise (governmental, non-governmental, private)

2.3 COMMITTEE MEETINGS

The Review Committee is tentatively scheduled to consult once per year via an in-person meeting or conference call. The meetings would be held to review current procedures, set future targets, and continue to provide input on operating guidelines. These annual meetings would assess how closely SCE&G matched outflows to inflows during spring stabilization periods, and to evaluate whether the stabilization goals were met year-round and/or seasonally.

The frequency of meetings may be adjusted based on need. The tentative schedule is provided in Section 6.0 of this plan. Minutes from each meeting, as well as any pertinent materials discussed in the meetings will be filed with FERC as an appendix to the annual report of AMP activities, as described in Section 7.0 of this plan.

3.0 GOALS AND OBJECTIVES

The Instream Flow TWC has requested that SCE&G reduce the fluctuations downstream of Parr Shoals Dam that result from Project operations. Specifically, they requested two levels of reduced fluctuations. The first goal is to reduce year-round downstream flow fluctuations. This goal would benefit the aquatic resources in the Broad River downstream of Parr Shoals Dam by stabilizing wetted habitat and reducing large daily fluctuations ~~by some amount~~. The second goal is to stabilize flows during two 14-day spawning periods. During the spawning periods, SCE&G would attempt to match inflow and outflow to potentially improve spawning conditions for several species of fish, including anadromous American shad, as well as landlocked populations of striped bass and shortnose sturgeon.

4.0 CURRENT OPERATIONS

During the current license, SCE&G has operated the Project to meet the requirements of the current license articles and FERC regulations. Under current operation guidelines, Parr Reservoir can fluctuate up to 10 feet daily and Monticello Reservoir can fluctuate up to 4.5 feet daily as part of the pumped storage operations of the Fairfield Development. SCE&G operators also do not allow Parr Reservoir to rise above full pool and pass water over the spillway crest gates in the closed position. The operators only have two options for managing Parr Reservoir level under variable inflow conditions. They can pass water through the Parr Shoals turbines or lower the spillway crest gates. The ten crest gates are operated in pairs, with each pair being 400 feet long. The crest gates can be lowered in 0.1 foot increments over a ten foot operating range to allow inflow in excess of Parr Shoals Hydro's hydraulic capacity to spill over the gates.

Article 39 of the current license requires SCE&G to operate the Project reservoirs in such a manner that releases from Parr Reservoir (during flood flows) are no greater than flows which would have occurred in the absence of the Project. Assessments conducted during the late 1970's and in 2014 both indicate that flows of 40,000-45,000 cfs would begin to inundate and flood lands downstream of Parr Shoals Dam. Several measures have been implemented during the current license to ensure that only natural inflows above 40,000 cfs pass downstream of the Parr Development, and that releases from the Fairfield Development do not increase the magnitude or frequency of downstream flooding. ~~only natural inflows above 40,000 cfs pass downstream, several measures have been implemented during the current license. These measures include incrementally lowering spillway gates when inflow, as measured at the three upstream USGS gages (see section 5.1.2) is between 6,000-8,000 cfs, and continuing until all ten gates are in the open (lowered) position by the time that inflows reach 40,000 cfs. Additionally, generation at the Fairfield Development is reduced as inflow increases and is completely curtailed by the time inflows reach 40,000 cfs. By the time that the 40,000 cfs threshold has been met, all gates must be lowered to the full open position and Fairfield Development generation must be curtailed. However, pump back operations at Fairfield may occur during high flow events, as these operations actually reduce the amount of flow passing through the Parr Development. This operational regime was designed to assure that only natural inflows above 40,000 cfs pass downstream of the Parr Development, and that releases from the Fairfield Development would not increase the magnitude or frequency of downstream flooding. This~~

operating regime has proved to be successful in the past and SCE&G intends to continue operating in this manner during future high flow events.

During relicensing, stakeholders noted that when inflow to the Project is less than 40,000 cfs, frequent fluctuation events occur throughout the year that sometimes increase and decrease releases from the Project by 5,000 to 10,000 cfs daily. SCE&G investigated those events and the associated operations and determined that two operational practices contribute to downstream flow fluctuations. First, current operations include daily or weekly “reservoir inventory management releases” through the Parr Shoals Dam spillway crest gates that caused some of the fluctuations in downstream flow. When inflow to Parr Reservoir is greater than the flows that the Parr Shoals powerhouse can pass, the reservoir level slowly rises during the week and water is then released by lowering crest gates. Current inventory management operations result in large, short duration pulses being released downstream. Second, some or all of the spillway gates are sometimes lowered and left in that position for several days to spill excess inflow, which increases the influence of Fairfield generation and pumping on downstream flows due to water spilling over the lowered gates as Parr Reservoir rises and falls during pumped storage operations. SCE&G plans to develop and begin to implement operational guidelines and procedures during the term of this AMP that will reduce the frequency and duration of these pulses and fluctuations and allow SCE&G to manage reservoir inventory more proactively.

5.0 IMPLEMENTATION

The Instream Flow TWC identified the need to reduce downstream flow fluctuations in the Broad River caused by Project operations year-round. The TWC also identified the need for stable flows during specific fish spawning periods during the spring. The success of flow reductions will be measured by comparing inflow to outflow at the Project, both qualitatively and using metrics such as deviation of outflow from inflow as described below in Section 5.1.2. Because this AMP covers a five-year period, SCE&G will work with the Review Committee to set appropriate evaluation and compliance criteria each year. Compliance criteria will consider the effects of mechanical restrictions (turbines down for repair), high inflow event information for each year and will also include deviation criteria during the four weeks of spring spawning season.

5.1.1 GENERAL YEAR-ROUND DOWNSTREAM FLOW FLUCTUATION REDUCTIONS

System control operators will modify year-round inventory management release operations to reduce downstream flow fluctuations during all months. Parr spillway gates are currently only operated when the Project is manned (i.e. weekdays during daytime hours). This can result in flows being built up overnight or gates being left down, both of which contribute to downstream flow pulses. Additional guidelines will be developed for use by system control and plant operators to ensure that flows are released on a more even schedule.

A remote-control camera will be installed on the west side of the Parr Shoals Dam. This camera will allow offsite system control operators to determine if conditions are safe to raise or lower crest gates 1 and 2 when the plant is unmanned. Along with the remote-control camera, the capability for remote-control operation of crest gates 1 and 2 will be added. This will allow system control to make around the clock gate adjustments based on real time inflow and reservoir level data, as opposed to gate adjustments being limited to daytime hours when the powerhouse is manned.

Modifications or replacement of generators at the Parr Development may also be implemented during the new license if it is determined that these changes are mechanically and economically feasible. This change would allow increased hydraulic capacity through the powerhouse and would assist in regulating reservoir inventory and reduce the frequency of spillage at Parr Shoals Dam.

5.1.2 SPRING SPAWNING STABILIZATION

Operational practices will be further modified during two 14-day spring spawning periods to further reduce downstream flow fluctuations. During these timeframes, the Project's operational goal will be to provide outflows that more closely match inflows. SCE&G will staff the Parr Shoals facility 24 hours/day during these periods to manipulate crest gates to more closely track Parr reservoir level and maintain a more constant discharge. Exceptions will be during periods when the inflow is less than the hydraulic capacity of the Parr Shoals turbines (when crest gates can be maintained in the raised position) and/or during flood events (when gates must be lowered progressively to limit backwater effects upstream of the dam). The periods of spawning flow stabilization will be:

- For 14 days during the last two weeks of March (March 15 through March 31) - flow stabilization for shortnose sturgeon.
- Two 7-day blocks during April 1 through May 10 - flow stabilization for numerous species including striped bass, American shad, and robust redhorse. The exact timing of these blocks will be determined annually by the Review Committee.

During these stabilization periods, hourly inflow and mean deviation of outflow vs. inflow will be computed and tracked as a running measure each year. An example of how the mean deviation would be computed is included in Appendix B. Annual target reductions in mean deviation (correlated to mean inflow) will be set by the Review Committee each year during the 5-year monitoring period. This will guide operations with the goal of reducing downstream fluctuations. Project inflow will be computed as the sum of flows measured at the three USGS gage stations upstream of Parr Shoals Dam minus estimated evaporation from the Project reservoirs. The three gages used to calculate inflow are:

- 02156500 Broad River near Carlisle, SC
- 02160105 Tyger River near Delta, SC
- 2160700 Enoree River near Whitmire, SC

As inflow increases, backwater restrictions will limit how far gates can be raised as Parr Reservoir rises. At some level of inflow Fairfield operations may need to be curtailed, or it may be determined by the Review Committee that certain releases during periods of higher inflow will not negatively impact the species in the river and that adjusting the gates to track the reservoir level won't be necessary. When computing inflow, no correction will be made for travel time, and the measured discharge (total inflow) will not be prorated to account for un-gaged areas between the gage stations and Parr Shoals Dam.

6.0 SCHEDULE

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

TABLE 6-1 AMP IMPLEMENTATION SCHEDULE

Period	Item
90 days of license issuance	Submit updated Downstream Flow Fluctuation AMP to FERC
120 days of license issuance	Form Review Committee – develop “compliance criteria”
*Year 1- of new license	<ul style="list-style-type: none">• Modify inventory management releases using guidelines to be developed by SCE&G• System Control implements new operating guidelines to reduce flow pulses throughout the year• Implement spring spawning flow stabilization (March and April-May)• Review Committee meeting to review results and set compliance criteria – February of the following year• File Annual Report with FERC – April after Review Committee meeting
End of first calendar year following the year of license issuance	<ul style="list-style-type: none">• Addition of remote control camera to west abutment of Parr Shoals Dam and provide System Control operators the ability to operate the camera• Add remote control operation of crest gates 1 and 2 and provide System Control operators the ability to operate these two gates
*Year 2 of new license	<ul style="list-style-type: none">• System Control implements any modifications of operating guidelines to reduce flow pulses throughout the year• Implement spring spawning flow stabilization (March and April-May)• Review Committee meeting to review results and set compliance criteria for following year – February of the following year• File Annual Report with FERC – April after Review Committee meeting
*Year 3 of new license	<ul style="list-style-type: none">• System Control implements any modifications of operating guidelines to reduce flow pulses throughout the year• Implement spring spawning flow stabilization (March and April-May)• Review Committee meeting to review results and set compliance criteria for following year – February of the following year• File Annual Report with FERC – April after Review Committee meeting
*Year 4 of new license	<ul style="list-style-type: none">• System Control implements any modifications of operating guidelines to reduce flow pulses throughout the year

	<ul style="list-style-type: none"> • Implement spring spawning flow stabilization (March and April-May) • Review Committee meeting to review results and set compliance criteria for following year – February of the following year • File Annual Report with FERC – April after Review Committee meeting
*Year 5 of new license	<ul style="list-style-type: none"> • System Control implements any modifications of operating guidelines to reduce flow pulses throughout the year • Implement spring spawning flow stabilization (March and April-May) • Review Committee meeting to review results and set compliance criteria for following year – February of the following year • Develop recommendation for completion or continuation of the AMP • File Annual Report with FERC – April after Review Committee meeting

*Year 1 through 5 - Upgrade generators and expand hydraulic operating range, this could continue through year 10 after license issuance

7.0 COMPLIANCE

A Review Committee meeting will be held annually to review the results of downstream flow fluctuation reductions, set compliance targets for the following year, and suggest additional changes to operating guidelines. For this meeting, SCE&G will prepare a summary report on the success of the downstream flow fluctuation efforts to date. This will include an assessment of how much reduction in fluctuation was achieved year round compared to operations prior to the AMP period. This assessment will be performed both qualitatively and using metrics such as deviation of outflow from inflow, or other measures such as the percent of time that outflow was within “X” percent of inflow. The report will also include an assessment of flow fluctuation reductions during the two 14-day spawning periods using the mean deviation from hourly inflow as a metric, or other parameters as determined by the Review Committee. The annual report, along with Review Committee meeting notes, will be filed with FERC following each annual meeting.

At the end of the 5-year AMP period, the Review Committee will provide final recommendations to FERC on extension or completion of the AMP. If the AMP is completed, then final compliance criteria will be proposed by the Review Committee for use during the remainder of the license.

8.0 REFERENCES

Federal Power Commission (FPC). 1974. Order Issuing New License (Major). Authorizing Project Redevelopment, Permitting use of Project Waters for Condenser Cooling Purposes, Vacating Hearing Order, and Permitting Withdrawal of Intervention. (Project No. 1894). Issued August 28, 1974.

APPENDIX A

SUMMARY OF CONSULTATION

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APPENDIX B

MEAN DEVIATION EXAMPLE

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ADAPTIVE MANAGEMENT PLAN

**WEST CHANNEL OF THE BROAD RIVER
DOWNSTREAM OF PARR SHOALS DAM**

SOUTH CAROLINA ELECTRIC & GAS COMPANY

FERC No. 1894

Prepared by:

South Carolina Electric & Gas Company

March 2017

**ADAPTIVE MANAGEMENT PLAN
FOR THE
WEST CHANNEL OF THE BROAD RIVER
DOWNSTREAM OF PARR SHOALS DAM**

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**ADAPTIVE MANAGEMENT PLAN
FOR THE
WEST CHANNEL OF THE BROAD RIVER BELOW PARR RESERVOIR**

1.0 INTRODUCTION

South Carolina Electric & Gas Company (SCE&G) will file an application for a new license for its Parr and Fairfield developments on the Broad River with the Federal Energy Regulatory Commission (FERC) in June 2018. The relicensing process was a multi-year cooperative effort between SCE&G and stakeholders, including state and federal resource agencies, non-governmental organizations and concerned citizens, to address operational, recreational and ecological concerns associated with hydroelectric project operations. During the relicensing process the issue of water quality in the West Channel of Broad River downstream of the Parr Shoals Dam was identified by the Water Quality Technical Working Committee (WQTWC) as an issue to resolve. Members of the WQTWC included representatives from SCE&G, South Carolina Department of Natural Resources (SCDNR), South Carolina Department of Health and Environmental Control (SCDHEC), U.S. Fish and Wildlife Service (FWS), American Rivers and Congaree Riverkeeper. The WQTWC discussed and determined a process for evaluating changes and making decisions based on the best available information. During the WQTWC meetings a framework for a West Channel Adaptive Management Plan (AMP) was developed to address improvement of water quality in the West Channel during the new license term. This AMP describes the water quality issue in the West Channel and SCE&G's proposed actions to improve water quality which will be implemented during the new Parr Hydroelectric Project License (FERC No. 1894).

1.1 PROJECT DESCRIPTION

The Parr Hydroelectric Project, FERC No. 1894 (Project), includes the 14.88-megawatt (MW) Parr Shoals Development (Parr Development) and the 511.2-MW Fairfield Pumped Storage Development (Fairfield Development) located in Fairfield and Newberry County, South Carolina. Parr Reservoir is a 4,400-acre impoundment formed by the Broad River and the Parr Shoals Dam and serves as the lower reservoir for the Fairfield Pumped Storage Development. Monticello Reservoir is a 6,800-acre impoundment formed by a series of four earthen dams and serves as the

upper reservoir for the Fairfield Development. The existing Project license was issued by the Federal Energy Regulatory Commission (FERC or Commission) on August 28, 1974 for a period of 46 years, terminating on June 30, 2020. SCE&G intends to file for a new license with FERC on or before May 31, 2018.

2.0 WEST CHANNEL AMP REVIEW COMMITTEE

2.1 COMMITTEE MEMBERS

A Review Committee will be formed within 30 days of license issuance to direct the implementation of the AMP. Members of the Review Committee must be signatories to the Comprehensive Relicensing Settlement Agreement (CRSA).

SCE&G will serve as chairperson of the Review Committee, and be responsible for organizing meetings and distributing documents to committee members. Each entity will have the opportunity to select a representative to the Review Committee from within their organization.

The Review Committee will ultimately work to guide the decision making processes specified in the West Channel AMP. The Review Committee will not make decisions that supersede state or federal law or USFWS Section 7 Authority. The Review Committee's responsibilities may include, but are not limited to:

- Evaluating baseline information and study plans;
- Providing overall guidance for the AMP process;
- Evaluating other study (i.e., existing) information or information which becomes available during the time period of evaluations and would be applicable to the AMP;
- Establishing and documenting the goals and objectives of each action undertaken as part of the AMP and advising when modification to metrics used for evaluation purposes are needed;
- Reviewing and considering long term impacts of operational modifications on the Project and Project economics when evaluating the feasibility of implementing modifications;
- Reviewing the West Channel Annual Report which documents the prior year's AMP activities which SCE&G will file with FERC, making it publicly available; and
- Advising on modifications to the AMP to be presented to FERC and advising if any amendment action is necessary during the license.

2.2 BUDGET/RESOURCES

The responsibility for implementation of this AMP will rest primarily with SCE&G, as licensee for the Parr Project. Annual budgets will be developed by SCE&G relative to the monitoring and study costs as well as administrative costs and expenses. SCE&G will also rely on other resources outside of its establishment including, but not limited to, the following:

- federal, state and local grants
- donated services (federal and state agency involvement)
- equipment (purchases and loaners)
- expertise (governmental, non-governmental, private)

2.3 COMMITTEE MEETINGS

The Review Committee is initially scheduled to consult twice per year via a meeting or conference call. The frequency of meetings may be adjusted based on need. The tentative schedule is provided in Section 6.0 of this plan. Minutes from each meeting, as well as any pertinent materials discussed in the meetings will be filed with FERC as an appendix to the annual report of AMP activities, as described in section 7.

3.0 GOALS AND OBJECTIVES

Improve the water quality in the West Channel of the Broad River downstream of the Parr Shoals Dam. The objective of this AMP is to enhance aquatic habitat by improving flows and dissolved oxygen levels in the West Channel during summer/fall periods. The methods that will be employed under this AMP to achieve this goal and objective are described in Section 5.0.

4.0 BASELINE DATA

4.1 WATER QUALITY

Baseline water quality data was collected in the West Channel during 2015 and 2016 (Kleinschmidt 2016 & 2017). Continuous dissolved oxygen (DO) and temperature data were collected from April 1st through October 15th in 2015 at three monitoring sites in the west channel and one in the east channel (Figure 4-1).

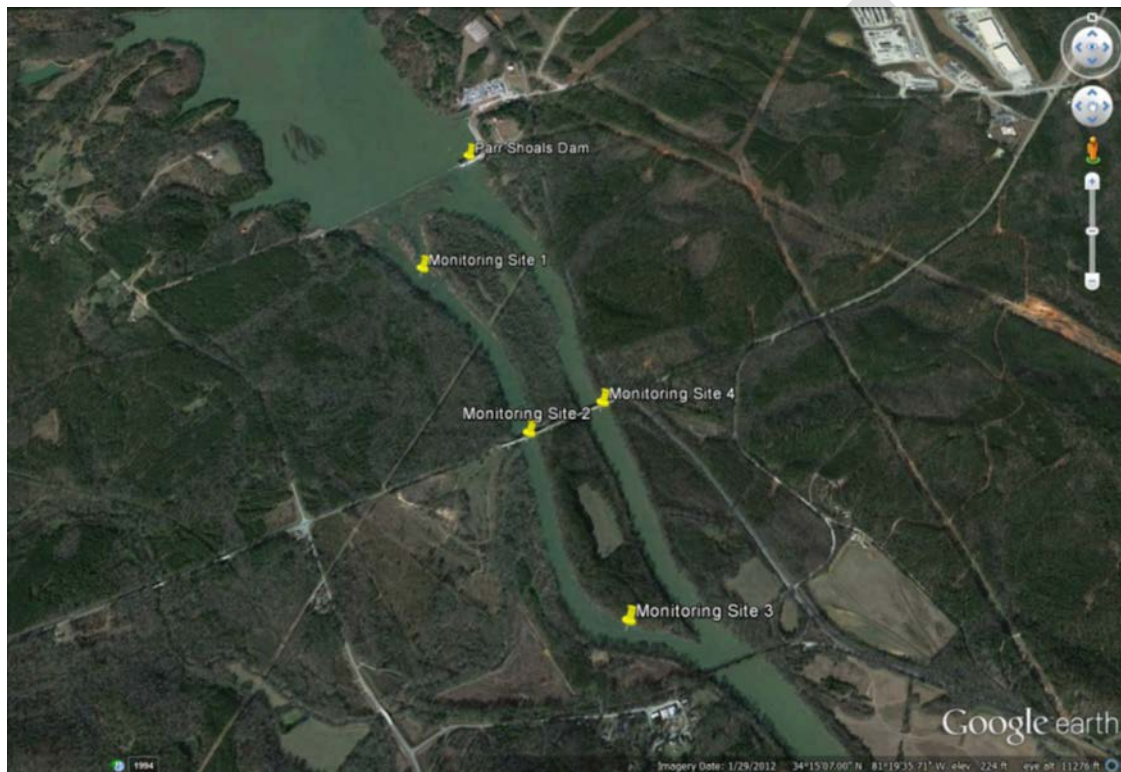


FIGURE 4-1. PARR SHOALS DOWNSTREAM WATER QUALITY MONITORING SITES

Monitoring in 2015 identified DO levels in the west channel that periodically were below the SCDHEC standard of 4.0 mg/L. Dissolved oxygen levels in the upper west channel of the Broad River, downstream of Parr Shoals Dam, were consistently lower than those further down the west channel and in the east channel. This is likely due to the shallow nature of the river in this area, as well as the presence of dense algal mats. Also, during drier weather conditions, the west channel does not receive a consistent flow of water.

Based on 2015 monitoring results and WQTWC recommendations, SCE&G performed additional water temperature and DO monitoring during August 2016 to verify baseline

conditions and to evaluate how discrete spillway releases or pulses through the spillway gates affect water quality in the west channel. The pulse flows consisted of distinct releases through spillway gates 1 and 2 for approximately 3 hours. The spills were targeted to release 25 acre-feet of water into the west channel.

Water temperature and DO were continuously monitored at four sites along the western channel. Water level data were collected at 3 locations in the upper west channel (Upper Site 1, Upper Site 2, and Upper Site 3), and stream flow measurements were collected at two locations in the upper west channel (Upper Site 1 and Upper Site 2). Each of the upper west channel monitoring sites are shown in Figure 4-2.

DO levels generally remained above the SCDHEC standard of 4 mg/L during 2016, with diel fluctuations in both temperature and DO occurring throughout the study. Greater fluctuations in DO were observed later in August as aquatic vegetation increased and spillway flows were curtailed. DO levels in 2016 were generally greater than those observed during 2015. The study also determined that water levels in the west channel were strongly influenced by flows from the powerhouse and indicate that portions of the tailrace flows from the east channel enter the west channel. Overall, water quality in the west channel seems to be most impacted during the later summer months, when stream flows are typically lower, temperatures are warmer, and vegetation growth rates are higher.

4.2 WATER LEVEL AND DISCHARGE

Water level and discharge measurements were collected under several operational scenarios on February 17 and 24, 2017 to investigate the relationship between powerhouse discharge (i.e., east channel discharge) and West Channel discharge. Water levels were recorded at 15-minute intervals at four locations: Upper Sites 1, 2, 4, and 5 (Figure 4-2). Discharge measurements were collected at four powerhouse operation levels, including one, two, three, and five-unit operation. The discharge measurements were collected during stable conditions with no spill at Upper Sites 1 and 2. Water level logger elevations were determined using a survey-grade GPS and used to calculate water surface elevations. Tailwater elevations and river discharge were obtained from USGS Gage 02160991 (Broad River @ Jenkinsville, SC) and 022161000 (Broad River @ Alston, SC), respectively. Comparisons of water surface elevations during the discharge measurements at the four operational scenarios are depicted graphically in Figure 4-3.

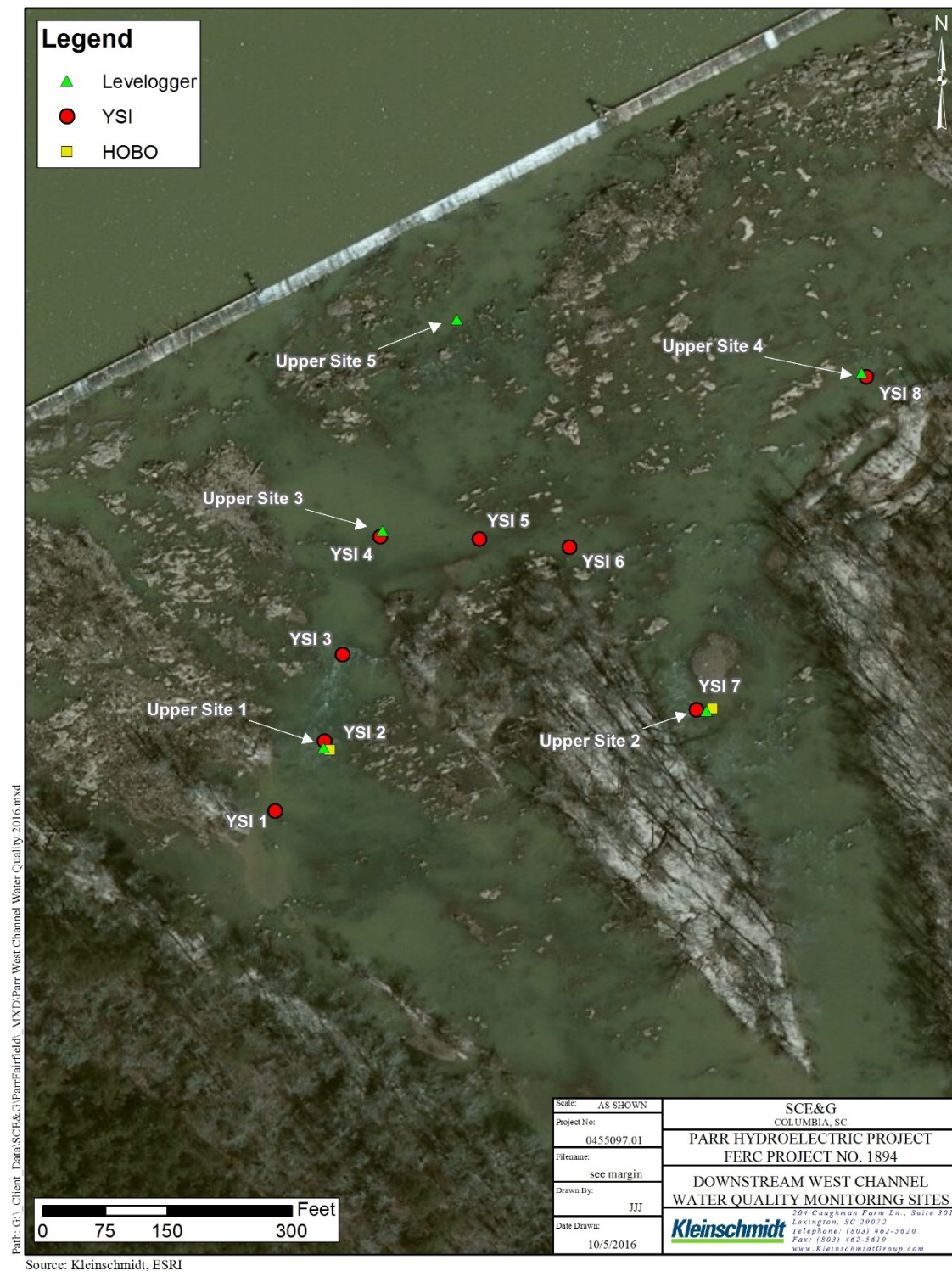
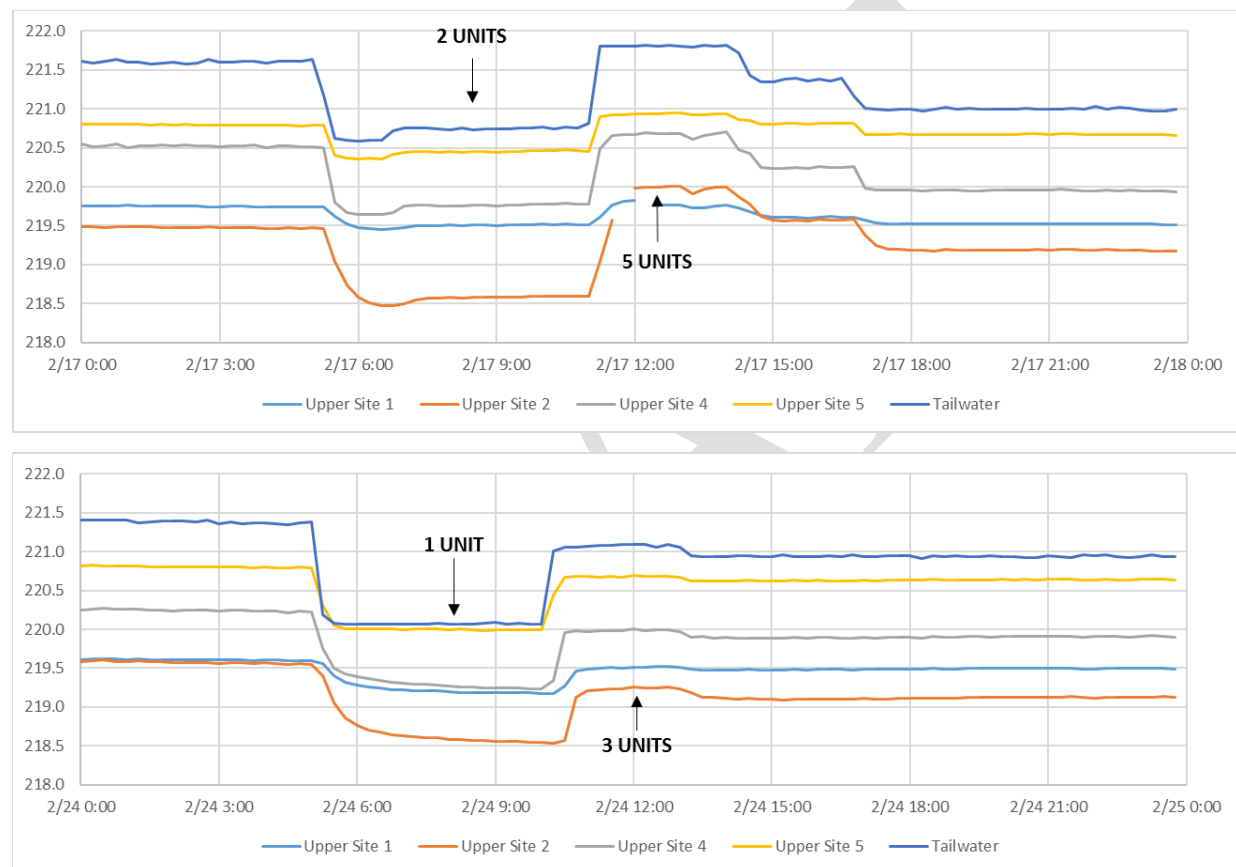


FIGURE 4-2. PARR SHOALS BASELINE MONITORING SITES

TABLE 4-1. RESULTS OF DISCHARGE MEASUREMENTS IN WEST CHANNEL

Operations	Upper Site 1 Discharge	Upper Site 2 Discharge	Total West Channel Discharge	Broad River at Alston
1 Unit	2	0	2	924
2 Unit	23	10	33	1746
3 Unit	47	32	78	2134
5 Unit	100	171	271	3438

**FIGURE 4-3. WATER SURFACE ELEVATIONS AT 1, 2, 3, AND 5 UNIT OPERATIONS**

These water surface elevations depicted in Figure 4-3 show the relationship between tailwater elevations and the resulting change at each of the level loggers. This relationship also helps explain why the flows measured in the different channels changed disproportionately as tailwater levels increase with 5-unit flow.

5.0 IMPLEMENTATION

5.1 MANAGEMENT MEASURES

The TWC identified several measures to increase dissolved oxygen levels in the west channel that will be implemented in the new operating license through the AMP. These measures are described in detail in the sections below.

5.1.1 FLOW TARGET DETERMINATION

The AMP review committee will determine an approximate target flow that it believes will adequately maintain dissolved oxygen levels in the west channel. The committee will determine this target using data from the 2015 and 2016 monitoring studies and observations made during flow demonstrations for the IFIM study in 2017. Flows between 50 to 150 cfs have been discussed as a target flow in the West Channel during low summer flows, but no agreement has been reached.

5.1.2 INCREASED FLOWS

The implementation of new instantaneous minimum flows for Parr should result in a more consistent amount of water flowing into the west channel from the east channel, compared to the previous license requirement of daily average minimum flows. Monitoring, based on a plan agreed to by the AMP review committee, will be conducted after implementation of these minimum flows will determine the extent of the benefits to west channel DO levels.

5.1.3 CHANNEL MODIFICATIONS

If the AMP Review Committee determines that new instantaneous minimum flows will not provide a sufficient flow into the west channel to maintain DO levels, it will direct efforts to physically modify channel(s) leading into the west channel. The channel will be modified to provide the identified target flow during periods of minimum flow releases, exclusive of periods when the low-inflow protocol is in effect. The channel modification will occur in Year 2 of the AMP. Another channel modification (if needed) will be completed in Year 4 of the AMP. Potential channel modifications could include notching or deepening of a small channel

at the north tip of Hampton Island, and/or removal of material that currently serves as a hydraulic control closer to the Parr Shoals Dam (Figure 5-1).

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FIGURE 5-1. POTENTIAL AREAS FOR CHANNEL MODIFICATION

5.1.4 LOW INFLOW PULSES

If inflows to Parr Reservoir decrease to a point that outflows from the dam do not provide any flows to the west channel, SCE&G will investigate the use of spillway gates to provide periodic flow pulses to “refresh” the west channel during periods when dissolved oxygen levels are expected to fall below acceptable levels. During the low inflow period, SCE&G will discuss the use of pulses with the Review Committee to make sure that all downstream resources are considered and releases are distributed in a balanced manner between the main channel and the west channel.

5.2 MONITORING

During each year of the AMP, monitoring will be conducted from May 15 to September 30. Water Quality (temperature and DO) will be continuously monitored (15-minute intervals) at three sites along the western channel: Sites 1 and 2, just downstream of the Parr Dam, and Site 4, midway down Hampton Island near the Highway 213 bridge (Figure 5-2). Water level data will be collected at Sites 1, 2, and 3 in the upper west channel. Monitors will be checked and cleaned throughout the study. On each day of cleaning, stream flow will be measured at Sites 1 and 2 in the upper west channel.

5.3 ANALYSIS

Monitoring data will be processed using appropriate quality control/quality assurance measures. Dissolved oxygen data will be summarized to determine the percentage of instantaneous readings above 4 mg/L, and the number of daily average values above 5 mg/L. The analysis will also include a summary of daily average discharge at the Parr powerhouse and the USGS Gauge #02161000 (Broad River at Alston, SC). Water level data from loggers in the West Channel will be used to estimate discharge in the West Channel during the monitoring period.



FIGURE 5-2. AMP MONITORING LOCATIONS

6.0 SCHEDULE

The AMP schedule is described in the table below in relation to the issuance of the license by FERC. The dates below are targets and are subject to Team availability.

TABLE 6-1. AMP IMPLEMENTATION SCHEDULE

Period	Item
90 days	Submit Final West Channel AMP to FERC
Year 1	<ul style="list-style-type: none">• Team consultation – by end of March• Monitoring – May - September• Annual Report - October• Team Meeting – by December 15• File Annual Report with FERC - December
Year 2	<ul style="list-style-type: none">• Team consultation – by end of March• Channel Modifications (if recommended)• Monitoring – May - September• Annual Report - October• Team Meeting – by December 15• File Annual Report - December
Year 3	<ul style="list-style-type: none">• Team consultation – by end of March• Monitoring – May - September• Annual Report - October• Team Meeting – by December 15• File Annual Report with FERC - December
Year 4	<ul style="list-style-type: none">• Team consultation – by end of March• Second Channel Modification (if needed)• Monitoring – May - September• Annual Report - October• Team Meeting – by December 15• File Annual Report with FERC - December
Year 5	<ul style="list-style-type: none">• Team consultation – by end of March• Monitoring – May - September• Annual Report - October• Team Meeting – by December 15• File Annual Report with FERC - December

7.0 COMPLIANCE

Compliance will be based on following the schedule in Section 6.0 and submission of an annual AMP report each year to FERC. The annual report will contain a summary of all AMP activities and data, including an assessment of the extent to which goals and objectives were achieved. The report will be made available to appropriate entities for review and comment at least 30 days prior to being submitted to FERC. All comments on the report, pertinent correspondence, and team meeting minutes will be appended to the annual report.

8.0 REFERENCES

Kleinschmidt Associates. 2016. Water Quality in Downstream West Channel Study Report. April 2016.

Kleinschmidt Associates. 2017. West Channel Water Quality Second Year Study Report. January 2017.

APPENDIX A

SUMMARY OF CONSULTATION

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APPENDIX B

BASELINE WATER QUALITY SAMPLING IN THE WEST CHANNEL

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AMERICAN EEL (*ANGUILLA ROSTRATA*) ABUNDANCE MONITORING PLAN

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

Prepared for:

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

Prepared by:

Kleinschmidt

Lexington, South Carolina
www.KleinschmidtGroup.com

May 2017

AMERICAN EEL (*ANGUILLA ROSTRATA*)
ABUNDANCE MONITORING PLAN

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May 2017

**AMERICAN EEL (*ANGUILLA ROSTRATA*)
ABUNDANCE MONITORING PLAN**

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

SOUTH CAROLINA ELECTRIC & GAS COMPANY

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**AMERICAN EEL (*ANGUILLA ROSTRATA*)
ABUNDANCE MONITORING PLAN**

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

SOUTH CAROLINA ELECTRIC & GAS COMPANY

1.0 INTRODUCTION

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.

The Parr Development creates a blockage for upstream fish passage on the Broad River, therefore stakeholders on the Fisheries Technical Working Committee requested an assessment of American eel (*Anguilla rostrata*) abundance downstream of Parr Shoals Dam. The study results were used to determine if upstream passage of American eel was warranted at this time or at some point during the term of the new license. SCE&G and the stakeholders reviewed the study results and have agreed to develop this American Eel Monitoring Plan to assess densities of American eel downstream of the Parr Shoals Dam during the term of the new license. This plan will be included as a PME measure in the Settlement Agreement.

2.0 EXISTING INFORMATION

Information on the distribution and abundance of American eel in the Broad River is not well documented. The South Carolina Department of Natural Resources (SCDNR) currently operates an eel ramp at the St. Stephen Re-diversion Dam, located approximately 135 river miles downstream of the Project. This ramp provides passage of eels into the Santee Cooper Reservoir System, which connects with the Congaree and Wateree Rivers. Little is known regarding the extent of passage of American eels upstream beyond the Santee Cooper reservoirs into the Congaree and further upstream above the Columbia Hydroelectric Project into the Broad River and to the base of the Parr Shoals Dam. During relicensing, stakeholders requested a study to assess eel abundance downstream of the Parr Shoals Dam, and SCE&G conducted American eel surveys during 2015 and 2016. Ramp-style elver traps, a fyke net, and electrofishing efforts were utilized during Spring 2015 and Fall 2015 (Figure 1), and only one eel was collected via backpack electrofishing. Additional backpack and boat electrofishing efforts were performed in Spring 2016 (Figure 2), which detected two additional eels. A total of three American eels, all in the yellow eel lifestage, were collected or observed during the entire study. All the eels were observed using electrofishing methods (Kleinschmidt 2016).

The SCDNR has conducted two separate American eel abundance studies in the Broad River. During 2010 through 2012, the SCDNR collected 13 eels downstream of the Columbia Hydroelectric Project dam (located on the Broad River 23.5 miles downstream of Parr Shoals Dam) via eel ramps, electrofishing, and Fukui traps. In separate collection efforts during 2009 through 2014, the SCDNR collected a total of 21 yellow eels in the Broad River via boat electrofishing, with 12 of those eels collected immediately downstream of Parr Shoals Dam. Results of these studies suggest that while American eels are present in the Broad River downstream of Parr Shoals Dam, they are not abundant.



FIGURE 1 PARR PROJECT AMERICAN EEL SAMPLING LOCATIONS – 2015

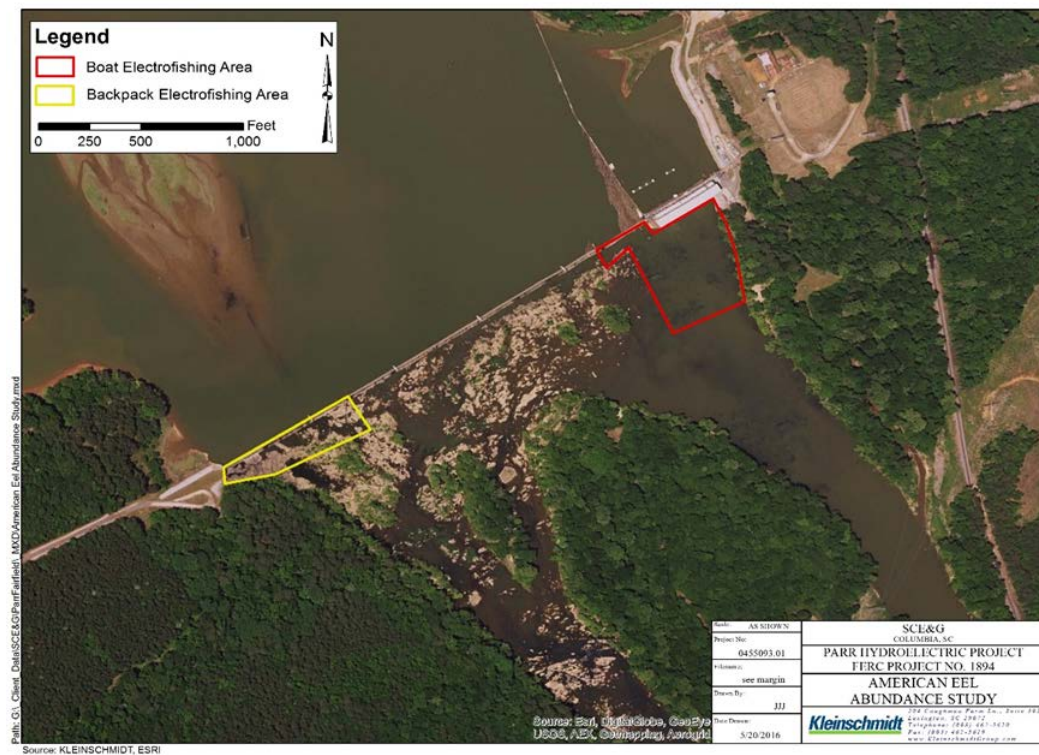


FIGURE 2 PARR PROJECT AMERICAN EEL SAMPLING LOCATIONS – 2016

3.0 PROPOSED PROTECTION, MITIGATION, AND ENHANCEMENT

Current distribution of American eel downstream of Parr Shoals Dam does not warrant construction of an eel ramp, but densities in the future may increase during the new FERC operating license. To address future concerns, SCE&G will conduct electrofishing sampling efforts to monitor the distribution and abundance of American eels downstream of the Parr Shoals Dam for the duration of their new license for the Project. Electrofishing methods will target the yellow eel lifestage and will include backpack electrofishing in pools downstream of Parr Shoals Dam located along the west side of the dam and boat electrofishing in the tailrace and along the face of the dam near the powerhouse. Surveys will be conducted during the first year after the license is issued and then every 10 years thereafter (i.e., years 11, 21, 31, etc. after license issuance). During each sampling year, sampling efforts will be conducted one day each in March, April, and May. Shock time effort will be similar to the efforts that occurred in 2015 and 2016 (i.e., approximately 900 seconds of backpack electrofishing and 1,500 seconds of boat electrofishing) (Kleinschmidt 2016). The monitoring results will be reported to National Oceanic and Atmospheric Administration (NOAA) Fisheries, U.S. Fish & Wildlife Service (USFWS), and SCDNR by September 30 of each collection year. SCE&G proposes to increase the frequency of electrofishing surveys if the total number of eels collected during a sampling effort reaches a “Target Threshold.” The Target Threshold will be based on updated American eel passage data from the St. Stephen eel ramp. From 2013 to 2016, SCDNR passed an average of 5,089 eels per year at the St. Stephen eel ramp (SCDNR 2016). The Target Threshold to increase sampling frequency will be 10 percent of the most recent 5-year average of American-eels-passed at the St. Stephen eel ramp. For example, if the 5-year average is 5,000 American eels passed at the St. Stephen eel ramp, then a total of 500 American eels observed downstream of Parr Shoals Dam would trigger increased monitoring from once every 10 years to once every 5 years. The Target Threshold will not include years of data when the St. Stephen eel ramp was not working for a substantial period of the passage season as that could significantly bias the Target Threshold.

The agencies have not provided a trigger for construction and implementation of an eel ramp at the Parr Shoals Dam. However, the Project currently has a plan with triggers established for

implementing passage of American shad and blueback herring at the Parr Shoals Dam. SCE&G will consider inclusion of an American eel ramp as part of that fishway design and construction when triggers are met for fish passage.

4.0 LITERATURE CITED

Kleinschmidt Associates. 2016. American eel (*Anguilla rostrata*) Abundance Study Report. June 2016.

South Carolina Department of Natural Resources (SCDNR). 2016. St. Stephen Dam American Eel Ramps. October 2016.

PARR SHOALS DAM TURBINE VENTING PLAN

PARR HYDROELECTRIC PROJECT

FERC No. 1894

Prepared for:

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

Prepared by:

Kleinschmidt

Lexington, South Carolina
www.KleinschmidtGroup.com

April 2017

PARR SHOALS DAM TURBINE VENTING PLAN

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PARR SHOALS DAM TURBINE VENTING PLAN

**PARR HYDROELECTRIC PROJECT
FERC No. 1894**

SOUTH CAROLINA ELECTRIC & GAS COMPANY

1.0 INTRODUCTION

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 and the Fairfield Pumped Storage Development. Both developments are located along the Broad River in Fairfield and Newberry Counties, South Carolina.

During relicensing, SCE&G tested all of the Parr turbines for their ability to self-vent and potentially increase the dissolved oxygen in the tailrace during specific periods of the year. An initial test of the turbines' capacity to vent was performed August 2014; a second test to determine which turbines had the most significant impact on increasing dissolved oxygen was performed in July 2015; a third test was completed in August 2016 to assess the initial plan developed for turbine venting. The results of the testing, along with the findings published in the Baseline Water Quality Report, were used to develop a final Turbine Venting Plan, which is included below. This plan will be included as one of the proposed protection, mitigation, and enhancement measures filed with the Final License Application for continued operation of the Project.

2.0 OPERATING PROCEDURES

Turbine venting shall occur continuously during the "venting period" for each calendar year, with vents opened as turbines are started up and brought online. During the venting period, the turbines will be operated with vents opened in a first-on / last-off order as follows: 3, 1, 5, 2, 4, and 6. Exceptions to this operating order shall occur due to equipment maintenance that results in unit outages, emergency conditions, or if additional turbine venting is available in the future.

SCE&G shall follow the venting procedures from June 15 through August 31 of each year. This period captures all of the excursions recorded by the nearby USGS Gage No. 02160991, Broad River near Jenkinsville, SC since the current probe was installed in 2011. However, in the event excursions begin occurring outside of the established turbine venting window, SCE&G will consult with SCDHEC and adjust or extend the window as appropriate.

3.0 DOCUMENTATION

SCE&G shall provide documentation to the South Carolina Department of Health and Environmental Control of hourly dissolved oxygen excursions below the standard within ten days of occurrence. The compliance measurement point for dissolved oxygen will be the USGS Gage No. 02160991, Broad River near Jenkinsville, SC. Should a dissolved oxygen deviation occur, upon request from a consulting agency, SCE&G shall provide hourly operation records to agency representatives to demonstrate adherence to the order of turbine operating during a venting period. Documentation of maintenance activities to justify deviation from the turbine operating order will also be provided, should a deviation occur.

APPENDIX A

PARR SHOALS DAM TURBINE VENTING REPORT

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APPENDIX B	PARR TURBINE VENTING TEST RESULTS

PARR SHOALS DAM TURBINE VENTING REPORT

PARR HYDROELECTRIC PROJECT FERC No. 1894

SOUTH CAROLINA ELECTRIC & GAS COMPANY

1.0 INTRODUCTION

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 and the Fairfield Pumped Storage Development. Both developments are located along the Broad River in Fairfield and Newberry Counties, South Carolina.

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), and interested individuals. SCE&G has established several Technical Working Committees (TWC's) comprised of members from the interested stakeholders. The TWC's objectives include the evaluation of relicensing issues and making recommendations to address these issues in the new license.

Following the completion of the Parr Hydroelectric Project Baseline Water Quality Report, there were questions regarding occasional low dissolved oxygen (DO) in the tailrace downstream of Parr Shoals Dam. At a Water Quality TWC meeting on February 4, 2014, the TWC noted that the Baseline Water Quality Report identified periodic excursions of DO levels less than 4.0 mg/L in the Parr Shoals Dam tailrace, as reported by the USGS station 02160991. In an effort to understand these excursions better, SCE&G consolidated historic USGS data to examine these excursions and issued an addendum to the Baseline Water Quality Report in June 2014. At the request of the Water Quality TWC, SCE&G collected additional water quality data in the summer of 2014 in the tailrace and forebay of Parr Shoals Dam in an attempt to determine whether project operations are causing these excursions. These results were summarized in a memo issued on March 2, 2015 (Appendix A). SCE&G followed up this effort by collecting

another series of water quality data in the Parr forebay from May through mid-October 2015. The results of this data collection effort are summarized in this report.

In addition, SCE&G proposed to test all of the Parr turbines for their ability to self-vent and potentially increase the dissolved oxygen in the tailrace during specific periods of the year. An initial test of the turbines' capacity to vent was performed August 2014; a second test to determine which turbines had the most significant impact on increasing dissolved oxygen was performed in July 2015. The results of the testing, along with the findings published in the Baseline Water Quality Report, were used to develop a Turbine Venting Plan, which is also included in this report.

2.0 OBJECTIVES

Parr forebay data was collected from May through mid-October, 2015 in an effort to determine if low DO in the tailrace was caused by low DO in the forebay as it passed downstream through the powerhouse and turbines. Additionally, the turbine vent testing was performed in the summer of 2015 to determine if turbine venting had a positive impact on DO in the tailrace. The results of the turbine vent testing were used to develop a Turbine Venting Plan for use during periods of the low DO season.

3.0 METHODS

3.1 METHODS USED FOR TURBINE VENTING TESTING

During the 2014 test, the primary objective was to determine the turbines' physical capacity to self-vent. This requires both the presence of vacuum breakers (which are used during dewatering operations) (Photo 3-1), as well as the proper turbine vertical setting and sufficient gross head to draw air into the turbine during operation. With a turbine operating, the vacuum breaker valve is opened, and venting can be audibly determined. Aeration of the water can also be visually observed in the tailrace (Photo 3-2).



PHOTO 3-1 PIPING FOR VACUUM BREAKERS IN HEADCOVER



PHOTO 3-2 TURBINE DISCHARGE WITH VENTS OPEN

Water quality measurements (dissolved oxygen, temperature and percent saturation) were taken using a Hydrolab Surveyor 4a (Photo 3-3). Measurements were made immediately downstream of each turbine both prior to and after the vent was opened. It was verified that the crest gates had not operated within the past several hours, therefore no mechanical aeration influence from spilling was present. Hydrolab readings were allowed to stabilize for several minutes before water quality parameters were recorded.



PHOTO 3-3 MEASURING DO LEVELS DURING TESTING

During the 2014 test, several of the turbines were undergoing maintenance, and testing of all units was not possible. In addition, the tailrace dissolved oxygen and total saturation levels were high prior to opening the vents, which likely reduced the effectiveness of venting. Given these limitations, an effectiveness venting test was planned for summer 2015 when additional turbines could be evaluated. Prior to the 2015 testing date, DO levels were monitored via the downstream USGS Gage No. 02160991, Broad River near Jenkinsville, SC to identify a test period with lower DO conditions.

3.2 METHODS USED FOR FOREBAY DO SAMPLING

Water quality data, including DO and temperature, was collected in the forebay of the Parr Shoals Dam using two HOBO data loggers, with one logger located approximately one foot above the bottom of the reservoir and the other located approximately one foot below the surface of the reservoir. The HOBO data loggers were suspended from the log boom located in the forebay. Data was logged on an hourly basis from May 4, 2015 through October 16, 2015. Hourly data was also collected from the USGS gage at Jenkinsville (02160991), which is located immediately downstream of Parr Shoals Dam near the powerhouse.

4.0 RESULTS

4.1 RESULTS OF TURBINE VENTING

The Parr Shoals powerhouse contains six vertical turbines, five of which have vacuum breakers to facilitate dewatering the draft tube. It was discovered that unit 6, which is nearest the shoreline, does not have a vacuum breaker. During the 2014 test, units 1, 3 and 4 were operable, and the admittance of air was audible when the vacuum breakers were opened. In addition, the tailrace observation clearly indicated the water was being aerated. With the high saturation levels (above 70%), the measured increases in dissolved oxygen were 0.16 and 0.17 mg/L between the initial measurement and the end of the venting test (Appendix A – 2014 report).

During the 2015 test, all turbines were tested except unit 4, which was inoperable due to ongoing maintenance; however, unit 4 had been tested in 2014. Results of the 2015 testing (data included as Appendix B) indicate that unit 3 venting had the most significant increase in dissolved oxygen, followed by units 1, 5 and 2. The increases are shown in Table 4-1.

TABLE 4-1 DISSOLVED OXYGEN MEASUREMENTS (MG/L)

Unit No.	Vent Closed	Vent Open	Increase in DO
1	4.65	5.04	0.39
2	4.60	4.80	0.20
3	4.70	5.15	0.45
4*	5.66	5.82	0.16
5	4.84	5.20	0.36
6**	5.10	N/A	N/A

*test data from 2014

**Unit 6 is not equipped with a vacuum breaker.

While the 2014 test indicated a dissolved oxygen increase of 0.16 mg/L induced by venting unit 4, the increase was hindered by the starting saturation level compared to the testing in 2015. It can be assumed that the lower levels in 2015 would have resulted in better uptake, but the exact level of increase is not known. Operating priority for the Turbine Venting Plan was not modified to arbitrarily place unit 4 above other turbines that have a better demonstrated uptake capacity.

4.2 RESULTS OF FOREBAY SAMPLING

Due to the fluctuations of the reservoir, periods of low inflows, and the general location of the HOBO loggers in the forebay of the dam, the loggers were highly susceptible to fouling due to debris, sediment, and algae. It appears that after approximately one week of data collection in the reservoir, the HOBO loggers became severely compromised and no longer collected accurate data. Likewise, as the study season progressed, the accuracy of the HOBO loggers decreased due to overgrowth with algae and other aquatic debris. At each download, which occurred on a monthly basis, HOBO loggers were freed of obvious debris as they were removed from the water, making the accuracy of the logger slightly increase for a short period of time, but then fouling quickly afterwards. For that reason, each week after the monthly download is considered to be the most accurate representation of the DO in the Parr forebay. However, the data was compromised during the collection period and is therefore not considered a completely reliable representation of DO in the Parr forebay. Regardless, the one week period following each

download is presented in graphs below (Figure 4-1 through Figure 4-6), along with the corresponding data from the Jenkinsville gage. Data collected during October is not included in this report, as severe flooding occurred in early October resulted in abnormally high flows and irregular DO levels.

Throughout the month of May, DO levels in the forebay, both from the top and bottom of the reservoir, and in the tailrace were consistent with each other, and well above the SCDHEC instantaneous standard of 4.0 mg/L (Figure 4-1 and Figure 4-2) (SCDHEC 2012).

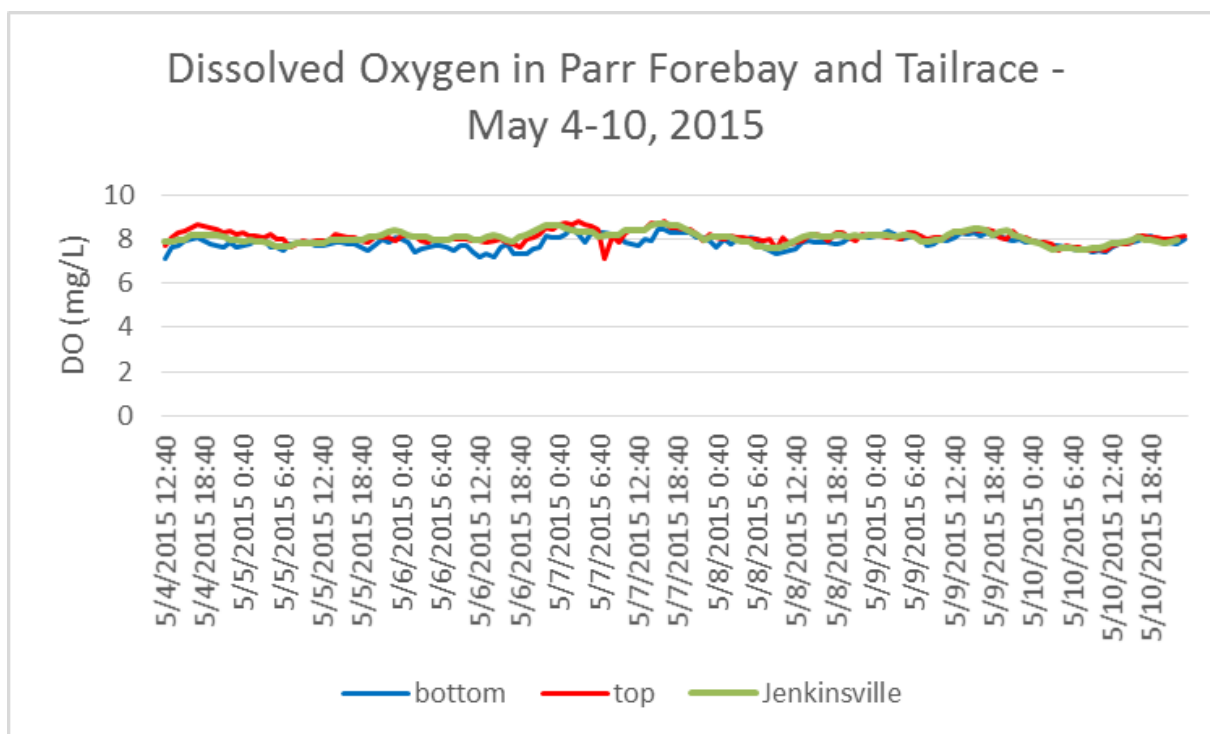


FIGURE 4-1 DISSOLVED OXYGEN IN THE PARR FOREBAY AND TAILRACE – MAY 4-10, 2015

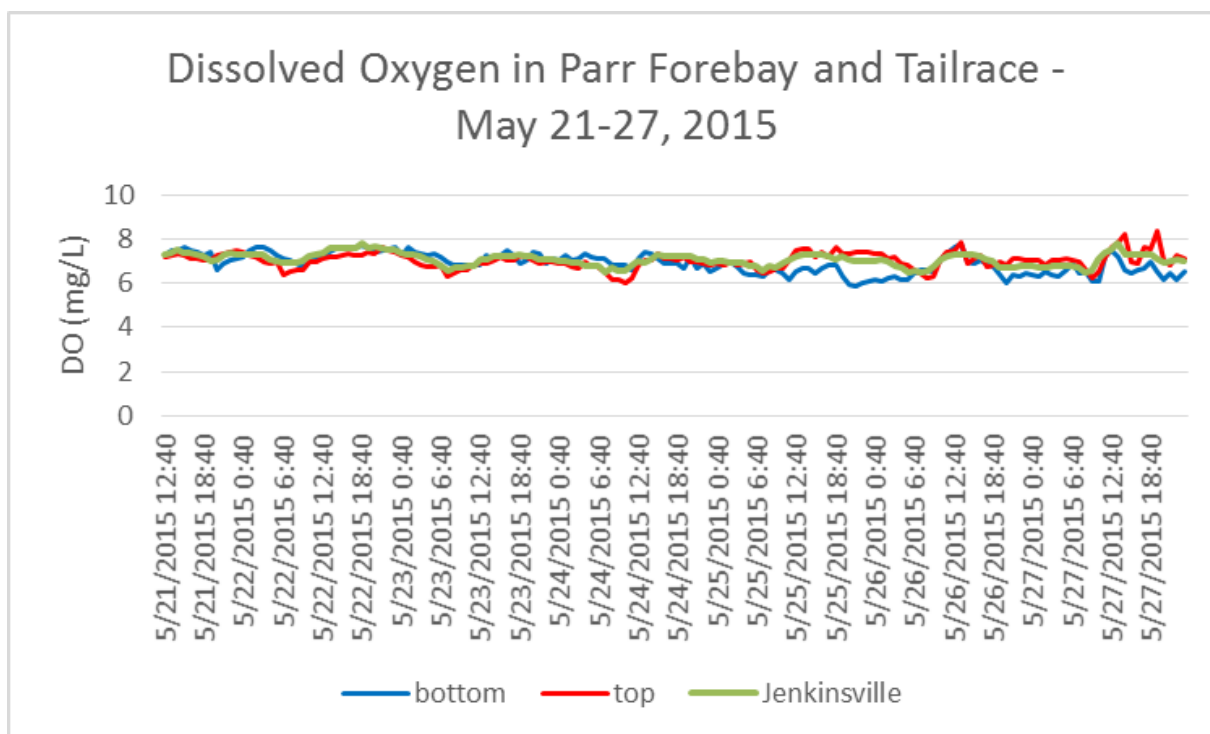


FIGURE 4-2 DISSOLVED OXYGEN IN THE PARR FOREBAY AND TAILRACE – MAY 21-27, 2015

In late June and early July, DO levels began to drop slightly in the forebay and tailrace (Figure 4-3). While the DO levels followed the same general pattern in the forebay as they did in the tailrace, the logger located near the bottom of the reservoir appeared to be affected by algal growth and debris. DO readings collected by the gage at Jenkinsville remain above the standard of 4.0 mg/L.

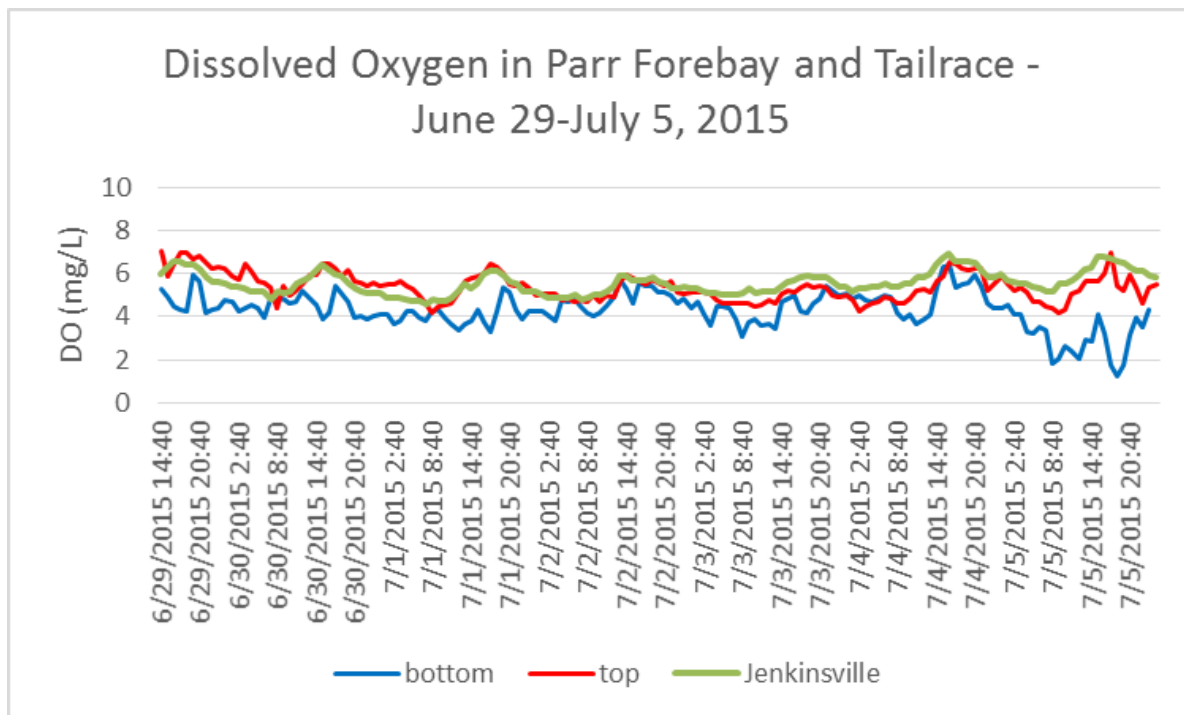


FIGURE 4-3 DISSOLVED OXYGEN IN THE PARR FOREBAY AND TAILRACE – JUNE 29-JULY 5, 2015

In mid-July, DO levels in the tailrace remained constant near 6.0 mg/L (Figure 4-4). DO readings collected in the forebay ranged from near 6.0 mg/L to 0.0 mg/L. Both loggers appeared to be affected by fouling from algae, sediment and other debris located in the forebay, but loggers began to detect a diel pattern typical of day and night shifts in DO levels associated with reservoirs and production and consumption of DO.

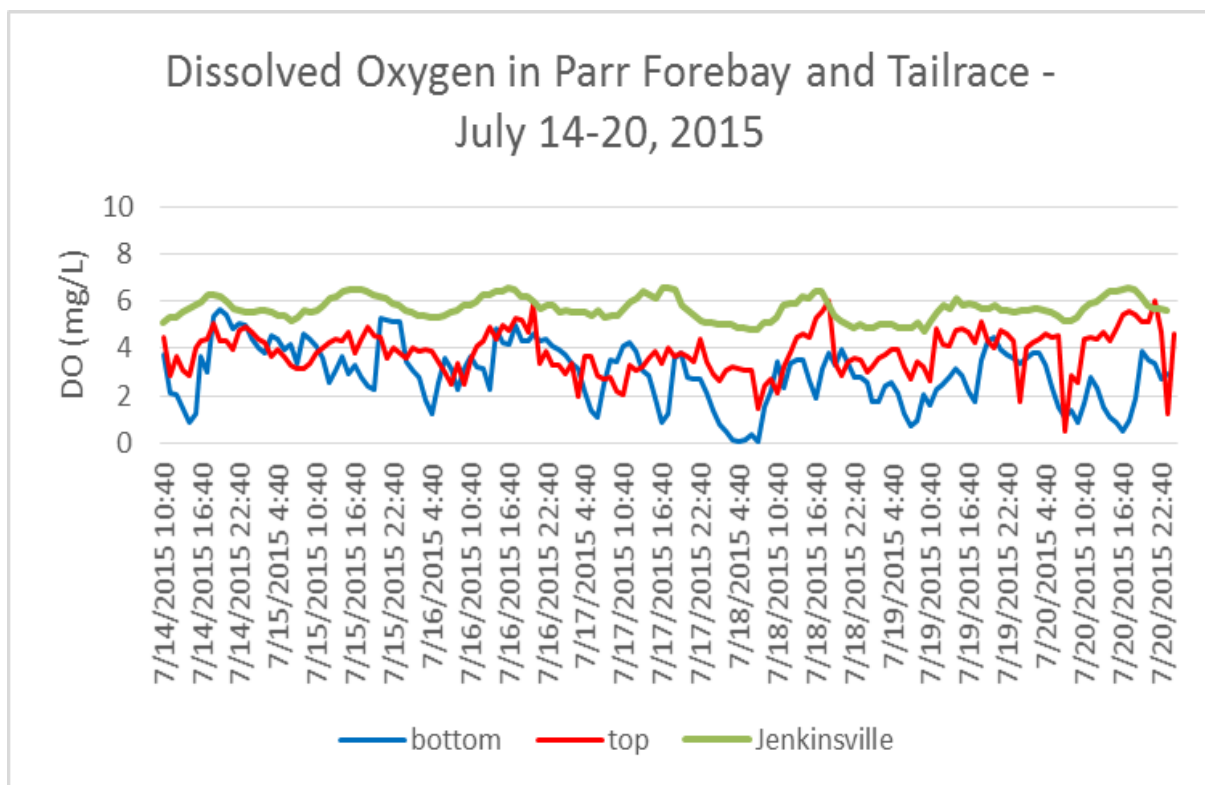


FIGURE 4-4 DISSOLVED OXYGEN IN PARR FOREBAY AND TAILRACE – JULY 14-20, 2015

In mid-August, DO levels in the tailrace continued to remain constant near 6.0 mg/L (Figure 4-5). DO readings collected in the forebay at the top of the reservoir again sporadically range from near 6.0 mg/L to 0.0 mg/L. It is likely that the top HOBO logger became wrapped with debris, causing the unusually low readings. The DO readings collected in the forebay at the bottom of the reservoir were less sporadic, however, they show a downward deterioration of fouling as time progresses, indicating that the longer the loggers were in the water, the more affected they became by algal growth, sediment, and debris.

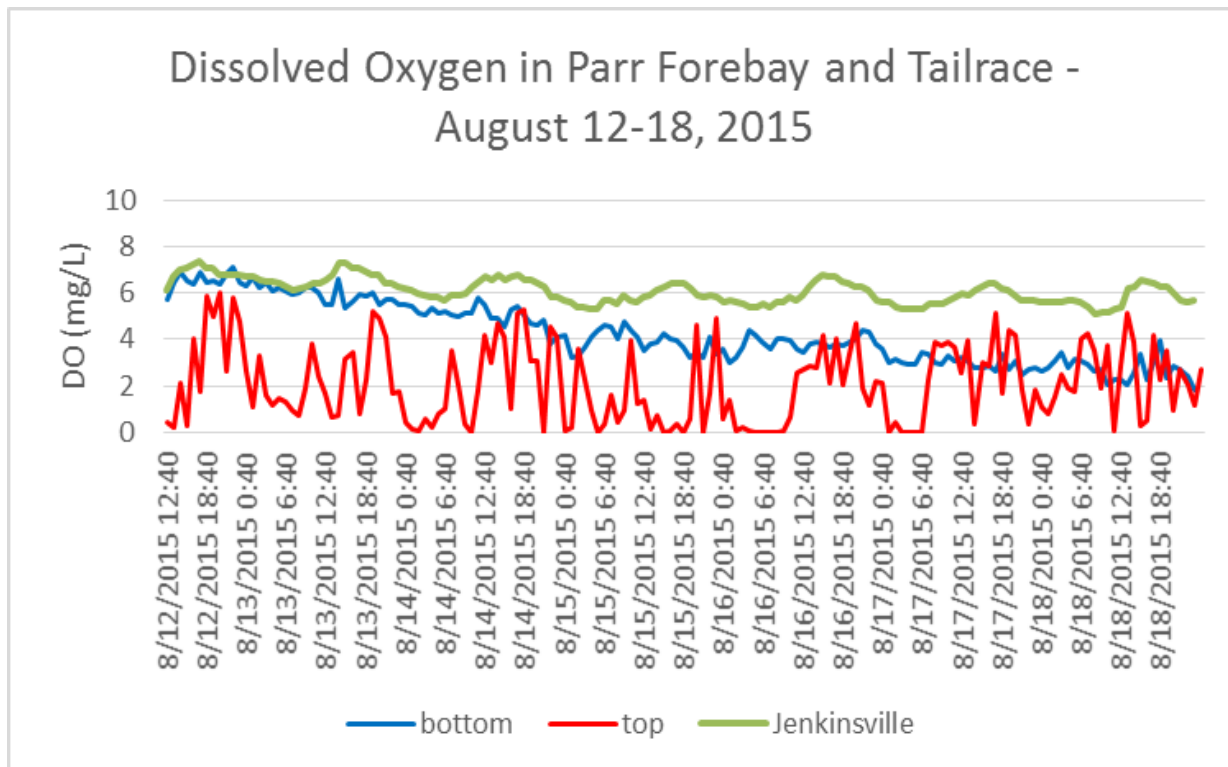


FIGURE 4-5 DISSOLVED OXYGEN IN PARR FOREBAY AND TAILRACE – AUGUST 12-18, 2015

During mid-September, DO levels in the tailrace rose from approximately 6.0 mg/L up to approximately 8.0 mg/L (Figure 4-6). DO readings collected in the forebay range from near 6.0 mg/L to 2.0 mg/L. The loggers again appear to be affected somewhat by algae, sediment and other debris located in the forebay. River flows during this period increased slightly with reoccurrence of rain events in the fall.

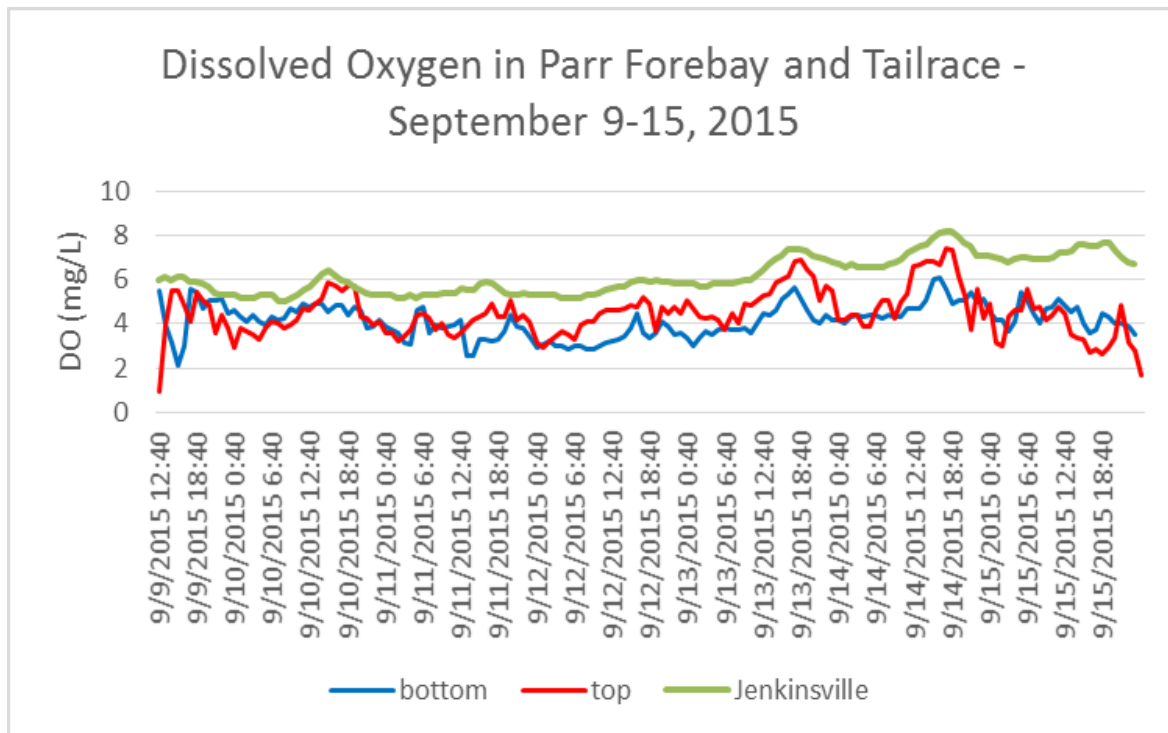


FIGURE 4-6 DISSOLVED OXYGEN IN PARR FOREBAY AND TAILRACE – SEPTEMBER 9-15, 2015

5.0 TURBINE VENTING PLAN

5.1 OPERATING PROCEDURES

Turbine venting shall occur continuously during a “venting period” for each calendar year, with vents opened as turbines are started up and brought online. During the venting period, the turbines will be operated with vents opened in a first-on / last-off order as follows: 3, 1, 5, 2, 4, and 6. Exceptions to this operating order shall occur due to equipment maintenance that results in unit outages, or emergency conditions.

SCE&G shall follow the venting procedures from June 15 through July 31 of each year. This period captures all of the excursions recorded by the nearby USGS Gage No. 02160991, Broad River near Jenkinsville, SC since the current probe was installed in 2011.

5.2 DOCUMENTATION

SCE&G shall provide documentation to DHEC of dissolved oxygen excursions below the standard within ten days of occurrence. Upon request from a consulting agency, SCE&G shall provide hourly records to agency representatives to demonstrate adherence to the order of turbine operating during a venting period. Documentation of maintenance activities to justify deviation from the turbine operating order will also be provided, should a deviation occur.

6.0 DISCUSSION

During two turbine tests at Parr Hydro, it was demonstrated that five of the six turbines have a demonstrated capacity to self-aerate by opening vacuum breaker valves. Effectiveness of the venting appears to vary between turbines, and the results of testing conducted with dissolved oxygen below 5.0 mg/L were used to prioritize an operating sequence. Observations of downstream data trends were used to determine trigger mechanisms for venting, which was combined with the operating sequence for a venting plan.

During 2015, there were no DO levels below 4.2 mg/L detected at the USGS tailrace DO gage. After July 31, there was only one DO reading lower than 5.0 mg/l and that was 4.9 mg/l on August 2. Fouling of DO monitor probes in the Parr forebay made it more difficult to see clear trends in the DO levels experienced in the forebay, but they did detect lower DO levels and a diel shift in DO levels starting at the end of June and extending through the end of September.

This report will be used as part of the 401 water quality certification application for the Parr Hydroelectric Project to demonstrate that the Project will meet the state standards as described by SCDHEC under the new FERC license.

7.0 REFERENCES

SCDHEC. 2012. Water Classifications and Standards (R. 61-68). [Online] URL: <https://www.scdhec.gov/Agency/docs/lwm-regs/r61-68.pdf>. Accessed December 29, 2015.

APPENDIX A

PARR HYDROELECTRIC PROJECT WATER QUALITY BASELINE MEMORANDUM – WATER QUALITY REPORT – SUPPLEMENTAL DISSOLVED OXYGEN DATA

Parr Hydroelectric Project – FERC No. 1894
Water Quality Baseline – Memorandum

TO: Parr/Fairfield Relicensing Water Quality Technical Working Committee (TWC)
FROM: Kelly Miller and Henry Mealing – Kleinschmidt Associates
DATE: March 2, 2015
RE: Water Quality Report – Supplemental Dissolved Oxygen Data

The Parr Hydroelectric Project Baseline Water Quality Report includes analysis of both upstream and downstream water quality associated with the Parr Shoals Development and concluded that project operations could affect water quality downstream of Parr Shoals Dam. At the Water Quality TWC meeting on February 4, 2014, the TWC noted that the Baseline Water Quality Report identified periodic excursions of dissolved oxygen (DO) levels below 4.0 mg/l in the Parr Shoals Dam tailrace, as reported by the USGS station 02160991. In an effort to understand these excursions better, SCE&G contacted USGS and asked if they had any further information on this station. In June of 2011, the USGS installed a new sensor at the station 02160991. From January 2011 through December 2014, there have been approximately 13 hourly excursions in DO below the 4.0 mg/l SCDHEC standard which is approximately 0.04 percent of that period of time. At the request of the Water Quality TWC, SCE&G collected additional water quality data in the tailrace and forebay of Parr Shoals Dam to attempt to determine whether project operations are causing these excursions, and if so, how SCE&G might prevent them from occurring.

Tailrace Data – July – September 2014

Methods

From July through September of 2014, SCE&G collected temperature and DO data at seven sites along the downstream face of the Parr Shoals Dam, adjacent to the USGS station 02160991, and at a location approximately 400 feet downstream of Parr Shoals Dam. Data was collected on a weekly basis, three times per day including one hour before sunrise, at sunrise, and one hour after sunrise. To see if unit location had an effect on DO, the turbine(s) running during collections and the number of any lowered flashboard was also recorded.

Results

SCE&G collected data in the tailrace for two main reasons: (1) to verify the accuracy of the USGS gage station 02160991 and (2) to determine if DO could be correlated to an early morning DO sag or related to which turbine units were running at the time of data collection. During the sampling period, DO levels consistently stayed above 4.0 mg/l. No excursions were recorded by SCE&G or on the USGS gage (Table 1). Data collected by SCE&G at the site of the USGS station 02160991 was consistent with the USGS gage.

**TABLE 1 DISSOLVED OXYGEN DATA AT USGS STATION 02160991 AND PARR SHOALS
TAILRACE JULY – SEPTEMBER 2014.**

Date	USGS Data		SCE&G Data	
	Time	DO mg/l	Time	DO mg/l
7/2/14	5:00 AM	6.2	5:35 AM	6.12
	6:00 AM	6.0	6:37 AM	5.95
	7:00 AM	6.0	7:42 AM	5.86
	8:00 AM	6.0		
7/10/14	5:00 AM	6.0	5:32 AM	6.24
	6:00 AM	5.9	6:27 AM	6.16
	7:00 AM	5.7	7:33 AM	6.08
	8:00 AM	5.5		
7/15/14	5:00 AM	5.5	5:34 AM	5.62
	6:00 AM	5.4	6:32 AM	5.32
	7:00 AM	4.9	7:42 AM	4.91
	8:00 AM	5.0		
7/24/14	5:00 AM	5.2	5:41 AM	5.15
	6:00 AM	5.2	6:51 AM	5.03
	7:00 AM	5.1	7:50 AM	5.49
	8:00 AM	5.3		
7/31/14	5:00 AM	5.8	5:43 AM	5.66
	6:00 AM	5.7	6:42 AM	5.55
	7:00 AM	5.7	7:54 AM	5.53
	8:00 AM	5.7		
8/7/14	5:00 AM	6.0	5:39 AM	5.90
	6:00 AM	6.0	6:48 AM	5.84
	7:00 AM	5.9	7:49 AM	5.74
	8:00 AM	5.9		
8/13/14	5:00 AM	5.9	5:30 AM	5.83
	6:00 AM	5.9	6:33 AM	5.86
	7:00 AM	5.9	7:33 AM	5.83
	8:00 AM	5.9		
8/20/14	5:00 AM	5.8	5:48 AM	5.90
	6:00 AM	5.8	6:46 AM	5.97
	7:00 AM	5.7	7:56 AM	5.86
	8:00 AM	5.7		
8/26/14	5:00 AM	6.3	5:41 AM	6.26
	6:00 AM	6.4	6:51 AM	6.51
	7:00 AM	6.4	7:48 AM	6.35
	8:00 AM	6.3		
9/3/14	5:00 AM	5.7	5:29 AM	6.02
	6:00 AM	5.8	6:40 AM	5.73
	7:00 AM	5.4	7:53 AM	5.46
	8:00 AM	5.4		
9/10/14	6:00 AM	5.6	6:30 AM	5.62
	7:00 AM	5.7	7:46 AM	5.78
	8:00 AM	5.7	8:46 AM	5.71
	9:00 AM	5.7		
9/16/14	6:00 AM	5.0	6:22 AM	4.94

	7:00 AM	5.0	7:24 AM	4.98
	8:00 AM	5.0	8:24 AM	4.92
	9:00 AM	5.0		
9/25/14	6:00 AM	7.3	6:33 AM	7.10
	7:00 AM	7.3	7:34 AM	7.65
	8:00 AM	7.3	8:29 AM	7.62
	9:00 AM	7.3		

Results did not detect a clear correlation between DO readings and the units running at the time of data collection. See Appendix A for a complete list of the data collected during this effort.

Forebay Data – October & November 2014

Methods

Water quality data, including DO and temperature, were collected in the forebay of the Parr Shoals Dam to determine if low DO water is being released through the turbines, causing the DO in the tailrace to drop. The data was collected using two HOBO data loggers, with one logger located approximately one foot above the bottom of the reservoir and the other located approximately one foot below the surface of the reservoir. Data was logged on an hourly basis from October 16, 2014 through December 3, 2014. We had planned to begin collections earlier but did not receive the data loggers until mid-September.

Results

Results showed the expected correlations between DO and temperature and natural diel fluctuations (Figure 1 through Figure 4). DO levels at the bottom of the forebay are consistently slightly lower than those at the top of the forebay, and there was no evidence of stratification in the forebay area of the reservoir. There were no low DO events observed in the tailrace during the monitoring effort.

FIGURE 1 DO AND TEMPERATURE AT BOTTOM OF PARR SHOALS DAM FOREBAY

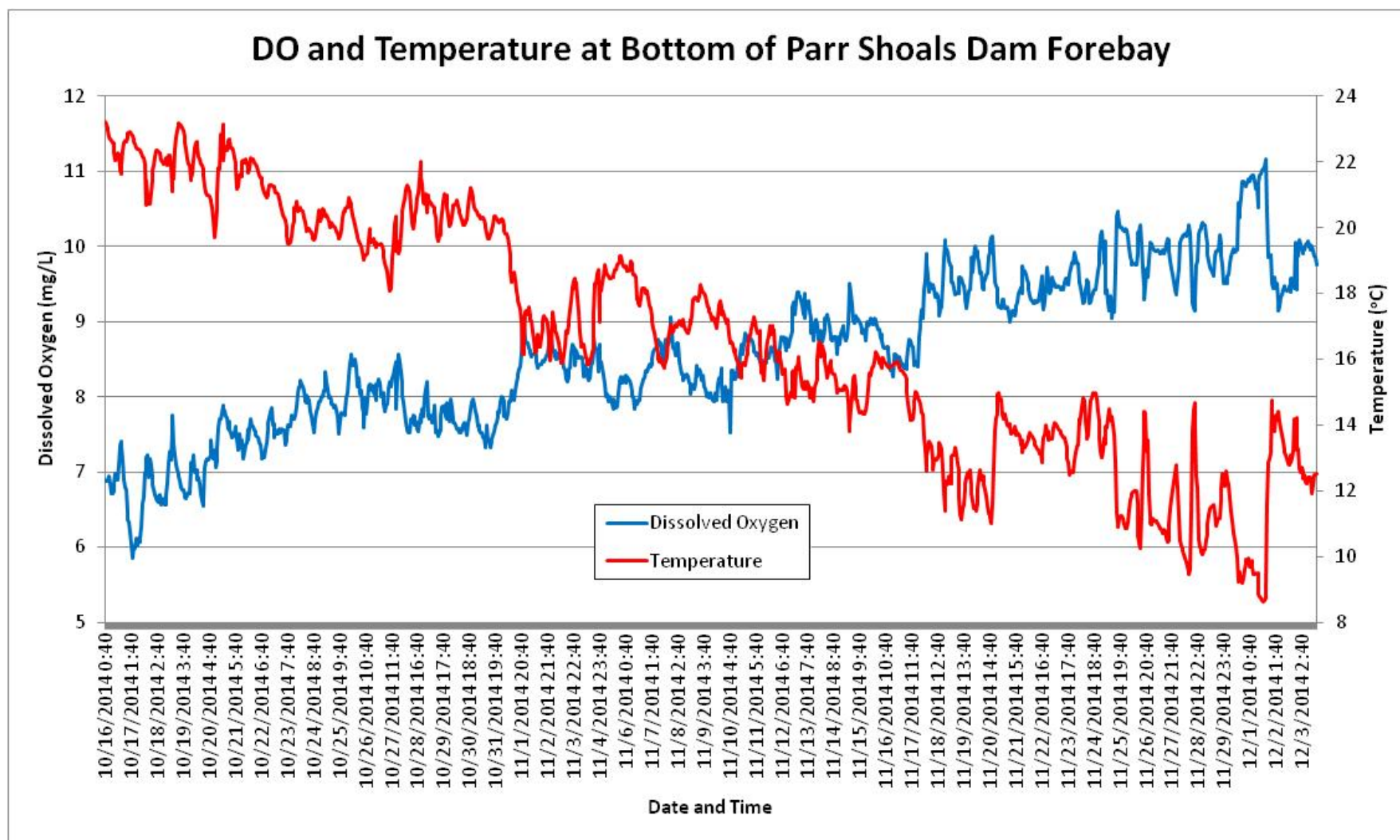


FIGURE 2 DO AND TEMPERATURE AT THE TOP OF PARR SHOALS DAM FOREBAY

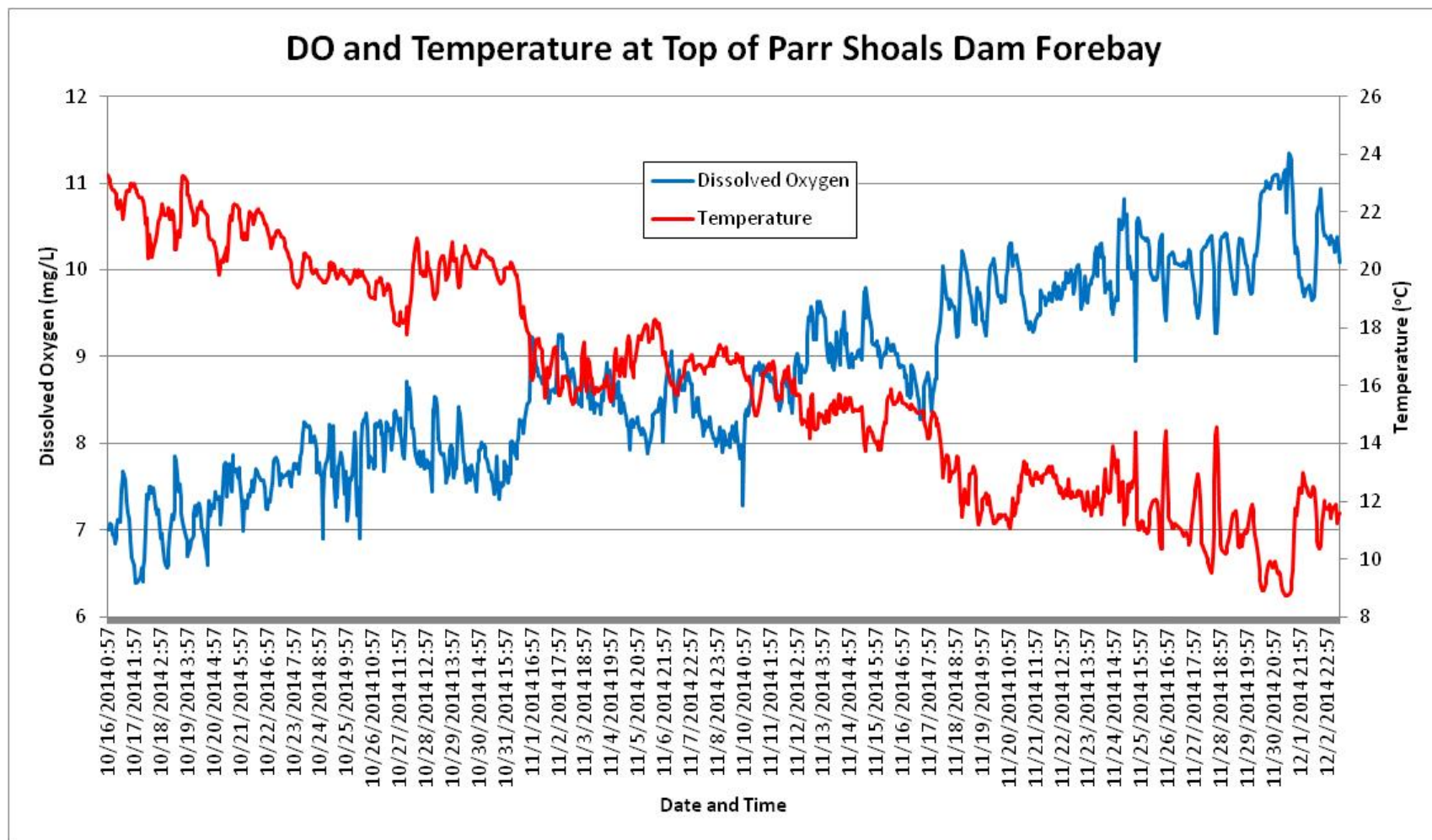


FIGURE 3 **PARR SHOALS DAM FOREBAY DISSOLVED OXYGEN**

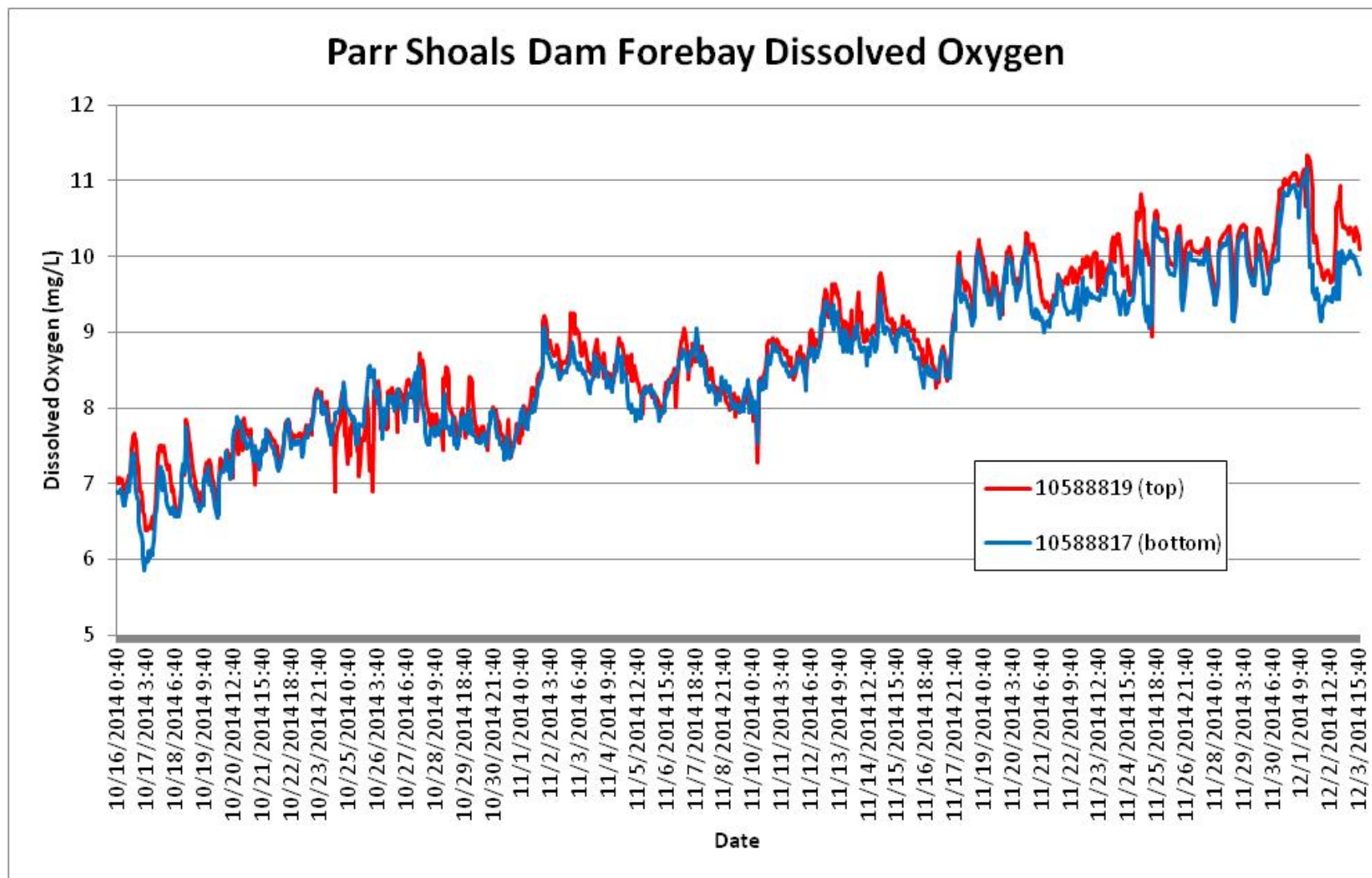
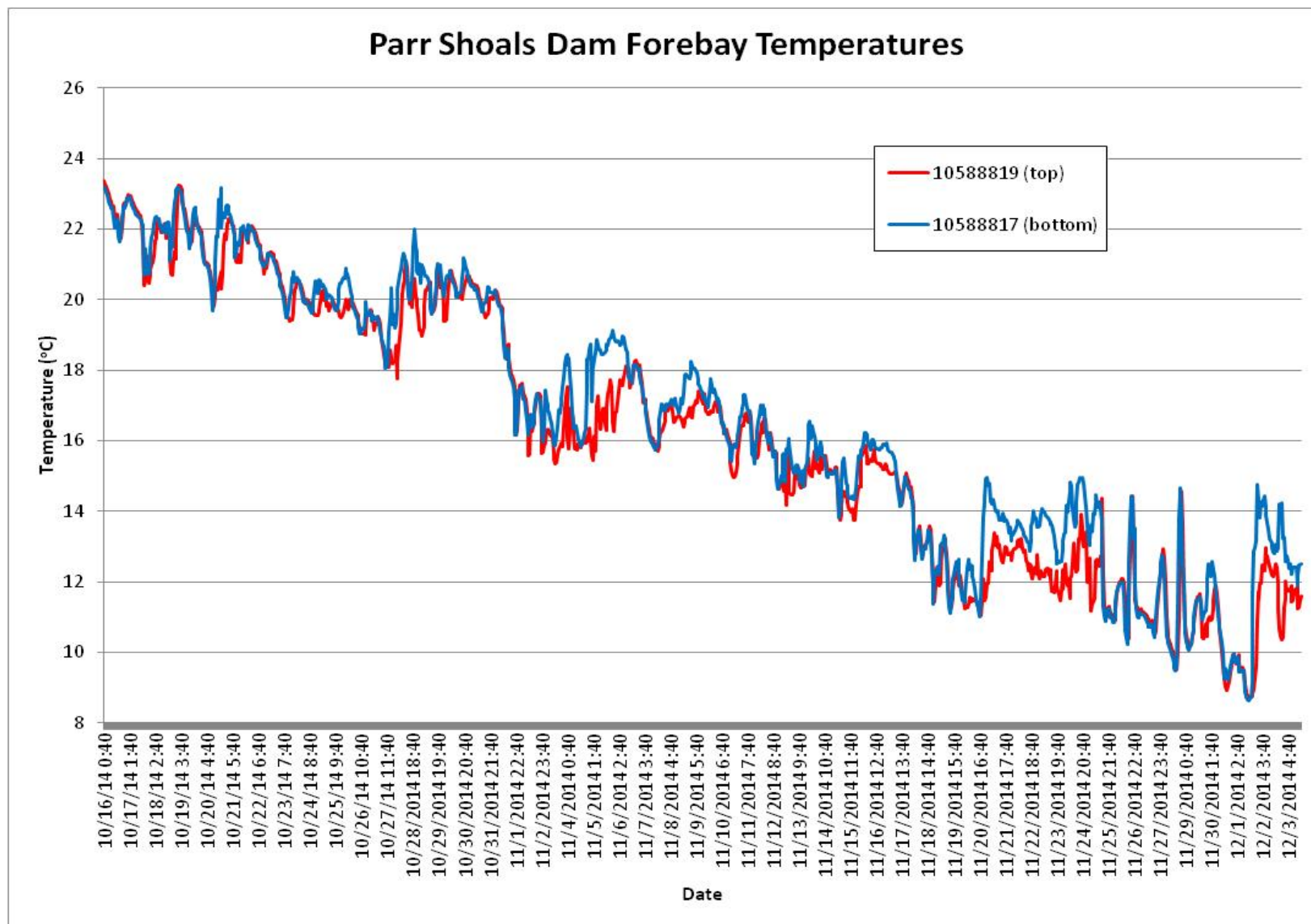


FIGURE 4 **PARR SHOALS DAM FOREBAY TEMPERATURES**



Parr Aeration Investigation – August 2014

Because of the success with turbine self-venting (or self-aerating) at the Saluda Hydro Project, SCE&G performed some initial investigations to determine if turbine aerating at the Parr Shoals Development was feasible for periodically increasing the tailrace DO levels. Bret Hoffman (Kleinschmidt), Amy Bresnahan (SC&EG), Milton Quattlebaum (SCE&G), and Mike Hall (USGS) performed some initial onsite turbine venting tests at the Parr Shoals Development on the morning of August 20, 2014. The results of their investigation are included below.

During each test run, water quality measurements (DO, temperature, and % DO saturation) were recorded with handheld meters (independent of the permanently installed USGS gage station equipment) in the tailrace at the bay 7 location (which is between the six turbine bays and the shore) and along the shoreline adjacent to the USGS gage. These measurements provided a cursory examination of the ability of the Units to aerate by opening the existing vacuum breaker valves located on the turbine head cover. Only Units 1, 3, and 4 were available for operation testing as the other units were out of service for repair, and Unit 4 could not be shut down because of equipment issues. During testing all river flow was passed through the turbine units and the spillway gates were in the closed (raised) position. Test runs for the water quality measurements were conducted in combinations of turbine operations as described below and were partially dictated by the requirement that Unit 4 could not be shut down. The headpond and tailwater elevations were also recorded, as were individual generator kW and kVar outputs.

Unit 4 - Test

Initially, tailrace readings were collected with only Unit 4 operating, and the vacuum breaker valve closed. Then, the vacuum breaker valve was fully opened to allow aeration, and audibly drew in air. The effects of the introduced air were clearly visible in the tailrace. The initial tailrace reading collected with the valve closed was 5.66 mg/l, the reading at bay 7 with the valve open was 5.82 mg/l. Upon closing the valve, the DO at bay 7 dropped to 5.78 mg/l, although the aerated water may not have had time to flush out from the tailrace area. The USGS measurements on the shore were 5.58 mg/l prior to opening any turbine vents, and 5.75mg/l with the vent open for 25 minutes. The USGS reading did not drop after the valve was closed, and matched the bay 7 reading of 5.78 mg/l, supporting the theory that residual aerated water remained in the immediate tailrace area. Initial saturation was 71% (valve closed), and with the valve open the saturation increased to 74.9%. Saturation levels reported near the USGS gage were within a tenth of a percent of those recorded at bay 7.

Units 1 and 4

Unit 1 was started (valve closed) and allowed to stabilize for 15 minutes. DO readings were collected with Unit 1 valve closed and Unit 4 valve open. The USGS reading increased to 5.84 mg/l, while the bay 7 reading increased from 5.82 mg/l to 5.86 mg/l. The Unit 1 valve was opened and readings were collected after 15 minutes of stabilization. The measurement near the USGS gage was 5.80 mg/l, while the bay 7 reading was 5.88 mg/l. Saturation with Unit 1 (valve

closed) and Unit 4 (valve open) was 73%, which increased to 75.4% with both units' valves open.

Units 1, 3, and 4

Unit 3 was started and operated for 15 minutes with no valve open, while the valves for Units 1 and 4 were left open. The measurements from the USGS site and at bay 7 were both 5.80 mg/l, and the saturation at bay 7 was 74.8%. When the valve was opened on Unit 3, the bay 7 reading was 5.76 mg/l and the USGS reading was 5.75 mg/l with a saturation level of 74.3% - with all three units aerating. USGS took an additional measurement at bay 2 (between units 1 and 3) with all units aerating, which ranged from 6.08 mg/l to 6.15 mg/l; at 6.08 mg/l, saturation was 79%.

One final measurement was taken with all units 1, 3 and 4 operating but all three valves closed. The reading near the USGS gage was 5.71 mg/l while the bay 7 reading was 5.73 mg/l, indicating very minimal reduction from aerating. It is likely that the aerated water in the tailrace area did not flush out and resulted in higher readings. The USGS handheld meter was used to re-sample water quality at bay 2 and the DO dropped to 5.89 mg/l and 75% saturation.

Discussion

The three units tested will aerate with their current valve configurations. The inability to shut down unit 4 likely prevented the aerated flows from units 1 and 3 from reaching the shore, as they are located further toward the middle of the river. While the DO readings with various combinations of valves open for all three units was fairly stable, the initial increase from Unit 4 indicates there is an ability to increase dissolved oxygen by aerating. Saturation was between 71% initial reading (prior to any aeration), and 75% after the valve was opened, indicating an increase in saturation. Saturation levels were near 75% for all readings following the initial valve opening.

Saturation was calculated for all the DO excursions (below 4.0 mg/L) during the past three years as recorded by the USGS gage. While the saturation levels during the aeration testing ranged from 71% (without aerating) up to 76%, the levels calculated for the excursions varied between 44.8% and 51.18%. Water temperatures during the testing ranged between 27.5 and 28.1 °C, while temperature during the excursions was measured at 29.3 to 30.1 °C.

The initial increase in DO measured during testing was approximately 0.17 mg/l. This indicates the turbines have some ability to increase DO by aerating, although the saturation percentage and water temperatures were significantly different during the historic DO excursions. A better determination of effectiveness could be made under lower DO and saturation conditions during the summer. Also, testing during a period when all of the turbine units can be manipulated (turned on/off and aerating on/off) would give more precise information on the performance of each unit.

APPENDIX A
TAILRACE DATA

Parr/Fairfield Relicensing Dissolved Oxygen Study 2014

Date: 7/2/14

Samplers: Milton Quattlebaum and Kelly Miller

Time	Location	DO (mg/L)	Temp (°C)	Units Running
5:11 AM	Unit 1	5.79	27.30	on
5:16 AM	Unit 2	5.92	27.45	off
5:20 AM	Unit 3	5.90	27.44	on
5:23 AM	Unit 4	6.01	27.69	on
5:26 AM	Unit 5	6.18	27.94	off
5:29 AM	Unit 6	6.14	27.94	off
5:35 AM	At USGS gage	6.12	27.92	
5:41 AM	DWNSTRM Plant	6.09	27.89	
6:16 AM	Unit 1	5.97	27.30	on
6:19 AM	Unit 2	5.89	27.40	off
6:21 AM	Unit 3	5.90	27.48	on
6:23 AM	Unit 4	6.06	27.74	on
6:26 AM	Unit 5	5.99	27.76	off
6:28 AM	Unit 6	5.98	27.79	off
6:33 AM	NPDES 001 sign	6.00	27.62	
6:37 AM	At USGS gage	5.95	27.74	
6:42 AM	DWNSTRM Plant	5.94	27.71	
7:17 AM	Unit 1	5.74	27.25	on
7:22 AM	Unit 2	5.82	27.36	off
7:25 AM	Unit 3	5.84	27.40	on
7:27 AM	Unit 4	6.03	27.64	on
7:30 AM	Unit 5	5.93	27.61	off
7:33 AM	Unit 6	5.89	27.63	off
7:36 AM	NPDES 001 sign	5.93	27.62	
7:42 AM	At USGS gage	5.86	27.56	
7:49 AM	DWNSTRM Plant	5.89	27.57	

Time	Jenkinsville 02160991	Parr Res. Level 02160990	Parr Crest Gate	USGS DO data at Jenkinsville	USGS Temp data at Jenkinsville
5:00 AM	221.37	261.52	258.50	6.2	27.8
6:00 AM	221.35	260.89	262.50	6.0	27.6
7:00 AM	221.65	260.44	258.50	6.0	27.5
8:00 AM				6.0	27.4

Parr/Fairfield Relicensing Dissolved Oxygen Study 2014

Date: 7/10/14

Samplers: Milton Quattlebaum and Kelly Miller

Time	Location	DO (mg/L)	Temp (°C)	Units Running
5:04 AM	Unit 1	5.73	27.40	on
5:08 AM	Unit 2	5.75	27.45	off
5:11 AM	Unit 3	5.86	27.48	on
5:15 AM	Unit 4	6.09	27.53	on
5:18 AM	Unit 5	6.28	27.69	off
5:21 AM	Unit 6	6.24	27.66	off
5:24 AM	NPDES 001 sign	6.26	27.67	
5:32 AM	At USGS gage	6.24	27.61	
5:35 AM	DWNSTRM Plant	6.24	27.65	
6:07 AM	Unit 1	5.75	27.44	on
6:10 AM	Unit 2	5.82	27.47	off
6:13 AM	Unit 3	5.89	27.51	on
6:15 AM	Unit 4	6.27	27.64	on
6:18 AM	Unit 5	6.24	27.65	off
6:20 AM	Unit 6	6.20	27.64	off
6:22 AM	NPDES 001 sign	6.19	27.65	
6:27 AM	At USGS gage	6.16	27.63	
6:32 AM	DWNSTRM Plant	6.16	27.59	
7:14 AM	Unit 1	5.87	27.50	on
7:16 AM	Unit 2	5.84	27.51	off
7:19 AM	Unit 3	5.91	27.51	on
7:21 AM	Unit 4	6.19	27.59	on
7:23 AM	Unit 5	6.15	27.60	off
7:25 AM	Unit 6	6.16	27.62	off
7:27 AM	NPDES 001 sign	6.13	27.61	
7:33 AM	At USGS gage	6.08	27.61	
7:40 AM	DWNSTRM Plant	6.15	27.50	

*lowered crest gates 5 and 6 at 7:20 am

Time	Jenkinsville 02160991	Parr Res. Level 02160990	Parr Crest Gate	USGS DO data at Jenkinsville	USGS Temp data at Jenkinsville
5:00 AM	221.36	260.89	266.00	6.0	27.6
6:00 AM	221.35	260.57	266.00	5.9	27.5
7:00 AM	221.93	260.59	258.00	5.7	27.5
8:00 AM				5.5	27.4

Parr/Fairfield Relicensing Dissolved Oxygen Study 2014

Date: 7/15/14

Samplers: Milton Quattlebaum and Kelly Miller

Time	Location	DO (mg/L)	Temp (°C)	Units Running
5:10 AM	Unit 1	5.30	28.19	on
5:14 AM	Unit 2	5.29	28.25	off
5:17 AM	Unit 3	5.30	28.29	on
5:19 AM	Unit 4	5.70	28.42	on
5:22 AM	Unit 5	5.63	28.45	off
5:25 AM	Unit 6	5.54	28.48	off
5:28 AM	NPDES 001 sign	5.64	28.41	
5:34 AM	At USGS gage	5.62	28.34	
5:39 AM	DWNSTRM Plant	5.57	28.41	
6:13 AM	Unit 1	4.77	28.18	on
6:15 AM	Unit 2	4.81	28.21	off
6:18 AM	Unit 3	4.92	28.22	on
6:20 AM	Unit 4	5.19	28.25	on
6:22 AM	Unit 5	5.40	28.16	off
6:25 AM	Unit 6	5.35	28.24	off
6:27 AM	NPDES 001 sign	5.31	28.34	
6:32 AM	At USGS gage	5.32	28.30	
6:36 AM	DWNSTRM Plant	5.33	28.29	
7:22 AM	Unit 1	4.98	28.18	on
7:25 AM	Unit 2	4.94	28.15	off
7:27 AM	Unit 3	4.94	28.11	on
7:30 AM	Unit 4	5.00	28.12	on
7:32 AM	Unit 5	5.18	28.18	off
7:35 AM	Unit 6	5.02	28.19	off
7:37 AM	NPDES 001 sign	5.03	28.16	
7:42 AM	At USGS gage	4.91	28.08	
7:47 AM	DWNSTRM Plant	5.00	28.18	
7:55 AM	Unit 1	4.86	28.12	on

*not spilling while monitoring

Time	Jenkinsville 02160991	Parr Res. Level 0216099 0	Parr Crest Gate	USGS DO data at Jenkinsville	USGS Temp data at Jenkinsville
5:00 AM	221.34	258.63	266, except 5&6 at 264	5.5	28.3
6:00 AM	221.31	258.40	266, except 5&6 at 264	5.4	28.2
7:00 AM	221.34	258.68	266, except 5&6 at 264	4.9	28
8:00 AM				5.0	28

Parr/Fairfield Relicensing Dissolved Oxygen Study 2014

Date: 7/24/14

Samplers: Milton Quattlebaum and Kelly Miller

Time	Location	DO (mg/L)	Temp (°C)	Units Running
5:10 AM	Unit 1	5.23	27.34	off
5:15 AM	Unit 2	5.26	27.32	off
5:17 AM	Unit 3	5.21	27.30	off
5:21 AM	Unit 4	5.43	27.35	on
5:24 AM	Unit 5	5.15	27.32	off
5:29 AM	Unit 6	4.81	27.21	off
5:35 AM	NPDES 001 sign	5.11	27.29	
5:41 AM	At USGS gage	5.15	27.28	
5:46 AM	DWNSTRM Plant	4.70	27.19	
6:27 AM	Unit 1	5.27	27.29	off
6:33 AM	Unit 2	5.26	27.23	off
6:35 AM	Unit 3	5.28	27.28	off
6:38 AM	Unit 4	5.19	27.30	on
6:41 AM	Unit 5	5.09	27.29	off
6:43 AM	Unit 6	4.97	27.27	off
6:46 AM	NPDES 001 sign	5.05	27.21	
6:51 AM	At USGS gage	5.03	27.27	
6:56 AM	DWNSTRM Plant	4.72	27.09	
7:22 AM	Unit 1	5.18	27.24	off
7:32 AM	Unit 2	5.68	27.24	off
7:33 AM	Unit 3	5.68	27.27	off
7:37 AM	Unit 4	5.83	27.26	on
7:40 AM	Unit 5	5.49	27.25	off
7:42 AM	Unit 6	5.43	27.11	off
7:45 AM	NPDES 001 sign	5.50	27.21	
7:50 AM	At USGS gage	5.49	26.68	
7:55 AM	DWNSTRM Plant	5.47	27.06	
8:00 AM	Unit 1	5.63	27.25	off

Time	Jenkinsville 02160991	Parr Res. Level 02160990	Parr Crest Gate	USGS DO data at Jenkinsville	USGS Temp data at Jenkinsville
5:00 AM	220.47	260.11	Gates 1, 2, 3, 4: 264	5.2	27.2
6:00 AM	220.47	259.41	Gates 5, 6, 7, 8: 266	5.2	27.2
7:00 AM	220.46	258.97		5.1	27.1
8:00 AM				5.3	27.1

Parr/Fairfield Relicensing Dissolved Oxygen Study 2014

Date: 7/31/14

Samplers: Milton Quattlebaum

Time	Location	DO (mg/L)	Temp (°C)	Units Running
5:18 AM	Unit 1	5.72	27.49	on
5:21 AM	Unit 2	5.73	27.52	off
5:24 AM	Unit 3	5.73	27.50	off
5:27 AM	Unit 4	5.78	27.51	on
5:30 AM	Unit 5	5.65	27.49	off
5:33 AM	Unit 6	5.60	27.48	off
5:37 AM	NPDES 001 sign	5.67	27.46	
5:43 AM	At USGS gage	5.66	27.32	
5:50 AM	DWNSTRM Plant	5.54	27.39	
6:22 AM	Unit 1	5.71	27.42	on
6:25 AM	Unit 2	5.71	27.47	off
6:28 AM	Unit 3	5.73	27.48	off
6:31 AM	Unit 4	5.81	27.46	on
6:33 AM	Unit 5	5.61	27.42	off
6:36 AM	Unit 6	5.59	27.41	off
6:38 AM	NPDES 001 sign	5.64	27.43	
6:42 AM	At USGS gage	5.55	27.32	
6:47 AM	DWNSTRM Plant	5.61	27.22	
7:32 AM	Unit 1	5.64	27.41	on
7:36 AM	Unit 2	5.69	27.37	off
7:39 AM	Unit 3	5.69	27.42	off
7:41 AM	Unit 4	5.73	27.41	on
7:44 AM	Unit 5	5.63	27.39	off
7:46 AM	Unit 6	5.66	27.38	off
7:49 AM	NPDES 001 sign	5.68	27.38	
7:54 AM	At USGS gage	5.53	27.36	
7:59 AM	DWNSTRM Plant	5.61	27.32	
8:07 AM	Unit 1	5.60	27.49	on *no gates spilling

Time	Jenkinsville 02160991	Parr Res. Level 02160990	Parr Crest Gate	USGS DO data at Jenkinsville	USGS Temp data at Jenkinsville
5:00 AM	220.97	260.44	Gates 1, 2, 5, 6, 9, 10: 266	5.8	27.4
6:00 AM	220.99	259.66	Gates 3, 4:264	5.7	27.3
7:00 AM	220.95	259.00	Gates 7, 8: 263	5.7	27.3
8:00 AM				5.7	27.3

Parr/Fairfield Relicensing Dissolved Oxygen Study 2014

Date: 8/7/14

Samplers: Milton Quattlebaum

Time	Location	DO (mg/L)	Temp (°C)	Units Running
5:14 AM	Unit 1	5.90	27.37	off
5:14 AM	Unit 2	5.92	27.30	off
5:20 AM	Unit 3	6.02	27.32	on
5:23 AM	Unit 4	5.99	27.29	on
5:26 AM	Unit 5	5.92	27.34	off
5:29 AM	Unit 6	5.92	27.33	off
5:33 AM	NPDES 001 sign	5.88	27.30	
5:39 AM	At USGS gage	5.90	27.30	
5:48 AM	DWNSTRM Plant	5.80	27.18	
6:25 AM	Unit 1	5.94	27.33	off
6:29 AM	Unit 2	5.94	27.33	off
6:31 AM	Unit 3	6.02	27.34	on
6:34 AM	Unit 4	5.95	27.32	on
6:36 AM	Unit 5	5.90	27.32	off
6:39 AM	Unit 6	5.86	27.28	off
6:42 AM	NPDES 001 sign	5.90	27.30	
6:48 AM	At USGS gage	5.84	27.27	
6:58 AM	DWNSTRM Plant	5.68	27.13	
7:27 AM	Unit 1	5.82	27.34	off
7:30 AM	Unit 2	5.92	27.29	off
7:33 AM	Unit 3	5.97	27.36	on
7:36 AM	Unit 4	5.95	27.32	on
7:39 AM	Unit 5	5.90	27.27	off
7:42 AM	Unit 6	5.85	27.26	off
7:45 AM	NPDES 001 sign	5.90	27.28	
7:49 AM	At USGS gage	5.74	27.21	
7:56 AM	DWNSTRM Plant	5.73	27.15	
8:03 AM	Unit 1	5.83	27.27	off

*no gates spilling

Time	Jenkinsville 02160991	Parr Res. Level 02160990	Parr Crest Gate	USGS DO data at Jenkinsville	USGS Temp data at Jenkinsville
5:00 AM	220.76	258.89	Gates 1, 2, 9, 10:266	6.0	27.2
6:00 AM	220.75	258.17	Gates 3, 4, 5, 6, 7, 8: 264	6.0	27.2
7:00 AM	220.72	258.02		5.9	27.2
8:00 AM				5.9	27.2

Parr/Fairfield Relicensing Dissolved Oxygen Study 2014

Date: 8/13/14

Samplers: Milton Quattlebaum and Kelly Miller

Time	Location	DO (mg/L)	Temp (°C)	Units Running
5:09 AM	Unit 1	5.87	26.18	on
5:13 AM	Unit 2	5.85	26.24	off
5:15 AM	Unit 3	5.89	26.26	on
5:18 AM	Unit 4	5.93	26.26	on
5:20 AM	Unit 5	5.80	26.28	off
5:23 AM	Unit 6	5.81	26.27	off
5:25 AM	NPDES 001 sign	5.82	26.27	
5:30 AM	At USGS gage	5.83	26.24	
5:35 AM	DWNSTRM Plant	5.85	26.23	
6:13 AM	Unit 1	5.85	26.20	on
6:16 AM	Unit 2	5.87	26.19	off
6:18 AM	Unit 3	5.85	26.21	on
6:20 AM	Unit 4	5.93	26.19	on
6:23 AM	Unit 5	5.83	26.18	off
6:25 AM	Unit 6	5.81	26.18	off
6:28 AM	NPDES 001 sign	5.83	26.18	
6:33 AM	At USGS gage	5.86	26.15	
6:38 AM	DWNSTRM Plant	5.87	26.14	
7:17 AM	Unit 1	5.86	26.14	on
7:19 AM	Unit 2	5.86	26.15	off
7:21 AM	Unit 3	5.88	26.15	on
7:23 AM	Unit 4	5.94	26.12	on
7:25 AM	Unit 5	5.86	26.10	off
7:27 AM	Unit 6	5.88	26.09	off
7:29 AM	NPDES 001 sign	5.89	26.08	
7:33 AM	At USGS gage	5.83	26.07	
7:37 AM	DWNSTRM Plant	5.90	26.06	
7:41 AM	Unit 1	5.90	26.12	on
*no gates spilling				

Time	Jenkinsville 02160991	Parr Res. Level 02160990	Parr Crest Gate	USGS DO data at Jenkinsville	USGS Temp data at Jenkinsville
5:00 AM	221.33	259.89	1, 2, 9, 10: 266	5.9	26.1
6:00 AM	221.33	259.5	3, 4, 5, 6, 7, 8: 261	5.9	26.0
7:00 AM	221.07	259.57		5.9	26.0
8:00 AM				5.9	26.0

Parr/Fairfield Relicensing Dissolved Oxygen Study 2014

Date: 8/20/14

Samplers: Milton Quattlebaum

Time	Location	DO (mg/L)	Temp (°C)	Units Running
5:24 AM	Unit 1	5.53	27.54	on
5:27 AM	Unit 2	5.88	27.68	off
5:30 AM	Unit 3	5.91	27.65	off
5:33 AM	Unit 4	5.99	27.67	on
5:36 AM	Unit 5	5.92	27.68	off
5:39 AM	Unit 6	5.91	27.64	off
5:42 AM	NPDES 001 sign	5.91	27.64	
5:48 AM	At USGS gage	5.90	27.47	
5:53 AM	DWNSTRM Plant	5.90	27.55	
6:26 AM	Unit 1	5.63	27.70	on
6:29 AM	Unit 2	5.87	27.68	off
6:31 AM	Unit 3	5.86	27.67	off
6:33 AM	Unit 4	5.91	27.66	on
6:35 AM	Unit 5	5.87	27.63	off
6:38 AM	Unit 6	5.86	27.60	off
6:41 AM	NPDES 001 sign	5.93	27.65	
6:46 AM	At USGS gage	5.97	27.21	
6:50 AM	DWNSTRM Plant	5.86	27.48	
7:32 AM	Unit 1	5.67	27.64	on
7:34 AM	Unit 2	5.96	27.57	off
7:38 AM	Unit 3	5.92	27.66	off
7:41 AM	Unit 4	6.02	27.65	on
7:43 AM	Unit 5	5.97	27.64	off
7:45 AM	Unit 6	5.87	27.53	off
7:48 AM	NPDES 001 sign	5.93	27.61	
7:56 AM	At USGS gage	5.86	27.47	
8:00 AM	DWNSTRM Plant	5.83	27.50	
8:09 AM	Unit 1	5.73	27.61	on
*no gates spilling				

Time	Jenkinsville 02160991	Parr Res. Level 02160990	Parr Crest Gate	USGS DO data at Jenkinsville	USGS Temp data at Jenkinsville
5:00 AM	220.97	258.50	1, 2, 9, 10: 265	5.8	27.6
6:00 AM	220.96	258.37	3, 4, 5, 6, 7, 8: 266	5.8	27.6
7:00 AM	220.94	258.42		5.7	27.5
8:00 AM				5.7	27.5

Parr/Fairfield Relicensing Dissolved Oxygen Study 2014

Date: 8/26/14

Samplers: Milton Quattlebaum

Time	Location	DO (mg/L)	Temp (°C)	Units Running
5:17 AM	Unit 1	7.05	28.08	off
5:20 AM	Unit 2	7.02	28.08	off
5:23 AM	Unit 3	7.09	28.07	on
5:26 AM	Unit 4	6.41	28.08	on
5:28 AM	Unit 5	6.29	28.06	off
5:31 AM	Unit 6	6.25	28.03	off
5:34 AM	NPDES 001 sign	6.30	28.04	
5:41 AM	At USGS gage	6.29	27.90	
5:46 AM	DWNSTRM Plant	6.20	27.95	
6:26 AM	Unit 1	7.00	28.02	off
6:29 AM	Unit 2	7.06	28.00	off
6:32 AM	Unit 3	7.03	27.98	on
6:35 AM	Unit 4	6.64	27.90	on
6:38 AM	Unit 5	6.43	27.86	off
6:41 AM	Unit 6	6.41	27.82	off
6:45 AM	NPDES 001 sign	6.50	27.87	
6:51 AM	At USGS gage	6.51	27.82	
6:56 AM	DWNSTRM Plant	6.36	27.61	
7:30 AM	Unit 1	6.74	27.81	off
7:32 AM	Unit 2	6.81	27.79	off
7:34 AM	Unit 3	6.80	27.84	on
7:36 AM	Unit 4	6.68	27.71	on
7:38 AM	Unit 5	6.45	27.74	off
7:42 AM	Unit 6	6.47	27.66	off
7:44 AM	NPDES 001 sign	6.50	27.74	
7:48 AM	At USGS gage	6.35	27.71	
7:53 AM	DWNSTRM Plant	6.29	27.60	
8:01 AM	Unit 1	6.67	27.79	off
*no gates spilling				

Time	Jenkinsville 02160991	Parr Res. Level 02160990	Parr Crest Gate	USGS DO data at Jenkinsville	USGS Temp data at Jenkinsville
5:00 AM	221.10	261.50	1, 2, 9, 10: 266	6.3	27.9
6:00 AM	221.10	261.33	3, 4, 5, 6, 7, 8: 265	6.4	27.8
7:00 AM	221.08	261.01		6.4	27.6
8:00 AM				6.3	27.5

Parr/Fairfield Relicensing Dissolved Oxygen Study 2014

Date: 9/03/14

Samplers: Milton Quattlebaum and Kelly Miller

Time	Location	DO (mg/L)	Temp (°C)	Units Running
5:01 AM	Unit 1	5.88	28.45	on
5:04 AM	Unit 2	5.74	28.41	off
5:10 AM	Unit 3	5.61	28.40	on
5:14 AM	Unit 4	5.75	28.42	on
5:17 AM	Unit 5	5.67	28.49	off
5:19 AM	Unit 6	5.63	28.48	off
5:24 AM	NPDES 001 sign	5.82	28.35	
5:29 AM	At USGS gage	6.02	28.86	
5:35 AM	DWNSTRM Plant	6.11	28.43	
6:19 AM	Unit 1	5.56	28.41	on
6:21 AM	Unit 2	5.58	28.41	off
6:25 AM	Unit 3	5.53	28.42	on
6:27 AM	Unit 4	5.62	28.44	on
6:30 AM	Unit 5	5.73	28.46	off
6:33 AM	Unit 6	5.69	28.47	off
6:35 AM	NPDES 001 sign	5.71	28.46	
6:40 AM	At USGS gage	5.73	28.46	
6:45 AM	DWNSTRM Plant	5.69	28.13	
7:31 AM	Unit 1	5.57	28.61	on
7:36 AM	Unit 2	5.62	28.60	off
7:39 AM	Unit 3	5.63	28.59	on
7:41 AM	Unit 4	5.61	28.57	on
7:44 AM	Unit 5	5.63	28.54	off
7:47 AM	Unit 6	5.56	28.54	off
7:49 AM	NPDES 001 sign	5.53	28.55	
7:53 AM	At USGS gage	5.46	28.51	
7:59 AM	DWNSTRM Plant	5.56	28.30	
8:05 AM	Unit 1	5.55	28.51	on

*no gates spilling

Time	Jenkinsville 02160991	Parr Res. Level 02160990	Parr Crest Gate	USGS DO data at Jenkinsville	USGS Temp data at Jenkinsville
5:00 AM	221.43	259.43	all @ 266	5.7	28.4
6:00 AM	221.38	259.1		5.8	28.4
7:00 AM	221.38	258.74		5.4	28.4
8:00 AM				5.4	28.4

Parr/Fairfield Relicensing Dissolved Oxygen Study 2014

Date: 9/10/14

Samplers: Milton Quattlebaum

Time	Location	DO (mg/L)	Temp (°C)	Units Running
6:02 AM	Unit 1	5.90	27.12	on
6:04 AM	Unit 2	5.82	27.11	off
6:07 AM	Unit 3	5.71	27.09	off
6:10 AM	Unit 4	5.77	27.09	on
6:13 AM	Unit 5	5.62	27.08	off
6:17 AM	Unit 6	5.61	27.04	off
6:20 AM	NPDES 001 sign	5.65	27.01	
6:30 AM	At USGS gage	5.62	27.04	
6:35 AM	DWNSTRM Plant	5.64	26.98	
7:22 AM	Unit 1	5.82	26.95	on
7:26 AM	Unit 2	5.76	26.94	off
7:29 AM	Unit 3	5.83	26.92	off
7:32 AM	Unit 4	5.81	26.92	on
7:35 AM	Unit 5	5.66	26.93	off
7:38 AM	Unit 6	5.74	26.67	off
7:41 AM	NPDES 001 sign	5.69	26.90	
7:46 AM	At USGS gage	5.78	26.64	
7:50 AM	DWNSTRM Plant	5.72	26.72	
8:27 AM	Unit 1	5.78	26.81	on
8:30 AM	Unit 2	5.80	26.87	off
8:33 AM	Unit 3	5.79	26.85	off
8:36 AM	Unit 4	5.85	26.85	on
8:38 AM	Unit 5	5.80	26.86	off
8:40 AM	Unit 6	5.76	26.83	off
8:42 AM	NPDES 001 sign	5.78	26.84	
8:46 AM	At USGS gage	5.71	26.75	
8:50 AM	DWNSTRM Plant	5.80	26.80	
9:00 AM	Unit 1	5.65	26.82	on
*no gates spilling				

Time	Jenkinsville 02160991	Parr Res. Level 02160990	Parr Crest Gate	USGS DO data at Jenkinsville	USGS Temp data at Jenkinsville
6:00 AM	221.07	259.38	all @ 266	5.6	26.9
7:00 AM	221.05	259.44		5.7	26.8
8:00 AM	221.06	259.43		5.7	26.8
9:00 AM				5.7	26.8

APPENDIX B

Parr/Fairfield Relicensing Dissolved Oxygen Study 2014

Date: 9/16/14

Samplers: Milton Quattlebaum

Time	Location	DO (mg/L)	Temp (°C)	Units Running
6:01 AM	Unit 1	5.13	26.99	off
6:04 AM	Unit 2	5.37	26.73	off
6:07 AM	Unit 3	5.36	27.06	off
6:09 AM	Unit 4	5.25	27.06	on
6:12 AM	Unit 5	4.95	27.01	off
6:15 AM	Unit 6	4.97	26.96	off
6:18 AM	NPDES 001 sign	4.95	26.84	
6:22 AM	At USGS gage	4.94	26.81	
6:26 AM	DWNSTRM Plant	4.87	26.77	
7:03 AM	Unit 1	5.16	26.99	off
7:05 AM	Unit 2	5.20	26.96	off
7:08 AM	Unit 3	5.34	26.98	off
7:11 AM	Unit 4	5.10	26.99	on
7:13 AM	Unit 5	5.00	26.92	off
7:16 AM	Unit 6	4.97	26.93	off
7:19 AM	NPDES 001 sign	4.81	26.85	
7:24 AM	At USGS gage	4.98	26.80	
7:30 AM	DWNSTRM Plant	4.95	26.83	
8:02 AM	Unit 1	5.18	26.91	off
8:05 AM	Unit 2	5.15	26.92	off
8:08 AM	Unit 3	5.30	26.88	off
8:11 AM	Unit 4	5.24	26.93	on
8:13 AM	Unit 5	4.99	26.93	off
8:15 AM	Unit 6	4.96	26.91	off
8:18 AM	NPDES 001 sign	5.04	26.80	
8:24 AM	At USGS gage	4.92	26.87	
8:28 AM	DWNSTRM Plant	5.12	26.67	
8:39 AM	Unit 1	5.26	26.89	

Time	Jenkinsville 02160991	Parr Res. Level 02160990	Parr Crest Gate	USGS DO data at Jenkinsville	USGS Temp data at Jenkinsville
6:00 AM	220.54	259.57	1, 2, 9, 10 @266	5.0	26.9
7:00 AM	220.54	259.73	3, 4, 5, 6, 7, 8@262	5.0	26.8
8:00 AM	221.44	259.81		5.0	26.9
9:00 AM				5.0	26.8

Parr/Fairfield Relicensing Dissolved Oxygen Study 2014

Date: 9/25/14

Samplers: Milton Quattlebaum

Time	Location	DO (mg/L)	Temp (°C)	Units Running
6:09	Unit 1	7.80	21.40	off
6:11	Unit 2	7.76	21.42	off
6:15	Unit 3	7.81	21.44	on
6:17	Unit 4	7.85	20.90	on
6:21	Unit 5	7.70	21.39	off
6:24	Unit 6	7.65	21.42	off
6:27	NPDES 001 sign	7.66	21.43	
6:33	At USGS gage	7.10	21.40	
6:40	DWNSTRM Plant	7.61	21.36	
7:17	Unit 1	7.69	21.68	off
7:19	Unit 2	7.71	21.67	off
7:21	Unit 3	7.80	21.67	on
7:23	Unit 4	7.70	21.61	on
7:25	Unit 5	7.58	21.57	off
7:27	Unit 6	7.62	21.62	off
7:29	NPDES 001 sign	7.60	21.62	
7:34	At USGS gage	7.65	21.61	
7:39	DWNSTRM Plant	7.31	21.59	
8:13	Unit 1	7.67	21.75	off
8:15	Unit 2	7.65	21.72	off
8:17	Unit 3	7.71	21.75	on
8:19	Unit 4	7.66	21.62	on
8:21	Unit 5	7.65	21.51	off
8:23	Unit 6	7.58	21.59	off
8:25	NPDES 001 sign	7.63	21.60	
8:29	At USGS gage	7.62	21.42	
8:34	DWNSTRM Plant	7.59	21.47	
8:39	Unit 1	7.68	21.65	off

*no gates spilling

Time	Jenkinsville 02160991	Parr Res. Level 02160990	Parr Crest Gate	USGS DO data at Jenkinsville	USGS Temp data at Jenkinsville
6:00 AM	221.06	259.18	all @ 266	7.3	21.5
7:00 AM	221.05	259.2		7.3	21.5
8:00 AM	221.05	259.24		7.3	21.5
9:00 AM				7.3	21.5

APPENDIX B
2015 TURBINE VENTING TEST RESULTS

Parr Aeration Investigation – July 2015

SCE&G initially performed turbine venting testing at the Parr Shoals Development during 2014. Based on the initial success of that testing for periodically increasing dissolved oxygen (DO) levels in the tailrace, SCE&G performed additional turbine venting testing on July 9, 2015. The results of this testing will be used to develop a Turbine Venting Plan for the Parr Shoals Development and submitted as part of the 401 Water Quality Certification application process for the Parr Hydroelectric Project.

During each test run, water quality measurements (DO, temperature, and % DO saturation) were recorded with handheld meters in the tailrace outflow of each unit being tested. Units 1, 2, 3, 5 and 6 were available for testing. Unit 4 was under repair and could not be tested. Unit 6 does not have a vacuum breaker installed on the headcover and cannot be vented, but was tested to determine its aerating capability. During testing all river flow was passed through the turbine units and the crest gates were in the closed (raised) position. The headpond and tailwater elevations were also recorded, as were individual generator kW and kVar outputs (Table 1).

At the beginning of each turbine test, tailrace readings were collected with the unit running and the vacuum breaker closed. After approximately 5 to 10 minutes, the vacuum breaker valve was fully opened to allow aeration. The effects of the introduced air were clearly visible in the tailrace for each unit tested. The unit was allowed to run for another 5 to 10 minutes until tailrace readings stabilized before data was recorded. Each unit was tested in sequence using this same scenario. Unit 6 data was collected to see the DO levels that occurred on that unit with no venting available. Surprisingly, Unit 6 DO levels were fairly high without venting which may be an artifact of its location near the shoreline. Unit 6 may pull water from closer to the surface than the other units located further away from the shoreline.

Discussion

Each of the units 1, 2, 3, and 5 tested will aerate with their current valve configurations and each increased DO levels at a different amounts. Testing showed that the units vent from highest to lowest as follows: 3, 1, 5, 2, 4, and 6. SCE&G will use this information to develop a Turbine Venting Plan for the Parr Shoals Development that will be submitted to South Carolina Department of Health and Environmental Control for discussion and approval.

Table B-1. Summary of Turbine Venting at Parr Shoals Dam July 9, 2015.

Unit Tested	Vent Open/Close	DO (mg/L)	DO Increase (mg/L)	Saturation %	Saturation Increase %	Temp (F)	Gate Setting %	Output (KW)	KVars
1	Close	4.65	-----	59.8	-----	82.9	45	1473	150
1	Open	5.04	0.39	64.3	4.5	83.0	45	1426	145
2	Close	4.60	-----	58.8	-----	82.9	43	1520	144
2	Open	4.80	0.20	61.2	2.4	82.9	43	1475	144
3	Close	4.70	-----	60.0	-----	82.9	45	1370	153
3	Open	5.15	0.45	65.2	5.2	82.9	45	1300	142
5	Close	4.84	-----	62.4	-----	82.9	45	1560	154
5	Open	5.20	0.36	65.6	3.2	82.9	45	1476	150
6	No Vent	5.10	-----	65.2	-----	83.0	39	1426	145

Unit 4 was not available for testing

Unit 6 does not have a vent

Headwater elevation remained stable between 258.1 – 257.9 msl during the test

Tailwater Elevation remained stable between 221.0 – 220.8 msl during the test

APPENDIX B

PARR HYDROELECTRIC PROJECT – FERC No. 1894 – PARR SHOALS DAM TURBINE VENTING – 2016 TURBINE VENTING TEST RESULTS – MEMORANDUM – AUGUST 15, 2016

PARR HYDROELECTRIC PROJECT – FERC No. 1894

PARR SHOALS DAM TURBINE VENTING – MEMORANDUM

TO: Water Quality Technical Working Committee
FROM: Kleinschmidt Associates
DATE: August 15, 2016
RE: 2016 Turbine Venting Test Results

INTRODUCTION

Following the completion of the Parr Hydroelectric Project Baseline Water Quality Report, there were questions from the Water Quality TWC regarding occasional low dissolved oxygen (DO) in the tailrace downstream of Parr Shoals Dam. At a Water Quality TWC meeting on February 4, 2014, the TWC noted that the Baseline Water Quality Report identified periodic excursions of DO levels less than 4.0 mg/L in the Parr Shoals Dam tailrace, as reported by the USGS station 02160991. In an effort to understand these excursions better, SCE&G consolidated historic USGS data to examine these excursions and issued an addendum to the Baseline Water Quality Report in June 2014. At the request of the Water Quality TWC, SCE&G collected additional water quality data in the summer of 2014 in the tailrace and forebay of Parr Shoals Dam in an attempt to determine whether project operations are causing these excursions. These results were summarized in a memo issued on March 2, 2015. SCE&G followed up this effort by collecting another series of water quality data in the Parr forebay from May through mid-October 2015. The results of this data collection effort was summarized in the Parr Shoals Dam Turbine Venting Report.

In addition, SCE&G proposed to test all of the Parr turbines for their ability to self-vent and potentially increase the dissolved oxygen in the tailrace during specific periods of the year. An initial test of the turbines' capacity to vent was performed August 2014; a second test to determine which turbines had the most significant impact on increasing dissolved oxygen was performed in July 2015. The results of the testing, along with the findings published in the Baseline Water Quality Report, were used to develop a Turbine Venting Plan. At the March 2016 Water Quality TWC meeting, SCE&G proposed to test the Turbine Venting Plan during June 15th through July 31st of 2016. In addition to testing the plan during 2016, SCE&G also conducted a re-test of Unit 4 after installation of the new "air-cooled wooden bearings". The results of each of these tests are presented in this document.

METHODOLOGY AND RESULTS

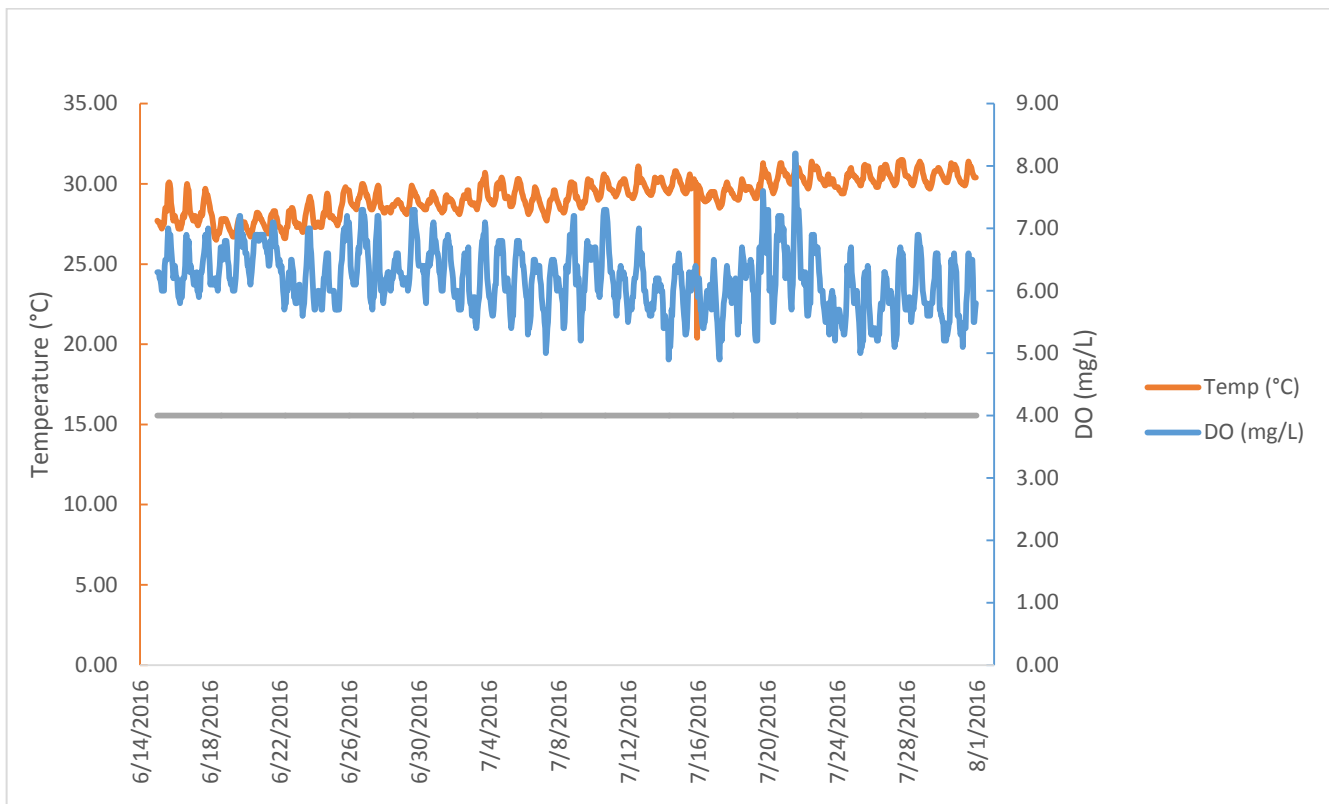
SCE&G implemented the proposed Turbine Venting Plan from June 15 through July 31, 2016. The success of turbine venting was measured at the USGS Gage No. 02160991, Broad River near Jenkinsville, SC.

Dissolved oxygen and temperatures observed in the tailrace are illustrated in Figure 1. No excursions of DO levels less than 4.0 mg/L were observed (Table 1).

Table 1 Parr Shoals Tailrace Maximum and Minimum DO and Temperature

	June		July	
	DO (mg/L)	Temperature (°C)	DO (mg/L)	Temperature (°C)
Maximum	7.30	30.10	8.20	31.50
Minimum	5.60	26.50	4.90	20.40

Figure 1 Parr Shoals Tailrace DO and Temperature



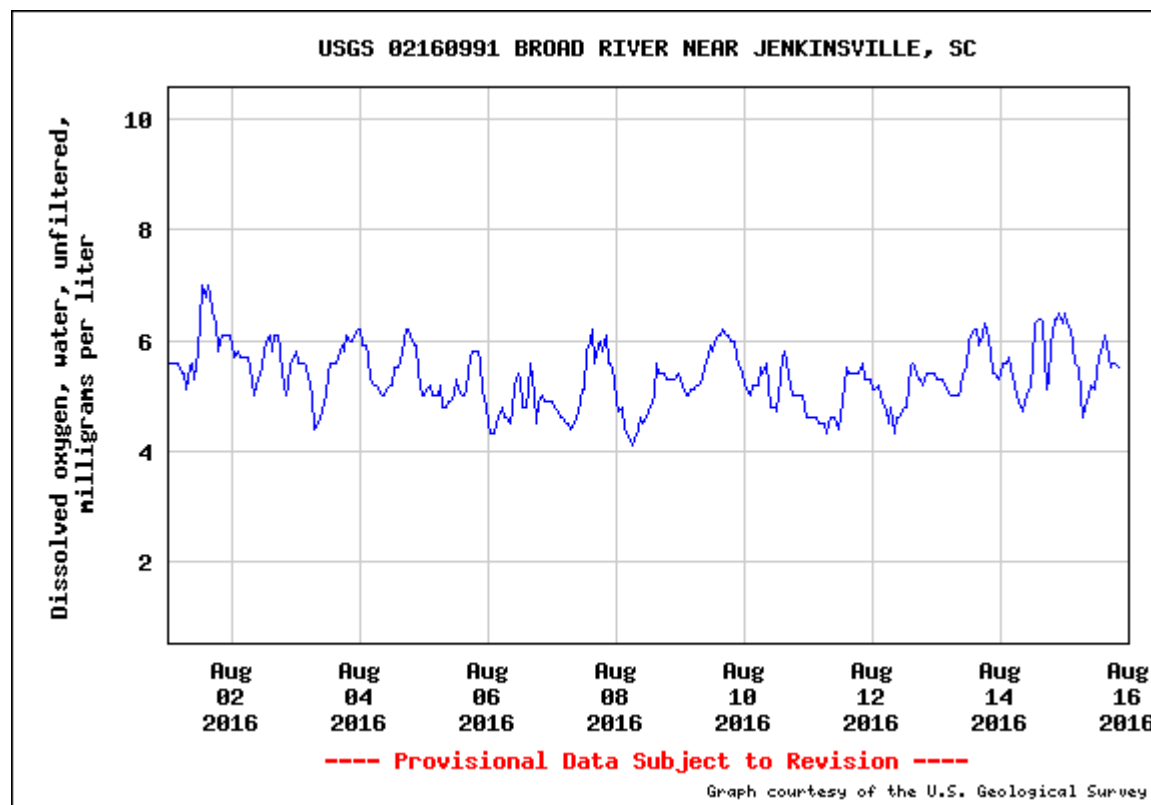
Turbine venting test of Unit 4 are presented in Table 2. The testing noted a DO uptake of approximately 0.20 mg/l. The testing performed during 2014 identified an uptake of 0.16, which is slightly less than the latest testing results.

Table 2 Parr Shoals Turbine Venting Unit 4 Test – August 2016

Test #	Time (DST)	Breaker Position Open/Closed	DO (mg/l)	Temp (°C)	TDG	% Sat	HP EI	TW EI	KW	Kvars Act.	Gates Act. (%)	BP
1	9:00	closed	5.08	29.42	713	67.2	257.22	220.70	1360±	150	45	759
2	9:40	open	5.3	29.48	718	70.2	257.53	220.72	1360±	151	46	759
Notes:												
Requested plant/system control to have all gates up and a max. of 2 units generating by 07:00 (DST).												
Units 4 & 6 were operating and all gates up upon arrival at the plant. Unit 6 was shutdown at 08:20 (DST).												
Breaker valve on Unit 4 was opened at approx. 09:20 (DST).												

Also of note was the general decline in DO levels recorded at the Jenkinsville gage during the first 2 weeks of August, 2016 (Figure 2). We are not sure if this is related to drops associated with the cessation of turbine venting or environmental factors.

Figure 2 Parr Shoals Tailrace DO and Temperature – August 1 – August 16, 2016



CONCLUSION

Based on the results of the 2016 Turbine Venting Plan test, turbine venting at the Parr Shoals Development was successful. Testing of Unit 4 during 2016 showed a slight increase in DO uptake. We also noted a decrease in DO levels during August.

Based on these findings, SCE&G proposes to perform turbine venting tests during 2017 and to extend the venting season to include June 15 through August 31. SCE&G will use the results of the 2016 and 2017 testing and the individual Unit test to update and modify the current Turbine Venting Plan. SCE&G plans to include the updated Turbine Venting Plan as one of the proposed protection, mitigation, and enhancement measures to be included in the Final License Application for continued operation of the Parr Hydroelectric Project (FERC No. 1894).

MONTICELLO RESERVOIR HABITAT ENHANCEMENT REPORT AND PME MEASURES

PARR HYDROELECTRIC PROJECT

FERC No. 1894

Prepared for:

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

Prepared by:

Kleinschmidt

Lexington, South Carolina
www.KleinschmidtGroup.com

October 2016

MONTICELLO RESERVOIR
HABITAT ENHANCEMENT REPORT
AND PME MEASURE

PARR HYDROELECTRIC PROJECT

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October 2016

**MONTICELLO RESERVOIR
HABITAT ENHANCEMENT REPORT AND PME MEASURE**

**PARR HYDROELECTRIC PROJECT
FERC No. 1894**

SOUTH CAROLINA ELECTRIC & GAS COMPANY

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APPENDIX B MONTICELLO RESERVOIR ESTIMATED HABITAT ENHANCEMENT COSTS

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**MONTICELLO RESERVOIR
HABITAT ENHANCEMENT REPORT**

**PARR HYDROELECTRIC PROJECT
FERC No. 1894**

SOUTH CAROLINA ELECTRIC & GAS COMPANY

1.0 INTRODUCTION

South Carolina Electric & Gas Company (SCE&G) is the Licensee of the Parr Hydroelectric Project (FERC No. 1894) (Project). The Project consists of the Parr Shoals Development and the Fairfield Pumped Storage Development. Both developments are located along the Broad River in Fairfield and Newberry Counties, South Carolina.

The Project is currently involved in a relicensing process which involves cooperation between SCE&G, as licensee, and a variety of stakeholders including state and federal resource agencies, state and local government, non-governmental organizations (NGOs), and interested individuals. SCE&G established several Technical Working Committees (TWCs) comprised of interested stakeholders with the objective of identifying Project-related resource issues and impacts.

During issue scoping meetings, the Fisheries TWC identified the need for a Reservoir Fluctuation Study on the Parr and Monticello Reservoirs. The operating regime for the Project consists of a lowering and a refilling of the Project's two reservoirs on a daily basis. Monticello Reservoir is currently permitted to fluctuate up to 4.5 feet. However, the amount that the Project reservoirs fluctuate will vary dependent on load demands and system needs. The magnitude of daily fluctuations also varies seasonally in both impoundments, with the largest average daily fluctuations generally occurring in June, July, and August in both reservoirs (Table 1-1).

TABLE 1-1 MONTICELLO RESERVOIR MONTHLY AVERAGE ELEVATIONS: 2005-2013

MONTHLY AVERAGE RES. ELEV.			
	MAX	MIN	RANGE
Jan	423.92	422.32	1.60
Feb	423.93	422.45	1.49
Mar	423.82	422.18	1.66
Apr	424.08	421.88	2.22
May	424.42	421.64	2.80
June	424.74	421.42	3.33
Jul	424.69	421.38	3.29
Aug	424.71	421.31	3.40
Sep	424.53	421.45	3.06
Oct	424.02	421.83	2.18
Nov	423.61	422.00	1.61
Dec	423.86	422.28	1.58
AVERAGE	424.19	421.84	2.35

During February through April, when many fish species are spawning in shallow water habitat, average daily fluctuations range from 1.6-2.4 feet in Monticello Reservoir (TWC Meeting presentation 12-19-13). Resource agencies and stakeholders expressed concerns that these daily and seasonal fluctuations may be affecting aquatic habitat along the shorelines of the reservoirs and fish spawning and recruitment.

2.0 METHODS

This study report was developed as a result of the Monticello Reservoir Fluctuation Study to assess the effects of fluctuations on reservoir habitat. The bases for this study can be found in the following documents: Fisheries TWC Meeting notes from April 2014, September 2015, March 2016, and May 2016, the Revised Reservoir Fluctuation Study Plan, and the Parr and Monticello Reservoir Fluctuation Study. The April 2014 TWC meeting identified the study objectives relative to each reservoir. It was decided that Monticello would be assessed qualitatively to identify areas that could be candidates for habitat enhancement. The September 2015 meeting identified potential habitat enhancement areas and the types of enhancements that would be explored: spawning, nursery, and deep-water. The subsequent March 2016 meeting involved discussions of the findings of the Reservoir Fluctuation Study and refining of the habitat enhancements for Monticello Reservoir. The group further refined the types of structures that

could be used for each enhancement and the amount of enhancement that could be provided to an identified area. The final TWC meeting in May 2016 involved a site visit to Monticello Reservoir to confirm the potential enhancement sites and the exact location and amount of enhancements that could be installed at a given site.

3.0 RESULTS

The TWC proposed potential fish habitat enhancements to be placed throughout Monticello Reservoir to mitigate for reservoir fluctuation impacts on current shoreline areas. Habitat enhancement structures would be installed to enhance spawning, nursery, and deep-water habitats available within Monticello Reservoir. The habitat enhancement structures would serve two purposes within the reservoir. First, the structures could provide enhanced fish production within the reservoir. Second, they would concentrate fish as an enhancement for recreational fishermen (Wagner 2016). Maps of the proposed locations within Monticello Reservoir for habitat enhancement are included in Appendix A. Descriptions for each proposed enhancement and total PM&E installation costs are presented in the following sections.

3.1 SPAWNING HABITAT ENHANCEMENTS

The proposed spawning habitat enhancements could be made by the installation of “spawning bed” structures. These structures would consist of commercially available three-foot diameter plastic pools (of varying color based upon vendor) (Figure 3-1) filled with 3-4 inches (in.) of pea gravel/sand. While the commercially available plastic pools were used for purposes of estimating costs and materials, the TWC suggested that other more permanent spawning structure materials may be considered. There were eight spawning areas identified by the TWC and spawning beds could be installed in each area identified for spawning habitat enhancement. The structures would be constructed on a pontoon style work boat and lowered into place via a three-point attachment rope system and winch. The enhancement locations would be located in areas that are approximately 5 to 6 feet deep when the reservoir is at full pool, leaving the spawning beds 0.5 to 1.5 feet underwater at the lowest reservoir elevation.



FIGURE 3-1 COMMERCIALY AVAILABLE 3-FOOT DIAMETER PLASTIC POOL
(Color may vary based upon vendor selected.)

Timing of Installation

Due to TWC concerns over the resilience of the proposed spawning structures, these habitat enhancements will be installed and evaluated in a stepwise approach. The proposed number of spawning structures to be installed during the new license is 360. Based on TWC recommendations, SCE&G will install 15 spawning beds in each of the 8 coves identified for spawning habitat enhancement (Appendix A) within the first three years of the new license. The SCDNR may request to vary the spawning structure material, substrate material, and/or substrate depth to evaluate fish preferences. SCE&G and SCDNR will develop a matrix to test the effects of these variables. The installed spawning beds will be inspected by SCE&G (underwater camera observation) after two spawning seasons for condition and evidence of use by fish. SCE&G will report observations to SCDNR and consult on the installation of up to 240 (30 structures per 8 locations) additional spawning beds to be installed over the following two years.

3.2 NURSERY HABITAT ENHANCEMENTS

Nursery habitat enhancements could be made by the installation of Mossback Safe-Haven structures. The safe-haven structures are made up of three 50 inches tall PVC posts, 72 50 inches long composite limbs, a three-post base, and a three-hole shade top (Mossback 2016) (Figure 3-2). The nursery structures would be constructed on a pontoon style work boat, weighted with a concrete cinder block, and lowered into position via rope. The structures would be installed at a depth sufficient to leave approximately four feet of water above the top of the structure at the lowest reservoir elevation. Three safe-haven structures would be installed at each point marked

by the TWC for nursery habitat enhancement (Appendix A). A total 111 nursery structures would be installed based on TWC recommendations.



FIGURE 3-2 MOSSBACK SAFE-HAVEN KIT

During the Fishery TWC meeting on September 1, 2016, the SCDNR stated that they would like to investigate periodic “shoreline tree felling” in various areas around the reservoir as an aquatic habitat enhancement. Shoreline trees (including hardwood, pine or cedar trees) would be felled into the lake and cabled to the shoreline to insure they do not become a navigation hazard. SCE&G agreed to coordinate with the SCDNR on their efforts to introduce this aquatic habitat during the new license.

Timing of Installation

Within the first five years of the new license, SCE&G will install three Mossback Safe-Haven (or equivalent) structures for nursery habitat enhancements at each location identified in the Appendix A for a total of 111 structures. These nursery habitat enhancements will require no additional monitoring after installation.

3.3 DEEP-WATER HABITAT ENHANCEMENT

Deep-water habitat enhancements would be made by the installation of Mossback Trophy Tree and Trophy Tree XL structures. As an alternative, structures constructed by SCE&G could be used in place of the Mossback structures (TWC meeting March 2016). The Mossback Trophy Tree structure is made up of three 50 in. tall PVC posts, 36 50 in. long composite limbs, a three-post base, and a three-hole shade top (Mossback 2016) (Figure 3-3). The Mossback Trophy Tree XL structure is approximately eight feet tall and made up of six 50 in. tall PVC posts, with 72 50 in. long composite limbs, a three-post base, and a three-hole shade top (Mossback 2016) (Figure 3-4). The deep-water structures would be constructed on a pontoon style work boat, weighted with a concrete cinder block, and lowered into position via rope. The structures would be installed at a depth sufficient to leave 10-15 feet of water above the top of the structure at the lowest reservoir elevation. The TWC recommended that 15 deep-water enhancement structures would be installed at each location marked for enhancement (Appendix A). The structures would be positioned in a five by three grid around the enhancement area. If Mossback structures are used, the four corners of the grid would be Trophy Tree XL units with the regular Trophy Trees making up the final 11 units within the enhancement area. Each of these areas would be marked with a floating buoy for reference.

Timing of Installation

Within the first five years of the new license, SCE&G will install deep-water habitat enhancements and buoy markers at 13 sites identified by the TWC and presented in Appendix A. Each of these enhancements will consist of 11 Mossback Trophy Tree (or equivalent) structures (143 total) and 4 Mossback Trophy Tree XL (or equivalent) structures (52 total) for a total of 195 structures. These deep-water habitat enhancements will require no additional monitoring after installation.



FIGURE 3-3 MOSSBACK TROPHY TREE KIT



FIGURE 3-4 MOSSBACK TROPHY TREE XL KIT

3.4 INSTALLATION COSTS

Habitat enhancement implementation costs were evaluated to include the costs to purchase the enhancement structure materials and estimated installation costs. Cost evaluations were made using several assumptions. Those assumptions include:

- One work day is 20 man-hours (two people working 10 hours);
- the labor rate used is \$50/hour;
- installation of spawning beds would be 15 units/day;
- nursery habitat structures would be installed at a rate of 10 units/day; and
- deep-water habitat structures would be installed at a rate of 10 units/day.

Costs were evaluated for each individual enhancement structure and then grouped by enhancement type. Total costs for each habitat enhancement type are presented in the sections below. All estimates are based on 2016 prices for materials and labor. More detailed tables and information is presented in Appendix B.

3.4.1 SPAWNING BED MATERIAL COSTS

The cost of the materials for an individual spawning bed are approximately \$16 for the plastic pool, \$10.50 for the pea gravel/sand, and \$2 for the rope. Using these assumptions, we used a value of \$28.50 for the materials for each spawning bed. Installation costs were based on the previous stated assumptions. Total estimated cost including materials and installation for 360 spawning structures is \$34,260 (Table 3-1). This estimate does not include the cost of alternate spawning bed materials or the spawning structure evaluation and consultation with the SCDNR during the license.

TABLE 3-1 SPAWNING HABITAT ENHANCEMENT COSTS

SPAWNING HABITAT ENHANCEMENT	
Structure Costs	\$10,260.00
Labor Costs	\$24,000.00
TOTAL COSTS	\$34,260.00

3.4.2 NURSERY HABITAT ENHANCEMENTS

The cost for materials for an individual Mossback Safe-Haven unit is \$209.99. This includes a discount for bulk orders. Installation costs were based on the previous stated assumptions. Total estimated cost for installation of 111 Safe-Haven structures is \$34,409.89 (Table 3-2).

TABLE 3-2 NURSERY HABITAT ENHANCEMENT COSTS

NURSERY HABITAT ENHANCEMENT	
Structure Costs	\$23,308.89
Labor Costs	\$11,100.00
TOTAL COSTS	\$34,408.89

3.4.3 DEEP-WATER HABITAT ENHANCEMENTS

The cost for materials for an individual Mossback Trophy Tree is \$179 and for an individual Trophy Tree XL is \$359. This includes a discount for bulk orders. Installation costs were based on the previous stated assumptions. Total estimated cost for materials and installation is \$66,365.00. We did not include the price option for SCE&G to construct deep-water structures from recycled materials, but installation costs should be similar. This includes installation of one buoy (\$200) per site. We did not include a cost for periodic replacement of the buoys during the new license.

TABLE 3-3 DEEP-WATER HABITAT ENHANCEMENT COSTS

NURSERY HABITAT ENHANCEMENT	
Structure Costs	\$46,865.00
Labor Costs	\$19,500.00
TOTAL COSTS	\$66,365.00

4.0 DISCUSSION

The TWC recommended aquatic habitat enhancements for Monticello Reservoir that should enhance fish production and recreational fishing on the reservoir. The total costs of implementing these habitat enhancements (based on 2016 costs) is approximately \$135,000 (Appendix B). These enhancements were proposed to offset the impacts of daily reservoir fluctuations and should create spawning and nursery habitat for juvenile fish that is not impacted by the maximum fluctuations. The placement of deep-water enhancements should also improve recreational fishing on the reservoir. Finally, implementation of this enhancement program should help to offset potential entrainment issues related to the operation of the Fairfield Development. Habitat structures have been located further up the lake away from the turbine intakes. Therefore, fish production and survival should be increased in the upper portions of the lake and these fish would be much less susceptible to entrainment by project operations.

5.0 PROTECTION MITIGATION AND ENHANCEMENT MEASURES

SCE&G proposes to provide these habitat enhancements on Monticello Reservoir as a Protection, Mitigation, and Enhancement measure (PME) for the renewal of the Parr Hydroelectric Project License.

Installation of both Nursery and Deepwater habitat enhancements are fairly straightforward.

- Within the first five years of the new license, SCE&G will install three Mossback Safe-Haven (or equivalent) structures for nursery habitat enhancements at each location identified in Appendix A of this report - for a total of 111 structures. These nursery habitat enhancements will require no long-term monitoring.
- Within the first five years of the new license, SCE&G will install deep-water habitat enhancements and buoy markers at 13 sites identified in Appendix A of this report. Each of these enhancements will consist of 11 Mossback Trophy Tree (or equivalent) structures (143 total) and 4 Mossback Trophy Tree XL (or equivalent) structures (52 total) for a total of 195 structures. These deep-water habitat enhancements will require no long-term monitoring.

Installation of the spawning structures will be performed more in an adaptive management approach. TWC members expressed concern that the plastic pools might not be resilient or be used by target fish species. Therefore, SCE&G will install these habitat enhancements in a

stepwise approach. Within the first three years of the new license, SCE&G will install 15 spawning beds as described in this report in each of the 8 coves (120 structures total) identified for spawning habitat enhancement as depicted in Appendix A of this report. The SCDNR noted during TWC discussions that they may request an alternate spawning bed material and that a variety of spawning substrate materials (pea gravel/sand) of various sizes and/or depth of substrates within the spawning structure may be evaluated on these initial installations. SCE&G and SCDNR will consult to develop a test matrix to evaluate the effects of these and other variables on the preference of fish to use the structure for spawning. The installed spawning beds will be inspected by SCE&G (possibly by underwater camera) after two spawning seasons for the condition of the structure and evidence of use for fish spawning. SCE&G will report observations to SCDNR and consult on the installation of up to 240 (30 structures per 8 locations) additional spawning beds to be installed over the following two years after completion of consultation.

6.0 REFERENCES

Kleinschmidt. 2013. *Baseline Fisheries Resources Report: Parr Hydroelectric Project*. Prepared for SCE&G by Kleinschmidt Associates, Lexington, SC. November 2013.

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Wagner, Eric. "Review of Fish Habitat Improvement Methods for Freshwater Reservoirs." *Utah Division of Wildlife Resources*. N.p., n.d. Web. Apr. 2016.

APPENDIX A

MONTICELLO RESERVOIR HABITAT ENHANCEMENT AREAS

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Source: Kleinschmidt, Orbis, SCE&G

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Legend

- ▲ Nursery Habitat (3 units)
- ◆ Deepwater Fish Attractor (15 units)
- ▨ Spawning Habitat Enhancement Area



Site 1

-81.319198, 34.375601

0 200 400 800 Feet

Scale: AS SHOWN

Project No:
0455097.01

Filename:
see margin

Drawn By:
JJJ

Date Drawn:
10/7/2016

SCE&G
COLUMBIA, SC

PARR HYDROELECTRIC PROJECT
FERC PROJECT NO. 1894

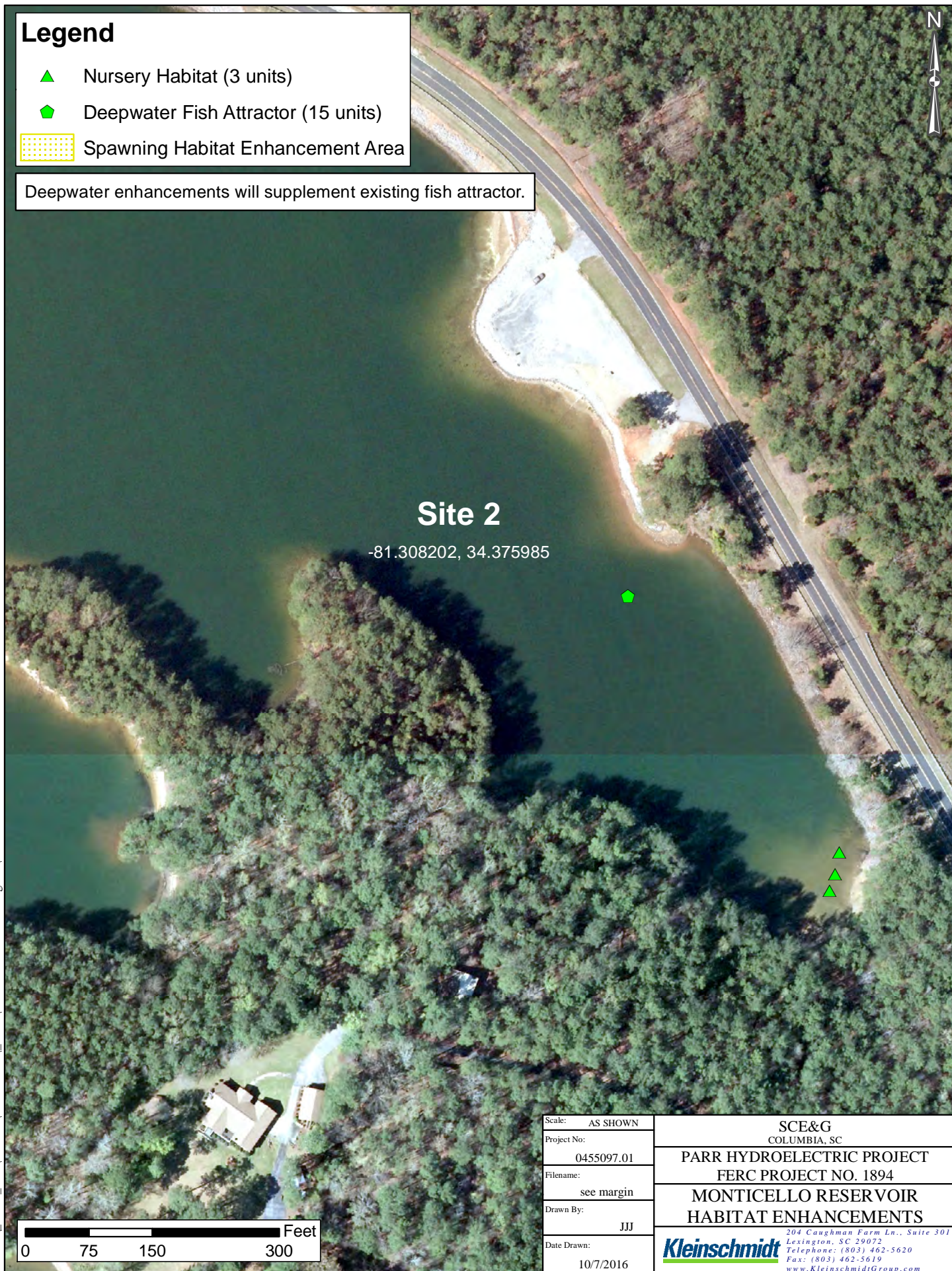
MONTICELLO RESERVOIR
HABITAT ENHANCEMENTS

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Source: Kleinschmidt, Orbis, SCE&G

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Legend

- ▲ Nursery Habitat (3 units)
- ◆ Deepwater Fish Attractor (15 units)
- ▨ Spawning Habitat Enhancement Area



Site 5

-81.327358, 34.36236



0 75 150 300 Feet

Scale:	AS SHOWN	SCE&G COLUMBIA, SC
Project No:	0455097.01	PARR HYDROELECTRIC PROJECT FERC PROJECT NO. 1894
Filename:	see margin	MONTICELLO RESERVOIR HABITAT ENHANCEMENTS
Drawn By:	JJJ	204 Coughman Farm Ln., Suite 301 Lexington, SC 29072 Telephone: (803) 462-5620 Fax: (803) 462-5619 www.KleinschmidtGroup.com
Date Drawn:	10/7/2016	Kleinschmidt

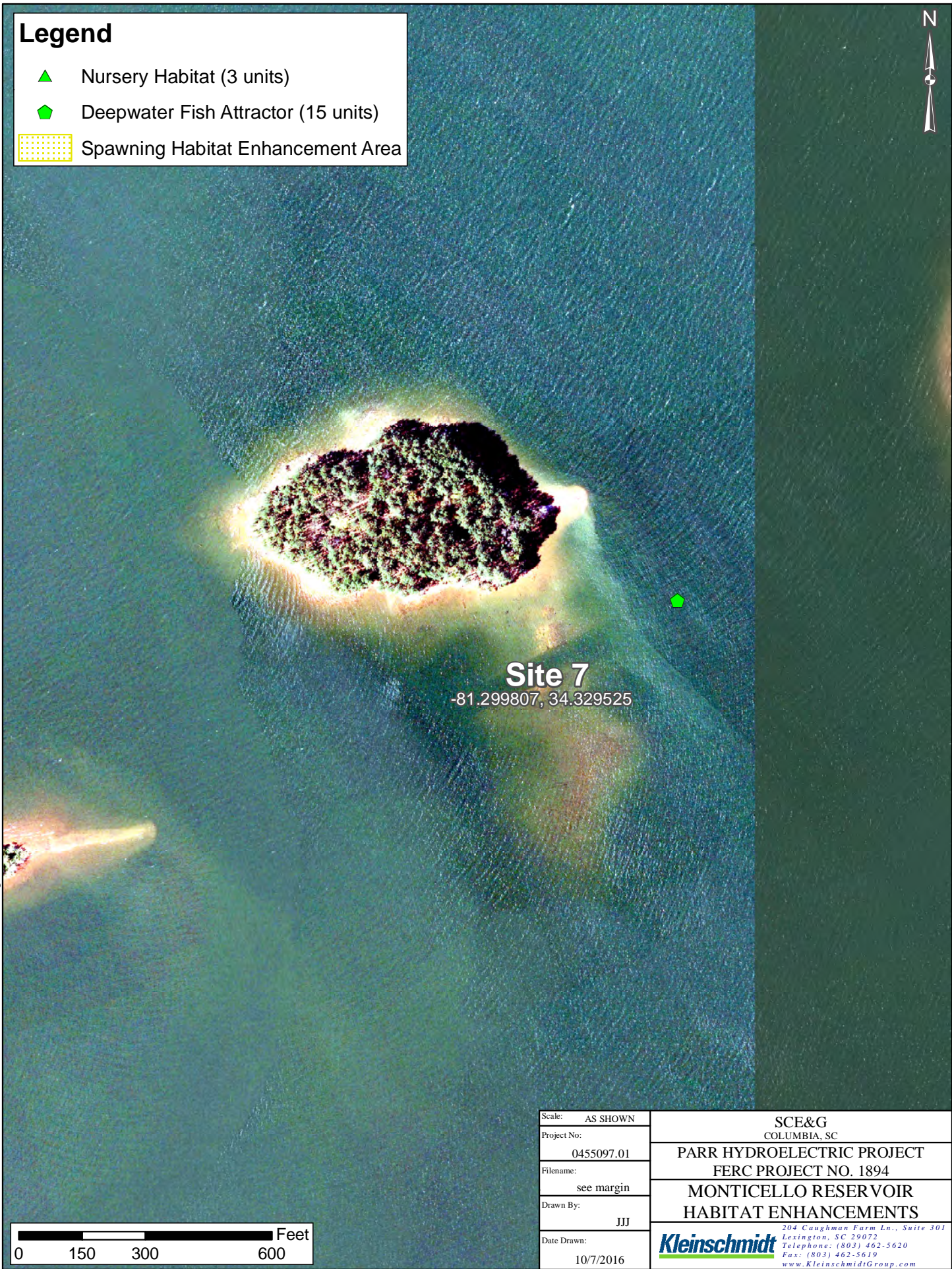
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Source: Kleinschmidt, Orbis, SCE&G

Legend

-  Nursery Habitat (3 units)
-  Deepwater Fish Attractor (15 units)
-  Spawning Habitat Enhancement Area

Deepwater enhancements will supplement existing fish attractor.



Site 8

-81.287834, 34.325097

Scale: AS SHOWN

Project No:
0455097.01

Filename:
see margin

Drawn By:
JJJ

Date Drawn:
10/7/2016

SCE&G
COLUMBIA, SC

PARR HYDROELECTRIC PROJECT
FERC PROJECT NO. 1894

MONTICELLO RESERVOIR
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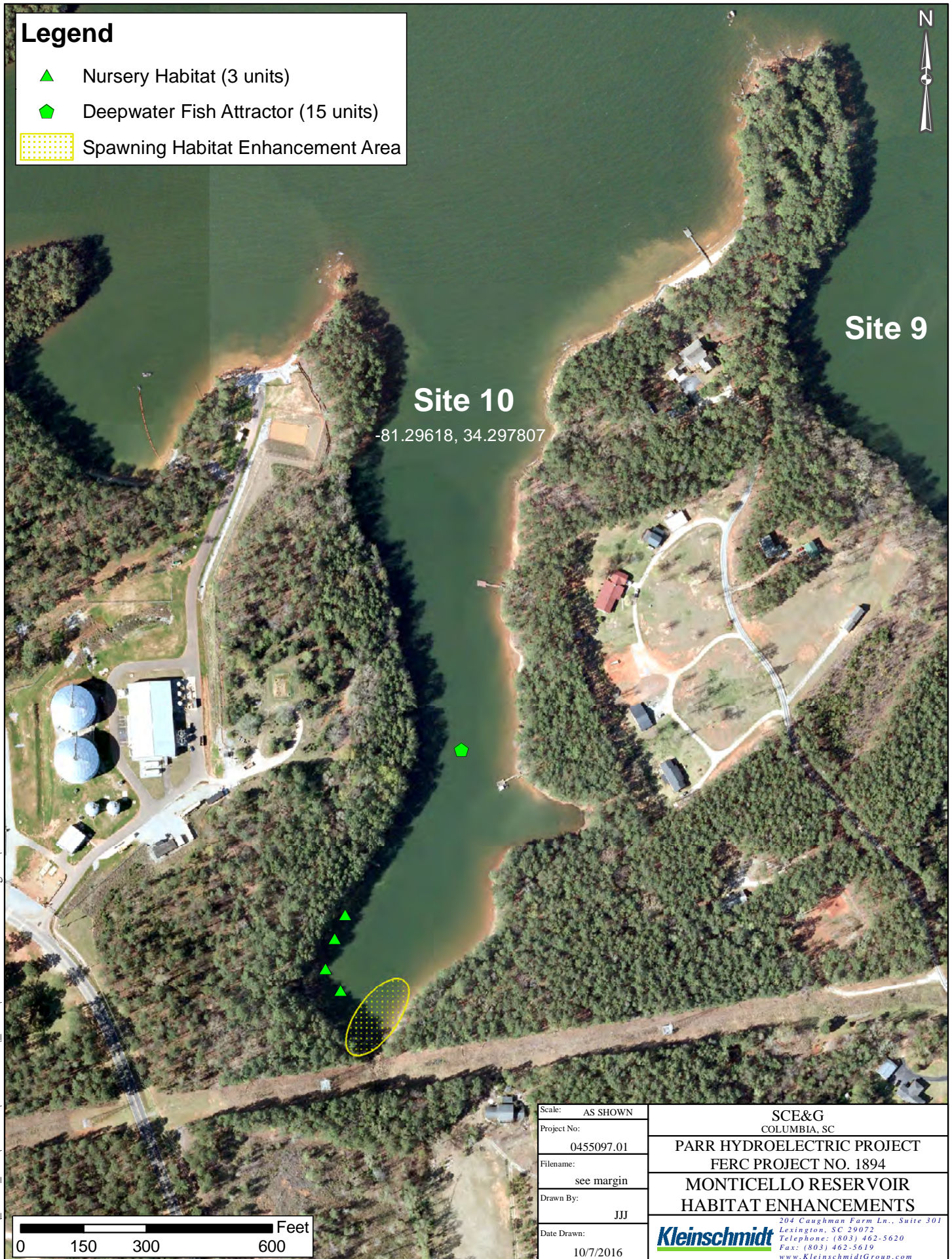
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Project No:	0455097.01	PARR HYDROELECTRIC PROJECT FERC PROJECT NO. 1894
Filename:	see margin	MONTICELLO RESERVOIR HABITAT ENHANCEMENTS
Drawn By:	JJJ	204 Coughman Farm Ln., Suite 301 Lexington, SC 29072 Telephone: (803) 462-5620 Fax: (803) 462-5619 www.KleinschmidtGroup.com
Date Drawn:	10/7/2016	Kleinschmidt

Source: Kleinschmidt, Orbis, SCE&G

Legend

- ▲ Nursery Habitat (3 units)
- ◆ Deepwater Fish Attractor (15 units)
- ▨ Spawning Habitat Enhancement Area

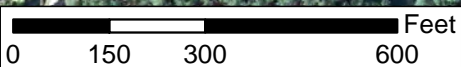
Deepwater enhancements will supplement existing fish attractor.

Site 12

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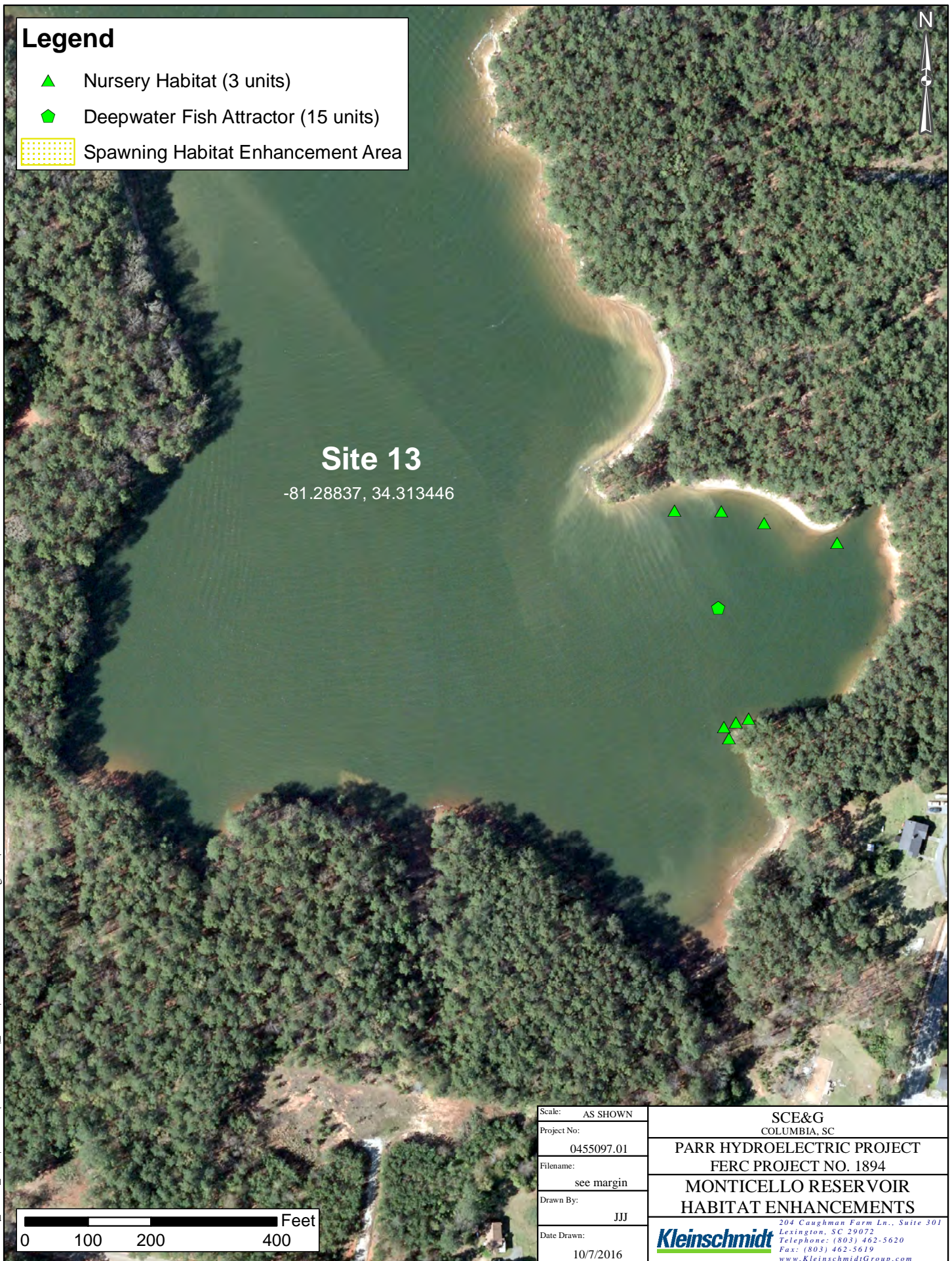
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Project No:	0455097.01	PARR HYDROELECTRIC PROJECT FERC PROJECT NO. 1894
Filename:	see margin	MONTICELLO RESERVOIR HABITAT ENHANCEMENTS
Drawn By:	JJJ	204 Coughman Farm Ln., Suite 301 Lexington, SC 29072 Telephone: (803) 462-5620 Fax: (803) 462-5619 www.KleinschmidtGroup.com
Date Drawn:	10/7/2016	Kleinschmidt

Source: Kleinschmidt, Orbis, SCE&G

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Source: Kleinschmidt, Orbis, SCE&G

APPENDIX B

MONTICELLO RESERVOIR HABITAT ESTIMATED ENHANCEMENT COSTS

Monticello Reservoir Habitat Enhancements Costs for Materials and for Installation						June 30, 2016
Enhancement Structure	Enhancement Locations	Structures per Enhancement Area	Total Structures	Costs per Structure	Total Structure Costs	Note that these prices are valid for 2016 only and do not include a CPI for future costs.
Spawning Bed	8	15	360	\$28.50	\$10,260.00	
Safe Haven	37	3	111	\$209.99	\$23,308.89	
Trophy Tree	13	11	143	\$179.00	\$25,597.00	
Trophy Tree XL	13	4	52	\$359.00	\$18,668.00	
Buoy Markers	13	1	13	\$200.00	\$2,600.00	
Total					\$80,433.89	

Labor Costs	Hours/day	\$/hr	\$/day	Installation Assumptions
Person 1	10	\$50	\$500	Day = 20 man-hours
Person 2	10	\$50	\$500	10 nursery structures/day
Total	20	\$50	\$1,000	10 deep-water structures/day
				15 spawning structures per day

Enhancement Type	Total Structure Costs	Install Speed (structure/day)	Install Days	Labor Costs (\$/day)	Total Labor Costs	Total PM&E Costs
Spawning Enhancement	\$10,260.00	15	24.0	\$1,000	\$24,000.00	\$34,260.00
Nursery Enhancement	\$23,308.89	10	11.1	\$1,000	\$11,100.00	\$34,408.89
Deep-water Enhancement	\$46,865.00	10	19.5	\$1,000	\$19,500.00	\$66,365.00
Total	\$80,433.89				\$54,600.00	\$135,033.89

PARR HYDROELECTRIC PROJECT EROSION MONITORING PLAN

PARR HYDROELECTRIC PROJECT

FERC No. 1894

Prepared for:

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

Prepared by:

Kleinschmidt

Lexington, South Carolina
www.KleinschmidtGroup.com

May 2017

PARR HYDROELECTRIC PROJECT EROSION MONITORING PLAN

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May 2017

PARR HYDROELECTRIC PROJECT EROSION MONITORING PLAN

**PARR HYDROELECTRIC PROJECT
FERC No. 1894**

SOUTH CAROLINA ELECTRIC & GAS COMPANY

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PARR HYDROELECTRIC PROJECT EROSION MONITORING PLAN

PARR HYDROELECTRIC PROJECT FERC No. 1894

SOUTH CAROLINA ELECTRIC & GAS COMPANY

1.0 INTRODUCTION

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.

The Project developments form two separate Project reservoirs. Parr Reservoir is formed by Parr Shoals Dam and serves as the lower reservoir for the Fairfield Development. Parr Reservoir has a surface area of 4,400 acres and approximately 88 miles of shoreline¹ within the Project boundary. Monticello Reservoir is formed by a series of four earthen dams and serves as the upper reservoir for the Fairfield Development. Monticello Reservoir has a surface area of 6,800 acres and approximately 57 miles of shoreline². An active storage of up to 29,000 acre-feet is transferred between the two reservoirs by the pumped storage operations of the Fairfield Development. Fairfield Development's alternate cycles of generation and pumping results in daily fluctuations in the water levels of both Parr and Monticello reservoirs. These daily fluctuations, along with unavoidable wind and wave action, have the potential to create erosion along the reservoir shorelines.

¹ Parr Reservoir shoreline miles is based on a full pool elevation of 266'. Shoreline inspections are done intentionally when the reservoir is at an elevation lower than full pool in order to visually see erosion areas.

² Monticello Reservoir shoreline miles is based on a full pool elevation of 425' and includes the Recreation Lake. Shoreline inspections are done intentionally when the reservoir is at an elevation lower than full pool in order to visually see erosion areas. The Recreation Lake shoreline is not inspected since it has a more stable water level and is not subject to the erosion found in the main reservoir.

SCE&G currently monitors the extent of shoreline erosion at Parr Reservoir annually and Monticello Reservoir biannually. This document describes SCE&G's current shoreline erosion monitoring plan, which SCE&G proposes to continue throughout the term of the new Project license.

2.0 CONSULTATION

As part of the relicensing process for the Project, SCE&G formed Resource Conservation Groups (RCGs) and Technical Working Committees (TWCs) with various stakeholders, including federal and state agencies, non-governmental organizations (NGOs) and interested individuals. These RCGs and TWCs met on a frequent basis throughout relicensing to discuss and address issues related to Project operations. Prior to filing the Pre-Application Document (PAD) with FERC, SCE&G distributed its draft PAD to the RCGs and TWCs for review and comment. During this review, the USFWS requested additional information be included in the PAD regarding erosion within the Project boundary. SCE&G informed the stakeholders that, although it was not a requirement under the current license, they did perform internal erosion studies around the shorelines of Parr and Monticello reservoirs on a regular basis. SCE&G revised the PAD to include the most recent erosion studies that had been completed to date. Later in the relicensing process, during the development of protection, mitigation and enhancement (PM&E) measures to be included in the Draft License Application (DLA) and Final License Application (FLA), SCE&G shared their process for studying erosion at the Project with the RCGs and TWCs during the PM&E meeting held on March 30, 2017. Stakeholders reviewed the information and provided no comments or revisions.

SCE&G recognizes the importance of continuing erosion monitoring at the Project and has developed this Erosion Monitoring Plan for inclusion in the new operating license.

3.0 MONITORING PLAN

3.1 RESPONSIBLE PARTY

The SCE&G Dam Safety Group, in coordination with plant personnel, conducts all inspection activities for both the Parr and Monticello shoreline inspections.

3.2 DATA COLLECTION METHODS

The SCE&G Dam Safety Group employs several methods when completing the shoreline erosion monitoring. Shorelines are visually monitored from a boat and then tracked using a GPS-enabled data collector. Inspectors then classify the level of erosion into one of four categories, listed in Table 3-1.

TABLE 3-1 EROSION CATEGORIES

EROSION CATEGORY	DESCRIPTION
Slight	Heavy vegetation, no recent downed trees, little to no erosion
Moderate	Some vegetation, presence of vertical or sloped erosion
Severe	Little to no vegetation, erosion undercutting the shoreline, recent downed trees
Rip-Rap	Shoreline with armoring

As the inspector travels the edge of the shoreline, the classification of the shoreline is entered into the GPS. Each section of shoreline is classified into one of the erosion categories listed above. This information is then transferred and overlain onto an aerial map and each classification is totaled for comparison to previous inspections. Areas of erosion which are deemed to be significantly close to affecting the Project boundary line, regardless of their actual severity, are always classified as severe and their location is marked for reference.

While efforts are made to be as consistent as possible with the classification of erosion, some variability is expected. This variability can be attributed to the objectivity of the inspector, the time of year and reservoir levels at the time of inspection.

3.3 EROSION REPAIR

When an area of shoreline is deemed in need of repair, the repair process is initiated as follows:

- Plan – Meet with SCE&G management to determine the extent of repairs. Develop plan to repair. Acquire cost estimates.
- Notification – Notify FERC of SCE&G's intent to repair.
- Budget – The Plant budgets money and time frame to perform the work.
- Permit – Determine what permits are required and prepare applications. Coordinate access with landowners if there is no SCE&G or public access to gain entry to the site.
- Repair – Mobilize workforce, material and equipment to make the repairs. Dam Safety personnel will monitor the work.
- Prepare a close out report and notify all necessary agencies of project completion.

3.4 MONITORING SCHEDULE

The Parr Reservoir shoreline is inspected for erosion on an annual basis, usually during the second quarter of each year. The Monticello Reservoir is inspected for erosion on a bi-annual basis, usually during the second and fourth quarters of each year.

4.0 DOCUMENTATION AND REPORTING

Following each inspection, a report is prepared that includes the details of the inspection and the amount of erosion by category for the entire shoreline. An aerial map is prepared and the shoreline segments are overlain, visually detailing each area of erosion. Totals for each classification group are also calculated and shown on the inspection form. An example inspection form and map are included in Appendix A.

Reports are filed with the FERC Atlanta Regional Office as part of the annual Dam Safety Surveillance and Monitoring Report. When a repair is necessary, SCE&G notifies FERC and any other appropriate government agencies.

APPENDIX A

SAMPLE INSPECTION REPORT FORM AND MAP

DRAFT

DRAFT RECREATION MANAGEMENT PLAN

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

Prepared for:

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

Prepared by:

Kleinschmidt

Lexington, South Carolina
www.KleinschmidtGroup.com

May 2017

DRAFT
RECREATION MANAGEMENT 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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May 2017

DRAFT RECREATION MANAGEMENT PLAN

PARR HYDROELECTRIC PROJECT (FERC No. 1894)

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DRAFT RECREATION MANAGEMENT PLAN

PARR HYDROELECTRIC PROJECT (FERC No. 1894)

1.0 INTRODUCTION

South Carolina Electric & Gas Company (SCE&G) (Licensee) is the owner and operator of the Parr Hydroelectric Project (FERC No. 1894) (Project). The Project consists of the two developments: the Parr Shoals Development (Parr Development), and the Fairfield Pumped Storage Development (Fairfield Development). Both developments are located on the Broad River in Fairfield and Newberry counties, South Carolina. The Parr Development creates the Parr Reservoir, located along the Broad River, and the Fairfield Development creates the Monticello Reservoir, located adjacent to the Broad River. The current Project license is set to expire on June 30, 2020.

1.1 BACKGROUND AND CONSULTATION

SCE&G is currently involved in a multi-year relicensing process with the ultimate goal of obtaining a new 30 to 50 year operating license for the Project. The Federal Energy Regulatory Commission's (FERC or Commission) regulations at 18 C.F.R. § 2.7 require the evaluation of project recreational resources within license applications with the goal of developing these resources consistent with a recreation plan approved by the Commission. It is the licensee's responsibility to allow for suitable public access and recreational use of project lands and waters consistent with the recreational needs of the area and primary project purposes. Likewise, it is the licensee's responsibility to inform the public of project recreational opportunities, as well as the rules governing the accessibility and use of recreational facilities. A Commission-approved recreation plan, developed in cooperation with appropriate local, state, and federal agencies, and other interested parties, aids licensees in fulfilling these responsibilities.

During relicensing, SCE&G formed the Recreation Technical Working Committee (TWC) to address recreation issues associated with operation of the Project. The Recreation TWC is composed of representatives from various federal, state, and local agencies, non-governmental organizations (NGOs) and private landowners. Agencies and NGOs on the Recreation TWC

include the U.S. Fish and Wildlife Service (USFWS), National Oceanic and Atmospheric Administration (NOAA), National Park Service (NPS), South Carolina Department of Natural Resources (SCDNR), South Carolina Department of Health and Environmental Control (SCDHEC), American Rivers, and Congaree Riverkeeper.

The Recreation TWC has convened throughout the relicensing process to discuss the development, implementation and results of a Recreation Use and Needs Study (RUN Study) and the development of this Recreation Management Plan (RMP). The consultation record for the development of the RMP is included in Appendix A.

As noted by FERC, a well-documented user survey is “an essential part of a good recreation plan” (*Recreation Development at Licensed Hydropower Projects*, FERC 1996). SCE&G completed the above-referenced RUN Study in 2016 to determine what additions and improvements are needed at the Project to accommodate for future recreation use. This RMP was subsequently developed in consultation with stakeholders using the results of the 2016 RUN Study. Moreover, this RMP will be filed with FERC as part of the Final License Application. Upon FERC approval, this RMP establishes SCE&G’s requirements for providing public recreation in accordance with the new license.

1.2 PROJECT LANDS AND WATERS

The Parr Development creates the 15-mile long Parr Reservoir, which has a surface area of 4,400 acres at full pool and serves as the lower reservoir for Fairfield Development pumped-storage operations. The Parr Development operates in a modified run-of-river mode and normally operates continuously, passing flow from the Broad River. Parr Reservoir has approximately 88 miles of shoreline within the Project boundary, much of which is available to the public for recreation purposes¹. The waters and shoreline of Parr Reservoir provide the public with many recreation opportunities including hunting, boating, fishing, hiking, and picnicking.

The Fairfield Development creates the 6,800 acre Monticello Reservoir, which serves as the upper reservoir for pumped storage operations. The Fairfield Development is primarily used for

¹ SCE&G manages its lands per the classification system described within the Parr Shoreline Management Plan – however, the public is generally not precluded from access to SCE&G-owned lands and shoreline regardless of classification, except for lands reserved and used for Project operations or other areas specifically protected from public access and posted as such.

peaking operations, reserve generation, and power usage. Monticello Reservoir has approximately 47 miles of shoreline within the Project boundary, much of which are available to the public for recreation purposes². The waters and shoreline of Monticello Reservoir are a source for many public recreation opportunities including hunting, boating, fishing, swimming, camping, hiking, and picnicking.

Adjacent to Monticello Reservoir is the Recreation Lake, which was constructed by SCE&G for the sole purpose of recreation. The Recreation Lake has a surface area of 300 acres and 10 miles of shoreline available to the public for recreation. While Parr and Monticello reservoirs are subject to daily fluctuations from Project operations, the Recreation Lake is maintained at a stable water level. The Recreation Lake provides the public with recreation opportunities such as fishing, swimming and picnicking.

In addition to the Project Recreation Sites at Parr and Monticello reservoirs and the Recreation Lake, approximately 9,000 acres of land and water within the Project boundary are included in the statewide Wildlife Management Area (WMA) Program, managed by the South Carolina Department of Natural Resources (SCDNR). The Broad River Waterfowl Management Area and the Enoree River Waterfowl Management Area provide hunting opportunities to the public throughout the year.

1.3 RECREATION USE AND NEEDS STUDY

As previously mentioned, this RMP was developed based on the findings of the 2016 RUN Study. The study was designed to provide information relevant to the current and future availability and adequacy of SCE&G owned and managed Project Recreation Sites and informal recreation sites at Monticello Reservoir and Parr Reservoir. Additionally, information was gathered regarding waterfowl hunting in the Project area, as waterfowl hunters represent a unique group of users whose preferences and perceptions may differ from those using Project recreation sites.

RUN Study results showed most study participants at Parr Reservoir reported the following:

² SCE&G manages its lands at the Fairfield Development per the classification system described within the Monticello Shoreline Management Plan – however, the public is generally not precluded from access to SCE&G-owned lands regardless of classification, except for lands reserved and used for Project operations, lands/areas within the Nuclear Exclusion Zone, or other areas specifically protected from public access and posted as such.

- Individuals chose to visit Parr Reservoir because of the good fishing opportunities.
- Low to moderate crowding perceptions.
- Good to very good recreation site condition perception.
- Additional boat launching or docking facilities were the most requested additional facility.
- Other facility and amenity recommendations included additional lighting and restrooms.

RUN Study results showed most study participants at Monticello Reservoir reported the following:

- Individuals chose to visit Monticello Reservoir because it was close to home and because it provided good fishing opportunities.
- Low to moderate crowding perceptions.
- Very good recreation site condition perceptions.
- Restrooms were reported as the most requested additional facility
- Other facility and amenity recommendations included picnic tables, shelters, lighting and fishing piers or docks.

The RUN Study showed that the population of the Project's surrounding counties will increase by approximately 13 percent over the next 15 years. Study data showed that Project facilities are in good condition and well used. Some sites are closer to capacity during peak periods while others have low density ratings. Generally, existing crowdedness at all facilities appeared to be low to moderate. Waterfowl hunters noted crowding at the Enoree River Waterfowl Management Area (non-Project recreation site maintained and managed by SCDNR) and on Saturdays at Parr Reservoir.

To address the requests for additional facilities, SCE&G is proposing enhancements to four (4) Project Recreation Sites during the first 10 years of the new license term. SCE&G is also creating four (4) new Project Recreation Sites by upgrading and formalizing existing informal sites, to address the potential future need for additional recreation access at the Project. The proposed schedule for enhancement implementation is included in Section 3.2.

1.4 STRUCTURE OF THE RMP

Pursuant to FERC guidelines, this RMP includes the following information:

- **Project Recreation Site Management Policies:** Information on the management policies for all Project Recreation Sites owned by SCE&G.
- **Ongoing Public Recreation Planning and Monitoring:** SCE&G is proposing to implement enhancements and monitor future recreation use during the term of the new license through an Adaptive Management Process (AMP) outlined in this RMP.
- **Existing Project Recreation Sites:** A comprehensive inventory of the existing Project Recreation Sites; facility amenities including type, number, and barrier free provisions; maps depicting existing Project Recreation Sites; location; owner; manager; user fees; hours of operation if applicable.
- **Enhancements to Project Recreation Sites:** Proposed facility enhancements including; type, number, and barrier free provisions; conceptual site plans; schedule for enhancement completion.
- **Consultation Record:** Documentation of consultation during preparation of the RMP, including comments and recommendations provided by consulting agencies and organizations; a description of how comments and recommendations have been addressed, including any justifications for not accommodating specific comments and recommendations

2.0 PROJECT RECREATION SITE MANAGEMENT POLICIES

Project Recreation Sites, as listed in Table 2-1, will be operated and managed according to the following policies.

TABLE 2-1 PROPOSED AND EXISTING PROJECT RECREATION SITES

PARR DEVELOPMENT PROJECT RECREATION SITES	FAIRFIELD DEVELOPMENT PROJECT RECREATION SITES
Cannon's Creek Project Recreation Site	Scenic Overlook Recreation Site
Heller's Creek Project Recreation Site	Highway 215 Recreation Site
Parr Shoals Dam Canoe Portage (<i>Proposed</i>)	Highway 99 West Recreation Site
Highway 34 Recreation Site (<i>Proposed</i>)	Highway 99 East Recreation Site (<i>Proposed</i>)
Enoree River Bridge Recreation Site (<i>Proposed</i>)	Recreation Lake Access Area

2.1 PROJECT RECREATION SITE HOURS OF OPERATIONS

All Project Recreation Sites and associated amenities such as boat ramps, picnic shelters, etc. are available and open to the public year-round except for the Recreation Lake Access Area. The Recreation Lake Access Area - Beach Area is open from sunrise to sunset April 1 through September 30 and is closed from October 1 through March 31. All other amenities at the Recreation Lake are open year-round. Restroom facilities at all SCE&G operated recreation sites are currently open from April 1 through September 30 and closed from October 1 through March 31.³

2.1.1 PROJECT RECREATION SITE CLOSINGS

In the case of temporary closures of Project Recreation Sites due to maintenance or safety issues, the Licensee will implement notification procedures to the public, including the installation of appropriate signage and physical barriers at the entrance of the recreation site or boat ramp.

³ Restroom facilities at the Highway 99 West Recreation Site are proposed to be upgraded for year-round access during the new license term.

2.2 USER FEES

All Project Recreation Sites are owned by the Licensee and are currently available to the public at no charge.

2.3 BANK FISHING AT THE PROJECT AND PROJECT RECREATION SITES

The shoreline around Parr and Monticello reservoirs and associated islands is open to the public for bank fishing, except for shoreline that is included in the Nuclear Exclusion Zone. Bank fishing is allowed at all Project Recreation Sites.

2.4 BARRIER FREE REQUIREMENTS

The Commission's regulations at 18 C.F.R. § 2.7(b) requires that the Licensee "develop suitable public recreational facilities upon project lands and waters ... and to include therein consideration of the needs of persons with disabilities in the design and construction of such project facilities and access." These facilities and access points are often referred to as "barrier free." Barrier free is defined as a design for those with physical or other disabilities, involving the provision of alternative means of access to steps. Currently, two of the Project Recreation Sites at Monticello Reservoir have some barrier free amenities and none of the Project Recreation Sites at Parr Reservoir have barrier free amenities. The Licensee will modify some of the Project Recreation Sites to increase the amount of barrier free recreation access at the Project. The barrier free modifications for specific sites are discussed in further detail in Sections 4.0 and 5.0.

2.5 PROHIBITED USES, ACTIVITIES AND STRUCTURES

Use of Project Recreation Sites must not endanger public health or safety, or create a public nuisance, or otherwise be compatible with the overall public recreation use of the Project. A list of prohibited uses, activities and structures is included below. The Licensee will consult with local enforcement agencies in the event the Licensee becomes aware the following activities are occurring at Project Recreation Sites.

- Littering
- Consuming alcoholic beverages or illegal controlled substances
- Destroying or defacing property
- Harassing wildlife

- Discharging firearms
- Operation of motorized trail bikes or off-road vehicles
- Open fires
- Private boat docks or boat ramps
- Boathouses
- Commercial marinas
- Marine rails and sea walls
- Permanent structures
- Land-based structures, storage buildings, shelters, patios, gazebos, fences, swimming pools, satellite dishes, signs, storage of boats, canoes or other watercraft or automobiles
- Jet skiing
- Water skiing
- Parasailing
- Paragliding
- Mooring
- Excavations/dredging (except commercial operations authorized by SCE&G and permitted by the state)
- Effluent discharges
- Storage or stockpiling of construction material
- Livestock access to reservoir
- Vegetation removal, limbing or trimming of any type
- Use of herbicides

A complete list of prohibited activities and structures on Project lands and waters is provided in the Parr and Monticello Shoreline Management Plans and Permitting Handbook.

2.6 COMPLIANCE WITH STATE, FEDERAL AND LOCAL LAWS AND REGULATIONS

Use of Project Recreation Sites must be consistent with all FERC orders and regulations regarding recreation opportunities and development at licensed projects including Order No. 313 (FERC Recreation Policy) and all applicable regulations or directives issued by FERC, or its predecessor, the Federal Power Commission. Use of Project Recreation Sites must also comply with applicable state, federal, and local laws as well as all ordinances, rules, regulations, and sanctions of any regulatory body or governmental agency (state, federal, or local) having

jurisdiction within the recreation site. Project Recreation Site facility construction projects shall comply with applicable federal, state and local rules, regulations, building and zoning codes, and public safety design standards.

2.7 PROTECTION OF THE ENVIRONMENT

During construction, operation and maintenance of Project Recreation Site facilities, necessary precautions will be taken to protect the scenic, environmental, recreational, and cultural quality of affected lands and waters of the Project. Construction of Project Recreation Site facilities shall be completed using Low Impact Development practices for storm water management, when possible and soil and erosion control measures will be implemented and maintained. When practicable, facilities will be designed and constructed to retain vegetation, maintain natural habitat, provide a natural view from the water, and use shielded lighting where lighting is provided.

2.7.1 HISTORIC PROPERTIES

Measures to address the management of historic properties at Project Recreation Sites and islands are addressed in the Project Historic Properties Management Plan.

2.7.2 WATERCRAFT

Houseboats, watercraft exceeding 30 feet in length, and watercraft with marine sanitation devices are prohibited on Project waters.

2.7.3 SANITATION

As mentioned above, watercraft with marine sanitation devices are prohibited on Project waters.

2.8 PROJECT ISLANDS

SCE&G owns all islands within Monticello Reservoir and Pearson's Island within Parr Reservoir and will retain ownership of these islands for the term of the new license.

2.8.1 PERMITTED USES OF ISLANDS

Unless otherwise noted, all islands in Monticello Reservoir and Pearson's Island in Parr Reservoir are available year round, for passive⁴ public recreation activities including walking, wading, picnicking, and bird watching. Waterfowl hunting is permitted on these islands in accordance with state hunting regulations pertaining to Wildlife Management Area (WMA) lands. Islands in Monticello Reservoir are also open for overnight camping.

2.8.2 RESTRICTED USE OF ISLANDS

Overnight camping is expressly prohibited on Project islands in Parr Reservoir. The Licensee may also restrict use of specific islands in consultation with federal, state or local agencies to protect cultural resources or endangered species or for public safety, security, or other management concerns.

2.9 PROJECT RECREATION SITE PLANNING

Continued public recreation planning and consultation with appropriate federal, state and local resource agencies, parks and recreation agencies, tribes, local governments, and resource or recreation-based non-governmental organizations (NGOs) is important to the Licensee. Over the term of the new license, unanticipated Project-related recreation needs may be identified and/or it may be determined that existing or planned recreation facilities are no longer needed. To aid in planning for future recreation needs at the Project, the Licensee plans to conduct the following activities.

2.9.1 FERC FORM 80 REPORTS

FERC regulations require the Licensee to prepare and file a Licensed Hydropower Development Recreation Report (Form 80) for each Project development every six years. The purpose of the Form 80 is to provide FERC and other agencies with a periodic assessment of the recreation facilities located at FERC-licensed projects, whether public recreation needs are being accommodated by the facilities, and where additional efforts could be made to meet future needs.

⁴ Passive recreation use is defined as those recreation activities that are generally non-consumptive in nature, require a minimum of facilities, and/or have a minimal environmental impact.

2.9.2 REVISING THE RMP

The Licensee will convene a group of interested stakeholders approximately 12 years after the issuance of the new license to discuss the development of a Recreation Assessment Study Plan. During relicensing, SCE&G agreed to conduct a Recreation Assessment two years after the completion of Project Recreation Site enhancements, which are scheduled to be complete 10 years after license issuance. Based on the findings of the Recreation Assessment, SCE&G, with input from stakeholders, will revise the RMP, as necessary, and submit it for FERC approval. The need for additional Recreation Assessments or Recreation Use and Needs Studies will be determined in consultation with interested stakeholders as part of an AMP. The AMP is discussed in further detail in Section 3.0.

2.10 MAINTENANCE OF PROJECT RECREATION SITES

SCE&G currently maintains Project Recreation Sites according to a pre-determined schedule developed by their Lake Management Department. Sites are monitored on a quarterly basis and the Lake Management Department addresses maintenance issues on an as-need basis. SCE&G will continue to monitor and maintain existing Project Recreation Sites in the same manner during the term of the new license. New Project Recreation Sites will be added to the monitoring schedule and regular monitoring and maintenance visits will begin upon formalization of the site.

3.0 ADAPTIVE MANAGEMENT PROCESS

3.1 OVERVIEW

During relicensing, the Recreation TWC discussed implementing an Adaptive Management Process (AMP) to address Project related recreation issues that arise during the term of the new license. The TWC agreed that SCE&G will complete proposed Project Recreation Site enhancements according to the schedule included in Section 3.2. Stakeholders will also meet with SCE&G periodically during the term of the new license to discuss recreation issues and determine the need for additional recreation assessments. Additional details on the enhancement schedule and future recreation assessments are discussed below.

3.2 PROJECT RECREATION SITE ENHANCEMENT SCHEDULE

Table 3-1 illustrates the schedule for executing recreation site enhancements, as agreed to in consultation with relicensing stakeholders. Specific enhancements planned for each Project Recreation Site are discussed in Sections 4.0 and 5.0. A summary of proposed enhancements for each site is included in Section 6.0.

TABLE 3-1 PROJECT RECREATION SITE ENHANCEMENT SCHEDULE

PROJECT RECREATION SITE	SITE STATUS	TIMEFRAME FOR COMPLETION
Highway 215 Recreation Area	Existing Site	Prior to license issuance
Parr Shoals Dam Canoe Portage	Proposed new facility	Upon license issuance
Informal Highway 34 Boat Ramp	Proposed new site	2 years after new license is issued
Informal Enoree River Bridge Recreation Site	Proposed new site	2 years after new license is issued
Cannon's Creek Recreation Site	Existing site	4 years after new license is issued
Highway 99 West Recreation Site (previously known as Highway 99 Boat Ramp)	Existing site	6 years after new license is issued
Recreation Lake Access Area	Existing site	6 years after new license is issued
Highway 99 East Recreation Site	Proposed new site	8 years after new license is issued
Scenic Overlook Recreation Site	Existing site	10 years after new license is issued

3.3 FUTURE RECREATION ASSESSMENTS

SCE&G will conduct a Recreation Assessment approximately 12 years after the new license is issued. The Recreation Assessment will take place two years after the site enhancements are complete. At that time, SCE&G will convene a meeting with interested stakeholders to discuss the Recreation Assessment and develop a study plan. Data collected during the Recreation Assessment will be used to complete the subsequent Form 80 Report.

Depending on the term of the new license, SCE&G will complete one or two additional Recreation Assessments approximately 10 and 20 years after the conclusion of the first Recreation Assessment. The complexity and detail of the additional assessments will be determined by SCE&G and interested stakeholders during a meeting held one year prior to each assessment. A meeting with interested stakeholders will be held within one year of the completion of each assessment to discuss the assessment results related to future recreation site improvements.

4.0 PARR RESERVOIR PUBLIC RECREATION SITES

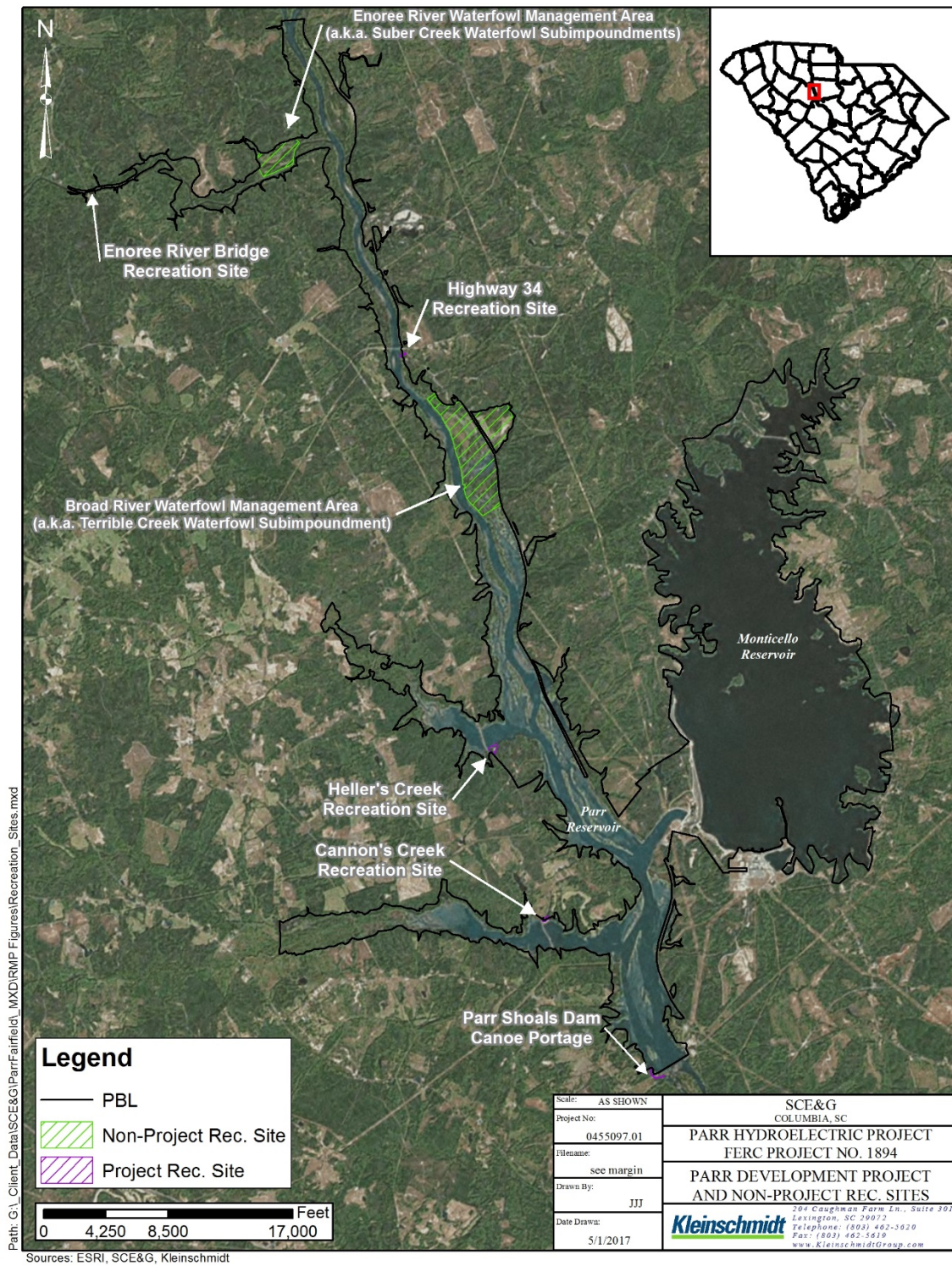
4.1 OVERVIEW

Parr Reservoir currently provides the public with several existing Project and Non-Project recreation sites. In addition, SCE&G is proposing to develop and/or enhance several new and/or informal Project recreation sites at Parr Reservoir. SCE&G owns, or has flowage rights over, all land on which the existing and proposed Project recreation sites are located. Existing and proposed new public recreation sites (both Project and Non-Project) are listed below in Table 4-1 and shown in Figure 4-1. Recreation facility and amenities tables are included in appendices C and D. In addition to the designated public recreation sites at the Project, lands within the Project boundary have been set aside for future recreational development. These lands are shown on land classification maps included in the Parr Reservoir Shoreline Management Plan.

TABLE 4-1 PUBLIC RECREATION SITES AT PARR RESERVOIR

EXISTING PUBLIC RECREATION SITES	PROPOSED NEW PUBLIC RECREATION SITES
Cannon's Creek Recreation Site	Parr Shoals Dam Canoe Portage
Heller's Creek Recreation Site	Highway 34 Recreation Site
Broad River Waterfowl Management Area (Non-Project Recreation Site)	Enoree River Bridge Recreation Site
Enoree River Waterfowl Management Area (Non-Project Recreation Site)	

FIGURE 4-1 PUBLIC RECREATION SITES AT PARR RESERVOIR



4.2 EXISTING PROJECT RECREATION SITES

4.2.1 CANNON'S CREEK RECREATION SITE

4.2.1.1 SITE DESCRIPTION AND EXISTING AMENITIES

Cannon's Creek Recreation Site is an existing Project Recreation Site located in Newberry County (Photo 1). Specifically, the recreation site is located on the western side of Parr Reservoir off of Broad River Road north of Peak, SC. GPS coordinates for this recreation site are latitude 34.2866, longitude -81.3631. This recreation site is owned and operated by SCE&G. A portion of this site is currently located on SCE&G lands outside of the Project boundary. SCE&G proposes to bring the entire recreation site within the Project boundary, as shown on revised Exhibit G drawings filed with the new license application.



PHOTO 1 CANNON'S CREEK RECREATION SITE

Existing amenities at this recreation site include one concrete boat ramp, two shelters each with a picnic table and one grill. Restroom facilities are also located at this recreation site. There is a gravel parking area with spaces for up to 30 vehicles with trailers. Additional supported activities

include primitive camping and bank fishing. This site is unstaffed and open year round to the public without fee.

4.2.1.2 PROPOSED ENHANCEMENTS

During relicensing, SCE&G agreed to implement enhancements at Cannon's Creek Recreation Site, as detailed below. Enhancements will be completed according to the schedule⁵ found in Section 3.2. A map of Cannon's Creek Recreation Site that displays existing and proposed amenities is in Appendix B.

- Add at least one (1) interpretive display (two panels) on the cultural and historic resources of the area prior to issuance of the new license in accordance with the Historic Properties Management Plan and Programmatic Agreement.
- Install one (1) fishing pier
- Install one (1) courtesy dock
- Install two (2) additional lights, one (1) near the road and one (1) near the restrooms
- Barrier Free enhancements – pave two (2) barrier free parking spaces and access paths to the picnic area, fishing pier and restrooms, upgrade the restroom to barrier free standards with a new handle on the men's room door and install proper height toilet seats

4.2.2 HELLER'S CREEK RECREATION SITE

4.2.2.1 SITE DESCRIPTION AND EXISTING AMENITIES

Heller's Creek Recreation Site is an existing Project Recreation Area located in Newberry County, South Carolina (Photo 2). Specifically, the recreation site is located on the western side of Parr Reservoir, off of Broad River Road in Pomaria, SC. GPS coordinates for this site are latitude 34.3193 and longitude -81.3744. This site is owned and operated by SCE&G.

⁵ Construction of the interpretive display will occur prior to issuance of the new license in accordance with the Historic Properties Management Plan and Programmatic Agreement.



PHOTO 2 HELLER’S CREEK RECREATION SITE

Existing amenities at the recreation site include one concrete boat ramp, two shelters with one picnic table each, and restrooms. The site also has a gravel parking lot with space for up to 25 vehicles with trailers. Additional supported activities include primitive camping and bank fishing. This site is unstaffed and open year round to the public without fee. A map of Heller’s Creek Recreation Site that displays existing amenities at the site is in Appendix B.

4.2.2.2 PROPOSED ENHANCEMENTS

SCE&G is not proposing any enhancements to the Heller’s Creek Recreation Site.

4.3 PROPOSED NEW PROJECT RECREATION SITES

4.3.1 PARR SHOALS DAM CANOE PORTAGE

4.3.1.1 SITE DESCRIPTION AND EXISTING AMENITIES

During relicensing, SCE&G built an experimental canoe portage on the western side of the Parr Shoals Dam (Photo 3). An approximately 1,600 ft. trail was cleared and appropriate signage was

installed. The portage, located in Newberry County, is currently partially inside and outside of the Project boundary. GPS coordinates for the take-out area, located upstream of the Parr Shoals Dam, are 34.2592, -81.3389. GPS coordinates for the put-in area, located downstream of the Parr Shoals Dam, are 34.2575, -81.3358.

PHOTO 3 PARR SHOALS DAM CANOE PORTAGE



Due to positive feedback from stakeholders, SCE&G plans to formalize the canoe portage by bringing it into the Project boundary and including it on the new Exhibit G drawings that will be filed with the new license application. SCE&G owns all of the land on which the proposed portage is located.

4.3.1.2 PROPOSED ENHANCEMENTS

During relicensing, SCE&G agreed to formalize the canoe portage by bringing it into the Project boundary and maintaining it as an additional recreation facility. Formalization will occur upon license issuance. A map of the Parr Shoals Dam Canoe Portage is in Appendix B. This amenity will be unstaffed and open year round to the public without fee.

4.3.2 HIGHWAY 34 RECREATION SITE

4.3.2.1 SITE DESCRIPTION AND EXISTING AMENITIES

The Highway 34 Recreation Site, currently known as the Informal Highway 34 Boat Ramp or the Highway 34 Primitive Ramp, is an informal recreation site situated partially inside and outside of the Project boundary (Photo 4). It is located in Fairfield County on the eastern side of Parr Reservoir. GPS coordinates for the recreation site are latitude 34.3898 and longitude -81.3950. SCE&G owns the land on which the informal recreation site is located. SCE&G is proposing to formalize the site following issuance of the new license and will propose to include the entire recreation site inside the Project boundary when the new Exhibit G drawings are filed with the new license application. The formal Project recreation site will be renamed the Highway 34 Recreation Site.



PHOTO 4 HIGHWAY 34 RECREATION SITE

Currently the only amenities located at the site are an earthen boat ramp and an informal, gravel parking lot with space for up to five vehicles.

4.3.2.2 PROPOSED ENHANCEMENTS

During relicensing, SCE&G agreed to formalize the recreation site and implement the enhancements listed below. Enhancements will be completed according to the schedule found in Section 3.2. A map of Highway 34 Recreation Site that displays existing and proposed amenities is in Appendix B. This site will be unstaffed and open year round to the public without fee.

- Improve the boat ramp – install geogrid and stabilize the bank
- Grade and gravel to improve the parking area
- Remove large trees that hinder vehicle access to the ramp
- Install a Recreation Sign on Highway 34 per FERC regulations
- Bring into the Project boundary, properties 211 parcel E (8.23 acres) and 285 parcel C (9.9 acres west of Railroad tracks) currently identified on Exhibit K-14 drawing

4.3.3 ENOREE RIVER BRIDGE RECREATION SITE

4.3.3.1 SITE DESCRIPTION AND EXISTING AMENITIES

The Enoree River Bridge Recreation Site is currently an informal, non-Project recreation site that is located on U.S. Forest Service lands, primarily outside of the Project boundary⁶ (Photo 5). SCE&G has flowage rights for the portion of USFS land inside the Project boundary. The recreation site is in Newberry County near Maybinton, SC. GPS coordinates for the recreation site are latitude 34.4230 and longitude -81.4669.

⁶ The Project boundary is located at elevation 274.6' NGVD88 at this site; therefore, only a small portion of the primitive ramp is located within the Project boundary.



PHOTO 5 ENOREE RIVER BRIDGE RECREATION SITE

Currently, the only amenity located at this site is for small watercraft, such as a canoe or kayak, to access the Enoree River.

4.3.3.2 PROPOSED ENHANCEMENTS

During relicensing, SCE&G agreed to enhance the portion of the small watercraft access area that is located within the Project boundary. Enhancements will be completed according to the schedule found in Section 3.2. A map of Enoree River Bridge Recreation Site that displays existing and proposed amenities is in Appendix B. This site will be unstaffed and open year round to the public without fee.

- Build canoe/kayak step down access within the Project boundary
- Install Recreation Sign on Maybinton Road per FERC regulations

4.4 NON-PROJECT RECREATION SITES

The following recreation sites are within the Project boundary; however, these facilities are owned and operated by another entity. SCE&G is not responsible for operating and maintaining the following facilities.

4.4.1 BROAD RIVER WATERFOWL MANAGEMENT AREA

4.4.1.1 SITE DESCRIPTION AND EXISTING AMENITIES

The Broad River Waterfowl Management Area (WMA) (part of which was formerly known as Terrible Creek Waterfowl Sub-impoundment) is located south of Highway 34 in Fairfield County near the town of Blair, South Carolina. GPS coordinates for the waterfowl area are latitude 34.371 and longitude -81.381. SCE&G owns the land that the Broad River WMA is located but leases the property to the SCDNR.

SCDNR manages the site as a Category I waterfowl area, which means hunts are conducted on selected Saturdays during the waterfowl season. Only hunters selected by the SCDNR lottery system are allowed to hunt at this site. This site is closed to the public during waterfowl season, and it is open to the public from February 2 through October 31. Recreation opportunities outside of the waterfowl season include bird watching, bank fishing, deer hunting, and small game hunting.

4.4.2 ENOREE RIVER WATERFOWL MANAGEMENT AREA

4.4.2.1 SITE DESCRIPTION AND EXISTING AMENITIES

The Enoree River WMA (part of which was formerly known as Suber Creek Waterfowl Sub-impoundments) is in Newberry County near the town of Whitmire, South Carolina. GPS coordinates for the waterfowl area are latitude 34.432 and longitude -81.422. The USFS and SCE&G own the land that the Enoree River WMA is located but SCE&G holds flowage rights for the portion owned by the USFS. The USFS and SCDNR manage the WMA cooperatively.

SCDNR manages the site as a Category II waterfowl area, which means it is open to the public for waterfowl hunting. Waterfowl hunting is permitted here on Saturdays until 12 p.m. during the hunting season. Outside of the waterfowl season, the area is open to visitors for activities including bird watching, deer hunting, and small game hunting.

5.0 MONTICELLO RESERVOIR PUBLIC RECREATION SITES

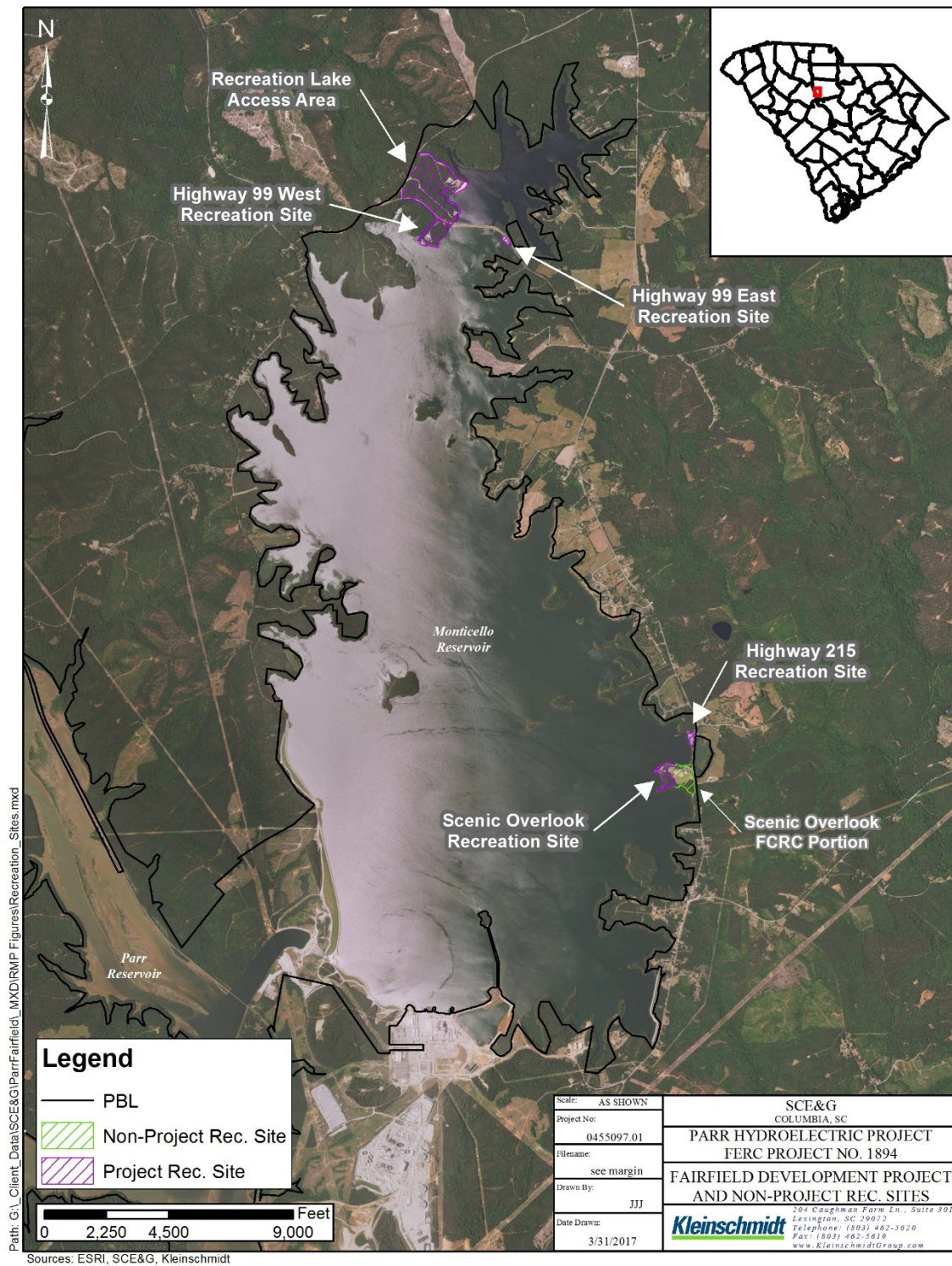
5.1 OVERVIEW

Monticello Reservoir currently provides the public with several existing Project and Non-Project recreation sites. In addition, SCE&G is proposing to enhance one informal recreation site at Monticello Reservoir, making it a formal Project Recreation Site. SCE&G owns, or has flowage rights over, all land on which the existing and proposed Project recreation sites are located. Existing and proposed new public recreation sites (both Project and Non-Project) are listed below in Table 5-1 and shown in Figure 5-1. Recreation facility and amenities tables are included in appendices C and D. In addition to the designated public recreation sites at the Project, lands within the Project boundary have been set aside for future recreational development. These lands are shown on land classification maps included in the Monticello Reservoir Shoreline Management Plan.

TABLE 5-1 PUBLIC RECREATION SITES AT MONTICELLO RESERVOIR

EXISTING PUBLIC RECREATION SITES	PROPOSED NEW PUBLIC RECREATION SITES
Scenic Overlook Recreation Site (Project and Non-Project portions)	Highway 99 East Recreation Site
Highway 215 Recreation Site	
Highway 99 West Recreation Site	
Recreation Lake Access Area	

FIGURE 5-1 PUBLIC RECREATION SITES AT MONTICELLO RESERVOIR



5.2 EXISTING PROJECT RECREATION SITES

5.2.1 SCENIC OVERLOOK RECREATION SITE

5.2.1.1 SITE DESCRIPTION AND EXISTING AMENITIES

The Scenic Overlook, formerly known as the Overlook, is a Project Recreation Site located on the eastern shore of Monticello Reservoir in Fairfield County, South Carolina (Photo 6). GPS coordinates for the site are 34.3239, -81.2894. The entire site is owned by SCE&G and is within the Project Boundary, however only a portion is operated and maintained by SCE&G as a Project Recreation Site. The remaining portion of the site is operated and maintained by the Fairfield County Recreation Commission (FCRC). The FCRC operated portion of this site is discussed under Section 5.4, Non-Project Recreation Sites.



PHOTO 6 SCENIC OVERLOOK RECREATION SITE

The portion of the site operated by SCE&G offers amenities including eight picnic tables, one picnic shelter, a scenic overlook and a fishing pier. Visitors can partake in activities such as

picnicking, dock fishing, and bank fishing. Restrooms and gravel parking areas are also available. The site is unstaffed and free to visitors year round.

5.2.1.2 PROPOSED ENHANCEMENTS

During relicensing, SCE&G agreed to improve the site by implementing the enhancements listed below. Enhancements will be completed according to the schedule found in Section 3.2. A map of the Scenic Overlook Recreation Site that displays existing and proposed amenities is in Appendix B.

- Add one (1) light at existing fishing pier
- Modify the existing fishing pier for barrier free use
- Pave two (2) barrier free parking spaces near the fishing pier and pave an access path to the fishing pier
- Add two (2) new picnic tables
- Build one (1) barrier free picnic shelter with one (1) barrier free picnic table
- Pave one (1) barrier free parking space and an access path near the new barrier free picnic table

5.2.2 HIGHWAY 215 RECREATION SITE

5.2.2.1 SITE DESCRIPTION AND EXISTING AMENITIES

The Highway 215 Recreation Site, also known as the Highway 215 Boat Ramp or Ramp 1, is located on the eastern side of Monticello Reservoir, off Highway 215, in Fairfield County, South Carolina (Photo 7). GPS coordinates for the site are 34.3273, -81.2853. This Project Recreation Site is owned and operated by SCE&G.



PHOTO 7 HIGHWAY 215 RECREATION SITE

This site is primarily used as a boat ramp. A courtesy dock and two concrete boat ramps are located at this site. The site also includes a paved parking area with space for 30 vehicles with trailers and a picnic shelter with two picnic tables. The site is unstaffed, free, and open to the public year round. A map of the Highway 215 Recreation Site that displays existing amenities is included in Appendix B.

5.2.2.2 PROPOSED ENHANCEMENTS

During relicensing, SCE&G agreed to improve the site by implementing the enhancements listed below. Enhancements will be completed per the schedule found in Section 3.2.

- Add at least one (1) interpretive display on the cultural and historic resources of the area prior to issuance of the new license in accordance with the Historic Properties Management Plan and Programmatic Agreement.

5.2.3 HIGHWAY 99 WEST RECREATION SITE

5.2.3.1 SITE DESCRIPTION AND EXISTING AMENITIES

The Highway 99 West Recreation Site is currently known as the Highway 99 Public Access Area, the Highway 99 Boat Ramp, or Ramp 2. The site is located on the northern side of Monticello Reservoir off Highway 99 in Fairfield County, South Carolina (Photo 8). GPS coordinates for the site are 34.3764, -81.3174. This Project Recreation Site is owned and operated by SCE&G.

PHOTO 8 HIGHWAY 99 WEST RECREATION SITE



Existing amenities at the site include three concrete boat ramps, one courtesy dock, two picnic shelters, five picnic tables, one grill, restrooms and primitive tent camping. The site also has a paved parking area with space for 80 vehicles with trailers. This site is unstaffed, free and open to the public year round.

5.2.3.2 PROPOSED ENHANCEMENTS

During relicensing, SCE&G agreed to improve the site by implementing the enhancements listed below. Enhancements will be completed according to the schedule found in Section 3.2. As mentioned, this site is being renamed the Highway 99 West Recreation Site. A map of the Highway 99 West Recreation Site that displays existing and proposed amenities is in Appendix B.

- Add one (1) fishing pier
- Improve boat ramp located in the cove to improve boat access
- Change two (2) existing lights, one (1) near boat ramp/courtesy dock and one (1) near new proposed fishing pier from standard to flood type lights
- Pave access paths or build ramps and platforms to provide barrier free access to the courtesy dock, new fishing pier and restrooms
- Convert four (4) existing parking spaces into two (2) barrier free parking spaces
- Modify restrooms to allow year round access – add heat to restroom and/or water pump room

5.2.4 RECREATION LAKE ACCESS AREA

5.2.4.1 SITE DESCRIPTION AND EXISTING AMENITIES

The Recreation Lake Access Area, also known as the Monticello Sub-Impoundment or Ramp 3, is located on the Recreation Lake, adjacent to Lake Monticello, off Highway 99 in Fairfield County, South Carolina (Photo 9). GPS coordinates for the site are 34.3821, -81.3134. The site is owned and operated by SCE&G.



PHOTO 9 RECREATION LAKE ACCESS AREA – BEACH AREA

The site is composed of two distinct areas, including a boat ramp area that is open to the public year round and a beach area that is open to the public from April 1 through September 30.

Amenities at the beach area include two picnic shelters, 24 picnic tables, seven grills, a beach, restrooms, and a 0.3-mile long hiking trail that connects the beach area and the boat ramp area.

The beach area has a gravel parking lot with space for approximately 95 vehicles, including several unpaved, barrier free parking spaces. The boat ramp area includes a concrete boat ramp, a picnic table, restrooms and a gravel parking area with space for 10 vehicles with trailers. Both areas are unstaffed and free to the public.

5.2.4.2 PROPOSED ENHANCEMENTS

During relicensing, SCE&G agreed to implement the enhancements listed below at the boat ramp area of the Recreation Lake Access Area. Enhancements will be completed per the schedule found in Section 3.2. A map of the Recreation Lake Access Area that displays existing and proposed amenities is in Appendix B.

- Add one (1) courtesy dock

5.3 PROPOSED NEW PROJECT RECREATION SITES

5.3.1 HIGHWAY 99 EAST RECREATION SITE

5.3.1.1 SITE DESCRIPTION AND EXISTING AMENITIES

The Highway 99 East Recreation Site is currently an informal recreation site known as the Highway 99 Informal Access Area or the Highway 99 Informal Fishing Area. This site is located on the north side of Monticello Reservoir, off Highway 99 in Fairfield County, South Carolina (Photo 10). GPS coordinates for this site are 34.3766, -81.3077. SCE&G is proposing to formalize this site, making it an official Project Recreation Site, and rename it the Highway 99 East Recreation Site. SCE&G owns the proposed recreation site land, which is currently within the Project Boundary.



PHOTO 10 HIGHWAY 99 EAST RECREATION SITE

Currently, the informal recreation site is used primarily for bank fishing. The site provides a gravel parking area for approximately 20 vehicles, as well as shoreline access for bank fishing. Swimming is prohibited at this site and there are no tables or other amenities available. This site is unstaffed, free to the public and open year round.

5.3.1.2 PROPOSED ENHANCEMENTS

During relicensing, SCE&G agreed to formalize this site and implement the enhancements listed below. Enhancements will be completed per the schedule found in Section 3.2. A map of Highway 99 East Recreation Site that displays existing and proposed amenities is in Appendix B.

- Add one (1) fishing pier
- Add two (2) benches
- Add two (2) picnic tables
- Add two (2) lights on one pole, with one (1) light directed at the fishing pier and one (1) light directed at the parking area

5.4 NON-PROJECT RECREATION SITES

The following recreation sites are within the Project boundary; however, these facilities are owned and operated by another entity. SCE&G is not responsible for operating and maintaining the following facilities. However, SCE&G may elect to upgrade certain site facilities, as determined through relicensing stakeholder consultation and as discussed below.

5.4.1 SCENIC OVERLOOK – FCRC PORTION

5.4.1.1 SITE DESCRIPTION AND EXISTING AMENITIES

The FCRC operated and maintained portion of the Scenic Overlook is a non-Project recreation site located adjacent to the SCE&G-maintained portion of the Scenic Overlook, discussed in Section 5.2.1. This area is located on the eastern shore of Monticello Reservoir in Fairfield County, South Carolina. GPS coordinates for the site are 34.3240, -81.2856.

The FCRC-maintained site offers many amenities to the public, including tennis courts, a baseball field, a playground area, additional picnic shelters, a 1-mile hiking trail, and a community center. Additional gravel parking areas are available throughout the recreation site.

5.4.1.2 SCE&G-PROPOSED ENHANCEMENTS TO THE FCRC SITE

During relicensing, SCE&G agreed to improve certain facilities at the FCRC site, as listed below. Enhancements will be completed according to the schedule found in Section 3.2. A map of entire Scenic Overlook Recreation Site that displays existing and proposed amenities is in Appendix B.

- Pave one (1) barrier free parking space and access path at the restroom area (SCE&G will coordinate this improvement with the FCRC)

6.0 SUMMARY

Parr Reservoir and Monticello Reservoir support a wide range of public recreation activities through their Project Recreation Sites, including boat and bank fishing, swimming, camping, hunting, and picnicking. In the 2015 RUN Study, most people surveyed reported being satisfied with the condition, number and type of recreation facilities located at the Project.

As part of Project relicensing and after the issuance of the new license, SCE&G will continue to work to maintain and enhance the Project Recreation Sites. SCE&G plans to meet with stakeholders at regular intervals throughout the term of the new license to reevaluate recreation needs at the Project. Table 6-1 summarizes the proposed enhancements for each Project Recreation Site.

TABLE 6-1 SUMMARY OF PROPOSED ENHANCEMENTS FOR PROJECT RECREATION AREAS

PROJECT RECREATION SITE	PROPOSED ENHANCEMENTS
<i>Parr Reservoir</i>	
Cannon's Creek Recreation Site (existing site)	Install one (1) fishing pier
	Install one (1) courtesy dock
	Install two (2) additional lights, one (1) near road and one (1) near restroom
	Pave two (2) barrier free parking spaces and access paths to picnic area, fishing pier and restrooms, upgrade restroom to barrier free standards with new handle on men's room door and install new proper height toilet seats
	Install at least one (1) interpretive display on the cultural and historic resources of the Project area.
Parr Shoals Dam Canoe Portage (proposed new facility)	SCE&G built an experimental canoe portage on the Newberry side of the Parr Shoals Dam. An approximately 1,600 ft. trail was cleared and appropriate signage was installed. Depending on usage and feedback from the agencies, SCE&G plans to formalize the canoe portage by bringing it into the Project boundary and maintaining it as an additional recreation facility.
Highway 34 Recreation Site (proposed new site)	Improve boat ramp - install geogrid and stabilize bank
	Grade and gravel to improve parking area
	Remove large trees that hinder vehicle access to ramp
	Install Recreation Sign on Highway 34 per FERC regulations

PROJECT RECREATION SITE	PROPOSED ENHANCEMENTS
	Bring into Project boundary, properties 211 parcel E (8.23 acres) and 285 parcel C (9.9 acres west of Railroad tracks) on Exhibit K-14 drawing
Enoree River Bridge Recreation Site (proposed new site)	Build canoe/kayak step down access within the PBL Install Recreation Sign on Maybinton Road per FERC regulations
Monticello Reservoir	
Scenic Overlook Recreation Site (existing site)	Add one (1) light at existing fishing pier
	Modify existing fishing pier for barrier free use, pave two (2) barrier free parking spaces and access path(s) to fishing pier
	Add two (2) new picnic tables
	Build one (1) barrier free shelter with one (1) barrier free picnic table, pave one (1) barrier free parking space and access path to new barrier free shelter
	Pave one (1) barrier free parking space and access path (SCE&G will need to coordinate this improvement with County)
Highway 215 Recreation Area (existing site)	Install at least one (1) interpretive display on the cultural and historic resources of the Project area.
Highway 99 West Recreation Site (existing site)	Add one (1) fishing pier
	Improve boat ramp in cove so it doesn't drop off
	Change two (2) existing lights, one (1) near boat ramp/courtesy dock and one (1) near new proposed fishing pier from standard to flood type lights
	Pave access paths or build ramps and platforms to courtesy dock, fishing pier & restrooms; and convert four (4) existing parking spaces into two (2) barrier free parking spaces
	Modify restrooms to allow year-round access - electricity exists in restrooms, so heat could be added in restroom and/or water pump room
Recreation Lake Access Area (existing site)	Install one (1) courtesy dock
Highway 99 East Recreation Site (proposed new site)	Add one (1) fishing pier
	Add two (2) benches
	Add two (2) picnic tables
	Add two (2) lights on one pole, one (1) light for fishing pier and one (1) light for parking area

APPENDIX A

CONSULTATION RECORD

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APPENDIX B

PROJECT RECREATION SITE FIGURES

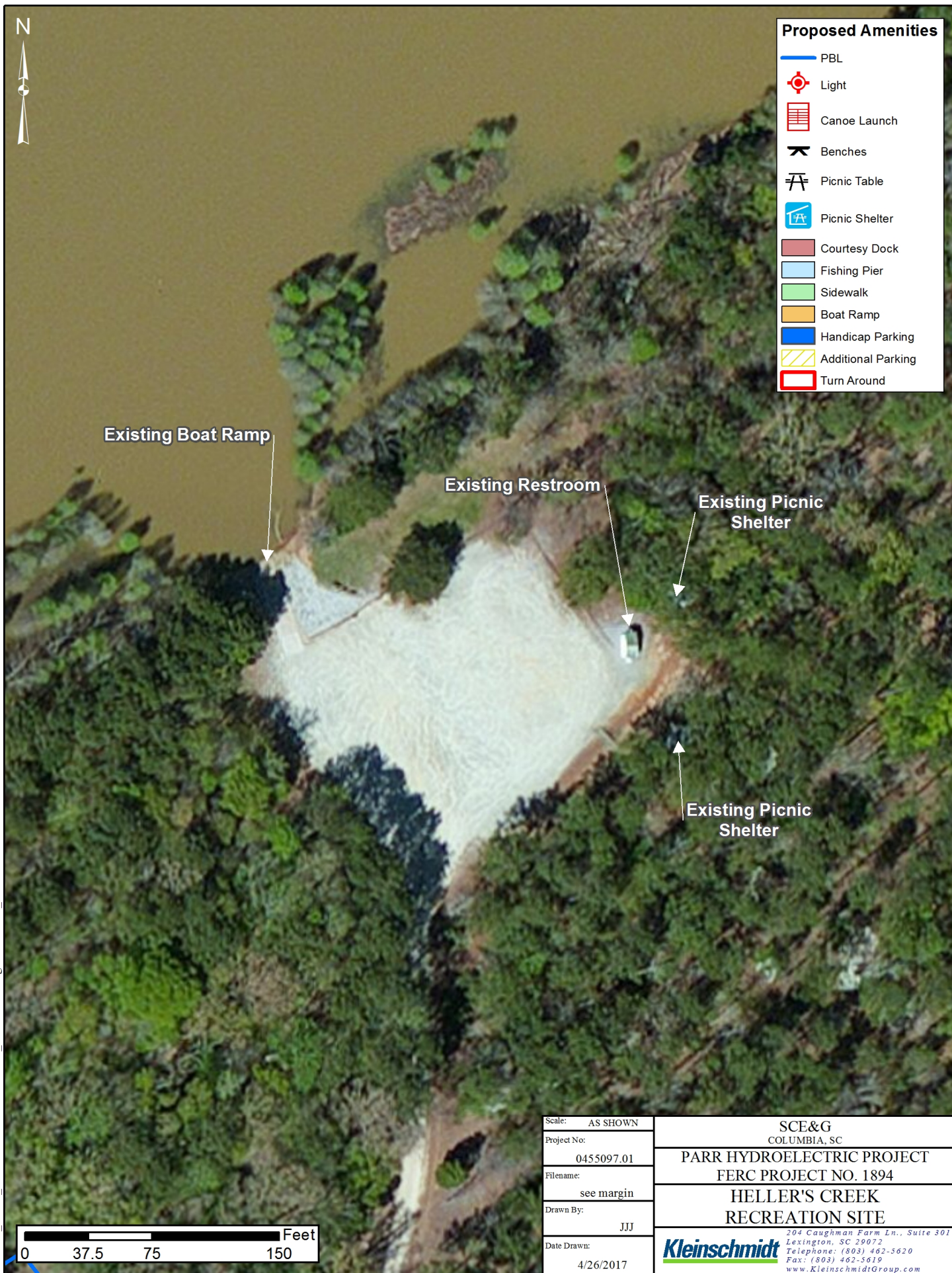
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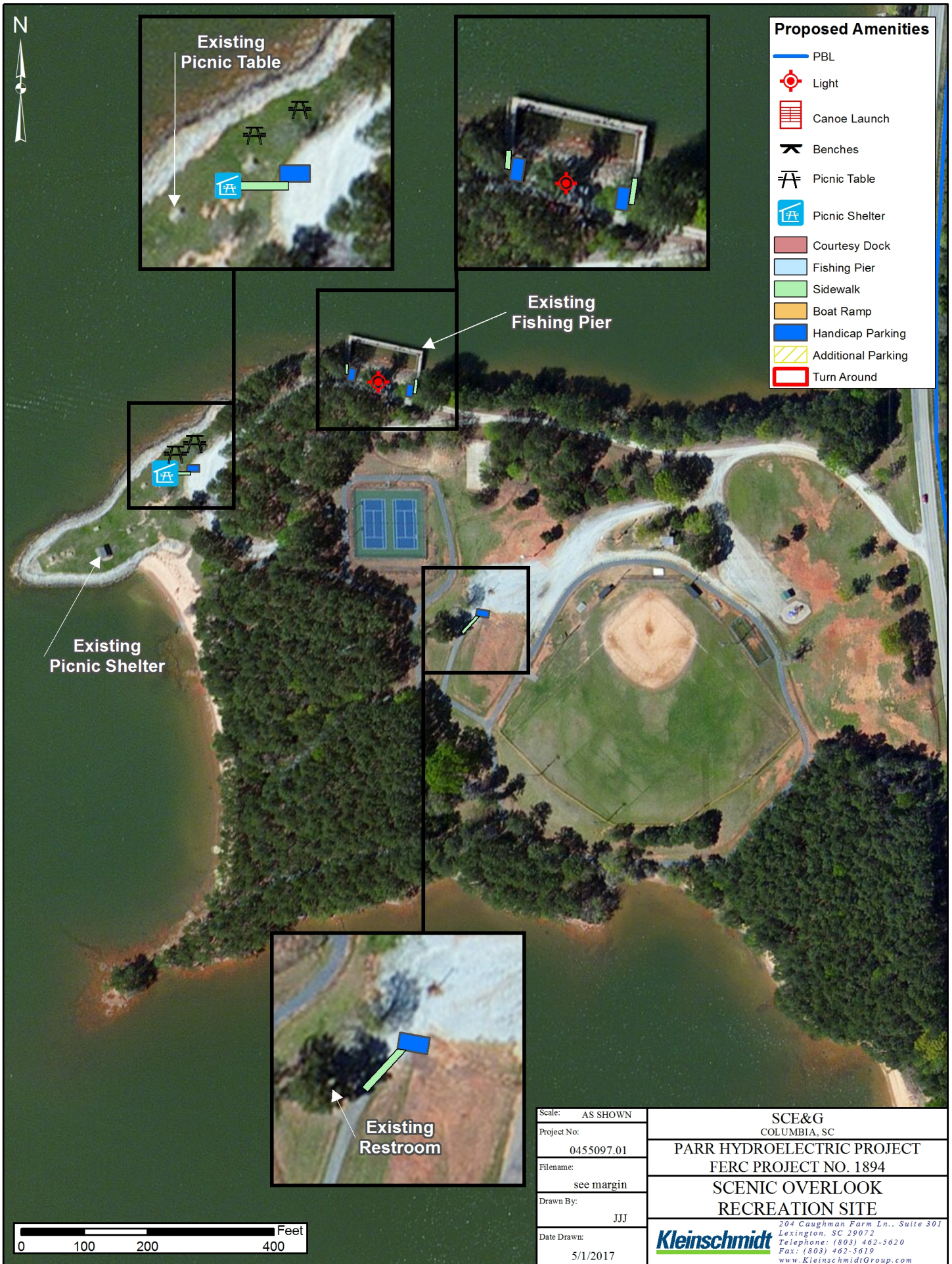
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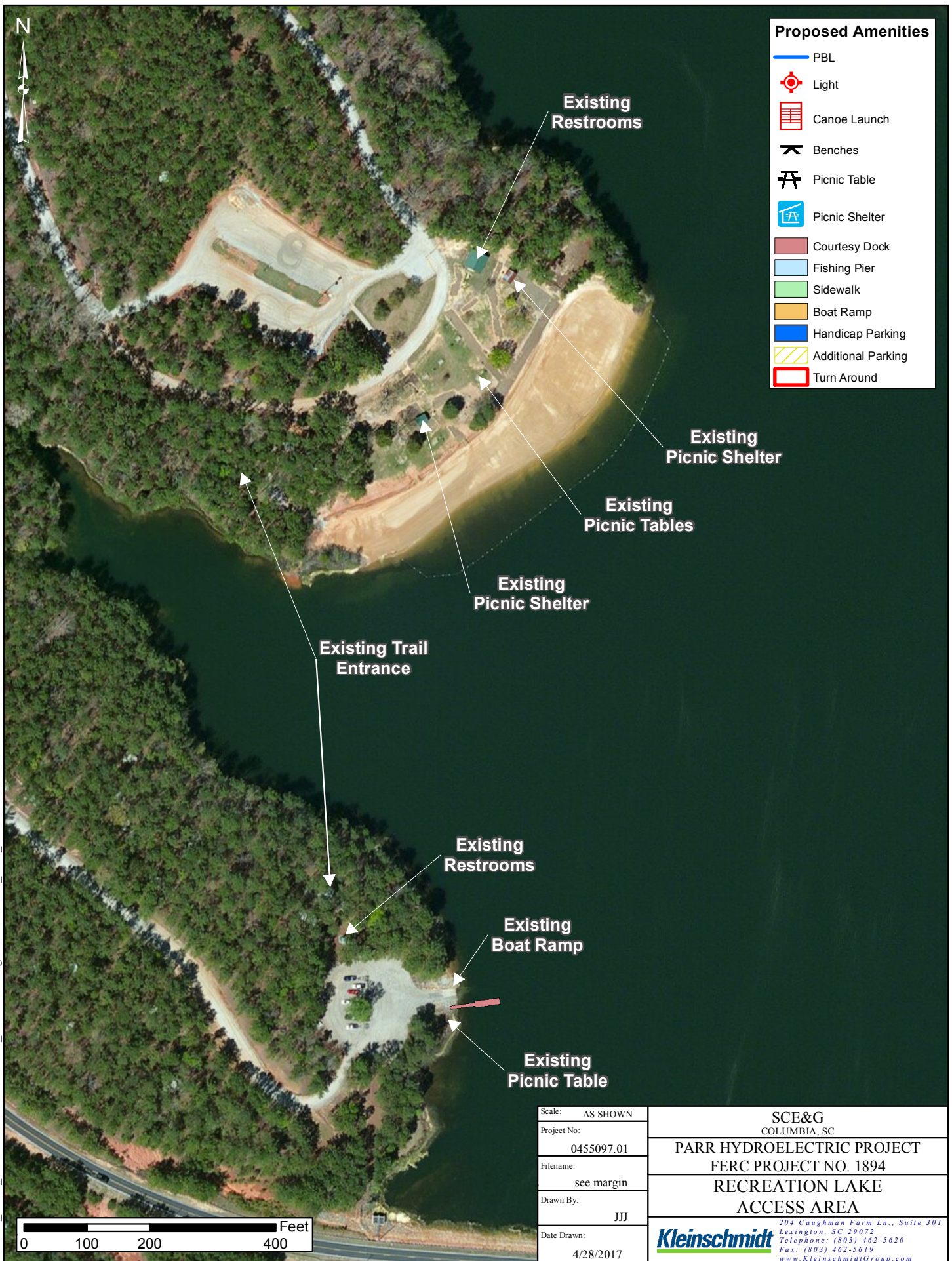


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Source: SCE&G, Kleinschmidt, ESRI



Source: SCE&G, Kleinschmidt, ESRI

APPENDIX C

RECREATION FACILITY TABLE

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TABLE 1 FERC-APPROVED RECREATION FACILITIES AT THE PARR HYDROELECTRIC PROJECT

RECREATION SITE NAME	RECREATION FACILITIES ^{7 8}
Cannon's Creek Recreation Site (<i>previously known as Cannon's Creek Site</i>)	30 vehicle w/trailer parking (<i>including 2 barrier free spaces</i>), 2 restrooms (<i>barrier free</i>), 1 boat ramp, 1 fishing pier, 1 courtesy dock, 2 picnic shelters, 2 picnic tables, 2 grills, primitive camping, interpretive display, accessible routes
Heller's Creek Recreation Site (<i>previously known as Heller's Creek Site</i>)	25 vehicle w/trailer parking, 2 restrooms, 1 boat ramp, 2 picnic shelters, 2 picnic tables, primitive camping
Scenic Overlook Recreation Site (<i>previously known as Overlook</i>)	Gravel parking areas (<i>including 3 paved barrier free spaces</i>), 2 restrooms (<i>barrier free</i>), 1 fishing pier (<i>barrier free</i>), 11 picnic tables (<i>including 1 barrier free picnic table</i>), 2 picnic shelters (<i>including 1 barrier free shelter</i>), overlook, accessible routes
Highway 215 Recreation Site (<i>previously known as Ramp 1</i>)	30 vehicle w/trailer parking spaces, 2 boat ramps, 1 courtesy dock, 2 picnic tables, 1 picnic shelter, interpretive display
Highway 99 West Recreation Site (<i>previously known as Ramp 2</i>)	80 vehicle w/trailer parking spaces (<i>including 2 barrier free spaces</i>), 2 restrooms, 3 boat ramps, 1 fishing pier, 1 courtesy dock, 5 picnic tables, 2 picnic shelters, 1 grill, primitive camping, accessible routes
Recreation Lake Access Area (<i>previously known as Ramp 3</i>)	105 parking spaces (<i>including 2 unpaved barrier free spaces</i>), 4 restrooms, 1 boat ramp, 26 picnic tables, 2 picnic shelters, 7 grills, beach, 1/3 mile hiking trail, 1 courtesy dock

TABLE 2 PROPOSED RECREATION FACILITIES AT THE PARR HYDROELECTRIC PROJECT

RECREATION SITE NAME	RECREATION FACILITIES
Parr Shoals Dam Canoe Portage	Canoe portage
Highway 34 Recreation Site	5 vehicle parking, geogrid boat ramp
Enoree River Bridge Recreation Site	Canoe/kayak step-down access facility
Highway 99 East Recreation Site	20 parking spaces, 1 fishing pier, 2 picnic tables, overlook with 2 benches

⁷ Proposed facilities are denoted in italics.

⁸ Highlighted recreation amenities are included in the Recreation Amenities Table included in Appendix D.

APPENDIX D

RECREATION AMENITIES TABLE

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TABLE 1 RECREATION AMENITIES FOR THE PARR HYDROELECTRIC PROJECT (FERC No. 1894)

PROJECT No.	DEVELOPMENT NAME	RECREATION AMENITY NAME	RECREATION AMENITY TYPE	AMENITY STATUS	LATITUDE	LONGITUDE	FERC CITATION & DATE	NOTES
P-1894	Parr Shoals Development	Cannon's Creek Recreation Site	Boat Ramp Area	Constructed	34.2867028°	-081.3625722°	52 F.P.C. 537 (1974) – 08/28/1974	1 boat ramp – 1 lane
P-1894	Parr Shoals Development	Cannon's Creek Recreation Site	Reservoir Fishing	Unconstructed	##.####	-##.####	### FERC ¶ ##,### MM/DD/YYYY	Fishing Pier
P-1894	Parr Shoals Development	Cannon's Creek Recreation Site	Picnic Area	Constructed	34.2868806°	-081.3625583°	52 F.P.C. 537 (1974) – 08/28/1974	2 picnic shelters, 2 picnic tables, 2 grills
P-1894	Parr Shoals Development	Cannon's Creek Recreation Site	Campsites	Constructed	34.2869778°	-081.3624333°	52 F.P.C. 537 (1974) – 08/28/1974	Primitive camping
P-1894	Parr Shoals Development	Cannon's Creek Recreation Site	Interpretive Display	Unconstructed	##.####	-##.####	### FERC ¶ ##,### MM/DD/YYYY	Industry Evolution on the Broad River
P-1894	Parr Shoals Development	Heller's Creek Recreation Site	Boat Ramp Area	Constructed	34.3193889°	-081.3746556°	52 F.P.C. 537 (1974) – 08/28/1974	1 boat ramp – 1 lane
P-1894	Parr Shoals Development	Heller's Creek Recreation Site	Picnic Area	Constructed	34.3191833°	-081.3739389°	52 F.P.C. 537 (1974) – 08/28/1974	2 picnic shelters, 2 picnic tables

PROJECT NO.	DEVELOPMENT NAME	RECREATION AMENITY NAME	RECREATION AMENITY TYPE	AMENITY STATUS	LATITUDE	LONGITUDE	FERC CITATION & DATE	NOTES
P-1894	Parr Shoals Development	Heller's Creek Recreation Site	Campsites	Constructed	34.3195139°	-081.3744611°	52 F.P.C. 537 (1974) – 08/28/1974	Primitive camping
P-1894	Parr Shoals Development	Parr Shoals Dam Canoe Portage	Canoe Portage Take-out	Unconstructed	##.####	-##.####	### FERC ¶ ##,### MM/DD/YYYY	Approx. 1,600-foot portage trail
P-1894	Parr Shoals Development	Parr Shoals Dam Canoe Portage	Canoe Portage Put-in	Unconstructed	##.####	-##.####	### FERC ¶ ##,### MM/DD/YYYY	Take-out and put-in counted as 1 canoe portage on Form 80
P-1894	Parr Shoals Development	Highway 34 Recreation Site	Boat Ramp Area	Unconstructed	##.####	-##.####	### FERC ¶ ##,### MM/DD/YYYY	1 boat ramp – 1 lanes
P-1894	Parr Shoals Development	Enoree River Bridge Recreation Site	Canoe Put-in	Unconstructed	##.####	-##.####	### FERC ¶ ##,### MM/DD/YYYY	Canoe/kayak step-down access facility
P-1894	Fairfield Development	Scenic Overlook Recreation Site	Reservoir Fishing	Constructed	34.3246639°	-081.2876972°	52 F.P.C. 537 (1974) – 08/28/1974	Fishing Pier

PROJECT NO.	DEVELOPMENT NAME	RECREATION AMENITY NAME	RECREATION AMENITY TYPE	AMENITY STATUS	LATITUDE	LONGITUDE	FERC CITATION & DATE	NOTES
P-1894	Fairfield Development	Scenic Overlook Recreation Site	Picnic Area	Unconstructed	##.####	-##.####	### FERC ¶ ##,### MM/DD/YYYY	8 picnic tables and 1 picnic shelter (constructed); <i>3 tables and 1 shelter (unconstructed).</i>
P-1894	Fairfield Development	Scenic Overlook Recreation Site	Overlooks/Vistas	Constructed	34.3238028°	-081.2897111°	52 F.P.C. 537 (1974) – 08/28/1974	Monticello Reservoir Overlook
P-1894	Fairfield Development	Highway 215 Recreation Site	Boat Ramp Area	Constructed	34.3275250°	-081.2856639°	52 F.P.C. 537 (1974) – 08/28/1974	2 boat ramps – 2 lanes
P-1894	Fairfield Development	Highway 215 Recreation Site	Picnic Area	Constructed	34.3265333°	-081.2852750°	52 F.P.C. 537 (1974) – 08/28/1974	1 picnic shelter, 2 picnic tables
P-1894	Fairfield Development	Highway 215 Recreation Site	Interpretive Display	Unconstructed	##.####	-##.####	### FERC ¶ ##,### MM/DD/YYYY	Industry Evolution on the Broad River
P-1894	Fairfield Development	Highway 99 West Recreation Site	Boat Ramp Area	Unconstructed	34.3762778°	-081.3178722°	### FERC ¶ ##,### MM/DD/YYYY	3 boat ramps, 3 lanes (constructed); <i>1 boat ramp to be extended (unconstructed)</i>

PROJECT NO.	DEVELOPMENT NAME	RECREATION AMENITY NAME	RECREATION AMENITY TYPE	AMENITY STATUS	LATITUDE	LONGITUDE	FERC CITATION & DATE	NOTES
P-1894	Fairfield Development	Highway 99 West Recreation Site	Reservoir Fishing	Unconstructed	###.####	-##.####	### FERC ¶ ##,### MM/DD/YYYY	Fishing Pier
P-1894	Fairfield Development	Highway 99 West Recreation Site	Picnic Area	Constructed	34.3766083°	-081.3175222°	52 F.P.C. 537 (1974) – 08/28/1974	2 picnic shelters, 5 picnic tables, 1 grill.
P-1894	Fairfield Development	Highway 99 West Recreation Site	Campsites	Constructed	34.3764472°	-081.3175639°	52 F.P.C. 537 (1974) – 08/28/1974	Primitive camping.
P-1894	Fairfield Development	Recreation Lake Access Area	Boat Ramp Area	Constructed	34.3793306°	-081.3133972°	52 F.P.C. 537 (1974) – 08/28/1974	1 boat ramp, 1 lane
P-1894	Fairfield Development	Recreation Lake Access Area	Picnic Area	Constructed	34.3818528°	-081.3135444°	52 F.P.C. 537 (1974) – 08/28/1974	2 picnic shelters, 26 picnic tables, 7 grills
P-1894	Fairfield Development	Recreation Lake Access Area	Beach Area	Constructed	34.3816556°	-081.3130639°	52 F.P.C. 537 (1974) – 08/28/1974	Beach Area
P-1894	Fairfield Development	Recreation Lake Access Area	Trails	Constructed	34.3828333°	-081.3144917°	52 F.P.C. 537 (1974) – 08/28/1974	1/3-mile hiking trail
P-1894	Fairfield Development	Highway 99 East	Reservoir Fishing	Unconstructed	###.####	-##.####	### FERC ¶ ##,### MM/DD/YYYY	Fishing Pier

PROJECT NO.	DEVELOPMENT NAME	RECREATION AMENITY NAME	RECREATION AMENITY TYPE	AMENITY STATUS	LATITUDE	LONGITUDE	FERC CITATION & DATE	NOTES
		Recreation Site						
P-1894	Fairfield Development	Highway 99 East Recreation Site	Picnic Area	Unconstructed	##.####	-##.####	### FERC ¶ ##,### MM/DD/YYYY	2 picnic tables
P-1894	Fairfield Development	Highway 99 East Recreation Site	Overlooks/Vistas	Unconstructed	##.####	-##.####	### FERC ¶ ##,### MM/DD/YYYY	Monticello Reservoir Overlook with 2 benches

SHORELINE MANAGEMENT PLAN PARR RESERVOIR

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

Prepared for:

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

Prepared by:

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Lexington, South Carolina
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May 2017

SHORELINE MANAGEMENT PLAN
PARR RESERVOIR

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**SHORELINE MANAGEMENT PLAN
PARR RESERVOIR**

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

EXECUTIVE SUMMARY

South Carolina Electric & Gas Company ("SCE&G") is the Licensee of the Parr Hydroelectric Project (Federal Energy Regulatory Commission ["FERC"] No. 1894) ("Project"). The Project consists of the Parr Shoals Development and the Fairfield Pumped Storage Development. The developments are located along the Broad River in Fairfield and Newberry Counties, South Carolina.

The Project developments form two distinct Project reservoirs. Parr Reservoir is located along the Broad River, as impounded by Parr Dam, and functions as the lower reservoir for the Fairfield Development. Monticello Reservoir is located adjacent to the Broad River and functions as the upper reservoir for the Fairfield Development. Both Project reservoirs serve as popular recreation destinations and are used and enjoyed by local residents as well as visitors to the state.

In conjunction with its relicensing activities, SCE&G has assembled a diverse and inclusive group of stakeholders to advise and assist in the development of two Shoreline Management Plans ("SMPs"), each tailored to a specific reservoir. SMPs are comprehensive plans for the management of Project land and adjoining water resources and their uses, consistent with License requirements and broad Project purposes, and appropriately accessible and beneficial to adjacent shoreline residents and the recreating public. A SMP serves to identify existing and appropriate future uses and to provide plans and programs for responsible future use and management of project lands and waters as well as the flora and fauna encompassed within them. This SMP exists specifically to address shoreline uses surrounding Parr Reservoir. A SMP to address Monticello Reservoir is included under separate cover and is available from the SCE&G Lake Management Department (Lake Management).

In addition to a SMP for each Project reservoir, a Shoreline Management Handbook and Permitting Guidelines (Permitting Handbook) was developed for both developments in

consultation with governmental, non-governmental, and individual stakeholders to address activities that will require consultation with and/or permits from SCE&G. These activities include construction, maintenance, and placement of docks on Monticello Reservoir, shoreline stabilization, lake access pathways and other shoreline activities.

The classification of Project lands surrounding Parr Reservoir is described in Section 5.0 and includes three management classifications. These classifications are as follows: Project Operations; Public Recreation; and, Non-Development Areas. Lands reserved for Project operations are those lands that are specifically required for operation of the Project. They include areas such as plant facility locations, dams, electrical substations, etc. Public Recreation land includes land within SCE&G developed recreation areas and islands that are owned by SCE&G. Undeveloped areas are areas protected from development to preserve the environmental resources and aesthetic values. Land use prescriptions associated with these land management classifications are discussed in further detail in Section 6.0. Prescriptions are administered through the Permitting Handbook.

SCE&G maintains a strong commitment to the management of the waters and shoreline of Parr Reservoir, focusing on the social, ecological, and economic impacts of activities on and near the shoreline and water, taking into consideration in particular the environmental, aesthetic, and recreational character of the shoreline and lake. Section 7.0 details the activities and structures on and adjacent to Parr Reservoir that require SCE&G consultation and/or approval. The permitting procedures for shoreline activities or structures are set out in more detail in Section 8.0 and in the Permitting Handbook.

Section 9.0 details SCE&G's fee structure for the shoreline management program. Such fees can be one-time or periodic.

Periodic surveys of the Parr Reservoir shoreline are conducted by SCE&G and include, among other things, inventories of unauthorized structures. These represent violations of the SMP. SMP violations will be dealt with as deemed by SCE&G, in its sole discretion, to be appropriate. Consequences of violations may range from required removal of unauthorized structure, fines, and/or legal action, and are discussed more fully in Section 10.0.

SCE&G Shoreline Management Practices include actions taken to lessen or mitigate for potential impacts to a particular resource resulting from its direct or indirect use. These include but may

not be limited to landowner Best Management Practices ("BMP"). Shoreline Management Practices are further described in Section 11.0 of this document.

Public education and outreach on the protection of valuable shoreline resources is integral to the effectiveness of the SMP. Section 12.0 of this document details specific measures to be undertaken to help educate both adjacent shoreline residents and other Project resource users. Among included objectives will be SMP education and BMP education.

In its Application for New License, SCE&G is proposing 10 year review periods for the SMP. The 10 year SMP review periods provide reasonable opportunities for SCE&G, in concert with governmental, non-governmental, and individual stakeholders, periodically and deliberately to assess new issues that arise as a result of development around the Reservoir, and allow for analyses of cumulative effects. Concurrently with the FERC SMP review process, SCE&G will review the Permitting Handbook with interested stakeholders periodically to ensure its effectiveness; however, changes to the permitting process may be made as it deems necessary and appropriate. This is discussed in Section 13.0.

**SHORELINE MANAGEMENT PLAN
PARR RESERVOIR**

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

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**SHORELINE MANAGEMENT PLAN
PARR RESERVOIR**

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

1.0 INTRODUCTION

The Parr Hydroelectric Project ("Project") is located on the Broad River in Fairfield and Newberry Counties, South Carolina (Figure 1-1). The Project is located approximately 31 river miles downstream of the Neal Shoals Hydroelectric Project (Federal Energy Regulatory Commission ["FERC"] No. 2315) and 24 river miles upstream of the Columbia Diversion Dam. The Project consists of two developments: the Parr Shoals Development ("Parr Development") and the Fairfield Pumped Storage Development ("Fairfield Development"). Subsequently, two reservoirs are included as part of the Project, Monticello Reservoir¹ and Parr Reservoir. The normal maximum water level in Monticello Reservoir is El. 425.0 feet National Geodetic Vertical Datum ("NGVD"), which corresponds to a surface area of 6,800 acres, and a gross storage of 400,000 acre-feet. Monticello Reservoir has approximately 57 miles of shoreline within the Project boundary². Parr Reservoir's normal maximum water level is at El. 266.0 feet NGVD, with a corresponding surface area of 4,400 acres. The gross storage is estimated to be 32,000 acre-feet. Parr Reservoir has approximately 88 miles of shoreline within the Project boundary.

An active storage of up to 29,000 acre-feet is transferred between the two reservoirs by the pumped storage operations of the Fairfield Development. Fairfield Development's alternate cycles of generation and pumping results in daily fluctuations in the water levels of both Monticello and Parr Reservoirs. Monticello, when beginning at normal maximum pool elevation, drops 4.5 to 5 feet over a 10 to 12 hour period during the generating phase of operation. At the same time, the water from Monticello and from the Broad River is flowing into Parr Reservoir,

¹ The State of South Carolina considers Monticello Reservoir waters of the State and refers to it as "Lake Monticello".

² Standard License Article 5 requires licensees to acquire and retain sufficient property and rights to construct, maintain, and operate their projects, as identified in their specific license, including any property or rights needed to accomplish all designated project purposes. As such, Project lands are those lands within the FERC project boundary owned by SCE&G in fee title and those lands for which SCE&G has acquired or retained an easement.

causing it to rise as much as 10 feet. During the pumping cycle, the reverse occurs – the water level rises in Monticello Reservoir and drops in Parr Reservoir.

The Project boundary encompasses land around each reservoir. South Carolina Electric & Gas Company ("SCE&G") manages SCE&G-owned lands within the Project boundary ("Project property") to comply with the FERC License for the Project (the "Licensee"). The goal of project land management is to serve the public interest by providing recreational access and opportunities, protecting wildlife habitat and water quality, producing electricity, and protecting and preserving cultural and aesthetic resources. The Shoreline Management Plan ("SMP") provides a set of administrative policies, procedures, and practices by which SCE&G seeks to manage the Project shoreline to achieve these goals. Future proposals for specific shoreline related developments or activities will be reviewed for consistency with the SMP.

A draft of the initial Project SMP was filed with the FERC in 1991. After several years of discussion and revisions, the initial SMP was approved by the FERC on June 4, 2001. The history of the Project's SMP is described in more detail in Section 3.0 (History of the Shoreline Management Plan). The current relicensing³ of the Project provides a near term impetus and opportunity for SCE&G to review the existing SMP in cooperation with relicensing stakeholders, including federal and state regulatory agencies, interested non-governmental organizations ("NGO"s), and individuals. Through discussions with these parties, it was decided that the existing FERC approved SMP, which encompasses both Parr and Monticello Reservoirs, should be divided into two distinct SMP's, one for each reservoir. Hence, this SMP has been prepared for Parr Reservoir and is being submitted to FERC as part of SCE&G's Parr Hydroelectric Project comprehensive relicensing package. A SMP for Monticello Reservoir is included under separate cover.

The management guidelines set forth in this SMP are applicable to all lands within the Project boundary surrounding Parr Reservoir. Among other things, the current document includes the following components:

- Detailed descriptions, management prescriptions and mapping of land classifications;
- Summary information on the Permitting Handbook and fee policies;

³ The current operating License for the Project is due to expire on June 30, 2020. As such, SCE&G will file for a new License with FERC on or before June 30, 2018.

- Best management practices ("BMP"s);
- Public education and outreach;
- Reservoir monitoring; and
- A proposed review process.

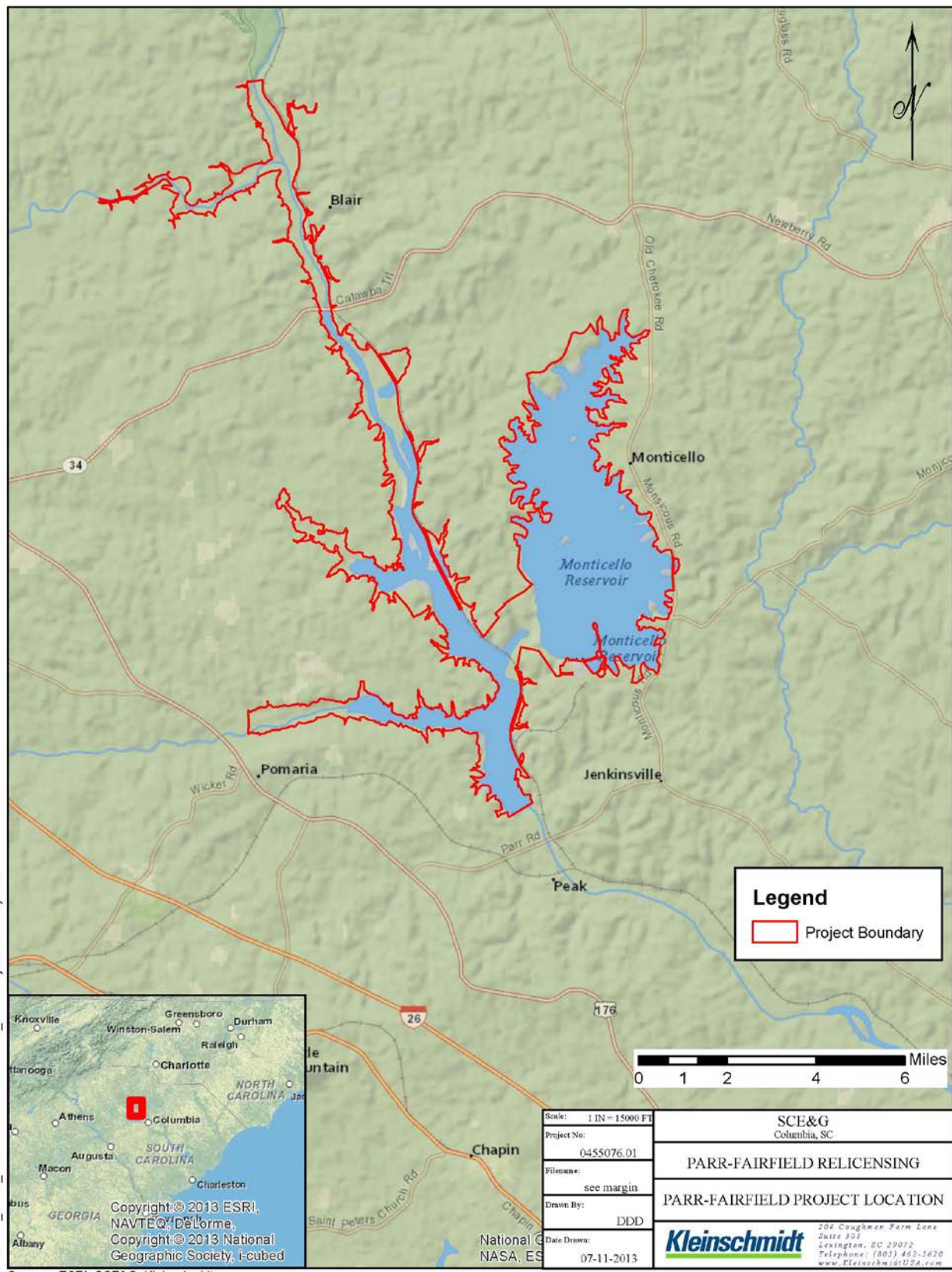


FIGURE 1-1 PROJECT LOCATION AND BOUNDARY MAP

2.0 PURPOSE AND SCOPE OF THE SHORELINE MANAGEMENT PLAN

The Project has served as a major source of power generation for SCE&G's customers and recreation for local residents and visitors to South Carolina for several decades. Consistent with FERC's Standard Land Use Article, a licensee may authorize specific non-project uses and occupancies of a project's shoreline. Examples of non-project uses at Parr Reservoir include access paths across SCE&G property, and water withdrawal. SCE&G has a responsibility to ensure that non-Project uses remain consistent with Project purposes, including protection and enhancement of the Project's scenic, recreational, and environmental values.

As development increases in areas surrounding the Project, so too does stress placed upon Project reservoirs and the surrounding watershed. Thus, a comprehensive SMP for each reservoir that recognizes and addresses sources of potential environmental impact is essential to managing each reservoir for the benefit of all interests and to ensure that non-Project uses remain consistent with the License.

The implementation of the SMP by SCE&G will help to maintain and conserve the area's natural and man-made resources. The SMP will comply with the terms of the License, as well as the regulations and orders of FERC, and is intended to assist in providing a balance between recreational use and development, environmental protection, and energy production.

3.0 HISTORY OF THE SHORELINE MANAGEMENT PLAN

Parr Reservoir is formed by the Parr Shoals Dam ("Dam"), which was originally constructed between 1912 and 1914. The Dam is situated across the Broad River and houses a 14.88 megawatt (MW) hydroelectric facility, located in an integral powerhouse. On August 28, 1974, the Federal Power Commission (FPC), predecessor to the FERC, issued SCE&G a new operating License for the Parr Shoals Development. In addition to relicensing the existing facilities, the new License authorized the construction of the 511.2 MW Fairfield Pumped Storage Development. This resulted in the creation of the Fairfield Development's upper pool, Monticello Reservoir. The new License also authorized the enlargement of the existing Parr Reservoir to serve as the lower pool to the Fairfield Development. This involved raising the height of the Dam approximately 9 feet, thereby nearly doubling Parr Reservoir's surface area. The construction of newly licensed facilities was completed in 1978, with the facilities beginning commercial operation that same year. The newly developed Project, including both Parr and Fairfield Developments, was subsequently referred to as the Parr Hydroelectric Project.

Article 48 of the Project License issued in 1974 required that SCE&G purchase in fee and include within the Project boundary all lands necessary or appropriate for project operations, including lands for recreational use and shoreline control. The lands encompassed by the Project boundary shall include, but not be limited to: the islands in the Parr and Monticello Reservoirs formed by the 266-foot and 425-foot contour intervals, respectively; shoreline lands up to the 270-foot contour, or 50 feet (measured horizontally) from the Parr Reservoir's 266-foot contour, whichever is greater; and, shoreline lands up to the 430-foot contour interval, or 50 feet (measured horizontally) from Monticello Reservoir's 425-foot contour, whichever is greater. Provided that the Project boundary, except with respect to land necessary or appropriate for recreational purposes, shall not exceed 200 feet, horizontally measured, from the 266-foot or the 425-foot contour, unless satisfactory reasons to the contrary are given. The FPC determined that acquiring these lands would provide SCE&G with adequate shoreline control around the reservoirs, in addition to serving the purposes of Project operation and recreation.

Furthermore, Article 20 of the Project License orders that SCE&G allow public access, to a reasonable extent to Project waters and adjacent Project lands (with the exception of lands necessary for the protection of life, health, and property) for navigation and outdoor recreational

purposes. This Article also allows SCE&G to grant permits for public access to the reservoirs subject to FERC approval.

In 1991, SCE&G recognized that appropriate policies and procedures should be in place to govern shoreline activities at the Project. Utilizing experience gained at their Saluda Hydroelectric Project (FERC No. 516), SCE&G filed a proposed SMP with FERC to regulate the use of Project shorelines. After extensive stakeholder consultation, an amended SMP was filed with FERC. It was approved on June 4, 2001. The SMP was included as part of the Project's Exhibit R.

The SMP approved in 2001 primarily covered activities associated with Monticello Reservoir. It dealt with the following matters: water quality management; forest management; waterfowl management; nuclear exclusion zone restrictions for the operation of SCE&G's V.C. Summer Nuclear Station; fishing, boating, and hunting; public access and recreation; private boat docks and access; vegetation removal; erosion control; and, prohibited activities.

In 2006, SCE&G amended the SMP's policy regarding common docks on Monticello Reservoir. The original policy allowed for two to five property owners to share a single common dock if the shoreline frontage requirement of 200 feet was met. The policy was amended to allow no more than two individual, adjacent single family residential lots to share a common dock. The shoreline frontage requirement of 200 feet was retained.

As noted, the previous SMP included very little pertaining to Parr Reservoir. As such, the need for a new SMP specifically pertaining to Parr Reservoir was identified.

3.1 CURRENT SMP DOCUMENT AND SHORELINE CLASSIFICATIONS

The SMP serves as a reference document for SCE&G in implementing the Standard Land Use Article, which authorizes SCE&G to permit certain non-project uses of project lands and waters. FERC did not begin including the Standard Land Use Article in new licenses until the early 1980's; thus, it was not included in the Project License issued in 1974. However, FERC granted SCE&G the authority to permit certain non-Project uses through the approval of the 2001 SMP, and added the Standard Land Use Article to the License (Article 62) in 2011, as revised in 2013 (Article 63). This present document, submitted in conjunction with SCE&G's License application, presents a management plan, covering only Parr Reservoir (a SMP for Monticello

Reservoir is included under separate cover), while adhering to the historical management goals agreed to and developed with agencies and stakeholders.

In addition to an updated SMP for each Project reservoir, a Permitting Handbook was developed in consultation with stakeholders and agencies to address activities requiring consultation with and/or permits from SCE&G. These activities include, but are not limited to the following: shoreline stabilization, access path development, and other shoreline activities. SCE&G will review the Permitting Handbook with interested stakeholders periodically to evaluate its effectiveness; however, SCE&G may make changes to the permitting process at any time as it determines in its sole judgment to be necessary and appropriate.

3.2 PROJECT BOUNDARY

SCE&G owns in fee or obtained flowage rights for all lands necessary or appropriate for project operations, including lands for recreational use and shoreline control. A Project boundary map is included as Figure 1-1.

4.0 SHORELINE MANAGEMENT PLAN GOALS AND OBJECTIVES

The overall goal of this SMP is to define, document, and present the processes and criteria that SCE&G will employ to manage and balance private and public access to and uses of Project lands, specifically including Parr Reservoir's shoreline, consistent with public safety, energy production operations, environmental protection for Project land as well as Project waters, and reasonable recreational opportunities. This SMP will help to ensure the protection and enhancement of the Project's scenic, environmental, recreational, natural and cultural resources over the term of the License.

This SMP represents a consensus-based, updated management plan intended for submittal with the Project No. 1894 License Application. Specific goals relative to the SCE&G relicensing process that are discussed under this SMP include the following:

1. Provide for reasonable current and future public access;
2. Provide for current and future recreational needs within the Project;
3. Protect fish and wildlife habitat;
4. Protect cultural resources;
5. Protect the ability to meet operational needs;
6. Facilitate compliance with License articles;
7. Minimize adverse impacts to water quality;
8. Protect scenic values;
9. Monitor and permit shoreline activities;
10. Provide a summary catalogue of the types and locations of existing recreational opportunities;
11. Establish Land Management Classifications and Land Use Prescriptions to help in the management of non-Project uses of the Parr Reservoir shoreline lands within the Project boundary;
12. Describe the SMP amendment and monitoring process; and
13. Educate and encourage property owners who own property adjacent to or adjoining Project Property (herein referred to as "adjacent property owners") on the use of voluntary BMPs.

4.1 CONSULTATION

The Project relicensing provides an opportunity for SCE&G to seek input on Project-related shoreline management issues from interested stakeholders. SCE&G recognizes that successfully completing the relicensing process requires identifying and resolving Project issues in consultation with federal and state resource agencies, local and national NGOs, homeowner associations, and individuals who have an interest in the Parr Hydroelectric Project (Table 4-1). SCE&G began public outreach efforts in January 2013 by holding a series of public workshops in Winnsboro, Newberry, Columbia, and Jenkinsville, SC. Since that time, SCE&G has sought active public involvement in the process and fostered commitment to issue resolution among SCE&G and stakeholders.

TABLE 4-1 PARTICIPATING GROUPS IN PARR HYDROELECTRIC PROJECT RELICENSING

STAKEHOLDER GROUPS
American Rivers
American Whitewater
Catawba Indian Nation
City of Columbia
Chestnut Hill Plantation HOA
Coastal Conservation League
Congaree Riverkeeper
Environmentalists Inc.
Fairfield County
Gills Creek Watershed
National Marine Fisheries Service
National Park Service
Newberry County
South Carolina Department of Health and Environmental Control
South Carolina Department of Natural Resources
South Carolina Department of Parks, Recreation and Tourism
South Carolina Electric & Gas Company
South Carolina Historic Preservation Office
Town of Winnsboro, SC
Tyger-Enoree River Alliance

STAKEHOLDER GROUPS

United States Fish and Wildlife Service

United States Forest Service

University of South Carolina

4.1.1 RECREATION/LAKE AND LAND MANAGEMENT RESOURCE CONSERVATION GROUP

In support of the relicensing effort, SCE&G formed three Resource Conservation Groups ("RCG"s) to identify, address and resolve Project-related issues by resource area. The RCGs are as follows: the Fish, Wildlife and Water Quality RCG; the Project Operations RCG; and the Lake & Land Management and Recreation RCG. Consideration of potential issues by resource area allows for more focused topic discussion and targeted issue resolution. Some RCGs have established sub-groups, or Technical Working Committees ("TWC"s), for issues requiring special knowledge, education, or experience. Consequently, the Lake & Land Management and Recreation RCG has a Lake and Land Management TWC as well as a Recreation TWC. The Lake and Land Management TWC is discussed further below.

4.1.2 LAKE AND LAND MANAGEMENT TECHNICAL WORKING COMMITTEE

The primary mission of the Lake and Land Management TWC is to revise the existing Parr Hydroelectric Project SMP to provide a management framework within which Project resources can be effectively protected while assuring appropriate public and private access to the Project resources and the recreational opportunities they present. Another important focus of the TWC is to allow interested parties an effective opportunity to provide input on resource issues and the overall future management of shoreline resources. The resulting collaboration has resulted in the contribution of valuable information by entities and individuals familiar with the Project. The forum was instrumental in addressing important issues relevant to the operation and management of the Project over the term of the new License. In working collaboratively, the members of the TWC (Table 4-2) aimed to blend the objectives of the state and federal resource agencies with other stakeholder interests.

**TABLE 4-2 ORGANIZATIONS PARTICIPATING ON THE LAKE AND LAND MANAGEMENT
TWC**

STAKEHOLDER GROUPS
American Rivers
American Whitewater
Coastal Conservation League
Congaree Riverkeeper
Fairfield County
Gills Creek Watershed
Adjacent Property Owners
National Marine Fisheries Service
National Park Service
South Carolina Department of Health and Environmental Control
South Carolina Department of Natural Resources
South Carolina Department of Parks, Recreation and Tourism
South Carolina Electric & Gas Company
Tyger-Enoree River Alliance
United States Fish and Wildlife Service
United States Forest Service

4.1.3 MEETING SCHEDULE

Between October of 2013 and January of 2018, SCE&G has held numerous meetings of the Lake and Land Management and Recreation RCG and Lake and Land Management TWC to discuss the details of the Project SMPs. The efforts of the TWC are reflected herein.

5.0 LAND USE CLASSIFICATIONS

Three distinct land management classifications have been developed for the shorelines surrounding Parr Reservoir. These land management classifications are as follows: Project Operations; Public Recreation; and, Non-Development Areas. The Public Recreation Classification includes designated public recreation areas, WMA and some islands within Parr Reservoir. Although SCE&G intends to manage its lands according to this classification system, the public generally will not be precluded from access to SCE&G-owned lands regardless of classification, with the exception of lands reserved and used for Project operations or other areas specifically protected from public access and posted as such. The sections below explain/define the land management classifications. The acreages and parcels for each of the classifications are provided in Table 5-1. Figure 5-1 depicts their distribution around Parr Reservoir.

TABLE 5-1 SHORELINE MILES AND ACREAGES BY LAND USE CLASSIFICATION⁴

CLASSIFICATION	SHORELINE MILES	ACRES
Project Operations*	2.77	90
Public Recreation ⁵ *	5.78	810
Non-Development Areas*	79.11	2,217
TOTAL	87.66	3,117

*No docks allowed

⁴ Preliminary information; final data will be provided in the final SMP.

⁵ Includes recreation lands and SCDNR-managed waterfowl areas.

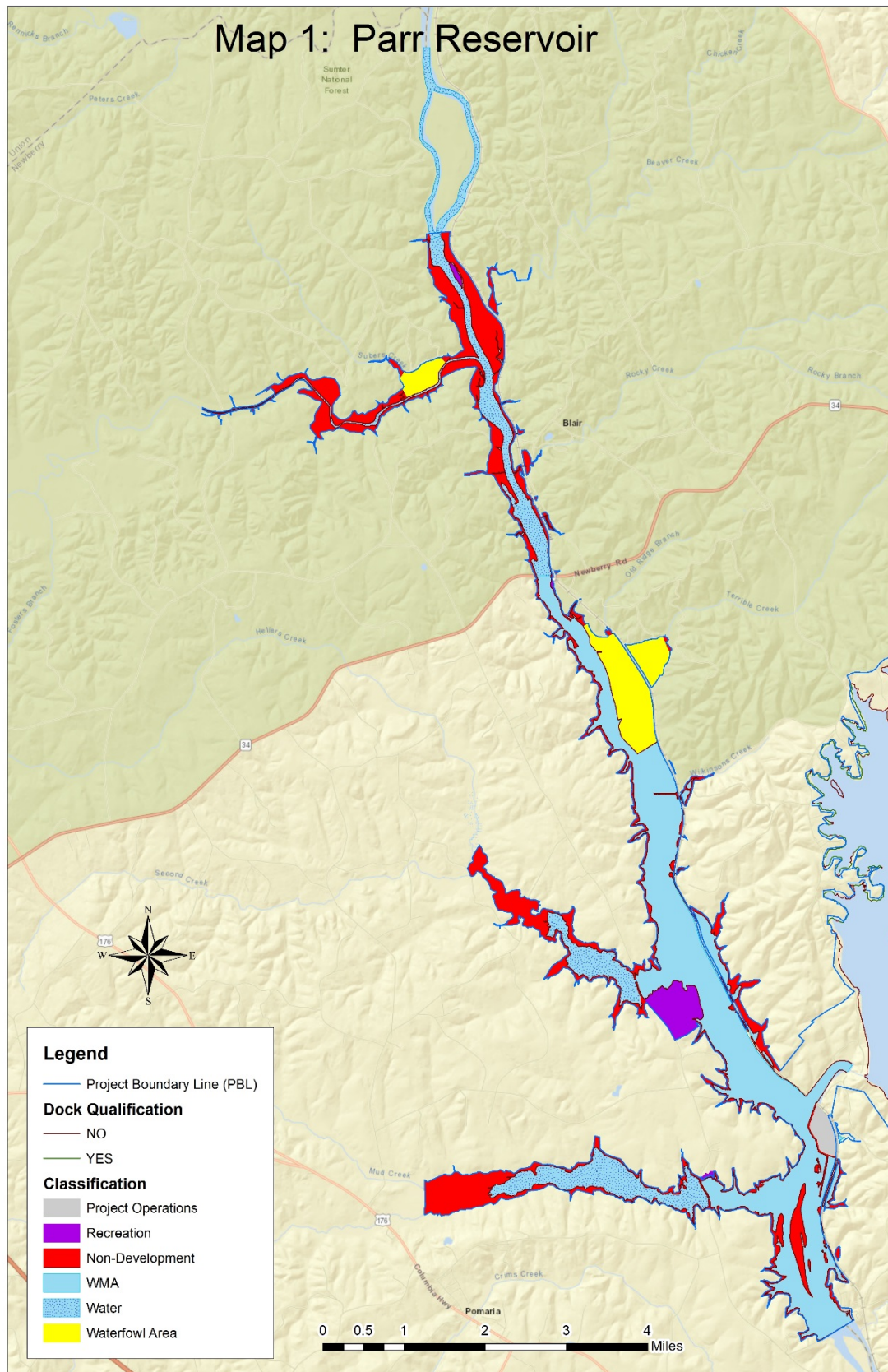


FIGURE 5-1 SHORELINE CLASSIFICATIONS MAP FOR PARR RESERVOIR

5.1 PROJECT OPERATIONS

Areas under this classification include SCE&G-owned and managed lands required for operation of the Parr Development. Public access to these lands is restricted to ensure public safety or to assure the security of the infrastructure system.

5.2 PUBLIC RECREATION

Project lands under this classification serve as recreational resources for the public and include areas managed expressly for recreation as well as those with recreation as a secondary usage. This classification includes South Carolina Department of Natural Resources (SCDNR)-managed waterfowl areas located on Project lands. This classification also includes properties set aside for recreational development. Public Recreation lands include the following sub-classifications:

- Public Access Areas;
- Islands owned by SCE&G;

5.2.1 PUBLIC ACCESS AREAS

This sub-classification includes public boat launches, and other areas currently being managed for public access. SCE&G has developed and maintains four public access areas and one canoe portage on Parr Reservoir. These include the following:

- Cannon's Creek Recreation Site
- Heller's Creek Recreation Site
- Highway 34 Recreation Site
- Enoree River Bridge Recreation Site
- Parr Shoals Dam Canoe Portage

Each Project recreation site provides facilities for boat launching, courtesy dock(s), and/or picnic facilities for public use.

5.2.2 ISLANDS AND SHOALS

SCE&G-owned islands located within Parr Reservoir are available for public recreational use in accordance with authorized activities (See the Permitting Handbook for authorized activities).

5.3 NON-DEVELOPMENT AREAS

Project lands under this classification are protected from private development. This is done for the protection of the environmental and aesthetic integrity of the shoreline.

6.0 LAND USE PRESCRIPTIONS

Land use prescriptions are based upon and reflect the guiding principles regarding the management of the SCE&G-owned lands within each classification. SCE&G publishes a detailed Permitting Handbook (included under separate cover) that contains descriptions of the permitting processes and specifications for various shoreline developments. Activities that require consultation with and/or permits from SCE&G include the following: construction, maintenance and placement of docks and boat lifts, shoreline stabilization; construction and maintenance of shoreline pathways, and other shoreline activities. Persons interested in shoreline development must contact SCE&G's Lake Management Department (803) 217-9221 to obtain permitting guidance and a copy of the Permitting Handbook. Section 8.0 of this document discusses the Permitting Handbook in greater depth. General information regarding permitting requirements is included where applicable within the scope of each management prescription below.

6.1 PROJECT OPERATIONS

Properties classified as Project Operation contain project works critical to the operation of the Parr Shoals Development. Public access to, or activities upon, these lands is restricted for reasons of safety and security.

6.2 PUBLIC RECREATION

Project lands devoted to public recreation include developed park sites, properties set aside for recreational development and islands and shoals. SCE&G manages the areas based on the specific, designated recreational activities including fishing, picnicking, and boat launching⁶. Primitive overnight camping is allowed on Public Recreation lands surrounding Parr Reservoir. Public hunting may be allowed on specific Public Recreation lands in accordance with state hunting regulations, as expressly discussed under each subsection below. See SCDNR's website for state hunting regulations (<http://dnr.sc.gov>).

6.2.1 PUBLIC ACCESS AREAS

SCE&G maintains four public access areas and one canoe portage on Parr Reservoir. These areas are depicted in Figure 12-1. Primitive overnight camping is allowed at Parr Reservoir Public

⁶ SCE&G manages some of the lands classified for public recreation for timber. Information on SCE&G's forest management practices is included in Section 11.1.1.

Access Areas. Private permitted activities are excluded under this classification. Public hunting and shooting are not allowed at SCE&G Public Access Areas.

6.2.2 ISLANDS AND SHOALS

Islands and shoals are located on Parr Reservoir and are open for public recreational use, such as bank fishing, walking, and bird watching. Overnight camping is not allowed on islands and shoals within Parr Reservoir. Hunting is allowed on islands and shoals in accordance with state hunting regulations.

6.3 NON-DEVELOPMENT AREAS

Lands under this classification warrant special protection because they may provide important habitat or aesthetic values. Meandering paths and water withdrawals on lands under this classification may be considered on a case-by-case basis by SCE&G. Primitive overnight camping is allowed on non-development property surrounding Parr Reservoir. Unless otherwise posted, hunting is allowed in non-development areas in accordance with state hunting regulations.

7.0 SHORELINE ACTIVITIES REQUIRING SCE&G APPROVAL

SCE&G maintains a strong commitment to managing the shoreline of Parr Reservoir for multiple resources by considering the impact of various activities on the environmental, aesthetic, and recreational character of the lands. SCE&G owns and manages property around the entire periphery of Parr Reservoir. Thus, any activity occurring on the "shoreline" is occurring on SCE&G property. Activities not in compliance with the shoreline activity parameters outlined in this SMP and in the Permitting Handbook may constitute a trespass which SCE&G may elect to prosecute.

7.1 AUTHORIZED ACTIVITIES REQUIRING APPROVAL THROUGH THE PERMITTING HANDBOOK

Only the following activities and structures may be permitted on Parr Reservoir:

- Construction of a meandering access path; and
- Water withdrawal for non-commercial agricultural/landscaping irrigation purposes.

7.2 PROHIBITED STRUCTURES AND ACTIVITIES

Activities and structures that SCE&G does not allow include, but are not limited to, the following:

Prohibited Structures:

- Private boat docks;
- Private shoreline stabilization;
- Boathouses;
- Private boat ramps;
- Commercial marinas;
- Marine rails;
- Sea walls;
- Fences;
- Electrical service;
- Permanent structures;
- Land-based structures, storage buildings, shelters, patios, gazebos, fences, swimming pools, satellite dishes, signs, storage of boats, canoes or other watercraft or automobiles;
- Septic tanks and/or drain fields;

Prohibited Activities:

- Jet skiing;
- Water skiing;
- Parasailing
- Paragliding
- Mooring;
- Excavations/dredging (except commercial operations permitted by the state);
- Effluent discharges;
- Storage or stockpiling of construction material;
- Livestock access to reservoir⁷;
- Vegetation removal of any type except in a permitted access path to the shoreline;
- Primitive or overnight camping on islands and shoals within Parr Reservoir;
- Use of herbicides: and
- Limbing or trimming of vegetation on Project property to create views or visual corridors.

⁷ Unless grandfathered through deed reservations.

8.0 PERMITTING PROCESS FOR SHORELINE ACTIVITIES OR STRUCTURES

8.1 SHORELINE PERMITTING PROCEDURES

Applicants must obtain the proper permit(s), per the SCE&G's Permitting Handbook, prior to the initiation of any construction or activity on the Parr Reservoir shoreline, which consists of the lands below the 266-foot contour interval and designated Project property. As noted above, some activities may also require local, state, and/or federal permits.

Whether a non-Project use is approved under the Standard Land Use article or through prior FERC approval, SCE&G is responsible for ensuring that the use is consistent with the purposes of protecting or enhancing the scenic, recreational, and other environmental values of the Project. To assist applicants in the permitting process, the staff at the SCE&G Lake Management Department is available to answer questions regarding documentation, permits, and specification requirements for their particular project. Permits from SCE&G are required for the following activities:

- Construction of a meandering access path;
- Water withdrawal for non-commercial agricultural/landscaping irrigation purposes.

It is highly advisable to begin the consultation process with SCE&G Lake Management staff at the planning stage of a project. SCE&G staff will be available to discuss specific permitting requirements with the property owner. Depending on the proposed new facility or activity, local, state and federal resource agencies may impose requirements on construction start/stop dates, the placement of erosion control devices, treatment plans, remedial measures, submittal of start construction notifications, and/or best management practices. Any permit applicant should be aware of such conditions, as violations may nullify a permit.

An overview of permitted activities is included below. Detailed information on SCE&G's permitting process, guidelines, and specifications, is provided in SCE&G's Permitting Handbook available by calling (803) 217-9221, or by writing:

SCE&G Lake Management Department
6248 Bush River Road
Columbia, SC 29212

8.1.1 SHORELINE VEGETATION MANAGEMENT

In general, SCE&G maintains a policy of non-disturbance of any vegetation below the 266-foot contour or on Project property without approval from SCE&G. Permission to remove vegetation within a permitted access path will only be granted by SCE&G Lake Management after a site visit with the applicant. Once clearing of the access path is completed according to the permit, the applicant may maintain the path in the permitted condition utilizing hand held tools and without the use of herbicides. Any unauthorized removal of shoreline vegetation may result in the cancellation of permits issued by SCE&G, as well as legal action. Violators may be required to replant and restore the disturbed area with such plantings and/or shoreline manipulation as SCE&G determines is necessary to mitigate and correct the situation.

8.1.2 ACCESS PATH

A single pedestrian access path may be cleared with hand held tools and without the use of herbicides from the adjacent property owner's land upon approval of SCE&G. The access path must follow a meandering route to prevent erosion and to protect the aesthetics of the shoreline. No trees larger than 10-inches in diameter at breast height may be removed within the access path. A SCE&G Lake Management representative will identify and designate the location of all access paths. Access path restrictions are included in the Permitting Handbook.

8.1.3 WATER WITHDRAWAL

Water withdrawals requiring piping and other transportation/delivery equipment to be placed along the shoreline or in the littoral zone, are managed according to the terms of this SMP. Water withdrawal for residential property must be for irrigation purposes only. Permits are required, and will not be issued for any other purpose. Associated pumps and electrical service must be located outside SCE&G property. SCE&G reserves the right to prohibit withdrawal during times of drought or water drawdown.

Applications for a permit to remove water must be submitted to SCE&G for review. Water withdrawal applications for greater than one million gallons per day (MGD) will be forwarded to the FERC for approval. Requests for withdrawal of one MGD or less may require agency consultation prior to approval. SCE&G may impose limits in granting permits for approved

applications (see Permitting Handbook). The applicant may be required to bear the expenses of filing the application and will be required to compensate SCE&G for water withdrawn.

9.0 SCE&G PERMITTING FEE POLICIES

FERC allows licensees the right to charge reasonable fees to cover the costs of administering shoreline management programs, which add management responsibilities and associated costs to project operations. SCE&G administers its SMP in part through a permitting program, which does include a fee component. This ensures that activities occurring within the Project and in particular on Project land, are consistent with the overall goals for the Project, and that SCE&G's customers are not burdened with the full cost of administering programs that also have significant private, and often non-customer, benefit. Permit fees are due with applications and are required for docks, boat lifts, access paths, water withdrawal, and erosion control projects. Should an application be denied, associated permit fees will be returned. Periodic permit renewal fees may be required depending on the shoreline activity. One-time and periodic permit fees for Parr Reservoir shoreline activities are detailed in the Permitting Handbook. Failure to comply with this policy may result in, among other things, revocation of existing permits, fines, or legal action, as well as loss of consideration for future permits.

SCE&G will give reasonable public notice through appropriate communication avenues before changing the fee structure.

10.0 ENFORCEMENT OF SHORELINE MANAGEMENT PLAN

10.1 VIOLATIONS OF SHORELINE MANAGEMENT PLAN

SCE&G conducts periodic surveys of the Parr Reservoir shoreline to inventory and inspect permitted uses throughout the year. Lake Management representatives make note of unauthorized structures that they see, as well as urging residents and Reservoir visitors to report anything they believe to be unauthorized activity below the 266-foot contour, or on designated Project property. Anyone believing that an activity violating the SMP is occurring is urged to contact SCE&G Lake Management at (803) 217-9221.

SCE&G Lake Management representatives will issue Stop Work Directives and or Trespass Notices for any violations detected on SCE&G property. Any unauthorized clearing of trees or underbrush will result in the revocation of any SCE&G issued permits within 30 days if the violation(s) is (are) not corrected or a course of and schedule for corrective action has not been agreed to and approved by SCE&G. SCE&G may also commence legal action, if it deems it necessary, to require re-vegetation of the affected area. Removal of merchantable timber will require reimbursement to SCE&G subject to valuation of the Forestry Operations Department, including legally allowable "penalties." Consequences for violations may also include restrictions of access to SCE&G property, legal actions, fines, and loss of consideration for future permits.

11.0 SHORELINE MANAGEMENT PRACTICES

11.1 SCE&G SHORELINE MANAGEMENT PRACTICES

SCE&G has established a set of management practices that apply to all of the lands included in the Project Boundary. These practices are reflective of each of their developments unique qualities. The current management practices for the Parr Development (which includes Parr Reservoir) are described in this section, but may be reviewed during the period of the FERC license.

11.1.1 FOREST MANAGEMENT/SHORELINE MANAGEMENT PRACTICES

SCE&G manages timber within the Parr Project boundary line in accordance with South Carolina's Best Management Practices for Forestry publication. An online copy of this publication is available at <http://www.state.sc.us/forest/refbmp.htm>.

11.1.2 PROTECTION OF LANDS KNOWN TO PROVIDE IMPORTANT HABITAT VALUES

Reservoirs are dynamic environments and the important natural and cultural values that Parr Reservoir presents, may evolve over time. During the upcoming license term, areas along the shoreline may be found to warrant protection against materially negative impacts from development upon one or more of a variety of ecologically important characteristics. Such characteristics may include, but not be limited to the following: areas known to be occupied by rare, threatened or endangered species; rare or exemplary natural communities; species in the State Wildlife Action Plan; significant land forms and geologic features; wetlands and shallow coves; and other areas, such as spawning and nesting habitat, determined to be critical to the continued existence of native species. In the event that one of the aforementioned species is determined to be present in the Project boundary, SCE&G will consult with SCDNR to determine appropriate management policies.

11.2 LANDOWNER RECOMMENDED BMPs

In addition to development activities, the environment around Parr Reservoir is susceptible to impacts associated with residential and recreational activities. These include, for example only, improper fertilizer/pesticide use, boat maintenance, and debris disposal. Adjacent property owners can mitigate negative impacts otherwise associated with their property uses and instead

make significant positive contributions to the Reservoir environment, and ultimately the watershed, by employing BMPs that preserve bank integrity and minimize non-point sources of pollution and contamination. Adjacent property owners should understand that using BMPs will help to preserve the scenic, environmental, and recreational qualities of the reservoir that they so highly value. Examples of effective BMPs recommended to adjacent property owners are provided in the succeeding section. SCE&G is available to provide more information and to assist landowners in determining effective BMPs for activities on their properties. Also, anyone may contact the Natural Resource Conservation Service or local county extension office (<http://www.sc.nrcs.usda.gov/contact/>).

11.2.1 MINIMIZING NON-POINT SOURCE POLLUTION

Reservoir pollution may result from a variety of activities related to residential development, agriculture, forestry, and construction. Contaminants may enter the reservoir and tributaries via overland flows carrying biological, chemical, and other substances picked up and carried by runoff from rain events. This runoff water may contain sediment, bacteria, oil, grease, detergents pesticides, fungicides, fertilizers, and other pollutants. These pollutants, depending on type, quantities, and concentrations can overwhelm a reservoir's natural ability to filter and process them, thus leading to degraded water quality and aquatic environments.

Although a single point of impact or action may seem insignificant in its effect on the reservoir, the cumulative effects of the resource may be considerable. With this in mind, SCE&G encourages adjacent land owners to be mindful that they are members of a larger community that uses and impacts the reservoir. Employing the following BMPs can go a long way in preserving and improving reservoir water quality:

- Use permeable paving materials and reduce the area of impervious surfaces, particularly driveways, sidewalks, walkways, and parking areas;
- Dispose of vehicle fluids, paints, and/or household chemicals as indicated on their respective labels and do not deposit these products into storm drains, project waters, or onto the ground;
- Use soap sparingly when washing vehicles and wash them on a grassy areas , preferably sloping gently away from the reservoir, so the ground can filter the water naturally;
- Use hose nozzles with triggers to save water and dispose of used soapy water in sinks or other vessels that direct the materials into sewer systems, not in the street;

- Maintain septic tanks and drain fields according to the guidelines and/or regulations established by appropriate regulatory authorities;
- Remove pet waste and dispose of properly in areas that do not drain to the reservoir; and
- Use only low or no phosphorous fertilizer on lawns near the reservoir.

12.0 PUBLIC EDUCATION AND OUTREACH

This SMP is intended to foster management of shoreline use and development to achieve consistency with the FERC License, as well as the promote protection of public safety and environmental quality (water quality, natural habitat, aesthetics, etc.). To garner support and compliance from the public and lake users, it is key to educate them to the need and means to protect shoreline resources. Additionally, the public must be aware of the management and permitting programs put in place to provide this protection. To accomplish the task of increasing public awareness of the goals and objectives of this SMP SCE&G has developed an education and outreach program that includes the components described below.

12.1 SHORELINE MANAGEMENT PLAN EDUCATION

SCE&G's Public Education and Outreach program seeks to educate the public on various aspects of the management of Parr Reservoir, including the Permitting Handbook, recommended BMP use, relevant Project Operations information, and the Safety Program. To accomplish this, SCE&G uses various public education measures including informational pamphlets, public meetings, newsletters, and an internet webpage.

The Internet, in particular, presents an excellent mechanism for disseminating information and improving awareness. SCE&G maintains a website designed to provide information on the SMP and the Permitting Handbook. Printed copies of the following materials may also be obtained by contacting SCE&G Lake Management at (803) 217-9221. Information and materials that will be available at the website include the following:

- Permitting Handbook;
- Permit application forms;
- Examples and information on BMPs;
- Alternative and example designs for shoreline stabilization on Monticello Reservoir; and
- Useful links and other related information.

Additional outreach mechanisms that SCE&G intends to employ in implementing the SMP include the following:

- Provide speakers for homeowner and other organizations' meetings;

- Provide information to realtors and encourage dissemination of this information to all potential adjacent property buyers; and
- Develop and distribute new, “user friendly” brochures that include general reservoir information, permitting processes, shoreline BMPs, and relevant contact information.

12.2 PUBLIC ACCESS AREA MAPS

A figure depicting Public Access Areas on Parr Reservoir is included as Figure 12-1.

12.3 PUBLIC HUNTING AND FISHING

The SCDNR maintains hunting and fishery management responsibility and state hunting and fishing regulations enforcement on Parr Reservoir. Separate regulations apply to hunting in areas included in the Wildlife Management Area (WMA) program and it is imperative that the individual check WMA regulations and maps prior to hunting. State regulations and maps are available at SCDNR's website at: <http://www.dnr.sc.gov>, or by contacting SCDNR at:

Hunting and Fishing Regulations
S.C. Department of Natural Resources
Wildlife and Fresh Water Fisheries
1000 Assembly Street
Columbia, South Carolina 29201
Telephone: 803-734-3886

12.4 SAFETY PROGRAMS

Due to operation of the pumped storage generating plant, the waters of Parr Reservoir can fluctuate several feet in a matter of a few hours. This rapid fluctuation makes it especially important for boaters and other recreationists to exercise a high degree of care and fully assume personal responsibility for their safety by being especially aware and cautious. For public safety, hazardous areas which are marked should not be entered and any other warnings posted around the reservoir should be observed as well.

SCE&G and SCDNR cooperate to mark shoals and other hazardous areas to increase boating safety. However, boaters should not assume all shoals and hazardous areas have been marked.

SCDNR also enforces the boating laws of South Carolina. Boaters should ensure that watercraft and safety equipment are in good working condition and in compliance with all applicable state laws.

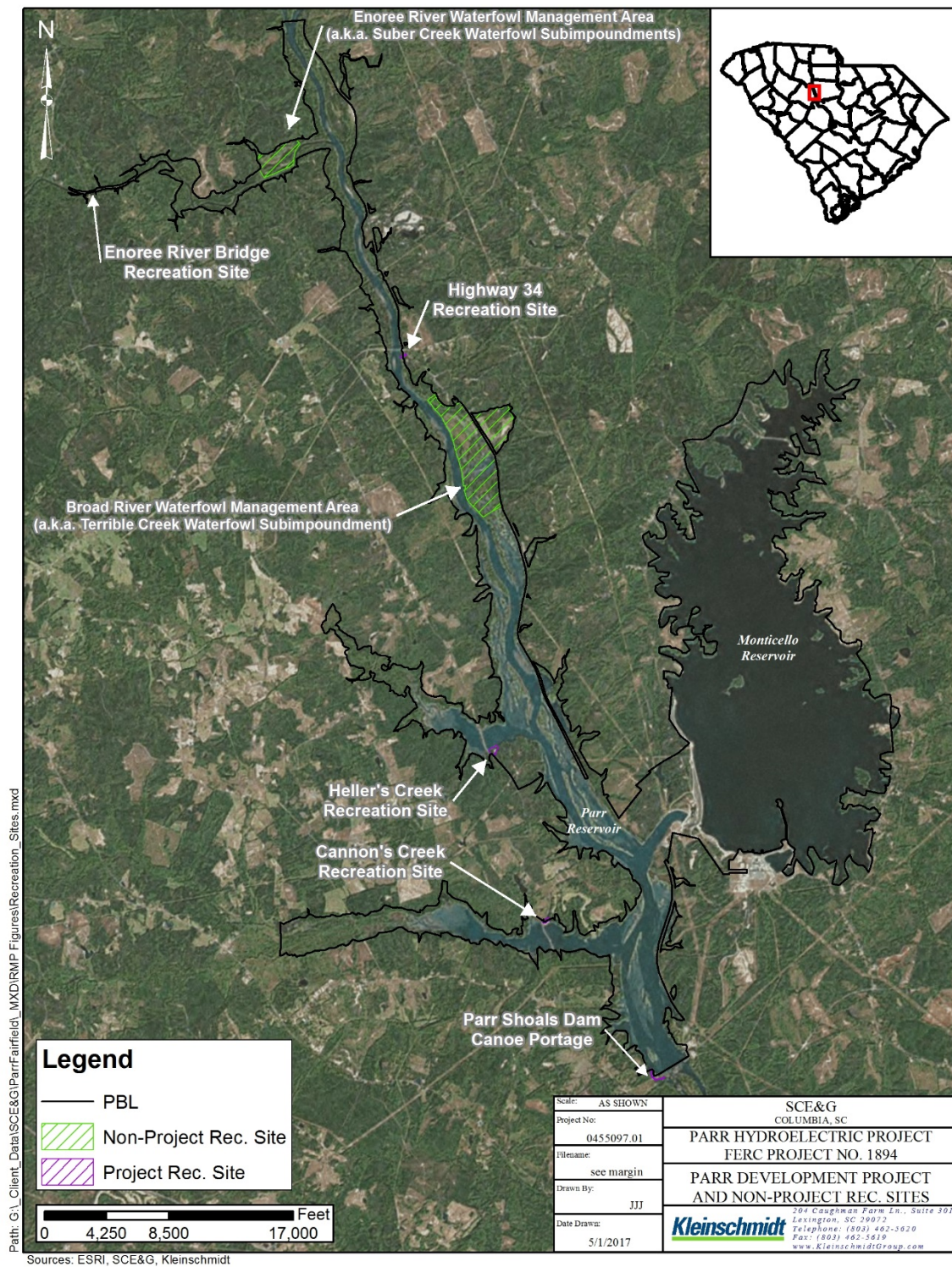


FIGURE 12-1 PARR RESERVOIR PUBLIC ACCESS AREA MAP

13.0 MONITORING AND REVIEW PROCESS

13.1 OVERALL LAND USE MONITORING

As demographics and user groups change within the Project area, changes in residential and commercial areas may occur. Often this type of use change is incremental and cumulative, occurring over a period of years or decades. To monitor land use around Parr Reservoir, SCE&G will employ a geographic information system (GIS) to compare new and existing permit applications against GIS data for the land management classifications. Such monitoring will provide long-term data that should be useful in identifying areas experiencing change. Every 10 years, during the SMP review process (see Section 13.2 on Review Process below), SCE&G will report on changes in land use for the various land management classifications in addition to filing Form 80 surveys. If it is found that material changes within the Project boundary have occurred that are not consistent with the current SMP goals, amendments to the SMP may be warranted. Such situations might include significant changes in land ownership, major commercial upgrades or uses, or new residential uses or pressures.

13.2 REVIEW PROCESS

SCE&G proposes a 10 year SMP review cycle interval. A 10 year SMP review period interval should provide reasonable opportunities for SCE&G, in concert with governmental, non-governmental, and individual stakeholders, periodically and deliberately to assess new issues that arise as a result of development around the Reservoir, and allow for analyses of cumulative effects. The SMP review process will begin sufficiently in advance of the end of each period so that it will be completed within the 10 year time frame. One month prior to the scheduled start of the review process, its occurrence will be advertised in various media formats (e.g., website, newsletter, contact with homeowner associations, etc.). SCE&G will use those same media avenues to issue a report on the outcome of the review process. As in the past, SCE&G will solicit input from interested parties in addressing issues that arise and have a bearing on Reservoir management. This includes keeping lines of communication open during the time between review periods. Concurrently with the FERC SMP review process, SCE&G will review the Permitting Handbook periodically with interested stakeholders to ensure its effectiveness; however, changes to the permitting process may be made periodically, as needed, outside of the scheduled review periods.

14.0 REFERENCES

Federal Power Commission (F.P.C.). 1974. Order Issuing New License for the Parr Hydroelectric Project. August 28, 1974. 52 F.P.C. 537.

Federal Energy Regulatory Commission (FERC). 2012. Guidance for Shoreline Management Planning at Hydropower Projects. Online. [URL]: <http://www.ferc.gov/industries/hydropower/gen-info/guidelines/smpbook.pdf>.

Federal Energy Regulatory Commission (FERC). 2001. Order Approving Land use and Shoreline Management Plan. June 4, 2001. 95 FERC 61,351.

SHORELINE MANAGEMENT PLAN MONTICELLO RESERVOIR

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

Prepared for:

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

Prepared by:

Kleinschmidt

Lexington, South Carolina
www.KleinschmidtGroup.com

May 2017

SHORELINE MANAGEMENT PLAN
MONTICELLO RESERVOIR

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**SHORELINE MANAGEMENT PLAN
MONTICELLO RESERVOIR**

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**SHORELINE MANAGEMENT PLAN
MONTICELLO RESERVOIR**

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

EXECUTIVE SUMMARY

South Carolina Electric & Gas Company ("SCE&G") is the Licensee of the Parr Hydroelectric Project (Federal Energy Regulatory Commission ["FERC"] No. 1894) ("Project"). The Project consists of the Parr Shoals Development and the Fairfield Pumped Storage Development. The developments are located along the Broad River in Fairfield and Newberry Counties, South Carolina.

The Project developments form two distinct Project reservoirs. Parr Reservoir is located along the Broad River, as impounded by Parr Shoals Dam, and functions as the lower reservoir for the Fairfield Development. Monticello Reservoir is located adjacent to the Broad River and functions as the upper reservoir for the Fairfield Development. Both Project reservoirs serve as popular recreation destinations and are used and enjoyed by local residents as well as visitors to the state.

In conjunction with its relicensing activities, SCE&G has assembled a diverse and inclusive group of stakeholders to advise and assist in the development of two Shoreline Management Plans ("SMPs"), each tailored to a specific reservoir. SMPs are comprehensive plans for the management of Project land and adjoining water resources and their uses, consistent with License requirements and broad Project purposes, and appropriately accessible and beneficial to adjacent shoreline residents and the recreating public. A SMP serves to identify existing and appropriate future uses and to provide plans and programs for responsible future use and management of project lands and waters as well as the flora and fauna encompassed within them. This SMP exists specifically to address shoreline uses surrounding Monticello Reservoir. A SMP to address Parr Reservoir is included under separate cover and available from the SCE&G Lake Management Department (Lake Management).

In addition to a SMP for each Project reservoir, a Shoreline Management Handbook and Permitting Guidelines (Permitting Handbook) was developed for both developments in

consultation with governmental, non-governmental, and individual stakeholders to address activities that will require consultation with and/or permits from SCE&G. These activities include construction, maintenance, and placement of docks, shoreline stabilization, lake access pathways and other shoreline activities.

The classification of Project lands surrounding Monticello Reservoir is described in Section 5.0 and includes five management classifications. These classifications are as follows: Project Operations; Nuclear Exclusion Zone; Shoreline Permitting; Public Recreation; and Non-Development Areas. Lands reserved for Project operations are those lands that are specifically required for operation of the Project. They include areas such as plant facility locations, dams, electrical substations, etc. The Nuclear Exclusion Zone (NEZ) is a defined area surrounding the V.C. Summer Nuclear Station. Within the NEZ, SCE&G, as the licensed nuclear plant operator, has responsibility and the authority to control all activities and has the absolute right to exclude or remove persons and property. Public Recreation land includes land within public parks, SCE&G developed recreation areas, and islands.¹ Non-Development Areas are areas protected from development to preserve environmental resources and aesthetic values. Conversely, lands included within the Shoreline Permitting classification are not automatically excluded from development related shoreline use, and hence may be available for permitted shoreline development such as access paths and docks.

Land use prescriptions associated with these land management classifications are discussed in Section 6.0. Prescriptions are administered through the Permitting Handbook.

SCE&G maintains a strong commitment to the management of the waters and shoreline of Monticello Reservoir, focusing on the social, ecological, and economic impacts of activities on and near the shoreline and water, taking into consideration in particular, the environmental, aesthetic, and recreational character of the shoreline and lake. Section 7.0 details the activities and structures on and adjacent to Monticello Reservoir that require SCE&G consultation and/or approval. The permitting procedures for shoreline activities or structures are set out in more detail in Section 8.0 and in the Permitting Handbook.

Section 9.0 details SCE&G's fee structure for the shoreline management program.

¹ SCE&G owns all land within the Monticello Development, including all islands within Lake Monticello

Periodic surveys of the Monticello Reservoir shoreline are conducted by SCE&G and include, among other things, inventories and inspections of all docks, including those built and permitted throughout the current year. SCE&G also looks for unauthorized structures within the Project property at that time. These represent violations of the SMP. SMP violations will be dealt with as deemed by SCE&G, in its sole discretion, to be appropriate. Consequences of violations may range from dock permit cancellations to fines and/or legal action, and are discussed more fully in Section 10.0.

SCE&G Shoreline Management Practices include actions taken to lessen or mitigate for potential impacts to a particular resource resulting from direct or indirect use. These include but may not be limited to shoreline stabilization and vegetation management, as well as aquatic plant management. Shoreline Management Practices are further described in Section 11.0 of this document.

Public education and outreach on the protection of valuable shoreline resources is integral to the effectiveness of the SMPs. Section 12.0 of this document details specific measures to be undertaken to help educate both adjacent shoreline residents and other Project resource users. Among included objectives will be SMP education and Best Management Practices ("BMP") education.

In its Application for New License, SCE&G is proposing 10 year review periods for the SMP. The 10 year SMP review periods provide reasonable opportunities for SCE&G, in concert with governmental, non-governmental, and individual stakeholders, periodically and deliberately to assess new issues that arise as a result of development around the Reservoir, and allow for analyses of cumulative effects. Concurrently with the FERC SMP review process, SCE&G will review the Permitting Handbook with interested stakeholders periodically to evaluate and improve its effectiveness. SCE&G reserves the right, however to make changes to the permitting process as it deems necessary and appropriate. This is discussed in Section 10.0.

**SHORELINE MANAGEMENT PLAN
MONTICELLO RESERVOIR**

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

1.0 INTRODUCTION

The Parr Hydroelectric Project ("Project") is located on the Broad River in Fairfield and Newberry Counties, South Carolina (Figure 1-1). The Project is located approximately 31 river miles downstream of the Neal Shoals Hydroelectric Project (Federal Energy Regulatory Commission ["FERC"] No. 2315) and 24 river miles upstream of the Columbia Diversion Dam. The Project consists of two developments: the Parr Shoals Development ("Parr Development") and the Fairfield Pumped Storage Development ("Fairfield Development"). Subsequently, two primary reservoirs are included as part of the Project, Monticello Reservoir² and Parr Reservoir. The normal maximum water level in Monticello Reservoir is El. 425.0 feet National Geodetic Vertical Datum ("NGVD"), which corresponds to a surface area of 6,800 acres, and a gross storage of 400,000 acre-feet. Monticello Reservoir has approximately 57 miles of shoreline within the Project boundary. Parr Reservoir's normal maximum water level is at El. 266.0 feet NGVD, with a corresponding surface area of 4,400 acres. The gross storage is estimated to be 32,000 acre-feet. Parr Reservoir has approximately 88 miles of shoreline within the Project boundary.

An active storage of up to 29,000 acre-feet is transferred between the two reservoirs by the pumped storage operations of the Fairfield Development. Fairfield Development's alternate cycles of generation and pumping results in daily fluctuations in the water levels of both Monticello and Parr Reservoirs. Monticello, when beginning at normal maximum pool elevation, drops 4.5 to 5 feet over a 10 to 12 hour period during the generating phase of operation. At the same time, the water from Monticello and from the Broad River is flowing into Parr Reservoir, causing it to rise as much as 10 feet. During the pumping cycle, the reverse occurs – the water level rises in Monticello Reservoir and drops in Parr Reservoir.

² The State of South Carolina considers Monticello Reservoir waters of the State and refers to it as "Lake Monticello".

The Project boundary³ encompasses land around each reservoir. A 300-acre Recreation Sub-impoundment ("Recreation Lake") is situated adjacent to Monticello Reservoir and is included within the FERC Project boundary. This lake was constructed by South Carolina Electric & Gas Company ("SCE&G") solely for recreational use. The Recreation Lake is unaffected by operational reservoir fluctuations on Monticello Reservoir.

SCE&G manages SCE&G-owned lands within the Project boundary ("Project property") to comply with the FERC license for the Project (the "License"). The goal of project land management is to serve the public interest by providing recreational access and opportunities, protecting wildlife habitat and water quality, producing electricity, and protecting and preserving cultural and aesthetic resources. The Shoreline Management Plan ("SMP") provides a set of administrative policies, procedures, and practices by which SCE&G seeks to manage the Project shoreline to achieve these goals. Future proposals for specific shoreline related developments or activities will be reviewed for consistency with the SMP.

A draft of the initial Project SMP was filed with the FERC in 1991. After several years of discussion and revisions, the initial SMP was approved by the FERC on June 4, 2001. The history of the Project's SMP is described in more detail in Section 3.0 (History of the Shoreline Management Plan). The current relicensing⁴ of the Project provides a near term impetus and opportunity for SCE&G to review the existing SMP in cooperation with relicensing stakeholders, including federal and state regulatory agencies, interested non-governmental organizations ("NGO"s), and individuals. Through discussions with these parties, it was decided that the existing FERC approved SMP, which encompasses both Monticello and Parr Reservoirs, should be divided into two distinct SMP's, one for each reservoir. Hence, this SMP has been prepared for Monticello Reservoir and is being submitted to FERC as part of SCE&G's Parr Hydroelectric Project comprehensive relicensing package. A SMP for Parr Reservoir is included under separate cover.

³ Standard License Article 5 requires licensees to acquire and retain sufficient property and rights to construct, maintain, and operate their projects, as identified in their specific license, including any property or rights needed to accomplish all designated project purposes. As such, Project lands are those lands within the FERC project boundary owned by SCE&G in fee title and those lands for which SCE&G has acquired or retained an easement.

⁴ The current operating license for the Project is due to expire on June 30, 2020. As such, SCE&G will file for a new license with FERC on or before June 30, 2018.

The management guidelines set forth in this SMP are applicable to all lands within the Project boundary surrounding Monticello Reservoir. Among other things, the current document includes the following components:

- Detailed descriptions, management prescriptions and mapping of land classifications;
- Summary information on the Permitting Handbook and fee policies;
- Best management practices ("BMP"s);
- Public education and outreach;
- Reservoir monitoring; and,
- A proposed review process.

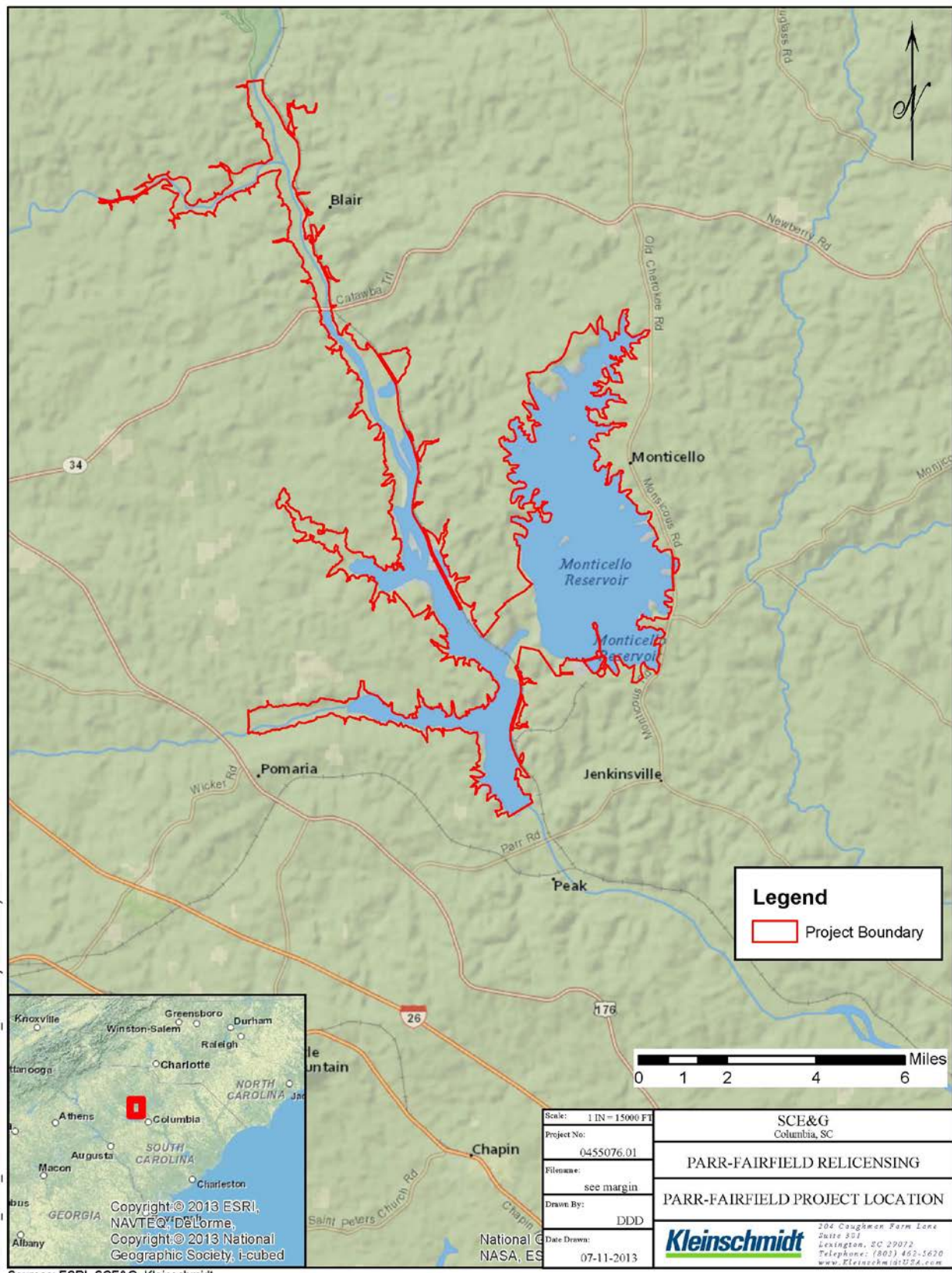


FIGURE 1-1 PROJECT LOCATION AND BOUNDARY MAP

2.0 PURPOSE AND SCOPE OF THE SHORELINE MANAGEMENT PLAN

The Project has served as a major source of power generation for SCE&G's customers and recreation for local residents and visitors to South Carolina for several decades. Consistent with FERC's Standard Land Use Article, a licensee may authorize specific non-project uses and occupancies of a project's shoreline. Examples of non-project uses at Monticello Reservoir include residential boat docks, access paths across Project property, and erosion control structures. SCE&G has a responsibility to ensure that non-Project uses remain consistent with Project purposes, including protection and enhancement of the Project's scenic, recreational, and environmental values.

As development increases in areas surrounding the Project, so too does stress placed upon Project reservoirs and the surrounding watershed. Thus, a comprehensive SMP for each reservoir that recognizes and addresses sources of potential environmental impact is essential to managing each reservoir for the benefit of all interests and to ensure that non-Project uses remain consistent with the License.

The implementation of the SMP by SCE&G will help to maintain and conserve the area's natural and man-made resources. The SMP will comply with the terms of the License, as well as the regulations and orders of FERC, and is intended to assist in providing a balance between recreational use and development, environmental protection, and energy production.

3.0 HISTORY OF THE SHORELINE MANAGEMENT PLAN

On August 28, 1974, the Federal Power Commission (FPC), predecessor to the FERC, issued SCE&G a new License for the Parr Hydroelectric Project. In addition to relicensing the existing 14.88 megawatt (MW) Parr Shoals Development, the new License authorized the construction of the 511.2 MW Fairfield Pumped Storage Development. This resulted in the creation of the Fairfield Development's upper pool, Monticello Reservoir. The new License also authorized the enlargement of the existing Parr Reservoir to serve as the lower pool to the Fairfield Development. This involved raising the height of Parr Dam approximately 9 feet, thereby nearly doubling Parr Reservoir's surface area. The construction of newly licensed facilities was completed in 1978, with the facilities beginning commercial operation that same year.

Article 48 of the Project License issued in 1974 required that SCE&G purchase in fee and include within the project boundary all lands necessary or appropriate for project operations, including lands for recreational use and shoreline control. The lands encompassed by the project boundary shall include, but not be limited to: the islands in the Parr and Monticello Reservoirs formed by the 266-foot and 425-foot contour intervals, respectively; shoreline lands up to the 270-foot contour, or 50 feet (measured horizontally) from the Parr Reservoir's 266-foot contour, whichever is greater; and, shoreline lands up to the 430-foot contour interval, or 50 feet (measured horizontally) from Monticello Reservoir's 425-foot contour, whichever is greater. Provided that the Project boundary, except with respect to land necessary or appropriate for recreational purposes, shall not exceed 200 feet, horizontally measured, from the 266-foot or the 425-foot contour, unless satisfactory reasons to the contrary are given. The FPC determined that acquiring these lands would provide SCE&G with adequate shoreline control around the reservoirs, in addition to serving the purposes of Project operation and recreation.

Furthermore, Article 20 of the Project License orders that SCE&G allow public access, to a reasonable extent to Project waters and adjacent Project lands (with the exception of lands necessary for the protection of life, health, and property) for navigation and outdoor recreational purposes. This Article also allows SCE&G to grant permits for public access to the reservoirs subject to FERC approval.

In 1991, SCE&G recognized that appropriate policies and procedures should be in place to govern shoreline activities at the Project. Utilizing experience gained at their Saluda

Hydroelectric Project (FERC No. 516), SCE&G filed a proposed SMP with the FERC to regulate the use of Project shorelines. After extensive stakeholder consultation, an amended SMP was filed with the FERC. It was approved on June 4, 2001. The SMP was included as part of the Project's Exhibit R.

The SMP approved in 2001 primarily covered activities associated with Monticello Reservoir. It dealt with the following matters: water quality management; forest management; waterfowl management; nuclear exclusion zone restrictions for the operation of SCE&G's V.C. Summer Nuclear Station; fishing, boating, and hunting; public access and recreation; private boat docks and access; vegetation removal; water withdrawal; erosion control; and prohibited activities.

In 2006, SCE&G amended the SMP's policy regarding common docks. The original policy allowed for two to five adjacent property owners to share a single common dock if the shoreline frontage requirement of 200 feet was met. The policy was amended to allow no more than two individual, adjacent single family residential lots to share a common dock. The shoreline frontage requirement of 200 feet was retained.

3.1 CURRENT SMP DOCUMENT AND SHORELINE CLASSIFICATIONS

The SMP serves as a reference document for SCE&G in implementing the Standard Land Use Article, which authorizes SCE&G to permit certain non-project uses of project lands and waters. FERC did not begin including the Standard Land Use Article in new licenses until the early 1980's; thus it was not included in the Project License issued in 1974. However, FERC granted SCE&G the specific authority to permit certain non-Project uses through the approval of the 2001 SMP, and added the Standard Land Use Article to the License (Article 62) in 2011, as revised in 2013 (Article 63). This present document, submitted in conjunction with SCE&G's License application, presents a management plan, covering only Monticello Reservoir (a SMP for Parr Reservoir is included under separate cover), while adhering to the historical management goals agreed to and developed with agencies and stakeholders.

In addition to an updated SMP for each Project reservoir, a Permitting Handbook was developed in consultation with stakeholders and agencies to address activities requiring consultation with and/or permits from SCE&G. These activities include, but are not limited to the following: construction, maintenance, and placement of docks; shoreline stabilization; construction and maintenance of lake access pathways; limited brushing; and other shoreline activities. SCE&G

will review the Permitting Handbook with interested stakeholders periodically to evaluate its effectiveness; however, SCE&G may make changes to the permitting process at any time as it determines in its sole judgment to be necessary and appropriate.

3.2 PROJECT BOUNDARY

SCE&G owns in fee or obtained flowage rights for all lands necessary or appropriate for project operations, including lands for recreational use and shoreline control, as described above in Section 3.0. A Project boundary map is included as Figure 1-1.

4.0 SHORELINE MANAGEMENT PLAN GOALS AND OBJECTIVES

The overall goal of this SMP is to define, document, and present the processes and criteria that SCE&G will employ to manage and balance private and public access to and uses of Project lands, specifically including Monticello Reservoir's shoreline, consistent with public safety, energy production operations, environmental protection for Project land as well as Project waters, and reasonable recreational opportunities. This SMP will help to ensure the protection and enhancement of the Project's scenic, environmental, recreational, natural and cultural resources over the term of the License.

This SMP represents a consensus-based, updated management plan intended for submittal with the Project No. 1894 License Application. Specific goals relative to the SCE&G relicensing process that are discussed under this SMP include the following:

1. Provide for reasonable current and future public access;
2. Provide for current and future recreational needs within the Project;
3. Protect fish and wildlife habitat;
4. Protect cultural resources;
5. Protect the ability to meet operational needs;
6. Facilitate compliance with License articles;
7. Minimize adverse impacts to water quality;
8. Monitor and address erosion;
9. Protect scenic values;
10. Monitor and permit shoreline activities;
11. Provide a summary catalogue of the types and locations of existing recreational opportunities;
12. Establish Land Management Classifications and Land Use Prescriptions to help in the management of non-Project uses of the Monticello Reservoir shoreline lands within the Project boundary;
13. Describe the SMP amendment and monitoring process; and
14. Educate and encourage property owners who own property adjacent to or adjoining Project Property (herein referred to as "adjacent property owners") on the use of voluntary BMPs.

4.1 CONSULTATION

The Project relicensing provides an opportunity for SCE&G to seek input on Project-related shoreline management issues from interested stakeholders. SCE&G recognizes that successfully completing the relicensing process requires identifying and resolving Project issues in consultation with federal and state resource agencies, local and national NGOs, homeowner associations, and individuals who have an interest in the Parr Hydroelectric Project (Table 4-1). SCE&G began public outreach efforts in January 2013 by holding a series of public workshops in Winnsboro, Newberry, Columbia, and Jenkinsville, SC. Since that time, SCE&G has sought active public involvement in the process and fostered commitment to issue resolution among SCE&G and stakeholders.

TABLE 4-1 PARTICIPATING GROUPS IN PARR HYDROELECTRIC PROJECT RELICENSING

STAKEHOLDER GROUPS
American Rivers
American Whitewater
Catawba Indian Nation
City of Columbia
Chestnut Hill Plantation HOA
Coastal Conservation League
Congaree Riverkeeper
Environmentalists Inc.
Fairfield County
Gills Creek Watershed
National Marine Fisheries Service
National Park Service
Newberry County
South Carolina Department of Health and Environmental Control
South Carolina Department of Natural Resources
South Carolina Department of Parks, Recreation and Tourism
South Carolina Electric & Gas Company
South Carolina Historic Preservation Office
Town of Winnsboro, SC
Tyger-Enoree River Alliance

STAKEHOLDER GROUPS
United States Fish and Wildlife Service
United States Forest Service
University of South Carolina

4.1.1 RECREATION/LAKE AND LAND MANAGEMENT RESOURCE CONSERVATION GROUP

In support of the relicensing effort, SCE&G formed three Resource Conservation Groups ("RCG"s) to identify, address and resolve Project-related issues by resource area. The RCGs are as follows: the Fish, Wildlife and Water Quality RCG; the Project Operations RCG; and the Lake & Land Management and Recreation RCG. Consideration of potential issues by resource area allows for more focused topic discussion and targeted issue resolution. Some RCGs have established sub-groups, or Technical Working Committees ("TWC"s), for issues requiring special knowledge, education, or experience. Consequently, the Lake & Land Management and Recreation RCG has a Lake and Land Management TWC as well as a Recreation TWC. The Lake and Land Management TWC is discussed further below.

4.1.2 LAKE AND LAND MANAGEMENT TECHNICAL WORKING COMMITTEE

The primary mission of the Lake and Land Management TWC is to revise the existing Parr Hydroelectric Project SMP to provide a management framework within which Project resources can be effectively protected while assuring appropriate public and private access to the Project resources and the recreational opportunities they present. Another important focus of the TWC is to allow interested parties an effective opportunity to provide input on resource issues and the overall future management of shoreline resources. The resulting collaboration has resulted in the contribution of valuable information by entities and individuals familiar with the Project. The forum was instrumental in addressing important issues relevant to the operation and management of the Project over the term of the new License. In working collaboratively, the members of the TWC (Table 4-2) aimed to blend the objectives of the state and federal resource agencies with other stakeholder interests.

**TABLE 4-2 ORGANIZATIONS PARTICIPATING ON THE LAKE AND LAND MANAGEMENT
TWC**

STAKEHOLDER GROUPS
American Rivers
American Whitewater
Coastal Conservation League
Congaree Riverkeeper
Fairfield County
Gills Creek Watershed
Adjacent Property Owners
National Marine Fisheries Service
National Park Service
South Carolina Department of Health and Environmental Control
South Carolina Department of Natural Resources
South Carolina Department of Parks, Recreation and Tourism
South Carolina Electric & Gas Company
Tyger-Enoree River Alliance
United States Fish and Wildlife Service
United States Forest Service

4.1.3 MEETING SCHEDULES

Between October of 2013 and January of 2018, SCE&G has held numerous meetings of the Lake and Land Management and Recreation RCG and Lake and Land Management TWC to discuss the details of the Project SMPs. The efforts of the TWC are reflected herein.

5.0 LAND USE CLASSIFICATIONS

Five distinct land management classifications have been developed for the shorelines surrounding Monticello Reservoir. These land management classifications are as follows: Project Operations; Nuclear Exclusion Zone; Shoreline Permitting; Public Recreation; and, Non-Development Areas. The Public Recreation Classification includes designated public recreation areas, the Recreation Lake, and all islands on Monticello Reservoir. Although SCE&G intends to manage its lands according to this classification system, the public generally will not be precluded from access to SCE&G-owned lands regardless of classification, with the exception of lands reserved and used for Project operations, lands/areas within the Nuclear Exclusion Zone, or other areas specifically protected from public access and posted as such. The sections below explain/define the land management classifications. The acreages and parcels for each of the classifications are provided in Table 5-1. Figure 5-1 depicts their distribution around Monticello Reservoir.

TABLE 5-1 SHORELINE MILES AND ACREAGES BY LAND USE CLASSIFICATION⁵

CLASSIFICATION	SHORELINE MILES	ACRES
Project Operations*	4.14	156
Nuclear Exclusion Zone *	5.43	184
Shoreline Permitting	20.70	225
Public Recreation*	18.18**	1229**
Non-Development*	9.15	158
TOTAL	57.60	1,952

*No docks allowed

** Includes the shoreline surrounding the Recreation Lake and all islands

⁵ Preliminary information; final data will be provided in the final SMP

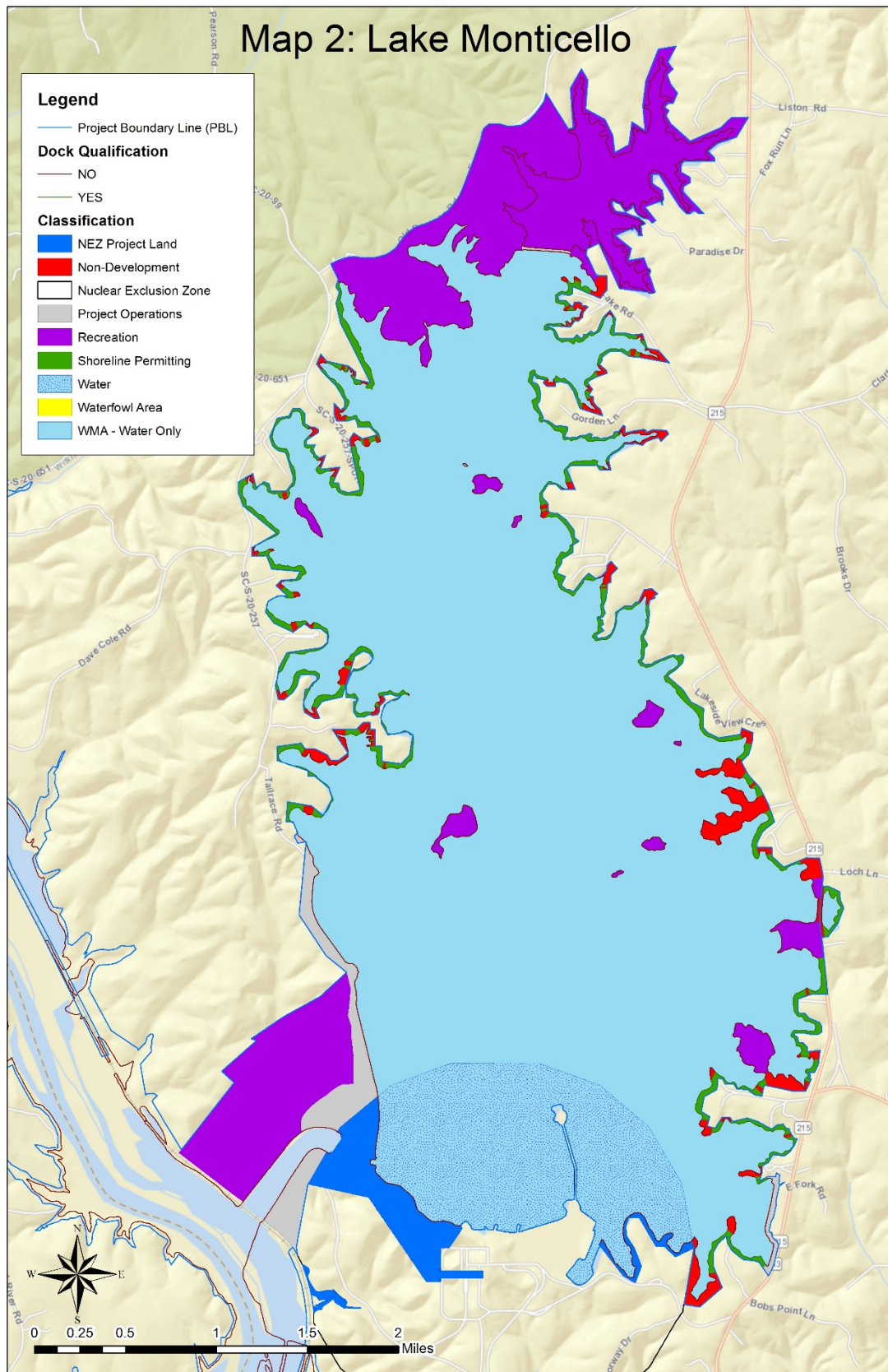


FIGURE 5-1 SHORELINE CLASSIFICATIONS MAP FOR MONTICELLO RESERVOIR

5.1 PROJECT OPERATIONS

Areas under this classification include SCE&G-owned and managed lands required for operation of the Fairfield Development. Public access to these lands is restricted to ensure public safety or to assure the security of the infrastructure system.

5.2 NUCLEAR EXCLUSION ZONE

In addition to its use as part of the Fairfield Development, Monticello Reservoir provides cooling water for the V.C. Summer Nuclear Station located on its shore (authorized under 52 F.P.C. 537 [1974]). The Nuclear Exclusion Zone consists of the area surrounding the V.C. Summer Nuclear Station between the Project boundary line and shoreline and a specified area within Monticello Reservoir where SCE&G as the reactor licensee has the authority to determine all activities, including exclusion or removal of personnel and property. This area is designated by warning signs on the landward side and by buoys on the lakeward side. Admittance to this area is restricted in order to comply with licensing requirements administered by the Nuclear Regulatory Commission.

5.3 SHORELINE PERMITTING

It is the policy of SCE&G to authorize certain private uses of and/or acts on Project property by permit when such uses or acts are consistent with the public interest and comply with the requirements of the Project License. Areas within the Shoreline Permitting Classification may be eligible for certain private residential uses upon approval by SCE&G. This does not include commercial activities (other than commercial water withdrawals).

5.4 PUBLIC RECREATION

Project lands under this classification serve as recreational resources for the public and include areas managed expressly for recreation as well as those with recreation as a secondary usage. This classification also includes properties set aside for recreational development. Public recreation lands include the following sub-classifications:

- Recreation Lake
- Public Access Areas
- Islands on Monticello Reservoir

5.4.1 RECREATION LAKE

The Recreation Lake is located at the north end of Monticello Reservoir and is approximately 300 acres and 10 miles of shoreline. The Recreation Lake was constructed to provide stable water for fisheries and recreation opportunities.

5.4.2 PUBLIC ACCESS AREAS

There are five public parks on Monticello Reservoir. All recreation facilities at Monticello Reservoir are open year-round, except the Recreation Lake Beach Area, which is closed October 1 through March 31. For a list of authorized activities, please see the Permitting Handbook.

5.4.3 ISLANDS

There are 8 islands within Monticello Reservoir, all of which are available for public recreational use in accordance with authorized activities (see Permitting Handbook for authorized activities).

5.5 NON-DEVELOPMENT AREAS

Lands under this classification warrant special protection because they may provide important habitat, aesthetic values, or other significant Project characteristics.

6.0 LAND USE PRESCRIPTIONS

Land use prescriptions are based upon and reflect the guiding principles regarding the management of the SCE&G-owned lands within each classification. SCE&G publishes a detailed Permitting Handbook (included under separate cover) that contains descriptions of the permitting processes and specifications for various shoreline developments. Activities that require consultation with and/or permits from SCE&G include the following: construction, maintenance and placement of docks, shoreline stabilization; construction and maintenance of shoreline pathways, and other shoreline activities. Persons interested in shoreline development must contact SCE&G's Lake Management Department (803) 217-9221 to obtain permitting guidance and a copy of the Permitting Handbook. Section 8.0 of this document discusses the Permitting Handbook in greater depth. General information regarding permitting requirements is included where applicable within the scope of each management prescription below.

6.1 PROJECT OPERATIONS

Properties classified as Project Operation contain project works critical to the operation of the Fairfield Development. Public access and recreation activities on these lands are restricted for reasons of safety and security.

6.2 NUCLEAR EXCLUSION ZONE

Properties and waters classified as Nuclear Exclusion Zone contain project works/areas critical to the operation of the V.C. Summer Nuclear Station. Public access and recreation activities on these lands are restricted for reasons of safety and security.

6.3 SHORELINE PERMITTING

Residential landowners whose property adjoins lands within the Shoreline Permitting classification may be eligible for certain permitted structures only upon written consent from Lake Management. SCE&G strictly regulates the placement and construction of permitted structures. To address aspects of shoreline structures, SCE&G has developed permitting application procedures and associated dock specification guidelines. These guidelines are detailed in SCE&G's Permitting Handbook.

6.4 PUBLIC RECREATION

Project lands devoted to public recreation include developed park sites, properties set aside for future recreational development, and islands on Monticello Reservoir owned by SCE&G⁶. With the exception of the islands, which are maintained in their natural condition, SCE&G manages the areas based on the specific, designated recreational activities for each, including fishing, picnicking, and boat launching⁷. SCE&G developed and maintained access areas on Monticello Reservoir are depicted in Figure 12-1. Private permitted activities, other than those noted under the Recreation Lake (Section 6.4.1) are excluded.

6.4.1 RECREATION LAKE

The park area at the Recreation Lake offers fishing, a beach area and picnic facilities. Regulations for its use are posted at the park site. The beach area is closed October through March. The boat launch area is open every day, all year long. No private docks or boat ramps will be permitted on the shoreline of the Recreation Lake. Meandering paths and water withdrawals, for residential irrigation only, may be considered on a case-by-case basis.

6.4.2 ISLANDS

SCE&G owns all of the islands on Monticello Reservoir and they are available for public recreational use, which includes activities such as fishing, walking and bird watching. Hunting is permitted on the islands in accordance with state hunting regulations.

6.5 NON-DEVELOPMENT AREAS

Lands under this classification warrant special protection because they may provide important habitat or aesthetic values. Non-development Areas are available for passive⁸ public recreational use. SCE&G will not permit private shoreline development for Project lands under this classification.

⁶ SCE&G also manages some of the lands classified as public recreation for timber. Information on SCE&G's forest management practices is included in Section 11.0.

⁷ The waters of Monticello Reservoir, excluding the Recreation Lake, and Monticello Reservoir islands are available for public waterfowl hunting as discussed under Section 12.0.

⁸ Passive recreation use can be defined as those recreation activities that are generally non-consumptive in nature, require a minimum of facilities, and/or have a minimal environmental impact.

7.0 SHORELINE ACTIVITIES REQUIRING SCE&G APPROVAL

SCE&G maintains a strong commitment to managing the shoreline of Monticello Reservoir for multiple resources by considering the impact of various activities on the environmental, aesthetic, and recreational character of the lands. SCE&G owns and manages the Project lands around the entire periphery of Monticello Reservoir and the Recreation Lake. Thus, any activity occurring on the "shoreline" is occurring on SCE&G property. Any activity not in compliance with the shoreline activity parameters outlined in this SMP and in the Permitting Handbook constitutes a trespass which SCE&G may elect to prosecute.

7.1 AUTHORIZED ACTIVITIES REQUIRING APPROVAL THROUGH THE PERMITTING HANDBOOK

Only the following activities and structures may be permitted on Monticello Reservoir:

- Construction or modification to private docks;
- Construction of a meandering access path and associated vegetation removal;
- Shoreline stabilization methods (including rip-rap and bio-engineering); and
- Water withdrawal.

7.2 PROHIBITED STRUCTURES AND ACTIVITIES

Activities and structures that SCE&G does not allow include, but are not limited to, the following:

Prohibited Structures:

- Roofs or covers over docks;
- Boat lifts;
- Boat slips;
- Boathouses;
- Fueling facilities on a dock;
- Private boat ramps;
- Houseboats;
- Watercraft exceeding 30 feet in length;
- Watercraft with marine sanitation devices ("MSD");

- Commercial marinas;
- Marine rails;
- Sea walls;
- Fences;
- Electrical service;
- Permanent structures other than permitted docks;
- Land-based structures, storage buildings, shelters, patios, gazebos, fences, swimming pools, satellite dishes, signs, storage of boats, camper trailers, canoes or other watercraft, motor homes or automobiles; and
- Septic tanks and/or drain fields.

Prohibited Activities:

- Water skiing;
- Jet Skiing
- Parasailing
- Paragliding
- Mooring;
- Excavations/dredging;
- Effluent discharges;
- Planting of grass except as a permitted bioengineering erosion control measure;
- Storage or stockpiling of construction material;
- Livestock access to reservoir⁹
- Primitive or overnight camping on all Project property, except at Highway 99 West Recreation Site and islands;
- Vegetation removal of any type except in a permitted access path to the shoreline;
- Use of herbicides; and,
- Limbing or trimming of vegetation on Project property to create views or visual corridors.

⁹ Unless grandfathered through deed reservations.

8.0 PERMITTING PROCESS FOR SHORELINE ACTIVITIES OR STRUCTURES

8.1 SHORELINE PERMITTING PROCEDURES

Applicants must obtain the proper permit(s), per the SCE&G's Permitting Handbook, prior to the initiation of any construction or activity on Project property. As noted above, some activities may also require local, state, and/or federal permits

Whether a non-Project use is approved under the Standard Land Use article or through Project-specific FERC approval, SCE&G is responsible for ensuring that the use is consistent with the purposes of protecting or enhancing the scenic, recreational, and other environmental values of the Project. To assist applicants in the permitting process, the staff at the SCE&G Lake Management Department is available to answer questions regarding documentation, permits, and specification requirements for their particular project. Permits from SCE&G are required for the following activities:

- Construction of a meandering access path;
- Water withdrawal;
- Installation/application of shoreline stabilization; and
- Installation of private docks.

It is highly advisable to begin the consultation process with SCE&G Lake Management staff at the planning stage of a project. SCE&G staff will be available to discuss specific permitting requirements with the property owner. Depending on the proposed new facility or activity, local, state and federal resource agencies may impose requirements on construction start/stop dates, the placement of erosion control devices, treatment plans, remedial measures, submittal of start construction notifications, and/or BMPs. Any permit applicant should be aware of such conditions, as violations may nullify a permit.

An overview of permitted activities is included below. Detailed information on SCE&G's permitting process, guidelines, and specifications, is provided in SCE&G's Permitting Handbook available by calling (803) 217-9221, or by writing:

8.1.1 DOCKS

A permit must be obtained from SCE&G Lake Management Department for the construction, installation, replacement of, or addition to any dock prior to the start of the activity. The configuration and location of a dock will be determined during a site visit by an SCE&G representative. At a minimum, dock construction and location must not create a nuisance, or otherwise be incompatible with overall Project recreation use. Impact on navigation or an adjoining property owner will be a strong determining factor. Size, length, or orientation may be restricted, or a permit may be denied if the dock would interfere with navigation or unreasonably impact an adjoining property owner. Dock length may vary depending on curvature or slope of the shoreline or lot line configuration. Any variance (i.e. increase in size or length) from guidelines included in the Permitting Handbook will be evaluated as to the effects on navigation, aesthetic value, or impact on adjacent properties and may be denied if in SCE&G's sole judgment the effects and impacts warrant denial. No dock will be permitted in narrow cove areas, which are defined to be areas where the distance across the water from one shoreline to the other at the 425-foot contour (normal high water level) is less than 200 feet. Only one dock will be permitted on a single-family lot¹⁰. Please see the Permitting Handbook for additional requirements.

General boat dock design may involve either fixed or a combination of fixed and floating structures. Common docks are encouraged and may be mandated for all adjacent property owners as an alternative to individual docks and will be required on property with inadequate property line frontage (property line frontage requirements included in Permitting Handbook), or in such other circumstances that SCE&G deems appropriate. Dock layout specifications are included in the Permitting Handbook.

¹⁰ SCE&G does not guarantee usable water access to the waters of Monticello Reservoir at any time. Each lot along the shoreline will have different slopes and contours that will determine water depth in front of the lot. The Monticello Reservoir is a pumped storage project that can fluctuate vertically up to 4.5 feet over a 10 to 12 hour period during generation and pumping phases. The fluctuation of the reservoir will, at times, limit or restrict the use of most docks on the Monticello shoreline.

Docks generally will not be permitted on shoreline affected by significant erosion or steep slopes. Applicants may submit a request for approval accompanied by a plan to address shoreline erosion that can be accomplished without the clearing of vegetation or disturbance of shallow water habitat. However, SCE&G reserves the right, in its sole discretion, to deny a permit.

The types of docks permitted include private individual and private common docks. See Permitting Handbook for more details describing dock permitting policies.

8.1.2 SHORELINE VEGETATION MANAGEMENT

In general, SCE&G maintains a policy of non-disturbance of any vegetation within the Project boundary without approval from SCE&G. Permission to remove vegetation within a permitted access path will only be granted by SCE&G Lake Management after a site visit with the applicant. Once clearing of the access path is completed according to the permit, the applicant may maintain the path in the permitted condition utilizing hand held tools and without the use of herbicides. Any unauthorized removal of shoreline vegetation may result in the cancellation of the dock and other permits issued by SCE&G as well as legal action. Violators may be required to replant and restore the disturbed area with such plantings and/or shoreline manipulation as SCE&G determines is necessary to mitigate and correct the situation.

8.1.3 ACCESS PATH

A single access path may be cleared with hand held tools and without the use of herbicides from the adjacent property owner's land upon approval of SCE&G. The access path must follow a meandering route to prevent erosion and to protect the aesthetics of the shoreline. No trees larger than 10-inches in diameter at breast height may be removed within the access path. A SCE&G Lake Management representative will identify and designate the location of all access paths. Access path restrictions are included in the Permitting Handbook.

8.1.4 SHORELINE STABILIZATION

Shoreline erosion occurs in some areas where the reservoir shoreline is exposed to prolonged or recurrent wind and wave action. Such erosion, if significant enough, can lead to sedimentation in those areas of the reservoir, affecting aquatic habitats and drainage channels, stream channels, water intakes, and affecting the character of the reservoir in general. Provided it conforms to good engineering standards, as judged by SCE&G, SCE&G supports voluntary efforts to address shoreline erosion in the immediate area of docks or access path for adjacent property owners. To ensure that appropriate, effective techniques and materials are used, SCE&G monitors and controls erosion control projects on or directly affecting Project Property as detailed in the Permitting Handbook. Owners of property adjoining Project Property who wish to employ erosion control measures on or affecting Project Property must use SCE&G shoreline stabilization practices appropriate for the specific situation.

Because shoreline vegetation serves several important functions (i.e., soil integrity, wildlife habitat, water cleansing functions, and aesthetic value) SCE&G prefers to see employment of vegetative shoreline stabilization techniques to address soil erosion problems, whenever possible. These techniques may be referred to as bioengineering, and consist of installing living plant material as a main component in controlling problems of land instability. Plants used should consist of native species that, ideally, have been collected in the immediate vicinity of a project site to ensure that they are well-adapted to site conditions. The ultimate goal in using bioengineering techniques is to establish diverse plant communities to stabilize erosion prone areas through development of a vegetative cover and a reinforcing root matrix.

Bioengineering techniques are least effective at sites with significant and prolonged exposure to strong currents or wind-generated waves. Stabilization of areas experiencing strong erosion pressure may also require the use of structural erosion control methods such as rip-rap. Areas with high-gradient banks or those in advanced stages of erosion may also benefit from such structural components. The optimal solution at a given location often involves combinations of techniques providing both structural and environmental benefits to the shoreline. A variety of bioengineering methodologies and devices are available to address erosion. Illustrations of erosion control designs that utilize both vegetation and structural elements are provided in Figure 8-1 and Figure 8-2. As depicted in the figures, rip rap can provide immediate shoreline stability, thereby enabling plantings to become established to add root-based soil integrity. Optimal erosion control designs must account for site specific slope and erosion pressure as well as homeowner/landowner preferences. Figure 8-3 illustrates a site at which SCE&G's general guidance on using rip rap is followed. Bricks, blocks, tires, or materials other than rip-rap are prohibited as alternative shoreline stabilization material. SCE&G's Lake Management Department is available to provide the benefit of its knowledge and experience to help homeowners attempting to select the design right for them and the Reservoir environment.

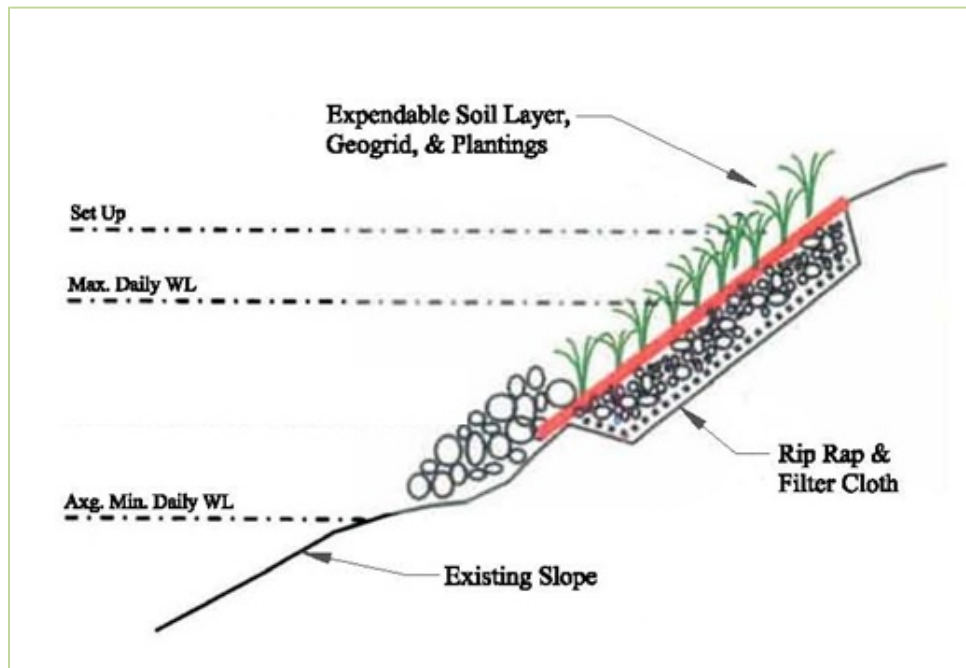


FIGURE 8-1 EXAMPLES OF SHORELINE EROSION CONTROL DESIGNS UTILIZING BIOENGINEERING AND STRUCTURAL TECHNOLOGIES (A)

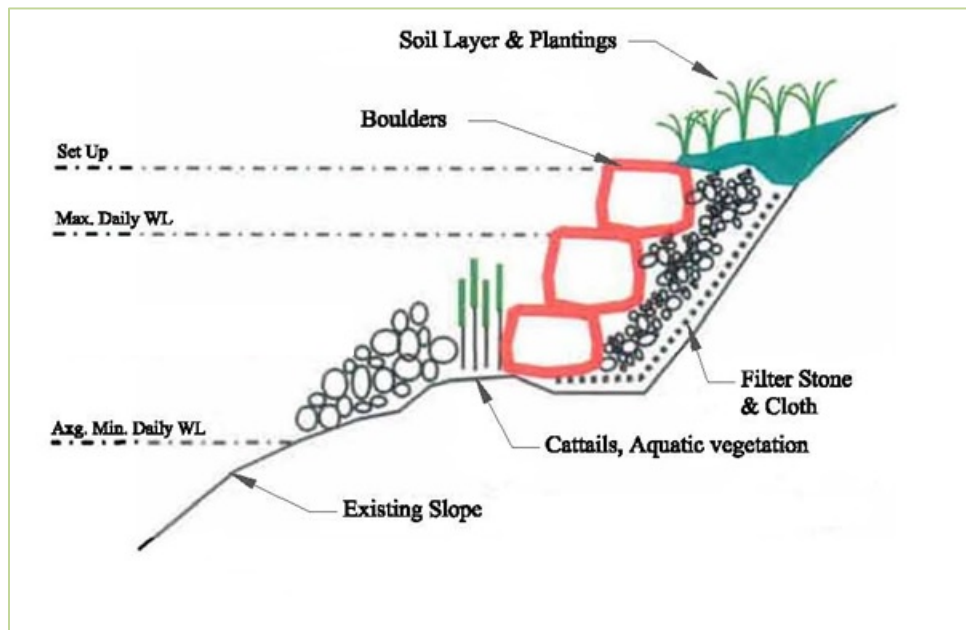


FIGURE 8-2 EXAMPLES OF SHORELINE EROSION CONTROL DESIGNS UTILIZING BIOENGINEERING AND STRUCTURAL TECHNOLOGIES (B)

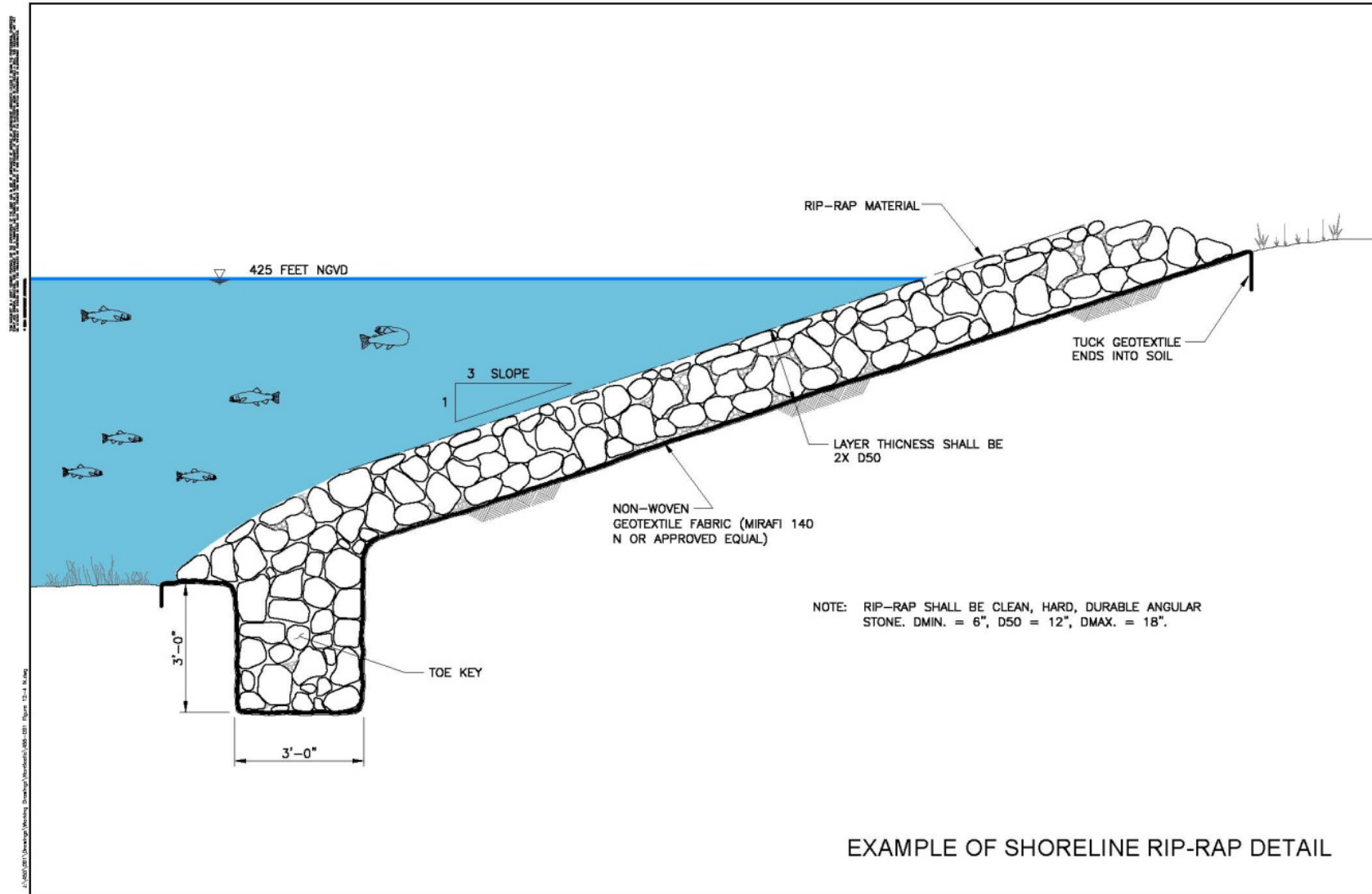


FIGURE 8-3 EXAMPLE OF SHORELINE RIP-RAP DETAIL

8.1.5 WATER WITHDRAWAL

Water withdrawals requiring piping and other transportation/delivery equipment to be placed along the shoreline or in the littoral zone, are managed according to the terms of this SMP. Water withdrawal for residential property must be for irrigation purposes only. Permits are required, and will not be issued for any other purpose. Associated pumps and electrical service must be located outside SCE&G property. SCE&G reserves the right to prohibit withdrawal during times of drought or water drawdown.

Applications for a permit to remove water must be submitted to SCE&G for review. Water withdrawal applications for greater than one million gallons per day (MGD) will be forwarded to the FERC for approval. Requests for withdrawal of one MGD or less may require agency consultation prior to approval. SCE&G may impose limits in granting permits for approved applications (see Permitting Handbook). The applicant may be required to bear the expenses of filing the application and will be required to compensate SCE&G for water withdrawn.

9.0 SCE&G PERMITTING FEE POLICIES

FERC allows licensees the right to charge reasonable fees to cover the costs of administering shoreline management programs, which add management responsibilities and associated costs to project operations. SCE&G administers its SMP in part through a permitting program, which does include a fee component. This ensures that activities occurring within the Project and in particular on Project land, are consistent with the overall goals for the Project, and that SCE&G's customers are not burdened with the full cost of administering programs that also have significant private, and often non-customer, benefit. Permit fees are due with applications and are required for docks, access paths, water withdrawal, and erosion control projects. Should an application be denied, associated permit fees will be returned. Periodic permit renewal fees may be required depending on the shoreline activity. Permit fees for Monticello Reservoir shoreline activities are detailed in the Permitting Handbook. Failure to comply with this policy may result in, among other things, revocation of existing permits, fines, or legal action, as well as loss of consideration for future permits.

SCE&G will give reasonable public notice through appropriate communication avenues before changing the fee structure.

10.0 ENFORCEMENT OF SHORELINE MANAGEMENT PLAN

10.1 VIOLATIONS OF SHORELINE MANAGEMENT PLAN

SCE&G conducts periodic surveys of the Monticello Reservoir shoreline to inventory and inspect docks, access paths, and shoreline erosion control structures/projects. Lake Management representatives make note of unauthorized structures that they see, as well as urging residents and Reservoir visitors to report anything they believe to be unauthorized activity within the Project boundary. Anyone believing that an activity violating the SMP is occurring is urged to contact SCE&G Lake Management at (803) 217-9221.

SCE&G Lake Management representatives will issue Stop Work Directives and/or Trespass Notices for any violations detected on SCE&G property. Any unauthorized clearing of trees or underbrush may result in the revocation of responsible parties' dock permits within 30 days if the violation(s) is (are) not corrected or a course of and schedule for corrective action has not been agreed to and approved by SCE&G. SCE&G may also commence legal action, if it deems it necessary, to require re-vegetation of the affected area. Removal of merchantable timber will require reimbursement to SCE&G subject to valuation of the Forestry Operations Department, including legally allowable "penalties." Consequences for violations may also include restrictions of access to SCE&G property, legal actions, fines, and loss of consideration for future permits.

11.0 SHORELINE MANAGEMENT PRACTICES

11.1 SCE&G SHORELINE MANAGEMENT PRACTICES

SCE&G has established a set of management practices that apply to all of the lands included in the Project boundary. These practices are reflective of each of their developments unique qualities. The management practices for the Fairfield Development (which includes Monticello Reservoir) described herein, may be reviewed and revised periodically during the period of the FERC license.

11.1.1 FOREST MANAGEMENT SHORELINE MANAGEMENT PRACTICES

SCE&G manages timber within the Monticello Project boundary line in accordance with South Carolina's Best Management Practices for Forestry publication. An online copy of this publication is available at <http://www.state.sc.us/forest/refbmp.htm>.

11.1.2 AQUATIC PLANT MANAGEMENT ACTIVITIES

Some species of aquatic plants can become significant nuisances to recreation and Project operations should their populations not be controlled. Some of the common problem species that may be found in Monticello Reservoir include hydrilla, water primrose, and several species of pondweed. When managing invasive and exotic aquatic plants it is important to also protect the aquatic ecosystems and fish habitat. This requires the integration and use of specific BMPs appropriate to the regional and local conditions.

SCE&G's Lake Management Department, in cooperation with the South Carolina Aquatic Plant Management Council, manages the Aquatic Weed Program on Monticello Reservoir. Because some aquatic weed control techniques can harm fish and native plant species if improperly used, it is unlawful, per state and federal regulations, for individuals to spray or treat aquatic growth in the waters of Monticello Reservoir. SCE&G joins with SCDNR to ask that any aquatic vegetation problems recognized by Reservoir visitors or adjacent property owners be reported to SCE&G's Lake Management Department and the SCDNR. In addition, to help curb the spread of invasive aquatic species, SCE&G joins with SCDNR to ask that Reservoir visitors examine their boats and trailers and remove all vegetation and visible mud from boats and trailers before placing them into the waters of Monticello Reservoir and after removing them from Monticello Reservoir. This plea and advice also applies to every body of water in the State. Additional

information on aquatic plant management throughout the state, including Monticello Reservoir, is available at SCDNR's website, <http://www.dnr.sc.gov/invasiveweeds/plan>.

11.1.3 WOODY DEBRIS & STUMP MANAGEMENT

Monticello Reservoir does not have a significant source of woody debris. Woody debris and stump management are discussed in the Permitting Handbook.

11.1.4 AQUATIC HABITAT ENHANCEMENT

SCE&G may partner with SCDNR to enhance fisheries habitat. Enhancing aquatic habitat is an important aspect of freshwater fisheries management. SCDNR and/or SCE&G may establish and maintain aquatic habitat enhancements on Monticello Reservoir such as, but not limited to, vegetation plantings, felled trees cabled along shorelines, spawning and fry rearing enhancements, artificial reefs or "fish attractors." Signage or buoys advising anglers and boaters of enhancement structures in the area may be installed. Structures should be designed and constructed so as not to pose hazards to navigation. At an absolute minimum, they must be designed and constructed to maintain adequate navigation clearance at normal low water elevations. All fisheries habitat enhancement activities will be coordinated with SCDNR and SCE&G.

Additional information on the SCDNR Fish Habitat Enhancement Program can be found online at www.dnr.sc.gov/fish/. For questions regarding an existing fisheries habitat enhancement structure or the notification of a missing buoy/marker, please contact SCDNR at 803-661-4767.

11.1.5 PROTECTION OF LANDS KNOWN TO PROVIDE IMPORTANT HABITAT VALUES

Reservoirs are dynamic environments and the important natural and cultural values that Monticello Reservoir presents may evolve over time. During the upcoming license term, areas along the shoreline may be found to warrant protection against materially negative impacts from development upon one or more of a variety of ecologically important characteristics. Such characteristics may include, but not be limited to the following: areas known to be occupied by rare, threatened or endangered species; rare or exemplary natural communities; species in the State Wildlife Action Plan; significant land forms and geologic features; wetlands and shallow coves; and other areas, such as spawning and nesting habitat, determined to be critical to the continued existence of native species. In the event that one of the aforementioned species is

determined to be present in the Project boundary, SCE&G will consult with SCDNR to determine appropriate management policies.

11.2 LANDOWNER RECOMMENDED BMPs

In addition to development activities, the environment around Monticello Reservoir is susceptible to impacts associated with residential and recreational activities. These include, for example only, improper fertilizer/pesticide use, boat maintenance, and debris disposal. Adjacent property owners can mitigate negative impacts otherwise associated with their property uses and instead make significant positive contributions to the Reservoir environment, and ultimately the watershed, by employing BMPs that preserve bank integrity and minimize non-point sources of pollution and contamination. Adjacent property owners should understand that using BMPs will help to preserve the scenic, environmental, and recreational qualities of the reservoir that they so highly value. Examples of effective BMPs recommended to adjacent property owners are provided in the succeeding section. SCE&G is available to provide more information and to assist landowners in determining effective BMPs for activities on their properties. Also, anyone may contact the Natural Resource Conservation Service or local county extension office (<http://www.sc.nrcs.usda.gov/contact/>).

11.2.1 MINIMIZING NON-POINT SOURCE POLLUTION

Reservoir pollution may result from a variety of activities related to residential development, agriculture, forestry, and construction. Contaminants may enter the reservoir and tributaries via overland flows carrying biological, chemical, and other substances picked up and carried by runoff from rain events. This runoff water may contain sediment, bacteria, oil, grease, detergents pesticides, fungicides, fertilizers, and other pollutants. These pollutants, depending on type, quantities, and concentrations can overwhelm a reservoir's natural ability to filter and process them, thus leading to degraded water quality and aquatic environments.

Although a single point of impact or action may seem insignificant in its effect on the reservoir, the cumulative effects of the resource may be considerable. With this in mind, SCE&G encourages adjacent land owners to be mindful that they are members of a larger community that uses and impacts the reservoir. Employing the following BMPs can go a long way in preserving and improving reservoir water quality:

- Use permeable paving materials and reduce the area of impervious surfaces, particularly driveways, sidewalks, walkways, and parking areas;
- Dispose of vehicle fluids, paints, and/or household chemicals as indicated on their respective labels and do not deposit these products into storm drains, project waters, or onto the ground;
- Use soap sparingly when washing vehicles and wash them on a grassy areas , preferably sloping gently away from the reservoir, so the ground can filter the water naturally;
- Use hose nozzles with triggers to save water and dispose of used soapy water in sinks or other vessels that direct the materials into sewer systems, not in the street;
- Maintain septic tanks and drain fields according to the guidelines and/or regulations established by appropriate regulatory authorities;
- Remove pet waste and dispose of properly in areas that do not drain to the reservoir; and
- Use only low or no phosphorous fertilizer on lawns near the reservoir.

12.0 PUBLIC EDUCATION AND OUTREACH

This SMP is intended to foster management of shoreline use and development to achieve consistency with the FERC License, as well as to promote protection of public safety and environmental quality (water quality, natural habitat, aesthetics, etc.). To garner support and compliance from the public and lake users, it is key to educate them to the need and means to protect shoreline resources. Additionally, the public must be aware of the management and permitting programs put in place to provide this protection. To accomplish the task of increasing public awareness of the goals and objectives of this SMP SCE&G has developed an education and outreach program that includes the components described below.

12.1 SHORELINE MANAGEMENT PLAN EDUCATION

SCE&G's Public Education and Outreach program seeks to educate the public on various aspects of the management of Monticello Reservoir, including the Permitting Handbook, recommended BMP use, relevant Project Operations information, and the Safety Program. To accomplish this, SCE&G uses various public education measures including informational pamphlets, public meetings, newsletters, and an internet webpage.

The Internet, in particular, presents an excellent mechanism for disseminating information and improving awareness. SCE&G maintains a website designed to provide information on the SMP and the Permitting Handbook. Printed copies of the following materials may also be obtained by contacting SCE&G Lake Management at (803) 217-9221. Information and materials that will be available at the website include the following:

- Permitting Handbook;
- Permit application forms;
- Examples and information on BMPs;
- Alternative and example designs for shoreline stabilization; and
- Useful links and other related information.

Additional outreach mechanisms that SCE&G intends to employ in implementing the SMP include the following:

- Provide speakers for homeowner and other organizations' meetings;

- Provide information to realtors and encourage dissemination of this information to all potential Reservoir shoreline back-property buyers; and
- Develop and distribute new, “user friendly” brochures that include general reservoir information, permitting processes, shoreline BMPs, and relevant contact information.

12.2 PUBLIC ACCESS AREA MAPS

A figure depicting Public Access Areas on Monticello Reservoir is included as Figure 12-1.

12.3 PUBLIC HUNTING AND FISHING

The SCDNR maintains hunting and fishery management responsibility and state hunting and fishing regulations enforcement on Monticello Reservoir. Separate regulations apply to hunting in areas included in the Wildlife Management Area (WMA) program and it is imperative that the individual check WMA regulations and maps prior to hunting. The designation for waterfowl management allows hunting on or in the water and on the islands in Monticello Reservoir, but not on adjacent shoreline land. State regulations and maps are available at SCDNR's website at: <http://www.dnr.sc.gov>, or by contacting SCDNR at:

Hunting and Fishing Regulations
S.C. Department of Natural Resources
Wildlife and Fresh Water Fisheries
1000 Assembly Street
Columbia, South Carolina 29201
Telephone: 803-734-3886

12.4 SAFETY PROGRAMS

Due to operation of the pumped storage generating plant, the waters of Monticello Reservoir can fluctuate several feet in a matter of a few hours. This rapid fluctuation makes it especially important for boaters and other recreationists to exercise a high degree of care and fully assume personal responsibility for their safety by being especially aware and cautious. For public safety, hazardous areas which are marked should not be entered and any other warnings posted around the reservoir should be observed as well.

SCE&G and SCDNR cooperate to mark shoals and other hazardous areas to increase boating safety. However, boaters should not assume all shoals and hazardous areas have been marked.

SCDNR also enforces the boating laws of South Carolina. Boaters should ensure that watercraft and safety equipment are in good working condition and in compliance with all applicable state laws.

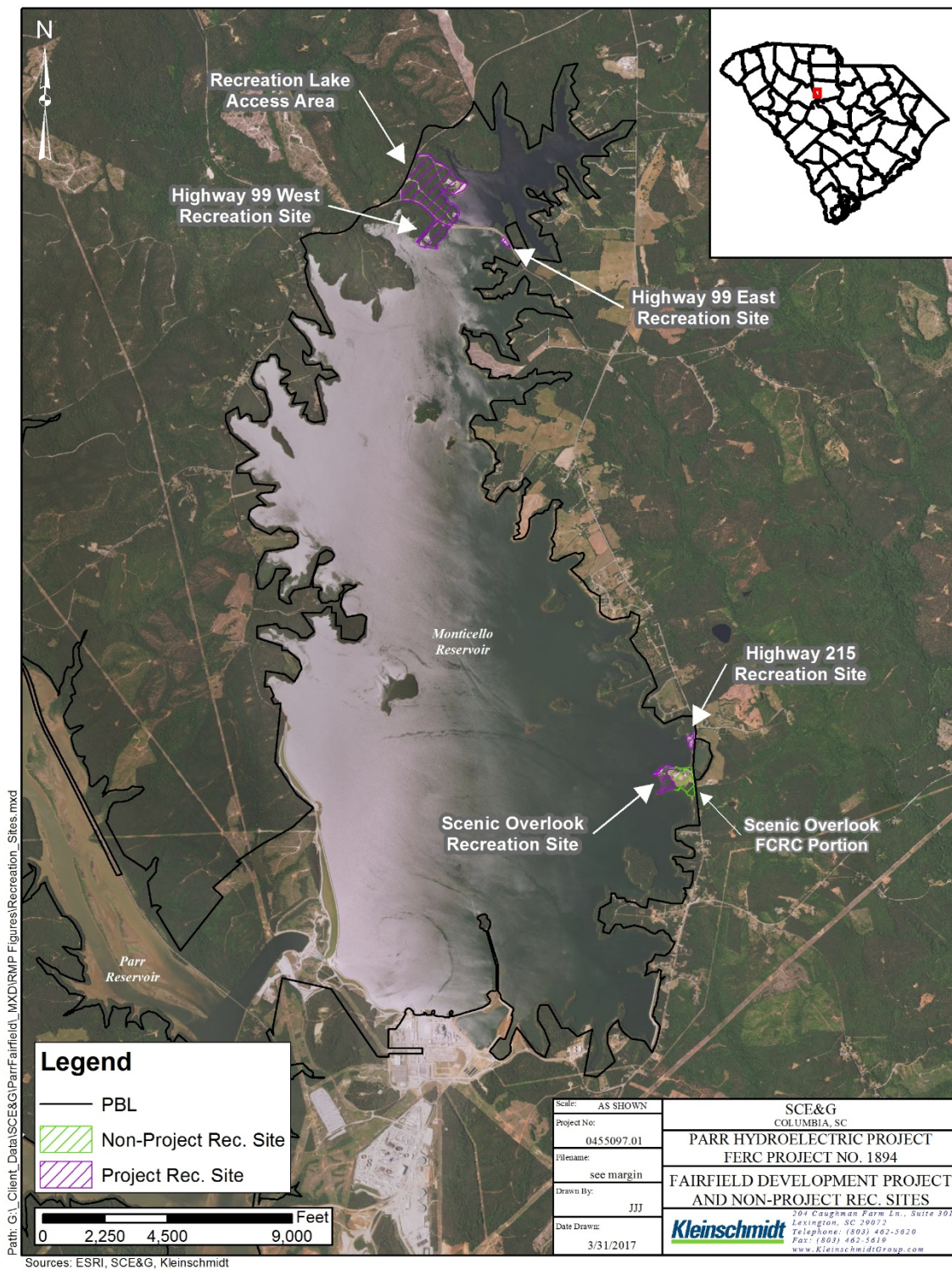


FIGURE 12-1 MONTICELLO RESERVOIR PUBLIC ACCESS AREA MAP

13.0 MONITORING AND REVIEW PROCESS

13.1 OVERALL LAND USE MONITORING

As demographics and user groups change within the Project area, changes in residential and commercial areas may occur. Often this type of use change is incremental and cumulative, occurring over a period of years or decades. To monitor land use around Monticello Reservoir, SCE&G will employ a geographic information system (GIS) to compare new and existing permit applications against GIS data for the land management classifications. Such monitoring will provide long-term data that should be useful in identifying areas experiencing change. Every 10 years, during the SMP review process (see Section 13.2 on Review Process below), SCE&G will report on changes in land use for the various land management classifications. If it is found that material changes within the Project boundary have occurred that are not consistent with the current SMP goals, amendments to the SMP may be warranted. Such situations might include significant changes in land ownership, major commercial upgrades or uses, or new residential uses or pressures.

13.2 REVIEW PROCESS

SCE&G proposes a 10 year SMP review cycle interval. A 10 year SMP review period interval should provide reasonable opportunities for SCE&G, in concert with governmental, non-governmental, and individual stakeholders, periodically and deliberately to assess new issues that arise as a result of development around the Reservoir, and allow for analyses of cumulative effects. The SMP review process will begin sufficiently in advance of the end of each period so that it will be completed within the 10 year time frame. One month prior to the scheduled start of the review process, its occurrence will be advertised in various media formats (e.g., website, newsletter, contact with homeowner associations, etc.). SCE&G will use those same media avenues to issue a report on the outcome of the review process. As in the past, SCE&G will solicit input from interested parties in addressing issues that arise and have a bearing on Reservoir management. This includes keeping lines of communication open during the time between review periods. Concurrently with the FERC SMP review process, SCE&G will review the Permitting Handbook periodically with interested stakeholders to ensure its effectiveness; however, changes to the permitting process may be made, as needed, outside of the scheduled review periods.

14.0 REFERENCES

Federal Power Commission (F.P.C.). 1974. Order Issuing New License for the Parr Hydroelectric Project. August 28, 1974. 52 F.P.C. 537.

Federal Energy Regulatory Commission (FERC). 2012. Guidance for Shoreline Management Planning at Hydropower Projects. Online. [URL]: <http://www.ferc.gov/industries/hydropower/gen-info/guidelines/smpbook.pdf>.

Federal Energy Regulatory Commission (FERC). 2001. Order Approving Land use and Shoreline Management Plan. June 4, 2001. 95 FERC ¶ 61,351.