

Final Study Plan Presented to



for

KEOWEE - TOXAWAY FERC No. 2503
RECREATIONAL USE AND NEEDS STUDY (RUNS)



Submitted by



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Scope of Work

I. Study Objectives

1. To provide data and analysis sufficient to characterize existing public recreation use and experience levels at project reservoirs.
2. To provide data and analysis sufficient to estimate future demand for public recreation at project reservoirs.
3. To provide data and analysis sufficient to determine present and future public recreation facility needs at project reservoirs.
4. To provide data and analysis sufficient to estimate present and future boating density and capacity at project reservoirs.
5. To provide data and analysis sufficient to characterize the economic value of public recreation at project reservoirs.

II. Basis

The basis for the study is to support Duke Energy's interests in understanding the recreation resources of, and public use levels at the Keowee-Toxaway Project, and to support near-term (2008 - 2016) public recreation planning for Keowee and Jocassee Reservoirs. In addition the study will establish a foundation for future recreation use and needs analysis in support of FERC relicensing related 18 C.F.R. 2.7 - Recreational Development at Licensed Projects.

III. Public Recreation Defined

Public Recreation is defined by the types of permitted uses allowed within the FERC Project Boundary, including Project access areas and islands, as specified by the terms of the current FERC Keowee-Toxaway Project License, and by Duke Energy's Access Area Improvement Initiative. In general, properties within the FERC Project Boundaries may be used for development, operation, and maintenance of land and water-based public recreation facilities and for the provision of compatible recreation related goods and services. Public recreation may include, but is not limited to, the following types of facility development:

- Picnic areas, tables and pavilions
- Nature centers or wildlife viewing areas
- Pedestrian, bicycle, or horse trails
- Swimming beaches, bath houses, and restrooms
- Boat launching ramps
- Fishing piers and bank fishing areas
- Primitive and developed campgrounds
- Recreational lodging including cabins
- Park stores and meeting facilities



- Food service including grills and restaurants
- Marinas with wet slips, dry stack boat storage, marine pump out facilities or gas sales
- Operations personnel residences
- Maintenance facilities that directly support park operations
- Other related outdoor recreation facilities or amenities

IV. Geographic and Temporal Scope

The study area will include Keowee and Jocassee reservoirs and lands and waters affected by the operation of the Project. Specifically, the study area includes the Project reservoirs (including Duke Energy-owned islands) within the FERC project boundary, existing developed Duke Energy Access Areas, and related governmental and commercial facilities located adjacent to the project that provide or affect water and land-based recreation opportunities for the general public. The study will also draw on information gathered from residents from the neighboring and surrounding counties. The study will evaluate data on recreational use gathered over a one-year period.

V. Methodology

Task 1: Present Recreation Use and Experience Levels

Berger will use several approaches to collect existing and future recreation visitor use data for Keowee and Jocassee reservoirs and lands and waters affected by operation of the Project. The following are descriptions of each approach for collecting data with additional details in the following sub-tasks.

Existing public use, will be documented with the use of traffic counters, trail counters, spot counts, and/or visitor interviews. Public recreation sites include existing developed Duke Energy access areas (boat landings), undeveloped access sites, state and county parks, public commercial facilities (campground, marina), and trails adjacent to the reservoirs, and Duke Energy owned islands.

Shoreline resident use, including residents that own land adjacent to the project boundary and residents that have access to the reservoirs via a common access lot (off-water portions of subdivisions or condominiums), will be documented using a mailed questionnaire.

The population of the surrounding counties will also be surveyed with a mailed questionnaire. This survey will include residents of Oconee and Pickens counties and residents of the next tier of counties, including counties in Georgia and North Carolina

Recreation providers including commercial recreation facility managers and public park managers will also be surveyed.



Sub-task 1.1: Existing Use Information

Berger will work with the study team to gather existing reports and data sources related to recreation at the Keowee-Toxaway Project. We will review these reports and data sources for information on existing recreational uses, facilities, opportunities, and needs. We will include relevant information from this review in our analysis. These sources include but are not limited to the following items:

Existing studies and reports from Clemson University Department of Parks, Recreation & Tourism Management

South Carolina Department of Natural Resources (SCDNR) recreation visitation study on the Jocassee Gorges area with focus on the Foothills Trail (SCDNR and Clemson University)

FERC Final License for the Keowee-Toxaway Project No. 2503

South Carolina Department of Natural Resources Management Plans

South Carolina State Outdoor Recreation Plan (SCDPRT, 2002)

South Carolina Recreation Participation and Preference Study (SCDPRT, 1999)

“Expanding the Experience, Trails for South Carolina, the 2002 South Carolina State Trails Plan (SCPRT & PCF 2002)

The Vision for the 21st Century – SC State Park Service (SCDPRT, 2003)

North Carolina State Outdoor Recreation Plan, (NCDPR, 2003)

Oconee County, SC Recreation Plan (Clemson University, 2004)

Plans for adjacent local, regional, and national parks, trails, greenways, open space, forests, refuges, etc.

2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (U.S. Fish & Wildlife Service and U.S. Census Bureau)

Guidelines for Understanding and Determining Optimum Recreation Carrying Capacity (Bureau of Outdoor Recreation, 1997)

Management of Aquatic Recreation Resources (Warren and Rea, 1989)

Outdoor Recreation in American Life: A National Assessment of Demand and Supply Trends (Cordell, et al, 1999)

Emerging Markets for Outdoor Recreation in the United States: Based on the National Survey on Recreation and the Environment (Cordell, et al, 1999)

Duke Energy and SCDNR Creel Survey Data

U.S. Army Corps of Engineers management plans for Lake Hartwell



Sub-task 1.2: Existing Public Access Sites

Berger will gather existing recreation use data from public and commercial recreation sites with traffic counters, trail counters, spot counts, and visitor interviews. We will use these methods to collect information about visitors to Keowee and Jocassee Reservoirs during peak and non-peak recreation seasons for a complete calendar year (December 2006 – November, 2007). Public recreation sites include existing developed Duke Energy access areas (boat landings), undeveloped access sites, state and county parks, public commercial facilities (campground, marina), and trails adjacent to the reservoirs, and Duke Energy owned islands. We will identify sites where the managing entity collects use information to reduce duplication of effort. This includes and is not limited to: the Jocassee Gorges, Devils Fork State Park, Double Springs Campground, Keowee – Toxaway State Natural Area, lands owned by South Carolina Department of Natural Resources, and High Falls, South Cove, and Mile Creek county parks.

Berger will install traffic and trail counters at sites that are conducive to this form of data collection. We use highly sophisticated counters that electronically record and time-stamp traffic 24 hours per day. Traffic counters will be used where there is a clearly designated entrance and exit to the site, and trail counters will be used near trail heads. We will assess all of the public recreation sites to determine which sites are best for traffic and trail counters.

Berger will conduct spot counts at sites where traffic counter data is collected, and at sites that are not suited for traffic counters. It is possible that certain recreation sites could be used as surrogates for other sites. We will work with the study team to determine if the use of such surrogates is appropriate and which areas are most suited to this approach if necessary.

We will conduct visitor interviews and spot counts at selected commercial recreation facilities and will interview the facility managers to acquire sufficient data to make reasonable use estimates. For example, we will interview marina and campground owners and ask them to record use or estimate use at their facility. Berger staff will count and record the number of vehicles, boat trailers, jet-ski trailers, campers, anglers, swimmers, picnickers, and other commercial site users.

Berger will conduct recreation site interviews to collect visitor use data including attitudes concerning public recreation needs and opportunities, safety-related issues and visitor demographic information. Berger will ask visitors about items such as satisfaction, safety, aesthetics, spending, and conflicts with other visitors. We will conduct exit interviews to capture the visitors' most recent perceptions of their experience. Interviews will be conducted at both the developed and undeveloped public recreation sites. We will schedule visits to the sites based on a stratified random sample that will include all seasons and times of day, including early morning and late evening to capture night use. This stratified random sampling scheme will enable us to gain representative responses from visitors, while ensuring interview coverage during key times (i.e. weekend days). Berger will work with the study team to develop the highest quality on-site interview and survey questionnaires that will not be biased or overly burdensome for respondents. The intensity of data collection efforts will vary according to season with the greatest effort occurring during the peak recreation season, April through September.



Sub-Task 1.3: Shoreline Resident Use

Berger will use a mailed questionnaire to survey shoreline residents and residents that have access via a common lot or common dock about their uses and needs of the Project area. We will conduct the survey of shoreline residents during the late summer and early fall of 2007. The survey will be used to collect information about amount of use, experiences, needs, new recreation opportunities, and overall recreation activities in the area. Our mailed questionnaire methods have been very effective, yielding statistically valid samples for Project wide analysis. A mailing list of single family residences will be developed using a system to randomly select shoreline residents from Duke Energy's shoreline permit database. A mailing list of back lot and condo residences and/or properties that have shared slips or access to Project waters will be developed from each adjacent county's tax data base. Berger will develop the sample size based on the total population size of shoreline residents to ensure we sample a sufficient population size to yield results within the 95 percent confidence interval. Berger estimates that the survey may include up to 1,000.residences.

Sub-Task 1.4: Regional Population

Berger also recognizes the need to include a regional population who reside at varying distances from the reservoir and who may recreate at Project reservoirs. A separate mailed questionnaire will be used to survey this regional population about their recreational use of the Project. The geographic extent of the regional population will include Oconee and Pickens counties and the next tier of counties, including counties in Georgia and North Carolina. A random sample size will be developed based on the populations within this geographic area so that the sample will yield results within the 95 percent confidence interval. Berger will stratify the potential visitor questionnaires by county, and the number sent to each county will be based on the proportion of the study area population in each county. Each residence will be mailed a questionnaire asking about existing and potential (future) recreation visits to the project area. If necessary, Berger will make up to two mailings to this randomly selected sample to increase the return rates to ensure we receive enough completed surveys to evaluate the responses within the 95 percent confidence interval.

Sub-Task 1.5: Recreation Providers

Commercial facilities and public parks provide public access to the Project and the area adjacent to the Project for a large number of individuals. Berger will work with the study team to develop separate survey tools specifically designed for each group.

Berger will interview commercial facility operators in order to estimate the amount of use at those facilities. We will assess the number of boat slips available, percent usage of the docking facilities during peak and off-peak times, number of boats launched during peak and off-peak times, and amount of fees for boat launching. We will also conduct exit interviews and spot counts at these sites.



Berger will also interview state and local public park managers. We will assess facility availability, the level of facility use, capacity utilized, and amount of fees for boat launching.

Sub-Task 1.6: Agencies

Berger will work with the study team to develop a list of representatives of federal, state, and local recreation, natural resource, and planning agencies who have an interest in the Project area. We will survey a representative from each agency to determine facility improvement needs and constraints to recreation use identified by the agency.

Sub-Task 1.7: Data Analysis

Berger will analyze and present the data so the recreation use and needs of the study area can be viewed aggregated and disaggregated for individual locations. We will organize and present the data we collect, as part of this study, such that it is usable by Duke Energy, state and local agencies, and commercial facility providers for their analysis and decision-making processes. For example, we will consolidate information about each of the facilities to assess current condition, determine the adequacy of the facility to accommodate current use levels, along with the needs for additional facilities, if any. We will also present use and demand estimates for the various populations including existing public access site visitors, shoreline residents, and the regional population.

Estimating recreation use at hydro developments is similar to assembling a puzzle. The pieces of information are often different shapes and types of data. The study methods focus on collecting as many of the pieces of recreation use data as possible. The pieces of data include traffic counter data, spot counts, visitor interviews, shoreline questionnaires, and use estimates from commercial recreation facility managers and park managers. The following is a brief summary of how Berger will analyze each type of data.

- Traffic/Trail counter data – Data from the traffic counters are a record of the vehicles that enter and exit a site. In order to estimate the number of people who use a site with a single access road during the study year, Berger will divide the total counts for the year for a site by two in order to account for vehicles (or trail users) entering and exiting the site. We will then multiply this count for the year by the average party size based on the data we collect using the visitor interviews. Trail counters will be used to supplement the traffic counter, interview, and spot count data. The methods for using them are the same as traffic counters.
- Spot counts – Berger will calculate the average number of vehicles by type at each site where we record spot counts. An excellent way to specify the precision of the averages is to construct a confidence interval. For example, if the number of spot counts for a site is 10 including: 4, 4, 5, 5, 5, 6, 6, 7, 8, 9 then the average would be 5.9 and the 95% confidence interval would range from 4.71 to 7.09. The wider the interval, the more



confident you are that it contains the parameter. The 99% confidence interval is therefore wider than the 95% confidence interval and extends from 4.19 to 7.61.

- Visitor interviews – We will calculate the averages for the responses to the visitor interview questions. As described above, we will use the average party size to estimate the number of people using a site. We will calculate a 95% confidence interval for each question where an average is calculated. Interviews will also be used in conjunction with the trail counters to confirm that people who boat to boat only accessible trail heads return the same way so we don't over estimate the use numbers.
- Shoreline Resident questionnaires – We will calculate the averages for the responses to the shoreline questionnaire. We will use the averages for annual recreation use in the study area to calculate the amount of annual use by shoreline residents. We will also calculate a 95% confidence interval for each question for which an average is calculated.
- Use estimates from commercial recreation facility managers and park managers – Berger will attempt to get annual recreation use estimates from all facility and park managers. If we are not able to get data from every facility or park, we will calculate average use by type of facility or park and extrapolate for the facilities and parks where use estimates are not available.

Task 2: Estimate Future Recreation Demand

Berger will estimate future recreation demand at the Project by assessing future demand for recreation activities and population trends. Recreation activity use projections for the years 2010 through 2050 will be from "Outdoor Recreation in American Life: A National Assessment of Demand and Supply Trends" by Cordell (1999). Berger will assess the indices developed by Cordell and make adjustments based on differences in population growth trends between the local counties and Cordell's population estimates. We will multiply the future use growth index by the estimated existing recreation use at the Project to estimate future demand for certain activities.

Task 3: Estimate Present and Future Boating Densities and Carrying Capacity

Berger will characterize the boating carrying capacity of the reservoirs using both physical and social parameters applying a combination of industry-recognized methodologies and survey tools. These methodologies include standards and procedures identified in the Bureau of Reclamation's "Water Recreation Opportunity Spectrum User's Guidebook" (Reclamation, 2004); Bureau of Outdoor Recreation (BOR) "Guidelines for Understanding and Determining Optimum Recreation Carrying Capacity" (BOR, 1977), and "Management of Aquatic Recreational Resources" (Warren and Rea, 1989). The physical aspect of boating carrying capacity will capture the spatial variability and boating density and will be assessed based on aerial photographs, boat counts, and boat use characterization (e.g., sizes, speeds, patterns) within the Project area. Carrying capacity is also relative to social considerations as people's perceptions dictate their recreation choices and experiences. Results from surveys of individuals recreating at the Project will be utilized to assess people's perceptions of the observed boating



densities, safety, and crowdedness. Together the physical and social aspects of boating use at the Project can be collectively assessed to estimate theoretical boating carrying capacities for the reservoirs.

Berger will conduct the density and boating carrying capacity assessment for both the Keowee and Jocassee Reservoirs. Berger will focus on the peak use period for the Project: April through September. We will collect data on randomly selected weekdays, weekend days, and holidays between the hours of 10:00 a.m. and dusk.

Current oblique aerial photography will be acquired by a local aerial photographer with knowledge of the area. We will use a stratified random sampling approach choosing 4 weekdays and 7 weekend days or holidays. To ensure uniform data entry and the ability to compare boating use on the variety of days, Berger will divide each lake into a number of individual cells. Using the photographs, we will count the number of boats within each cell and then transfer this information into a Geographic Information System (GIS) layer for analysis. We will analyze the data at the level of the individual cell, and then aggregate the data and analyze it for larger sections of each lake.

In addition to aerial photos, Berger will perform spot counts from the water on 10 days throughout the peak use period to document boating numbers, types, and use patterns. Berger will use these spot counts in conjunction with public recreation site exit interview data (information on boat sizes, distances traveled, preferred boating activities, and any shortcomings to their experience) to characterize areas within the reservoirs into uses consistent with the Bureau of Reclamation's Water Recreation Opportunity Spectrum (e.g., high density, high speed, varied boat types or non-motorized, quiet water areas). For example, after characterizing the concentrations and types of boats on each reservoir it may be apparent that higher speed boating occurs in certain areas of the lake while non-motorized boating (canoeing, sailing) occurs in more remote lake settings.

The lakes will be classified and divided into similar character subunits. Berger will then perform the carrying capacity analysis for both the subunits and the overall reservoir-wide capacity. This will help to highlight capacities at a finer resolution (i.e., identify potential problem areas) in addition to providing a lake wide optimum capacity.

Berger will measure the social aspect of boating carrying capacity with specific questions from the on-site interviews and mail surveys outlined in Task 1. Berger will utilize the on-site, exit interviews conducted at public and commercial recreational sites and the mail survey of landowners along the shoreline of the Project to assess people's perception of crowding, safety, and boat launch and retrieval times.

Task 4: Determine Present and Future Public Recreation Facility Requirements

To determine present and future facility requirements, Berger will first collect information about the recreation resources within the study area. Berger will compare this information about existing facilities with data collected regarding existing public use and estimates of future use. In addition, we will review any recreation needs identified by respondents to the surveys utilized



in Task 1 and state, regional, and local plans. Berger will also provide a regional recreation characterization to assist in presenting Project related recreational opportunities.

Sub-Task 4.1: Recreation Facility Inventory

The facility inventory will include the types of facilities, services offered, GPS location and representative photos at each site. In addition the inventory will include:

- Identify and characterize all developed recreation facilities,
- Identify amenities at undeveloped sites,
- Determine adequacy and condition of existing facilities,
- Identify safety features designed to protect the recreating public.
- Identify dedicated open space and game lands.
- Identify Wild and Scenic Rivers and formal or recommended Wilderness areas,

Berger will also develop detailed map layers that meet all of Duke Energy's GIS base map standards.

Sub-task 4.2: Recreation Needs Assessment

Berger will review the recreation facility inventory information, recreation use data, and visitor, shoreline resident, and regional population comments to assess existing recreation facility needs at the Project. Berger will assess the available capacity of recreational sites, boating density determinations, and future recreational use estimates and develop recommendations for any future mitigation and enhancement measures regarding public recreation. We will review existing recreation sites to determine if future demand can be met through existing sites, enhancement of existing sites, the addition (and location) of new recreation sites, or changes in current recreation policy (e.g., the deletion of planned recreation sites from current management plans or commitments) at the Project.

Task 5: Economic Value of Recreational Visitation Assessment

Keowee and Jocassee Reservoirs play an important role in the regional recreational resources of South Carolina. As such, people make decisions about the types of recreation experience they want and decide to make expenditures that support that experience. Individuals access the lake from private docks, public boat launches, local and state parks, and commercial facilities such as marinas and campgrounds. They make expenditures on food and beverages, lodging, entrance fees, boat rentals, supplies, and slip/launch fees, bait and tackle, gasoline, and other expenditures related to their recreation experience and activities.

Berger will assess the socioeconomic effects that Project-related public recreation has on the local economies of Oconee and Pickens counties. We will utilize the recreation use estimates combined with expenditure information, each of which will be developed as a part of Task 1, in conjunction with IMPLAN, an economic input-output model, to estimate the level of economic



activity that recreation expenditures contribute to the study area. The IMPLAN model utilizes specific multipliers for each of the counties in the study area to assess total economic effects resulting from the expenditures made during recreational visits to the Project. Berger will assess the value of the income, number of jobs, and taxes that arise directly and indirectly from Project-related recreational expenditures.

Task 6: Reporting and Meetings

Berger proposes two pre-study meetings with the study team to develop the study plan, and a third pre-study meeting with stakeholders to present the final study plan. The first meeting will present our staff, our proposed methods and survey tools, and discuss any questions. The second meeting will discuss the study team's suggested changes to the study plan, and finalize the survey methods. The third meeting will present the final study plan to stakeholders with an overview of objectives and methods, provide a Q & A session, and officially kick off the study. The anticipated schedule for these pre-study meetings is:

- September 2006 – Study Team Meeting
- October 2006 – Study Team Meeting
- November 2006 – Stakeholder Meeting

Berger will supply 3 electronic quarterly reports to provide updates to the study team and a draft study report. The updates will consist of a summary of data collection efforts, data received to date, and preliminary analysis. The anticipated schedule for quarterly reports is:

- March 2007
- June 2007
- September 2007

Task 7: Draft Study Report

Berger will prepare the draft study report that will incorporate the results of Tasks 1 – 6. The draft report will be provided to the study team for review and comment. Berger will meet with the study team to discuss members' comments on the draft report and resolve any concerns.

- January 2008 – Draft Study Report Review with Study Team



Task 8: Final Study Report

Berger will prepare the final study report that will incorporate the comments of the study team as appropriate. We will also prepare an appendix that provides a summary of comments received on the draft report and responses to the comments. Berger will analyze the recreational data and information it collects, and include in the final report:

- A recreational facility inventory of Duke Energy Access Areas with maps and photos,
- Visitor profile information including results of interviews and mailings,
- Data tables including information gathered via spot counts and traffic counters,
- Annual total recreational use estimates for the project, with breakdowns for each reservoir,
- Data tables of estimated future activity levels,
- Boating density maps for each flyover and composites for weekend and weekdays,
- Boating carrying capacity characterizations, and
- Data tables of recreational related expenditures.

These results will characterize the experiences of existing recreational users, as well as the type and amount of existing and estimated future recreational use within the study area, and the ability of the Project to accommodate future increases in use. The report will include maps and analysis related to boating densities throughout the Project as well as an assessment of the theoretical boating capacity of Keowee and Jocassee reservoirs. The results will provide information on the quantity and quality of existing recreational facilities available at and adjacent to, the Project and their ability to support existing and estimated future demand. The results will characterize the amount of economic activity recreational expenditures made during recreational visits to the Project. The results will also provide a prioritization of the types of, and locations for, additional facilities that may be needed, which ultimately will assist Duke Energy in the analysis of recreational resources with respect to the Exhibit R of the existing license.

- March 2008 – Final Study Report Presentation to Stakeholders

VI.