

MEETING NOTES

**SOUTH CAROLINA ELECTRIC & GAS COMPANY
SALUDA HYDRO PROJECT RELICENSING
DOWNSTREAM FLOWS TECHNICAL WORKING COMMITTEE**

**SCDNR HEADQUARTERS
September 20, 2006**

final dka 10-20-06

ATTENDEES:

Name	Organization	Name	Organization
Tom Eppink	SCANA	Malcolm Leaphart	TU
Bill Marshall	SCDNR and LSSRAC	Dave Anderson	Kleinschmidt Associates
Patrick Moore	AR/SCCCL	Jennifer Summerlin	Kleinschmidt Associates
Mary Crockett	SCDNR	Alan Stuart	Kleinschmidt Associates
Kelly Maloney (by phone)	Kleinschmidt Associates		

ACTION ITEMS:

- Dave Anderson – contact Hal Beard about creel surveys
- Dave Anderson – send out study plan to committee members and finalize

PARKING LOT ITEMS:

- None

DATE OF NEXT MEETING: **TBA**

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These notes serve as a summary of the major points presented during the meeting and are not intended to be a transcript or analysis of the meeting.

Dave welcomed the Downstream Flow TWC (DFTWC) members and noted the purpose of the meeting was to discuss and finalize the Downstream Recreation Flow Assessment Study Plan (attached). Dave noted that he would like to go through each section so all committee members have the opportunity to comment on the study plan.

Dave briefly summarized the introduction of the study plan and no comments were made. Dave further explained the purpose of the study is to assess recreational flows for the lower Saluda River (LSR) for different types of recreation at different river reaches under different flow conditions. Malcolm asked how a rate of change will be determined. Dave noted that rate of change will be estimated from the tailrace to the confluence using level loggers. He explained that level loggers will measure down to a tenth of a foot. He added that all flows will be investigated to examine how the river rises differently. Dave noted that the locations of level loggers coincide with the HEC Res-Sim model and cross sections were chosen according to river habitats (riffle, run, pool).

The group continued to review the study plan and Dave briefly discussed the goals of the study plan. There were no comments provided on Goals One and Two. Dave read Goal Three and it was noted that “public” should be inserted before the word “ingress” for Objective Three of Goal Three. Dave then briefly reviewed the locations the level loggers will be placed in the lower Saluda River. He noted that rate of change will be estimated between each location. There was some discussion about where the level loggers will be placed in the LSR and the group agreed that a second level logger should be added to Oh Brother Rapids and Ocean Boulevard locations.

Dave then began to discuss the three phases of methodology. He noted that the first phase will include hydrologic data, creel surveys, and the IFIM study. Dave then explained that Phase Two will include a downstream flows focus group and a land based reconnaissance. There was some discussion about the benefits of doing a water-based reconnaissance. The group also felt flow ranges should be provided in order to assess actual flows rather than collect opinions on flows. At the end of the reconnaissance, members will fill out a questionnaire about the flows for that day. There was a brief discussion about what flow ranges should be evaluated. Kelly Maloney noted that Phase One will help identify the specifics of the flows. The group decided that flow ranges will be determined by the DFTWC based on the results from Phase One. There was further discussion about the use of video documentation to capture a rate of change of event. The group decided to include this option in the study plan as part of the Phase Two work.

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Dave briefly reviewed Phase Three and asked the group to provide comments. It was noted that “minimum of 180 days” should be deleted and replaced with “deployed long enough to capture the full range of flow releases necessary to complete the study.” The group also agreed that the first two bullets should be removed from Phase Three (overall and daily average flow). It was suggested the comment matrix should be added to the appendix of the study plan. Dave noted that questionnaires will be drafted once Phase One is complete. Dave mentioned that he would send out the study plan to committee members so everyone can review changes made.

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Comments from Bill Marshall: Folks, more food for thought...I was thinking this morning about some ideas which have been expressed about understanding rate-of-change and even experiencing rate-of-change.

I'm not sure what we concluded yesterday about the use of video, but I'm thinking now that we may want to consider trying to capture video or time-lapsed photography of certain rates of change in order to better document the (call it what you will) surge/bubble/wave/wall-of-water experience in the river. Since we are relying upon expert assessments of river conditions, visual information when combined with the water level logger data could be more effective than logger data alone in documenting and evaluating what happens in the river. Perhaps a video component could be accomplished quickly if we were able to schedule one rapid high-flow release event and have cameras deployed at selected points.

This idea could be an option for later consideration under Phase 2 (expert recon) of the study. What do you all think?

Comments from Malcolm Leaphart: The draft, including the comments and replies, has evolved to an accurate document of the scope and intentions for the Downstream Flow study as discussed at the past meetings. The disposition of the major issue of future recreational needs is still of key concern. Would you please clarify in the Recreational Flows Plan, exactly what the 'Saluda Recreation Assessment' is, who will be doing it, and when? This is the phrase from the answer you provided to several questions about future recreational needs in the table of comments and responses:

"Future use will be addressed in the Saluda Recreation Assessment"

The concern is that future recreation needs are a major issue because of the inadequate current sites, especially on the lower Saluda, but also on Lake Murray where marinas are closing or have been converted to private use. Most of the stakeholders would have preferred this issue be a starting point for committee efforts, rather than it still not being addressed to date. So, we would appreciate you stating the intentions for an assessment at some future time with some level of certainty and with as much level of detail as you can at this time as to how it will be dealt ultimately in the relicensing. It is certainly much too important an issue to fail to cover or to lose track of...

Reply from Dave Anderson: The Recreation Assessment is currently being conducted. The study plan is on the web site:

<http://www.saludahydrorelicense.com/documents/001-SaludaRecreationAssessmentStudyPlanFINAL.pdf>

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Reply from Malcolm Leaphart: My request was not for the study details, but to clearly state that the issue of future recreation needs are highlighted as the important issue it is in the draft. So, let me re-state my request and be more specific... The following paragraph from the Downstream Flows does not include any reference to future recreation needs (except the term 'opportunities' which is too vague to infer future needs from). Please add a reference to this paragraph that states that future recreation needs is one of the goals of the Assessment as documented.
Thanks.

“The 2006 Saluda Project Recreation Assessment is currently being conducted under the Recreation RCG. This study utilizes vehicle counts and on-site interviews of individuals at Project recreation sites to ascertain opportunities, patterns, and levels of use along the lower Saluda River. These data will be reviewed and analyzed to determine what recreation activities are currently supported by access sites along the lower Saluda River, what recreation activities are being participated in by individuals at these sites, how much use the lower Saluda River receives, and any specific comments made by respondents pertaining to safety, river flows, and barriers to access.”

Reply from Kelly Maloney: I would agree that future recreation use levels and needs on the lower Saluda River should be addressed in the relicensing process and the Saluda Recreation Assessment (the study plan of which was distributed by Dave) should address all of the concerns that you have raised. Because we are not considering future uses or needs in the Downstream Recreation Flow Assessment Study Plan, however, I do not believe that the flow study is the most appropriate forum to discuss the goals and objectives of Saluda Recreation Assessment. I'm not clear on the reason why we would want to specifically highlight a goal of another study for an issue that is not a part of the study plan at hand.

Future uses are not included as part of the goals of the flow study plan because we are attempting to determine the appropriateness of certain flow levels for certain activities. Irrespective of how use levels increase or change in the future, the flows most appropriate for certain activities would not change. Though use distributions may shift and other access locations utilized in the future, the capacity and condition of existing access sites, as well as the potential for additional sites and improvements which would support recreational use of the lower Saluda River, are wholly addressed in the Recreation Assessment.

As you pointed out, there are two places in the flow study plan that reference the Saluda Recreation Assessment: Section 2.1 and Appendix C. Section 2.1 discusses the aspects of the Saluda Recreation Assessment that will be utilized as part of the Phase I investigation for the flow study. Because the flow study is not considering future uses, I believe it would confuse the issue to discuss details of the Recreation Assessment that are not being used or considered here in the flow study.

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Likewise, I do not believe that Appendix C is the forum to outline the goals and objectives of the Saluda Recreation Assessment. If an issue was raised that we believed to be out of the scope of the flow study but addressed by the Saluda Recreation Assessment, we referenced that document in Appendix C. If you feel it would be helpful to include a hyperlink to the Saluda Recreation Assessment Study Plan (such as the one forwarded by Dave) in Appendix C, we can certainly do that.

Reply from Malcolm Leaphart: The reason to expand the statement as I suggested is because it is incomplete in listing all of the goals of the Recreation Assessment that is being summarized by the statement. However, I have no major objection in leaving it as it is since the Recreation Assessment includes the goal of identifying future recreational needs, and the point has been made in our exchanges of the importance of that. Please include our exchanges, including this one, as an addendum to the last meeting summary for the Recreation Flow Assessment TWC.

It is evidently important to further clarify why I made this simple request: There is a concern that the critical issues identified at the beginning of the relicensing process, including in ICD comments from stakeholders, are not the focus and organizational point for the process. Tracking of issues is very difficult as a result, as is keeping up with all the inter-relations between the many issues being dealt with in separate groups. Also, a promised issues spreadsheet for tracking has not been communicated to date and will soon become a moot point. So, any opportunity to emphasize key issues is looked for, such as for the future recreation needs issue which is a very sensitive one. It was originally not even included in the first drafts of the Recreation Assessment, and only added after stakeholder requests. To many of the stakeholders, identifying future recreation needs is a much more important issue and goal worthy of a separate TWC when compared to identifying possible site upgrades which could be done outside of the relicensing process as a maintenance item - much like the recent upgrade to the Hilton boat landing. Will continue to try to participate positively as SCE&G manages the relicensing process, and appreciate the opportunity to express concerns and to try to keep the focus on critical issues.

SOUTH CAROLINA ELECTRIC & GAS COMPANY

SALUDA HYDROELECTRIC PROJECT
(FERC NO. 516)

**DOWNSTREAM RECREATION FLOW ASSESSMENT
STUDY PLAN**

DRAFT

SEPTEMBER, 2006

Prepared by:

Kleinschmidt
Energy & Water Resource Consultants

SOUTH CAROLINA ELECTRIC & GAS COMPANY

SALUDA HYDROELECTRIC PROJECT
(FERC NO. 516)

DOWNSTREAM RECREATION FLOW ASSESSMENT STUDY PLAN

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SEPTEMBER, 2006

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**SALUDA HYDROELECTRIC PROJECT
(FERC NO. 516)**

DOWNSTREAM RECREATION FLOW ASSESSMENT STUDY PLAN

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SOUTH CAROLINA ELECTRIC & GAS COMPANY

SALUDA HYDROELECTRIC PROJECT (FERC NO. 516)

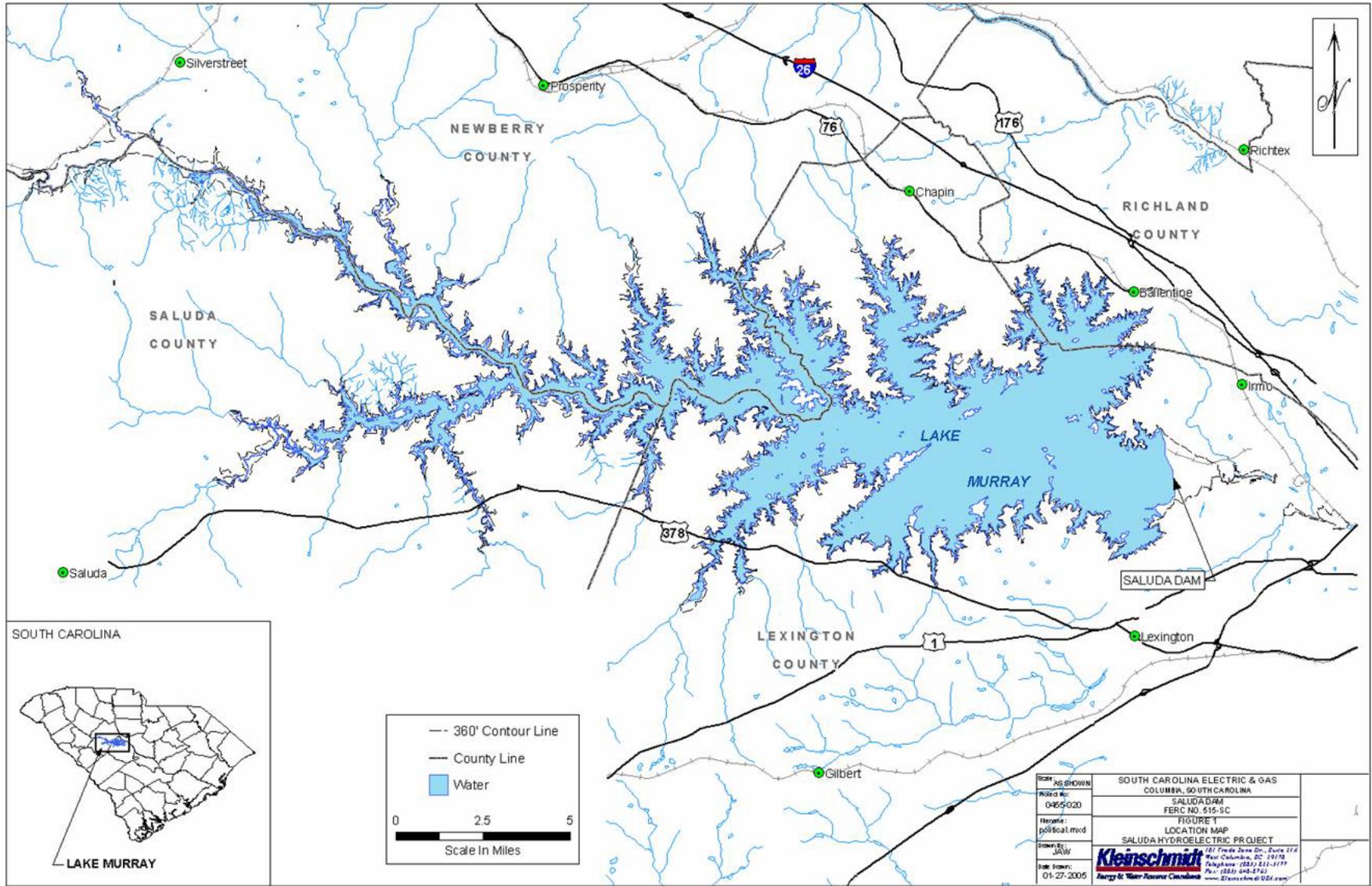
DOWNSTREAM RECREATION FLOW ASSESSMENT STUDY PLAN

1.0 INTRODUCTION

The Saluda Hydroelectric Project (Project), is a Federal Energy Regulatory Commission (FERC) licensed project (FERC No. 516), owned and operated by South Carolina Electric & Gas Company (SCE&G), pursuant to the license issued by the FERC in 1984. The Project is located on the Saluda River within Richland, Lexington, Saluda, and Newberry Counties, South Carolina, and situated within proximity of the towns of Irmo, Chapin, and Lexington and within the metropolitan area of the City of Columbia, South Carolina, which is approximately 10 miles east of the Project (Figure 1). The Saluda Project includes Lake Murray, the Saluda Dam and Spillway, the Saluda Berm, Saluda Powerhouse, intake towers, and associated penstocks.

SCE&G is in the process of relicensing the Saluda Project as the current operating license expires on August 31, 2010. This relicensing process involves cooperation and collaboration with a variety of stakeholders, including state and federal resource agencies, state and local government, non-governmental organizations (NGO), and interested individuals, in order to identify and address any operational, economic, and environmental issues associated with a new operating license for the Project. The Downstream Flows Technical Working Committee (TWC) is comprised of interested stakeholders (Appendix A) who are collaborating with SCE&G to identify and make recommendations related to public safety and recreational opportunities associated with downstream project flows to the lower Saluda River. The Downstream Flows TWC has requested that a study be designed and implemented that would assess flows, identify preferred flows for recreational activities, and determine safety issues associated with river flows that may need to be addressed through the work of the Safety Resource Conservation Group (RCG).

Figure 1: Project Location



1.1 Study Area

SCE&G currently operates the Saluda Project in order to provide reserve capacity for the company's utility obligations, a mode of operation that the company proposes to continue under the new license. Project generators are typically offline, *i.e.*, not operating, but can be started and synchronized to the electrical grid and can increase output immediately in response to a generator or transmission outage on SCE&G's system or in response to a call for reserve power from neighboring utilities, with which the company has reserve agreements and obligations. As a result, flows from the Saluda Project are generally unscheduled. Although there is no minimum flow requirement for the Project, SCE&G has an informal agreement with the South Carolina Department of Health and Environmental Control (SCDHEC) to provide a minimum of 180 cfs at the Project to enhance downstream water quality¹. The average annual flow from the Saluda Dam to the lower Saluda River is 2,595 acre feet with a minimum average daily flow of 285 cfs. For the purposes of this study, the geographic scope will be from the base of the dam to the confluence with the Broad River (Figure 2).

1.2 Purpose and Content of the Study

The Downstream Flows TWC has requested an assessment of recreational flows for the lower Saluda River for different types of recreation at different river reaches under different flow conditions. The assessment is designed to provide information pertinent to optimum and preferred flows for particular recreation activities and any public safety issues associated with recreational use of the river. This study encompasses the following goals and objectives:

Goal 1: Characterize currently available recreation opportunities on the lower Saluda River. This will be accomplished by meeting the following objectives:

- i. Utilize the information collected during the Saluda Project Recreation Assessment to identify sites providing recreational access to the lower Saluda River and the recreation activities supported by these sites.

¹ At certain times of the fall season, SCE&G can not utilize a full range of operations due to dissolved oxygen concerns.

- ii. Utilize the information collected during the Saluda Project Recreation Assessment to identify the patterns of use on the lower Saluda River by type, location, and volume.
- iii. Estimate preferred flows associated with reasonable and safe recreational use of the lower Saluda River for specified activities to serve as input constraints to the HEC Res-Sim model being developed by the Operations RCG.

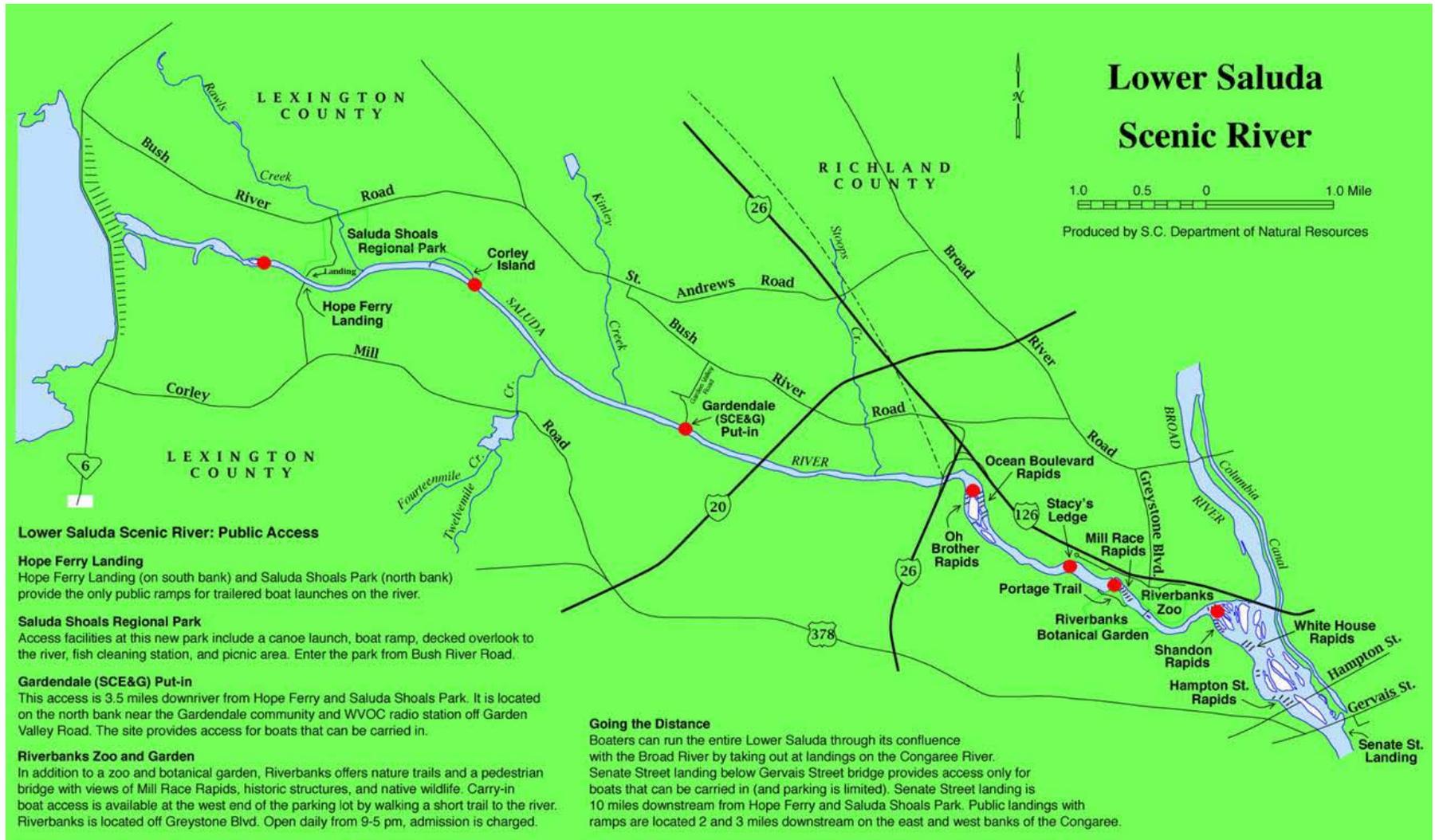
Goal 2: *Understand the “rate of change” of the lower Saluda River at various flows at various river reaches. This will be accomplished by meeting the following objectives:*

- i. Identify and characterize water level changes at predetermined intervals, encompassing the various river channel types (pools, runs, shoals) along the lower Saluda River from the dam to the confluence with the Broad River, capturing the full range of project operation flow scenarios.

Goal 3: *Identify potential public safety issues associated with lower Saluda River flows. This will be accomplished by meeting the following objectives:*

- i. Identify potential safety issues and barriers on the lower Saluda River.
- ii. Identify potential locations for additional flow release warning systems such as sirens, strobes, and signage on the lower Saluda River.
- iii. Identify locations for ingress and egress on the lower Saluda River as related to the safety of river users.

Figure 2: Study Area for Downstream Flow Assessment and Approximate Locations for Level Loggers
 (Source: South Carolina Department of Natural Resources, as modified by Kleinschmidt)



2.0 METHODOLOGY

Information gathered for this study will be used to examine the suitability of the lower Saluda River for several types of recreation activities as a function of variations in flow levels. This study will take a three-phase approach to meet the goals of the study through the objectives identified above. Phase I will involve a desktop analysis of the recreation opportunities, patterns of use, physical characteristics, and hydrology of the lower Saluda River. Phase II will involve structured surveys and on-site reconnaissance of an expert panel of experienced boaters, recreationists, NGO's, and agency staff familiar with the river to assess the feasibility and potential quality of particular flow ranges for on-water activities. Phase III will involve the deployment of water level data loggers at various predetermined intervals along the lower Saluda River from the dam to the confluence with the Broad River.

2.1 Phase 1 – Literature Review and Desktop Analysis

This task involves compilation and review of existing information about river channel characteristics, hydrology, current and planned recreational opportunities, and flow data for the lower Saluda River.

Literature searches will be conducted via the web, libraries, and SCE&G and agency collections. Consultation may include local paddling clubs, the Irmo Chapin Recreation Commission (ICRC), American Rivers (AR), American Whitewater (AW), Saluda Chapter of Trout Unlimited/Federation of Fly Fishers, the River Alliance, and others to determine if there are current or recent river recreational studies or data pertinent to this effort. South Carolina whitewater, fishing, and outdoor recreation tourism guidebooks will be reviewed in an effort to identify potential boating, angling, and other recreational opportunities on the lower Saluda River. Other relevant documents may include the Three Rivers Greenway plan, South Carolina Statewide Comprehensive Outdoor Recreation Plan (SCORP), and the Lower Saluda Scenic River Corridor Plan and Update.

Relevant summary hydrology data, from SCE&G, United States Geological Survey (USGS), South Carolina Department of Natural Resources (SCDNR), and other state agencies will be collected. In addition, any existing studies on instream flow and

creel surveys will also be reviewed. Historic records of minimum, maximum, and average flow rates will be reviewed and seasonal variations will be noted. These data will be examined to determine the number of days the lower Saluda River may be available for each identified primary recreation activity.

The 2006 Saluda Project Recreation Assessment is currently being conducted under the Recreation RCG. This study utilizes vehicle counts and on-site interviews of individuals at Project recreation sites to ascertain opportunities, patterns, and levels of use along the lower Saluda River. These data will be reviewed and analyzed to determine what recreation activities are currently supported by access sites along the lower Saluda River, what recreation activities are being participated in by individuals at these sites, how much use the lower Saluda River receives, and any specific comments made by respondents pertaining to safety, river flows, and barriers to access.

2.2 Phase 2 – Focus Group and Land-Based Reconnaissance

An expert panel will be compiled to collect and disseminate information regarding recreation opportunities and potential flow effects on recreation on the lower Saluda River. The expert panel will consist of the experienced recreational users and resource experts that make up the Downstream Flows TWC and others as needed. A survey (Appendix B) and focus group discussion panel will be conducted to document characteristics of the lower Saluda River with respect to the nature and seasonal distribution of on-water activities; the locations and flows for wading, swimming holes, velocity refuges, rapids and eddies; existing and potential ingress and egress locations; potential locations for additional safety lights/sirens; and any potential safety hazards.

The expert panel will also conduct an on-site reconnaissance. The purpose will be to augment existing information on flows, opportunities, and safety concerns. This will involve a facilitated expert panel site visit led by a principal researcher. The expert panel will observe and assess the lower Saluda at predetermined geographic intervals. Ideally, the land-based reconnaissance will be scheduled when flows are provided in the river reach within an estimated recreational flow range. The expert panel will complete a land-based reconnaissance survey (Appendix C) similar to the focus group survey, which will

solicit additional information on locations and flows for select recreation activities and potential safety hazards.

River flows identified by the expert panel during these efforts will serve as input constraints for the HEC Res-Sim model. The purpose of this model is to determine effects of downstream flows on various resources, based on flow constraints provided by the focus group. The model will determine a series of operational regimes which target the diverse interests of the various resource groups and identify a balance between these interests and project operations with respect to lake levels, generation needs, and project outflows.

2.3 Phase 3 – Field Data Collection

To accurately assess the effect of Project generation on water levels in the lower Saluda River, water level data loggers will be deployed at predetermined intervals correlated with the HEC Res-Sim cross-sections along the River from the Saluda Dam to the confluence of the Broad River (Figure 2). Water level loggers will record the barometric pressure, water depth, and temperature once per minute and will be deployed for a total minimum of 180 days. These data will be correlated with hydrologic data (such as from USGS gaging stations) to determine (for the study time period):

- the overall average flow (in cfs);
- daily average flow (in cfs);
- overall average river depth (in feet) for each water level data logger location;
- daily average river depth (in feet) for each water level data logger location;
- average maximum river depth (in feet) for each water level data logger location;
- average time to maximum river depth for each water level data logger location;
- average time to recession for each water level data logger location;
- average rate of change in water level for each water level data logger location;
- maximum river depth (in feet) for each water level data logger location by flow;
- minimum time to maximum river depth for each water level data logger location by flow;
- maximum time to recession for each water level data logger location by flow ; and

- minimum, average, and maximum rate of change in water level for each water level data logger location by flow level.

The information gathered through field reconnaissance, literature review, flow and hydrologic data analysis, and the expert panel will provide a basis by which to identify preferred flows for the lower Saluda River that target particular recreation activities at appropriate locations. These flows will be provided as input constraints to the HEC Res-Sim model to determine the feasibility, suitability, and availability of such flows. Recommendations for special recreational flow releases may be developed from the HEC Res-Sim model analysis of recreational flow inputs.

Likewise, any existing and potential safety issues associated with typical and preferred flows will be identified and recommendations for safety measures to be considered by the Safety RCG will be provided. In particular, the location of the level loggers will assist in determining which sections of the river may be in need of additional safety and protection measures such as additional warning lights/sirens, formal ingress/egress sites, and determine which areas of the river may be suitable as velocity refuges.

3.0 DELIVERABLES

The Draft and Final Report will be prepared for this effort. The Draft Report will be reviewed internally by the Downstream Flows TWC and Recreation RCG. Comments and edits from the Downstream Flows TWC will be incorporated into a Final Report for Saluda Hydro Relicensing Group. The report will include an executive summary, an introduction, objectives, methods, and results. It will also include recommendations for optimal recreation flows and flow schedules for use as HEC Res-Sim model inputs. The report will also outline safety concerns, including rate of change, and potential measures to enhance public safety.

4.0 SCHEDULE

The proposed schedule for completion of the Recreation Flow Assessment Study is as follows:

TASK	DATE
Literature Review and Desktop Analysis	Winter 2006
Focus Group and Expert Panel Land-Based Reconnaissance	Spring 2007
Field Data Collection	Fall 2006 – Summer 2007
Submit Draft Report	Fall 2007
Client and TWC Review	Fall 2007
Submit Final Report	Winter 2007

5.0 REFERENCES

- American Whitewater. 2006. Whitewater Flow Studies. [Online} URL:
http://www.americanwhitewater.org/content/Wiki/stewardship:whitewater_flow_studies.
Accessed June 16, 2006.
- Lienemann, Anne, Peter Jonas, and Jim Vogel. 2004. Whitewater and River Boating Report for the Oroville Hydroelectric Project (FERC No. 2100). Prepared for the California Department of Water Resources. January 2004.
- Rood, Stewart B., and Wilco Tymensen. 2001. Recreational Flows for paddling along rivers in southern Alberta. Prepared for Alberta Environment, Lethbridge, AB. October 2001.
- South Carolina Department of Parks, Recreation and Tourism, Recreation, Planning and Engineering Office. 2002. South Carolina Statewide Comprehensive Outdoor Recreation Plan.
- South Carolina Design Arts Partnership. 2000. Lower Saluda Scenic River Corridor Plan Update. Clemson, South Carolina. Prepared for the Lower Saluda Scenic River Advisory Council and the South Carolina Department of Natural Resources.
- South Carolina Water Resources Commission, South Carolina Department of Parks, Recreation and Tourism, and Lower Saluda River Task Force. 1990. The Lower Saluda River Corridor Plan. Report #170. Columbia, South Carolina.
- Whitaker, Doug, Bo Shelby, and John Gangemi. 2005. Flows and Recreation: A Guide to Studies for River Professionals. October 2005.
- Whitaker, Doug, and Bo Shelby. 2000. Boating Feasibility Study for the Lake Chelan Hydroelectric Project (FERC No. 637). Prepared for Public Utility District No. 1 of Chelan County, Wenatchee, Washington. October 2000.

APPENDIX A

DOWNSTREAM FLOWS TECHNICAL WORKING COMMITTEE

Name	Contact Information	Affiliation
Bill Marshall	marshallb@dnr.sc.gov	Lower Saluda Scenic River Advisory Council, DNR
Charlene Coleman	cheetahrk@yahoo.com	American Whitewater
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Patrick Moore	patrickm@scccl.org	SCCCL AR
Tom Eppink	teppink@scana.com	SCANA Services, Inc.

APPENDIX B

LOWER SALUDA RIVER FOCUS GROUP SURVEY

APPENDIX C

LOWER SALUDA RIVER LAND-BASED RECONNAISSANCE SURVEY

Response to Comments Submitted to Draft Downstream Recreation Flow Assessment Study Plan

Author	Comment	Response
Patrick Moore	1) The study should address all types of recreation, from the perspective of different skill levels at the full range of operation flows.	The study will cover on-water activities and solicit input on the range of flows appropriate for specific on-water activities. Information on appropriateness of flows for varying skill levels will be captured during focus group discussions and the land-based reconnaissance.
Patrick Moore	2) The study should look at different types of river, i.e. pool, riffle, shoal etc. in its rate of change analysis	These will be captured by the locations of the level loggers, the on-site reconnaissance (some locations of the river better than others for certain activities), etc.
Patrick Moore	The study should address all types of recreation at the full range of operation flows.	The study will address the range of flows experienced during the deployment of the level loggers. The expert panel will be providing information based on their experience with flows in the full range of operation, as appropriate.
Patrick Moore	3) The study should look at different types of river in its rate of change analysis	Expected to be addressed by level logger locations.
Patrick Moore	The study should look at prospective use and associated issues.	This will be addressed by the Saluda Recreation Assessment and is not a component of this study.
Patrick Moore	(the predetermined intervals should be representative of and not just be limited to “rec flow ranges”, this is the only way to capture the impact of actual project operations on the existing and beneficial uses)	The predetermined intervals in this context are spatial intervals, not temporal intervals. The range of flows that are experienced during the deployment of the level loggers are the full range of flows that will be assessed.

Response to Comments Submitted to Draft Downstream Recreation Flow Assessment Study Plan

Author	Comment	Response
Tony Bebber	<p>i. Identify and characterize potential/anticipated recreation areas on the lower Saluda River.</p> <ol style="list-style-type: none"> 1. Identify activities that may be supported by these areas. 2. Identify anticipated patterns of use of these areas by type and volume. 3. Estimate preferred flows associated with reasonable and safe recreational use. 4. Understand the “rate of change” at various flows at these areas. 	<p>With exception of the rate of change and preferred flows, these will be addressed by the Saluda Recreation Assessment.</p>
Patrick Moore	<p>i.e. if it goes to 20,000 unannounced, you need access points much more frequently than if there is an operational ramping, otherwise, you could be forcing people to handle conditions they are not comfortable with or trespass.</p>	<p>This will be taken into consideration in the assessment of ingress, egress, and safety warning devices.</p>
Tony Bebber	<p>Red dots are insufficient areas to consider. These appear to be major kayaking areas. You must consider other recreational activities – wade fishing, bank fishing, swimming, tubing, rock use, sunbathing, picnicking, walking, bicycling, etc.</p>	<p>Red dots correlate with the HEC Res-Sim model cross sections that will be used for assessment of recreational flows and provide a range of hydrological conditions (pools, riffle, shoals). Red dots also correlate with or are within proximity of recreation access sites. Recreational activities are likely concentrated in areas in proximity of these access sites (for example, rock use, sunbathing, etc. occurs frequently at Mill Race, which is also considered a kayaking area).</p>

Response to Comments Submitted to Draft Downstream Recreation Flow Assessment Study Plan

Author	Comment	Response
Tony Bebber	What about anglers and other users?	<p>Opinions on appropriate flows for anglers will be solicited during focus group discussions and the land-based reconnaissance. However, flows for anglers, for the most part, will likely be determined by the most suitable and appropriate flows for fish habitat. TU advocates for the best flows to be set based on scientific studies for the fish, not for the fishermen or other recreationists. Fish habitat suitability would generally be the limiting factor for optimal flows for any kind of angling (from a canoe, bank angling, wading, etc.). SCDNR has already identified optimum flows for fish habitat on the lower Saluda River.</p> <p>The flow assessment will target on-water activities only. The focus group discussion and land-based reconnaissance will provide information on appropriate flows for other uses. For example, it would seem to me that the optimum flows for rock people are any flows where the rocks are exposed and easily accessible. Likewise, for picnickers, sunbathers, mountain bikers etc. who utilize exposed rocks in the river bed for recreational activities. For swimming, any flow, including no flow, could be appropriate. Individuals have opportunities to swim in eddies at different flows, for example.</p>

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Tony Bebber	What about inexperienced users?	Issues associated with recreational use by inexperienced individuals are expected to be addressed by “optimal” flow recommendations and identification of safety issues provided by the expert panel. Inexperienced users will not be included in the focus group discussions or land-based reconnaissance as these efforts require experience and familiarity to adequately assess flow needs for various activities.
Bill Marshall	The following use of terms needs clarification... sounds like the writer is wanting to understand how rapids and river conditions change with flows???	The focus group discussion and land-based reconnaissance should provide information on what rapids, eddies, etc. are produced under what flows which will contribute to the analysis of preferred flow inputs for the HEC Res-Sim model.
Tony Bebber	How will you anticipate future use associated with Three Rivers Greenway, ICRC greenway extension, park at 12 mile Creek, etc. Also, be aware that much of the recreational activity occurs from private property, such as the Rivers Edge subdivision (near Oh Brother Rapids) and Cornerstone Church.	Future use will be addressed in the Saluda Recreation Assessment.
Patrick Moore	Since operations are required to protect everyone and not just experts, we should get a range of experiences as needed. Liability waivers are an option. The panel should observe the rate of change, if not experience it.	The field reconnaissance will be targeted to observe varying flow conditions on the river. This may or may not encompass a “rate of change” event.

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Patrick Moore	All operational ranges should be evaluated. This study should evaluate real world operations on recreation, not just limit itself to predetermined “recreational flow ranges”. All recreators currently have to recreate in the full 180-18,000cfs range and the study should reflect that.	The focus group discussion and land-based reconnaissance is expected to provide information on the optimum flows, between 180 and 18,000 cfs, for various recreation activities. The level loggers will provide rate of change information.
Patrick Moore	Part of the study must include assessment of the quality of the recreational experience by people actually boating, tubing, swimming, fishing (wading and from boats and banks), not just stream-side observations	An assessment of crowdedness, condition of recreation facilities, what recreation activities people are participating in, why they chose the site that they did, recommendations for additional facilities and improvements, and an assessment of on-water safety issues will be provided by the Saluda Recreation Assessment.
Bill Marshall	Will water depth (stage as it is termed below) be measured in tenths of feet?? The units need to be detailed, down to 0.25-foot increments or better seems desirable...???)...	Level loggers will measure to 0.10 foot.
Bill Marshall	This time frame (180 days) certainly seems adequate to capture the a normal range of hydro flows under the various power-production demands; however, the last six-months have been abnormal and to my knowledge there have been very few rapid, high-flow release event for hydropower production. We need to capture data for the normal, expected hydro release scenarios or this study will be of little use to us.)	The TWC will determine the schedule for level logger deployment.

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Tony Bebber	Group needs to decide which 6 month period is best.	The TWC will determine the schedule for level logger deployment.
Bill Marshall	the event specific information I am describing above is needed to meet what I think is the main objective behind Goal 2 of this study ... Goal 2: Understand the “rate of change” of the lower Saluda River at various flows at various river reaches. We are trying to better understand an identified safety issue and that issue is connected to specific types of events. The above list of “average” statistics is not very useful to the question in my mind. We need water level change data for distinct hydro operation events (or types of events) that present the potential threat to public safety.	This comment is addressed in the revised study plan. Minimums and maximum rates of change, etc. for different flow releases were added to the bullet list.
Tony Bebber	Be aware that AVERAGE FLOW is not the issue. High flows and sudden rises are of great concern to anglers, sunbathers, tubers, inexperienced paddlers, and others. Low flows are of concern to paddlers.	Included bullets accordingly – see above.
Patrick Moore	The location of ingress egress is intimately related to being on the river when the water begins to rise and figuring out how long different users have to get off before they are out of their league.	This will be taken into consideration in the assessment of ingress, egress and safety warning devices.
Patrick Moore	Rephrase - The study must provide an assurance that specific conditions/flows/rates of change will be observed and a flow schedule will be developed to create these conditions.	Recommendations developed for this study will provide input into the HEC Res-Sim model. This study can not assure that specific flow recommendations will be implemented, but must be balanced with other uses.

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Patrick Moore	I do not understand the idea that specific conditions/flows/rates of change cannot be intentionally created for us to experience for liability purposes. We are being asked to sign off on these same unannounced releases for the next 30-50 years? It is common for applicants to release water for studies and activities like canoeing for kids and rescue training	Rather than depend on water availability, this study provides the opportunity for all flow ranges be considered. It is felt that the expert panel can provide recommendations/observations based on their experiences on the river. These recommendations/observations will be considered equal to the results of a full blown recreational flow study.
Tony Bebber	The study plan seems to be skewed toward recreational boating (primarily paddling) and generally ignores wade fishing, bank fishing, swimming/sunbathing/rock use, tubing, and other uses along the river.	The flow assessment will target on-water activities only. The focus group discussion and land-based reconnaissance will provide information on appropriate flows for other uses.
Tony Bebber	The study plan does not address potential recreation use associated with anticipated new recreation venues (Three Rivers Greenway, Lower Saluda Greenway/Saluda Shoals extension, potential new park at 12 mile creek, etc.) or residential recreational use (Rivers Edge Subdivision and others).	Future use will be addressed in the Saluda Recreation Assessment.
Tony Bebber	I assume the red dots on the map are the locations for testing. These all appear to be paddling areas and have little to do with other activities. You must consider other recreational activities - wade fishing, bank fishing, swimming, tubing, rock use, sunbathing, picnicking, walking, bicycling, etc. Shouldn't the shoreline along Saluda Shoals Park be a prime spot to be considered?	Red dots correlate with the HEC Res-Sim model cross sections that will be used for assessment of recreational flows and provide a range of hydrological conditions (pools, riffle, shoals). Red dots also correlate with or are within proximity of recreation access sites. Recreational activities are likely concentrated in areas in proximity of these access sites (for example, rock use, sunbathing, etc. occurs frequently at Mill Race, which is also considered a kayaking area).

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Tony Bebbber	You must also be aware that all current and future users are not "experts" or familiar with the dangers presented by the hydro project river.	These issues are expected to be addressed by “optimal” flow recommendations and identification of safety issues provided by the expert panel.
Bill Marshall	The main concern expressed in my comments is related to the purpose behind Goal 2 ... to understand the “rate of change” of the lower Saluda River at various flows at various river reaches. To better understand the safety issues associated with rapidly rising water, we need to characterize water level change for specific types of hydro events. As the plan currently reads, it appears to miss the specificity needed to really understand this public safety issue. Therefore, I have supplied suggestions for more specific language.	This comment is addressed in the revised study plan. Minimums and maximum rates of change, etc. for different flow releases were added to the bullet list.
Malcolm Leaphart	I endorse and 'second' all of the comments from Tony Bebbber listed below and in his redline comments in his response to you of August 18 on the proposed 'Downstream Recreation Flow Assessment Study'. In fact, the draft study as noted could be more appropriately titled a 'Downstream Paddlers Flow Assessment Study'. The inclusions that Tony noted are critical to ensure that other recreation uses are not left out.	The flow assessment will target on-water activities only. The focus group discussion and land-based reconnaissance will provide information on appropriate flows for other uses.
Malcolm Leaphart	Also, the realization of the tremendous increase in usage because of the new river parks and greenways is extremely significant. As the tv ad goes, “This is not your father’s Buick”	Future use will be addressed in the Saluda Recreation Assessment.

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Patrick Moore	River flows and rates of change identified by the focus group during these efforts will serve as input constraints for the HEC Res-Sim model.	The HEC Res-Sim model will not to model the rates of change. These will be analyzed separate from the model.
Patrick Moore	The purpose of this model is to determine effects of downstream flows on various resources, based on flow constraints provided by the focus group, which will be derived from an analysis of the full range of flows and intended to protect designated and existing uses in a safe manner.	The expert panel will be providing information on the optimum flows based on their experience of the full range of flows but the full range of flows will not likely be provided for observation.