

MEETING NOTES

SOUTH CAROLINA ELECTRIC & GAS COMPANY Instream Flows TWC Meeting

September 27, 2016

Final KMK 10-26-16

ATTENDEES:

Bill Argentieri (SCE&G)	Bill Marshall (SCDNR)
Ray Ammarell (SCE&G)	Dick Christie (SCDNR)
Caleb Gaston (SCANA)	Ron Ahle (SCDNR)
Mike Mosley (SCANA)	Tom McCoy (USFWS)
Brandon Stutts (SCANA)	Gerrit Jobsis (American Rivers)
Randy Mahan (SCANA)	Bill Stangler (Congaree Riverkeeper)
Shane Boring (Kleinschmidt)	Alex Pellet (SCDNR) via conf. call
Henry Mealing (Kleinschmidt)	Fritz Rhode (NOAA) via conf. call
Jordan Johnson (Kleinschmidt)	Brandon Kulik (Kleinschmidt) via conf. call

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

Henry opened the meeting with introductions and a brief overview of the agenda and meeting goals. The goal of the meeting was to review the Parr Downstream Flow IFIM Study results, seek agreement on the results, and begin discussions of the potential minimum flow range that should be considered. The group was given handouts of the Wetted Usable Area (WUA) results from PHABSIM and 2D model runs to review.

Shane noted that, with the exception of Study Site 2 (west channel), the WUA tables had been revised to include the additional flow increments requested by SCDNR. Shane reminded all attendees that the goal of the IFIM study is to balance hydropower operations and aquatic habitat. He recommended that the group initially focus on putting boundaries around a flow range for minimum flow discussions. Ron commented that the group should carefully consider the study results before considering what is practical in relation to project operations. Caleb commented that the group should always keep project limitations in consideration when discussing the results as to not discuss flows/scenarios that aren't possible. Gerrit stated that he was expecting a habitat duration and/or dual flow analyses but did not see these items in the report. Shane said that the group should discuss and approve the raw WUA vs flow relationships contained in the PHABSIM model runs prior to discussions about next steps, which then could include the habitat duration and/or dual flow analyses. Gerrit noted that habitat duration is a very important aspect in making a minimum flow recommendation. Gerrit also provided the group with a brief explanation, noting that habitat duration allows the WUA data to be analyzed based on how often different flows occur at the Project. Brandon K. commented that the group should discuss and specify timeframes addressed in any duration analysis; annual/monthly vs. seasonal vs. periods of low flow. Shane added that due to the large of WUA output for the various species and lifestages, the group also

needs to discuss “driver” species or study sites as to narrow down the dataset for any additional analysis.

Shane opened a PowerPoint presentation outlining the IFIM study. Reach 1 of the study is located from Parr Dam to the downstream end of Hampton Island. Reach 2 of the study is located from the downstream end of Hampton Island to the downstream end of the Bookman Island complex. These study reaches are primarily influenced by the Project with little inflow from tributaries. The only tributary of note is Little River, located just upstream of Bookman Island. Shane gave a brief overview of each study site, including their locations and characteristics. Shane made a special note of study site 9, located at Huffman Island, as it was originally slated for 2-D modeling. He explained that the TWC decided 2-D modelling of study site 10 (Bookman Island) would be sufficient and any flow recommendations would be verified by a site visit to study site 9.

Shane moved on to explain how the east and west channels below the dam, separated by Hampton Island, were analyzed. The west channel had its own calibration flows and was analyzed separately from the rest of the reach. The east channel, which encompasses all flow passed through the powerhouse, followed the 400, 2000, 6000 cfs calibration flows conveyed throughout the rest of the study area. Shane also gave a brief overview of the fish passage analysis completed as part of the IFIM study. Shane wrapped up his overview of the study by providing a table illustrating the target species, lifestage, Habitat Suitability Curve (HSC) sources, and guilds assigned during study scoping. He noted that recent comments from SCDNR were incorporated into the table. Brassy jumprock and robust redhorse were changed to the “deep fast; shallow fast” guild. Shane also explained one change made to HSC source data for smallmouth bass included data from a study in Deerfield River in MA.

Shane moved discussions over to the study results for each study site.

West Channel (study sites 1,2 and 4). The group started with discussions of site 1 in the upper West Channel. Shane explained the elevation data used to analyze pool volumes in study site 1; including DEM data collected by Glenn Associates, ADCP data collected by Watercube, and point elevations collected by Kleinschmidt and Glenn Associates. Henry also provided a brief discussion of methods and data collected during the 2016 West Channel Water Quality. He explained how those data will be used in ongoing discussions of conditions at Study Site 1. Shane wrapped up the West Channel IFIM results with a review of study site 4. He explained that the site was a “wetted perimeter” transect that is backwatered somewhat buy flow from the east channel, and showed the group the results of the analysis.

Shane then moved the group into discussions of the east channel and Reach 2 study sites.

East Channel

Study Site 3 is located immediately downstream of the Parr powerhouse. Shane noted the site has higher velocities and therefore the “slow” guilds and species returned poor results. Ron noted that the WUA table for study site 3 contained multiple flows that had 100% of available habitat. Shane explained that this was simply rounding by Microsoft Excel and that edits would be made to the tables. The group briefly discussed why the site was given the moniker “sucker city”. Ron explained that this is a result of observations made during electrofishing efforts in the area for robust redhorse spawning grounds.

Study Site 5. Shane gave a brief overview of the results, explaining that this site was deeper. Gerrit asked if it is known how water partitions into the east and west channels. Henry said that most of the flows from the powerhouse move down the east channel and that water released through the spillway gates moves to both channels (especially dependent upon which gates are releasing). The 2016 West Channel Water Quality Study should provide additional understanding of this relationship. Study site 6 results showed that optimal WUA ranges between 1,000-1,500 cfs for most of the species/guilds. Shane explained that the small “bumps” seen in the WUA curves at 5,000 cfs are artifacts of the hydraulic model. The group noted a few errors in the WUA tables that will be corrected. Dick noted that he would like to review the report again with any edits resulting from the meeting. Henry replied that the report and WUA tables would be redistributed to the group for review.

Downstream study sites

Shane returned discussions to **study site 6** by asking Ron to give a brief review of why the site was chosen for analysis. Ron commented that the site is a slate belt run with deeper pockets that is very important to the smallmouth bass fishery as it offers some of the best smallmouth bass fishing habitat in the river. He noted that the site also provides cover and habitat for juveniles in the shallower areas. Shane added that this site represents a situation where smallmouth bass could be a “driver” species when evaluating a minimum flow.

Study site 7 WUA peaks around 600-1,200 cfs. Shane also briefly mentioned that this site contained two passage points that were analyzed for fish and navigational passage.

Study site 8 (Haltiwanger Island) peak WUA values occur between 500-1,500 cfs. Shane explained that there was one transect located in each channel around the island; each one was independently modeled. Shane pointed out “fluctuations” in the WUA curves, explaining that this resulted from combining the PHABSIM results for each transect into one graph for analysis. He mentioned that higher flows were likely needed to provide the most habitat at this site. This is a result of the very wide and shallow nature of the western channel. **Study site 8** was the final site analyzed using PHABSIM. Gerrit commented that this site could be good for assessing seasonal and interannual flows, explaining that the project lends itself to providing more water during high flow years. Henry commented that while this is true, SCE&G will need an “or inflow” component with any minimum flow recommendation. Ray A. added that this should already be happening as Parr does not store any water. High flow years should be reflected in the flow record. Ron commented that if seasonal flows might be considered for a minimum flow recommendation, the group needs to be sure and consider all the different species if spawning seasons will be used.

Study site 10 (the Bookman Island complex). Shane explained that it was modeled with the program River2D due to the complexity of the reach including multiple channel bifurcations and patches of habitat. He explained that elevations throughout the reach were collected using a combination of methods. Elevation data were first collected during a flyover of the area using georeferenced aerial photogrammetry methods during low flows (400-600 cfs) in December 2014. These data were supplemented with additional field data collections with survey grade GPS. These elevation data were the basis for the River2D analysis. Shane broke down the WUA results, noting that the peaks tend to be around 1,000 cfs, with smallmouth bass peaking around 3,000 cfs.

Gerrit asked the group how the study sites should be weighted based on the varying analysis methods (1D/PHABSIM vs. River2D). Shane and Brandon K. explained that results could be weighted according to river linear length or they could not be weighted at all (these are the representative reach vs. critical habitat approaches). Shane added that results presented for each study site are standardized at WUA per 1,000 linear feet of stream, so study sites can be compared regardless of their length differences. The group noted that the WUA results could be also be weighted utilizing the results of the Mesohabitat mapping assessment, if the representative reach approach is chosen.

Zone of Passage

Shane reminded the group of the fish passage portion of the IFIM analysis. He gave the group an overview of the results noting the flows required to meet the passage criteria. The ledge at study site 7 meets fish passage criteria at 500 cfs. The ledge upstream of Bookman Island meets the criteria at 700 cfs. Shane summarized that most sites experience optimum WUA between 800 and 1,200 cfs.

Discussion of further analysis

Shane explained to the group that he would like to take the results presented to the group and discuss driver species and sites individually. Gerrit asked if the sites could be prioritized by suitability for species. He explained that he would like to see WUA comparisons by species across multiple sites, in addition to WUA comparisons by site across multiple species. Ray displayed flow duration curves (FDC) to the group that were developed utilizing a prorated inflow dataset used by the Project Operations Model. The group reviewed monthly flow duration curves, noting the 90% and 50% exceedance flows. Henry explained that he wanted the group to see these in response to Gerrit's comment about analyzing the WUA data in light of what flows are available in the river. The group broke for lunch, planning to have a workshop session in the afternoon to narrow down driver species and flow ranges to be addressed in any further analysis.

Workshop session

The group opened up the "workshop" session after lunch by constructing a calendar with the flows from the FDC review (Appendix A). They added bio-periods to the calendar based on species/guilds of importance. During the "workshop" session, Gerrit offered up a suggestion for how to analyze the WUA data by species rather than study site. He created an example table using the American Shad WUA from each study site (Appendix A). The group approved of Gerrit's suggestions, and created similar tables for adult smallmouth bass and robust redhorse/deep-fast guild. The tables allowed the group to rank/prioritize the study sites based on the available WUA.

After the workshop session, the group returned to the tables for discussion. Henry and Shane asked the group if there were priority species or study sites that the group is considering. Ron and Gerrit identified American shad, robust redhorse, and adult smallmouth bass as priority species. Ron added that smallmouth bass continues to be an important fishery for the SCDNR. Ron also pointed out that while study site 3 offers unique habitat for suckers not found in other parts of the river, it shouldn't take precedence over downstream study sites when evaluating for minimum flow. Since it is close to the powerhouse, conditions there remain relatively stable no matter the flow.

Henry provided a recap of what the TWC discussed in the meeting. He noted that the WUA tables will be presented by species rather than by study site. He noted that the group will need to continue to narrow the flow ranges discussed in order to start establishing minimum flow recommendations. He also noted that SCE&G would like to have 3 or less seasonal minimum flows in a year.

Seasonal Flow Targets

Caleb G. asked the group if they could identify periods of time where they would like to see certain minimum flows (i.e. bio-periods). He noted that this doesn't require a particular flow recommendation, just a general description such as low, medium, and high. The group referred back to the calendar produced during the "workshop" session. The group considered the exceedance flows provided by the inflow flow duration curves and the time periods identified that are of importance to the various species and guilds. They identified a period of "high" minimum flows starting February 15th and extending until May 15th or 30th depending on river conditions. The minimum flow would then drop back to a "medium" flow through June 30th. The "low" minimum flow period would extend until November 30th and then returning to "medium" flows until the following February 15th. The flow periods are illustrated in the attached tables. Henry asked the group if they could identify potential flows they would like to apply to the "low, medium, and high" flow periods. After clearly explaining that additional information (i.e. habitat duration) and analysis (i.e. dual flow) were needed before final recommendations could be made, Gerrit recommended for discussion purposes 2,500 cfs for the "high" period, 1,800 for the "medium" period, and 1,200 for the "low" period. SCE&G identified 2,000 cfs for the "high" flow, 1,300 cfs for the "medium" flow, and 700 cfs for the "low" flow period. Henry encouraged the other stakeholders and agencies to provide specific flows as this issue is resolved.

Habitat Duration

The group turned discussions back to the habitat duration analysis. Gerrit reiterated that applying the flow duration data to the WUA data would allow the group to make a flow recommendation that best benefits aquatic habitat. He noted that the analysis will also provide the group with more information to identify time periods that should be grouped into the low, medium, and high minimum flow periods. Brandon commented that completing the flow duration analysis can be accomplished utilizing existing data presented during the meeting.

Ray and Bill A. reiterated to the group that it's important to consider plant operations when recommending minimum flows. Ray explained that SCE&G currently calculates minimum flow as inflow minus evaporative loss. He added that current maximum evaporative loss is 118 cfs; however, this will increase to 180 cfs when the new nuclear units begin operating. SCE&G needs enough room between inflows and minimum flow requirement to account for these variables. SCE&G will review how inflows are currently calculated to ensure they are not overestimating. They will also review their compliance records to identify times where they struggled with maintaining minimum flows and see if the suggested flow ranges fit with their capabilities.

Brandon K. asked the group if there were species or guilds currently being analyzed that can be removed from future analyses. Ron recommended that the shallow-slow guild be removed. Gerrit added that the group most discussed robust redhorse, American shad, smallmouth bass, and the deep-fast guild during the "workshop" discussions.

Dual Flow analysis

Bill A. asked the group if the dual flow analysis still needed to be considered. Shane asked if, with the emphasis put on the habitat duration analysis, the dual flow analysis was still the best tool. Henry noted that the findings from the Downstream Flow Fluctuation Group could replace the dual flow analysis. He added that the TWC could incorporate the IFIM data into recommendations to SCE&G on an operational band for them to try and stay between while operating the project. He

noted that this could be included in an adaptive management plan and would provide a way for SCE&G to evaluate how they are managing downstream fluctuation flows while benefitting aquatic habitat. Gerrit replied that he is willing to suspend a dual flow analysis until after the results of the habitat duration analysis is presented. He explained that the dual flow analysis may provide a means of quantifying the effects of large spill events and offers a way to mitigate later.

The group discussed an operational band for Parr. Gerrit and Henry explained that there would be a target release for the project with an upper and lower band. There wouldn't be any penalty for operating below or above the target flow, as long as the project operated within the band. This could provide a means to mitigate instances where there are peaks and valleys created within the hydrograph by Project operations. Henry reiterated that this would be a means for the group to evaluate the success of SCE&G's operational changes to address project influenced flow fluctuations. Henry also reminded the group that they should consider low inflow protocols as part of their recommendations. Gerrit added that an operational band is about providing a buffer for project operations. He provided an example to the group. The minimum flow could be 1,200 cfs, if inflow were at or above 1,500 cfs. If inflows drop below 1,500 cfs, the minimum flow could, for example, drop to 1,000 cfs to allow for operational needs. Gerrit added that an operational band would allow for flexibility during low inflow periods, while also providing an opportunity for flows to be higher than a prescribed minimum flow requirement when there were higher inflows.

Gerrit asked if the group was still considering stabilization flows during spawning periods. Bill replied that it is still being considered, and will be addressed in the next Downstream Flow Fluctuations TWC meeting in October.

The meeting adjourned. Action items from this meeting are listed below.

ACTION ITEMS:

- Kleinschmidt - prepare meeting notes
- Kleinschmidt - increase detail of higher range of flows for Study Site 2
- Kleinschmidt - edit errors identified in the WUA table percentages
- Kleinschmidt - edit WUA tables and curves. Data by species/guild rather than study site.
- SCE&G - review how inflow is calculated by the operators, ensure not overestimating
- SCE&G - review compliance records to establish times where maintaining minimum flows were an issue. See if the TWC's suggested flow ranges match up with capabilities.
- Kleinschmidt - remove Shallow-Slow guild from list for further analyses
- All TWC Members - provide recommendations for upper and lower operational limits based on WUA tables
- Kleinschmidt - prioritize transects based on mesohabitat data
- Kleinschmidt - develop habitat duration curves

Workshop Attachments

American Shad			
Transect	75% WUA Flows (cfs)	WUA Units	Rank
SS3	750-7,000	238k-294k	5
SS5	200-2,500	61k-79k	6
SS6	700-6,000	244k-309k	4
SS7	700-10,000	283k-373k	3
SS8	1,750-10,840	618k-791k	1
SS10	800-20,000	398k-524k	2

Deep Fast/Robust Redhorse			
Transect	75% WUA Flows (cfs)	WUA Units	Rank
SS3	2,600-5,000	188k-244k	1
SS5	500-1,150	32-43k	4.5
SS6	3,000-4,000	146-163	2
SS7	1,200-3,000	34-42	5
SS8	5,000-10,800	67-90	3
SS10	1,500-4,000	32-42	5

Smallmouth Bass Adult			
Transect	75% WUA Flows (cfs)	WUA Units	Rank
SS3	1,200-4,500	96-128	5
SS5	400-3,500	67-89	6
SS6	1,200-6,000	220-293	3
SS7	600-3,000	196-261	4
SS8	2,500-7,180	341-455	2
SS10	2,500-7,000	387-516	1

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
90% Exceedance	2,435	2,571	3,365	2,978	2,036	1,368	1,045	771	865	1,083	1,235	1,979
50% Exceedance	5,000		6,000	5,000	3,750	3,000	2,500	2,250	2,160	2,300	3,000	4,400
		D/F	AMS	AMS	AMS juv (shallow, fast)							
				RRH	RRH							
				SMB (spawn)	SMB (spawn fry)	SMB (juv/fry)						
					RBS (spawning)	RBS (spawn/fry)	RBS (fry/juv)					
				Striped Bass	Striped Bass							
FLOW		2/15			5/15 or 31		6/30				11/30	
	Medium			High Flow Stakeholder -2,500 SCEG-2,000		Medium Flow Stakeholder -1,800 SCEG-1,300			Low Flow Agency-1,200 SCEG-700			