

## **MEETING NOTES**

### ***SOUTH CAROLINA ELECTRIC & GAS COMPANY Instream Flows TWC Meeting***

***March 5, 2014***

Final KDM 04-8-14

#### ***ATTENDEES:***

Bill Marshall (SCDNR)  
Ron Ahle (SCDNR)  
Gerrit Jobsis (American Rivers)  
Shane Boring (Kleinschmidt)  
Henry Mealing (Kleinschmidt)  
Kelly Miller (Kleinschmidt)  
Bill Stangler (Congaree Riverkeeper)  
Vivianne Vejdani (SCDNR)

Bill Argentieri (SCE&G)  
Milton Quattlebaum (SCANA)  
Steve Summer (SCANA)  
Brandon Kulik (Kleinschmidt) via conf. call  
Dick Christie (SCDNR)  
Randy Mahan (SCANA)  
Byron Hamstead (USFWS)  
Fritz Rhode (NOAA) via conf. call

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*These notes serve to be 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 then Shane lead the group in a review of the Mesohabitat Assessment Report. Shane explained the intent of the study and reviewed the results, including an overview of the maps. Ron asked to see an individual breakdown of maps 2a, 2b and 2c and Shane said he will provide these maps to the group.

Bill M. asked if we learned anything new from the study. Shane said that the most restricted point on the river for fish passage and boat navigation was identified. This area is right above the Bookman Shoals complex. This area is identified in the IFIM Study Plan as an area that needs further study. Shane said they also did a survey for Robust Redhorse spawning areas during the mesohabitat study. Two areas were identified including a location right downstream of Parr Shoals Dam and another location upstream of Bookman Shoals. Shane said that Scott Lamprecht agreed that these spots seemed ideal for Robust Redhorse spawning. Milton said he also went out on the river with Scott and they identified another area near the Bookman Shoals complex and Hickory Island. A spot near Haltiwanger Island was also identified. Shane will develop a memo summarizing all of this information on Robust Redhorse spawning sites and will distribute this memo to the group. He will also append the memo to the final IFIM report. Shane will edit the IFIM Study Plan so it mentions that the Robust Redhorse memo will be appended to the final IFIM report.

Shane also said that during the mesohabitat assessment they learned that Bookman Island is very complex with lot of cross channels, braiding and varying elevations. He said that at least seven channels had been identified in the area. Fritz added that seams of bedrock add complexity because they act as weirs, moving the water in different directions depending on flow. He said it is good that 2D modeling will be performed in this area during the IFIM study. Byron asked if the 2D

modeling will include the two Robust Redhorse sites identified in the Bookman Island complex and Shane said yes. Shane added that the upstream site at Haltiwanger Island will be studied using PHABSIM along with the site right below Parr Shoals Dam at Hampton Island. Ron said that the area just downstream of the Parr Shoals Dam is good for Robust Redhorse because there seems to be a dike formed by the rock with a gravel bed, covered by deep water. Ron said suckers are often found in this area.

Ron said that the Broad River downstream of Parr Shoals Dam is very complex, and that the maps included in the Mesohabitat Assessment Report are generalized. But he believes they are fairly accurate and that the proportions of the various mesohabitat types found in the river are accurate. Shane agreed and said that sometimes while looking at a cross section of the river, one side of the river may have a run and the other side may have a backwater pool. Shane said this was hard to convey in the maps, but that overall the map delineations and the report are very accurate.

Byron asked if areas of constriction throughout the river have been mapped out. Shane said GPS points have been taken and can be provided to the group, but cross sections detailing depth and other information has not been mapped out yet and will be completed as part of the IFIM study. Shane showed the group, using Bing maps, two areas in the river where fish passage and navigation may be possible. These areas will be studied in more detail during the IFIM study.

The group began reviewing the IFIM Study Plan and Shane mentioned that the Mesohabitat Assessment Report will be added as an appendix to the final IFIM Report. Byron wanted to know how the information collected in the IFIM study would be used for determining suitable crayfish habitat. Will the amount and type of cover available at various depths be examined? Henry said this will not be done using PHABSIM, but this information can be collected as part of the general description of the study area. Gerrit asked if when determining cover types, isn't it typical to not only look at the transect, but upstream as well? Brandon said yes because at the upstream/downstream cell boundary level, the area is reasonably homogenous but within the cross section localized substrate variations can be like a mosaic, so it is typical to look upstream and downstream a reasonable distance to characterize the substrates assigned to a particular vertical. Brandon said that in regards to crayfish, the group can establish what the important cover types are for a particular species beforehand so that the field crews know what to look for during data collection. Byron said he will do some additional research to identify the preferred covers for the spiny crayfish. He is interested in determining how much cover is available and how much is exposed at varying water levels. Henry said that this may be possible with rocky substrates since they are fairly permanent, but that the abundance and distribution of woody debris can change from year to year so only general qualitative observations can be made. Henry said that if large woody debris is located at a PHABSIM transect, it will be surveyed in depth, otherwise just general descriptions of what is located upstream and downstream will be recorded to characterize conditions and where it is located relative to water levels. Brandon said that photos and possibly videos will also be taken to document the substrate and cover types in the area. If Byron develops a specific list of the type of substrate and cover that is important for crayfish, including a description of the types of woody debris preferred (approximate size and position in the water column), it will make it easier to document these during the study. Brandon said they can look at what is exposed during low flows and also record how high flows mobilize these substrates. Ron said that in his experience the large woody debris found in the central portion of the river is usually located in areas of accumulating sand and is typically transient and moving. All other woody debris tends to be found along the shorelines. Byron said that the wetted perimeter study will provide a lot of information on the

woody debris found throughout the river. He will determine what the specific habitat requirements are for the spiny crayfish, an at risk species which is currently under candidate review, and provide these to the group prior to the IFIM study.

In section 3.2.2 of the IFIM Study Plan, Shane added in a description of the downstream ledge which may be a possible navigation site.

Bill S. asked why the river directionality is positioned looking upstream. Shane said that it just depends on how the biologist is trained. The group agrees to change all direction references to looking downstream.

Prior to the meeting, Gerrit submitted a comment regarding the inclusion of a Dual Flow analysis (DFA) into the IFIM Study Plan. Brandon explained to the group what a DFA is and his description is attached to the end of these notes. He said the goal of a DFA is to assess Project generating flows and how various operating scenarios affect habitat suitability. Base flow and generating flow couplets of interest are identified, along with selection of key species and lifestages. Effectively available habitat for a particular study site is calculated at pair of stream flows. A comparison of the amount of units of WUA available at the base flow versus the units of WUA at the generating flow is completed. DFA only records WUA corresponding to the lower of the two paired values regardless of whether the lower WUA occurs at the low or high flow. The assumption is that the lower WUA value represents the level of suitability persisting under both conditions. For example, if the habitat value is zero at the low or high flow, then the value for that pairing is zero. Shane said this can be done as a desktop exercise and doesn't require any extra field effort however a basic PHABSIM analysis must be completed and reviewed first since this step establishes the quantification basis.

Gerrit said DFA can also be done to mitigate the effects of peak flows by changing the base flow. He said you can iteratively move the base flow up or peak flow down to mitigate and lessen the affect on habitat to assess different operating scenarios. The idea is that if the higher the habitat suitability is a majority of the time, then the episodes of lower habitat suitability are less stressful to the aquatic species. Bill A. asked if base flows would be changed during certain times of the day or seasonally. Gerrit said this is a seasonal change. Brandon said spatially peaking effects attenuate going downstream so that the effect is most pronounced nearest the tailrace. The group would have to decide if the analysis should focus on the upstream reaches of the river or the downstream reaches.

The group decided that the study plan needs to include information on process steps regarding the DFA. The TWC will review initial WUA output and then meet to determine the DFA scope. No additional field work will be needed. Shane will add a few paragraphs to the IFIM Study Plan describing the DFA process. Kelly will send these paragraphs out to the TWC for review and comment.

Other additions to the IFIM Study Plan include mentioning the Robust Redhorse memo, adding in crayfish habitat suitability information (provided by Byron) and adding wording on the identification of substrates for crayfish during the IFIM study. Ron mentioned he would like to see a more specific schedule for when the IFIM study will take place because he would like to help. He would like to see the schedule already included in the IFIM Study Plan expanded to include more specifics. He would also like to see qualifiers added in to account for bad weather or flows that

might inhibit data collection. All of these changes will be made to the study plan in track changes and sent out to the TWC for review and approval.

Dick asked the group if they want to specify the goals of the analyses in the study plan. For example, SCDNR's recommendation is to identify a minimum flow that would provide 80 percent of maximum WUA. The group decided to add a list or table outlining the process of the study, which will include an expanded section on TWC consultation.

Gerrit asked if there will be demonstration flows scheduled following the results of the IFIM study regarding navigation and fish passage. Bill A. said that there can be demonstration flows and Shane will add this into the process schedule.

Dick mentioned the navigation component of the IFIM Study Plan and said that it was not consistent with the Navigational Flows Study Plan, which is discussed in the Recreation TWC. The Navigational Flows Study Plan needs to be changed to include a description of the two-way navigation requirement. This study will still only focus on one way navigation, but a description of two-way navigation needs to be included. This study plan will be re-circulated to the Recreation TWC for approval and then finalized.

Shane then gave the group an overview of the 2014 field season efforts for the IFIM study. Level loggers will be deployed in late March or early April in 12 different locations from the Parr Shoals Dam to the Columbia Dam pool, near the rowing facility. Level logger data is being collected to examine travel time for flows and to develop stage discharge relationships. Additionally, 2-D data collection will be completed in the Bookman Shoals area (Study Site 10), which includes latitude, longitude and elevation data for the entire two mile study area. At Study Site 1, a terrain model for quantifying pools and fish passage will be created. Cross sectional profiles including bed elevations and water surface elevations will also be collected at Study Site 4. Bill S. asked how many points will be examined at Study Site 10. Shane said he isn't sure yet, but it will be a good idea to look at existing LiDAR data and DEM data to make sure they establish an adequate number of points. This should give clarity to the density of points needed for the model. Densities could be as tight at every three meters. Shane said that the TWC is welcome to help with these efforts this year as well. Emails will be sent to the group to notify them as soon as possible when the work will be done.

The IFIM Study Plan will be updated to reflect the items discussed at the meeting and sent back out to the TWC for approval. Action items stemming from this meeting are listed below.

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***ACTION ITEMS:***

- Byron will identify the preferred habitat substrates for the spiny crayfish and provide this information to the group for use during the IFIM study.
- Shane will change the language in the IFIM Study Plan to reflect a "looking downstream" perspective.

- Shane will add in a section describing the process steps of the IFIM study with an expanded section on TWC consultation. He will also expand the schedule to include more specific dates and times which will include demonstration flows if possible. He will also add qualifiers to account for bad weather or flows that might inhibit data collection.
- Shane will add in a section to the IFIM Study Plan discussing Dual Flow Analysis. He will also add in a few sentences discussing the information collection on Robust Redhorse spawning areas. Additionally, once Byron provides the information regarding preferred spiny crayfish habitat substrates, Shane will include this in the IFIM Study Plan.
- Kleinschmidt will update the Navigational Flows Study Plan with information on two-way navigation and redistribute to the Recreation TWC.

## DUAL FLOW ANALYSIS

- The basic WUA/flow relationship is the foundation
- Base flow/generating flow couplets of interest are identified
- Key species/lifestages (or guilds) are strategically selected
- Effectively available habitat for a study site<sup>1</sup> is calculated at pairs of stream flows: (base) non-peaking and a (generation) peaking flow.
- Dual Flow analysis only records WUA corresponding to the lower (“effectively available”) of the two paired values. If the habitat value is zero at either the low or high flow, then the value for that pairing is zero.

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Example:

### basic WUA/flow relationship (example from Chippewa River, WI):

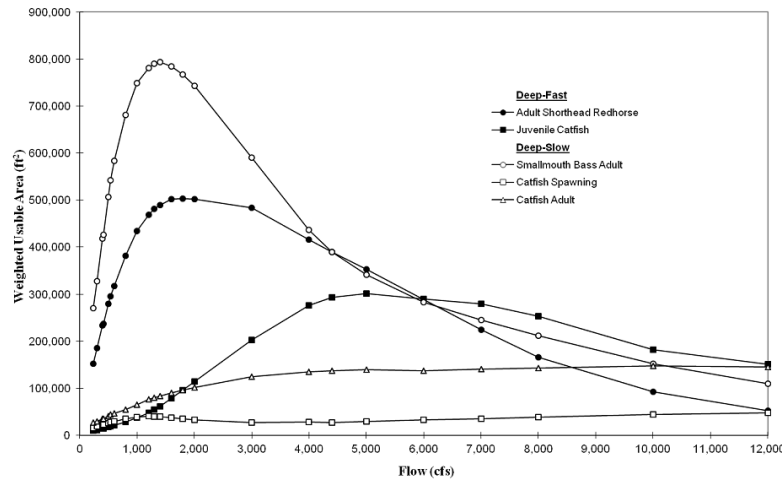
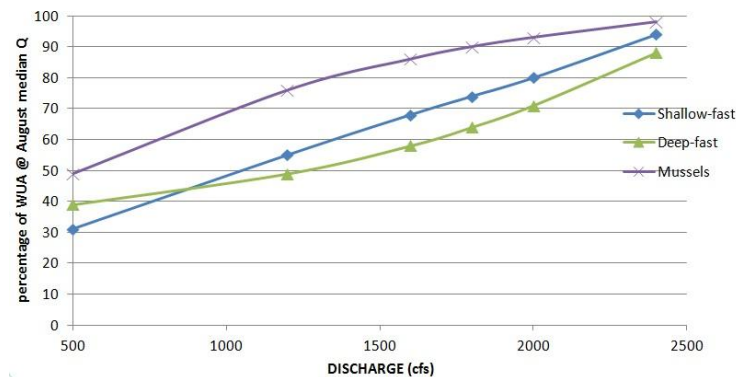


Figure 4. Habitat-discharge relations for fishes in Deep-Fast and Deep-Slow habitat guilds within the Cornell Project instream flow study area.

### Effective Habitat WUA of generation vs. base flow condition plotted percentage of August median flow WUA occurring at various peaking flows



<sup>1</sup> For non-mobile life stages such as macroinvertebrates or nest spawning, calculations can optionally be performed at the cell level using the “HABEF” routine in PHABSIM