



SUSITNA-WATANA HYDRO

Instream Flow Study-Fish, IFS-Riparian, Groundwater, Ice, Geomorphology, Water Quality

Field Reconnaissance Debrief Meeting Notes - DRAFT

October 4, 2012

- LOCATION:** Northern Susitna Institute
22510 S. Talkeetna Spur Rd
- TIME:** 1:00 pm – 4:00 pm (AKDT)
- ATTENDEES:** Kathryn Toews LVA, Dudley Reiser R2, Phil Hilgert R2, Bill Fullerton TetraTech, Bob Mussetter TetraTech, Chiska Derr NOAA, Kevin Fetherston R2, Kirk Pedersen Stillwater, Betsy McCracken USFWS, Jeff Davis ARRI, Mike Buntjer USFWS, Ron Benkert ADF&G, Joe Klein ADF&G, Eric Rothwell NMFS, Matt Cutlip FERC, Stormy Haught ADF&G, Bob Henszey USFWS
- ON PHONE:** Steve Padula LVA, Betsy McGregor AEA, Wayne Dyok AEA, Matt Love VNF, Jan Konigsburg NHI/HRC, Michael Lilly GWS, Sue Walker NMFS, Hal Shepard CWA

This debrief session was held to review the activities and impressions of those who attended the field visit which took place on 10/03/2012 and the morning of 10/04/2012. Attendees were able to visit three of the candidate focus areas for the Instream Flow Study: Whiskers Slough, Slough 8A and Slough 6A. All debrief attendees were present on the field trip with the exception of Kathryn Toews. Michael Lilly attended the site visit on 10/03/2012 but was unable to attend the visit on 10/04/2012. The site visit was conducted via boat along the Susitna River. AEA's water resources contractors who organized and lead the field visit and their respective responsibilities include:

- Dudley Reiser - Instream Flow Program Lead
- Kevin Fetherston - Riparian Instream Flow Study Lead
- Phil Hilgert - Instream Flow Study Lead
- Bill Fullerton - Geomorphology Program Lead
- Michael Lilly - Groundwater-related Aquatic Habitat Study Lead

River conditions and flood effects

It was noted that the river flow on 10/4/12 was 15,800 cfs. The most recent flood (mid-September 2012) included flows as high as 78,900 cfs. River bed effects from the flood were observed by the Mahay's river boat captain at the three river confluence, with less bed changes noticed as he traveled upstream.

Bill Fullerton and Dudley Reiser mentioned that wood seemed to play a larger role at Whiskers Slough than Slough 8A with an extensive addition of large woody debris from the flood. Bill Fullerton also saw fine sediment with vegetation removed by the flood at Slough 8A.

Kevin Fetherston noticed that at Whiskers Slough, the flood penetrated the willow/alder zones to a level of at least two feet above the full bank. Dudley Reiser saw a geomorphic change in the area of Whiskers Slough that was previously occupied by spawning chum salmon on September 13, 2012.

Round Table Discussion

Dudley led the group in a roundtable discussion to obtain initial impressions from those participating in the field visit.



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Responses are summarized below:

Michael Buntjer – He was surprised to see less spawning fish in the sloughs, seeing only one sockeye Slough 8A) and one coho salmon (Whiskers Slough). He speculated this may be due to the recent high flows.

Bob Mussetter – Seeing the scale of the system was helpful in understanding the habitat modeling challenges. 2D is the only practical approach at a complex site such as Whiskers Slough and Slough 8A, while 2D modeling is not necessary at Slough 6A. He also mentioned it is important to differentiate substrate variability relative to flow conditions. He said that the bed of Whiskers Slough did not appear to have been mobilized in the recent flood but it was at Slough 8A. He feels that a 2D sediment transfer model of both sites would help explain that process.

Ron Benkert – He was impressed by the system and how well the main tem handled the recent high flows without signs of extreme changes and instability. Sediment deposition was seen high from the current river levels, but the vegetation was not ruined. It was nice for him to see first-hand the sites and likes the focus area approach being proposed.

Stormy Haught – Stormy Haught noted that all three visited focus areas were very different from each other. He suspects that if we look at the 1980s transects where they found suitable spawning habitat, we would currently not find the same conditions due to the recent flood impacts. This makes him wary of using only 1980s data in selecting sites. Dudley Reiser explained the difficulty in identifying spawning habitat. An area that may not look suitable for spawning as defined by depth/velocity/substrate combinations may actually be. This is because the system may be more complex than what meets the eye due to factors such as groundwater upwelling. Being out there made Stormy more aware of the groundwater-surface water interaction importance and challenges in understanding the system's complexity.

Eric Rothwell – He expressed concerns of the ability to choose sites suitable for extrapolating data to the river as a whole. He also noted that the three visited candidate focus areas were very different from one another. Eric agreed with 2D modeling approach at Whiskers Slough and Slough 8A. While on the river, Eric found it easy to see the multiple levels of habitats and how habitat classifications can change with flows. He is unclear on how these changes will be addressed in the studies. When assessing the Project effects on groundwater, Eric believes the first objective must be to understand the groundwater – surface water interactions. Eric also requested a draft list of data collection techniques (methods and parameters) at all fish study sites. Dudley addressed this by saying that detail will be added to the draft RSPs and more so in the final RSPs with further details added continuously as they are available.

Betsy McCracken – Betsy indicated she had gained a more interdisciplinary understanding while on the river. She was impressed by the habitat complexity and saw how the various areas were fitting into the current classification system. While visiting the river, Betsy realized the importance of groundwater and its strong role in the environment. She also was pleased to hear it confirmed that some focus areas will include habitat suitability criteria (HSC) sites with other HSC sites being located outside of focus areas.

Bob Henszey – Bob appreciated this time of year for better viewing and navigation on ground. He would have enjoyed more time at each site. He expected to see more changes in the channel from the recent high flows. Ron Benkert noted that the most recent flood was the second highest on record. With that being true, Bob Henszey wonders how the landforms are built in the Susitna system if such a



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significant flood did not considerably influence the existing landforms. He also noted that the trees in the areas visited are uniformly aged, lacking the usual border of younger trees. Bob suspects this to be due to stable channels. Bill Fullerton noted that these trees could be a useful way to age the landforms that they grow on.

Chiska Derr – Chiska noted that Slough 6A included more established habitats which encompassed an old beaver complex. In this complex, she saw moving water and asked how much through flow and how much groundwater can be contributing to this movement. She also saw a floating bog at Slough 6A and explained that the taxa on such a bog can help calculate how old the structure is due to the change of vegetation associated with a timescale. Chiska also noted that according to the currently proposed study plan, this floating bog is considered outside the study area and would not be captured as part of a transect. She would like to see such structures included in transects. Kevin explained that off channel water bodies, such as these, increase in age as one goes away from the river. The peat building systems are the furthest from the river and these areas will be included in the studies. The lateral extent of the study area will include areas that could be affected by Project-induced changes in the flow and sediment transport. It is important to include lateral systems due to water flowing from the river to channel areas. It is important to also consider hill slope vs. river input, and LiDAR will help us to evaluate this input.

Matt Cutlip – Matt Cutlip noticed how sterile some habitats looked without fish being present where he expected. He asked where fish are presently in the river, if not in these areas. If these habitats are not being utilized now, when are they being utilized? Matt is interested in how the fish distribution study will capture such variability. Dudley Reiser suspects that the fish may have been displaced from the side channels to the main channel and that the habitats are used opportunistically at different times and different flows.

Dirk Pederson – Dirk Pederson was impressed by the lack of bed load transport in the side channels from this recent flooding event. He expressed that lower Whiskers Slough looked like ideal rearing habitat and upstream seemed to have groundwater input without any productivity. Dudley Reiser identified visually detectable upwelling at the north end of the slough as well.

Jeff Davis – Jeff Davis mentioned that he understands that resident fish are using the main channel in the winter. He had seen “pockets” along the banks which looked like low velocity areas similar to where he has seen fish in the Little Susitna River in summer months. Dudley Reiser indicated that he noticed these structures at the southern end of the focus area of Slough 6A and confirmed that they are within the currently proposed study areas. Jeff Davis feels that the river’s flow affects the water level in beaver ponds in Slough 6A. Kevin Fetherston suspects this is due to a difference in pressure (relating to groundwater) and this interaction would be modeled with MODFLOW. Bill Fullerton noted the complexity of beaver dam water levels by explaining that beavers control the water level to their liking, adding an additional influence to the water level.

Phil Hilgert stated he was curious regarding night time activity of juvenile fish and Dirk Pederson expects many to be in the beaver ponds.

Jeff Davis also mentioned that the percent of fines in the riverbed influence its permeability. This may be influenced by the Project and can be a factor in the groundwater – surface water modeling. Jeff raised the hypothesis that if Project effects result in a coarsening of the substrates, permeability would be increased, resulting in a quicker interaction with the groundwater. Eric Rothwell asked that if the



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Project changed sediment transport, the effects on hydraulic conductivity be looked at during the studies. Ron Benkert mentioned the need for drilling to find layers and lenses when determining the controls on downward movement of water.

Kevin Fetherston - Kevin saw evidence of flooding of plant communities and sediment deposition of about 4 cm in certain areas due to this most recent flood. Kevin also noted higher elevation floodplain forms with cottonwood. Cottonwood have a general life expectancy of 150 years, implying that the river influences these areas within that time. Water levels could have reached these areas as a result of ice jams since floods do not seem to go to such high elevations. The most recent flood laid sediment occurred in alder and willow thickets, but not above. Kevin also explained that the smaller willows, which seem to be only a few years old, based on their size, are actually much older and are unable to grow very large since they are constantly laid down by winter ice. The root structures are characteristic of much older plants.

Phil Hilgert - Phil Hilgert asked for all to consider the importance of stage as well as the flow. In winter, ice jams cause the stage to increase while the flow does not, causing floods. Bob Mussetter mentioned that most large floods occur June-August. The 2006 flood in late August saw flows around 60,000 cfs. Joe Klein said that high water event history would be interesting to look at with the stage information. This may be historically recorded in reference to property damage.

The meeting concluded with a request from participants for timely posting of meeting materials in the future.

Summary

Whiskers Slough and Slough 8A were recognized as good candidates for 2D modeling. Most participants expressed surprise of the little observed effects of the recent flood, and surmised the Susitna River to be a resilient system accustomed to variable influences. Groundwater-surface water interactions play a large role in the riparian and lateral habitats and are recognized as an important aspect of the overall study effort.