



SUSITNA-WATANA HYDRO

Draft Meeting Notes Instream Flow Study-Riparian Technical Work Group Meeting 1 October 2012

- LOCATION:** AEA Project offices – 1st Floor Conference Room
411 W 4th Avenue; Suite 1
Anchorage, Alaska 99501
- TIME:** 12:00 pm– 5:00 pm (AKDT)
- SUBJECT:** **Instream Flow Riparian Study Plan & USFWS Comments**
- ATTENDEES:** Bob Henszey USFWS, Chiska Derr NMFS, Steve Padula LVA, Kathryn Toews LVA, Betsy McGregor AEA, Justin Crowther AEA, Jan Konigsberg National Heritage Institute, Michael Lilly GWS, Marie Steele DNR, Bill Fullerton TetraTech, Kevin Fetherston R2
- ON PHONE:** Becky Long Coalition for Susitna Alternatives, David Turner FERC, Paul McCowsky FERC, Matt Love Van Ness Feldman, Hal Shepard CWA, Zoe Bigary Stillwater, Tim Sundlov BLM, Paul Dworjan URS, Aaron Wells ABR

This meeting was held to compare and contrast USFWS' study plan request and the PSP by presenting the current study plan and to provide an opportunity for questions and concerns of the participants. Kevin Fetherston explained that the riparian study would identify current/natural conditions and use models to show possible effects of the proposed Susitna Watana Project (Project) on riparian resources below the Project. Kevin stated that very few aspects of the current study plan are new (since the PSP), with the only changes being additional details and the RSP format. A PowerPoint presentation which Kevin Fetherston referenced throughout the meeting can be found at http://www.susitna-watanahydro.org/wp-content/uploads/2012/09/IFS_Riparian_TWG_mtg_20120911_1500.pdf.

Synthesis of 1980s data and other literature

Bob Henszey requested literature to be included from other rivers both regulated and unregulated by dams. Kevin Fetherston agreed to add studies on floodplains unaffected by hydro-regulation to the literature review.

Focus Areas

Focus Areas are ~1-2 mile representative areas along the Susitna River where multiple disciplines will be conducting integrated studies for a more complete understanding of the ecosystem. Betsy McGregor highlighted that sampling was not limited to the focus areas and that sampling would occur at other sites along the river, specific to the issues/concerns for each resource area. Focus Areas are chosen to capture the riparian, aquatic and fish habitat variability present in the identified geomorphic reaches for the multidisciplinary study. The



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candidate Focus Areas were chosen using best professional judgment by the consultant team based on a review of the available data.

Study site design

Kevin Fetherston explained that classification of the river corridor into riparian process domains (segments of the river with similar riparian disturbance regimes) would allow efficient sampling and modeling of the entire Project area. The hierarchical riparian process domain approach, with each process domain sampled using Focus Areas, will allow extrapolation of the modeling data to the larger Project area.

Bob Henszey expressed a concern that the overall instream flow study effort seems to be “fish-centric”, and he wants to be assured that riparian areas are not overlooked. Kevin Fetherston explained that in regards to riparian, each Focus Area will include groundwater–surface water modeling, historic geomorphology, sediment transport modeling, and vegetation and soils mapping of the entire floodplain. There will be multiple replicates for many aspects of the Focus Area sampling in the Riparian Botanical Survey however less for groundwater (due to costs).

Fine sediment deposition can be a key factor in both colonization and the plant community establishment. Sediment transport and surface water modeling will be 2D modeled in Focus Areas to evaluate the Project effects on flow and sediment regimes. It was noted that one option for collecting historic data is to determine the rate of sediment deposition using cesium 137 (a radioisotope deposited during nuclear testing in 1950s and 1960s. Carbon dating of organic deposition is another option. Dating a number of core samples and combining the data with tree core dating, one may obtain a thorough understanding of the age of riparian communities. Sediment deposition rates throughout the Project area will be measured using isotopic dating of fluvial sediments and dendrochronology.

Bob Henszey said in the methods section, exact study locations are not necessary in the study plan. When selecting site locations, Bob Henszey asked to be sure to select some locations that are predicted to be affected by the Project, including a site immediately downstream of the proposed dam site.

Kevin indicated that the study area will be based on the flow routing modeling to determine the down river extent of Project operational influence. Final Focus Area selection is expected to be determined in collaboration with the TWG in early 2013. Candidate Focus Areas were presented and the following locations were discussed as follows:

- MR2 – The river reach MR2 (middle river 2) includes two Focus Areas.
 - Upriver Focus Area
 - Less confined reach with greater floodplain and side channel complexity
 - Greater suite of vegetation types and ages
 - Downriver Focus Area
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 - Bob Henszey noted that the Focus Area excludes an emergent wetland just upstream of border.



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- It was noted to include this emergent floodplain wetland in this Focus Area, if selected as one of the study areas.
- Portage Creek Focus Area, MR-5
 - Just downstream of Devils Canyon
 - Not much floodplain
 - Bob Henszey feels this could be eliminated as a Focus Area but that it could be a site for specific aquatic resources of concern (not for riparian).
- Indian River Focus Area, MR-6
 - Beaver dams present with associated side channel and floodplain meadow
 - Many features imply fish presence
 - Moderately confined channel
 - Has a range of plant community types
 - Kevin Fetherston said the islands' distinct plant variability may be influenced by frequent ice floodplain shearing.
- Gold Creek Focus Area
 - Moderately confined
 - Has a range of plant community types
 - Includes terraces and side channel
 - This Focus Area will be fairly straight forward to instrument with wells for both fish and riparian needs
- Slough 6A, MR-7
 - Multiple beaver dams present
 - Signs of significant ice influences
 - Low density Poplar forest
 - Mid-channel island
 - Moderately confined channel
 - Off-channel water body
 - Floodplain peatlands
- Slough 8A, MR-6
 - Moderately confined
 - Has a full range of plant community types
- Whiskers Slough, MR-8
 - Focus Area located upstream of the Three Rivers confluence
 - Moderately confined channel
 - Hydrologically unique due to Chulitna River influence and Susitna River backwater effects
 - Mike Wood has a home at this location and can provide observations on ice formation
 - Area was studied in the 1980s and Whiskers Slough has been relatively stable since 1949, as illustrated in the comparative geomorphology study
 - Ice tree scars indicate active ice floodplain interactions

Groundwater-surface water interaction study



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Project effects on floodplain vegetation will occur through the interaction of groundwater and surface water and sediment transport reduction. Bob Henszey noted his understanding that groundwater sampling is costly so the number of groundwater sampling sites will need to be limited. Because of this, the Focus Areas need to be carefully selected to represent the range of variability found within each Riparian Process Domain.

Michael Lilly explained that due to the lateral effects of changes in surface water the Focus Area well locations will include adjacent hillslopes to help delineate the project hydrologic boundary. As the river stage is low, groundwater is expected to discharge into the river. When the river stage is high, river water is expected to recharge shallow floodplain aquifers. Surface water affects groundwater by means of hydrologic pressure gradients and occurs underground (where it cannot be seen and does not freeze) and therefore difficult to study. Modeling groundwater (using MODFLOW software) provides a numerical representation of the effects surface water pressure has on groundwater. Identifying how groundwater is affected by changes in surface water can help anticipate the Project effects on groundwater and the associated riparian vegetation. When modeling groundwater, the stage level is used as the key influential factor rather than discharge. This is especially important in the ice season when discharge may be low, but an ice jam may create a localized backwater flood with high stage/added pressure. Michael Lilly identified precipitation as an influence on both groundwater and surface water.

River stage changes can be used as a “natural pump test” by its direct pressure effects on groundwater. Michael Lilly compared the interaction to a water ripple, where there is a delayed effect with the magnitude and frequency dissipated the further from the event (change in river stage). Understanding of the groundwater-surface water interactions is based on the number of unique events observed rather than the number of years observed. Models can make up for a lack of multiple years of data by using events in the modeling process.

Michael Lilly said that piezometers will be used along the Susitna River in lateral habitats such as side sloughs. Shallow wells will be useful for the riparian study. With wells placed in specific plant communities the relationship between groundwater-surface water and the plant communities can be statistically described using the models. Michael Lilly added that some species thrive in areas with precipitation as the only water source. The life history strategies of dominant plants will be summarized with information available. Representative species will be selected after identifying what species rely on what type of water source and specific condition (such as geomorphology). Bob Henszey suggested creating a bell curve with groundwater level on the X-axis.

Ice influences

Chiska Derr asked if isostatic rebound is a factor in the study area. MaryLouise Keefe answered that it is not at a scale of reasonable influence for riparian concern.

Michael Lilly and Kevin Fetherston indicated that the study would include mapping out the influence of ice processes based on scarring of trees.

Action Items



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The literature review will include river floodplains in both unregulated systems and systems regulated by dam(s).

The RSP will include the process, criteria and schedule for final selection of Focus Areas.

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