

Draft Meeting Summary
Instream Flow, Riparian Instream Flow, Groundwater, Glacial Runoff
Technical Workgroup Meeting
October 24, 2012

LOCATION: Alaska Energy Authority Main Office [Note New Meeting Location]
813 West Northern Lights BLVD
Anchorage, AK 99503

TIME: 8:30am – 4:15pm (AKDT)

SUBJECT: **Instream Flow, Riparian Instream Flow, Groundwater, Glacial Runoff**

ATTENDEES: **Rob Plotnikoff** Tetra Tech, **Harry Gibbons** Tetra Tech, **Paul Dworian** URS, **Roy Ireland** DNR, **Kathryn Toews** Long View Associates, **Dave Meyer** USGS, **Mike Buntjer** USFWS, **Bill Fullerton** Tetra Tech, **Marie Steele** DNR, **Brian Bjorkquist** AGO, **Jan Konigsberg** Hydropower Reform Coalition, **Michael Lilly** GWS, **Dudley Reiser** R2, **Robin Beebee** HDR, **Eric Marchegioni** USDA, **Bryan Carey** AEA, **Justin Crowther** AEA, **Matt Love** VNF, **Betsy McGregor** AEA, **Kevin Fetherston** R2, **Hannah Ramage** ARRI, **Gabe Wolken** DGGS, **Michael Barclay** HDR, **Stormy Haught** ADF&G, **Joe Klein** ADF&G, **MaryLouise Keefe** R2, **Sandie Hayes** AEA, **Dave Brailey** Brailey Hydro, **Scott Crowther** Ratepayers

ON PHONE: **Richard Leo** Coalition for Susitna Alternatives, **David Turner** FERC, **John Haapala** MWH, **Fred Winchell** Louis Berger, **Dirk Peterson** Stillwater, **Terry Schwarz** DNR, **Paul Makowski** FERC, **Eric Rothwell** NMFS, **Gary Vandervine**, **Wayne Dyok** AEA, **Becky Long** Coalition for Susitna Alternatives, **Sue Walker** NMFS, **Steve Padula** Long View Associates, **Hal Shepard** CWA, **Phil Hilgert** R2, **Kim Sager** DNR, **Chiska Derr** NMFS, **Bob Henszey** USFWS

Action items are underlined

AEA PSP and ILP Study Plan Process

Matt Love, VNF

The purpose of the meeting was to provide an overview of to-date revisions made to select PSPs. Matt Love reviewed the RSP schedule, Project updates and meeting purpose as explained in the “Overview of AEA Draft Revised Study Plans” presentation (available at http://www.susitna-watanahydro.org/wp-content/uploads/2012/10/AEA_overview_revised_study_plans_Geo.pdf). He informed everyone that a spreadsheet of the status of each study plan is available on the AEA website (<http://www.susitna-watanahydro.org/wp-content/uploads/2012/10/Study-Table.pdf>). This sheet informs the reader whether a draft RSP is available for review or changes to the PSP have not been significant based on comments received to date and thus only the original PSP is available at this time. Live links to these documents are imbedded in the spreadsheet. Within each draft RSP is an updated schedule, a figure showing interdependencies amongst studies and a consultation table showing comments to-date along with AEA’s responses.

Fish and Aquatics Instream Flow

Dudley Reiser, R2
Phil Hilgert, R2



SUSITNA-WATANA HYDRO

Dudley Reiser presented information on the Fish and Aquatics Instream Flow Study (IFS) (presentation available at <http://www.susitna-watanahydro.org/wp-content/uploads/2012/10/TWG20121023DR.pdf>). Throughout slides 3-31 Dudley presented an overview and photos of the recent site tour. Three candidate Focus Areas were visited by multiple water resource study leads and licensing participants. Those Focus Areas are located at Whiskers Slough, Slough 8A and Slough 6A.

There have been 48 comments directed towards the IFS. Dudley Reiser grouped many of them in 5 recurring themes as presented on slides 33-37. The themes are listed below with a brief explanation of AEA's response.

1. **Habitat Site Selection.** The IFS is incorporating three approaches in site selection. A number of *representative* sites will be chosen to characterize habitats. *Critical* sites will be chosen based on all available data and information suggesting that specific areas are important from a fish use perspective; additional sites may be added as more data become available. *Random* site selection may be used to select sites within specific mesohabitat types.
2. **Habitat Model Selection.** The proposed modeling techniques are explained briefly in the consultation tables and in more detail in the draft RSP.
3. **Study Integration.** Phil Hilgert explained the two types of integration as 1) integration of results for different water resources within a Focus Area to get effects analysis and 2) integration within the study area (including results from terrestrial studies).
4. **Winter Fish Habitats.** The 1980s studies put substantial effort into winter studies and the results provide important background information on fish use and behavior during the winter periods. The Focus Areas at Whiskers Slough and Slough 8A will be studied in a winter pilot study this winter (2012-2013) with the possibility of expansion in later years. Joe Klein suggested that fish tagging may be useful in evaluating fish winter behavior. Dudley indicated there were a number of fish sampling and observation methods being considered including tagging. Information obtained from the winter pilot studies will be used to refine methods and techniques applied in subsequent years and will also provide important information regarding site access and sampling logistics. Stormy Haught (ADF&G) mentioned that a Habitat Use permit will be required from ADF&G for installation of any instruments in the river and indicated he would provide R2 with the necessary permit application.
5. **Stranding and Trapping.** Dudley referred to Section 8.5.4.5.4 in the draft RSP.

Slides 39-43 list the IFS section headings in the PSP with newly expanded sections contained in the draft RSP in green text. Dudley noted that overall; much more detail is included in the draft RSP than was presented in the PSP.

Jan Konigsberg asked if Habitat Suitability Criteria (HSC) will be considered for all species throughout all life stages. Dudley Reiser explained that although the RSP will consider all species, there will be specific target species for which HSC criteria data will be collected and analyzed. It is simply not logistically feasible to cover all species and all life stages throughout the entire year. The RSP will discuss data collection, a schedule and the process used for selecting target species. Data collected in the 1980s will help in the selection of target species. Joe Klein agrees with that approach and added that applying HSC curves from other areas may not be applicable.



SUSITNA-WATANA HYDRO

Dudley Reiser reviewed the revised schedules on slides 45-53. Joe Klein requested that the application of models be decided prior to data collection. Matt Love suggested that “Preliminary and final review of weighting factors” be added to the schedule. Dudley added that an additional TWG meeting could be scheduled to discuss the area weighting process and Sue Walker agreed. Phil Hilgert said that a dashed line will be added to “study area selection” and “model selection” to represent the opportunity for follow-up. Dudley will also add a dashed line to “Identify need for additional data” in Hydraulic Routing for follow-up.

Joe Klein asked what time steps are being proposed for the routing model. Phil Hilgert said that the model will be developed with analysis possible at three minute time steps. He said that a one hour time step is common practice for presenting the model output, and Joe mentioned that something shorter than a one hour step may be necessary when evaluating stranding and trapping.

The IFS integration figure is on slide 55. Slide 56 includes the integration of models originally presented in the PSP. This figure will be included in the RSP as well.

Dudley Reiser continued the presentation and explained the stratification approach with a map of the geomorphic reaches and candidate Focus Areas in the Middle River. The Lower River will likely contain at least one Focus Area, but the specifics are still under discussion.

Riparian Instream Flow

Kevin Fetherston, R2

Kevin Fetherston presented the changes made to the Riparian Instream Flow Study (Riparian Study). The presentation is available at http://www.susitna-watanahydro.org/wp-content/uploads/2012/10/V_3_Riparian_IFS_TWG_Presentation_10_24_2012.pdf. After reviewing the meeting objectives (slide 2), Kevin presented the interdependency figure for the Riparian Study (slide 3). The line showing input from the Riparian Botanical Study represents the strong relationship between the studies. Kevin agreed to add the Large Woody Debris component (6.5.4.9) of the Geomorphology Study and the River Productivity Study as recipients of data from the Riparian Study.

Kevin Fetherston reviewed the section headings of the draft RSP which were reorganized from the PSP to better represent the study request of USFWS (slide 5). Throughout slides 6-7 Kevin reviewed the components of the Riparian Study.

Slides 8-38 addressed some comments received since AEA’s filing of the PSP and AEA’s responses to those comments. Pseudoreplication was referenced in slide 10 in response to USFWS’s comment regarding replication. Kevin Fetherston explained that pseudoreplication is addressed in the Riparian IFS with sampling conducted at the Focus Area modeling sites. Also, riparian plant community and soils sample replicates are being taken throughout the entire Project Area as the primary objective of the Riparian Botanical Study. Although groundwater characteristics will not be measured throughout the entire Project riparian area, but will be at Focus Areas. Bob Henszey asked how the data will be extended to other areas with confidence. Kevin said that the Focus Area modeling results will be used to “scale up” to the larger riparian process domain and Project Areas. Michael Lilly said that with groundwater process and scale understood, one may infer those data elsewhere within the Project Area. Kevin added that if the relationship between riparian plant communities and groundwater-surface water regime is identified, one may be able to assume that those relationships are consistent in similar conditions.



SUSITNA-WATANA HYDRO

Kevin Fetherston addressed USFWS's comment on slides 12-17 regarding seedling establishment by explaining seedling establishment requiring specific timing, surface and groundwater conditions, and sediment type. By applying fluvial geomorphology sediment transport, groundwater / surface water, and ice process models, and operational projections, one may obtain an understanding of the possible Project effects on seedling establishment. An approach to addressing study length limitations is to age established seedlings, using dendrochronology techniques, and statistically model the hydrologic, sediment type and establishment relationship.

USFWS questioned the sensitivity of MODFLOW in quantifying hydroperiod relationships for seedlings (slide 14). Michael Lilly said that data will be evaluated for accuracy and wells will be added if deemed necessary for calibration and validation of models. Kevin added that wells will be located in specific riparian plant communities, including sites critical to riparian vegetation establishment and recruitment. Bob Henszey requested that a schematic diagram of proposed well placements be included in the Riparian Study Plan as well as the Groundwater Study Plan.

Kevin presented photographs of the Susitna River on slide 24-30 to show the sediment deposition from ice and/or flooding with the river location identified on each slide.

Jan Konigsberg asked if nutrients will be evaluated in sediment depositions. Kevin Fetherston said that nutrients are not a parameter proposed to be studied. Slides 33-36 explained what will be characterized of sediment depositions.

Kevin Fetherston concluded his presentation with an updated schedule on slides 39 and 40.

Groundwater – Related Aquatic Habitat Study

Michael Lilly, GWS

Michael Lilly reviewed comments to the Groundwater-related Aquatic Habitat Instream Flow Study (Groundwater Study) PSP as well as AEA's responses, an updated schedule, an interdependency figure, and recent field observations. Michael's presentation is available at http://www.susitna-watanahydro.org/wp-content/uploads/2012/10/Groundwater_IFS_TWG_Presentation_10_24_2012.pdf.

All notable comments requested more detail in particular topics. Those topics are listed on slides 3 and 4 with checks representing that those comments were addressed and detail was added to those sections. Michael Lilly explained that the completed consultation tables, located in the draft RSP, will include an overview of AEA's response with an associated section number to reference for further detail.

Michael Lilly said that groundwater wells will be placed at Focus Areas and data from functioning private water source wells will be collected as permitted by well owners. He predicts that private water-source wells are generally drilled to depths to be unaffected by relatively low winter stages. This will be confirmed as wells are incorporated into study efforts and water levels will be measured. Bob Henszey asked if raw data will be provided for use in other studies. Bob wanted to ensure that Michael was responsible for the quality control. Michael explained that he will evaluate the quality of the data before providing it to the other studies. Joe Klein asked if piezometers will be placed to confirm that upwelling is occurring where it is visually identified. Michael said that piezometers will be used as much as it is practical, but additional visual data and observations will be collected as possible from all relevant field crews. Joe asked how field crew will be confirming the presence of upwelling if piezometers are not applied to those locations. Dudley Reiser explained that temperature readings may be taken. He said

that visual observation will be the means of identifying upwelling outside of Focus Areas. With an understanding of upwelling and the associated habitat conditions, one may be able to confirm upwelling by relating it to the conditions in which it is visually observed. Joe Klein asked if upwelling would be considered not present if not observed or only weak signs are observed. Michael Lilly said that the surface observation of upwelling is only the “tip of the iceberg” so if any signs are observed in sloughs and other surface-water bodies, one must assume it is present in the area. He also added that if visual signs are not observed, it cannot be concluded that it is not present.

Slide 5 explains additional changes to the PSP including the updated schedule and interdependency figures (slides 6-9). Michael Lilly noted a correction to be made on slide 6. A “7” must be added to the beginning of “.5.4.5 Riparian Vegetation....”. Also, the “•” needs to be added to the schedule’s legend.

Michael Lilly presented his interdependency figure over three separate slides (7-9) focused on separate elements of the study. Michael Lilly clarified that the “Watana Dam/Reservoir” element feeds into the construction aspect of the proposed Project in that any underground water exchange between the area of the proposed reservoir and river downstream of the Project would be reduced to stop leakage, which is meeting the intent of the engineering designs.

Michael Lilly finished his presentation by updating licensing participants of recent field observations on slides 10-22.

Glacial and Runoff Changes Study

**Paul Dworjan, URS
Gabe Wolken, DGGs**

Brian Carey explained that all current comments pre-date the PSP filing, and he anticipates further consultation with agencies fairly soon.

Gabe Wolken provided background of the Glacial and Runoff Changes Study (Glacial Study) in a presentation available at http://www.susitna-watanahydro.org/wp-content/uploads/2012/10/Glacier-and-Runoff-Changes_Susitna-Watana_10-24-2012.pdf. Gabe explained that the main purpose of the Glacier Study is to analyzing the potential impacts on flow into the reservoir due to glacial reactions to climate change. A model will be utilized to evaluate the surface mass balance of glaciers on an annual, decadal and century time scale. Gabe explained that approximately 40 glaciers are in the Susitna watershed, but this study focuses on 5. This is the largest scale of this type of study yet to be conducted in the state of Alaska.

In 2012, crews were able to install all off ice stations, with on-ice stations being added in 2013. A map of the stations can be seen on slides 9 and 11. The field season started in April 2012 and due to the large study area, the Glacier Study is expanding beyond traditional field methods and employing high tech options such as ground penetrating radar from a helicopter for the first time in Alaska. This has proven successful, and the apparatus as well as results can be seen on slide 12. The results are graphed on slide 13 (X axis being elevation). Gabe Wolken pointed out that the Maclaren glacier (pink) has been shown to have a higher snow depth although it is located at a lower elevation than the other surrounding glaciers.

Slide 14 consists of photos of ablation stakes (upper left and lower right) as well as tundra weather stations (upper right and lower left). The tundra weather stations provide data on surrounding non-ice terrain which can be used to calibrate the hydraulic model.



SUSITNA-WATANA HYDRO

Gabe Wolken explained the WaSiM model on slide 16 saying that it is physically based and considers changes in glacier size over time. Application of the model is presented on slide 18; the model must be calibrated with in situ data. Gabe explained that when a model is developed and calibrated, future scenarios to year 2100 can be created with different assumed climate conditions.

The final slide of Gabe Wolken's presentation (slide 19) shows the Glacier Study's schedule. Gabe said that it is a work in progress and updates will be provided periodically.

Gabe Wolken's discussed the current status of Upper Susitna glaciers. He said that a reduction of glacier volume is apparent when comparing historic and current data. The Glacier Study is utilizing information retrieved from historic photos. Paul Dworian noted the time gaps between years photographed. Gabe confirmed that there are four time stamps on photos prior to year 2000 and about three time stamps after that. Earlier photos are basin-wide.

Sue Walker asked the current state of the studied glaciers in regard to their water retention capabilities (the Run-off section of the graph on slide 6). Gabe Wolken said that this detail is not within the Glacier Study's scope.

Project Hydrology

Bryan Carey, AEA

Bryan Carey presented some new information regarding predicted post-Project Susitna River flows and stages (available at <http://www.susitna-watanahydro.org/wp-content/uploads/2012/10/Downstream-Stages-TWG-Oct-16-2012-R1-pptx.pdf>). The first group of stage slides is based on a conservative assumption that the Project would be utilized to provide the entire load following capability needed for the entire Railbelt. This is a very conservative assumption as it is likely that other hydroelectric projects in the Railbelt system (Bradley, Eklutna and Cooper lakes) will be utilized to meet load following needs. When viewing these graphs one must take into consideration that they are based on USGS gages placed in constrained areas of the Susitna River. This implies that the stage effects are most extreme in these areas and would dissipate in wider neighboring reaches. Second group of slides shows daily stage and flows with load following at various gage locations. Stage changes are less than one foot at each location. The August flows and stages at locations on the Susitna, Talkeetna, and Chulitna Rivers show that the rivers are currently seeing daily stage swings from snow/glacial melt. Last group of slides shows the stage with and without Project based on 1984 flows.

Additional Discussion

Sue Walker asked where differences between the study requests and PSP are being identified. David Turner responded by explaining that the PSPs should have addressed all concerns stated in the study requests. Comments should be provided to address specific differences in the two so they can be discussed and resolved. David promoted the sharing of informal comments as soon as they are conceived for maximum time available to reach a resolution. Sue Walker stated that it is difficult to compare the two documents because the organization changed from the study requests to the PSPs. Sue Walker requested a crosswalk to be provided to compare organization of the study requests and PSPs. David said that a crosswalk would be helpful, but if unavailable, one must identify differences by thorough review. Betsy McGregor located a crosswalk previously created to compare the fisheries study requests and PSPs, which were substantially reorganized. She forwarded that document to Sue Walker.

Action Items

IFS Fish and Aquatics

Joe Klein finds fish tagging beneficial in the winter season. Dudley will consider adding this to the RSP Section 8.5.4.5.1.1.

Joe Klein requested that the application of models be decided prior to data collection. Matt Love said that “Preliminary and final review of weighting factors” would be added to the schedule. Dudley added that an additional TWG meeting would be scheduled to discuss the area weighting process.

Regarding the IFS Fish and Aquatics schedule: Phil Hilgert said that a dashed line will be added to “study area selection” and “model selection” to represent the opportunity for follow-up. Dudley will also add a dashed line to “Identify need for additional data” in Hydraulic Routing for follow-up.

Riparian

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Bob Henszey requested that a schematic diagram of proposed well placements be included in the Riparian Study as well as the Groundwater Study.

Groundwater

Schedule: A “7” must be added to the beginning of “.5.4.5 Riparian Vegetation....”. Also, the “•” needs to be added to the schedule’s legend.