

**Meeting Summary**  
**Susitna-Watana Hydroelectric Project Licensing**  
**Instream Flow and Water Quality Workgroup Meetings**  
**March 2, 2012**  
**AEA Project Offices, First Floor Conference Room**  
**411 W 4<sup>th</sup> Avenue, Anchorage, AK**

**Attendees:**

<b>Organization</b>	<b>Name</b>
AEA	Betsy McGregor
AEA	Wayne Dyok
USFWS	Mike Buntjer
USFWS	Betsy McCracken (by phone)
USFWS	Bob Henszey
USFWS	Jennifer Spegun
NMFS	Susan Walker
NMFS	Eric Rothwell
BLM	Tim Sundlov
NPS	Cassie Thomas (by phone)
ADF&G	Joe Klein
ADF&G	Ron Benkert
ADNR	Courtney Smith
ADNR	Krissy Plett
ADNR	Kim Sager
NPS	Cassie Thomas
FERC	David Turner (by phone)
Natural Heritage Institute/Hydropower Reform Coalition	Jan Konigsburg
Long View Associates	Steve Padula
Long View Associates	Randall Filbert
Cardno-ENTRIX	Craig Addley
Cardno-ENTRIX	Woody Trihey
HDR	James Brady
HDR	Robin Beebee
HDR	Keri Lestyk
HDR	Scott Prevatte
URS	Paul Dworian
R2 Resource Consultants	Dudley Reiser
R2 Resource Consultants	MaryLouise Keefe (by phone)
Tetra Tech	Harry Gibbons
Tetra Tech	Rob Plotnikoff (by phone)
Tetra Tech	Andrew Parker
E-Terra	Lars Gleitsmann
GW Scientific	Michael Lilly

<b>Organization</b>	<b>Name</b>
Brailey Hydro	David Brailey
LGL	Michael Link
Alaska Ratepayers	Scott Crowther
Citizen	Jim Ferguson

## Presentations

- Craig Addley and Woody Trihey (Cardno-ENTRIX): Table of Preliminary 2013-2014 Formal ILP Studies – Instream Flow, and select tables and figures from 1980s study program
- Craig Addley (Cardno-ENTRIX): Table of Preliminary 2013 - 2014 Formal ILP Studies – Water Quality

## Introduction

Wayne Dyok (AEA) stated that AEA had been discussing the proposed Project with Railbelt utilities, including the extent to which the Project may be operated in a load-following capacity. AEA has also been in ongoing discussions with resource agencies and recognizes that resource constraints will limit the timing and extent of any load-following operations and that at times, load following might be precluded completely. Wayne (AEA) emphasized that determining the extent to which load following can-or cannot- be conducted would be based on the results of technical resource studies and modeling. The integrated suite of models developed and applied in 2012-15 will be used to identify a suitable operating regime that minimizes impacts to natural resources.

## 2013 - 2014 Formal ILP Studies – Instream Flow

Dudley Reiser (R2 Resource Consultants) outlined the approach the technical team, in coordination with AEA, would take to develop the 2013-14 Instream Flow Study plan outline for the March 23 delivery date to stakeholders: (1) describe main study components, (2) identify Project nexus, (3) identify general modeling approaches, e.g., one- and two-dimensional modeling, expert habitat mapping over a range of flows, etc., tentatively identifying which approach will be applied to which reaches/macrobhabitat types, (4) describe steps for developing baseline data and HSC, including, where possible, use of 1980s data, (5) explain how modeling of flow and other physical processes will be incorporated into instream flow analyses, and (6) discuss general approach to assessing Project impacts. Dudley (R2) noted that the content of the plan would remain provisional for some time, as more is learned and AEA and stakeholders consult on study details, but that the general framework of the study would be provided on March 23.

Dudley (R2) asked if it would be permissible to conduct informal coordination with various stakeholders, individually or in small groups, while developing the plan. Betsy McGregor (AEA) said that so-called offline communications between technical consultants and stakeholders would be appropriate but that all substantive interchange would need to be

documented in writing. Betsy (AEA) emphasized that she should be kept apprised of all such activity and that it would be necessary to hold instream flow subgroup meetings during the development of the study plan, either in person or by teleconference/web-based conference. Wayne (AEA) stated that for all such coordination events the lead technical consultant would need to draft a brief summary, i.e., a bulleted list of agreements, decisions, and action items, which would then become part of the record and be distributed to relevant individuals.

Regarding the use of historic data to help develop HSC for fish, Mike Buntjer (USFWS) asked whether the 1980s studies provided a reliable quantitative record of habitat conditions in locations that were not used by fish. Woody Trihey (Cardno-Entrix) replied that documentation of microhabitat variables at sites with no fish was not a priority during the 1980s studies. Instead, the emphasis was on identifying sites where fish were present and then attempting to determine what effect the proposed Project would have had on those sites.

Mike (USFWS) noted that there are coho salmon in the Susitna River that complete their life cycles in the mainstem and do not enter tributaries. Woody (Cardno-ENTRIX) stated that researchers in the 1980s had not been aware of this and so no attempt was made to document the habitat use of these individuals.

Eric Rothwell (NMFS) stated that juvenile fish are selecting habitats for a reason and that for the proposed modeling to be useful it would be essential to identify where fish are, and why they are there. Eric (NMFS) stated that characterizing winter habitat use would be critical, emphasizing the importance of having a full understanding of environmental variables that will be affected by the Project, for example the seasonal dynamics of source water in side sloughs.

Following Woody's (Cardno-ENTRIX) presentation of select 1980s fish abundance and habitat use results (available at [Susitna-watanahydro.org](http://Susitna-watanahydro.org)) Dudley (R2) asked Woody (Cardno-ENTRIX) if 1980s IFG4 data decks were available. Woody (Cardno-ENTRIX) replied that he possessed hardcopy versions of much of the fisheries information from the middle river but did not have any data in electronic format.

Michael Lilly (GW Scientific) noted that depth, velocity, substrate, and channel geometry data would be collected at many of the 1980s transects. He added that the locations of historic transects would need to be approximated because transect markers placed in the 1980s would be difficult or impossible to relocate and in some locations the channel will have changed since those transects were established.

The group discussed the availability of aerial imagery of the Susitna River, digitizing of information, and maps to be produced. Betsy (AEA) instructed technical consultants to coordinate with Lars Gleitsmann (E-Terra) to obtain relevant aerial images for use in instream flow study planning and execution.

## **2013 - 2014 Formal ILP Studies – Water Quality**

### *Upper Susitna River Basin Glacier and Hydrologic Runoff Model Study*

Wayne (AEA) stated that AEA would develop a glacier/hydrologic runoff model for the Susitna River basin above river mile 184 and use it to simulate the effects of climate change on the quantity and seasonality of runoff in the upper basin through the year 2100. Wayne (AEA) stated that AEA was coordinating with Gabriel Wölken (ADNR-DGGS) to develop the model and that the goal was to begin fieldwork to assess existing glacier conditions in summer of 2012.

Sue Walker (NMFS) stated that climate change will affect a wide range of environmental variables beyond temperature and precipitation, including evapotranspiration and permafrost dynamics, among others. It's critical to consult NMFS climate change experts, who have some of the most in-depth and broad expertise in the field. Sue (NMFS) stated that using NMFS experts would not only help to provide a better simulation of the proposed Project's effects but would also be useful in refining potential operations and assessing the long-term viability of the Project, both of which would have practical applications for AEA.

Wayne (AEA) stated that AEA would schedule a teleconference in March 2012 to discuss the approach to glacier and hydrologic runoff modeling; the call would include, among others, Bryan Carey (AEA), Michael (GWS), John Haapala (MWH) and representatives from NMFS. Wayne stated that John (MWH) would be tasked with drafting a 2013 -14 glacier and hydrologic runoff modeling study request for submittal to stakeholders on March 23, 2012.

### *Water Quality*

Paul Dworin (URS) stated that useful water quality data had been collected during the 1980s in the Susitna River, as documented in AEA's Pre-Application (PAD) document. These data would be augmented with data collected during 2013-14, and a water quality model would be developed to simulate existing and with-Project conditions over the range of flows measured during the period of record. Paul (URS) stated that some parameters would be measured continuously, e.g., temperature, dissolved oxygen, pH, and specific conductance, and others, such as metals, would be sampled discretely.

Paul (URS) stated that it would be important to measure water quality throughout the year to detect any factors that could be limiting fish use, e.g., possible anoxic conditions in some sloughs during winter. Wayne (AEA) stated that water quality sampling would need to be conducted in habitats where fish are present and where fish are absent for results to yield valuable information about fish habitat use.

The workgroup discussed the timing of the pilot thermal imaging assessment, which would be undertaken to identify areas of groundwater upwelling. Michael (GWS) stated that the pilot study, and likely any subsequent thermal imaging studies, should be conducted in early fall. Temperature differences would be difficult to detect during summer because water is well mixed

during high flows. In the early fall, flows would be low and the differences between groundwater and surface water temperatures would be pronounced. Michael (GWS) added that when conducting thermal imagery it would be important to have an understanding of geologic controls in the system, i.e., locations where bedrock is likely to be forcing groundwater to the surface. Paul (URS) agreed that it would be useful to develop a set of predictors regarding the potential locations of upwelling.

Joe (ADF&G) stated that from a fish habitat suitability perspective, it would be important to differentiate between areas of true groundwater upwelling and areas where subterranean flow from the river channel is reemerging, the former being more important for providing year-round thermal refugia. Michael (GWS) stated that it should be relatively straightforward to differentiate between the two, because temperature and conductivity differentials between true groundwater and surface water will make it apparent where groundwater is emerging.

Craig Addley (Cardno-ENTRIX) said that temperature data from the 1980s could be evaluated in an attempt to fine tune the timing of the pilot study. Wayne (AEA) stated that it would be critical to document changes in thermal baseline since the 1980s data were collected, given that some degree of channel change has occurred.

Rob Plotnikoff (Tetra Tech) stated that it would be important to document mercury sources under existing conditions, adding that a single tributary could be the major source of mercury levels in the proposed Project area. Rob (Tetra Tech) recommended that multiple media (e.g., surface water and pore water) be sampled to assess metals concentrations, and that a pathways model be developed to identify potential bioaccumulation mechanisms and the Project's potential effects on those mechanisms.

Referring to the analysis of mercury levels in fish tissue, Harry Gibbons (Tetra Tech) asked whether AEA envisioned evaluating whole body burden or muscle tissue only. Craig (Cardno-ENTRIX) replied that the agencies' primary concern was human health, and as such, documenting muscle tissue concentrations would be most relevant.

Jan Konigsburg (NHI/HRC) questioned whether metals data from the 1980s were still valid, given that analytical methods have improved since that time. Paul (URS) replied that some analytical methods for metals detection are similar to what they were in the 1980s, but in instances where detection methods have improved significantly, additional data would need to be collected. In addition, metals concentrations will have likely changed, making it important to sample adequately to characterize existing conditions.

Sue (NMFS) stated that fires are ecologically important in the upper Susitna River basin and that AEA would need to evaluate the relationship between fire and water quality under baseline conditions and address any potential Project effects on that relationship.

Bob Henszey (USFWS) stated that it would be useful to establish observation wells along the river corridor to understand how groundwater influences the extent and species composition of

the riparian zone. Craig (Cardno-ENTRIX) replied that the relationship between groundwater and riparian vegetation would be addressed as part of the Instream Flow Riparian Study.

Betsy (AEA) stated that the water quality program lead would need to coordinate with Michal (GWS) and David Brailey (Brailey Hydro) regarding the placement of pressure transducers, which would also measure temperature, at transects surveyed for use in the hydraulic routing model.

Betsy (AEA) and Craig (Cardno-ENTRIX) noted that it would be important for AEA and its water quality consultants to coordinate soon with the Alaska Department of Conservation (ADEC) to ensure that the proposed water quality sampling design and parameters selected for measurement are adequate. Rob (Tetra Tech) added that it would be important to coordinate with ADEC regarding the content of the Quality Assurance Project Plan (QAPP). Craig (Cardno-ENTRIX) added that it would also be important to contact the USGS to determine what water quality data are being collected at the Tsusena, Gold, and Sunshine gaging stations.

Wayne (AEA) requested that URS/Tetra Tech develop a recommendation regarding the approach to water quality modeling, including which model to use and what variables to model and why. Craig (Cardno-ENTRIX) added that whatever water quality model is selected, it must have flow routing capability, interface with the other models being applied as part of the study program, and be capable of accounting for the effects of ice. Effects of tributary inflows on mainstem water quality would also need to be accounted for in the model. Andrew Parker (Tetra Tech) stated that CE-QUAL-W2, as modified by Alberta Environment and Water, would likely be the best choice. Craig (Cardno-ENTRIX) stated that Tetra Tech should recommend a few models, comparing and contrasting their capabilities and limitations. Based on this, AEA and the stakeholders would decide which model best addressed the needs of the study program. Craig (Cardno-ENTRIX) reminded the group that the output from the reservoir water quality model would serve as the upstream boundary condition for the riverine water quality model, so that approaches used in the two environments would need to be compatible.

Mike (USFWS) noted that in its PAD, AEA had proposed a multi-level Project intake to enable withdrawal of water from different depths within the reservoir to manage the downstream water temperature regime. However, if the low-level outlet were to be used discharges to the river would reflect temperature and other water quality conditions near the reservoir's bottom, which could have adverse effects on aquatic biota in the river. Wayne (AEA) replied that the low-level intake represented an approach to flow release that would only be used under extreme, very rare circumstances, perhaps in the event of a transmission system outage. However, it might be necessary to engineer the low-level intake so that water can be withdrawn from higher in the water column, to prevent adverse effects on riverine biota in the event of an emergency. Craig (Cardno-ENTRIX) stated that it would likely be a good idea to design the multi-level intake so that it could supply water to the bypass.

### **Action Items**

- AEA agreed to schedule a teleconference with NMFS in March 2012 to discuss the approach to glacier and hydrologic runoff modeling.
- AEA stated that John Haapala (MWH) would be tasked with drafting a 2013 -2014 glacier and hydrologic runoff modeling study request for submittal to stakeholders on March 23, 2012.