SUSITNA-WATANA HYDRO

Meeting Notes
Instream Flow Technical Meeting
03/21/2014

LOCATION:	**Alaska Energy Authority – Board Room** **813 West Northern Lights Blvd.** **Anchorage, AK 99503**
TIME:	**1:15 p.m. – 4:15 p.m. (AKDT)**
SUBJECT:	**Technical Team Meeting on HSC/HSI Curve Development and IHA (Study 8.5)**
Goal	**To collaborate on Habitat Suitability Criteria (HSC) and Index of Hydrologic Alteration (IHA) topics as identified in the Study Plan; provide an update on HSC curve development and IHA candidate metrics.**
ATTENDEES:	**Joe Klein** ADF&G, **Kathryn Peltier** McMillen, **Phil Hilgert** R2, **Justin Crowther** AEA, **Betsy McCracken** USFWS, **Dara Glass** CIRI, **Lori Verbrugge** USFWS, **Betsy McGregor** AEA, **Scott Crowther** Ratepayers
ON PHONE:	**Stormy Haught AD**F&G, **Dudley Reiser** R2, **Sue Walker** NMFS, **Mike Gagner** R2, **Alice Shelly** R2, **Chris Holmquist-Johnson** USGS, **Sharon Kramer** CIRI, **Matt Cutlip** FERC, **Greg Auble** USGS, **Kim Sager** ADNR, **Matt Love** VNF, **Leanne Hansen** USGS

The purpose of this meeting was to collaborate on Habitat Suitability Criteria (HSC) and Index of Hydrologic Alteration (IHA) topics as identified in the Study Plan; provide an update on HSC curve development; and discuss IHA candidate metrics.. Through this collaboration, AEA hopes to include input from licensing participants into the final ISR section 7 (plans for completing the study). Comments and suggestions are welcomed by AEA and can be provided by contacting Betsy McGregor (BMcGregor@aidea.org).

The following meeting notes are intended to capture any significant discussion/information in addition to the materials provided on the Project website (http://www.susitna-watanahydro.org/). The meeting agenda and materials are available under the "previous meetings" tab (link provided under the meetings tab) on the Project website.

Instream Flow HSC Curve Development Presentation– M. Gagner/A. Shelly

Review of 2013 findings

- The IFS Study 8.5 draft ISR includes the data collected in 2013.
- The 7 downstream Middle River Focus Areas were sampled in 2013 (upper 3 Focus Areas were not sampled due to potential access restrictions).
- The graphic on slide 12 shows an example plot of an HSC grid. The stars represent locations where a distinct group of fish were identified.
- At each site, utilized area was identified, and habitat measurements were taken at utilized locations and at random locations along transects in the area of availability.

- Blue dots do not necessarily mean that the location is suitable habitat. The characteristics of an area deemed suitability are determined from the locations of fish utilization.

- Slide 14 – The number of observations targeted was 100.

- Chris Holmquist-Johnson asked if the locations utilized by fish in 2013 data compares to that identified in the 1980s. Mike Gagner said that this HSC/HSI study was designed to identify the depth and velocities associated with fish observations but was not designed to evaluate fish distribution and abundance (FDA), but suggests looking at FDA data (Study 9.6) for a better/more appropriate comparison.

Statistical methods proposed for curve development

- The primary addition to technical HSC content in the ISR will be a discussion provided by Alice Shelly (statistician).

- Greg Auble suggested trying different suitability models with the fish data sets to determine the best model for the study. Joe Klein supports this approach. Alice Shelly said that they looked at alternate models intensely and believes that the best path is being taken.

- Slide 17 – Univariate HSC assume predictors are independent of each other and equally weighted, making that approach less attractive for this study.

- Slide 22 – Joe Klein warned against reporting the units for VHG measurements since they are not standardized to a uniform depth. Rather, say that the upwelling/ downwelling was positive, neutral, or negative and that distinction is determined if the VHG was greater or less than a specific threshold. Mike Gagner will coordinate with the Groundwater Study to determine upwelling/downwelling throughout the Focus Areas. The Proof of Concept meeting will discuss groundwater integration further.

- Mike Gagner said that based on his observations of chum salmon spawning was generally in areas with upwelling rather than downwelling.

- Greg Auble stated that there is no standard way to complete the statistical analysis but simply recognize the strengths and weaknesses of different methods and document all decision points.

- Leanne Hansen asked if residuals are being looked at when selecting a model. Alice Shelly said that residual analysis is part of the modelling.

- "Site" on slide 25 refers to a macrohabitat unit.

- Betsy McCracken said that an ADF&G document had noted spawning in the "mainstem". She will check their nomenclature to see if they defined mainstem versus main channel since AEA has made a distinction (i.e., mainstem includes off-channel habitats, while main channel does not).

- Greg Auble said that AEA's modeling approach is commendable, but he will continue to question the details. Joe Klein will ask the ADF&G statisticians to review AEA's approach once they are available (late summer likely). AEA encourages input. Although they are moving forward with the approach, they are available to consider comments and suggestions.

- Slide 31 shows that univariate models giving the same weight to velocity, substrate and upwelling show less influence of substrate than the multivariate model.

- The initial conclusions on slide 32 will be refined with future data.

- Based on current data, there are some questions about how upwelling influences a specific site of spawning. Some spawning sites were not at an area of upwelling detected with the VHG device, but neighboring upwelling may be an influence.

- Leanne Hansen asked if a correlation analysis was performed to see if a combination of parameters affected the spawning location. Alice Shelly said that they looked into it, but did not see as strong of a correlation as expected. If someone would like to see a specific type of correlation analyses, Alice Shelly asked that they request it through AEA.

- Chris Holmquist-Johnson requested a plot showing which variables were determined not significant.

- Joe Klein mentioned that the VHG device may not detect a particular magnitude of upwelling. The fish may be able to respond to upwelling not detectable with the device; and the VHG could vary and not be detected during the sampling event. Greg Auble agreed that AEA should look at VHG sensitivity.

- Slide 36 - Joe Klein doubts that a sufficient amount of historic data will be available for some species/life stages. Mike Gagner agreed and said that future discussions will be necessary once those data gaps are known.

- A technical memo or appendix will be submitted with the final ISR to discuss the Proof of Concept details, which will include the HSC curves.

- Because it will be challenging to sample sufficient numbers of some species/life stages on slide 37, it will not be possible to create site-specific preferences curves for all species and life stages (slide 38). Alternative methods will have to be used for many of the target species and life stages. Phil Hilgert said that eulachon may be moved from low to moderate priority since the eulachon study will be collecting habitat/HSC data.

- Slide 39 - Mike Gagner said that the HSC curves will be applied based on species and life stage periodicity.

Plans for 2014 data collection

- In addition to 2013 sample sites, the Lower River and three upstream Middle River Focus Areas (access dependent) will be sampled in 2014.

Instream Flow Indicators of Hydrologic Alteration (IHA) – P. Hilgert/M. Tiedemann

IHA will help guide development of post-Project operations by quantifying flow changes compared to existing conditions. The analyses will use the output from the operations model and routed downstream using the Open-water Flow Routing Model. AEA encourages licensing participants to comment on the proposed parameters and indicated that IHA analyses will begin in earnest when Version 3 of the Open-water Flow Routing Model is developed in 2015.

Update – IHA overview and candidate metrics (including Hydrologic Alteration Factor)

- The flat lines on slide 21 shows incomplete data from historic discharge data. Although 61 years of data is available, there are 50 years with minimal data gaps.

- Lori Verbrugge asked if snap models are being used to analyze climate change effects for future modeling. Betsy McGregor said that they are not although DGGS is using a climate change model to estimate temperature and rainfall effects on reservoir input (Study 7.7). Joe Klein suggested applying climate change to the historic hydrograph to predict future conditions and model those rather than model the same 50 years of historic data. Phil Hilgert said that he will ask John Haapala of the inputs and capabilities of the operations model.

Action Items	Responsibility
John Haapala-MWH to identify whether the historic hydrograph will be modified for climate change when the hydrologic records are used as input to the reservoir.	Phil Hilgert