



SUSITNA-WATANA HYDRO

Draft Meeting Summary Fish and Aquatic Resources Technical Workgroup Meeting 25 October 2012

LOCATION: Alaska Energy Authority Main Office
813 West Northern Lights BLVD
Anchorage, AK 99503

TIME: 8:30am – 4pm (AKDT)

SUBJECT: **Water Resources Studies & Geology and Soils Study Plan Updates**

ATTENDEES: **Dudley Reiser R2, Betsy McGregor AEA, Kathryn Toews LVA, Joe Klein ADF&G, Hannah Ramage ARRI, Michael Barclay HDR, MaryLouise Keefe R2, Justin Crowther AEA, Sandie Hayes AEA, Bill Fullerton Tetra Tech, Leslie Jensen ARRI, Rob Plotnikoff Tetra Tech, Harry Gibbons Tetra Tech, Dani Evenson R2, Keri Lestyk HDR, Brian Bjorkquist AGO, Jack Erickson ADF&G, James Brady HDR, Mike Buntjer USFWS, Eric Marchiegioni USDA, Tim Sundlov BLM, Stormy Haught ADF&G, Michael Lilly GWS, Jan Konigsberg HRC, Marie Steele DNR, Mandy Migura NMFS, Brian Lance NMFS**

ON PHONE: **David Turner FERC, Fred Winchell Louis Berger, Dirk Peterson Stillwater, AJ Keith Stillwater, Chuck Sensiba VNF, Kim Sager DNR, Steve Padula LVA, Ethan Bell Stillwater, Wayne Dyok AEA, Sue Walker NMFS, Angela Percival Stillwater, Mark Birch DWC, AJ Keith Stillwater, Tim Nightengale R2**

AEA PSP and ILP Study Plan Process (Dudley Reiser, R2)

The purpose of today's meeting was to provide an overview of to-date revisions made to select PSPs. Dudley Reiser reviewed the RSP schedule, Project updates, and today's 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, if changes to the PSP have not been significant based on comments received to date, only the original PSP is available. Live links to these documents are imbedded in the spreadsheet. Within each draft RSP is an updated schedule, a figure showing interdependencies among studies, and a consultation table showing comments to-date along with AEA's responses.

Habitat Characterization Study (MaryLouise Keefe, R2; Michael Barclay, HDR)

MaryLouise Keefe introduced the Habitat Characterization Study (Habitat Study) presentation available at <http://www.susitna-watanahydro.org/wp-content/uploads/2012/10/Aquatic-Habitat-Characterization.pdf>. Many of the comments received to date and responses are included in Slides 2 and 3. MaryLouise explained that many comments received on the Habitat Study ask for further



SUSITNA-WATANA HYDRO

detail. AEA has been working on additional details which are provided in the draft RSP. One commenter inquired why the USFS protocol will be used to characterize the habitat. MaryLouise explained that this is a standard protocol used widely in Alaska, and it generates a comparative data set based on a consistent set of parameters to characterize riverine habitats. AEA has also added the edge habitat concept to the Susitna-Watana habitat classification system for use in this study.

Michael Barclay said that lessons-learned from 2012 field efforts have prompted some detail changes to the PSP. On Slide 6, Michael Barclay showed that the red text indicates items not included in the PSP but present in the draft RSP.

Michael Barclay explained that the advantage of using aerial video is the ability to access areas that would not be accessible by foot or by boat. The 2012 videography efforts took place in excellent conditions and the result is good quality video at approximately 100-400 feet elevation above the ground and traveling about 15-40 miles per hour, depending on stream size. Michael Barclay explained that generally at these speeds and elevation, habitat will be sampled about every 80-150 feet. These samples will be taken from the video using a frequency analysis where habitats are characterized along systematically delineated video transect habitats. Hannah Ramage asked if the mesohabitat characterization will be accurate when sampling at only one flow. Michael Barclay explained that when mapping mesohabitats, a low to moderate flow is ideal because the driving factors of underlying channel morphology can be identified to infer the habitat at that location. If the river flow is higher than average, the mesohabitats may become uniform and cannot be differentiated. If the river is at an especially low flow, the aquatic habitats may not be present and only substrate may be seen. MaryLouise Keefe added that low flow often is considered a limiting condition for fish populations and thus low flows have additional value when characterizing aquatic habitat. Michael Barclay said that the fish sampling would be conducted at a low to moderate flow, so mapping at a similar flow is most useful. Bill Fullerton added that the Geomorphology Study will be delineating habitat at three flows.

Michael Barclay explained the process of characterizing mesohabitats. Multiple (approximately 5-12) photo examples of each mesohabitat will be used as a type index and referenced when determining a particular sample's classification. There will be variability within each habitat type and that variability will be captured in the type index photographs. Slide 8 lists all tributaries and mainstem river miles videoed in 2012. Michael Buntjer asked about the differentiating feature between a cascade and rapid, and Michael Barclay identified it to be primarily the slope. The specifics are available in the draft RSP.

Slides 9-13 consist of photo examples of numerous mesohabitat types in the Susitna River. Slide 13 shows the results of a test to see if it is feasible to map the lower river using aerial video. Michael Barclay said that to contain the entire main channel and lateral habitats, one would need to fly at over 2,200 feet above the ground. If traveling at the preferred 400 feet, at least five passes would be required to cover the entire river width (including lateral habitats), adding room for mistakes in overlapping the images. MaryLouise Keefe said that because of the complexity it is not practical to map the lower river to the mesohabitat level; instead, the lower river will be mapped to mainstem habitat level using aerial imagery.

Slides 14 and 15 show a revised nested habitat type classification system for tributaries. Some areas will be sampled using aerial video as well as ground sampling to verify mesohabitat types. Slide 17 includes a similar classification system for the Susitna River mainstem. MaryLouise Keefe agreed to



SUSITNA-WATANA HYDRO

add “rapids” to the mainstem classification system. She explained that if encountered, additional mesohabitat types can be added. Per Joe Klein’s request, Michael Barclay will be looking into the necessity of differentiating between alcove and backwater habitat types.

A sample of line mapping is included in Slide 18. Michael Barclay said that a new identification number will be given every time the habitat changes along the river. The results for the middle river will be available to the Instream Flow Study prior to 2013. In addition, he noted that edge habitat would be quantified from the video. The length of edge habitat will be calculated as double the unit length but may be refined once the Geomorphology Study creates polygons for each segment, by calculating the actual edge length. Bill Fullerton said that the actual edge length will not be available prior to 2013 so the current numbers will remain as placeholders until refinement is possible.

Slide 19 shows an example of how data could be presented. Hannah Ramage mentioned the difficulty of classifying habitats that may change with changes in flow/stage and asked how that will be addressed. In particular, Hannah mentioned a side slough becoming a side channel at higher flows. Dudley Reiser clarified that the Habitat Study will be identifying such a situation as a side slough that is overtopped at high flow, as opposed to changing the nomenclature under different flow conditions. Michael Barclay added that the video was taken at 10,000-11,000 cfs which will be the reference condition for habitat mapping and characterization. MaryLouise Keefe mentioned that distinctions between sloughs and side channels will also be verified by field crews during sampling. Betsy McGregor indicated that the video will be publicly available at DNR’s website in multiple files (total play time combined is three to five hours). Also, in the draft RSP, a link is provided to Michael Barclay’s preferred video viewing software for free download.

Fish Distribution and Abundance Middle/Lower River (MaryLouise Keefe and Dani Evenson, R2)

MaryLouise Keefe introduced the Fish Distribution and Abundance in the Middle and Lower Susitna River Study presentation, which is available at <http://www.susitna-watanahydro.org/wp-content/uploads/2012/10/Fish-Distribution-and-Abundance.pdf>. She explained that there were many comments addressing both upper and middle/lower river studies, so the comment/response tables were combined. MaryLouise summarized some of the key comments and AEA’s responses in Slides 3-10. She explained the habitat-based sampling approach in sites randomly selected within a habitat classification. She said that graphics and detailed text had been added to the draft RSP to further explain the study.

MaryLouise Keefe explained that AEA has added an objective (black text on Slide 12) addressing salmon early life history, timing, and movements. This objective links directly with the varial zone modeling in the Instream Flow Study. Also, MaryLouise explained that an objective was added for the winter-spawning species such as burbot. She added that it is no longer proposed to sample for population estimates based on discussion with USFWS and ADF&G. This decision was made at a workgroup meeting where licensing participants found it more advantageous to add effort to other objectives of the fish distribution and abundance studies.

Dani Evenson reviewed PSP revisions in Slides 13-18. Emergence timing sampling (Slide 13) will be conducted in areas known for chum and sockeye spawning. These areas will be sampled monthly until temperatures reach a level associated with emergence, when sampling will increase to bi-weekly.



SUSITNA-WATANA HYDRO

When reviewing Slide 14, Jack Erickson questioned if DIDSON will capture individuals less than 50 mm. Dani Evenson said that will be determined in the pilot study this winter. Joe Klein said that this size criteria may be too limiting and larger individuals may be at risk of trapping/stranding equally to those less than 50 mm. Dudley Reiser explained that fish smaller than 50 mm are known to burrow into the gravel as down ramping occurs. This makes them very susceptible to stranding and trapping. He added that other size classes will not be ignored if observed.

When discussing day/night activity of fish (Slide 15), MaryLouise Keefe explained the lack of previous studies in ice-prone areas regarding salmon activity.

MaryLouise Keefe explained that prior to field work, periodicity charts will be created using existing data for all species. Dani Evenson added that all 1980s procedure manuals will be reviewed as well as information from ADF&G regarding successful and failed methods to gain a better understanding of how to approach fish collection.

Slides 21-24 provide a visual representation of site selection by strata. MaryLouise Keefe explained that it is currently unknown if all mesohabitats are present in each reach of the river. The number of sampling sites (in parentheses) may be redistributed at the mesohabitat level to a ratio representative to the applied reach. MaryLouise said that the goal is to have six sample sites at each main channel habitat with the sampled mesohabitats distributed proportionately.

Jack Erickson asked how “hard to catch” species, such as lamprey and sculpin, will be addressed and if specific gear will be chosen to focus on them. MaryLouise Keefe said that with the extensive sampling program planned, over 150 sites sampled monthly, she would expect they would encounter all fish present even if only in small numbers.. She said that the planned intensity of sampling is high, and the crews will be in the water most days of the year, making the collection of such species probable. However, if a certain species warranted specific consideration, it should be brought forth and a specific objective considered, similar to the winter spawning species objective mentioned earlier.

While reviewing the schematic for lower river site selection (Slide 24), MaryLouise Keefe explained the limitations of habitat classification in the lower river. She said that there is less understanding of potential Project effects in this area and that the mapping is less precise due to the area’s complexity. MaryLouise said that because of this, it may be better to focus sampling sites in lateral habitat in the upper portion of the lower river. This aspect of the plan is still under consideration but will be made clear in the RSP.

Dani Evenson explained that sampling is proposed in the upper river in 25% of the accessible tributaries, with an initial preference for those sites being within the known as Chinook salmon distribution. She added that if spawning areas in the inundation zone are identified, species-specific efforts may be added as necessary. Radiotelemetry will be conducted in the Upper River. MaryLouise Keefe added that there may be a need for smaller, shorter-life tags for seasonal tagging efforts. Currently, multiple tagging events are proposed for both the upper and lower river sections. Mike Buntjer asked the value of tagging fish in the Upper River since that habitat will be converted to a reservoir post-Project. MaryLouise added that the Fish Passage Feasibility Study will use information from telemetry studies conducted above the Project.

Tim Sundlov asked if lamprey should be included as a targeted rare species. He explained that electrofishing can be used to target lamprey if that need occurs. Hannah Ramage said that an



SUSITNA-WATANA HYDRO

objective may be needed to address the presence of lamprey. Little is known of them, and because they seem to require specific sampling methods, they may be overlooked with more general fish collection. MaryLouise Keefe said that the need for lamprey-specific sampling will be considered by AEA.

Slides 1 and 2 of the fisheries interdependency flow chart (available at <http://www.susitna-watanahydro.org/wp-content/uploads/2012/10/Fisheries-Interdependnecy-Flow-Charts.pdf>) include the interdependency figures for the fish distribution and abundance studies. It was agreed that for both figures, “Mercury Assessment and Potential for Bioaccumulation Study” should be added to the bottom right as a recipient of fish distribution and abundance data. It was also agreed that “Cross Disciplinary Studies” on the top row should be replaced with “Fish and Aquatics Instream Flow Study”.

Jan Konigsberg asked if an estimated mortality of egg-to-fry and fry-to-smolt will be calculated based on Project effects. MaryLouise Keefe explained the purpose of this study is to provide baseline data and it does not include such an objective. She added that it would be very complicated and likely not possible to develop a specific prediction of mortality by life stage.

River Productivity (MaryLouise Keefe and Tim Nightengale, R2)

MaryLouise Keefe introduced the River Productivity Study presentation (available at <http://www.susitna-watanahydro.org/wp-content/uploads/2012/10/River-Productivity.pdf>). She explained that Mark Wipfli of UAF will assist AEA with the River Productivity Study Plan. MaryLouise summarized comments and responses on Slides 2-9.

MaryLouise Keefe explained that the use of a surrogate system had been requested. A surrogate system is one which would later represent the Susitna River as if the Project were present. After much consideration and research it has been concluded that a system does not likely exist in Alaska with the necessary characteristics to allow it to be considered as a surrogate to the Susitna River. Synthesis of existing literature will cover this concept.

Study of the stream’s metabolism was requested. Although stream metabolism is not being directly studied, MaryLouise Keefe explained that a rigorous approach will be undertaken to evaluate river productivity, including bioenergetics modeling and isotopic analysis of prey species.

Tim Nightengale explained AEA’s response to ADF&G’s request for reference sites on Slides 10 and 11. Reference sites are sites similar to areas in the Project-affected area of the Susitna River that can be monitored before, during, and after Project construction. Parameters of a reference site can be compared to an associated site on the Susitna River to monitor possible change. He explained that the Talkeetna River includes areas most like the middle river portion of the Susitna River. Tim explained that these sites will be studied in the spring, summer, and fall using the same methods that are applied to the Susitna River. Discussion ensued regarding the request for a Before After Control Impact (BACI) design. MaryLouise Keefe explained that BACI designs are now requiring many more years of data than originally thought to be reliable. She added that sample sites in the upper river area of the Susitna River will also be sampled and may continue to be sampled as reference sites if needed. Rob Plotnikoff indicated that the proposed design would be adequate if a BACI approach was desired.



SUSITNA-WATANA HYDRO

Tim Nightengale presented Slide 13, which explains the growth rate potential (GRP) model. Stormy Haught suggested changing northern pike to sculpin. He said that northern pike may be difficult to locate in the middle river area due to a velocity barrier downstream that limits their distribution. MaryLouise Keefe said that she would consider that and noted the need to review available literature for whatever species is chosen.

Tim Nightengale explained that stable isotope analysis can identify the contribution of marine-derived nutrients as well as freshwater-derived nutrients. This analysis can be conducted on terrestrial drift, algae, fish, and possibly fish stomachs. Stormy asked if tissue plugs will be taken from juvenile fish and if so, AEA should consider mortality and permitting requirements. MaryLouise Keefe agreed to look into that.

Emergence traps are explained on Slide 14 with a photo. Tim Nightengale explained that this instrument collects emerging aquatic insects, a product of aquatic insect production from the stream, which will serve as a surrogate measure for actual production. Checking and resetting the traps monthly from April through October is proposed.

MaryLouise Keefe explained that the number of stations changed from nine in the PSP to six in the draft RSP due to a shift in focus on more rigorous sampling at fewer stations. Joe Klein asked what UAF's perspective on the fewer stations was. MaryLouise said that Mark had indicated that sampling four sites (two above the proposed Project and two below) would be sufficient. Stormy Haught said that he may prefer more stations below Devils Canyon due to the added presence of fish there. MaryLouise asked if it would be adequate to conduct community-based sampling only, and Stormy agreed it would be adequate.

Stormy Haught asked how the crew would conduct benthic sampling in high flows. Tim Nightengale explained that newly inundated areas are not colonized immediately and sampling would wait until that area is inundated for the necessary time for colonization (estimate is one month until site specific colonization rates are available). MaryLouise Keefe said that details will be added to the RSP.

Cook Inlet Beluga Whales (Keri Lestyk, HDR; Michael Link, LGL)

MaryLouise Keefe summarized the comments addressing the Cook Inlet Beluga Whales Study (Beluga Study). She said that most comments request a reevaluation of the study area, additional and more frequent aerial surveys, and passive acoustic monitoring for beluga presence in the winter. Keri Lestyk said that passive acoustic monitoring may prove difficult because the equipment would need to be installed far from the belugas due to ice scour. She said that during the winter, belugas will be assumed as present and foraging.

Keri Lestyk explained that the objectives of the Beluga Study (Slide 3) have not changed since the PSP, but many details have been added to the draft RSP. Keri explained that the study area has been reduced to the Susitna River delta (Slide 5 provides a map showing that area), based on previous meetings held with NMFS and ADF&G. She specified that the Beluga Study will be collecting data up to river mile 50. By reducing the study area, Keri explained that survey times were shortened. The survey frequency was increased, allowing for additional surveys in critical months for belugas. These times include May/June for feeding as well as July/August for calving and breeding. Keri explained that four-hour surveys will be broken up with two hours during high tide and two hours during low tide, if possible.



SUSITNA-WATANA HYDRO

Slide 8 addresses the remote live-feed camera system. Keri Lestyk explained that these cameras provide information on an individual's behavior and feeding activities, while aerial surveys focus more on the group behavior. These cameras may capture group composition better than aerial surveys in regard to calves. Aerial surveys will be conducted simultaneously for cross-checking. Aerial surveys will be conducted visually at a 1,000-foot elevation above the ground. A camera and camcorder will be available if found necessary and multiple passes may be needed for large groups.

Keri Lestyk introduced a proposed model presented in the draft RSP on Slide 9. She explained that the Ezra model, which had been previously considered, is not predictive. Mandy Migura asked if the proposed model would address potential Project effects to the substrate in the delta. She explained that beluga whales utilize channel morphology to ambush their prey and could potentially be affected by changes in the channel. Bill Fullerton said that the sediment transport model will be using river mile 75 as the downstream boundary. He added that if effects are seen to possibly extend past river mile 75, the model may be extended as well. Bill explained that the Chulitna River and Talkeetna River have such high sediment input that any changes in the Susitna upstream of the Three Rivers Confluence may have a relatively small effect, especially as far downstream as the delta. This is why the current downstream boundary of the modeling effort for Project effects on sediment is just downstream of the Three Rivers Confluence. Also, the geomorphology in the delta relied on by the belugas may be due to a localized phenomenon such as tides, which will not be affected by the Project.

Keri Lestyk presented the interdependency chart for the Beluga Study (Slide 13 of the fisheries interdependency flow chart available at <http://www.susitna-watanahydro.org/wp-content/uploads/2012/10/Fisheries-Interdependnecy-Flow-Charts.pdf>). Mandy suggested adding the Salmon Escapement Study as an input.

Angela Percival suggested that Keri Lestyk reference Hansen and Hubbard (1999) and Rugh (2000). Keri agreed to look at those papers.

Hydrology Update (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 are based on a conservative assumption that the Project would be utilized to provide all the 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 will be utilized to meet portions of 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 and during ice-free, open water conditions. The stage effects are more extreme in the confined reaches where the USGS gages are located and would dissipate in wider neighboring reaches. The 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. The last group of slides shows the stage with and without the Project, using 1984 flow data.

Action Items

AEA Consultants will add "rapids" to the mainstem classification system.



SUSITNA-WATANA HYDRO

Michael Barclay will look into the necessity of differentiating between alcove and backwater.

AEA will consider the need for lamprey-specific sampling.

AEA Consultants will add “Mercury Assessment and Potential for Bioaccumulation Study” to the bottom right of the interdependency figure for both fish distribution and abundance studies as a recipient of fish distribution and abundance data.

AEA Consultants will replace “Cross Disciplinary Studies” with “Fish and Aquatics Instream Flow Study” at the top of the interdependency figure for both fish distribution and abundance studies.

AEA will consider replacing northern pike with sculpin in the growth rate potential (GRP) model.

The Salmon Escapement Study will be added as an input in the interdependency figure for the Beluga Study.

AEA requested a meeting be scheduled with licensing participants regarding the Eulachon Distribution and Abundance in the Susitna River Study and the proposed model to evaluate potential Project effects in the delta. Mandy Migura requested it be on Friday, November 2.