Meeting Summary
Susitna-Watana Hydroelectric Project Licensing
Water Resources Workgroup Meetings
June 14, 2012
AEA Project Offices, First Floor Conference Room
411 W 4th Avenue, Anchorage, AK

Stakeholder PAD Comments/Study Requests and Study Plan Development for Ice Processes and Geomorphology, June 14, 2012, 9:00 am - 1:00 pm

Attendees:

Organization	Name
AEA	Betsy McGregor
AEA	Wayne Dyok
AEA	Brian Carey
USFWS	Bob Henszey
USFWS	Bill Rice
USFWS	Mike Buntjer
NMFS	Susan Walker (by phone)
BLM	Dave Mushovic
Coalition for Susitna River Dam Alternatives	Becky Long
EPA	Matthew LaCroix
EPA	Lisa McLaughlin
ADF&G	Joe Klein
ADF&G	Ron Benkert
ADF&G	Stormy Haught
ADNR	Terry Schwarz
NPS	Cassie Thomas
USGS	Dave Meyer
Natural Heritage Institute/Hydropower Reform Coalition	Jan Konigsburg
FERC	David Turner (by phone)
FERC	Paul Makowski (by phone)
Long View Associates	Steve Padula
Long View Associates	Bao Le
HDR	Bob Butera
HDR	Ingrid Corson
R2 Resource Consultants	Dudley Reiser
R2 Resource Consultants	Kevin Featherston
R2 Resource Consultants	Phil Hilgert
GW Scientific	Michael Lilly
ARRI	Jeff Davis (by phone)
Watershed Geodynamics	Kathy Dube

Organization	Name
Tetra Tech	Bill Fullerton
Tetra Tech	Mike Harvey
Tetra Tech	Bob Mussetter
Tetra Tech	Christy Miller
E-Terra	Lars Gleitsmann

Presentations

- None.

Introduction

Steve Padula (Long View Associates) acknowledged the receipt, by AEA, of stakeholder comments and study requests and noted that many of them were consistent with the study requests developed by AEA. Steve Padula stated that the goal of the meeting was to seek clarification regarding any stakeholder comments that would require the development of new studies, additional study tasks or differing approaches to existing study methods.

Geomorphology Studies

Kathy Dube (Watershed Geodynamics) began the discussion by addressing a NPS request for a study of dust generated in the reservoir fluctuation zone, roads, and the Lower Susitna River. Kathy stated that to calculate dust from road activity, EPA procedures would be used. For wind erosion potential, Kathy Dube noted that the study is proposing to use USDA/NRCS procedures that have been applied to calculating erosion from croplands using climate and soil properties. Cassie Thomas (NPS) stated that her concern was with the fine glacial flower that will be deposited around the reservoir and when combined with high wind events could create fine particulate suspension. Despite few people living in the immediate vicinity of the Project, this could impact recreationists and residents in other areas. Kathy Thomas added that the issue is an air quality issue and potentially a wildlife issue. Kathy Dube requested confirmation that the areas of interest relate to how much fine particulate matter could be generated, mobilized in the air, and how far it might travel. Kathy Thomas concurred and added that the season of interest is spring into summer when the reservoir is low and filling. Wayne Dyok (AEA) stated that AEA could address this issue. Kathy Dube asked who could serve as a resource if more information was needed. Kathy Thomas stated that the recreation consultants may be the best source of information. Betsy McGregor (AEA) added that Bridget Easley and Paul Dworian (URS) could provide information on meteorological stations that will have wind data.

A comment was received by FERC requesting that studies consider deep rotational and block failure as part of the mast wasting/erosion along the reservoir shoreline. Kathy Dube stated that there are two studies being conducted; a study on large failures and dam safety by MWH and a study on shallow slide components of erosion which she is conducting. Paul Makowski (FERC)

asked where the MWH write-up could be found so that he could make FERC dam safety staff aware of its availability. Wayne Dyok replied that this information would be included in the PSP.

A comment was received from Trout Unlimited requesting that erosion from new road construction be evaluated. Kathy Dube stated that she would be calculating erosion and sediment delivery to streams at road crossings as part of the geomorphology work. Kathy Dube also stated that one could model erosion from entire road surface and link this to receptors of interest if those were identified. David Turner (FERC) stated that following up with Trout Unlimited would be appropriate. Kathy Dube stated that she would follow up with Trout Unlimited to identify the potential receptors of interest.

A comment was received from FERC regarding the effect of glacial surge on contribution to reservoir sediment accumulation rates. Bill Fullerton (Tetra Tech) stated that this issue was first introduced by Dr. Harrison (University of Alaska, Fairbanks) at a scoping meeting, has been included as an objective in the study plan, and will be evaluated in a stepwise manner. Mike Harvey (Tetra Tech) stated that the evaluation can only occur if Dr. Harrison can provide the necessary information. Mike Harvey added that in general, he is skeptical that glacial surge is a major contributor given that glacial systems are always in a state of transport and near their maximum. David Myers (USGS) stated that the system is energy limited and that there is sufficient river length between glaciers and the proposed reservoir to attenuate any high sediment loads. Mike Harvey reiterated the need to engage Dr. Harrison directly to assess the availability of information. Wayne Dyok stated that he would connect Dr. Harrison with appropriate Tetra Tech staff. Matt LaCroix (EPA) asked whether sediment transport models could run scenarios with large inputs from glacial events. Bob Mussetter (Tetra Tech) replied that the model could but that the critical question is whether such an event is realistic or not. Tetra Tech will consider glacial events and if appropriate, they can pursue it.

A comment was received from NMFS/USFWS to describe sediment removal procedures. Bill Fullerton stated that this is something that is not being evaluated at this point in time since previous work showed the reservoir life is hundreds of years long. Matt LaCroix (EPA) noted that there are concerns with sedimentation and tributary access from Project operations. Matt added that it is conceivable that limited dredging could be necessary. Sue Walker (NMFS) referenced the Oroville Project as an example where sediment wedges. Bill Fullerton replied that part of the reservoir geomorphology study plan is to evaluate processes in major tributaries to evaluate the potential of sediment accumulation as they relate to fish passage barriers. This component of the study will occur in coordination with the reservoir fisheries activities.

A comment was received by the USFWS to digitize river habitat types for three flows in the Middle and Lower Susitna River. Bill Fullerton (Tetra Tech) stated that the current study plan proposes to examine three flows in the Middle Susitna River (23, 12 and 5 kcfs) and one in the Lower Susitna River (36 kcfs). There would be an option to digitize river habitat at the two additional flows in the lower river but this would be dependent upon whether the geomorphology and instream flow work would need to be expanded into the lower river (below the Three Rivers Confluence). At this time, the criteria to determine expansion would be if the model shows

sediment transport and bed response are outside range of the natural variability. Bob Mussetter (Tetra Tech) stated that the relative contribution from upstream is relatively small (since sediment inputs at the Three Rivers Confluence is likely significant) and this needs to be evaluated first. Bill Rice (USFWS) concurred with this is approach but asked why the lower river flow was set at 36 kcfs and not a lower flow. Bill Fullerton replied that 36 kcfs is the middle range of the flows evaluated from the historical assessment. Wayne Dyok asked if the group supported the criteria for the expansion of modeling downstream as outputs outside of the range of natural variability. Matt LaCroix asked that AEA define "natural". Bob Mussetter replied that natural variability criteria would be associated with whether changes associated with the Project create a systematic change or are more consistent with what is currently seen. Matt LaCroix noted that variation occurs at a reach scale and on a seasonal basis and requested that this be considered.

Bill Rice asked what can be expected for bank erosion during load following operations. Mike Harvey replied that in general, load following may have impacts on bank erosion but it depends on specific areas and composition. Overall, Tetra Tech is planning on addressing these issues and can examine bank stability at specific sites. Joe Klein (ADF&G) asked about whether the rate of erosion on LWD pre and post Project will be examined. Kevin Featherston (R2 Resource Consultants) replied that the LWD study will examine size and distribution which will feed into modeling of how load following will affect the changes in patterns of wood mobilization. Michael Lilly (GW Scientific) stated that in the summer time, there is a constant effect of boat wake erosion which should be considered part of the natural variability. Jan Konigsburg (NHI/NHC) asked if boat wake contributions to erosion would be evaluated. Betsy McGregor replied that this would be part of the environmental baseline. Bob Mussetter stated that if this were to be included in the study, data about boat use would be needed. Betsy McGregor noted that the recreation team will be collecting these data. Joe Klein and Michael Lilly added that other studies could also provide additional data. Bob Mussetter will coordinate with Michael/Joe about what types of information would be needed to add this task to their scope of work.

Dave Mushovic (BLM) stated that the discussion seems focused on the lower river but if a reservoir is built, this will create additional boat traffic in this area and that this should be examined as well. Wayne Dyok replied that some information to address this issue is being collected in pieces through a variety of other reservoir resource studies but is not sure if this issue is being addressed explicitly. Paul Makowski (FERC) stated that there is always the option to make adjustments, as necessary, to the study program in the second study year. It may be that after year 1, this is an issue that could be added. Wayne Dyok stated that Kathy Dube's work (erosion) and the recreation data being collected could represent the preliminary phases of a step-wise process. Dave Mushovic supports this approach.

A comment was received from NMFS/USFWS to include two-dimensional model sites to include representation of each riverine habitat type, primary tributary deltas, and an unstable reach. Bill Fullerton asked if the Three Rivers Confluence would be considered a primary tributary delta. Bill Rice stated that he believed the area would be a primary tributary delta and would require two-dimensional modeling. Bill Fullerton replied that modeling this area would

be a very extensive study and believes that fisheries and other data should be collected and evaluated first to identify whether an extensive modeling approach is justified consistent with the step-wise approach being implemented for other aspects of modeling. Matt LaCroix stated that a step-wise approach would be appropriate. Bill Rice stated that this area is of high interest to the USFWS. Joe Klein and Mike Buntjer agreed noting fisheries concerns in the Three Rivers Confluence. Wayne Dyok reiterated Matt's point that an incremental approach would be most appropriate. Bill Rice stated that primary tributary deltas could be discussed further. Betsy McKracken added that she was interested in Indian River and Portage Creek as primary tributaries. Bill Fullerton stated that there are more than one primary tributary and that selection would be driven by fisheries and other environmental information. Christy Miller (Tetra Tech) stated that there has been some two-dimensional modeling done at Talkeetna but only for a specific portion. Michael Lilly added that the railroad may have had additional modeling done in this area as well.

After the break, Brian Carey (AEA) reminded participants that the site visit has been moved the July 26-27th. He requested that those interested in participating RSVP by June 30th. He also asked that participants provide information about sites of interest and specific requirements from federal agency participants about paying for their own participation. Information can be provided to Brian via email at bcarey@aidea.org.

A comment was received from NMFS/USFWS to conduct fluvial geomorphology modeling tied to warm and cold Pacific Decadal Oscillations (PDOs). Bill Fullerton stated that the study is already evaluating the wet and dry years and thought that PDOs would be nested in these years. David Myers (USGS) replied that PDO cycles wouldn't necessarily be represented consistently in wet and dry years. Wayne Dyok stated that AEA will address warm and cold PDOs but stressed the importance of integration and coordination amongst team members to address all issues. Bill Fullerton stated that they will start with the 6 scenarios (wet, dry, and average years and warm and cold PDOs) but as a group, may select a subset that is representative of everyone's concerns.

A USFWS comment was received requesting the use of tracers to assess bed material mobilization. Bill Fullerton stated that for a river this large, this would be very challenging and would likely not yield any useful results due to the inability of finding a significant number of tracers. Mike Buntjer replied that he would consult with Bill Rice on this request. Bill Fullerton stated that he would contact Bill Rice to discuss.

A NMFS/USFWS comment was received requesting a geomorphic evaluation of load following during the winter period. Bill Fullerton stated that if bed is not mobilized in the winter, that there would be no reason to run the model. However, re-suspension and increasing turbidity during a period where you'd see low turbidity could be examined. Matt LaCroix stated that tributaries are not just sediment sources but can also be areas of deposition. Bill Fullerton added that this is why two-dimensional modeling will occur; to examine the dynamics of transport or accumulation at these areas, as needed. As part of the sediment balance exercise, Bill plans to identify the major point sources. Bill Henszey asked if there is a time period where turbidity is

low enough to use LIDAR (green spectrum) to collect data. Bob Mussetter stated that green spectrum LIDAR is still considered to be experimental and has been used successfully in shallow mountain streams with extreme clarity but likely not applicable for this system. Sue Walker (NMFS) stated that this technology should not be dismissed. Lars Gleitsmann (E-Terra) added that aerial photos from just before freeze up (around Oct. 1) show extreme clarity to the river bottom. Bob Henszey reiterated his interest in evaluating if green spectrum LIDAR can be used.

A comment was received by the NRDC requesting that modeling include turbidity and sediment transport. Bill Fullerton stated that sediment routing will look at sediment load and will be routed through the system as a concentration. The model does not "route turbidity." Sediment is related to turbidity but it is not the sole factor. The Water Quality Modeling Study will model turbidity.

Betsy McGregor stated that two technical memos on one- and two-dimensional modeling were prepared by Bill Fullerton and are now available on the Project website.

Ice Processes Modeling Study

Ingrid Corson (HDR) provided an overview of recent field work related to the Ice Processes Modeling Study. Spring ice flights were conducted between March 21 and May 10. In total, 13 helicopter flights surveying RM 234 down to the mouth of the river were completed. Fourteen multigrain cameras were installed, seven flights had GPS tagged video, and 2000 GPS tagged photos were taken. Additionally, GIS data was collected for open leads and ice jams. Currently, the ice processes group is in the office geo-referencing all historical data into a database. All weather data during the surveys is being compiled in an Access database. All data including ARCGIS geodatabase containing ice jams, open leads (points and lines), ice survey hyperlinked to photos, all multigrain camera photos hyperlinked, and all flight lines hyperlinked to video will be available. Ingrid added that this year's ice breakup appeared to be "dull" noting that the break up was so mild that there were rarely interactions with vegetation (3 total observations) and that although ice jamming occurred, nothing out of the flood channel and interacting with vegetation was observed.

Bob Butera (HDR) stated that the 2012-2014 study period will continue with observations starting with freeze up (October to freeze up in late December/early January) using the same methods as in 2012 for ice breakup surveys. One additional task will be ice thickness measurements that did not occur in the last survey due to safety issues since this was a comment from agencies. Selection of the ice processes model is also continuing with two potential models; the KRISP Model and one developed for the Peace River. Wayne Dyok stated that the goal is to have full agreement on model selection for the RSP in November.

Bob Butera presented the ice processes comments from stakeholders that required additional discussion as follows:

ADFG provided a comment to examine ice processes under alternative operation scenarios which Bob believed will be built into the scope after the model is built.

Bob noted that a comment provided by ADNR and FERC was prevalent throughout the public comments reviewed and this was the use of ice as a transportation corridor. Bob stated that currently this is not a study plan task. Betsy McGregor noted that this task is part of the transportation studies.

A NMFS comment was received regarding the need to measure ice thickness. As stated earlier, this will be addressed in the ice processes study.

A NMFS comment was received regarding extending surveys to RM 250. Bob stated that the constraints of the helicopters range preclude expansion. In addition, the need to expand the study does not appear warranted.

Bill Rice (USFWS) asked about the collection of solar radiation data and its extent. Michael Lilly (GW Scientific) replied that there will be a series of solar radiation measurements taken by AEA as well as coordination with other agency data collectors, as appropriate. Bill Rice questioned whether these measures would be sufficient. Michael replied that the 2012 activity is the preliminary step to determine if more data is needed. Currently, the solar radiation monitoring has been focused on supporting the development of the temperature modeling, however, the ice processes model selection and evaluation may also inform other data needs.

In closing, Steve Padula stated that next steps will include AEA integrating into and developing new study plans per the discussions over the past two weeks. These study plans will be integrated into the PSP which will be filed with FERC on July 16th. He also noted that there was one study request that will not be adopted; the National Economic Study. But for most all other issues, it appeared that consensus was reached.

Action Items

- As part of the erosion assessment, AEA will evaluate the mobilization of fine particulate matter by wind and its potential impacts to recreationists and residents in other areas near the Project.
- AEA will put Tetra Tech in contact with Dr. Harrison regarding the acquisition of historical information on glacial surge and sedimentation in the vicinity of the proposed Project reservoir.
- Kathy Dube (Watershed Geodynamics) will contact Trout Unlimited to identify the eceptors of interest in aquatic systems that may be impacted from erosion due to new road construction.
- Bob Mussetter (Tetra Tech) will coordinate with Michael Lilly and Joe Klein about the types of information needed to add boat wake erosion as a task to the geomorphology studies.

- AEA will add additional scenarios to the fluvial geomorphology modeling to address warm and cold PDO cycles.
- Bill Fullerton (Tetra Tech) stated that he would contact Bill Rice (USFWS) to discuss the request to utilize tracers to assess bed material mobilization.