

**ILP Formal Study Plan Meeting for Geomorphology, Ice Processes,  
Water Quality, Mercury, August 17, 2012, 8:30 am - 3:00 pm**

**Attendees:**

<b>Organization</b>	<b>Name</b>
AEA	Betsy McGregor
AEA	Wayne Dyok
AEA	Bryan Carey
USFWS	Mike Buntjer
USFWS	Betsy McCracken
USFWS	Bob Henszey
USFWS	Lori Verbrugge
ADNR	Melissa Hill
ADNR OPMP	Marie Steele
NMFS	Eric Rothwell
ADF&G	Joe Klein
ADF&G	Ron Benken
USGS	Dave Meyer
Tribal Council	Wilson Jastin
FERC	Matt Cutlip
LBG/FERC Contractor	Fred Winchell
Natural Heritage Institute/Hydropower Reform Coalition	Jan Konigsburg
Long View Associates	Steve Padula
Long View Associates	Cory Warnock
Van Ness Feldman	Matt Love
MWH	Kirby Gilbert (by phone)
Watershed Geodynamics	Kathy Dube
HDR	Robin Beebee
R2 Resource Consultants	MaryLouise Keefe
R2 Resource Consultants	Phil Hilgert
R2 Resource Consultants	Dudley Reiser (by phone)
Tetra Tech	Harry Gibbons
Tetra Tech	Rob Plotnikov
Tetra Tech	Bill Fullerton
Tetra Tech	Bob Mussetter
GW Scientific	Michael Lilly
Stillwater Sciences	Dirk Pedersen
Stillwater Sciences	Jay Stallman
URS	Paul Dworian
Genovar	Karen Olson
ARRI	Jeff Davis
ARRI	Gay Davis
Alaska Ratepayers	Scott Crowther
Tetra Tech	Mike Harvey (by phone)

## Introduction

Steve Padula (Long View Associates) opened the meeting and explained that the intent of this meeting was to discuss the Geomorphology, Ice Processes, Water Quality and Mercury studies that have been proposed and to have substantive discussions related to any remaining misunderstandings or inconsistencies. Steve went through a few slides reminding everyone about the formal study planning process, current status, and associated deadlines. He noted that another set of TWG meetings is scheduled after the October 15 due date for filing comments on the Proposed Study Plan (PSP) to address any remaining issues. Steve stated that the agenda, meeting minutes and all presentations given during the day would be made available on the AEA website. Introductions were held.

Jeff Davis (ARRI) stated that he didn't understand how the geomorphic classification could be done when the fish data weren't acquired yet. He stated that without the site specific distribution data, you don't know how geomorphic classification relates to fish in Susitna. He stated that fish communities should drive geomorphic classification. He went on to state that alterations to the biological fish studies may be needed to get the appropriate data.

## Study Presentations

### Geomorphology

Bill Fullerton (Tetra Tech) gave the Geomorphology presentation. Areas discussed included goals and objectives, study area, methods and expected results. See the presentation on the AEA website.

Wayne Dyok (AEA) pointed out that the studies were looking at all 3 potential access routes and that AEA will narrow down to a preferred option later in the process.

Eric Rothwell (NMFS) asked if current data was being collected in the Chulitna River. Bill stated that it was. Eric added that it would be nice to know the location of all of the bed loading sites. **Action Item.** Bill agreed and stated that he would add a map.

Betsy McCracken (USFWS) asked if there was a significant gradient change below the tri-rivers area that would affect the habitat. Bill stated that currently, the downstream boundary of the study is at Sunshine and that if project impacts appear to extend further downstream, the boundary may be moved. Matt Cutlip (FERC) asked when that boundary decision would be made. Bill stated that additional coordination meetings over the course of the next month would assist in determining the boundary and if a consensus couldn't be reached by the RSP, a protocol and schedule would be put in place for reaching that decision. Michael Lilly added that the cross section analysis is actually looking downstream of Sunshine to river mile 75 and if project impacts extend further downstream, the model will be adjusted accordingly. Matt Cutlip

clarified that that decision could be reached by the Initial Study Report (ISR). Betsy McGregor (AEA) said that it would.

Betsy McCracken asked why the study wasn't looking all the way to the mouth as she felt that there would be biological impacts all the way down the river. Bill pointed out that he was only dealing with geomorphology issues and that other studies were looking all the way down to the mouth. Matt Cutlip stated that it would be helpful to identify the downstream extent of each study and put a mechanism in place to modify the boundaries if needed. **Action Item.** Bill stated that as information was developed, a technical memo would be developed for discussion purposes.

Jeff Davis asked if the eulachon study was tied to the geomorphology study. **Action Item.** Wayne Dyok stated that AEA would provide how studies are interrelated.

Jan Konigsberg (NHI/HRC) asked if AEA would be able to determine the downstream project affects over a 50 year period. Bill stated that that would be looked at. Jeff asked if the studies would be able to document how the sediment that was transported out of the middle affected the lower river. Bill stated that would be done as well. Bob Henszey (USFWS) asked Matt Cutlip if the cumulative impacts of the project don't show up in the term of the license will an impact beyond that term be taken into account by FERC when making the determination. Matt stated that FERC only considers a 50 year timeframe (i.e., the term of an original license).

Jay Stallman (Stillwater Sciences) asked if bank erosion would be evaluated. Bill stated that it would. Jay asked if the sediment budget was broken down into different size classes. Bill stated that the field work would initially be looking at bed load and the model would be more specific. Eric Rothwell asked if that meant that there wouldn't be good resolution on diffuse processes. Bill stated that that was correct with respect to the field work.

Wilson Jastin (Tribal Council) stated that he was concerned about mixing disciplines to reach conclusions. He was concerned that the right data will be acquired but the wrong conclusions will be reached.

Ron Benken (ADF&G) stated that an inventory and assessment should be done along the Denali Highway if the Seattle Creek access route is chosen. Ron stated that if the Seattle Creek access route was chosen, improvements would be needed and ADF&G would like to see Tier 1 stream crossings if the streams were fish bearing.

Betsy McCracken asked if one flow was being modeled for the lower river. Bill clarified that they were just looking at one flow in 2012 but it had nothing to do with the model. Betsy asked what that flow was. Bill stated that it was 36,300 cfs. Bob Henszey asked if tributary input would be evaluated. Bill said that it would be evaluated during modeling exercises. Bob asked if the modeling relied on some of the field data being collected in the field during this study. Bill confirmed that it did.

Jeff Davis asked/made a series of questions/statements:

1. Explain the effective discharge sites for bed load movement and how the data will be used.
2. The tributaries discharge a good amount of sediment during storm events.
3. Explain the interrelationship between ice processes and bank erosion on sediment.
4. Can the scale of large wood debris be assessed on fish habitat in sloughs?

Bill answered questions 1-3:

1. The sediment rating curves are indicative of the river over time. We assume that the river is in a state of dynamic equilibrium. The 1-D model will further detail the sediment balance.
2. Tributaries will be taken into account during modeling.
3. We need to continue to get a handle on ice processes and develop an approach for handling them. One key factor will be where ice forms now and where ice is influencing the channel.

Kathy Dube (Watershed Geodynamics) answered question 4:

4. The goal is to look at how large woody debris influences aquatic habitat. Wood will be mapped via aerial surveys and some site specific work.

Jeff Davis asked if the study would look at spawning habitat modifications for chum salmon at specific sites along the river. Bill stated that the next presentation would discuss this.

Betsy McCracken asked how ice processes were being related to project impacts. Bill stated that AEA currently wasn't proposing to model geomorphological changes under ice conditions because the low flow conditions don't warrant it. Wayne stated that Robin Beebee's (HDR) presentation would look at this issue.

Jeff Davis stated that the channel cross section can be reduced when ice is present. Even though flows are low, the channel is still compressed. Bill stated that as the study progressed, they would consider that as an option for 2-D modeling.

Bryan Carey (AEA) stated that current work included looking at slope stability issues in the reservoir area, particularly Watana Creek. Eric Rothwell asked if the reservoir geomorphological analysis would look at the potential effects for different dam heights. Kathy Dube stated that the plan was to look vertically above the maximum height of the dam and create a band around the reservoir.

Matt Cutlip stated that yesterday, Kevin Fetherston (R2 Resource Consultants) said he was looking at 6 focus sites and they were going to be integrated with the 2-D modeling sites. Matt stated that those sites should be selected soon because if the stakeholders decide to say that they

feel there should be more than 6 sites, AEA will need a justification for why this isn't necessary. Bill stated that the study plan says approximately 6 sites will be evaluated. Matt reiterated that the possibility exists that the stakeholders will request more than 6 sites and that would have a significant impact on the level of effort. Bob Henszey stated that Matt's comment was a good one and that with only 6 sites, you'd have a low level of confidence relative to the results. Bill pointed out that the 2-D modeling won't be completely based on the intensive sites and that the 2-D modeling is only one tool that will be used. Matt asked if the stakeholders would assist in selecting the 2-D modeling sites. Bill stated that they would.

Jay Stallman stated that more detail was needed about specific geomorphic data variable collection. He additionally stated that it would be helpful if you further defined the stratification system at both a local and reach scaled. Bill acknowledged that more detail was needed.

Jan Konigsberg asked if you have 2 similar sites but one produces fish and one doesn't, is there value in modeling both sites. Mary Lou Keefe (R2 Resource Consultants) asked if Jan was talking about spawning. Jan stated that he was talking about sites where you'd expect fish to be but they aren't. Phil Hilgert (R2 Resource Consultants) stated that sites were being expanded to include both areas where we know fish are and areas that look good but fish aren't present. Phil acknowledged the need for more detail in the plans and stated that more detail would be incorporated into to the RSP. Any areas where the detail cannot be added until a later date, the RSP will describe the schedule, process and criteria for getting to that detailed level. Phil went on to say that the goal is to be able to extrapolate the findings at the intensive study sites to other areas and that this method would be developed with collaboration with the stakeholders.

Wilson Justin stated that he felt 6 sites were not enough. He used the Copper River salmon run as an example of how drift in peak spawn timing can be altered over time. He stated 60 or 70 sites were needed.

Jay Stallman pointed out that in the USFWS and NMFS study requests they ask for pebble counts and asked that more detail be added as to when and where bed material samples will be taken. Bill noted the comment and stated additional detail would be added.

## **Fluvial Geomorphology Modeling Below Watana Dam**

Bill Fullerton (Tetra Tech) gave the Geomorphology presentation. Areas discussed included goals and objectives, study area, methods and expected results.

Bob Henszey asked what the mesh size was for the 2-D modeling. Bill stated that mesh sizes would be adjusted relative to the study site. Jeff Davis asked if feedback from the field measurements would define the mesh sizes. Bill stated that field data input would help focus on the appropriate areas. Bob Mussetter (Tetra Tech) stated that if only hydraulic conditions were being modeled, the mesh sizes could be adjusted significantly. He stated that he expect to have 2 meshes for each site, 1 for habitat conditions and one for the mobile boundary. Marie Steele

(ADNR OPMP) asked at what point in the process mesh sizes would be chosen. Bill stated that they would be selected within the next year.

Eric Rothwell asked if additional cross sections may be selected at areas that aren't hydraulic controls if sediment deposition was being evaluated. Bill confirmed this. An unknown person asked how long a model run would take. Bob stated that the mobile boundary run would take 1-3 days and the hydraulic and sediment run would take a few hours.

Betsy McCracken asked for more information related to the data needs for modeling. Bill stated that stakeholder expectations and needs along with data collected will assist in populating the model. Betsy stated she wanted to see how fish distribution over time changes with the proposed project. Bill stated that that was the goal of the interaction of the models.

Jeff Davis stated that the modeling would be somewhat limited due to the use of intensive study sites. Bill agreed. Bob Henszey asked if a comparison was done between what the stakeholders requested and what was in the study plan. Bill stated that he felt that everything that could be addressed at this point, has been and that the additional detail needed would continue to be worked on. Bob stated that the discussion related to the discrepancy between what was in the plans and what was needed. Betsy McGregor pointed out that there was a table discussing the comments.

Jay Stallman stated that FERC requested that if there were multiple requests for model production and output, it must be made clear what model will do what. Bill acknowledged the need to come up with a hierarchical diagram that will document what model feeds what. Matt Cutlip asked if that could be done for the RSP. **Action Item.** Phil Hilgert stated that AEA would try to have it ready by that point. Betsy McGregor pointed out that in June, Bill produced a technical memo related to what models will be used. She asked if anyone had any comments. Eric Rothwell stated that he was comfortable with the memo. He asked if the 2-D model was proprietary. Bob Mussetter stated that hydraulic component was publically available and the mobile boundary had limited availability but Tetra Tech has been granted access.

Bill reviewed an internal comment response table. There was a request for AEA to make the table publically available. **Action Item.** AEA stated that a modified version may be made available after the upcoming small group meetings.

Eric Rothwell stated that the geomorphology plan lined up better with stakeholder requests but that more detail would be needed to refine the plan. Eric asked Matt Cutlip if it would be possible to extend the comment deadline by 30 days. Matt Cutlip stated that he wasn't the coordinator and couldn't make those decisions.

Jay Stallman stated that it wasn't clear to him how calibration of the 2-D modeling sites occurred without existing measurements. Bill stated that there would be a good deal of ADCP data and more was forthcoming and as far as sediment transport modeling, there would be no calibration at the 2-D sites. Bob Mussetter stated that water surface elevations would also be calibrated. He

added that transport rates would be used to calibrate the sediment transport model. Bill added that water surface elevation data loggers would be installed at each site. Michael Lilly reiterated that the integration of studies would be clearer in the RSP.

Jeff Davis asked if the model could be calibrated to model chum spawning with changes in substrate size, and how can the model be depended upon. Bob Mussetter explained that the model is calibrated to all available parameters. For the data that isn't available, you must trust the physics and reliability of the model. Phil Hilgert added that you can model changes in gravel movement but you can't calibrate it.

Betsy McCracken asked if the models are what would be used to quantify habitat loss in an effort to mitigate for the project. Bill stated that the models are part of the process and that it is all coordinated. Betsy stated that if studies are cut off at the downstream boundary, the area of concern is being limited. She asked if mitigation options were being considered. Betsy McGregor and Wayne Dyok stated that they weren't ready to discuss mitigation.

An ADF&G representative asked how far along the engineering models were. Wayne stated that the reservoir operations model was done and output of that model would provide input to the cost production model. He stated that there were still unknowns including maximum flows, size of units, etc.

Betsy McCracken asked when she could expect to hear about mitigation options. Matt Love stated that at this phase in the process, AEA was setting up the methods to determine what the project impacts would be. Once those are determined, then PM&E's would be discussed. He stated that conversation was premature at this point. Betsy asked if AEA had adequate budget to mitigate for the project. Wayne stated that mitigation has been considered in the overall budget. Betsy McGregor stated that AEA was considering options but nothing was firm yet. AEA is currently most interested in developing studies that will adequately define project impacts.

Matt Cutlip asked if the 30,000 cfs release would be from a low level outlet. Bryan Carey stated that it would be combination of spill and a low level outlet.

An ADF&G representative asked if PM&E options wouldn't be seen until after model runs in 2015. Matt Love suggested that after the study planning process was complete, the TWG get together to understand the process for PM&E's.

## **Ice Processes**

Robin Beebee (HDR) gave the Ice Processes presentation. Areas discussed included goals and objectives, study area, methods and expected results.

Mike Buntjer asked if this modeling effort would be done in conjunction with the other modeling and what the downstream extent of this work would be. Robin stated that the downstream extent was river mile 75 and the model type had not been determined yet.

Eric Rothwell asked how many sites would be evaluated and how often discharge measurements would be taken. Robin stated that the River 1-D model used the same open water calibration sites and that fewer sites were used in the winter. Eric acknowledged that winter discharges were hard but stated that flow change significantly in the winter and without enough discharges, the winter time frame may not be defined appropriately. Robin asked if Eric was thinking primarily of braided areas. Jeff Davis confirmed that this was his concern. Michael Lilly stated that AEA was coordinating with USGS for additional winter gauging data.

Bob Henszey asked if the model could document water coming out of the proposed reservoir. Robin confirmed that this was possible.

Bob Henszey asked if jumble ice in the fall resulted in stronger ice in the spring. Michael Lilly confirmed this and stated that there are indications that you'll see some of this type of ice in the Susitna.

Bob asked if there would be a camera in Devils Canyon. Robin stated that there would not be. Eric asked about the availability of the telemetered data. **Action Item.** Betsy McGregor stated that the 2012 videography and photos from Robin would be available soon via the ADNR website and Michael Lilly's work would be available via the AEA website. Michael added that other available data would include water temperature, water height, air temperature and images for ice studies.

Joe Klein asked if the ice processes model would predict anchor ice. Robin confirmed that it would.

Jeff Davis stated that jumble ice appears overnight and asked if it was coming from upstream. Robin stated that it was. Jeff asked how the model dealt with calibration and what the level of confidence was. Robin stated that it depended on the process. It wouldn't predict overflow at a bend but it would predict less localized events. Steve Padula asked about the timing for getting folks more information on the model. Robin stated more information would be made available in the next month. Wayne Dyok asked the group if they had an issue with using the University of Alberta 1D/River 2d modeling framework. Eric Rothwell stated that he didn't have a problem with it but more detail was needed. Robin stated that a model hierarchy would be created. Bob Henszey asked if a 2D model was necessary. Robin stated that it would be a huge time commitment and there would be a need to route water down the river laterally. Robin stated the primary need for 2-D model would be for lateral routing across a floodplain.

## **Baseline Water Quality**

Harry Gibbons (Tetra Tech) gave the Baseline Water Quality presentation. Areas discussed included goals and objectives, study area, methods and expected results.

Lori Verbrugge (USFWS) stated that the criteria weren't specified to address aquatic life and that needs to be addressed. Jeff Davis added that detection limits need to be clarified. **Action Item.** Harry stated that that would be specified.

Bob Henszey asked if copper was being looked at. Harry stated that it was. Lori stated that the plan doesn't include analysis of element mixture toxicity. Harry stated that mercury was the parameter with the highest interest but the intent was to look at all metals. Lori added that toxicity related to pH interaction should also be evaluated. Harry stated that by going through the pathway analysis, other methods would be understood. Lori disagreed and stated that at some point an aquatic toxicity model would be required.

Wilson Justin stated that there have been massive changes in the sediment in the river and that criteria are going to be difficult to work with. He stated that having a standard in an ever-changing system is difficult.

Joe Klein stated that more information was needed relative to site selection and what is being sampled. Rob Plotnikov (Tetra Tech) stated the 6 intensive study sites were selected based on historical studies and concerns voiced by stakeholders.

Jeff Davis stated that water quality parameters in the side channels and sloughs of the middle river need to be understood. He added that DO needed to be focused on in these areas and that a comparative analysis was needed. He stated a calculation was needed for limited concentration in macro nutrients. He stated turbidity at depth, suspended sediment and water color in the presence of less turbidity should be looked at. Rob stated that there were more complex temperature monitors in place in the sloughs at various depths to understand and explain what other characteristics are influenced.

Eric Rothwell stated that in case thermal imaging didn't work, he'd like to see a decision tree in the RSP that would document what will take place to adjust to the appropriate methods. He stated his concern was what would be done with things like upwelling, thermal refugia, etc. if thermal imaging wasn't successful. Michael Lilly stated that Robin Beebee's work will look at the bigger picture of upwelling and open leads and that there are USGS methods for evaluating upwelling. Eric pointed out that these methods weren't currently proposed. Michael stated that the intensive study sites are used to look at upwelling and then scale up to extrapolate over the river length. He stated that if the processes are understood at the intensive study sites, then we will know what level of confidence to have in the ability to scale up.

Joe Klein asked when the QAPP would be ready. Matt Cutlip asked if it could be filed with the RSP. Harry said that that could probably be done.

## Water Quality Modeling

Rob Plotnikov gave the Water Quality Modeling presentation. Areas discussed included goals and objectives, study area, methods and expected results.

Lori Verbrugge asked about inputs from vegetation, peat, etc. Rob stated that the plan was to rely on how work like this has been successfully conducted under similar conditions. Detail will be added prior to modeling. Lori asked if after the small group meetings, the necessary level of detail could be reached. Matt Love stated that perhaps a red-lined comment response table would be made available. Wayne Dyok asked Lori when her study plan comments had to be approved by the USFWS. **Action Item.** Lori stated that she would get AEA her comments soon and that she saw some inconsistencies in the plan. Rob stated that detail would be added to the plan. Bob Henszey asked if the slides could be referenced. Matt Cutlip confirmed that this was ok.

Matt Cutlip stated that two other things FERC would need to see would be:

1. An incorporation of evaporation into hydrology
2. Methane production

## Mercury Assessment and Potential for Bioaccumulation

Paul Dworin (URS) gave the Mercury Assessment and Potential for Bioaccumulation presentation. Areas discussed included goals and objectives, study area, methods and expected results.

Jeff Davis asked what fish species are being sampled. Paul stated that AEA was using the Alaska DEC list for adult fish. Lori Verbrugge asked why macroinvertebrates were not being looked at. Paul stated that there would be a lot of non-detections with macroinvertebrates.

Jeff Davis asked if lake turnover increased methylation. Rob Plotnikov stated that cold water environments have very limited stratification and that modeling will inform the methylation question.

Lori asked if there was a step for conducting a risk assessment for terrestrial species. Paul stated that there was a sampling issue with terrestrial species and since fish were being evaluated the higher trophic levels would be easier to predict. Lori stated that some bird species like the kingfisher were possibilities and it would be good to know how much assimilative capacity terrestrial species have. Paul stated he was confident that the risk to terrestrial species could be evaluated based on the data being gathered.

Wayne Dyok asked if everyone was ok with using the EFDC model. The general consensus of the group was that would be okay. Wilson Justin asked if the pathway analysis had predictive

powers to look into the future. Paul stated that it did and the idea was to predict conditions with the reservoir in place.

Eric Rothwell asked when meetings will be scheduled to review stakeholder comments. He stated that he didn't want to have the meetings the day after stakeholder comments were due to FERC. Betsy McGregor stated that AEA would like to have those meetings in September.

Steve Padula adjourned the meeting.