Revised Study Plan

Susitna-Watana Hydroelectric Project

FERC No. 14241

Appendix 3

Comment Response Table of Informal Consultation, July - November 2012

ALASKA ENERGY AUTHORITY

December 2012

Appendix Arrangement: The comments and responses in this appendix are arranged by resource area, following the order of the RSP sections.

RSP Study Title and RSP Section Number Key

RSP Study Title (Resource Area)	RSP Section Number
General Comment	No Particular Section of RSP
Geology and Soils	4.5
Baseline Water Quality Study	5.5
Water Quality Modeling Study	5.6
Mercury Assessment and Potential for Bioaccumulation Study	5.7
Geomorphology Study	6.5
Fluvial Geomorphology Modeling below Watana Dam Study	6.6
Groundwater Study	7.5
Ice Processes in the Susitna River	7.6
Glacier and Runoff Changes Study	7.7
Instream Flow Study	8.5
Riparian Instream Flow Study	8.6
Fish and Aquatic Resources	General to Section 9 of RSP
Study of Fish Distribution and Abundance in the Upper Susitna River	9.5
Study of Fish Distribution and Abundance in the Middle and Lower Susitna River	9.6
Salmon Escapement Study	9.7
River Productivity Study	9.8
Characterization and Mapping of Aquatic Habitats	9.9
The Future Watana Reservoir Fish Community and Risk of Entrainment	9.10
Study of Fish Passage Feasibility at Watana Dam	9.11
Study of Fish Passage Barriers in the Middle and Upper Susitna River and Susitna Tributaries	9.12
Aquatic Resources Study within the Access Alignment, Transmission Alignment, and Construction Area	9.13
Genetic Baseline Study for Selected Fish Species	9.14
Analysis of Fish Harvest in and Downstream of the Susitna-Watana Hydroelectric Project Area	9.15
Eulachon Run Timing, Distribution, and Spawning in the Susitna River	9.16
Cook Inlet Beluga Whale Study	9.17
Wildlife Resources	General to Section 10 of RSP
Moose Distribution, Abundance, Movements, Productivity, and Survival	10.5
Caribou Distribution, Abundance, Movements, Productivity, and Survival	10.6
Dall's Sheep Distribution and Abundance	10.7
Distribution, Abundance, and Habitat Use by Large Carnivores	10.8
Wolverine Distribution, Abundance, and Habitat Occupancy	10.9
Terrestrial Furbearer Abundance and Habitat Use	10.10
Aquatic Furbearer Abundance and Habitat Use	10.11
Small Mammal Species Composition and Habitat Use	10.12

RSP Study Title (Resource Area)	RSP Section Number
Bat Distribution and Habitat Use	10.13
Surveys of Eagles and Other Raptors	10.14
Waterbird Migration, Breeding, and Habitat Use Study	10.15
Landbird and Shorebird Migration, Breeding, and Habitat Use Study	10.16
Population Ecology of Willow Ptarmigan in Game Management Unit 13	10.17
Wood Frog Occupancy and Habitat Use	10.18
Evaluation of Wildlife Habitat Use	10.19
Wildlife Harvest Analysis	10.20
Vegetation and Wildlife Habitat Mapping Study in the Upper and Middle Susitna Basin	11.5
Riparian Vegetation Study Downstream of the Proposed Sustina-Watana Dam	11.6
Wetland Mapping Study	11.7
Rare Plant Study	11.8
Invasive Plant Study	11.9
Recreation Resources Study	12.5
Aesthetic Resources Study	12.6
River Recreation Flow and Access Study	12.7
Cultural Resources Study	13.5
Paleontological Resources Study	13.6
Subsistence Resources Study	14.5
Regional Economic Evaluation Study	15.5
Social Conditions and Public Goods Study	15.6
Transportation Resources Study	15.7
Health Impact Assessment Study	15.8
Air Quality Study	15.9
Probably Maximum Flood Study	16.5
Site-Specific Seismic Hazard Study	16.6

Commenter Acronym Key

Commenter Acronym	Commenter
ADEC	Alaska Department of Environmental Conservation
ADNR-ADF&G	Alaska Department of Natural Resources - Department of Fish and Game
ADNR-DPOR	Alaska Department of Natural Resources – Division of Parks and Outdoor Recreation
ADNR-OHA	Alaska Department of Natural Resources - Office of History and Archaeology
ADNR-OPMP	Alaska Department of Natural Resources - Office of Project Management and Permitting
Alaska Ratepayers	Alaska Ratepayers, Inc.
ARRI	Aquatic Restoration & Research Institute
BLM	United States Department of the Interior – Bureau of Land Management
DCCED-DED	Alaska Department of Commerce, Community, and Economic Development – Division of Economic Development
EPA	United States Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
NHC	Northwest Hydraulic Consultants
NHI	Natural Heritage Institute
NMFS	United States Department of Commerce – National Oceanic and Atmospheric Administration
NPS	United States Department of the Interior – National Park Service
RAC	BLM Resource Advisory Council
SHPO	State Historic Preservation Office
Stillwater	Stillwater Ecosystem, Watershed and Riverine Sciences
USFWS	United States Department of the Interior – Fish and Wildlife Service

APPENDIX 3

Alaska Energy Authority's Response to Comments on the Proposed Study Plan (Consultation dated July 16 through early November, 2012)

NOTE: This table is a compilation of Technical Workgroup meeting comments and informal consultation between AEA and other licensing participants from AEA's filing of the Proposed Study Plan in July 2012, through its release of the interim draft Revised Study Plan (RSP) at the end of October 2012, as well as some additional consultation in early November 2012. Based on written comments filed with FERC following the release of the interim draft RSP through November 14, 2012, AEA made numerous changes to the interim draft RSP when preparing the final RSP. See Appendices 1 and 2. Accordingly, many of the comments and responses appearing in the table below have been superseded and are included primarily for purposes of documenting AEA's consultative efforts and the iterative process of developing the final RSP.

Comment Format	Comment Date	Licensing Participant Name	Licensing Participant Affiliation	Comment or Study Request	AEA's Response
GENERAL/GLOBAL					
Email	9/06/2012	Joseph Klein	ADNR-ADF&G	Project operations – We support the effort to provide a means to evaluate future changes in the Susitna River under different operation scenarios and also recommend identifying a reference reach in a similar Alaska river for using a BACI design monitoring program to assess post project impacts.	As detailed in Section 8.5, AEA will be conducting studies to assess various operational modes. AEA is using the environmental flows proposed in the 1980s as a starting point for assessing project operation scenarios. AEA plans to investigate full load-following, partial load-following based on primary use of load-following from other existing hydro power projects like Bradley Lake, Eklutna and Cooper Lake. AEA recognizes that maintenance of ecosystem functions may require an assessment of other operational scenarios. These will be developed as resource needs are identified through the environmental resource assessments.
Email	9/07/2012	Betsy McCracken	USFWS	Biometric review – The Service previously requested a biometric review of the 1980s findings. This request is remains outstanding and should be conducted prior to basing any study plans on 1980s studies or results. In all cases, including the usage of the 1980s Su-hydro data results and for the Susitna-Watana study	AEA is not conducting a biometric review of the data collected in the 1980s for the Project. Instead, each study plan in the RSP describes the extent to which—if any—AEA is relying upon the1980s-era data and how that data will be used to meet the goals and objectives of the study plan.

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				plans, estimates of precision and accuracy of study results is required to evaluate the power of any study plan. Details of proposed study plan sampling and design methods need to be explicit and statistically valid with a priori determination of levels of precision and accuracy of model outputs.	As contemplated by FERC's ILP regulations, AEA has expended a significant effort to synthesize the 1980s data. The results of the initial synthesis were presented in the Pre-Application Document (PAD). Over 3,000 documents were produced during the intensive studies of the 1980s. AEA will continue to review this information and include relevant information in the currently proposed studies. This effort will continue through 2013 and 2014. Although the proposed APA project in the 1980s was different than the anticipated RCC proposed Project today, the historic environmental information remains relevant, including from an historic and trends perspective. Further, the impacts assessment should not be discounted. Much of the assessment contained in the 1983 application, FERC's draft EIS, and the 1985 amended license application may be useful for comparison of the impact assessment to be completed for the 2015 License Application.
Email	9/07/2012	Betsy McCracken	USFWS	Studies integration – During the three days [August 15-17, 2012] of ILP study meetings, sequencing and integration of the proposed biological resource studies and the physical process studies was not described and is still a significant outstanding information need. It is necessary to describe the integration of these inter-related studies and how that integration will result in a comparison of the baseline biological information and the resulting effects to biologic resources caused by the proposed project operations… The Service has repeatedly articulated concerns about the lack of study sequencing, connectivity and integration between the biological studies and the other proposed engineering and physical processes studies.	A detailed overview of the study plan process appears in Section 2 of the RSP and includes a detailed study plan schedule at Attachment 2-1, which has been prepared at FERC's request. In addition, for each of the 58 studies proposed in the RSP, AEA has included a section entitled "Relationship with Other Studies." This section provides a detailed narrative on how the study uses outputs from other studies and/or provides inputs to other studies. These interdependencies also are illustrated graphically in each study plan. Although this level of detail is not required by FERC's ILP regulations, AEA believes it important for all licensing participants to understand the relationships within the RSP and stay coordinated on these matters.

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				A "map" or chart of how studies are proposed to be integrated is needed. AEA sponsors and consultants, committed to providing this by September. Biological resource components are currently not integrated or connected to the other studies, and appear as being treated independently of the rest of the study requests. Study proposals must demonstrate how they will be integrated to provide needed resource information.	
Email	9/11/2012	Bob Henszey	USFWS	Studies integration – Many of the PSPs rely upon or provide data from/for other studies. Recognizing these relationships is an important part of the Integrated Licensing Process (ILP); however, the study providing the data should describe the methodology and oversee the data collection and analyses, while the study requiring the results should restrict its discussion to the types of data/results required from other PSPs. Repeating the methods in a study not responsible for the data collection and analyses is unnecessary and risks confusion if the methods differ or are inadequate in one of the studies. Since the Riparian Instream Flow PSP will rely upon data from the Groundwater PSP, the Riparian Instream Flow PSP should describe only the results required from the Groundwater PSP, and then describe how those results will be used in the Riparian Instream Flow PSP (e.g., 5.7 Groundwater PSP should be the only PSP that describes the groundwater methods). This applies to other PSPs, such as the habitat mapping studies that may be providing data for this PSP.	AEA agrees with this comment. When preparing the RSP, AEA decided to organize study plans by resource area, to take advantage of common background issues related to all studies in each resource area. In addition, AEA prepared the RSP in a manner that explains the interdependencies among the different study, without overlapping the scopes of the different plans. See above discussion related to interdependencies.
Email	9/07/2012	Betsy McCracken	USFWS	Compensatory mitigation – Compensatory mitigation is determined as part of a mitigation sequence after avoidance, and minimization efforts. The Service has inquired about potential	Each individual study plan has been designed to yield sufficient information that will allow AEA, FERC, and federal and state resource agencies to assess Project-related effects of the resource. Based on the results of

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				compensatory mitigation for project impacts during several meetings. To date, this concern has not satisfactorily been addressed by the project sponsors or project consultants. Because compensatory mitigation is a requirement in order to offset unavoidable projects impacts to fish and wildlife resources and their habitats, it is should be considered throughout the review process. Please explain how you plan to quantify existing habitats, and quantify primary, secondary and cumulative (40cfr Part230 of the CWA) losses to those habitats under the proposed operational flows over the temporal scale of the license period. How will habitats change proportionally under project operations?	these studies, AEA's 2015 License Application will include proposed protection, mitigation, and enhancement measures. As appropriate, AEA in its License Application may propose compensatory mitigation as a means of addressing identified Project-related effects.
Email	9/18/2012	Betsy McCracken	USFWS	Can you please provide a timeline for when resource agencies can expect AEA to provide meeting minutes from the August and the September ILP TWG meetings? Also, requested is the documentation of how AEA will address agencies identified discrepancies and concerns related to proposed approaches that were presented during the meetings. We intend to have follow-up related to these outcomes, and need to make concerted efforts toward this goal. Resource agencies have many outstanding and complex resource concerns yet to resolve with AEA consultants related to the Susitna River basin resources and their habitats; particularly under AEA's proposed approaches within the study requests, and would appreciate receipt of the follow-up information. NMFS previously requested the August meeting minutes, a few weeks ago. We are following up with this secondary request, along with the additional request for the September meeting materials.	Meeting summaries for the TWG meetings appear in Appendix 4 of the RSP. For a discussion of how AEA synthesized and responded to the comments made during TWG meetings, as well as during more informal consultation meetings and correspondence, from the release of the PSP through the preparation of the interim draft RSP, please see Section 2 of the RSP. AEA's responses to substantive comments received during this period appear in this Appendix 3.

Comment Format	Comment Date	Licensing Participant Name	Licensing Participant Affiliation	Comment or Study Request	AEA's Response
SECTION 4 GEOLOGY AND SOILS					
Geology and Soils Characterization Study (Section 4.5)					
				No comments.	
SECTION 5 WATER QUALITY					
General					
Email	8/23/2012	Joseph Klein	ADNR-ADF&G	Information on availability of the Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP) is needed.	AEA will include in the SAP and QAPP in the RSP as an attachment.
Baseline Water Quality Study (Section 5.5)					
Email	8/23/2012	Joseph Klein	ADNR-ADF&G	5.5.4.3.2 In-Situ Water Quality Sampling The sampling protocol currently calls for monthly in-situ water quality monitoring for the 4 summer months. It should be revised to include continuous (hourly or so) water quality measurements for basic parameters (pH, DO, conductivity, turbidity), year-round if possible using in-situ semi-permanent sensors (e.g. sondes). The technology is readily available and would provide very useful baseline information to assess any post project impacts.	Grab sampling of surface water has been proposed at approximately every 5 river miles (39 sites). Grab sampling of water for physical parameters allows for better quality control, especially regarding calibration of parameters such as DO and pH. The use of multi-parameter probes would be appropriate for the focus study areas where monitoring of conditions is required to detect changes in water quality that may affect aquatic life stages. This will be performed in the Focus Areas selected for intensive instream flow studies. (Section 5.5.4.5)
Email	8/23/2012	Joseph Klein	ADNR-ADF&G	Any monitors should be calibrated pre- and post-monitoring along with multiple field measurements for post monitoring calibration.	Agreed. The RSP's QAPP will include this detail.
Email	8/23/2012	Joseph Klein	ADNR-ADF&G	GW Quality in Selected Habitats (Section 5.5.4.7) - need more information on study. For example, sampling intensity/number of site measurements per slough or criteria for how they will be determined. Will ground water level monitors be installed if so, what is the sampling intensity (numbers per habitat type) and duration of monitoring (e.g. continuous year-round/ point samples during field visits, etc.). If not, it is	This comment will be addressed more thoroughly when the Focus Area intensive study site selection is complete. The RSP will include a process, criteria, and schedule for selection of Focus Area. See RSP Section 5.5.4.5. For each Focus Area, the sampling methodology will be described, including sampling intensity/number of site measurements per slough; whether ground water

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				strongly recommended groundwater monitoring be performed concurrently with water quality monitoring in this study.	level monitors will be installed, and sampling intensity and duration of monitoring.
Water Quality Modeling Study (Section 5.6)					
				No Comments.	
Mercury Assessment and Potential For Bioaccumulation Study (Section 5.7)					
Letter	8/17/2012	Lori Verbrugge	USFWS	1) Mercury modeling aspect is absent in all studies. We need them to model mercury inputs into the reservoir, amounts of mercury methylation, uptake and biomagnification of methylmercury in reservoir organisms including concentrations at each trophic level, and transport of mercury downstream from the reservoir, from date of initial flooding until 20 years post-impoundment. 2) Avian piscivores - need to analyze feathers for mercury content to determine baseline. This objective is absent from the bird studies. 3) Actual risk assessment step is missing. We need them to perform an ecological risk assessment for each piscivorous species. Estimate the amount of mercury ingested by individuals of each piscivorous species, based upon dietary information and modeled mercury levels in food items post-impoundment. Compare ingested mercury amounts to toxic levels, based on species-specific data from the scientific literature. Note: this step is missing in the study plans for avian species and aquatic furbearers.	Mercury modeling is being addressed in both the Water Quality Modeling Study (Section 5.6.4.8) and the Mercury Assessment and Potential for Bioaccumulation Study plan (Section 5.7). Studies have shown that the occurrence of mercury in newly formed reservoirs is a relatively predictable phenomenon, and that such predictions do not require the degree of modeling requested. Avian piscivore sampling is included in section 5.7.4.2.5. A predictive risk analyses is included in Section 5.7.4.2.5.3. It is specific to avian piscivores and aquatic furbearers.
Letter	8/17/2012	Lori Verbrugge	USFWS	Page 5-164, first paragraph: discussion does not make sense. The State of Alaska (SOA) measured total mercury in salmon and other freshwater fish species from the Susitna River drainage. Contrary to the discussion, the SOA does not compare fish	The text has been changed and clarified. See section 5.5.4.7. The text has been changed to reference SQuiRT tables.

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				mercury concentrations to water quality standards. Unlike some other states such as Oregon, SOA does not base mercury water quality standards on fish concentrations. Table 5.12-1 reveals mean concentrations of mercury in several species of fish (arctic char, northern pike, pink salmon and lake trout) that are above levels deemed safe for unlimited consumption by women of childbearing age, as determined by the Alaska Division of Public Health.	
Letter	8/17/2012	Lori Verbrugge	USFWS	Page 5-163, paragraph 5: The report states "At Costello Creek only 0.02 percent of the mercury detected (in what- sediments?) was found to be methylated. This study suggests, based on limited data, that mercury concentration varies significantly between separate drainages, and that methylation is also tributary specific". a. This may be true for sediments, but is very unlikely to be true for fish. As a general rule, mercury in fish tissue is nearly 100% methyl mercury.	This text has been clarified (Section 5.5.2); however, several studies have shown that both metallic and methylated mercury concentrations can vary considerably between drainages and tributaries of the same drainage. In the case of the Frenzel study, significant differences were noted in mercury speciation in sediment between Costello Creek and the Deshka River, and the report attempted to explain those differences based on tributary specific physical conditions. It can be assumed that tributaries with higher methylmercury concentrations in sediment and water will also display higher methylmercury concentrations in fish, particularly those (ex. Slimy sculpin) that spend a majority of their time confined to specific tributaries. The Frenzel study also reported inorganic mercury in both Slimy sculpin and Dolly Varden. This data has been added to the text. A majority of mercury found in fish is methylmercury, and the text did not mean to imply otherwise.
Letter	8/17/2012	Lori Verbrugge	USFWS	Page 5-168, Section 5.12.4.3.2 "Fish Tissue": The report states, "Body size targeted for collection will represent the non-anadromous phase of each species life cycle (e.g., Dolly Varden; 90 mm- 125 mm total length to represent the resident portion of the life cycle.) a. This makes some sense, in order to understand the amount of mercury in the fish that is clearly attributed	The goal is not to determine the current mercury concentration in all species and model their connections, rather it is to determine whether the conditions for mercury methylation will be enhanced or diminished by the dam (described in Section 5.7.1). Target fish species in the vicinity of the Susitna-Watana Reservoir will include adult Dolly Varden, arctic grayling, long nose sucker, lake trout, whitefish

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				to the local environment. However, for risk assessment purposes it is also important to sample fish that are representative of those taken for consumption by humans and wildlife receptors. Specifically, large adult fish that are targeted by anglers (and bears) should also be sampled, to determine how much additional mercury can "safely" be added from the project before consumption advisories are warranted.	species, burbot, and resident rainbow trout. If possible, filets will be sampled from seven adult individuals from each species.
Letter	8/17/2012	Lori Verbrugge	USFWS	Page 5-170, Section 5.12.4.5, "Pathway assessment of mercury into the reservoir..." a. The water quality modeling this section refers to (from Section 5.6) does not have the capacity to predict mercury inputs from inundated bedrock, soils and vegetation, mercury fate and transport, mercury methylation, or mercury uptake by biota. Studies 5.6 and 5.12 point to each other, but neither actually does this critical mercury modeling work. A concerted, specific mercury modeling component is essential and must be added.	The differences seem to be between the use of the words "model" and "assessment", and not in the functional result. The Water Quality Modeling Study (Section 5.6) will generate a three-dimensional model of the proposed reservoir. This model will allow us to evaluate the potential for conditions conducive to mercury methylation in the reservoir. If conditions for mercury methylation are created, mitigation may be necessary. Mercury impacts will be modeled in fish, piscivorous birds, and aquatic mammals. (Section 5.7)
Letter	8/17/2012	Lori Verbrugge	USFWS	Section 5.12.6 Schedule: Two additional monitoring activities needs to be added to this table and scheduled. a. Quantitative modeling of mercury inputs, rates of methylation, and uptake by biota; and b. Ecological risk assessment for mercury exposure to avian and mammalian piscivores in the study area.	The planned modeling will generate predictions regarding methylmercury concentrations in water, sediment, and fish within the reservoir. It will also model potential impacts to birds and aquatic mammals (Sections 5.6 and 5.7). Previous studies have found that increases in methylmercury concentrations in a reservoir after filling are not related to atmospheric deposition, geology, or vegetation. Rather, they are due to mercury being released from inundated fine organic soil particles (Stokes and Wren, 1987; Abernathy 1979; Bodaly el al., 1984, Newberry et al, 1983, Rudd, 1995, etc). Rudd, for example, estimates that in a typical reservoir,

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					between 0.3 and 3% of the total mercury observed is derived from precipitation. Inorganic mercury deposition from the atmosphere is not a significant source of mercury concentrations that are elevated above background; however, they can be a source of background mercury concentrations. The goal of the study is to quantify mercury resulting from filling the reservoir, not necessarily background mercury. Background mercury concentrations are better predicted from studying mercury levels in nearby natural lakes. Background lake studies are included as part of the fish tissue sampling (Section 5.7.4.2.6). Mercury levels in reservoirs typically are not source limited, but are related to methylation rates in the reservoir. The water quality model will predict methylation rates in the reservoir (Section 5.6.4.8).
Letter	8/17/2012	Lori Verbrugge	USFWS	Page 5-17, paragraph 2 in total: the report states, "Body size targeted for collection will represent the non-anadromous phase of each species life cycle (e.g., Dolly Varden; 90 mm- 125 mm total length to represent the resident portion of the life cycle.) a. This makes some sense, in order to understand the amount of mercury in the fish that is clearly attributed to the local environment. However, for risk assessment purposes it is also important to sample fish that are representative of those taken for consumption by humans and wildlife receptors. Specifically, large adult fish that are targeted by anglers (and bears) should also be sampled, to determine how much additional mercury can "safely" be added from the project before consumption	The RSP has been modified (See Section 5.7.4.2.5). Target fish species in the vicinity of the Susitna-Watana Reservoir will be Dolly Varden, arctic grayling, stickleback, long nose sucker, lake trout, whitefish species, burbot, and resident rainbow trout. If possible, filets will be sampled from seven adult individuals from each species, given these fish will show the highest background concentrations of methylmercury. All fish species currently present in the inundation zone will be sampled.

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				advisories are warranted. Similarly, for ecological risk assessment purposes it is important to sample fish representative of those in the diet of avian and mammalian piscivores in the project area. Our study request (Page 19 paragraph 3) contains a more robust description of the types and sizes of fish that should be sampled.	
Letter	8/17/2012	Lori Verbrugge	USFWS	Page 5-17, paragraph 4: the report states "Results will be reported with respect to applicable Alaska State and federal standards". The comparison values must be specified and agreed to up front. For human risk assessment purposes, US EPA guidance for fish consumption advisories is most appropriate. For ecological risk assessment purposes, risks should be interpreted using published scientific literature, based on both field observational studies and controlled laboratory experiments, using the same or comparable piscivorous avian and mammalian species.	EPA fish consumption advisories will be utilized for human health protection. USEPA (1997) sets reference doses for methylmercury in avian and mammalian wildlife, and these have been referenced in Section 5.7.4.2.5.3
Letter	8/17/2012	Lori Verbrugge	USFWS	Page 5-17, paragraph 5: the report states "Results from fish tissue analysis will also be used as a baseline for determining how the proposed Project may increase the potential of current metals concentrations to become bioavailable". This doesn't make sense. Results from fish tissue analysis will be used as a baseline for fish metal concentrations prior to development. In order to understand how the Project may increase the potential for current metal concentrations to become bioavailable, you need to predict how mercury methylation rates may change in response to the Project. This would entail prediction of organic carbon stores, amount of wetland or peat surface this context, because water levels do not relate directly to fish	This will be taken care of by mercury modeling under EFDC. The model will predict if the conditions in the reservoir will be conducive to mercury methylation. Fish tissue mercury concentrations will be modeled using methods described in Harris and Hutchison (2008) and Hydro Quebec (2003). These modeling methods predict future methylmercury concentrations using existing background concentrations. Methylation rates will be predicted using the water quality model (Section 5.6).

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				levels.	
TWG meeting	8/17/2012	Lori Verbrugge	USFWS	Explain the absence of macroinvertebrate sampling in the PSP.	There are no plans for macroinvertebrate sampling at this time. As with soil and vegetation, current mercury concentrations in macroinvertebrates are poor indicators of the potential methylmercury concentrations in fish and wildlife, and most methylmercury models do not utilize this data for that reason. Fortunately models for predicting methylmercury concentrations in fish are well advanced and fairly accurate (Harris and Hutchison, 2008, Hydro Quebec, 2003, etc). Methylmercury in fish tissues is generally higher by an order of magnitude than that of their food (Rennie et al, 2011). Therefore predictive models for fish can be generally applied to macroinvertebrates. In addition, impacts on other species are going to be evaluated (Section 5.7.4.2.5.3). Sampling of macroinvertebrates needs to be conducted, if necessary, based on the pathway analysis to define methylmercury generation and bioexposure routes. Before this analysis is completed, AEA will not know which sampling protocol to follow because it will not know the specific community that is at risk.
Letter	8/17/2012	Lori Verbrugge	USFWS	Page 5-17, paragraph 5: the report states, "Detection of mercury in fish tissue and sediment will prompt further study of naturally occurring concentrations in soils and plants and how parent geology contributes to concentrations of this toxic (sic) in both compartments of the landscape". The study of "naturally occurring concentrations of mercury in soil and plants and how parent geology	This statement has been removed from the RSP. The source of the mercury above background in reservoirs is not typically the geology, or atmosphere, or woody plant debris. If they were, mercury concentrations would not decrease to background after only 20-30 years. Green vegetation (leaves of trees and shrubs) and the top centimeters of humus are the primary source of mercury in newly filled reservoirs. This was first noted as far back as Abernathy and Cumbie

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				contributes to concentrations of this toxicant" must be undertaken, regardless of whether it is currently present in fish and sediment. Vast surface areas and vegetation will be inundated, that are not currently part of the system. There is not the need to prove current presence before proceeding to predict the addition from the project. In any case, if adequate detection limits are used it is a given that fish and sediments will contain mercury; unfortunately they do everywhere. There is no reason to delay this "further study", particularly as the ILP process is so compressed. This study needs to be planned and implemented now. Likewise, macroinvertebrates need to be added to the current study plan.	(1977), and is well understood science (Meister et al. 1979; Hydro Quebec, 2003, etc.). Soil and vegetation sampling have been added to the document, and an evaluation of potential geologic sources in the inundation zone is planned (Section 5.7.4.2) Current mercury concentrations in macroinvertebrates are poor indicators of the potential methylmercury concentrations in the future. Most methylmercury models do not utilize this data for that reason.
Letter	8/17/2012	Lori Verbrugge	USFWS	Page 5-19, section 5.5.6 Schedule: Several needed elements are missing, including the collection of geomorphology, geology, vegetative type and quantity, etc. needed to estimate mercury inputs to the reservoir. Then modeling is needed to incorporate baseline conditions, estimate new mercury inputs and rates of methylation, and predict mercury levels in biota post-impoundment. Several study plans point to each other regarding this topic, but none actually undertake these tasks.	Soil and vegetation sampling have been added, and a geologic survey will be done for mineral deposits. However, this information is not necessary for estimating methylmercury impacts to fish. The proposed study will provide mercury modeling for methylmercury in water, sediment, fish, birds, and aquatic mammals. The schedule can be found in Section 5.7.6
Letter	8/17/2012	Lori Verbrugge	USFWS	Objectives Analysis: Two objectives contained in our study request are not included in the AEA study plan. These are: 1) Model mercury inputs into the reservoir, amounts of mercury methylation, uptake and biomagnification of methylmercury in reservoir organisms including concentrations at each trophic level, and transport of mercury downstream from the reservoir, from date of initial flooding until 20 years post-impoundment.	The study will be limited to predicting mercury impacts to water, sediment, birds, aquatic mammals, and fish. Methylmercury generation will be modeled in Section 5.6. AEA intends to model to a point where methylmercury concentrations in the reservoir return to background concentrations. This may be more or less than 20 years. Other reservoirs have taken as little as 10 and more than 35 years to return to background methylmercury concentrations (Hydro Quebec, 2003).

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Letter	8/17/2012	Lori Verbrugge	USFWS	Page 5-37, paragraph 4: the report reads, "Organic carbon content from inflow sources will be correlated with mercury concentrations determined from the Baseline Water Quality Study discussed in Section 5.5. Predicted water quality conditions established by Project operations and that promote methylation of mercury will be identified by location and intensity in both riverine and reservoir habitats." a. Nowhere in Section 5.5 or elsewhere does it indicate how mercury inputs will be estimated based on the specific vegetation, bedrock and soils in the area to be inundated. Likewise, a specific model has not been proposed to predict mercury inputs, concentrations, or rates of methylation in the reservoir. Neither the underlying data collection nor the modeling activity necessary to quantify future mercury levels in biota are contained within any of the current study plans. This includes the area inundated, and the pH, calcium concentration and water hardness of the reservoir ... among other factors	Hydro Québec (2003) has studied these phenomena extensively, and found the increase in fish mercury levels after reservoir impoundment does not depend on the mercury content of soil, rock, or vegetation, but rather on the conditions within the reservoir after filling. The variability in methylmercury concentrations within reservoirs and drainages is based on the methylation rate, not on the mercury source, which is largely atmospheric for background mercury levels. Samples of vegetation and soil will be analyzed for mercury as part of this study; however, this information does not directly input calculations for methylmercury concentrations in fish and wildlife. It will be used as part of evaluating potential mitigation strategies.
SECTION 6 GEOMORPHOLOGY					
General					
Memo	8/07/2012	Unspecified	NPS	Limiting downstream scope of this and other studies to Talkeetna is unfounded. Until results of the instream flow, ice, fluvial geomorphology, fish, and other studies are available, cannot say how far downstream project's measurable effects on visual, auditory resources will go. Vehemently disagree w/ this premature decision, which contradicts statements elsewhere in this and other PSPs acknowledging need to rely on the results of other studies.	The Fluvial Geomorphology Modeling Study area downstream limit is currently identified at RM75; however, components of the Geomorphology Study extend to RM 0 or to RM 28. The initial determination of the downstream limit was based on based on a bedload sediment balance using USGS data from the 1980s. The downstream limit of the Fluvial Geomorphology Study will be extended further downstream if the studies indicate potential for the Project to affect the of the channel morphology below RM 75. Section 6.6.3.2 discusses the process, criteria and schedule for establishing the downstream limit of

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					the Fluvial Geomorphology Modeling Study.
TWG Meeting	8/17/2012	Matt Cutlip / Betsy McCracken	FERC / USFWS	D/S Limit of study – What is it, how and when will it be determined. Would it be in the ISR if not reached in RSP? Each study needs to identify the D/S extent and put a mechanism in place to modify the boundaries if needed.	The downstream limit of the Fluvial Geomorphology Modeling is proposed at RM 75, which includes the upper 23 miles of the lower river. Portions of the Geomorphology Study will extend further. The reach delineation and evaluation of historic channel change extend to RM 0. Comparison of 1980s and current aquatic habitat extend to RM 28. The initial extent of the detailed study area was determined based on a bedload sediment balance using USGS data from the 1980s. Additional discussion of the sediment balance and the potential influence of the Project are discussed in Section 6.5. More detailed sediment balance and evaluation, within in a geomorphic framework, of potential Project along with hydraulic routing to determine downstream Project effects on stage and discharge are being performed in 2012 and early 2103 to further evaluate the downstream modeling limits. The results of the 1-D sediment transport modeling to RM 75, will be evaluated to determine if the detailed study area needs to be extend further downstream. The process, criteria and schedule for determining the downstream extent of the detailed study area are presented in Section 6.6.3.2
TWG Meeting	8/17/2012	Jeff Davis	ARRI	Is the Eulachon Study tied to Geomorph Study?	In the sense that the geomorphology of the Susitna River helps define the habitat for the eulachon; The Geomorphology Study is tied to the Eulachon Run, Timing, Distribution, and Spawning in the Susitna River study. Initial evaluation of the potential for the Project to affect the geomorphology of the lower river has indicated it is unlikely that Project effects will extend into the lower river downstream of Sunshine (RM 84). To be conservative, the downstream limit for the Fluvial Geomorphology Modeling Study has been initially set at RM 75. If, as the studies progress, additional analysis and information suggest the Project may

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					impact the morphology D/S of RM 75, the study limit will be extended D/S. Section 6.6.3.2 discusses the process, criteria and schedule for establishing the downstream limit of the Fluvial Geomorphology Modeling Study.
Email	8/23/2012	Joseph Klein	ADNR-ADF&G	For the eulachon and boating studies, similar information is needed on what is the study area.	The currently identified downstream study limit for the Fluvial Geomorphology Modeling Study is RM 75. Initial evaluation of the potential for the Project to affect the geomorphology of the lower river has indicated it is unlikely that Project effects will extend into the lower river downstream of Sunshine (RM 84). To be conservative, the downstream limit for the Fluvial Geomorphology Modeling Study has been initially set at RM 75. Therefore, in terms of the potential for boating to be affected by changes in the geomorphology as a result of Project operations and construction will not extend below RM 84. This would be the D/S limit of interaction of the boating Study with the Geomorphology Study. Based on the initial assessment Project effects on geomorphology would not extend downstream into the habitat for eulachon. If, as the studies progress, additional analysis and information suggest the Project may impact the morphology D/S of RM 75, the study limit will be extended D/S Section 6.6.3.2 discusses the process, criteria and schedule for establishing the downstream limit of the Fluvial Geomorphology Modeling Study.
Letter	9/07/2012	Betsy McCracken	USFWS	If the physical studies boundary is terminated at river mile 75, there will be no ability to relate or integrate biological data to those studies (e.g., geomorphology, ISF, ice processes, flow routing). Resource agencies management goals would effectively not be addressed below river mile 75, if project effects are not assessed to the mouth of the river.	In terms of the Fluvial Geomorphology Study, the downstream study limit was set at RM 75 because initial evaluation of available sediment transport information indicated that the Project would not affect the morphology of the Susitna River downstream of Sunshine Station (RM 85). If the Project does not affect the morphology below RM 75, there will be no impact on the resource agencies goals from this aspect of the physical environment. If, as the studies progress,

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					additional analysis and information suggest the Project may impact the morphology D/S of RM 75, the study limit will be extended D/S. Section 6.6.3.2 discusses the process, criteria and schedule for establishing the downstream limit of the Fluvial Geomorphology Modeling Study. In terms of the Ice Processes Study, the physical study extends to the mouth of the river, as described in Section 7.6, Study Area.
Email	9/07/2012	Betsy McCracken	USFWS	Instream Flow, Habitat Utilization, Geomorphology PSPs do not fully address USFWS' resource mgmt. concerns. During 3 days of ILP study meetings, sequencing and integration of proposed biological resource studies and physical processes was not described; significant outstanding info needed.	To address USFWS resource management concerns, AEA has expanded the discussion and figures in Section 6.5.6 and 6.6.6 to show the integration and interdependency of the Geomorphology Study and Fluvial Geomorphology Modeling studies with biological resource and other physical process studies.
Email	9/07/2012	Betsy McCracken	USFWS	Necessary to describe the integration of inter-related studies, how that integration will result in a comparison of baseline biological info, resulting effects to biological resources caused by project operations.	AEA has revised Section 6.5.6 and 6.6.6 to provide more detail on how the integration of inter-related studies will address baseline biological information and allow for an assessment of potential project effects.
E-mail	9/07/2012	Betsy McCracken	USFWS	USFWS has repeatedly articulated concerns about lack of study sequencing, connectivity, integration between biological studies, other proposed engineering and physical processes studies. Need for collection of adequate temporal and spatial baseline biological, fish habitat data to provide direct input to some of proposed physical modeling efforts. Many USFWS concerns are related to temporal mismatch of biological data collection w/ forward momentum of physical modeling efforts.	To address USFWS resource management concerns, AEA has expanded the discussion and figures in Section 6.5.6 and 6.6.6 to show the integration and interdependency of the Geomorphology Study and Fluvial Geomorphology Modeling Studies with biological resource, other physical process studies and the engineering studies (Operations Modeling and Soils & Geology).
Email	9/07/2012	Betsy McCracken	USFWS	Do not believe current Instream Flow, Habitat Utilization, Geomorphology PSPs will yield sufficient info to allow USFWS to adequately assess proposed SuWa Project impacts to US fish, wildlife resources, and to develop adequate PMEs.	The Geomorphology Studies are integrated with the Instream Flow and Habitat Utilization studies as well as numerous other studies. The Geomorphology Study has been specifically designed to provide the Instream Flow studies with information on potential Project effects to the Geomorphology of the Susitna River that

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					would result in changes to the physical habitat. Section 6.6.4.1.2.1 provides examples of the issues that the Fluvial Geomorphology Modeling Study was designed to address.
E-mail	9/07/2012	Betsy McCracken	USFWS	Study results must be quantifiable to: assess potential losses to aquatic resources, habitats; review SuWa Project under relevant fish, wildlife resource conservation authorities; inform fishway prescription authority (Sec. 18 FPA); eventually develop recommended protection, mitigation, enhancement measures.	The Study Plans for the Geomorphology Study (Section 6.5) and Fluvial Geomorphology Study (Section 6.6) have been developed to provide the biological resources and other physical process studies with evaluation of potential changes in the geomorphology of the Susitna River that can be used to support determination of habitat indices under with Project conditions. For instance, the 1-D and 2-D bed evolution models will identify if the substrate size changes below the dam or if downcutting results in less connectivity to off-channel habitats. The 2-D modeling at focus areas can identify the potential change in the rate of sedimentation and floodplain building which will provide information for the IFS Riparian study to quantify potential changes to riparian plant communities. of potential changes in channel and floodplain morphology to support their assessments of potential habitat losses.
Geomorphology Study (Section 6.5)					
TWG Meeting	8/17/2012	Jeff Davis	ARRI	Will the studies be able to identify how sediment passed out of Middle effects the Lower Reach?	Yes. The sediment dynamics between the middle river and the lower river will be evaluated in Section 6.5.4.3 as part of the sediment balance calculations as well as in the 1-D modeling effort in Section 6.6. The latter effort will include modeling to at least RM 75. The former effort looks at the sediment balance to Susitna Station (RM 28).
TWG Meeting	8/17/2012	Jay Stallman	Stillwater / FERC	It would be useful to further define the stratification system on a local and reach scale.	The first two levels of the stratification system are the river segment and geomorphic reach. These are described in Section 6.5.4.1. The remaining 3 levels are described in the Fish Studies. The stratification system includes river segment, geomorphic reach,

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					macroscale habitat (main channel and off-channel habitats), mesoscale habitat, and microscale habitat levels. Additional information on the geomorphic reach characterization system has also been provided in Section 6.5.4.1 including an initial reach delineation and identification of geomorphic reach types.
TWG Meeting	8/17/2012	Eric Rothwell	NMFS	Add proposed sediment measurement stations to map to identify locations where USGS is collecting 2012 Data	Figure 6.5-5 has been added to RSP showing the Susitna River above Tsusena Creek, the Susitna River at Gold Creek/ above Talkeetna, the Susitna River at Sunshine and the Chulitna River near Talkeetna gages.
TWG Meeting	8/17/2012	Jay Stallman	Stillwater / FERC	Will bank erosion be evaluated?	Yes. Bank erosion will be evaluated using the historical aerial photo analysis and by comparison of the 1980s cross-sections with cross-sections surveyed in 2012 at the same locations (See Sections 6.5.4.4). The volume of sediment from bank erosion will be included in the sediment balance describe in Section 6.5.4.3.2.2.
TWG Meeting	8/17/2012	Jay Stallman	Stillwater / FERC	Will sediment budget look at sizes?	Yes. The sediment budget will consider sediment in at least three size ranges, fines or wash load (silts and clays), sand, and coarse sediments (gravel and cobble). The balance will also consider in terms of bed material load and suspended load. The RSP includes additional details and clarification of the sediment budget calculations including a distinction of the initial sediment budget developed to support the initial determination of the downstream study limit and a more detailed sediment budget to assist in developing the sediment supply for the fluvial morphology modeling effort. The details of the sediment balance have been revised and are presented in Section 6.5.4.3.
TWG Meeting	8/17/2012	Jeff Davis	ARRI	Explain the use of effective discharge in the geomorphology study	Effective discharge discussion in Section 6.5.4.3.2.4 was expanded to further describe its use in the overall assessment of potential channel change as a result of

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					Project alterations to sediment transport capacity and discharge. Effective discharge is one means of identifying the potential for increase or decrease in channel dimensions as a result of alteration of flow and sediment transport capacity.
TWG Meeting	8/17/2012	Jeff Davis	ARRI	Tributaries dump a good amount of sediment during storm events. Are they being accounted for in the Study?	Yes. Tributaries are included in the detailed sediment transport balance described in Section 6.5.4.3.2.2 and as a source of sediment supply in the 1-D and 2-D modeling efforts. The discussion of determination of tributary sediment supply is described in Section 6.6.6.4.1.2.6.
TWG Meeting	8/17/2012	Jeff Davis	ARRI	Is the scale of the LWD study such that the influence of LWD on aquatic habitat in the sloughs be determined (4th of 4 parts)?	Yes, the scale will be sufficient to assess the influence of LWD on aquatic habitat in the sloughs. The following wording is included in the LWD study component described in Section 6.5.4.9: "Observations and discussion of how large woody debris is currently functioning in the Susitna River, including a discussion of interactions with riparian and aquatic/fish habitat, geomorphic processes (sediment transport/channel forming processes), ice processes, and flows."
TWG Meeting	8/17/2012	Eric Rothwell	NMFS	Will the reservoir erosion study look at the potential different dam designs (heights)?	Yes. The reservoir Geomorphology Study component (Section 6.54.8) will consider the reservoir inundation zone and a band 100 feet above the high water and covers all potential reservoir heights being considered.
Fluvial Geomorphology Modeling below Watana Dam Study (Section 6.6)					
TWG Meeting	8/16/2012	Jay Stallman	Stillwater / FERC	Will the geomorphology effort model different operational scenarios and come up with new channel patterns?	Yes. Both the 1-D and 2-D sediment transport models will be run to evaluate operational scenarios. Section 6.6.4.2 provides a description of time frame for each model. The 1-D model will provide a 50 year simulation of the overall aggradation/ degradation response of the system, including general changes in bed material composition, under both baseline (existing) and project conditions. Due to computational limitations, the 2-D model cannot reasonably be run for a 50-year period; however, runs will be made for individual (i.e.,

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					seasonal) hydrographs for both baseline and project conditions, and the results will be used to assess how changes in flow and sediment regime under project conditions will affect bed evolution. Although specific, long-term changes in bed topography and channel patterns cannot be made, the trajectory of these changes can be inferred from a combination of the short-term 2-D results and the long-term 1-D results.
TWG Meeting	8/17/2012	Jeff Davis	ARRI	Can the model look at spawning habitat modification for chum (referring to the specific chum spawning area identified for the Whiskers Slough Site in the 1980s)?	Yes. The 2-D sediment transport model is capable of simulating the physical processes at the resolution necessary to identify changes in hydraulic conditions and bed material (substrate) in areas such as the chum spawning site identified in the 1980s study at the Whiskers Slough site. To model these areas, a finer mesh will be used. Specific areas to provide a finer mesh size to investigate specific aspects of local hydraulics, bed material and sedimentation processes will be evaluated and determined for each of the focus areas through coordination with the Fish and Aquatics Instream Flow Study, Riparian Instream Flow Study, Groundwater Study, Ice Processes Study and Fish Study and in collaboration with the relicensing participants. Discussion of varying the mesh site to focus in on specific areas of interest such as spawning areas and off-channel habitats has been added to Section 6.6.4.1.2.3
TWG Meeting	8/17/2012	Matt Cutlip	FERC	During the general discussion on site selection, it was indicated that AEA will need to justify use of 6 sites (or whatever number)	The process, schedule and criteria for selection of the focus areas are provided in Section 8.5.4.2 of the Fish and Aquatics Instream Flow Study. Section 6.6.4.1.2.4 describes the role of the Geomorphology Study in the selection process. The site selection process is a collaborative effort between the Fish and Aquatics Instream Flow Study, Riparian Instream Flow Study, Groundwater Study, Fish Study and Ice Processes in the Susitna River Study and coordinated with the relicensing participants. It is noted that the fluvial

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					geomorphic analysis presented in Section 6.5 and the 1-D sediment transport modeling presented in Section 6.6 will be performed for the entire detailed study area (currently proposed as RM 184 to RM 75 excluding Devils Canyon).
TWG Meeting	8/17/2012	Jay Stallman	Stillwater / FERC	Need more detail on specific geomorphic data to be collected at the sites.	AEA has modified to Section 6.6 to describe the field data collection program that will be conducted in 2013. Section 6.6.4.1.2.8 has been added to present the field data collection effort. The field data collection effort described in this section covers the collection of data for both the Geomorphology Study (Section 6.5) and the Fluvial Geomorphology Modeling below Watana Dam Study (Section 6.6). Major activities at focus areas will include bed material sampling, bathymetric and cross-sectional data collection, mapping of geomorphic features, and characterization of physical process at each focus area. Additional data will be collected outside the focus areas such as cross-sections to supplement the 2012 data available for the 1-D model, additional bed material samples for the 1-D model, and identification and/or verification of controls and other geomorphic features identified from aerial photographs and available mapping. Data will be collected in conjunction with field efforts being performed by the Instream Flow Fish, Instream Flow Riparian, Groundwater, and Ice Processes Study.
TWG Meeting	8/17/2012	Jay Stallman	Stillwater/ FERC	USFWS and NMFS request pebble counts in their Study Plans. We need to have more detail as to where and when we will do pebble counts	The requested detail on bed material sampling has been included in the description of data collection added to Section 6.6.4.1.2.8. Bed material samples will be collected at both the Focus Areas as well as at other locations in the study area.
TWG Meeting	8/17/2012	Henszey/ Davis / Steele	USFWS/ ARRI / ADNR OPMP	General discussion on the mesh size for the 2-D model with questions concerning: what will the size be? Will field results influence it? When will size be selected?	The 2-D sediment transport model selected for the focus areas will have a variable mesh size. This will allow a finer mesh to be applied to areas in which the scale of the feature being modeled (for example side or upland sloughs) requires a finer mesh size than other

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					areas of the model. Larger mesh sizes can be used in the main channel to allow for more efficient execution of the model. However, even within the main channel, a finer mesh can be applied to provide higher resolution in areas such as spawning sites. More detail on the use and selection of the 2-D model mesh size is provided in Section 6.6.4.1.2.3.
TWG Meeting	8/17/2012	Eric Rothwell	NMFS	Will additional cross-section be selected at areas that aren't hydraulic controls and added to the 1-D model? This question was brought up since the hydraulic routing model data collection likely concentrated on hydraulic controls, but these may not be the best features for describing sediment transport processes.	Yes. AEA will collect additional cross-sections to supplement the cross-sectional data collected in 2012 to support the hydraulic routing model development. Cross-section sites will be chosen in conjunction with the Fish and Aquatics Instream Flow Study, Riparian Instream Flow Study, Groundwater Study and Ice Processes in the Susitna River Study. These additional cross-sections are discussed as part of the fieldwork described in Section 6.6.4.1.2.8
TWG Meeting	8/17/2012	Jay Stallman	Stillwater / FERC	How will the 2-D model be calibrated?	Yes. AEA has included additional discussion of the calibration of the 2-D fluvial geomorphology model in Section 6.6.4.1.2.5. This includes discussion of the calibration of hydraulics (velocity, depth and flow distribution) and sediment transport conditions.
Email	8/23/2012	Joseph Klein	ADNR-ADF&G	Will 2-D modeling include side channels and sloughs within study area?	The decision to apply 2-D modeling will be evaluated at focus area in coordination with the IFS-Fish, IFS-Riparian and groundwater studies. 2-D modeling of side channel and sloughs will be utilized at the focus areas as appropriate when complex hydraulic conditions exist that are more accurately and effectively analyzed with 2-D hydraulic and sediment transport modeling. Section 6.6 describes the application of 2-D modeling of fluvial geomorphology.
Email	9/11/2012	Bob Henszey	USFWS	RISF-5 Characterize the Role of Sediment Deposition in the Formation of Soils: The proposed soil sampling techniques are included in Section 6.6.4.3.1.5, but based on these techniques it is unclear how the USFWS requested objective to characterize the role	The Fluvial Geomorphology Modeling below Watana Dam Study will assist the Instream Flow Riparian Study in determining the potential effect of the Project on the rate of sediment deposition in the floodplain. This will include modeling of the sedimentation process

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				of sediment deposition in the formation of floodplain and riparian soils, and how sediment deposition affects the rate and trajectory of plant community succession. This objective should investigate the rate of deposition, depth of sediment, and soil profile development required for natural floodplain plant community succession, and then use the predicted sediment deposition characteristic from the Fluvial Geomorphology Study to predict the effects of Project operation on floodplain plant communities.	at the focus areas for both existing conditions and for various operational scenarios. Information developed from the Riparian Instream Flow Study on existing rates of floodplain deposition will be adjusted based on comparison of the frequency of inundation and alteration of sediment delivery under with Project scenarios. This will provide an assessment of the change in the rate of floodplain building under Project conditions. This aspect of the Fluvial Geomorphology Modeling below Watana Dam Study is discussed in Section 6.6.4.1.2.8.
SECTION 7 HYDROLOGY-RELATED RESOURCES					
General					
				No comments.	
Groundwater Study (Section 7.5)					
Email	8/23/2012	Joseph Klein	ADNR-ADF&G	What are the monitoring well placement sampling approach (e.g. equal spacing along linear transects, etc.) and location (e.g. for instream flow, in all habitat types?) for the various resource studies (i.e. instream flow, riparian instream flow, water quality). Also, a description of sampling intensity would be helpful (i.e. for instream flow purposes, will the objective be to characterize entire gw/sw interaction throughout entire intensive study site [*Focus Area*] or only at select microhabitats).	AEA has included more detail in the Groundwater RSP Sections 7.5.4.5 and section 7.5.4.6 pertaining to well place sampling approach and location. In general, the placement of wells in transects will be determined by local hydrologic boundary conditions. Wells are generally placed close to a boundary (stream, slough, main channel) and then at increasing distance away from the boundary to help measure the pressure response from rising and falling stage levels in surface-water features (internal/external modeling boundaries). Additionally, some wells will be placed in key areas related to riparian habitat, key instream flow study needs, or to help identify hydrologic conditions near groundwater model or study area boundaries. Within each Candidate Focus Area (CFA), there will be area(s) where groundwater analysis will be focused. In some of the CFAs, this may cover a majority of the CFA area, in others it may only be a portion. The groundwater analysis areas will encompass the

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					internal focus areas for riparian and instream to help provide the groundwater portion of the hydrologic framework being used for analysis by the various studies.
Email	8/23/2012	Joseph Klein	ADNR-ADF&G	What is the duration for monitoring (I believe at the meeting it would be from installation until winter 2013-14?)	The duration of monitoring will vary for different hydrology data collection programs. The current network of gaging stations started in summer of 2012 will continue operations through the winter of 2012/13 into 2013 and 2014. Technical evaluations will be made in the summer of 2014 as to which gaging stations need to be operated during the winter of 2014/15. Groundwater monitoring programs will begin at a small scale in winter 2012/13 and the increase during summer of 2013. The monitoring of groundwater wells will continue into 2014,. At that time, a subset of the groundwater wells may be monitored for the winter of 2014/15.
Email	8/23/2012	Joseph Klein	ADNR-ADF&G	How often will monitoring wells be calibrated for various parameters to be sampled pre- post- and during field monitoring?	Monitoring wells will be surveyed with a combination of RTK survey methods and optical level loop methods. This will be done at least two times a year, or more frequent if well movements are recorded. Pressure transducer measurement will be verified with manual measurement at least month during summer months, and 3-4 times during winter periods. Both calibration (for determining offsets) and verification water levels will be collected. Conductivity and temperature sensors will have calibration checks performed before field installations and field calibration checks monthly during summer months. Calibration checks during winter months will be performed at least once during the mid-winter period when safe access and weather conditions allow, and before spring break-up and fall freeze-up. This process will be further described in the Groundwater Study Plan in section 7.5.4.5 and section 7.5.4.6.

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Email	9/07/2012	Betsy McCracken	USFWS	The integration of the groundwater study efforts with the biological studies is not clear. Specifically, how will the groundwater study be made relevant to the scale of fish habitat and fish habitat site selection in the Susitna River? The objectives of the groundwater study should include relevance to the hierarchially nested habitats, including macro-, meso-, and micro-habitats that are influential to fish habitat selection. The groundwater study sampling design should be relevant to fish habitat and site selection. A specific objective needs to be measuring the hydraulic gradient/head (upwelling or downwelling) under the existing hydrograph and under the proposed project hydrograph release flow schedule.	In the RSP, AEA has clarified how fisheries studies have been incorporated into the instream flow and groundwater aquatic studies. The groundwater aquatics study is coordinating with both Instream Flow and Fisheries studies on the selection of Focus Areas (FAs). The Groundwater Study will be measuring the both horizontal and vertical head gradients through combinations of nested wells installed at different depths and shallow wells installed in surface-water habitat areas to measure the gradients between surface-water sources and underlying groundwater conditions. Details on the measurement of fluxes can be found in the RSP in section 7.4.5.6. These gradients will be compared with simulated gradients from groundwater/surface-water models under the field conditions measured in 2013 and 2014 and compared with project operation scenarios.
Email	9/11/2012	Bob Henszey	USFWS	Section 6.6.4.5 (Groundwater): The suggested four to six intensive study reaches instrumented with groundwater and surface-water recording instruments may be insufficient to address this objective if plant response will be described by process-domains (see pseudoreplication discussion above). However, hydrology is likely the most dominant physical factor required for maintaining floodplain plant communities across the various process-domains, and baring some other dominant physical factor (e.g., soil parent material, weather, etc.) it may be possible to use data from the individual intensive study-site transects to build response curves (see Henszey et al. 2004 {ne.water.usgs.gov/platte/reports/wetlands_24-3.pdf}, Figure 7 for an indication of the number of data points required to build a response curve).	The purpose of the Focus Areas (FAs) is to develop intensive enough data collection and analysis programs to define the groundwater/surface-water interactions and hydrologic cycle processes in a variety of environments so the process understanding can be used at the larger scale to evaluate potential Project affects and methods for alternating Project operations to reach desired management goals. The CFAs will be used in conjunction with hydrologic analysis to help inform the Project and agencies on the hydrologic interactions and range of natural variability in the system. Response curves for the CFA's will be evaluated as part of the Riparian Groundwater Study (see RSP 8.6.4.5).
Email	9/11/2012	Bob Henszey	USFWS	One-and-a-half growing seasons (July 2013 to September 2014) will likely provide insufficient groundwater hydrology data to fit individual species	The study schedule for riparian growing seasons is sufficient. The model simulation tools will be used to re-analyze past hydrologic conditions (such as recent

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				response curves (especially for annual species), and may not be enough data to reasonably predict groundwater relationships with river stage and to verify the model predictions with independent data. Precipitation may also dramatically affect transient but critical groundwater levels (a few days to a week or more of elevated water levels), which would be difficult to evaluate with limited data. How will these potential problems be addressed?	years or 80s information) to gain additional data for the development of responsive curves. Data from Long-Term Ecological Research (LTER) sites such as the Bonanza Creek Experimental Forest (BCEF) will be compared with the evaluations in the Susitna riparian study areas to help expand the process understanding of riparian responses to groundwater/surface-water interactions. Precipitation data will be measured at each of the riparian focus areas. Shielded summer precipitation gages will be installed in early spring 2013 in time for the 2013 summer season. The information will be compared with the recent update to the statewide precipitation evaluation and new index maps. Additionally, precipitation information collected by the Glacier Runoff Study will be incorporated into the precipitation analysis for the riparian focus areas.
Email	9/11/2012	Bob Henszey	USFWS	In addition to the Work Products described in Section 6.6.4.5.2, the products should provide water-level summary statistics for each location (e.g., point, plot, or transect) that will be used to test and fit plant response curves, such as growing season cumulative frequency, 7-day moving average, 10-day moving average, 14-day moving average, and arithmetic mean (see Henszey et al. 2004 {ne.water.usgs.gov/platte/reports/wetlands_24-3.pdf}, Table 1).	The Groundwater Study will provide the time series for measured and simulated groundwater levels to help provide the summary statistics needed for developing plant-response curves. This is further described in the Riparian Instream Flow Study Plan in Section 8.6.4.5 (previously in Section 6.6.4.5.2).
Email	9/11/2012	Bob Henszey	USFWS	Section 6.6.4.7 (Succession Models and Flow Response Guilds) appears to potentially address the USFWS's Objective 6 request; however, two critical referenced papers (Merritt et al. 2010 and Pearlstine et al. 1985) were not included in the Literature Cited. These references were not provided until 8/28/2012, and the USFWS has had insufficient time to review these papers in detail. The concept of the PSP	Additional detail has been added to the Riparian Instream Flow RSP Section 8.6.4.7 to demonstrate that USFWS Objective 6 will be met by the proposed methods. A description of the hydrologic gradient analyses is provided in Section 7.5: Groundwater. AEA has revised the Groundwater RSP at Section 7.5.4.5] to provide more detail to show how quantifiable hydrologic gradient will be constructed. The

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				response guilds is similar to the USFWS's request to develop plant community response curves, but the PSP methods are insufficient to evaluate if our requested Objective 6 will be met. The USFWS requested evaluating specific water-level summary statistics (see above discussion for groundwater) with a rigorous curve-fitting technique similar to Henszey et al. (2004). The methods should provide sufficient detail to show how quantifiable (not qualitative) hydrologic (surface-water and groundwater) gradients will be constructed to show the optimum and range of favorable water levels required for maintaining floodplain species/communities.	groundwater and surface water field measurements for continuous monitored stations will be 15 minutes or less. Model simulations will also 15 minutes or less, based on analysis of modeling results. This information will produce time series data sets, from which water level summary statistics can be calculated for a range of analysis objectives, such as running averages in hourly and daily increments.
Ice Processes In the Susitna River Study (Section 7.6)					
Email	9/12/2012	Eric Rothwell	NMFS	I have a concern with winter flow routing and ice processes, and how they will inform site selection. Site selection for analyzing winter instream flow effects to fish and their habitat will depend on an understanding of operational effects downstream (to flow timing and quantity, hydraulics, and water quality). Also the extension of the studies downstream will depend on these results. The winter hydraulic flow routing model will rely on ice process modeling to determine the downstream extent and magnitude of operational flow effects. The ice process modeling will need several years of data, in addition to the ice thickness measurements and discharge measurements at each of the cross-sections for the winter routing model. I see a lack of time to collect data for the models (winter flow routing and ice process) calibrate the models and then selection sites and methods to conduct ISF studies to assess project effects on fish during winter operations under the currently proposed study period.	See Ice Study Interdependencies (Figure 7.6-1 and 7.6-2) and Schedule (Table 7.6-1) for a description of how ice processes model input and output are scheduled. Final winter flow routing/ice model results for project conditions will not be available prior to selection of focus areas. The selection of candidate focus area sites will use prior information (80s and other), current 2012 studies and professional judgment to select sites that would be affected by changes to winter flow. Preliminary results from a steady-flow HEC-RAS model with ice cover can be used to estimate the potential for stage changes in the lower river. For instance, if the HEC-RAS model indicates that winter discharges will be higher than the natural range of variability in the Lower River, marginal habitats that would be susceptible to under-ice inundation may be selected. The proposed model development and simulation goals will continue to inform the study teams during the 2013-14 study period so that information can be used to help refine studies, as technical and scientific

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					analysis warrants. This adaptive approach will help the concurrent studies each run in parallel, helping address both the concerns of study timeframes and adaptive approaches to modifying study designs as additional knowledge is gained.
Email	9/12/2012	Eric Rothwell	NMFS	• What can be determined from each of the study components, a description of deliverables (not results) this will help us understand if our requests have been met. • How will uncertainty be determined for each of the study components? (ice processes -> hydraulic flow routing -> winter fish and habitat effects)	AEA has included in the Ice Processes in the Susitna River RSP Section 7.6.4 description of study components and deliverables (including field data collected and model output). 7.6.4.4 describes how the ice processes model uncertainty will be assessed by comparing the results of the existing conditions model to known conditions, and by evaluating the error associated with model input and generalization of physical processes by model equations.
TWG Meeting	10/23/2012	Gary Van Der Vinne	NHC	• Will there be enough data to calibrate a 1-D model after one season of data collection? Will the 1-D existing condition model be updated after 2013 if new information is collected?	The 1-D model will be calibrated with data from 2012 and ice thickness, elevation, and meteorological data from the 1980s. AEA will update the RSP to extend the calibration of the 1-D model past 2013 if conditions warranting and updated calibration are encountered.
TWG Meeting	10/23/2012	Gary Van Der Vinne	NHC	• Was there sufficient climate variability in the 1980s observations to encompass the range of expected conditions?	Section 7.6 of the RSP has been updated to expand on the range of climate conditions encountered in the 1980s. Cold, warm, and average conditions are well represented, but warmer conditions have occurred since the 1980s, and would be expected to occur in the future.
TWG Meeting	10/23/2012	Felix Kristanovich	ENVIRON	• Will climate change be considered in the Ice Processes modeling?	Climate change will not be considered in the ice processes modeling. However, the post-project conditions to be modeled will include unusually warm conditions, unusually cold conditions, and average conditions. The unusually warm conditions model should encompass the range of temperatures expected due to climate change.
Glacier and Runoff Changes Study (Section 7.7)					
				No comments.	

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SECTION 8 INSTREAM FLOW STUDY: FISH, AQUATICS, AND RIPARIAN					
General					
				No comments.	
Fish and Aquatics Instream Flow Study (Section 8.5)					
Email	8/01/2012	Betsy McCracken	USFWS	Relative to the proposed Instream Flow (ISF), Groundwater and Habitat Utilization study plans, would you please provide a summary of recent fieldwork conducted or currently in the works from this summer (2012) season?	A summary of the 2012 field efforts will be provided in the Section 8.5.4. Instream flow related fieldwork conducted during the summer of 2012 includes 1) measurement of nearly 100 main channel transects to use in the mainstem summer flow routing model, 2) aerial photography and videography that will be used in habitat delineations and 3) pilot HSC/HSI data collection.
Email	8/02/2012	Joseph Klein	ADNR-ADF&G	Following up with the suggestion below, additional information that would be helpful with development of the study design would be a summary of the relative proportions of channel types. It would be great if the information was combined with relative densities of documented fish use. I see that some of this information is included in the proposed study plan and so I'm not clear on when this information will be available.	The relative proportions of channel types were identified during early 1980s study efforts along with estimates of fish use by habitat type. This information will be supplemented by remote sensing studies conducted during September-October 2012 to identify the distribution of habitat types under existing conditions (RSP Section 9.9). The 2012 remote sensing habitat data will be available by 1st Quarter 2013. Study efforts to be conducted during 2013 and 2014 will document fish use by habitat type under existing conditions and will be presented in the ISR and USR (RSP Section 9.6). Information on the proportion of channel types and associated fish use will be used to identify the need for modifications to Focus Areas and weight habitat modeling results in 3rd Quarter 2014 (Section 8.5.4).
Email	8/02/2012	Joseph Klein	ADNR-ADF&G	As you know, this information is one of the initial steps for identifying sampling strategies (representative reach vs. macro habitat), habitat selections as well as modeling selections (transects, weighting protocols, hydraulic and habitat simulation programs, aggregation protocols, etc.). Two key issues that I am	Regarding issue one, habitat modeling selection will be based on applying one or more methods most applicable for addressing the flow related questions within a given habitat type. Table 6.5.2 of the PSP provided an initial listing of candidate methods that are being considered for application and will be updated in

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				not clear on are 1) how will the decision be made on which habitat specific model(s) will be used, and 2) how and when will other related riverine studies be integrated (e.g., water temperature, ground water, fish passage, sediment transport, channel maintenance, and ice processes)?	the Section 8.5.4. The selection of specific habitat models will be made following a careful review of the approaches used during the 1980s studies, and a review of contemporary methods available for addressing the objectives of the Fish and Aquatics Instream Flow Study, AEA will seek to reach TWG consensus on habitat model selection during the 2nd Quarter 2013 (Section 8.5.4). Regarding issue two, the integration of studies was conceptually described in Figure 6.5-3 in the PSP and provided in Section 8.5.4. In practice, this will occur as part of both field data collection activities (completed in 2013 and 2014) that will be completed at the Focus Areas in which cross-discipline studies will be conducted and coordinated, as well as during the data analysis and modeling exercises that will link discipline specific models with the flow routing and operations models. Results of these models will be used in a Decision Support System framework to assess different operational scenarios.

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Email	8/23/2012	Joseph Klein	ADNR-ADF&G	Varial zone modeling, may need more defined time steps during analysis phase (possibly down to 15-minute increments) depending on the rate of flow change over time.	Time-step increments, used to calculate stage changes, will be identified during calibration of the Mainstem (Open-water) Flow Routing Model in 4th Quarter 2012 (see Section 8.5.4.3). Depending on the initial calibration results, time steps as short as 3-minutes may be needed to match predicted to measured stage changes. In 2014, the calibrated flow routing model will be used to evaluate the effects of Project operations using 1-hour time-steps unless the Technical Workgroup (TWG) determines that shorter time steps are needed to evaluate specific fisheries resources.
Email	8/23/2012	Joseph Klein	ADNR-ADF&G	For the eulachon and boating studies, similar information is needed on what is the study area, what sampling strategy will be used, how many and what range of calibration-discharge sets if appropriate, and how HSI curves will be developed.	As needed to support the evaluation of Project effects on eulachon, modeling of eulachon habitat will be conducted under the Fish and Aquatics Instream Flow Study; as needed, HSC/HSI criteria will be collected consistent with sampling methods described in Sec 8.5.4.5. Additional details of the recreation boating study are provided in RSP Section12.
Email	8/23/2012	Joseph Klein	ADNR-ADF&G	What equipment will be used and how will they be calibrated?	Water velocities will primarily be measured using either Acoustic Doppler Current Profiler (ADCP) equipment or Price AA current meters. Calibration of the ADCP equipment will follow the ADCP Quality Assurance Plan dated May 2012. Calibration of the Price AA meters will employ a spin test whenever the meter is assembled in the field. Once assembled, Price AA meter operation will be tested by performing a spin test. The cups should spin freely for a minimum of 3.5 minutes for the AA meter. The results will be recorded on a calibration data sheet kept in the meter housing. In some instances, other water velocity equipment may be used, such as Marsh McBirney meters when frazil ice is encountered.
Email	8/23/2012	Joseph Klein	ADNR-ADF&G	How do you envision the "collaborative process" will work? When will major decisions be made (e.g., site and transect selections) and how often do you	AEA will seek to reach TWG consensus on major decisions. A schedule of major decisions is provided in Section 8.5.6.

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				envision the work group will get together?	
Email	8/23/2012	Joseph Klein	ADNR-ADF&G	Will a DSS-type program be available to review study results and if so, information is needed on it.	A Decision Support System-type program will be available as described in Section 8.5.4.8.
Email	8/23/2012	Joseph Klein	ADNR-ADF&G	How will the data be aggregated to evaluate single flow recommendation?	Habitat data will be used to evaluate potential impacts of Project operation flow regimes by aggregating such data by river segment unless geomorphic reach-specific differences indicate a finer level of aggregation is appropriate. The data analysis and aggregation process is described in Section 8.5.4; additional details will be developed in coordination with the TWG after reviewing initial study results in 2014.
Email	8/23/2012	Joseph Klein	ADNR-ADF&G	HSI data are needed for identified target species for each defined habitat type, over 2 years.	As described in Section 8.5.4.5, HSI data will be collected in defined habitat types over 2 years. HSC/HSI data collection efforts were initiated as a pilot program in 2012 and will continue in 2013 and 2014. These data will contribute to the site-specific database of HSC/HSI data collected in the early 1980s.
Email	8/23/2012	Joseph Klein	ADNR-ADF&G	Per the description of study sites for fish passage/off-channel connectivity (§6.5.4.5.5), what criteria will be used to identify "a representative number" of different habitat types?	Fish passage/off-channel connectivity will be evaluated at sites selected using a hierarchical, framework of habitat classification. The stratified sampling approach will include several levels based on channel attributes including river segment, geomorphic reach (RSP Section 6.5), mainstem habitat type (RSP Section 9.9) and potential fish barriers identified through Study of Fish Distribution and Abundance in the Middle and Lower Susitna River (RSP Section 9.6). Additional details of process, criteria and schedule of fish passage/off-channel connectivity are described in RSP Section 9.12.
Email	8/23/2012	Joseph Klein	ADNR-ADF&G	What criteria will be used to select and weight transect-derived models?	As discussed at the September 14, 2012 TWG meeting, and described in Section 8.5.4.6, criteria to select habitat models will include: • All major habitat types sampled within each geomorphic reach • At least one Focus Area per geomorphic

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					reach • Replicate sampling strategy for major habitat types • Include biologically important salmon spawning/rearing sites in main channel and off-channel habitats • Tributary deltas included as habitat unit • Incorporate multiple study elements Results of sites that are modeled using either 1-D (i.e., transect) or 2-D techniques will be extrapolated to non-modeled sites based on the proportion of habitat area they represent within the geomorphic reach. If biological studies indicate that specific habitat types are highly important to a species, the weighting of modeling results from those habitat types will be given priority as determined in coordination with the TWG in 3rd Quarter 2014.
Email	8/23/2012	Joseph Klein	ADNR-ADF&G	For PHABSIM, will transects be independent, dependent or a combination and accordingly, what WSE models and composite suitability index will be used?	Habitat modeling is expected to represent a combination of dependent and independent techniques. The selection of PHABSIM modeling techniques will be determined in 2nd Quarter 2013, in collaboration with the TWG (Section 8.5.4.6). Model selection will be based on the hydraulic characteristics of each site and the information needed to address Project effects. For instance, the use of 2-D modeling techniques will involve dependent water surface modeling techniques. The mainstem flow routing model, used to calculate site boundary conditions, will represent a combination of dependent and independent transect calculations.
Email	8/23/2012	Joseph Klein	ADNR-ADF&G	What criteria will be used to identify cover types and substrate sizes?	Cover types will be selected to represent the primary habitat. Substrates will be classified using a Wentworth grain scale modified to reflect English units of measurement (Section 8.5.4.5).

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Email	8/23/2012	Joseph Klein	ADNR-ADF&G	Will 2-D modeling include side channels and sloughs within study area?	Yes. See Section 8.5.4.2.1.1.
Email	8/23/2012	Joseph Klein	ADNR-ADF&G	How many and at what range will discharge-calibration sets be collected for each sampling method?	A minimum of three stage: discharge calibration sets will be collected for each sampling method (Section 8.5.4.6). The Mainstem (Open-water) Flow Routing Model, used to calculate site boundary conditions, will be developed using hydraulic data collected at flows of approximately 8,000 cfs, 16,000 cfs and 28,000 cfs.
Email	8/23/2012	Joseph Klein	ADNR-ADF&G	What is the sampling strategy (e.g., representative reach, mesohabitat typing) for the defined habitat types?	As described in Section 8.5.4.2, a stratified sampling strategy, incorporating replicate samples of major habitat types will be based on a hierarchical, framework of habitat classification. Sampling of representative habitat types will be supplemented by sampling of sites considered to be of high biological importance.
Email	9/07/2012	Betsy McCracken	USFWS	Habitat site selection criteria: Criteria that influence habitat selection and suitability need to be identified using statistically powerful and robust methods and current models of fish distribution including bioenergetics and not exclusively physical habitat models (Lovtang 2005). The Service remains opposed to the proposal to repeat the 1980s approaches to fisheries studies. The 1980s studies do not determine the habitat criteria influencing fish habitat site-selection, they simply report utilization functions for water depth and velocity, or depth and substrate. They also lack a fundamental baseline assessment of all available fish habitat and instead focus on study of habitats that had high fish use density. The habitats that were apparently suitable but unoccupied or underutilized by fish need to be assessed, and the entire range of habitat availability and habitat use data need to be assessed prior to habitat study site selection.	Draft criteria for the selection of study sites were presented during the 9/14/12 TWG meeting, discussed during the 10/02/12 TWG meeting, and are described further in Section 8.5.4.2. Advantages and disadvantages of various stratification and site selection methods have been presented. AEA is committed to the development and implementation of a technically sound and defensible site selection process that is founded on the best available science and information. As noted in Section 8.5.4.2 of the RSP, the proposed approach includes elements of all three of the most commonly used stratification and site selection methods applied in instream flow studies – representative sites, critical sites, and randomly selected sites. AEA maintains that the entire range of habitat availability and habitat use data does not need to be assessed prior to habitat model site selection. Habitat use information can be valuable to ensure that important but scarce habitat types are represented in the site selection process. AEA has proposed Focus Areas that contain examples of the major habitat types

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					and contains areas of high habitat use based on surveys conducted in the 1980s. The proposed site selection process also allows for Focus Areas to be added or modified in 2014 based on the results of data collection efforts in 2012 and 2013. Information on habitat use can also be used during the data analysis and interpretation process to assign weighting factors by habitat type, but this occurs after site selection and habitat modeling. The proposed Fish and Aquatics Instream Flow Study plan is not a repeat of the habitat modeling studies completed in the 1980s. Rather, the proposed studies build upon the data collected during the 1980s studies. AEA considers the information provided in the 1980s studies to be a valuable and informative resource that can be used to help guide and develop its study plans and has accordingly utilized this resource and more contemporary information in developing the RSP.
Email	9/07/2012	Betsy McCracken	USFWS	More comprehensive data collected on nearby glacial rivers may be used to demonstrate that habitat selection by salmon in side-sloughs can be independent of water depth and velocity and should be compiled.	Information on salmon micro-habitat selection in nearby glacial rivers will be presented to the TWG as part of the HSC/HSI development process in 4th Quarter 2013 and 1st Quarter 2014 (Section 8.5.4.5). The proposed Fish and Aquatics Iinstream Flow Study plan acknowledges that salmon habitat selection and use involves more factors than just depth and velocity. The RSP reflects an integrated study approach involving groundwater, water quality, geomorphology and ice processes.
Email	9/07/2012	Betsy McCracken	USFWS	Model selection: We need to first determine what criteria are important to fish habitat site/suitability and selection before we can choose an appropriate flow-habitat model. ADFG Marine Mammals biologist, Dr. Bob Small also reiterated this very same point regarding model selection for the beluga whale studies. Again, the Service notes our concern about the limited focus of the 1980s studies and using	Methods and model selection were presented during the October 2, 2012 TWG meeting and are discussed in more detail in Section 8.5.4.6. The methods/models represent those best suited for evaluating specific habitat types (e.g. main channel, side channel, side slough, upland slough) and are not limited to the standard application of PHABSIM. Specialized methods for evaluating specific processes

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				PHABSIM. Our concerns stated in earlier correspondence to AEA remain unaddressed and are reiterated here for emphasis.	(e.g., effective spawning/incubation, varial zone modeling) and habitat features (e.g. groundwater upwelling, turbidity) are also proposed and will be discussed at TWG meetings in 1st Quarter 2013 and re-visited in 1st Quarter 2014.
Email	9/07/2012	Betsy McCracken	USFWS	Instream Flow, Habitat Utilization, Geomorphology PSPs do not fully address USFWS' resource mgmt. concerns. During 3 days of ILP study meetings, sequencing and integration of proposed biological resource studies and physical processes was not described; significant outstanding info needed.	Additional information was provided during workshops held on August 15-17, September 14, October 2-4, October 23-25 and during a site tour on October 3-4. In addition, additional detail on sequencing and integration of instream flow and physical processes-related studies and other resource studies is provided in the Section 8.5.4.8.
Email	9/07/2012	Betsy McCracken	USFWS	Need to describe the integration of these inter-related studies, how integration will result in a comparison of baseline biological info, resulting effects to biological resources caused by project operations.	Section 8.5.4.8 describes the integration of these inter-related studies, the comparison of alternate operational scenarios to existing conditions, and analysis of Project effects on biological resources.
Email	9/07/2012	Betsy McCracken	USFWS	Study results must be quantifiable to: assess potential losses to aquatic resources, habitats; review Susitna-Watana Hydroelectric Project under relevant fish, wildlife resource conservation authorities; inform fishway prescription authority (FPA Section 18); eventually develop recommended protection, mitigation, and enhancement (PMEs).	The proposed study will produce quantifiable results, as requested by USFWS.
Email	9/07/2012	Betsy McCracken	USFWS	USFWS does not believe current Instream Flow, Habitat Utilization, Geomorphology PSPs will yield sufficient info to allow USFWS to adequately assess proposed Susitna-Watana Hydroelectric Project impacts to US fish and wildlife resources, and to develop adequate PMEs.	In response to this comment and other feedback, the RSP includes additional study detail which was developed through multiple TWG meetings. These RSPs will result in the collection of sufficient information to assess the likely impacts of the proposed Susitna-Watana Hydroelectric Project on fish and wildlife resources, and to develop appropriate PME measures.
Email	9/07/2012	Betsy McCracken	USFWS	USFWS has repeatedly articulated concerns about lack of study sequencing, connectivity, integration between biological studies, other proposed engineering and physical processes studies. Need for	Additional detail on study sequencing and integration between biological studies and habitat modeling studies is described in Sections 8.5.4.7 and 8.5.4.8. Study of Fish Distribution and Abundance in the Middle

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				collection of adequate temporal and spatial baseline biological, fish habitat data to provide direct input to some of proposed physical modeling efforts. Many USFWS concerns are related to temporal mismatch of biological data collection w/ forward momentum of physical modeling efforts.	and Lower Susitna River (RSP Section 9.6), and HSC/HSI data (Section 8.5.4.5) will be collected on a seasonal basis at representative habitat types identified through the stratified sampling program. The biological data will be used to ensure biologically important habitat types are not underrepresented in the habitat modeling efforts.
Email	9/07/2012	Mike Buntjer	USFWS	Early Life History and Juvenile Fish Distribution and Abundance in the Susitna River (USFWS Study Request; Enclosure 13) 6. Collect and provide the Instream Flow study with habitat suitability criteria (HSC) data to support analysis of potential project impacts. Mention of HSC is in Study 6.5, but the study request objective is not addressed in the upper, middle, or lower reaches for juvenile anadromous, resident fish, and non-salmonid anadromous fish studies. It is unclear how HSC information will be collected, particularly in winter for post-emergent fish up to 60 mm when fish will be most vulnerable to load-following operations. I see no empirical baseline information being collected to evaluate potential project effects or for inclusion in habitat modeling efforts. There is generic reference to developing HSC model in Study 6.5 for these species and life stages, but unclear about the source of that information.	Data on the early life history of juvenile fish are being collected as part of the Study of Fish Distribution and Abundance in the Middle and Lower Susitna River (RSP Section 9.6) and represents a collaborative effort of Fisheries, Instream Flow, Groundwater, Ice and Water Quality. Pilot winter studies will be conducted in early 2013 to guide more extensive study efforts planned for winter 2013-2014 and late winter 2014. Some HSC data have already been collected as part of 2012 field studies and the results of those study efforts and proposals to collect site-specific HSC/HSI data in 2013 and 2014 are described in the RSP. In response to this comment and other feedback, Section 8.5.4.5 provides more details regarding methods (locations, survey methods, frequency of sampling, etc.) of HSC/HSI data collection.
Email	9/07/2012	Mike Buntjer	USFWS	Early Life History and Juvenile Fish Distribution and Abundance in the Susitna River (USFWS Study Request; Enclosure 13) 8. Evaluate the potential for stranding of juvenile fish and stranding mortality by season under proposed operational conditions. This Study Request objective is not addressed. Stranding is mentioned in Chapter 6, but the study approach is not discussed	Stranding and trapping will be evaluated using the varial zone model described in Section 8.5.4.6. Stranding and trapping surveys will be conducted in the Susitna River following natural stage reductions on an opportunistic basis during 2013 and 2014. Site-specific data on the size and species of stranded and trapped fish (see Section 8.5.4.5) will be used to validate criteria developed from studies conducted at existing hydroelectric projects exhibiting load-following operations.

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Email	9/07/2012	Mike Buntjer	USFWS	Early Life History and Juvenile Fish Distribution and Abundance in the Susitna River (USFWS Study Request; Enclosure 13) 9. Measure intragravel water temperature in spawning habitats and winter juvenile fish habitats at different surface elevations and different depths to determine the potential for freezing of redds, freezing of juvenile fish, and their habitats. This Study Request objective is not addressed anywhere.	This Study Request objective is addressed in RSP Section 9.6. Plans for completing a pilot winter sampling program at two Focus Areas in 2012 -2013 were presented during the October 2 2012 TWG meeting. In summary, intergravel temperature recorders are scheduled to be installed at several locations within each site. Recorders will be installed as vertical arrays with thermistors located at different depths to capture variable groundwater flow. At two locations, continuous recording dissolved oxygen meters will be installed in the gravel as a means to monitor intergravel dissolved oxygen under winter conditions. Fish sampling will be completed at selected locations within these areas. Pressure transducers will be installed at different habitat types and within the main channel to determine water surface elevation relationships. The results of these pilot studies will be used to guide studies of the intergravel environment to be conducted during the winter of 2013-2014.
Email	9/07/2012	Mike Buntjer	USFWS	Adult Salmon Distribution, Abundance, Habitat Utilization and Escapement in the Susitna River (USFWS Study Request: Enclosure 15) 9. Determine the availability and accessibility of spawning habitats by adult salmon to mainstem and tributary locations based upon flow regime. Unclear if, how, or where this Study Request objective is being addressed. Not listed as an objective in this study; section 6.5.4.3.1 (page 6-19) describes assessing access to rearing and spawning habitats via output from flow routing models. Also, objective 13 (shown below) in fish passage study (section 7.12); page 7-98):	RSP Sections 9.5 and 9.6 describes the methods that will be applied including selection of passage criteria, methods and modeling techniques, and the selection of study sites. This work will be integrated into the Fish and Aquatics Instream Flow Study program (Section 8.5) and will include collection of data by habitat type.
Email	9/07/2012	Mike Buntjer	USFWS	Adult Salmon Distribution, Abundance, Habitat Utilization and Escapement in the Susitna River (USFWS Study Request: Enclosure 15)	RSP Section 9.12 describes the methods that will be applied including selection of passage criteria, methods and modeling techniques, and the selection of

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				13. Evaluate the potential creation of fish passage barriers within existing habitats (tributaries, sloughs, side channels, off-channel habitats) related to future flow conditions, water surface elevations, and sediment transport.	study sites. This work will be integrated into the Fish and Aquatics Instream Flow Study program (Section 8.5) and includes data collection by habitat type within Focus Areas and at potential passage barriers identified by biotelemetry studies (RSP Section 9.6)
Email	9/07/2012	Mike Buntjer	USFWS	Adult Salmon Distribution, Abundance, Habitat Utilization and Escapement in the Susitna River (USFWS Study Request: Enclosure 15) 10. Measure critical habitat characteristics (e.g., channel type, flow, substrate, and groundwater) at reaches used for spawning and compare these characteristics with those in adjacent reaches that do not contain spawning adults. Do not see this study request objective addressed or any objective that looks at characterizing use, availability, or quality of potential spawning habitats. There appears to be no empirical baseline information being collected; only see determining distribution and potential abundance of redds. Also, see mention of evaluating potential dewatering or scouring of redds in Chapter 6, but no empirical baseline information to assess daily load-following operations.	Studies to evaluate potential Project effects on salmonid spawning will integrate groundwater, geomorphology, ice processes and water quality (see Section 8.5.4.8). The effects of daily load-following operations will be addressed as part of the varial zone modeling and effective spawning analyses that were discussed during the October 2, 2012 TWG meeting and described in Section 8.5.4.6.
Email	9/12/2012	Eric Rothwell	NMFS	General – All PSPs: What can be determined from each of the study components, a description of deliverables (not results) this will help us understand if our requests have been met.	Thank you for this suggestion. Specific deliverables will be identified under specific subheadings in Section 8.5.4.
Email	9/12/2012	Eric Rothwell	NMFS	General – All PSPs: How will uncertainty be determined for each of the study components? (ice processes -> hydraulic flow routing -> winter fish and habitat effects)	Determination of uncertainty and procedures to address uncertainty will be described in the respective RSP sections for each of the study components. For example, with respect to the Mainstem (Open-water) Flow Routing Model, calibration details will allow uncertainty to be calculated by comparing simulated versus observed conditions at different locations in the stream (Section 8.5.4.3).
Email	9/12/2012	Eric Rothwell	NMFS	General – All PSPs: How will incomplete study	The studies are designed to be adaptive so that

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				components, data, or results be dealt with - situations where an extension of the study period is necessary.	information learned during 2013 will be used to refine methods, approaches and study locations applied in 2014. In the event that there are incomplete study components, data, or results, AEA, in consultation with the TWG, will assess the significance of such and respond accordingly.
Email	9/12/2012	Eric Rothwell	NMFS	Site Selection Process: The data from the 1980s provides some useful information about utilization of off-channel habitats that should inform our studies but the information is limited in that it does not fully capture mainstem utilization or overwintering. So, with new fish utilization and distribution information site selection should include some flexibility to include sites where life histories are not assessed under the currently proposed sites. This seems to be suggested in the site selection process schedule if it includes fish distribution/habitat utilization information, November 2013 evaluate summer 2013 data and modify/add sites as needed in collaboration with TWG	Yes, as described in the RSP Section 9.6, data on fish distribution, and utilization by habitat type will be collected seasonally in both main channel and off-channel habitats. Fish distribution and abundance data, intergravel monitoring and winter fish behavior observations, and channel and hydraulic data, will also be collected at Focus Areas in 2013. In collaboration with the TWG, these data will be used to modify/add Focus Areas in March 2014 to allow additional data collection in 2014.
Email	9/12/2012	Eric Rothwell	NMFS	Site Selection Process: If possible an addendum to the PSP or definitely in the RSP a description of the initial site selection (by the hierarchical framework) and refinement (by habitat mapping results and fish studies) methods should be presented, not just the selected sites. This depends on the fish studies being sufficient to describe the full distribution of fish and their habitat use.	The hierarchical framework of habitat classification used to support instream flow study site selection and refinement will be presented in RSP Section 9.9. The process and criteria used to identify proposed Focus Areas, and a list of the areas will be identified in Section 8.5.4.2.
Email	9/12/2012	Eric Rothwell	NMFS	Site Selection Process: The 1980s sampling focused on the off-channel habitats (side sloughs/channel, upland sloughs, and confluences with tributaries). This information should be used to inform selections but must also be put into context that we really don't know very much about mainstem utilization and overwintering, and so need to be flexible (potential with extended study years) when a better understanding is gained through the 2013 and 2014	Although limited by available technology, nearly four years of surveys conducted in the early 1980s provide background information on fish and habitat distribution. Assumptions developed in the 1980s regarding main channel utilization and overwintering will be tested through the use of new methods such as dual frequency identification sonar (DIDSON) (http://www.didson.com). The study site selection and review process (Section 8.5.4.2) provides the

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				fish studies.	opportunity and flexibility to modify/add sites as new information becomes available.
Email	9/12/2012	Eric Rothwell	NMFS	Site Selection Process: The slides on each of the species, I had a general comment that they should be put into perspective. That the 1980s data does not represent a complete understanding so comments like no mainstem spawning should be qualified. There likely is a riverine component to sockeye (and other species) that do spawn in the river but that just wasn't captured in the 1980s due to the methodologies available. We do not currently know the full spawning distribution.	The draft slides referenced in this comment presented the summary results of multiple years of study conducted in the early 1980s along with source citations. When distributed at the September 14, 2012 TWG meeting, qualifiers were added to the slides to identify the information as 1980s observations. Studies to identify the current spawning distribution, using recent advancements in survey techniques (e.g., DIDSON), are proposed in RSP Sections 9.5 and 9.6.
Email	9/12/2012	Eric Rothwell	NMFS	Site Selection Process: The ice process modeling will need several years of data, in addition to the ice thickness measurements and discharge measurements at each of the cross-sections for the winter routing model. I see a lack of time to collect data for the models (winter flow routing and ice process) calibrate the models and then selection sites and methods to conduct ISF studies to assess project effects on fish during winter operations under the currently proposed study period.	Ice process modeling results (RSP Section 7.6) will be available prior to the 2014 summer instream flow sampling period allowing sufficient time to add or modify instream flow Focus Areas as needed to evaluate Project effects during winter operations.
Email	9/18/2012	Joe Klein	ADNR-ADF&G	I am concerned, however, that at the pace we are going we are going to run out of time before we have the opportunity to thoroughly discuss key elements (e.g., target species, HSC development, methods per habitat types, transect selection criteria and number, desired outputs). I am grateful for the time extension granted by FERC and encourage you and your staff to take advantage of this opportunity to put forth a concerted effort to hold more meetings (either in person or via teleconference) and address the study topics mentioned.	The current schedule provides sufficient time to address key elements and AEA is committed to working collaboratively with the NMFS and others on finalizing the RSP. Additional TWG meetings were held on Oct 2, 4 and 24 to discuss site selection, habitat modeling methods, and other details of the instream flow study. Thorough discussion of various details of the instream flow study will continue during monthly TWG meetings scheduled through December 2013.
Email	9/18/2012	Joe Klein	ADNR-ADF&G	Please include a definition list for each study plan of key terms. We are not overly concerned about	Thank you for the suggestion. A list of key study terms will be provided as a table in each technical section of

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				consistency between groups since different specialties often have their own terminology, however a list would help understand these differences/similarities.	the RSP.
Email	9/18/2012	Joe Klein	ADNR-ADF&G	After reading my notes, details about the sampling approaches discussed are not clear to me. For example, how many intensive sites are planned? I believe the fish studies mentioned the previous day that they were looking at 8-10 sites – would these be the same? For both instream flow and riparian studies? What is the sampling approach for other habitats in addition to identified critical sites?	Proposed Focus Areas for the Middle Susitna River were identified and described during the September 14, 2012 TWG meeting. A description of proposed Focus Areas is provided in Section 8.5.4.2.These Focus Areas may be modified in collaboration with the TWG in early spring 2013 after the habitat mapping results (RSP Section 9.9) are available. These Focus Areas will include sampling for Fish and Aquatics Instream Flow, Riparian-Instream Flow, Groundwater, Geomorphology, Water Quality and Ice Processes in the Susitna River Studies.
Email	9/18/2012	Joe Klein	ADNR-ADF&G	We support and agree with the approach proposed for using 2-D modeling for sampling the intensive sites.	Complex Focus Areas, such as Whiskers Slough and Slough 8a will be modeled using 2-D techniques. Transect-based techniques may be appropriate to model less complex Focus Areas, such as Slough 6a. The selection of modeling techniques are described in Section 8.5.4.6 and confirmed in collaboration with the TWG in late 1st Quarter 2014.
Email	9/18/2012	Joe Klein	ADNR-ADF&G	Likewise, we support and agree with the approach proposed for assessing surface water/ground water interactions.	Comment noted.
Agency consultation meeting	9/27/2012	Joe Klein	ADNR-ADF&G	Requests that any historic data used for stranding / trapping be referenced.	Citations for historic stranding and trapping studies or data referenced in the Fish and Aquatics Instream Flow Study are provided in Section 8.5.8.
Agency consultation meeting	9/27/2012	Joe Klein	ADNR-ADF&G	Requests all low gradient areas, including islands and gravel bars, be modeled in the middle river.	Low gradient areas (i.e., <4% gradient), including islands and gravel bars, will be mapped and modeled within Focus Areas (Section 8.6.4.6). Low gradient areas will modeled as part of the digital terrain models developed from a combination of Focus Area-specific bathymetry and remote sensing data. Extrapolation of the analysis of low gradient Focus Areas to other areas will rely on digital terrain models developed through

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					remote sensing.
TWG meeting	10/1/2012	Eric Rothwell	NMFS	Requests 2-D modeling at Whiskers Slough and Slough 8A Focus Areas (if these Focus Areas are chosen).	2-D modeling is proposed at Whiskers Sough and Slough 8A Focus Areas (Section 8.5.4.6).
Riparian Instream Flow Study (Section 8.6)					
Email	9/11/2012	Bob Henszey	USFWS	Section 6.6.4.7 (Succession Models and Flow Response Guilds) appears to potentially address the USFWS's Objective 6 request; however, two critical referenced papers (Merritt et al. 2010 and Pearlstine et al. 1985) were not included in the Literature Cited. These references were not provided until 8/28/2012, and the USFWS has had insufficient time to review these papers in detail. The concept of the PSP response guilds is similar to the USFWS's request to develop plant community response curves, but the PSP methods are insufficient to evaluate if our requested Objective 6 will be met. The USFWS requested evaluating specific water-level summary statistics (see above discussion for groundwater) with a rigorous curve-fitting technique similar to Henszey et al. (2004). The methods should provide sufficient detail to show how quantifiable (not qualitative) hydrologic (surface-water and groundwater) gradients will be constructed to show the optimum and range of favorable water levels required for maintaining floodplain species/communities.	Additional detail has been added to Section 8.6.4.7 to demonstrate that USFWS Objective 6 will be met by the proposed methods. In response to this comment and other feedback, a description of the hydrologic gradient analyses is provided in RSP Section 7.5: Groundwater. This description provides detail to show how quantifiable hydrologic (surface-water and groundwater) gradients will be constructed to show the optimum and range of favorable water levels required for maintaining floodplain species/communities.
Email	9/11/2012	Bob Henszey	USFWS	Study Goals and Objectives: The USFWS requested a specific goal that included quantifying the frequency, timing and duration of surface-water and groundwater levels required to establish, maintain, and promote floodplain and riparian plant communities. Two ancillary goals were also requested to quantify the frequency and rate of sediment deposition required to promote soil development, and to quantify the effect of river ice on the establishment and persistence of	Section 8.6.3 (Study Methods) provides: "Objectives of the modeling approach are to: "(1) measure and model riparian vegetation physical process relationships under the natural flow, sediment and ice regimes, (2) model potential impacts to riparian vegetation resulting from proposed Project operational changes to natural flow, sediment and ice regimes." In addition, Section 8.6.3.2 provides: "Metrics and

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				riparian plant communities. Section 6.6.1.1 of the PSP has no stated goal, and only a general approach is provided. An "overarching goal" is provided in the Section 6.6.4 Study Methods, but this goal is also very general. While goals can be very general in nature, the specifics in our goal set the stage for a rigorous study plan to evaluate potential project-related effects on floodplain plant communities.	indices will be developed for quantitatively describing the relationship between floodplain plant communities and the varying groundwater and surface water hydroregime. Probabilistic response curves will be developed for select plant species and all riparian plant community types using techniques described in Rains et al. (2004) and Henszey et al. (2004)." Goals and specific objectives are further clarified in Section 8.6.3.6.
Email	9/11/2012	Bob Henszey	USFWS	Study Goals and Objectives: The USFWS requested six objectives to help meet our goal. Three of the PSP objectives are similar to our requests {1) Synthesize 1980s data, 2) Study sites, and 6) Seed dispersal}, but they lack the additional specifics stated in our requested objectives. Two of the PSP objectives appear to be wholly or at least partially the objectives for other PSPs and not appropriate as stated {3) Map riparian vegetation, and 10) Impacts to shallow groundwater well users}. What the PSP objectives lack, however, are our specific requests for river ice, sediment deposition, and water-level regime (USFWS Objectives 4, 5, and 6). These missing objectives may be studied under AEA's PSP objectives, but the USFWS prefers they be considered as standalone objectives, and possibly integrated into a single modeling objective after they have been studied individually. The USFWS is particularly interested in our Objective 6 to characterize the water-level regime required to maintain floodplain and riparian plant communities. Much of the discussion so far has focused on floodplain plant succession, but little or no discussion so far has involved maintenance flows. Succession is important, but without maintenance flows whole floodplain plant communities may collapse or the direction of succession changed	The RSP includes each of the USFWS requested six objectives, and these objectives have been specifically identified in the text of each appropriate RSP study plan section. USFWS Objective 6 to characterize the water-level regime required to maintain floodplain and riparian plant communities (maintenance flows) is an objective of the Groundwater / Surface Water Interaction Modeling Study and is clearly stated as such in Section 8.6.3.6. In addition, collection of vegetation data will be shared between the Riparian Study (Section 11.6) and Riparian Instream Flow Study (Section 8.6). Pre-development vegetation types will be mapped in the Riparian Study, and then will be used to map the predicted changes in vegetation based on changes in flow, groundwater/surface water interactions, ice, etc., derived from modeling conducted in the Riparian Instream Flow Study. Impacts to shallow groundwater well users was added to the groundwater / surface water study overall objectives during PSP development. The shallow groundwater impact analysis has been moved to the Groundwater Study (Section 7.5).

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				to an unnatural target (e.g., non-floodplain plant communities).	River ice, sediment transport and deposition, and water-level regime analyses will be studied individually and then integrated into the overall riparian vegetation physical processes modeling approach including Section 8.6.3.4 "Characterize the role of river ice in the establishment and recruitment of dominant floodplain vegetation. Develop predictive model of potential Project operational impacts to ice processes and dominant floodplain vegetation establishment and recruitment." Section 8.6.3.5 "Characterize the role of erosion and sediment deposition in the formation of floodplain surfaces, soils and vegetation. Develop a predictive model of Project operations changes to erosion and sediment deposition pattern and associated floodplain vegetation."
Email	9/11/2012	Bob Henszey	USFWS	Study Area: The USFWS agrees with the PSP study area and four river segments, with the following additional comments. The width of the active valley should also include the distance from the River that the River influences groundwater, as well as define the return interval for both groundwater and flooding (e.g., 100-year event under current or climate-change induced conditions). Much discussion has centered on the downstream influence of the Project. The PSP study area Lower Reach would extend to RM 0. Will this lower extent remain even if all agree that the Project influence on surface- and ground-water becomes indistinguishable from normal environmental variation?	The Project Study Area includes the active floodplain, the valley area flooded under current climatic conditions. By definition the active floodplain is that valley region currently flooded. The 100-year flood has legal significance when it comes to establishing floodplain insurance rates, but we have not seen any studies that link it to physical processes. When flows exceed bankfull (recurrence interval = 1.5 years), the river will start to interact with the floodplain. As flows increase beyond bankfull, the river will interact with more of the floodplain surface area. A recent point of reference is the September 2012 flood (peak = 79,000 cfs at Gold Creek). This flood had a recurrence interval of almost 25 years. Rather than trying to pick a recurrence interval for a valley flood condition, we will use the HEC-RAS model to determine the flood magnitude that floods the geomorphically delineated valley floor. The lateral floodplain geographic extent will be mapped out using LiDAR shaded relief map to identify slope breaks between adjacent hill slope and valley bottom

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					alluvial surfaces, the "active floodplain." Surface water / groundwater influences will be sampled and modeled in the groundwater / surface water interaction study. The lower extent of the Project Area will be assessed by the flow routing modeling to the extent of Project operational influence. The final Lower River study area extent will be determined by examining the flow routing model results in consultation with the TWG.
Email	9/11/2012	Bob Henszey	USFWS	Study Methods: The methods need to follow the order of the objectives and use section headings that refer to the intent of the objectives	Agreed. The RSP will have individual study element objectives and methods with section headings.
Email	9/11/2012	Bob Henszey	USFWS	Study Methods: Few methods are referenced, and some references that are cited are not included in the literature cited.	All methods will be referenced and missing references will be included in the RSP.
Email	9/11/2012	Bob Henszey	USFWS	Study Methods: The relationship with other PSPs often seems confusing. It would be more helpful to state what results will be required from PSP "x" to evaluate a Riparian ISF objective, and potentially what results from a Riparian ISF objective will be required by PSP "y." It is not necessary to repeat coordination for every objective, only state the inputs required and the outputs provided by an objective. This applies across PSPs and among a PSPs objectives.	In response to this Comment and other feedback, flow diagram will be included in the RSP showing the input / output relationships between the various PSPs and Riparian IFS. The RSP narrative will reflect and explain the flow diagram input / output structure.
Email	9/11/2012	Bob Henszey	USFWS	RIFS-1 Synthesize Historical Data: In addition to other North American hydro-projects, this review should also include a review of relatively undisturbed riverine systems.	Scientific literature available concerning relatively undisturbed riverine floodplain systems will be incorporated into the historical data synthesis.
Email	9/11/2012	Bob Henszey	USFWS	RIFS-2 Select and Design Study Sites: The number of study sites should provide sufficient replication to address the needs of the objectives, and should include sites where Project operation is expected to cause early channel bed degradation or aggradation. The casual reference to pseudoreplication in one of the other objectives needs	Focus Areas have been proposed in the Middle River between the Project site, RM 184, and Devils Canyon, the river segment likely to exhibit early channel bed degradation in response to Project operations. Aggradational areas will be determined through the sediment transport and fluvial geomorphological studies. The issue of pseudoreplication and number of

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				to be addressed at the study-site level. Study sites are typically the experimental unit where replication is used for true statistical analysis. All other sampling (e.g., within the study site) is really subsampling used to obtain a better average value for that one replicate. As envisioned by many of the PSPs, the "representative" study sites are really only one replicate for each process-domain. For more on pseudoreplication see: Hurlbert, Stuart H. 1984. Pseudoreplication and the Design of Ecological Field Experiments. Ecological Monographs 54:187–211. http://dx.doi.org/10.237/1942661	sample sites is addressed in the hierarchical riparian process domain sampling design. The Focus Areas will be representative of specific riparian process domains and their channel / floodplain characteristics (ice process domains, channel plan form, channel slope, channel confinement). The Focus Area physical processes will be modeled and floodplain vegetation-flow response relationships determined. The sampling design will be further described in Section 8.6.3.2. The Riparian Botanical Survey is designed to provide Project Area wide representative sample replicates of floodplain vegetation, soils and alluvial terrain relationships. Furthermore, surface water flood regime for the Project Area will be modeled providing flow regime plant community relationship analysis replicates throughout the Project Area, in addition to the Focus Area sites.
Email	9/11/2012	Bob Henszey	USFWS	RISF-3 Characterize Seed Dispersal and Frequency of Establishment: Not sure where this objective is addressed in the PSP. It appears to be scattered across several sections in the methods. If the methods have been described by other similar projects, then cite their methods if appropriate and include enough details to help others understand the methods that will be used. How will the Susitna River bimodal peak flows be addressed? On a float trip down the Susitna 27-29 July 2012, there were newly emerging dicot seedlings on the sandbars. How will the fate of these "second peak" seedlings be addressed? How will the role of precipitation in maintaining favorable soil moisture conditions be evaluated? Will soil texture be considered? If so, how will the soil profile be described?	RISF 3 is addressed specifically in Section 8.6.3.3; methods proposed will be further documented with citations in this section. Bimodal peak flows will be addressed by measuring and modeling such flows at each Focus Area. "Second peak" seedling fate will be assessed in the seedling recruitment plot study by aging woody seedlings and quantifying these "recruitment flow regime" characteristics. The role of precipitation in maintaining favorable soil moisture conditions will be evaluated by measuring precipitation at each Focus Area meteorological station and soil surface moisture at each Focus Area. Further methodological details will be provided in the Groundwater Study RSP Section 7.5.

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					Soil texture will be considered by sampling, measuring and describing soil stratigraphy using standard NRCS soils survey protocols (Field Book for Describing and Sampling Soils by Schoeneberger, Wysocki, Benham, and Broderson, 2002.
Email	9/11/2012	Bob Henszey	USFWS	RISF-3 Characterize Seed Dispersal and Frequency of Establishment In Section 6.6.4.3.1.4: Is "abundance" density or some other metric? What is "elevation" referenced to: ASL, an arbitrary datum, or some elevation that can be linked to the local river or groundwater stage (keep in mind the river drops downstream, so that must be accounted for also)? Is there a citation for others using 2-meter square plots? What is the shape of these plots? A square plot may not be appropriate for a narrow band of seedlings along a specific elevation in the gradient above the river. MODFLOW is a groundwater model, and many not be sensitive enough to quantify hydroperiod relationships for seedlings. What other metrics will be used to quantify/separate surface water, groundwater, soil moisture, precipitation, and other potential hydrological process that support seedling establishment and recruitment?	Abundance will be measured as percent cover (herbs, shrubs) or stem density (trees, saplings). Abundance measurement methodological details and citations will be supplied in Section 8.6.3.7. "Elevation" references to plot elevations. Plot elevations will be surveyed and tied into a project wide standard datum. Agreed, vegetation plot sample size and shape methods citations will be provided in Section 8.6.3.7. Seedling plot groundwater regime will be both modeled with MODFLOW and a subset of wells will be located within seedling areas allowing for groundwater seedling response curves to be developed to check precision of MODFLOW results with local well data. Further details of MODFLOW groundwater level modeling precision will be described in the RSP. Detailed groundwater / surface water modeling metrics necessary to assess seedling establishment and recruitment conditions will be provided in the RSP. Metrics will include: meteorological stations at each Focus Area to measure local precipitation, and measurements of the height of the capillary fringe relative to the groundwater surface at well points to measure effective soil pore water availability to seedlings.
Email	9/11/2012	Bob Henszey	USFWS	RISF-3 Characterize Seed Dispersal and Frequency	Natural seed dispersal hydro and sediment regime

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				of Establishment; How will the results from this objective be used to predict potential Project-related changes in seedling establishment and recruitment into the population?	relationships will be measured in the field. Project operational changes to the natural hydro and sediment regimes will be assessed and changes to the natural seedling recruitment and establishment "physical template" will be assessed. Potential Project-related changes to seedling recruitment and establishment sites will be compared first at the Focus Area sites and then throughout the Project Area to model potential Project-related changes in the recruitment "safe site" conditions (Harper, J. 1977. Population Biology of Plants), Section 8.6.3.5 and Section 8.6.3.7.
Email	9/11/2012	Bob Henszey	USFWS	RISF-4 Characterize the Role of Ice in the Establishment, Survival and Recruitment of Riparian Species: The discussion on ice processes (Section 6.6.4.4.1) seems unfocused, and essentially provides no discernible methods: "Final details of the geomorphology and ice processes modeling will be developed as the 2012 studies are obtained." The goal of this study should be to characterize the role of river ice in the establishment (colonization), survival (first 3 years) and recruitment into the future reproductive population of dominant riparian species (e.g., balsam poplar, willows). Have others investigated the role of ice on riparian plant communities? If so, can their methods be used here? How will the magnitude, frequency, and longitudinal distribution of ice events affecting dominant riparian species/communities be evaluated?	The ice processes (Section 8.6.3.4) has been revised to clarify the methodology in light of 2012 summer fieldwork and further development of the ice process study plan. One goal of this study will be to characterize the role of river ice in establishment, survival and recruitment of dominant riparian species. There has been limited research into this question on boreal rivers, however a recent publication by Engstrom et al., Effects of River Ice on riparian vegetation. (Freshwater Biology 2011, 56: 1095-1105) begins to address this question. A similar study approach and methods will be developed and presented in the RSP. The magnitude, frequency and longitudinal distribution of ice events affecting riparian species/communities will be assessed by a combination of on-the-ground surveys of tree ice-scar distribution (mapping and aging with dendrochronology) and the results of the ice processes modeling. A geospatial analysis of the modeled, and empirically mapped locations, of ice floodplain interactions will be conducted. A study approach to characterizing role of river ice process in establishment, survival and future plant community development is presented in Section 8.6.3.4.

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					Tree ice-scars, first identified in summer 2012 fieldwork, will be used to map ice floodplain interaction zones along the river. Ice process modeling will also be used to identify the vertical and lateral extent of ice floodplain vegetation interaction zones (Section 8.6.4.3).
Email	9/11/2012	Bob Henszey	USFWS	RISF-5 Characterize the Role of Sediment Deposition in the Formation of Soils: The proposed soil sampling techniques are included in Section 6.6.4.3.1.5, but based on these techniques it is unclear how the USFWS requested objective to characterize the role of sediment deposition in the formation of floodplain and riparian soils, and how sediment deposition affects the rate and trajectory of plant community succession. This objective should investigate the rate of deposition, depth of sediment, and soil profile development required for natural floodplain plant community succession, and then use the predicted sediment deposition characteristic from the Fluvial Geomorphology Study to predict the effects of Project operation on floodplain plant communities. Sampling to only a depth of 50 cm, and describing cumulative thickness of all organic horizons and loess (windblown material?) without stratigraphy will likely be insufficient to meet this objective. Soil texture by feel should follow standard techniques (e.g., Thien 1979, http://soils.usda.gov/education/resources/lessons/texture/).	The characterization of the role of sediment deposition in the formation of soils will be conducted in three ways: (1) sediment rates will be determined throughout the project area by dating floodplain sediments to determine rates of sedimentation, (2) sediment dating techniques will include dendrochronology (tree age of alluvial surface), and sediment isotopic analyses (Cs137, Pd210), and soil stratigraphic descriptions and vertical profile measurement. Probabilistic models will be developed characterizing the relationship between plant community successional stage, soil type and sediment depositional history. The fluvial geomorphology 2-D sediment transport models will be used to predict the effects of Project operations on sediment transport and depositional patterns. Changes in sediment depositional patterns, soil development and effects on plant community recruitment and development will be modeled. Further methodological details will be provided in the RSP. The rate of deposition, depth of sediment, and soil profile development required for natural floodplain plant community succession, and then use the predicted sediment deposition characteristic from the Fluvial Geomorphology Modeling below Watana Dam Study to predict the effects of Project operation on floodplain plant communities.] Standard NRCS (2002) soil sampling protocols are

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					being used, including measuring stratigraphy and soil texture. Yes, NRCS (2002) field manual is based upon Thien (1979). Soil stratigraphy will be described and measured. Sediment transport and deposition are being modeled in the Fluvial Geomorphology Modeling below Watana Dam Study. The integration of the Fluvial Geomorphology Modeling below Watana Dam Study and the Riparian IFS will be further described in the RSP.
Email	9/11/2012	Bob Henszey	USFWS	RISF-6 Characterize Water-Level Regime Required to Maintain Floodplain and Riparian Plant Communities: This is a critical objective that has not been sufficiently discussed in past workgroup meetings, possibly due to lack of time, and the PSP methods are insufficient to evaluate if the USFWS requested objective will be met. Suggest this objective be discussed near the beginning of future meetings to allow sufficient time for discussion.	Yes, this subject was covered in greater detail in the October 1, 2012 Riparian TWG meeting. The Study Plan has been revised to provide specific details on methodology and additional literature citations. See Groundwater Study RSP Section 7.5 for further details.
Email	9/11/2012	Bob Henszey	USFWS	Objective 6 combines hydrologic information from the groundwater study (PSP 5.7) and the plant community information from this study (PSP 6.6) and possibly the habitat mapping studies (PSPs 9.6 and 9.7) to produce plant species/community response curves. The USFWS's Objectives RISF-3 to RISF-5 target critical stages in plant community succession, while RISF-6 targets critical instream flows required for maintaining plant communities as succession progresses (i.e., both succession and maintenance are important). The methods for groundwater belong in the Groundwater PSP, and not in this PSP for reasons discussed above. This PSP should request the required hydrologic information from PSP 5.7 and	Groundwater methods will be moved from the Riparian PSP to the Groundwater RSP (RSP Section 7.5).

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				begin the discussion from that point.	
SECTION 9 FISH AND AQUATIC RESOURCES					
General					
Email	9/07/2012	Betsy McCracken	USFWS	Resource valuation of non-salmon anadromous and resident fish resources. During the meeting, AEA consultants stated that a resource valuation would not be provided, as requested in the Service's study request for non-salmon anadromous, resident and invasive fish study. We request that an explanation be provided that describes the rationale for this determination and urge reconsideration of our study request.	AEA is not providing a resource valuation because FERC does not require a monetary value be placed on fish and wildlife resources potentially affected by a proposed project.
Email	9/07/2012	Betsy McCracken	USFWS	Trophic ecology- The Service requested information on trophic ecology in the non-salmon anadromous, resident and invasive species study request. The trophic ecology component needs to be clearly spelled out in a study plan identifying any aspects that will and will not be addressed explained and with appropriate rationale.	AEA has revised the River Productivity Study plan (see Section 9.8.4.5.2) to incorporate sampling at multiple trophic levels including: organic matter, periphyton, macroinvertebrates and fish. In addition AEA has incorporated trophic model(s) that will allow AEA to describe the trophic ecology of the river with respect to supporting fisheries resources. The model(s) will also allow for evaluation of potential project effect at multiple trophic levels.
Email	9/07/2012	Michael Buntjer	USFWS	In Study Request = Measure intragravel water temperature in spawning habitats and winter juvenile fish habitats at different surface elevations and different depths to determine the potential for freezing of redds, freezing of juvenile fish, and their habitats.	A hyphoreic study plan has been added to the ISF program that will address intergravel temperatures. See RSP Section 8.5.2.1.6 for Instream Flow.
Email	9/07/2012	Michael Buntjer	USFWS	In Study Request = Evaluate the potential for stranding of juvenile fish and stranding mortality by season under proposed operational conditions.	An early life history study object has been added to the Study of Fish Distribution and Abundance in the Middle and Lower Susitna River. See Section 9.6.4.3.3. This new objective includes several subobjectives one of which is to evaluate baseline conditions for stranding of juvenile fish. This stranding study also will be incorporated into the ISF Program Varial Zone model and will be used to evaluate future potential risk for

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					stranding under proposed project operational conditions. This stranding study will be used to assess the risk of stranding mortality to fry under varying flow conditions.
Email	9/07/2012	Michael Buntjer	USFWS	In Study Request = Collect and provide the Instream Flow study with habitat suitability criteria (HSC) data to support analysis of potential project impacts. Comment = Mention of HSC is in Study 6.5, but the study request objective is not addressed in the upper, middle, or lower reaches for juvenile anadromous, resident fish, and non-salmonid anadromous fish studies. It is unclear how HSC information will be collected, particularly in winter for post-emergent fish up to 60 mm when fish will be most vulnerable to load-following operations. I see no empirical baseline information being collected to evaluate potential project effects or for inclusion in habitat modeling efforts.	HSC methods are described in the ISF Program HSC Study Plan. See RSP Section 8.5.2.1.5. These data are also being collected by Fish Distribution and Abundance Field Teams in locations where target species and life stages are found. Teams will follow the ISF study plan methods. In addition, AEA has revised the Study of Fish Distribution and Abundance in the Middle and Lower Susitna River (See Section 9.6.4.3.3) to provide more detail regarding focused sampling for fry less than 60mm. This sampling will provide empirical baseline data that will be used to inform habitat modeling efforts.
E-mail	9/07/2012	Betsy McCracken	USFWS	Instream Flow, Habitat Utilization, Geomorphology PSPs do not fully address USFWS' resource mgmt. concerns. During 3 days of ILP study meetings, sequencing and integration of proposed biological resource studies and physical processes was not described; significant outstanding info needed.	AEA has revised the study plans to describe the integration of proposed biological resource studies and physical processes. See RSP Sections 9, and 8. Interdependencies Flow Charts have been added to all study plans to show the flow and integration of data across studies. See RSP Sections 9 and 8.
E-mail	9/07/2012	Betsy McCracken	USFWS	Need to describe the integration of these inter-related studies, how integration will result in a comparison of baseline biological info, resulting effects to biological resources caused by project operations.	Interdependencies Flow Charts have been added to all study plans to show the flow and integration of data across biological resources. This baseline information will be available to support effects analysis but it is premature to identify specific analyses that will be applied before baseline data are available.
E-mail	9/07/2012	Betsy McCracken	USFWS	Study results must be quantifiable to: assess potential losses to aquatic resources, habitats; review SuWa Project under relevant fish, wildlife resource	In the RSP, AEA has included additional detail that will clarify how data will be collected in support of future quantifiable assessments.

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				conservation authorities; inform fishway prescription authority (Sec. 18 FPA); eventually develop recommended protection, mitigation, enhancement.	
E-mail	9/07/2012	Betsy McCracken	USFWS	USFWS has repeatedly articulated concerns about lack of study sequencing, connectivity, integration between biological studies, other proposed engineering and physical processes studies. Need for collection of adequate temporal and spatial baseline biological, fish habitat data to provide direct input to some of proposed physical modeling efforts. Many USFWS concerns are related to temporal mismatch of biological data collection w/ forward momentum of physical modeling efforts.	Interdependencies Flow Charts have been added to all study plans to show the flow and integration of data across studies and resource programs. This detail includes temporal and spatial biological data on fish and aquatic habitat. The biological data collection is being coordinated closely with the physical modeling, for example the collection of data from multiple resources in Focus Areas. The biological data on fish distribution and abundance and habitat characterization will be used to inform the ISF model.
Study of Fish Distribution and Abundance in Upper Susitna River (Section 9.5) and Study of Fish Distribution and Abundance in Middle and Lower Susitna River (Section 9.6)					
TWG meeting	8/15/2012	Joe Klein	ADNR-ADF&G	Request methods for shocking to include block nets.	Block nets have been added to methodology in RSP. See RSP Section 9.5.4.4.2, 9.6.4.4.2
TWG meeting	8/15/2012	Various	USFWS	Study site selection should follow a stratified random design.	A stratified random design is being proposed. AEA has included additional detail and documentation in the RSP regarding the sampling effort by strata. See RSP Section 9.5, and 9.6. In addition, strata have been modified per review of the 2012 video in the middle and lower river. This modification is presented in both Habitat Characterization and Fish Distribution and Abundance Revised Study Plans. See RSP Section 9.5.4.1, and 9.6.4.1.
E-mail	8/23/2012	Joe Klein	ADNR-ADF&G	Minnow trapping under ice should be used during the winter, in all habitat types.	Winter access in the Upper River will be evaluated in a pilot study conducted this winter (2012-2013). Depending on the results of the pilot study AEA will add minnow trapping under ice in multiple locations to Middle River sampling methodology in the RSP. See RSP Section 9.6.4.3.1.
E-mail	8/23/2012	Joe Klein	ADNR-ADF&G	Evaluate the feasibility of under ice videography.	Winter access in the Upper River will be evaluated in a pilot study conducted this winter (2012-2013). Depending on the results of the pilot study AEA will

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					add video under ice in multiple locations to Middle River sampling methodology in the RSP. See RSP Section 9.6.4.3.1.
E-mail	8/23/2012	Joe Klein	ADNR-ADF&G	Request use of trot lines in winter.	Winter access in the Upper River will be evaluated in a pilot study conducted this winter. Depending on the results of the pilot study AEA will add the use of trot lines for winter sampling in the Middle River to the RSP for the Middle and Lower River. See RSP Section 9.6.4.3.1, 9.6.4.4.4.
Email	9/07/2012	Betsy McCracken	USFWS	A first step is to assess the seasonal distributions of target species and life stages and the physical habitat criteria that influence habitat selection and suitability. As a first step, target species have to be identified, agreed upon, and their life history and habitat use similarities to other, unstudied species (i.e., non-target species) need to be determined and described. In the study requests of the Service and other agencies, we recommended studying the baselines of all affected fish species and life stages, including all five species of anadromous salmon and all resident fish.	AEA will be studying seasonal distribution and life stages of all target species as described in detail in Objective 1 of the Fish Distribution and Abundance Study Plan. Target species lists were presented, discussed and agreed upon in TWG meetings in May. Since that time specific additions have been requested by ADF&G and USFWS and these requests have been added to that study plan. See RSP Section 9.6.4.3. In addition, AEA is proposing a habitat based sampling design for Fish Distribution and Abundance. Part of the value in this approach is that all fish species and life stages present at sampling locations will be targeted. Multiple methods will be used at each location to capture all species and life stages present, including all five species of anadromous salmon and resident fishes. See RSP Section 9.6.4.1.
Email	9/07/2012	Betsy McCracken	USFWS	Fish distribution data are needed to describe the baseline data to support and compliment other proposed study objectives, including those related to fish habitat selection and utilization. A first step to acquiring adequate fish distribution is to assess the full lateral and longitudinal profile of seasonal fish distribution, life stage periodicity, and suitable used and unused habitats that are influential in fish habitat site selection.	Fish distribution data will be collected as part of Objective 1 of the Fish Distribution and Abundance Study Plan. Data will be collected in representative habitats and across all seasons in the middle and lower river. Data will be collected in the open water period in the upper river. See RSP Section 9.5.4.3.1, 9.6.4.3.1. AEA is proposing a habitat based sampling design for Fish Distribution and Abundance. This approach

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					includes seasonal sampllng throughout that lateral and longitudinal habitats identified in the Susitna River. Part of the value in this approach is that AEA is not just going where AEA thinks fish will ,or will not, be based on 1980s data, instead AEA is proposing stratified random design to document fish presence. Multiple methods will be used at each location to attempt capture all species and life stages present. With this approach we would expect to document habitat that are and are not used by fish. See RSP Section 9.5.4.1, 9.6.4.1.
Email	9/07/2012	Michael Buntjer	USFWS	PSP = Collect tissue samples to support the Genetic Baseline Study for Selected Fish Species (Section 7.14); (7.5 upper reach) Comment = No mention of analyzing samples; analysis mentioned in Genetic Baseline Study, but link/integration to analyzing samples collected in this study is not discussed. Will samples be analyzed? Explain.	Yes. AEA has included additional detail in the RSP for Genetic Baseline Study for Selected Fish Species that includes descriptions of both laboratory analysis of samples and analysis of genetic structure of Chinook salmon populations. See RSP Section 9.14.4.3.
Email	9/07/2012	Michael Buntjer	USFWS	PSP = Document the timing of downstream movement and catch for fish species via outmigrant traps; (7.5 upper reach) Comment = Unclear if the timing of downstream movement and catch for the upper river includes or excludes addressing outmigration and winter sampling	AEA has included additional detail in the Study of Fish Distribution and Abundance for the Upper Susitna River RSP regarding the location and timing of outmigrant trapping and winter sampling. See RSP Section 9.5.4.3.2, 9.5.4.3.2.
Initial written comments to PSP	9/07/2012	USFWS staff	USFWS	The list of habitat types to be sampled in the middle and lower reaches appears longer than habitats proposed for the upper reach	AEA has included additional detail in the RSP to clarify that the lists of habitat types for the Middle/Lower and Upper reaches are similar, but the actual habitat types will be defined by the habitats present in the mainstem and tributaries of interest. See RSP Section 9.5.4.1, 9.6.4.1, and 9.9.
Email	9/07/2012	Michael Buntjer	USFWS	Only winter sampling I see proposed in the upper reach includes using DIDSON and video cameras in 10 "selected" sloughs and side channels; how were/will sites be selected?; What other habitat types	AEA has added additional detail in the Study of Fish Distribution and Abundance in the Middle and Lower Susitna River by including an objective for winter sampling and describing the techniques, locations and

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				are available and why are they not being sampled? Is this sufficient to get at winter distribution and abundance for all life stages?; will not likely be able to identify juvenile species using these techniques (therefore, no distribution and abundance information and habitat use by species, particularly for early life stages (<60 mm); other winter sampling (using gillnets, minnow traps, and trot lines) is listed in the schedule section (and not in methods), but it is not described.	timing of proposed sampling. See RSP Section 9.6.4.3.1, 9.6.4.3.2, 9.6.4.3.3, 9.6.4.3.4. In addition, a study objective focused on Early Life history of Anadromous Salmon has been added to focus sampling on this species and life stages. See RSP Section 9.6.4.3.3.
Email	9/07/2012	Michael Buntjer	USFWS	Comment = Study Request objectives 7-9 are not addressed in 7.5 or 7.6; there is no mention of egg incubation (rates or success), hatching (rates or success), stranding (ramping rates) or emergence (dates and times) sampling anywhere; no mention of baseline intragravel temperature or water quality monitoring of spawning and pre-emergent juvenile fish habitats; no mention of characterizing baseline water quality conditions at spawning or rearing habitats. Only mention is in Study Goals (6.5.1.2, page 6-10); Objective 8. Conduct a variety of post-processing comparative analyses derived from the output metrics under aquatic habitat models. Approach appears to evaluate using only physical habitat models and without empirical sampling post-spawning through emergence and for juveniles up to PIT tagging size (i.e., 60 mm).	Study Request Objectives 7-9 are now addressed more specifically. AEA has added a study objective focused on Early Life history of Anadromous Salmon has been added to the Study of Fish Distribution and Abundance in the Middle and Lower Susitna River RSP. See RSP Section 9.6.4.3.3. This study objective includes efforts to evaluate emergence, early movements, and stranding of fry/parr. In addition a hyporheic study will address water quality in spawning areas. See RSP Section 8.5.2.1.6.
E-mail	9/07/2012	Mike Buntjer	USFWS	There does not appear to be any studies to collect baseline biological or physical spawning habitat information between the time eggs are deposited in redds and the time of fry emergence	The Intergravel Study will collect data on the physical characteristics of spawning habitat. See RSP Section 8.5.2.1.6, 9.6.4.3.3.
Initial written comments to PSP	9/07/2012	USFWS staff	USFWS	Unclear if Biotelemtry objective includes or excludes PIT tagging juvenile anadromous salmon.	AEA has added additional detail in the RSP to clarify that that juvenile salmon will be included in PIT tagging efforts. See RSP Section 9.5.4.3.2, 9.5.4.4.10, 9.6.4.3.2, 9.6.4.4.12.

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Initial written comments to PSP	9/07/2012	USFWS staff	USFWS	The Middle/Lower River study objective 'characterize the age structure, growth, and condition of juvenile anadromous and resident fish by season' is not in the Upper River PSP. Is this study objective limited to juveniles or should it say "all" resident fish?	AEA has added the objective to characterize the age structure, growth, and condition of juvenile anadromous and all resident fish by season to the Upper River RSP. See RSP Section 9.5.1.1.
Comments on Agency consultation meeting notes	9/13/2012	Michael Buntjer	USFWS	Michael's comment reads: "Seems to me this is at the margins of the ice cover season. Jan-Mar would seem to provide safer ice conditions for accessing sites? …would like more discussion."	Winter access in the Middle River will be evaluated in a pilot study conducted this winter (2012-2013). Depending on the results of the pilot study AEA will add additional sampling events and locations to the Study of Fish Distribution and Abundance in the Middle and Lower Susitna River RSP. See RSP Section 9.6.4.3.1, 9.6.4.3.2, 9.6.4.3.3.
Comments on Agency consultation meeting notes	9/13/2012	Michael Buntjer	USFWS	Is "population estimate" a necessary objective? Could do more frequent sampling for CPUE instead of population estimate sampling.	AEA has eliminated population estimation from the Study of Fish Distribution and Abundance in the Middle and Lower Susitna River RSP. See RSP Section 9.6.4.3.1.
Agency consultation meeting	9/13/2012	Betsy McCracken	USFWS	Unclear whether juvenile salmon would be included in Objective #2	AEA has added additional detail in the RSP to clarify that juvenile salmon are included in Objective #2. In addition, AEA has added additional early life history objectives. See RSP Section 9.5.1.1, 9.6.1.1.
Agency consultation meeting	9/13/2012	Jeff Davis	ARRI	Request that sampling be tied to species and life stage specific objectives	AEA's approach to fish sampling is habitat-based not driven by where we would expect to find individual species and life stages of fish. Sampling will be stratified by geomorphic reaches and mainstem habitat categories. Random samping within the habitat strata will ensure that sampling is representative of all habitats present in the system and therefore will be effective at capturing all species and life stage are present within these habitats.. In addition, monthly sampling in those representative sites will be implemented to determine what species and life stages are using those habitats seasonally. See RSP Section 9.5.4.3, 9.6.4.3.

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Agency consultation meeting	9/13/2012	Stormy Haught, Monte Miller	ADNR-ADF&G	Concerns with using PIT tags: 1) half vs full duplex tags, 2.) size of fish tagged, 3) human ingestion of tags	PIT tag systems have been evaluated. AEA is considering use of Texas Instruments half-duplex tags due to the flexibility of system and the ability to tailor it to local conditions at a reasonable cost. See RSP Section 9.5.4.4.10, 9.6.4.4.12
Agency consultation meeting	9/13/2012	ADF&G staff	ADNR-ADF&G	Request grayling to be added to list of species to be radio tagged	Grayling has been added to target species list. See RSP Section 9.5.1.1, 9.6.1.1.
Agency consultation meeting	9/13/2012	Betsy McCracken	USFWS	USFWS recommended Beechie as opposed to USFS which was developed for small SE streams and relative to forest practices	The methods for habitat characterization were discussed and approved in an agency meeting in May 2012. The USFS method is a standardized approach that is widely used in many rivers, including larger waters. In addition, to using that protocol for habitat characterization, AEA has revised the Habitat Characterization study plan to include the delineation and characterization of "edge habitat" in mainstem reaches. See RSP Section 9.9, 9.5.1.1, 9.6.1.1.
Agency consultation meeting	9/13/2012	ADF&G staff	ADNR-ADF&G	Request for details of surgical methods, battery life and specifications which determine battery life.	Additional detail has been added to the study plan on tagging and tags. However, detail on tag specifications and battery life will be available post RSP in an study implementation plan. See RSP Section 9.5.4.4.10, 9.6.4.4.12
Agency consultation meeting	9/13/2012	Monte Miller	ADNR-ADF&G	Request a table in RSP which includes: proposed tagged species, type of tagging, number of individuals, and any discrepancies.	A table with detail on target species and sample sizes has been added to the Fish Distribution and Abundance Study plans. See RSP Section 9.5 Table 9.5-2, 9.6 Table 9.6-2.
Agency consultation meeting	9/13/2012	Mike Buntjer	USFWS	Request data on movement (and timing) of newly emergent fish from spawning to rearing areas or movement of juvenile fish <60 mm in winter. Specifically: 1. How will the Project effect changes in temperature and survival? (There will be an Intergravel study in the ISF program). 2. How will flow fluctuations affect early life history? (The ISF physical habitat model will	An objective on early life history of anadromous salmon has been added to the Study of Fish Distribution and Abundance in the Middle and Lower Susitna River RSP study plan. This objective includes subobjective to address timing, movements, and diurnal behavior of anadromous salmonids in the Middle/Lower River. See RSP Section 9.6.4.3.3 In addition there has been an intergravel study

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				address this) 3. When are fish active- day vs. night? 4. Timing of movements with respect to flows to understand Project flow effects	component added to the Riparian Instream Flow Study Program to help collect baseline information that will be used to evaluate project effects on incubating embryos. See RSP Section 8.5.2.1.6.
Phone conversation	9/19/2012	Matt Evenson	ADNR-ADF&G	Burbot sampling methodologies. Suggested burbot be captured with hoop traps for radio tagging; trot lines are lethal to burbot.	AEA has added hoop traps to capture methods in the RSP. See RSP Section 9.5.4.4.8, 9.6.4.4.8.
Email	9/07/2012	Michael Buntjer	USFWS	PSP = Collect tissue samples from juvenile salmon and opportunistically from all resident and non-salmon anadromous fish to support the Genetic Baseline Study (Section 7.14). (7.6 middle and lower reach) Because PSP is not structured similarly to our study requests, why is this study objective limited to juvenile salmon? This may be okay, because genetic sampling included in Salmon Escapement Study, though no mention in study of analyzing samples or overall links between studies. Without providing linkages between studies, there is a lot of searching required to find if, where, and how information is being collected.	Genetic sampling in the Fish distribution and Abundance studies (RSP Sections 9.5 and 9.6) is complimentary to Adult Escapement study (RSP Section 9.7). As such the Fish Distribution and Abundance study plans do not address collecting samples from adult salmon; that is included in the Genetic Baseline Study for Selected Fish Species plan. This is addressed by the study interdepencies flow chart described in RSP Section 9.14.7.
Email	9/07/2012	Michael Buntjer	USFWS	PSP = Characterize the age structure, growth, and condition of juvenile anadromous and resident fish by season; (7.6 middle and lower reach) Comment = Is there a difference between Document (as requested) and Characterize (as proposed)? Explain Is this study objective limited to juveniles or should it say "all" resident fish. This objective is not included in upper reach; should at least characterize age structure for all resident and anadromous fish by season	AEA has revised the terminology in the RSP to use the term "document" instead of the term "characterize". This objective will be applied to all fish species collected and has been added to study plan for Upper River. See RSP Section 9.5.4.1, 9.6.4.1
Email	9/07/2012	Michael Buntjer	USFWS	PSP = Document the timing of downstream movement and catch for all fish species using	The use of outmigrant traps is intended to address downstream movements of fish species that have

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				outmigrant traps; (7.6 middle and lower reach) Comment = Unclear if this includes or excludes addressing outmigration	known out-migrations. The placement of the traps will reflect locations where the likelihood of intercepting target species is high. This is described in the RSP. See RSP Section 9.5.4.3.2, 9.6.4.3.2.
Email	9/07/2012	Michael Buntjer	USFWS	PSP = Describe seasonal movements of selected fish species such as rainbow trout, eulachon, Dolly Varden, whitefish, northern pike, Pacific lamprey, and burbot) using biotelemetry (PIT and radio-tags) with emphasis on identifying foraging, spawning and overwintering habitats within the mainstem of the Susitna River and its associated off-channel habitat; (7.6 middle and lower reach) Comment = Also, mentions installing up to 10 antenna arrays; is that sufficient to determine movement of juveniles in and out of habitats by reach? When, where, and how will sites be selected? What is rationale and assumptions for selecting habitat types and sites?	AEA has added additional detail in the RSP on radio telemetry of target species and array design. See RSP Section 9.5.4.4.10, 9.6.4.4.12
Agency consultation meeting	9/13/2012	Jeff Davis	ARRI	Sampling frequency: suggested bi-weekly sampling during the critical periods for early life stages of salmon	Biweekly sampling has been added to the study plan for the objective related to early life history of salmon. See RSP Section 9.5.4.2, 9.6.4.2
TWG meeting	9/14/2012	Jeff Davis	USFWS	Jeff Davis asked what classification scale critical sites (addressing specific life stages of fish) will be based on.	As described in the RSP fish sampling will occur at several habitat categories including the mainstem habitat, mesohabitat and edge habitat levels. These levels vary with the size and complexity of the river system. It is possible that one life stage of a species, including critical life stages will be sampled at all or some of these three different levels in different part of the river This should not be unexpected as fish move between habitats both within and across seasons and sampling will occur on a seasonal or monthly basis. See RSP Section 9.5.4.1, 9.6.4.1.
Phone	9/18/2012	Randy Brown	USFWS	Existing cisco whitefish data. Recent studies by	Will consider dropping cisco from list of focal species in

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conversation				Brown 2008-2011 (unpub) have ID'ed relative abundance, distribution, age camp, and spawning timing; suggest dropping cisco from list of species	study
Agency consultation meeting	9/27/2012	Michael Buntjer	USFWS	Requests the periodicity data sources be referenced.	Sources for periodicity tables used in Project studies will be given proper citations. See RSP Section 9.5.4.3, 9.6.4.3.
Agency consultation meeting	9/27/2012	Michael Buntjer	USFWS	Requests clarification on the sampling approach in the lower river due to the more broad habitat classification applied.	The Habitat Characterization Plan has been revised and includes clarifying information on the habitat mapping approach for the Lower River and the limitations of delineating at a scale finer than mainstem habitats. See RSP Section 9.6.4.1.
Salmon Escapement Study (Section 9.7)					
Email	8/23/2012	Joseph Klein	ADNR-ADF&G	Identify locations of adult fish weir locations described on tributary streams (7.7.4.1.5, page 7-39). Consider placement of adult fish weir upstream of the proposed dam on prominent Chinook salmon streams.	AEA has added additional detail in the RSP identifying the likely weir locations. See RSP Section 9.7.4.4.2. In light of 2012 results on Chinook salmon above Devils Canyon, AEA is concerned that an adult fish weir could delay or deter the upstream migration. The current tagging and escapement study design will adequately address the distribution and habitat use of adult Chinook salmon above the dam with less risk for alteing fish behavior.
Email	9/07/2012	Michael Buntjer	USFWS	= Need to define "generate count" and how generated. If it is an index of abundance, then need to identify the standardized unit of effort. Also, not sure why escapement estimate is not being determined? This study references escapement estimates from the 1980s, but not here. Explain.	Counts will be visual observations of individual salmon in clear-water areas within the study area. These counts will be obtained from helicopter, ground, and/or on-water surveys of tributaries and mainstem habitats of the middle and upper river. The primary use for these counts is not an index of abundance but is instead to quantify mark rates among different areas. Mark rate is the fraction of the fish that are tagged. Mark rate derivation takes into account survey conditions and observer efficiency. Escapement estimate are not being determined because escapement levels are not critical to conducting an assessing the proposed project's

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					impacts. Some quantification of abundance above the tagging sites and in particular habitats will be possible, but not total escapement to river sections (e.g., middle and/or upper river). The Salmon Study Plan has additional text to address counting and estimates of abundance.
Email	9/07/2012	Michael Buntjer	USFWS	*In Study Request = Determine the availability and accessibility of spawning habitats by adult salmon to mainstem and tributary locations based upon flow regime*. Comment = Unclear if, how, or where this Study Request objective is being addressed. Not listed as an objective in this study; section 6.5.4.3.1 (page 6-19) describes assessing access to rearing and spawning habitats via output from flow routing models. Also, objective 13 (shown below) in fish passage study (section 7.12); page 7-98): 13. Evaluate the potential creation of fish passage barriers within existing habitats (tributaries, sloughs, side channels, off-channel habitats) related to future flow conditions, water surface elevations, and sediment transport.	AEA describes how this study request objective is being address in both the Fish Barriers and ISF study plans. RSP Sections 9.12 and 8.5. In addition text has been added to better describe the interdependencies of the Fish Barriers and ISF study plans with respect to access to rearing and spawning habitats, including mainstem sloughs, side channels, off-channel habitats and tributaries. RSP Sections 9.12.1.1 and 8.5.4.61.7.
Email	9/07/2012	Michael Buntjer	USFWS	*In Study Request = Measure critical habitat characteristics (e.g., channel type, flow, substrate, and groundwater) at reaches used for spawning and compare these characteristics with those in adjacent reaches that do not contain spawning adults.* Comment = Do not see this study request objective addressed or any objective that looks at characterizing use, availability, or quality of potential spawning habitats. There appears to be no empirical baseline information being collected; only see determining distribution and potential abundance of	Detail has been added to the Riparian Instream Flow study plan to address these concerns. See RSP Sections 8.5.4.6.1.

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				redds. Also, see mention of evaluating potential dewatering or scouring of redds in Chapter 6, but no empirical baseline information to assess daily load-following operations.	
Email	9/07/2012	Betsy McCracken	USFWS	Request that tissue samples be obtained from radio-tagged Chinook salmon	AEA has added additional detail to the RSP by including descriptions of how tissue samples will be taken from radio-tagged salmon in 2013/14. AEA notes that AEA's ability to do so is subject to ADF&G Fish Research Permit conditions.
Email	9/07/2012	Betsy McCracken	USFWS	Clarify what you mean by "generate counts" of adult Chinook salmon. Are escapement estimates being made?	The RSP study plan defines "generate count" (Section 9.7.4.4.2). Counts will be visual observations of individual salmon in clear-water areas within the study area. These counts will be obtained from helicopter, ground, and/or on-water surveys of tributaries and mainstem habitats of the middle and upper river. The primary use for these counts is not an index of abundance but is instead to quantify mark rates among different areas. Mark rate is the fraction of the fish that are tagged. Mark rate derivation takes into account survey conditions and observer efficiency. Escapement estimates of the middle and upper river are not proposed as explicit objective. Escapement levels are not critical to conducting an impact analysis. Some quantification of abundance above the tagging sites and in particular habitats will be possible, but not total escapement to river sections (e.g., middle and/or upper river).
Email	9/07/2012	Betsy McCracken	USFWS	No mention of analyzing non-Chinook tissue for genetics.	Only Chinook analyses are proposed as part of Genetic Baseline Study for Selected Fish Species (See RSP 9.14.4 for additional responses to this comment).
Email	9/07/2012	Betsy McCracken	USFWS	It is unclear where issue of availability of habitat affected by altering flows is addressed.	This is address by instream flow model and using data from several studies in the RSP, including the salmon escapement (distribution and habitat use by spawning salmon). See RSP Section 8.5.4.3.1.

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Agency consultation meeting	9/25/2012	Jack Erickson and James Hasbrouck	ADNR-ADF&G	Series of suggested edits/clarifications to PSP. Clarified that coho salmon escapement does not need to be "system-wide" but instead only Susitna River *above Yentna River*	AEA has added additional detail in the RSP tto clarify that coho escapement only applies to Susitna above Yentna confluence. See RSP Section 9.7.4.4.2.4.
River Productivity Study (Section 9.8)					
TWG meeting	8/15/2012	Mike Buntjer	USFWS	Discussion regarding Objective 4 (Section 7.8.4.4), inquired about the rationale for not having surrogate sites in Alaska.	During the River Productivity Subgroup meeting it was discussed that surrogate systems likely do not exist in Alaska; there are no regulated glacial rivers with reservoirs of similar size and potential operations. Thus is was determined that adding a literature review of glacial rivers affected by water regulation to Objective 1 of the River Productivity Study was an acceptable alternative. This was agreed to by the Subgroup participants including representatives from AEA, USFWS, NMFS, and ADF&G. See RSP Section 9.8.4.1.
TWG meeting	8/15/2012	Jeff Davis	ARRI	Discussion regarding Objective 4 (Section 7.8.4.4), expressed concerns about literature-based assessment	This subject was further discussed in the 9/27/12 Agency consultation meeting. Literature review of glacial rivers affected by river regulation will be included in Objective 1, synthesis of literature reviewed, in the RSP, Section 9.8.4.1..
TWG meeting	8/15/2012	Jeff Davis	ARRI	Suggests that study plan should be measuring primary and secondary productivity by conducting stream respiration / metabolism studies.	This subject was further discussed in the 9/27/12 Agency consultation meeting. AEA has revised the River Productivity Study plan to include a more rigorous approach to measuring primary and secondary productivity that includes collecting data on organic matter, periphyton and algea, emerging aquatic invertebrates as an estimate of carbon production, benthic macroinvertebrates, and drift. These data will be used to describe existing communities of primary and secondary producers as well as will feed into two independent trophic models: one to describe the bioenergetics and a second to describe origin of food sources under current

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					conditions (RSP Section 9.8.4.5). AEA thinks this is as rigorous approach and is associated with less uncertainty as compared to a stream metabolism approach. In addition, stream respiration and stream metabolism studies are do not correlate well to the communities (macroinvertebrates, fish) that potentially would be affected by Project operations. As such this type of approach would limit our ability to predict project effects on those communities, outside of a net change in amount of GPP or ER. , through sampling drift, benthos, and fish diet) best relates changes in the ecosystem to fish.
TWG meeting	8/15/2012	Joe Klein	ADNR-ADF&G	Discussion regarding Objective 4 (Section 7.8.4.4), expressed concerns about literature-based assessment	This subject was further discussed in the 9/27/12 Agency consultation meeting. Literature review of glacial rivers affected by river regulation will be included in Objective 1, synthesis of literature reviewed, in the RSP, Section 9.8.4.1.
TWG meeting	8/15/2012	Jeff Davis, Joe Klein	ARRI, ADNR-ADF&G	Requested sampling in deep water	Current federal protocols (specifically Angradi et al. 2006, as well as those cited in the RSP Section 9.8.4.2) recommend shoreline littoral sampling, as they are usually considered to be where much of the macroinvertebrate productivity takes place. Furthermore, shoreline areas are the locations that will be most affected by the Project. Sampling deeper benthic habitats farther out in the channel is challenging and benthic organisms are usually lower in abundance in these habitats (Angradi et al. 2006).
Email	8/23/2012	Joseph Klein	ADNR-ADF&G	7.8.4.4 Conduct a literature/data search to identify existing river systems that could act as surrogates in evaluating future changes to productivity in the Susitna River. We recommend supplementing or substituting this section using a reference reach in a similar Alaska river using a BACI design monitoring program in order to assess post	During the River Productivity Subgroup meeting it was discussed that surrogate systems likely do not exist in Alaska so that adding a review of potential project effect to Objective 1 of the River Productivity Study was an acceptable alternative. This was agreed to by the Subgroup participants including representatives from AEA, USFWS, NMFS, and ADF&G. AEA has

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				project impacts.	included in the RSP a feasibility study to identify the suitability of the Talkeetna River as a reference reach. RSP Section 9.8.4.4. AEA will consider the use of a BACI design when developing a monitoring plan for post-project impacts to river productivity. Prior to developin a monitoring plan it is important first to obtain results from baseline studies and have finalized Project operation procedures.. See RSP Section 9.8.4.4.
Email	9/07/2012	Betsy McCracken	USFWS	Marine derived nutrients are mentioned in Section 7.5.2 in association with the River Productivity Study, but are not mentioned elsewhere in the PSP.	AEA has added additional detail to the RSP describing how marine derived nutrients will be addressed with a stable isotope analysis as part of the trophic analysis. See RSP Section 9.8.4.5.2.
Email	9/07/2012	Betsy McCracken	USFWS	Trophic ecology needs to be clearly spelled out in a study plan identifying any aspects that will and will not be addressed explained and with appropriate rationale.	This subject was further discussed in the 9/27/12 Agency consultation meeting. AEA has added additional detail to RSP by describing a more rigorous approach in defining trophic relationships. Options discussed included bioenergetics, stable isotope analysis, and adult insect emergence traps. See RSP Section 9.8.4.5.2.
Email	9/06/2012	Joseph Klein	ADNR-ADF&G	Recommends identifying a reference reach in a similar Alaska river for using a BACI design monitoring program to assess post project impacts.	RSP will address reference sites in Objective 4 (Section 9.8.4.4), with a feasibility study on the Talkeetna River in 2013, conducting sampling efforts on multiple sites to assess community similarities with middle Susitna River sites.
Email	9/07/2012	Michael Buntjer	USFWS	Study Request = Develop a white paper on the impacts of hydropower development and operations (including temperature and turbidity) on benthic macroinvertebrate and algal communities in cold climates. *PSP = Synthesize existing literature on the impacts of hydropower development and operations (including temperature and turbidity) on benthic*	"Developing a whitepaper" and "synthesizing existing literature" may be considered synonymous. However, stating "develop a white paper" may hold different meaning or expectations for different parties, and would require a definition of what a whitepaper is. Therefore, the PSP refers to the action of synthesizing existing literature, in descriptive terms, to clarify the proposed task. RSP Section 9.8.4.1.

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				macroinvertebrate and algal communities; Comment = Any difference in developing a white paper versus synthesizing existing literature?	
Email	9/07/2012	Michael Buntjer	USFWS	Study Request = Characterize the pre-project benthic macroinvertebrate and algal communities with regard to species composition and abundance in the lower, middle and upper Susitna River. *PSP = Characterize the pre-Project benthic macroinvertebrate and algal communities with regard to species composition and abundance in the middle and upper Susitna River;* Comment = Omission of lower reach is an apparent typo.	AEA has considered the inclusion of sampling for macroinvertebrates and algae in the Lower Susitna River and has determined that, at this time, sampling in the Lower River is not warranted. Given the dramatic change is discharge, turbidity and temperature in the Susitna River associated with the inflows from the Talkeetna and the Chulitna River we do not anticipate Project related affects that will be translated to primary and secondary producers. Our approach for river productivity is to establish a rigorous sampling program for the locations with the greatest potential for change, the river upstream and directly downstream of the proposed Project dam site.
Email	9/07/2012	Michael Buntjer	USFWS	Study Request = 3. Estimate drift of benthic macroinvertebrates in habitats within the lower, middle and upper Susitna River to assess food availability to juvenile and resident fishes. *PSP = Estimate drift of benthic macroinvertebrates in selected habitats within the middle and upper Susitna River to assess food availability to juvenile and resident fishes;* Comment = Omission of lower reach is an apparent typo.	AEA has considered the inclusion of sampling for macroinvertebrates and algae in the Lower Susitna River and has determined that, at this time, sampling in the Lower River is not warranted. Given the dramatic change is discharge, turbidity and temperature in the Susitna River associated with the inflows from the Talkeetna and the Chulitna River we do not anticipate Project related affects that will be translated to primary and secondary producers. Our approach for river productivity is to establish a rigorous sampling program for the locations with the greatest potential for change, the river upstream and directly downstream of the proposed Project dam site.
Email	9/07/2012	Michael Buntjer	USFWS	Study Request = Conduct a trophic analysis to describe potential changes in the primary and secondary productivity of the riverine community following post-project construction and operation *PSP = Conduct a review on the feasibility of a trophic*	This subject was further discussed in the 9/27/12 Agency consultation meeting. AEA has added additional detail n the RSP describing a more rigorous empirical approach to define trophic relationships. See RSP Section 9.8.4.5.

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				analysis to describe potential changes in the primary and secondary productivity of the riverine community following Project construction and operation; Comment = Shouldn't this read: Conduct a trophic analysis, if feasible, to describe…? Also, why would it not be feasible? Explain.	
Email	9/07/2012	Michael Buntjer	USFWS	Study Request = Characterize the benthic macroinvertebrate compositions in the diets of representative fish species in relationship to their source (benthic or drift component). *PSP = Characterize the macroinvertebrate compositions in the diets of representative fish species in relationship to their source (benthic or drift component);* Comment = I assume this should include term "benthic". If not, explain difference.	Analysis of fish diets of target species will include both benthic and terrestrial invertebrates. RSP will mention the terrestrial component in this objective, as well as the drift objective, Sections 9.8.4.3 and 9.8.4.7.
Email	9/07/2012	Michael Buntjer	USFWS	Study Request = Evaluate the feasibility of reference sites on the Talkeetna and Chulitna Rivers to monitor baseline productivity, pre- and post-construction. (deleted in PSP; and not addressed) *PSP = AEA replaced this objective (with #4 below), but based on discussion at August 15, 2012, TWG meeting it was suggested to do both or keep the original Study Request objective. We recommend and support that suggestion.* Comment = Conduct a literature/data search to identify existing river systems that could act as surrogates in evaluating future changes to productivity in the Susitna River. (added in PSP)	This subject was further discussed in the 9/27/12 Agency consultation meeting. Literature review of glacial rivers affected by river regulation will be included in Objective 1, synthesis of literature reviewed, in the RSP. See RSP Section 9.8.4.1. RSP will address reference sites in Objective 4 (Section 9.8.4.4), with a feasibility study on the Talkeetna River in 2013, conducting sampling efforts on multiple sites to assess community similarities with middle Susitna River sites.
Email	9/07/2012	Michael Buntjer	USFWS	Study Request = 9. Estimate benthic macroinvertebrate colonization rates in the middle and	AEA has added additional detail in the RSP including an analysis of fish food sources including freshwater

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				lower reaches to monitor baseline conditions and evaluate future changes to productivity in the Susitna River *PSP = Estimate benthic macroinvertebrate colonization rates in the middle and lower reaches to monitor baseline conditions and evaluate future changes to productivity in the Susitna River.* Comment = Note: Page 7-12 of PSP states that marine derived nutrients are included in River Productivity Study, but there is no mention of it in Chapter 7; i.e., is not addressed.	and marine derived nutrients as part of the trophic analysis. See RSP Section 9.8.4.5.2.
Initial written comments to PSP	9/27/2012	Jeff Davis	ARRI	Regarding Section 7.8.4.2.1, request for additional details of site-specific sample locations and sampling methodology	The RSP will include additional details regarding sampling methodology, which will be based on accepted federal agency standardized methods, such as the USGS NAQWA protocols, which sample in "richest-targeted habitat", typically riffle-like habitat and woody snags. See RSP Section 9.8.4.2.1. Sampling locations will follow this standardized sampling approach and availability within sampling focus areas; details will be addressed in the implementation plan.
Initial written comments to PSP	9/27/2012	Jeff Davis	ARRI	Regarding Section 7.8.4.2.1, number of sample sites per macrohabitat classification.	PSP contains details on sampling areas and number of sites within those areas in Table 7.8-1, along with Figures 7.8-1 through 7.8-3. AEA has included in RSP clarification that sampling focus areas contain 1 mainstem site and 2 off-channel sites that are associated with that mainstem site. See RSP Section 9.8.4.2.1.
Initial written comments to PSP	9/27/2012	Jeff Davis	ARRI	Regarding Section 7.8.4.2.1, inquired if macrophyte beds should be included as habitat to be sampled for benthic macroinvertebrates	No documentation of macrophyte beds as a major habitat area in the Susitna. No plans to further stratify for this habitat type.
Initial written comments to PSP	9/27/2012	Jeff Davis	ARRI	Questions on methodology of sample snags for macroinvertebrates (in Section 7.8.4.2.1)	PSP refers readers to Moulton et al. 2002 for USGS protocols on snag sampling. RSP Section 9.8.4.2.1.

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Initial written comments to PSP	9/27/2012	Jeff Davis	ARRI	Objective 3, Section 7.8.4.3, invertebrate drift sampling methods and timing.	RSP will clarify that drift sampling will occur in spring, summer, and fall, and that 12 of the 18 sites to be sampled will be in a focus area in the Middle Reach, which include mainstem sites paired with1-2 associated off-channel sites. RSP Section 9.8.4.1, and 9.8.4.3.
Initial written comments to PSP	9/27/2012	Jeff Davis	ARRI	Objective 5, Section 7.8.4.5, trophic analysis.	AEA has revised the RSP to include a more rigorous approach in defining trophic relationships and addressing estimates of river productivity. See RSP Section 9.8.4.5.
Initial written comments to PSP	9/27/2012	Jeff Davis	ARRI	Regarding Objective 6, Section7.8.4.6, HSC criteria development. Concerned that level of sampling is insufficient.	AEA has added additional detail in the RSP regarding the HSC/HSI criteria development process. See RSP Section 9.8.4.6. In the RSP, the suitability information is literature-based, with validation by site-specific field observations, and finalization by expert panel.
Initial written comments to PSP	9/27/2012	Jeff Davis	ARRI	Regarding Objective 7, Section7.8.4.7, questioned what the objective is for fish diet analysis.	Fish diet analysis will provide information on what target fish species are consuming in relation to their overall abundance in community and their prevalence in drift. See RSP Section 9.8.4.7.
Initial written comments to PSP	9/27/2012	Jeff Davis	ARRI	Regarding Objective 7, Section7.8.4.7requested additional details about sampling efforts (locations and frequency).	AEA has added additional detail in the RSP regarding the implementation plan. RSP describes how the efforts will be coordinated with relevant fish study for timing and locations at focus areas. See RSP Section 9.8.4.7.
Initial written comments to PSP	9/27/2012	Jeff Davis	ARRI	Regarding Objective 7, Section7.8.4.7, asked if weights and cohort info should be collected.	Detail has been added to the RSP including taxa weights (See RSP sections 9.8.4.2.1, 9.8.4.3, 9.8.4.5, and 9.8.4.7.). In addition with the inclusion of the bioenergetics and isotopic analyses AEA approach will focuses on trophic relationships not production estimates and thus, does not include cohort analysis. RSP Section 9.8.4.5.
Initial written comments to PSP	9/27/2012	Jeff Davis	ARRI	Regarding Objective 7, Section7.8.4.7, asked if terrestrial invertebrates and riparian vegetation cover information should be collected.	Terrestrial invertebrates will be analyzed in drift samples and fish diet analysis (RSP sections 9.8.4.3 and 9.8.4.7). Additional information on riparian vegetation will be available from the Riparian

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					Vegetation Study Downstream of the Proposed Watana Dam or Riparian Instream Flow studies. The interdependencies of the Riparian Vegetation Study Downstream of the Proposed Watana Dam and the River Productivity Study will be clarified as baseline data are collected and we learn what proportion of the drift and fish diet is derived from terrestrial, specifically riparian, resources.
Initial written comments to PSP	9/27/2012	Jeff Davis	ARRI	Regarding Objective 4, Section7.8.4.4, asked how and who will determine if additional reference data collection at other sites is "feasible".	RSP will address reference sites in Objective 4 (Section 9.8.4.4) with a feasibility study of potential sites in the Talkeetna River in 2013 which will include sampling efforts on multiple sites to assess community similarities with middle Susitna River sites.
Initial written comments to PSP	9/27/2012	Jeff Davis	ARRI	Regarding Objective 8, Section7.8.4.8, requested more detail on organic matter sampling methods.	AEA has added additional detail in the RSP regarding the methods of collecting and analyzing organic matter will be provided in the RSP. See RSP Section 9.8.4.8.
Initial written comments to PSP	9/27/2012	Jeff Davis	ARRI	Regarding Objective 8, Section7.8.4.8, asked if organic matter processing, flow transport, and floodplain interactions will be investigated.	AEA is not proposing to such investigations because such investigations would be focused on river processes, and less on the trophic community analysis that is the focus of this study. Results of such investigations would not be easily related/ correlated to the organisms of interest, i.e. macroinvertebrates and fish, and, therefore, would be difficult to use those results to predict project effects on those communities. In addition, each of these would require a specialized and extensive study involving development with or by other study plans.
Initial written comments to PSP	9/27/2012	Jeff Davis	ARRI	Regarding Objective 9, Section7.8.4.9, request for additional details on the sample design, materials, and deployment.	Decisions on specific artificial substrates to be used will depend on location of the site, flows the devices will be subjected to, accessibility to the site, vandalism risks, and comparability to other studies in Alaska. This decision will be made after consideration of all focus areas and site-specific information required to select sampling stations for the study. See RSP Section 9.8.4.9.

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Agency consultation meeting	9/27/2012	Various agencies	Various agencies	Discussion regarding Objective 4 (Section 7.8.4.4), concerning surrogate sites and a literature-based assessment.	Literature review of glacial rivers affected by river regulation will be included in Objective 1, synthesis of literature reviewed, in the RSP. See RSP Section 9.8.4.1.
Agency consultation meeting	9/27/2012	Various agencies	Various agencies	Discussion regarding reference sites in a similar Alaska river for using a BACI type design monitoring program to assess post project impacts.	RSP will address reference sites in Objective 4 (Section 9.8.4.4) with a feasibility study of potential sites in the Talkeetna River in 2013 which will include sampling efforts on multiple sites to assess community similarities with middle Susitna River sites.
Agency consultation meeting	9/27/2012	Various agencies	Various agencies	Discussion regarding the BACI design for use in monitoring program to assess post project impacts.	A BACI type design can be attempted, but there are concerns about the power of analysis due to the level of sampling efforts (study plan is only 2 years). Possible that only large differences will be detectable. Multivariate analyses could be attempted. Additional details would be included in an implementation plan.
Agency consultation meeting	9/27/2012	Various agencies	Various agencies	Discussion regarding Objective 5, Section 7.8.4.5, trophic analysis and formal productivity measures	RSP will include a more rigorous approach in defining trophic relationships and addressing estimates of river productivity. RSP Section 9.8.4.5.
Agency consultation meeting	9/27/2012	Various agencies	Various agencies	Question about recent flooding and the possible negative effect it would have upon sampling next year	Sampling requires multiple years in order to account for the annual variability; high, low, and average years all need to be sampled. Study plan has the limitation of 2 years of data.
Agency consultation meeting	9/27/2012	Various agencies	Various agencies	Regarding Objective 5, Section7.8.4.5, discussion about options for trophic analysis, productivity measures	Several approaches were discussed, including bioenergetics, stable isotope analysis, and adult emergence sampling. Regarding bioenergetics, target species may include all 3 salmon species fry/juveniles, and possibly stickleback. RSP Section 9.8.4.5.
Agency consultation meeting	9/27/2012	Various agencies	Various agencies	Discussion regarding Objective 4 (Section 7.8.4.4), surrogate sites in Alaska vs. literature-based.	There are no glacial rivers with hydropower operations of the proposed size and operation in Alaska. Literature review of glacial rivers affected by river regulation will be included in Objective 1, synthesis of literature reviewed, in the RSP, Section 9.8.4.1.
Agency consultation	9/27/2012	Jeff Davis	ARRI	Suggests that study plan should be measuring primary and secondary productivity by conducting	RSP will include a more rigorous approach in defining trophic relationships between algae, benthos, and fish

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meeting				stream respiration / metabolism studies.	(RSP Section 9.8.4.5.). Surrogate for productivity would be adult insect emergence sampling, measuring carbon production emerging from river (RSP Section 9.8.4.2.1). This measure has been successful in other Alaskan systems, and ties in benthic macroinvertebrates and fish. Chlorophyll-a and AFDM measures are commonly used in federal protocols as surrogates for primary productivity, as well. Stream respiration and stream metabolism studies are not easily related/ correlated to the organisms of interest, i.e. macroinvertebrates and fish, and, therefore, would be difficult to predict project effects on those communities outside of a net change in amount of GPP or ER. Measuring the fish prey base (as proposed through sampling drift, benthos, and fish diet) will effectively relate changes in the ecosystem to fish. See RSP Sections 9.8.4.2, 9.8.4.3, 9.8.4.5, and 9.8.4.7.
Characterization and Mapping of Aquatic Habitats (Section 9.9)					
TWG Meeting	8/15/2012	Eric Rothwell	NMFS	Eric asked how the sampling structure detail would be determined and where all the data would be collected for habitat typing.	The RSP will include the requested detail. See RSP Section 9.9.2, 9.9.5, 9.9.5.3 and 9.9.5.4.
TWG Meeting	8/15/2012	Jeff Davis	Alaska Ratepayers	Jeff Davis asked why Tongass National Forest method was selected. Jeff asked what level of classification would be used for the video work. Jeff asked if Tier III would be applied in the tributaries. Jeff stated that more detail on methods was needed.	The methods for habitat characterization were discussed and approved in an agency meeting in May 2011. The USFS method is a standardized approach that is widely used to characterize habitats in many rivers, including larger waters. In addition, to using that protocol for habitat characterization we will be revising the Habitat Characterization study to include the delineation and characterization of "edge habitat" in mainstem reaches. See RSP Section 9.9.2, 9.9.5.1, 9.9.5.2, and 9.9.5.3.
TWG Meeting	8/15/2012	Joe Klein	ADNR-ADF&G	Stated that Tier III was satisfactory but more detail on methods was needed.	AEA has added additional detail in the RSP on remote and field surveys See RSP Section 9.9.2, 9.9.5, 9.9.5.3 and 9.9.5.4.
TWG Meeting	8/15/2012	Betsy	FWS	Stated she has concerns about Tier III and said more	The RSP will include hierarchical nesting and

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		McCracken		detail is needed in the plan. She asked if some form of hierarchical habitat mapping would be done.	expansion of habitat type categories. (See RSP Section 9.9.2, 9.9.5, 9.9.5.3 and 9.9.5.4)
email	9/07/2012	Betsy McCracken	USFWS	The hierarchally nested aquatic habitats framework is needed to structure fish distribution surveys, the instream flow study and other physical process studies. Without it, the fish surveys will be too narrowly constrained and the instream flow studies will not represent all habitats that may be affected by the proposed project. The Service recommends the following habitat hierarchy for the Susitna River be used for habitat mapping purposes and integration of studies: see email for "Large River Floodplain Habitat Hierarchy" recommendation	AEA has considered the USFWS request and has developed a hierarchically nested aquatic habitat classification system that Is presented in the Habitat Characterization study plan. See RSP Section 9.9.1, 9.9.2, 9.9.5, 9.9.5.3 and 9.9.5.4. Fish distribution sampling and instream flow transects will be structured based on the hierarchical habitat framework. This is further described in RSP Sections 9.6.4.3.1 and 8.5.4.6.1.
TWG meeting	9/14/2012	Jeff Davis Betsy McCracken	ARRI NMFS	Asked if the non-physical habitat characteristics at the micro level (such as temperature, DO and food source) being considered in site selection.	The habitat characterization study does not incorporate data collection of temperature, dissolved oxygen and food source. The data collection at the Focus Areas covers multiple resources and will include the collection of mesohabitat data, fish presence and relative abundance, water quality, etc. These data will be integrated to describe these habitats in more detail.
TWG meeting	9/14/2012	Jeff Davis	ARRI	Jeff is concerned that while sampling in turbid waters it may not be able to differentiate whether individuals are not present or simply not collected due to method limitations.	AEA approach includes non-visual capture methods, such as minnow trapping and seining, that have proven to be effective when fish sampling in turbid environments.
TWG meeting	9/14/2012	Jeff Davis	ARRI	Requests an outline for habitat classification and integration of studies.	The Habitat Classification system is outlined in the RSP. In addition the interdependencies section addresses how this study support and integrates with other studies. See RSP section 9.9.7.
TWG meeting	10/04/2012	Eric Rothwell	NMFS	Eric is unclear how the changes of habitat types with different flows at a particular location will be addressed when mapping habitat.	It is standard practice to map aquatic habitats at low to moderate stream flows, in part to help determine the most limiting condition for aquatic species. AEA approach to mapping is consistent with those standards to a large extent. Thus, AEA in not

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					proposing to map habitat changes with flows. Flow-habitat relationships will be developed under the ISF Program.
The Future Watana Reservoir Fish Community and Risk of Entrainment Study (Section 9.10)					
TWG Meeting	8/15/2012	Jeff Davis	ARRI	Has shelf ice and its potential impact on fish in the littoral zone been considered?	AEA reviewed this issue at the Willowstone Reservoir. Shelf ice is not anticipated to be an issue in the Susitna-Watana reservoir due to the changes in surface water elevation
TWG Meeting	8/15/2012	Jeff Davis	ARRI	Smolt movement through still water habitats	This issue will be addressed as part of the Study of Fish Passage Feasibility at Watana Dam. See RSP Section 9.11.
TWG Meeting	8/15/2012	Jeff Davis	ARRI	Sediment deposition and settling rate downstream of dam	This issue will be addressed as part of the Fluvial Geomorphology Modeling below Watana Dam Study. See RSP Section 6.6.
Study of Fish Passage Feasibility at Watana Dam (Section 9.11)					
Email	9/07/2012	Betsy McCracken	USFWS	Fish Passage/fishway prescription- The Service is concerned with the lack of transparent discussion about the potential for fish passage alternatives at the proposed Susitna-Watana dam. If fish passage is required, how will that be accomplished? If it is not feasible, what is your alternative proposal? Where is your project assessment of the fish passage feasibility? What are the design criteria being considered/evaluated?	AEA is conducting a Study of Fish Passage Feasibility at Watana Dam. The RSP will contain a revised study plan that describes the process to be followed. See RSP Section 9.11.4.3.
Study of Fish Passage Barriers in Middle and Upper Susitna River and Susitna Tributaries (Section 9.12)					
TWG Meeting	8/15/2012	Jan Konigsberg	Natural Heritage Institute	Barrier studies in Lower River	AEA is not proposing a barrier study in Lower River at this time because it is anticipated that the potential Project-induced effects to hydrology and geomorphology will be sufficiently attenuated to preclude the creation of barriers at tributary mouths.
TWG Meeting	8/15/2012	Jeff Davis	ARRI	Target species and life stages	As stated in the RSP (see Sections 9.12.4.1 and 9.6.4.3), target species and life stages will be identified after review of the existing data on fish distribution in

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					the Middle River and in consultation with Licensing Participants during the TWG process. No modification to study plan.
TWG Meeting	8/15/2012	Joe Klein	ADNR-ADF&G	Species and life stage timing	As stated in the RSP (See Section 9.12.4.10), passage analyses will include life stage timing. No modification to study plan.
Email	8/23/2012	Joe Klein	ADNR-ADF&G	What criteria will be used to identify "a representative number" of different habitat types?	Criteria will be determined as part of the IFS study site selection process. Study Plan revised to address this comment. See RSP Section 8.5.
Aquatic Resources Study within the Access Alignment, Transmission Alignment, and Construction Area (Section 9.13)					
Letter	8/31/2012	Joe Klein	ADNR-ADF&G	Fish surveys should be conducted at proposed crossing locations by electrofishing a distance equal to 40 wetted stream widths, with a minimum survey length of 50 meters. If initial surveys do not detect fish presence at specific crossing locations, at least one additional fish survey should be conducted during a different season.	Section 9.13.4.2.2 of the Study Plan identifies electrofishing as the primary sampling method and indicates that sampling will be conducted at a distance of up to 40 wetted channel widths and that a subsequent survey will occur during a different season for locations where fish are not observed during initial sampling. Section 9.13 of the Study Plan was revised to identify a minimum survey length of 50 meters.
Letter	8/31/2012	Joe Klein	ADNR-ADF&G	If the Denali access route is chosen, replacing or improving existing stream crossings along the Denali Highway would be a necessary component of upgrading the highway to accommodate Project traffic. The ADF&G will require a comprehensive survey of stream crossings so that existing stream crossings inadequate for fish passage can be repaired or replaced with culverts or bridges designed for fish passage (ADF&G 2012).	Section 9.13.2 of the Study Plan has been revised to indicate that upgrades to the existing Denali Highway would be necessary to accommodate Project traffic, and that reviewing these crossing would be completed outside of the this current assessment, when required.

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Genetic Baseline Study for Selected Fish Species (Section 9.14)					
Email	9/07/2012	Betsy McCracken	USFWS	Fish genetics- During the August 15-17 meetings, AEA stated that genetic samples from the Chinook above the proposed dam site would not be collected. The stated rationale was due to the desire to minimize the handling of the fish after subsequent tagging of fish. Genetic samples of Chinook at locations above the proposed Susitna-Watana dam site are crucial to informing the Service's management goals specific to recommending licensing conditions under the Federal Power Act, and to conservation recommendations under the Fish and Wildlife Coordination Act, and the Anadromous Fish Act. As such, we consider our request for collection of genetic samples from Chinook salmon, and other fish species to be necessary for our resource evaluation of the Susitna-Watana hydropower project. Because of this information need, if AEA does not plan to collect the information, AEA should document how this study request is being addressed.	AEA supported ADF&G in 2012 by using its radio telemetry surveys to locate Chinook salmon for tissue sampling and samples were collected (Kosina Creek). This effort will continue in 2013 and 2014. Juvenile salmon collected by AEA contractors in areas above Devils Canyon were also sampled for tissue and these were provided to ADF&G. In addition, AEA will be taking tissue samples from its radio-tagged fish in 2013-14, which will directly contribute to the genetic characterization of fish in the areas above Devils Canyon and the proposed dam site. As part of spawning ground surveys of the middle and upper river, AEA contractors will collect tissue from spawning adult Chinook salmon in 2013-14, as was done in 2012. Samples from middle river tributaries will contribute to addressing the question of genetic relatedness of those fish and fish that migrate above Devils Canyon.
Email	9/07/2012	Betsy McCracken	USFWS	Fish genetic samples should be current and include samples of the Chinook migrating above the proposed dam location. Because gene frequencies change over time, all genetic samples should be within the most recent ten years to allow for valid comparison. Genetic analysis should analyze the existing extent of genetic differentiation within and between fish using distinctly different habitats. We request genetic analysis of Chinook above the proposed dam site relative to those at other upper, middle and lower river and tributary sample locations.	Genetic sampling is included in the RSP for Chinook above and below the proposed dam site. See RSP Section 9.14.3.
Email	9/07/2012	Betsy McCracken	USFWS	Request that tissue samples be obtained from radio-tagged Chinook salmon	AEA will revise the RSP to include tissue sampling of some radio-tagged salmon in 2013/14.
Email	9/07/2012	Betsy McCracken	USFWS	When comparing uniqueness among stocks, use samples less than 10 yrs old.	AEA concurs.

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Email	9/07/2012	Betsy McCracken	USFWS	Will tissue samples from species other than Chinook salmon be analyzed as part of the study? Explain.	No, there is not a plan to analyze these other tissue samples. These samples will be used as a repository for other researchers and for subsequent research needs identified for the Project based on the outcome of other proposed research. Analyzing all these samples without explicit questions/needs/impacts identified is beyond AEA's scope and mandate.
Analysis of Fish Harvest in and Downstream of the Susitna-Watana Hydroelectric Project Area (Section 9.15)					
TWG meeting	8/15/2012	Joe Klein	ADNR-ADF&G	Commercial fisheries data	Analysis will incorporate caveats of data including fishery closures. See RSP Section 9.5.1.1.
TWG meeting	8/15/2012	Jeff Davis	ARRI	Additional fish harvest surveys.	No new fish harvest surveys will be completed. Such surveys are not necessary to analyze proposed Project effects.
Eulachon Run, Timing, Distribution, and Spawning in the Susitna River (Section 9.16)					
TWG meeting	6/12/2012	Betsy McCracken	USFWS	A comment was received to quantify marine-derived nutrients input into the system by estimating biomass of anadromous lamprey, eulachon, and Bering cisco	The Eulachon Run, Timing, Distribution, and Spawning in the Susitna River study will estimate biomass of eulachon in the lower river during 2014 and if possible 2013 (Section 9.16.4.3 Objective 3: Evaluate the feasibility of estimating density of eulachon at spawning sites). In addition, marine-derived nutrients will be addressed by the River Productivity Study. See RSP Section 9.8.
Cook Inlet Beluga Whale Study (Section 9.17)					
Agency consultation meeting	9/19/2012	Mandy Migura	NMFS	The study area should only include the Susitna River delta and not all of Type 1 critical habitat	Study area was limited to Susitna River Delta. See RSP Section 9.17.3.
Agency consultation meeting	9/19/2012	Mandy Migura	NMFS	Aerial surveys should be conducted more regularly and should include times when not only prey resources are available (May and June) but also during times when calves are present (July and August)	The aerial survey schedule was revised to include more surveys which will document times when prey are abundant and when calves may be present. In addition, surveys will be scheduled to include different tidal cycles. See RSP Section 9.17.4.1.
Agency consultation	9/19/2012	Mandy Migura	NMFS	Clarification needed for Impact Analysis	Impact Analysis will be completed following the 2013 and 2014 field seasons. Modeling efforts were

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meeting					increased to facilitate future impact analysis. See RSP Section 9.17.4.3.
Agency consultation meeting	9/19/2012	Mandy Migura	NMFS	Clarification needed regarding how group size, group composition and behavior will be documented.	Revised Study Plan included clarification. Aerial surveys will be used for group counts and group behavior while the video camera portion of the study will assist with group composition (i.e. calves) and individual behavior. AEA also clarified that these surveys will be conducted to gather data on distribution and relative group sizes – there will be no attempt at producing an abundance estimate from this data. See RSP Section 9.17.4.
Agency consultation meeting	9/19/2012	Bob Small	ADNR-ADF&G	Passive acoustic monitoring should be considered as a method for monitoring beluga presence, particularly for winter months when aerial and video surveys are not occurring.	AEA discussed using acoustics as a method for this study. However, given that acoustic recorders would need to be placed further away from the mudflats and in deeper water in winter due to ice scour, this data would not be relevant to the Project-related impact analysis. Therefore, modeling efforts and impact analyses will assume that belugas utilize the Susitna River delta year-round. See RSP Section 9.17.4.3.
SECTION 10 WILDLIFE RESOURCES					
General					
				No comments.	
Moose Distribution, Abundance, Movements, Productivity, and Survival (Section 10.5)					
TWG meeting	8/09/2012	Sarah Bullock	BLM	The moose study plan does not need to validate the carrying-capacity model developed for the Susitna Hydro Project in the 1980s because the proposed browse removal study would use a different method and model.	No corresponding change to the Moose Distribution, Abundance, Movements, Productivity, and Survival study plan is needed because the study plan did not propose to validate the 1980s carrying-capacity model. Instead, a newer technique was proposed to evaluate the proportional removal of browse biomass by moose.
Phone conversation and email	9/24/2012	Mark Burch	ADNR-ADF&G	The moose study plan needs to be revised to reflect the fact that the GeoSpatial Population Estimator (GSPE) quadrat surveys will be combined into a single-year effort (currently planned for 2012), in	The Moose Distribution, Abundance, Movements, Productivity, and Survival study plan (Section 10.5.4.2) has been revised to clarify that the GSPE survey will be conducted in a single year instead of

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				which case it would not need to be included in the 2013–2014 study plan. If the survey effort cannot be conducted in 2012 because of unsuitable survey conditions, then the GSPE survey would be retained in the study plan for 2013.	over two years. The GSPE survey was planned for November 2012 but suitable conditions did not occur because of insufficient snow cover. As such, the survey has been retained in the study plan and will be attempted again in November 2013. If suitable conditions do not occur at that time, then it will be conducted in March 2014.
Caribou Distribution, Abundance, Movements, Productivity, and Survival (Section 10.6)					
TWG meeting	8/09/2012	Sarah Bullock	BLM	The caribou study plan needs to assess whether the Nelchina caribou herd or the Delta caribou herd crosses the proposed reservoir inundation zone.	The Caribou Distribution, Abundance, Movements, Productivity, and Survival study plan (Section 10.6.2 and 10.6.4) has been revised to clarify that, although the Nelchina herd is known to cross the proposed reservoir inundation zone, the Delta herd may do so as well, even though it has a more northerly distribution. The radio telemetry to be conducted for the study will elucidate the movement patterns of both herds in the study area.
TWG meeting	8/09/2012	Kim King	ADNR-ADF&G	Due to the number of caribou collars being tracked and the large area to be covered, the frequency of radio-tracking flights has had to be reduced from the weekly flights proposed to once every two weeks.	The Caribou Distribution, Abundance, Movements, Productivity, and Survival study plan (Section 10.6.4) has been revised to make this change.
Phone conversation and email	9/24/2012	Mark Burch	ADNR-ADF&G	One of the caribou study plan objectives needs to be revised to reflect the likelihood that sample sizes will not be large enough for reliable estimation of calf survival.	The third Caribou Distribution, Abundance, Movements, Productivity, and Survival study objective (Section 10.6.1, regarding survival estimation), has been revised accordingly by deleting 'calf.'
Dall's Sheep Distribution and Abundance (Section 10.7)					
Agency consultation meeting	9/13/2012	Mark Burch, Kimberly King, Earl Becker	ADNR-ADF&G	A watershed approach was recommended to define the Dall's sheep survey area instead of applying a buffer around the Project area.	ADF&G was consulted subsequently in revising the Dall's Sheep Distribution and Abundance study plan and requested that the study area (Section 10.7.3) be revised as suitable sheep habitat in Game Management Unit 13E (a watershed-based management subunit), east of the Parks Highway. The study plan has been revised to describe the study area as the portion of GMU 13E located east of the Parks

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					Highway and south of the Denali Highway.
Phone conversation	9/24/2012	Mark Burch	ADNR-ADF&G	ADF&G is potentially interested in conducting the proposed aerial survey of Dall's sheep in the study area. Other tasks being considered by ADF&G are the possibility of genetic sampling to evaluate the degree of isolation of sheep inhabiting the Watana Creek Hills (north of the proposed reservoir inundation zone), as well as the extent of the aerial survey area needed on the south side of the Susitna River.	No changes in the study plan were made at the time in response to this comment. Instead, further consultation is ongoing with ADF&G regarding the study plan approach (see next entry below, for 10/05/2012).
Phone conversation	10/05/2012	Mark Burch	ADNR-ADF&G	ADF&G is interested in conducting aerial surveys of Dall's sheep in Game management Unit 13E (east of the Parks Highway and north of the Denali Highway) and possibly in deploying radio-collars to evaluate the extent of movements and potential geographic isolation by sheep using mineral licks north of the reservoir inundation zone.	After further consultation with ADF&G, the RSP has been revised to clarify that radio-collaring and genetic analysis to investigate potential isolation of sheep will not be included in the study plan. ADF&G will conduct a single aerial survey each summer (Section 10.7.4).
E-mail	10/12/2012	Mark Burch	ADNR-ADF&G	The Dall's Sheep study calls for delineating seasonal home ranges, but summer range should be adequate. The Jay Creek mineral lick is above the area of inundation, so there is no reason to believe the current data are not adequate.	The RSP (Sections 10.7.1 and 10.7.4) has been revised to clarify that the aerial surveys will be used to delineate summer range only. Examination of the Jay Creek and Watana creek mineral licks has been retained in the study plan, however.
E-mail	10/31/2012	Mark Burch	ADNR-ADF&G	The study boundary will be drawn at the 13E subunit boundary and not extend into the mountains within the 13A subunit.	The RSP (Section 10.7.3 and Figure 10.7-1) has been updated to depict the revised study area as being the GMU Subunit 13E boundary east of the Parks Highway and south of the Denali Highway.
Distribution, Abundance, and Habitat Use by Large Carnivores (Section 10.8)					
Agency consultation meeting	9/13/2012	Various	ADNR-ADF&G	ADF&G agrees that fish spawning areas downstream that could be impacted by altered river flow and are important to bears need to be identified. It was recommended that DNA and stable-isotope data be collected from hair samples to enumerate the minimum number of bears and characterize their diet in drainages used for spawning in the middle reach of the Susitna River. Hair traps that capture one	The Distribution, Abundance, and Habitat Use by Large Carnivores study plan (Section 10.8.4.1) proposes to investigate bear numbers and diets along spawning streams downstream from the dam by obtaining hair samples for DNA analysis and stable-isotope analysis. ADF&G suggested that Lavern Beier (ADF&G DWC, Juneau) be consulted about the feasibility of using single-sample hair traps that obtain

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				individual's hair and then close should be considered instead of wire snags that may sample multiple individuals.	samples from single animals, rather than wire snags that sample hairs from multiple animals. That type of trap has been proposed for use in the RSP (Section 10.8.4.1.2).
Phone conversation	9/24/2012	Mark Burch	ADNR-ADF&G	ADF&G is pursuing the feasibility of conducting spatial modeling of bear density using existing survey data (discussed at the 9/13/2012 meeting) with David Miller of the University of Rhode Island. ADF&G also is considering potential involvement in the DNA and stable-isotope sampling proposed for bears using anadromous fish spawning streams downstream from the dam in the middle reach of the Susitna River drainage.	The Distribution, Abundance, and Habitat Use by Large Carnivores study plan (Sections 10.8.3 and 10.8.4.1.1) has been revised to include the proposed spatial modeling of bear density in the study area, which would use the results of several line-transect surveys conducted by ADF&G since 2001. The study plan (Section 10.8.4.1.2) has been revised to state that ADF&G biologists will be consulted regarding the sampling design and analysis of hair samples from bears in the downstream study area.
Wolverine Distribution, Abundance, and Habitat Occupancy (Section 10.9)					
TWG meeting	8/09/2012	Mark Burch	ADNR-ADF&G	The wolverine study plan describes sampling blocks 25 square miles in size, but they should be 25 square kilometers instead. The proposed study area should be consolidated ("squared up") to reduce potential problems caused by wolverines moving into and out of the sampling blocks during the survey. A single survey will not be sufficient to obtain habitat-use information, so that objective should be dropped.	The error in sample-block size on the study area map (Figure 10.9-1) has been corrected. The study area (Section 10.9.3) was revised through further consultation at the follow-up meeting with ADF&G on 9/13/2012 and the study area map (Figure 10.9-1) has been revised accordingly. The objective regarding habitat use was dropped from an interim version of the study plan (Section 10.9.1), but the objective was reinstated after occupancy modeling was added to the plan methods (Section 10.9.4) at the request of ADF&G at the TWG meeting on October 16, 2012.
Agency consultation meeting	9/13/2012	Earl Becker, Howard Golden, Todd Rinaldi	ADNR-ADF&G	The sampling blocks for the wolverine survey should be 25 square kilometers in size, not 25 square miles. The study area should be "squared up" to avoid problems caused by animals leaving and then reentering the study area. Sample smaller blocks to get finer scale resolution. Stratify and select survey quadrates according to the likelihood of seeing wolverines.	The Wolverine Distribution, Abundance, and Habitat Occupancy study plan has been revised to correct the study area map error (Figure 10.9-1) regarding the size of sampling blocks and to describe the stratification of the study area (Section 10.9.3 and 10.9.4). The study area (Figure 10.9-1) has been reconfigured to consolidate the sampling blocks, thereby reducing potential errors caused by animals moving into and out of the study area.

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Agency consultation meeting	9/13/2012	Howard Golden, Earl Becker, Todd Rinaldi	ADNR-ADF&G	Aerial surveys of wolverine tracks should be conducted 12–36 hours after a snowfall that covers previous tracks. Surveys should be conducted in February and March because of increasing day length and generally better weather than earlier in winter. Reconnaissance flights should be conducted to determine when and where snow has fallen in the study area.	Additional details of the proposed survey method have been added to Section 10.9.4 of the Wolverine Distribution, Abundance, and Habitat Occupancy study plan, describing the optimal timing of the survey as being in February or March 2013, 12–36 hours after a fresh snowfall, and preceded by a reconnaissance survey, if necessary, to assess the adequacy of snow cover throughout the study area.
Agency consultation meeting	9/13/2012	Todd Rinaldi, Howard Golden	ADNR-ADF&G	Assessing habitat associations should be removed from the wolverine study objectives because a single Sample-Unit Probability Estimator (SUPE) survey will not provide suitable habitat-use data. The most effective way to obtain habitat associations for wolverines is by using GPS telemetry.	This objective was deleted from Section 10.9.1.1 of an interim version of the Wolverine Distribution, Abundance, and Habitat Occupancy study plan, but has been reinstated in Section 10.9.1 after occupancy modeling was added to the plan methods (Section 10.9.4) at the request of ADF&G at the TWG meeting on October 16, 2012.
Phone conversation	9/24/2012	Mark Burch	ADNR-ADF&G	ADF&G is potentially interested in participating in the proposed wolverine survey effort, using the SUPE method. AEA contractors could potentially provide additional observers if ADF&G needs help.	The study plan proposed to use the SUPE method, so no changes were made to the study plan at the time; see entries under 10/05/2012 below.
Phone conversation	10/05/2012	Mark Burch	ADNR-ADF&G	ADF&G is interested in conducting the SUPE survey of wolverines.	After consultation with ADF&G biologists, the Wolverine Distribution, Abundance, and Habitat Occupancy study plan was revised (Section 10.9.4) to incorporate their input on the SUPE survey and occupancy modeling.
Terrestrial Furbearer Abundance and Habitat Use (Section 10.10)					
Agency consultation meeting	9/13/2012	Earl Becker	ADNR-ADF&G	The use of standard mark–recapture techniques to develop population estimates of terrestrial furbearers is problematic due to concerns about closure assumptions and differential probability of capture. Instead, cluster-grid sampling and a spatially explicit capture–recapture (SECR) model should be used to estimate population density because it accounts for spatial variability.	The Terrestrial Furbearer Abundance and Habitat Use study plan (Sections 10.10.1.1 and 10.10.4) has been revised to incorporate the recommended changes in sampling design and analyses. Specifically, more details have been added describing the proposed sampling design and the accompanying statistical analyses (including population closure and capture heterogeneity) to incorporate the spatially explicit capture–recapture approach recommended by

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					ADF&G.
Aquatic Furbearer Abundance and Habitat Use (Section 10.11)					
TWG meeting	8/09/2012	Mark Burch	ADNR-ADF&G	The proposed survey methods for aquatic furbearers should be examined in more detail, particularly for mink, and the use of another possible survey method (floating trackbeds) should be considered.	Survey methods for mink were discussed in detail at the follow-up meeting on selected mammals (including aquatic furbearers) on 9/13/2012; see corresponding entries below from that date.
TWG meeting	8/09/2012	Mark Burch	ADNR-ADF&G	River otters potentially could be studied by surveying latrine sites and sampling DNA in scats to get an indication of the number of otters using the study area. Hair snares employing roughened wire cables and DNA analysis potentially could be used also to estimate the baseline population without collecting animals.	Survey methods for river otters were discussed in detail at the follow-up meeting on selected mammals (including aquatic furbearers) on 9/13/2012 (see corresponding entries below from that date).
TWG meeting	8/09/2012	Mark Burch	ADNR-ADF&G	ADF&G supports the USFWS study request interest in assessing the risk of mercury bioaccumulation to aquatic furbearers as a result of filling the proposed reservoir.	Comment noted. In addition to enumerating minimum numbers of animals using the study area, the Aquatic Furbearer Abundance and Habitat Use study plan (Section 10.11.4.3) has been revised to include sampling of hair for laboratory analysis of mercury, in addition to the literature review of the food habits and diets of river otters and mink, to inform the mercury risk assessment study.
TWG meeting	8/09/2012	Mark Burch	ADNR-ADF&G	Spring flooding creates suitable habitat for aquatic furbearers. If furbearers lose habitat because of reduced spring flows during Project operation, furbearers could be affected. The impact of reducing spring flows on aquatic furbearer populations needs to be studied.	Comment is acknowledged and understood. The results of the geomorphology, instream flow, and riparian habitat studies will provide the necessary information to evaluate potential effects on aquatic furbearer habitats downstream. The study plan (Section 10.11.7) has been revised to state that, in the impact assessment for the FERC License Application in 2015, the potential effects of flow alterations downstream will be assessed for aquatic furbearers when results become available from those other studies.
Agency consultation	9/13/2012	Howard Golden	ADNR-ADF&G	Riverbank surveys to locate beaver lodges and caches are difficult because of the tree canopy.	The Aquatic Furbearer Abundance and Habitat Use study plan, which proposes to use aerial surveys of

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meeting				Helicopter surveys in the fall (after leaf-fall and before freeze-up) are the best way to detect fresh beaver caches. All fresh caches should be noted along with all lodges.	beaver food caches before freeze-up in fall, has been clarified further (Section 10.11.4.1) to state that the optimal timing of these surveys is after leaf fall.
Agency consultation meeting	9/13/2012	Howard Golden	ADNR-ADF&G	With regard to aquatic carnivores, focus on river otters and not mink because mink are difficult to study. Recognizing that mink will be difficult to enumerate and appear to be uncommon or rare in the study area, intensive survey methods using floating trackbeds do not appear to be warranted. Consult Dr. Merav Ben-David at the University of Wyoming for further ideas regarding aquatic furbearer survey methods.	The Aquatic Furbearer Abundance and Habitat Use study plan has been revised (Section 10.11.4) to deemphasize mink as a focal species, although some mink may be captured in the Terrestrial Furbearer Abundance and Habitat Use study and an effort will be made to record mink tracks during winter track surveys of river otters by helicopter. Dr. Ben-David was consulted for her ideas on survey methods for aquatic carnivores (see Appendix 4).
Agency consultation meeting	9/13/2012	Howard Golden	ADNR-ADF&G	Obtain relative abundance of river otters by surveying tracks along streams from the air in winter, flying the survey area after fresh snowfall and using GPS to mark tracks (noting single versus multiple tracks). The survey should be flown two or three times during each winter (probably requiring 2–3 days for each survey).	The Aquatic Furbearer Abundance and Habitat Use study plan (Section 10.11.4.2) has been revised accordingly to incorporate winter track surveys of river otters along streams in the study area within 2–3 days after fresh snowfalls, recording locations using a GPS receiver and the number of tracks present, if possible. (Mink tracks also will be noted to the extent possible.)
Phone conversation	9/24/2012	Mark Burch	ADNR-ADF&G	ADF&G is willing to assist in obtaining hair samples for preconstruction characterization of mercury levels in aquatic furbearers, although the small number of trappers, and the small number of piscivorous furbearers likely harvested, in the reservoir inundation zone and stream drainages immediately downstream from the proposed dam site likely will be problematic for obtaining samples. Hair snags might be a better way to obtain samples.	The Aquatic Furbearer Abundance and Habitat Use study plan (Section 10.11.4.3) has been revised accordingly to include this alternative method of obtaining hair samples from river otter and mink.
Small Mammal Species Composition and Habitat Use (Section 10.12)					
Phone conversation	11/29/2012	Sarah Bullock	BLM	BLM approves of AEA's proposal to conduct the small mammal study as a desktop analysis of existing information, rather than using additional field sampling.	AEA appreciates BLM's input on the Small Mammal Species Composition and Habitat Use study plan and has revised the RSP (Section 10.12) to reflect this change, which was proposed at the TWG meeting on October 16, 2012.

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Bat Distribution and Habitat Use (Section 10.13)					
Agency consultation meeting	9/13/2012	David Tessler	ADNR-ADF&G	Anabat ultrasonic detectors, as proposed in the study plan, are suitable for acoustic detection work. The bat survey should focus on the Project infrastructure area and reservoir inundation zone (not necessary in the access and transmission corridors) where there are suitable geologic features (caves, crevices) and human structures for use as roosts. The bat study should assess habitat suitability, although acoustic sampling is not likely to provide enough data to evaluate bat habitat associations. Hence, an inventory of existing human structures and geological features in the study area should be conducted to identify potential locations of bat roosts and hibernacula.	The Bat Distribution and Habitat Use study plan (Section 10.13.4.1) has been modified to emphasize further that geological and human structures will be a focus of field surveys for bats, as well as acoustic sampling in forest and wetland habitats judged to be suitable for foraging by bats.
Agency consultation meeting	9/13/2012	David Tessler	ADNR-ADF&G	Acoustic surveys for bats should be done throughout the reservoir inundation zone during the first year. In the second year, the acoustic survey should focus on areas where detections occurred during the first year's surveys. The daily sampling period for ultrasound detectors should be adjusted according to night length throughout the sampling season.	Language has been added (Section 10.13.6) to clarify the intent of the Bat Distribution and Habitat Use study plan as a 2-year effort, with the effort in 2014 depending on the results from the first year (2013) of work. The study plan (Section 10.13.4.1) has been revised to clarify the length of the study season as extending from May to October and to describe the seasonal adjustment of acoustic sampling periods to night length.
Survey of Eagles and Other Raptors (Section 10.14)					
Agency consultation meeting	9/06/2012	Various	USFWS	Winter surveys for owls are not necessary, provided that the wildlife habitat evaluation assumes they are present in suitable habitats.	The Survey of Eagles and Other Raptors study plan (Section 10.14.4.1) has been modified accordingly to remove winter surveys for owls.
Waterbird Migration, Breeding, and Habitat Use (Section 10.15)					
TWG meeting	8/09/2012	Catherine Berg	USFWS	The spacing of transects for breeding-pair surveys in the proposed waterbird study plan is 800 meters, but USFWS standard methodology uses 400-meter spacing.	The distance in question refers to transect strip-width rather than transect spacing. The study plan for Waterbird Migration, Breeding, and Habitat Use (Section 10.15.4.2.1) has been revised to eliminate breeding-pair transect surveys (in favor of a lake-to-

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					lake survey pattern) in all but the easternmost portion of the study area (lowlands east of the reservoir inundation zone), as discussed at the study plan follow-up meeting on waterbirds on 10/04/2012. In the transect block established in the easternmost portion of the study area, as depicted on the revised study area map (Figure 10.15-1), transect strip-width will be 400 meters.
Agency consultation meeting	10/04/2012	Maureen de Zeeuw, Bob Platte	USFWS	USFWS requested that minimum waterbody size, spatial extent, and number of waterbodies to be surveyed should be identified in the study plan.	The study plan (Sections 10.15.3 and 10.15.4) has been revised accordingly to specify these details.
Agency consultation meeting	10/04/2012	Maureen de Zeeuw, Bob Platte; Mark Burch, Mike Petrula	USFWS, ADNR-ADF&G	USFWS and ADF&G requested that the streams to be surveyed for Harlequin Ducks should be specified in the study plan, along with the extent of the streams to be surveyed (i.e., how far outside the proposed 3-mile study area buffer).	The study plan (Sections 10.15.3 and 10.15.4.3) has been revised to clarify that all suitable streams in the study area will be surveyed for Harlequin Ducks and that these surveys will extend outside the 3-mile buffer as far as is necessary to cover suitable habitat.
Agency consultation meeting	10/04/2012	Maureen de Zeeuw, Bob Platte	USFWS	USFWS requested that spring migration surveys should start by the last week of April, to avoid missing birds in a year of early break-up and melt.	The timing of the spring migration surveys (Section 10.15.4.1.1) has been revised accordingly.
Agency consultation meeting	10/04/2012	Maureen de Zeeuw, Bob Platte	USFWS	USFWS suggested that breeding-pair surveys be timed to match seasonal conditions and melting lake ice in each year, based on available weather and break-up data.	The study plan (Section 10.15.4.2.1) has been revised to state that the timing of breeding surveys will be adjusted each year, if necessary, based on results of ice break-up monitoring and results from spring migration surveys. Breeding-pair transects will be conducted only in the transect-survey block in the lowlands in the easternmost portion of the study area, whereas lake-to-lake surveys will be conducted in the remainder of the study area.
Agency consultation meeting	10/04/2012	Mike Petrula	ADNR-ADF&G	ADF&G suggested that the distinction between spring migration and breeding surveys be dropped, so that migration surveys would transition directly into breeding surveys (late April to mid-June). The same survey method (complete waterbody search in lake-to-lake pattern) should be used for both, and surveys should be done every 5 days instead of every 7–10	The study plan (Sections 10.15.3, 10.15.4; Figure 10.15-1) has been revised to incorporate these suggested changes, including lake-to-lake surveys in most of the study area instead of breeding-pair transect surveys, which will be restricted to a survey block in the easternmost portion of the study area.

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				days, as proposed in the PSP.	
Agency consultation meeting	10/04/2012	Mike Petrula	ADNR-ADF&G	ADF&G suggested that productivity (brood) surveys be conducted by helicopter, rather than on foot, and that at least two brood surveys be conducted, beginning in mid-July, with a possible third survey based on the results of the second survey.	The study plan (Section 10.15.4.2.3) has been revised accordingly to replace the single foot survey with multiple helicopter surveys.
Agency consultation meeting	10/04/2012	Maureen de Zeeuw, Bob Platte	USFWS	USFWS wants to understand the volume and composition of birds migrating through the Project area, for assessment of collision risk at power transmission lines and attraction of landbirds to lighting on Project infrastructure.	The RSP has been revised by adding Section 10.15.4.1.2 to incorporate radar and visual surveys of bird migration in the vicinity of the dam site in 2013, with continuation in 2014 depending on the findings of the 2013 surveys.
Landbird and Shorebird Migration, Breeding, and Habitat Use Study (Section 10.16)					
TWG meeting	8/09/2012	Maureen de Zeeuw	USFWS	Landbird and shorebird densities need to be determined in the Project area. USFWS does not think that measures of relative abundance are adequate to understand the number of breeding birds potentially affected by the Project.	The study plan (Section 10.16.4.1.1) has been revised to incorporate density estimation from point-count surveys, employing distance sampling and removal sampling, as suggested by USFWS at the study plan follow-up meeting on 9/06/2012.
TWG meeting	8/09/2012	Maureen de Zeeuw	USFWS	The landbird and shorebird study plan needs to include a method to study the potential for the potential attraction of landbirds to facility lighting and the risk of subsequent collisions.	Radar monitoring of nocturnal migration by landbirds in the vicinity of the proposed dam, as was discussed at the study plan follow-up meetings on 9/06/2012 (landbirds/shorebirds) and 10/04/2012 (waterbirds) has been added to the RSP (Sections 10.15.4.1.2 and 10.16.4.4).
TWG meeting	8/09/2012	Maureen de Zeeuw	USFWS	Most of the population of the Pribilof subspecies of Rock Sandpiper (*Calidris ptilocnemis ptilocnemis*) overwinters in upper Cook Inlet, where they feed heavily on *Macoma balthica*, a clam that occurs in intertidal sediments. The potential effects of Project operations on these clams need to be assessed to understand how Rock Sandpipers may be affected by the Project.	The potential for impacts on *Macoma* will be assessed in 2015 for the FERC License Application, based on the predicted or modeled physical effects of Susitna River flow alterations on intertidal mudflats in upper Cook Inlet, using the results of other studies of geomorphology, hydrology, sedimentation, and temperature under the Geomorphology and Aquatic Resources programs.
Agency consultation meeting	9/06/2012	Maureen de Zeeuw	USFWS	Habitat characterization of point-count locations should not be conducted at the same time as auditory surveys for landbirds and shorebirds.	Habitat variables at point-count locations will not be characterized at the same time as auditory surveys. The study plan (Section 10.16.4.1) has been revised to

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					clarify that habitat characterization of point-count locations will be derived from the wildlife habitat map geodatabase by using field GPS coordinates.
Agency consultation meeting	9/06/2012	Maureen de Zeeuw, Steve Matsuoka	USFWS	Landbird and shorebird surveys should focus on the species of concern listed in Table 2 of the *Wildlife Data-Gap Analysis For The Proposed Susitna–Watana Hydroelectric Project*, dated August 2011.	All species heard or seen will be recorded during field surveys. The wildlife habitat evaluation study plan (Section 10.19.4.1) identifies the species listed in Table 2 of the wildlife data-gap analysis report (with a couple of minor corrections, as discussed with Steve Matsuoka of USFWS) as focal species for detailed habitat evaluation.
Agency consultation meeting	9/06/2012	Maureen de Zeeuw	USFWS	A survey from a boat should be conducted to search for swallow breeding colonies along the Susitna River within the reservoir inundation zone.	The study plan (Section 10.16.4.2) has been revised to add a survey of colonial-breeding swallows, which are undersampled by standard point-count surveys.
Agency consultation meeting	9/06/2012	Steve Matsuoka	USFWS	Surveying within a 2-mile buffer around the project area should adequately sample landbirds and shorebirds by focusing on the habitats most likely to be affected (rather than expending sampling effort in more mountainous areas where impacts are less likely to occur).	The study area description in the Landbird and Shorebird Migration, Breeding, and Habitat Use Study plan (Section 10.16.3) has been revised to state that point counts will target the area within a 2-mile buffer around the Project area footprint, access/transmission alignments, and reservoir inundation zone. A new study area map (Figure 10.16-1) has been created accordingly.
Agency consultation meeting	9/06/2012	Various	USFWS	Additional point-count surveys outside of the Project study area (e.g., in Denali National Park or the Copper River Basin), are not needed for the landbird/shorebird study if suitable detection functions from the literature are used for density estimation of rare species.	No changes to the study plan are needed (see next entry below for relevant study plan revisions regarding detection functions).
Agency consultation meeting	9/06/2012	Steve Matsuoka	USFWS	Alaska Landbird Monitoring System (ALMS) protocols should be used for the landbird and shorebird study. Double-observer methods are not needed for the landbird and shorebird study, and the ALMS methods with distance analyses and removal analyses should be adequate for landbird and shorebird surveys. Existing detection functions, derived from other landbird and shorebird point-count studies in Alaska,	ALMS protocols were proposed in the original study plan, but additional details have been added (Section 10.16.4.1.1) to describe the analytical approach to density estimation of landbirds and shorebirds by using distance analyses, removal analyses, and detection functions.

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				should be used in cases where Project field data are too limited to derive adequate detection functions (e.g., rare or uncommon species).	
Agency consultation meeting	9/06/2012	Maureen de Zeeuw	USFWS	Mist-netting could potentially be used to determine if the reservoir inundation zone is used as migration stopover habitat for landbirds or shorebirds. A radar study could potentially be conducted to quantify the volume of nocturnal bird migration through the Project area, focusing on the dam site to address the potential for attraction of night-migrating landbirds to lights on the proposed infrastructure around the dam.	Because of the site-specific nature of the information obtained from mist-netting and the risk of injury to captured birds, mist-netting is not proposed in the Landbird and Shorebird Migration, Breeding, and Habitat Use Study plan. Consultation on this study plan is continuing between USFWS and AEA.
Agency consultation meeting	9/06/2012	Maureen de Zeeuw, Steve Matsuoka	USFWS	The PSP does not include enough field survey effort to adequately sample the number of birds of different species using the study area and to estimate landbird and shorebird densities. Additional survey effort is needed to sample all species throughout the early portion of the breeding season between mid-May and mid-June.	The field sampling effort for point-counts in the Landbird and Shorebird Migration, Breeding, and Habitat Use Study study plan (Section 10.16.4.1.2) has been extended accordingly to cover the period from mid-May to mid-June.
E-mail	09/12/2012	Steve Matsuoka, Jim Johnson, Rick Lanctot	USFWS	On the priority species list, a few species on the list appear on the Bird of Conservation Concern (BCC) 2008 list, but are not checked off under the BCC column. Some examples include Short-eared Owl and Surfbird.	The list of species of conservation concern (Table 10.19-1 in Section 10.19, Evaluation of Wildlife Habitat Use) was reviewed again and updated to include species listed in the 2008 BCC list from USFWS, including Short-eared Owl, which is listed for regions other than Alaska during the non-breeding period. Although Surfbird was not found in the USFWS 2008 BCC list, it is included in the table because it appears in the Alaska Shorebird Group's 2008 list.
E-mail	09/12/2012	Steve Matsuoka, Jim Johnson, Rick Lanctot	USFWS	Two shorebirds that are on the BCC list that could be added are Hudsonian Godwit and Short-billed Dowitcher. These probably occur in low densities, but should be included on the species priority list.	Hudsonian Godwit and Short-billed Dowitcher were not included in the original list because they were not recorded in the study area during 2 years of field surveys done in the early 1980s by Kessel's University of Alaska Museum crews. However, these species have been added to the species priority list (Section 10.19, Table 10.19-1).
Agency	9/13/2012	David Tessler	ADNR-	Dave Tessler noted that, based on subsequent	Clarifying details have been added to the Landbird and

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consultation meeting			ADF&G	discussions he had with Maureen de Zeeuw of USFWS, his concerns had largely been addressed during the previous meeting on the landbirds/shorebirds study (September 6, 2012), which he was unable to attend. He emphasized that observers used for point-count surveys should undergo distance estimation training and testing before field surveys are conducted. Although he sees some validity in using double observers, the USFWS recommendation of employing distance and removal analyses based on standard Alaska Landbird Monitoring System (ALMS) field methods would be adequate. He agreed with the USFWS recommendation of conducting point counts over a longer period of time than was stated in the PSP.	Shorebird Migration, Breeding, and Habitat Use Study plan (Section 10.16.4.1) with regard to observer training and testing and the length of the field sampling period.
Population Ecology of Willow Ptarmigan in Game Management Unit 13 (Section 10.17)					
				No comments.	
Wood Frog Occupancy and Habitat Use (Section 10.18)					
Agency consultation meeting	9/13/2012	David Tessler	ADNR-ADF&G	Examine data on fish presence in waterbodies to determine where frogs may occur, because frogs tend to not occur in waterbodies with fish (which prey on adults and eggs). Frog surveys should concentrate on isolated waterbodies and wetlands not connected to stream systems.	This recommendation has been added to the revised frog study plan (Section 10.18.4.1), using Project-specific fish survey data, where available.
Agency consultation meeting	9/13/2012	David Tessler	ADNR-ADF&G	USGS's amphibian monitoring protocol recommends that a second visit be conducted to improve occupancy estimates. Consider two visits in May because the peak calling period can be difficult to identify.	The frog study plan (Section 10.18.4.1) has been revised to incorporate a second sampling visit to a subset of waterbodies in the study area to improve detectability and occupancy estimates.
Agency consultation meeting	9/13/2012	David Tessler	ADNR-ADF&G	Field sampling for chytrid fungus can be conducted readily by collecting swab samples from captured frogs. Meg Perdue or Mari Reeves at USFWS can suggest labs that can analyze frog swabs for chytrid fungus.	Further details regarding field sampling and lab analysis of chytrid fungus samples have been added to the frog study plan (Section 10.18.4.2).

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Evaluation of Wildlife Habitat Use (Section 10.19)					
TWG meeting	8/09/2012	Catherine Berg	USFWS	The Wildlife Habitat Evaluation Study should identify the species for which habitat will be mapped.	The Evaluation of Wildlife Habitat Use study plan (Section 10.19.4.1) has been revised to include a preliminary list of species of concern (Table 10.19-1) for which habitat use will be evaluated.
Agency consultation meeting	9/06/2012	Maureen de Zeeuw	USFWS	The rationale and assumptions used in the habitat evaluation study should be clearly documented.	The Evaluation of Wildlife Habitat Use study plan (Section 10.19.4.1) has been revised to provide more detailed description of the proposed analytical approach.
Agency consultation meeting	9/13/2012	David Tessler	ADNR-ADF&G	The Project should "crosswalk" habitat mapping and evaluation data with the Alaska Gap Analysis Project (GAP) mapping. Contact Keith Boggs and Tracy Gotthardt at the Alaska Natural Heritage Program to discuss how the data might be compared between the Project and Alaska GAP.	The Evaluation of Wildlife Habitat Use study plan (Section 10.19.4.1) has been revised to clarify that the study report will incorporate the suggested crosswalk of habitat types between the two projects. The results of the suggested consultation will be reflected in the revised study plan.
Wildlife Harvest Analysis (Section 10.20)					
				No comments.	
SECTION 11 BOTANICAL RESOURCES					
General					
				No comments.	
Vegetation and Wildlife Habitat Mapping Study in the Upper and Middle Susitna Basin (Section 11.5)					
TWG meeting	8/09/2012	Various	USFWS, ADNR-ADF&G, FERC	The general consensus was that the large (5-mile buffer) size of the mapping area was more than sufficient to account for the indirect wildlife habitat alteration effects likely to occur from Project development.	In Section 11.5.3 in the RSP, the study area for the mapping of vegetation and wildlife habitats has been reduced to a 4-mile buffer, which remains twice the size of the buffer (2 miles) used in the Wetland Mapping Study.
TWG meeting	8/09/2012	Bob Henszey	USFWS	The USFWS requested a comparative analysis of the changes in vegetation between the 1980s and present, if such a comparison would not involve a large amount of extra work.	The draft RSP does not propose this comparative analysis. AEA does not believe that such a comparison can be readily prepared, because a different version of the Alaska Vegetation Classification was used in the 1980s. In addition, the purpose of the

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					vegetation mapping proposed in the draft RSP is to obtain current baseline information on vegetation; possible changes in vegetation coverage since the 1980s would not yield any information related to project effects.
Agency consultation meeting	9/06/2012	Maureen de Zeeuw	USFWS	The USFWS (Maureen de Zeeuw) requested that for the habitat mapping study, Kessel's bird habitat classification system for Alaska (Kessel 1979) be compared to the Level IV vegetation types of Viereck et al. (1992). The concern is that the habitat classification used for the Project should appropriately represent the habitats used by landbirds and shorebirds, and not be limited to plant species composition. The USGS prepared a report comparing the two classification systems; USFWS indicated they would provide the report.	It was confirmed that the proposed methodology (Viereck et al. 1992 Level IV vegetation types, plus ABR's landscape feature additions), addresses habitat parameters beyond plant species composition (e.g., vegetation structure, landscape position, disturbance level, etc). The habitat mapping approach is further described in Section 11.5.4.2 of the draft RSP. The USFWS has not located the USGS report that compares the Viereck and Kessel classifications, but in the absence of that material, AEA prepared a "crosswalk" between the two classification systems and has the following comments. First, some aspects of the Kessel classification system will be integrated into the mapping of habitats for the Project (e.g., cliff faces for nesting birds will be extracted from barren vegetation types using DEM data). Second, the low, moderate, and tall shrub classes used in the Kessel system cannot be consistently delineated from aerial imagery. Those fine-scale classes work well for on-the-ground vegetation classifications, but cannot be reliably identified from aerial imagery. The Project will use a habitat map derived from aerial imagery to quantitatively estimate habitat loss and alteration effects. Lastly, AEA notes that recent Alaskan landbird data indicate that the clean separations in habitat use by landbird species in low, moderate, and tall shrub types, which Kessel refers to in her paper, are not common. Rather, many species often show a wide range in use of shrub types with an emphasis, perhaps, in tall or low shrub habitats depending on the species. AEA will use that complete range of habitat

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					use (from low to tall shrub types) in the estimates of Project-induced habitat effects noted above.
Riparian Vegetation Study Downstream of the Proposed Watana Dam (Section 11.6)					
TWG meeting	8/09/2012	Various	USFWS, ADNR-ADF&G	The lateral boundary of the riparian study area needs to be determined. In the PSP, the 100-year floodplain limit was proposed. There were agency concerns, however, about how the flood limit would be determined.	Comment addressed in Section 11.6.3 in the RSP. Preliminarily, riverine physiographic boundaries will be used to define the lateral extent of the study area. Riverine physiography (areas directly influenced by semi-regular to irregular overbank flooding [~5–25 year intervals] including off-channel waterbodies) will be mapped from recent aerial imagery. The riverine physiography map will be sent out for review and agency input (late October/early November 2012) before the final riparian study area boundary is defined and described in the RSP.
TWG meeting	8/09/2012	Various	ADNR-ADF&G, ARRI, BLM, OPMP, NHI, USFWS	The length of the Riparian Vegetation Study area downstream needs to be determined.	Comment addressed in Section 11.6.3 in the RSP. The downstream extent of the study area will be defined as the point at which the effects of altered flow regimes expected in the Susitna River would not be significant (i.e., where expected flow changes would be overridden by input from other rivers, are within the range of natural variability, and/or overridden by the effects of Cook Inlet tides). The potential Project-induced changes to flow will be attenuated downstream of the confluence of the Susitna and Chulitna rivers near Talkeetna. The length of the study area below the confluence will be defined following analysis of data from the 2012 Fish and Aquatics Instream Flow Study, Ice Processes in the Susitna River Study and further refinement of the range of potential Project operations.
Wetland Mapping Study (Section 11.7)					
Agency consultation meeting	9/18/2012	Various	USACE, EPA, USFWS, ADEC	The general consensus was that the water quality wetland function would not need to include subfunctions like sediment retention and nutrient/toxicant removal, although an exception was	The water quality function listed in Section 11.7.4.3 in the RSP notes that these wetland functions will be evaluated individually.

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				noted by the USACE wherein they would need, as part of the evaluation of the wetlands permit application, to assess these possible functions for wetlands that would be adjacent to proposed gravel pads and roads.	
Agency consultation meeting	9/18/2012	Various	USACE, EPA, USFWS, ADEC	Fish habitat should be assessed as a subfunction of the abundance-and-diversity-of-wetland-fauna function. Data collected by the fish studies should be incorporated into the wetlands functional assessment to determine whether wetland polygons are performing a fish habitat function.	Section 11.7.4.3 in the RSP notes that fish occurrence information for lacustrine waterbodies (from the Fish and Aquatics Resources Studies, Section 9 in the RSP) will be applied in the evaluation of the abundance-and-diversity-of-wetland-fauna wetland function. The wetland functional analysis will include a spatially explicit component in which particular waterbodies will be noted as providing a fish habitat function (pending adequate data from the fish studies).
Agency consultation meeting	9/18/2012	Various	USACE, EPA, USFWS, ADEC	Wildlife abundance and diversity should be assessed as a subfunction of the abundance-and-diversity-of-wetland-fauna function.	Section 11.7.4.3 in the RSP notes that wildlife occurrence information will be applied in the evaluation of the abundance-and-diversity-of-wetland-fauna wetland function.
Agency consultation meeting	9/18/2012	Various	USACE, EPA, USFWS, ADEC	Wildlife habitat work should be incorporated into the wetlands functional assessment to determine whether wetland polygons are performing a wildlife diversity and abundance function.	Section 11.7.4.3 in the RSP notes that wildlife habitat-use information (similar to that used in the Evaluation of Wildlife Habitat Use study, Section 10.19 in the RSP) will be assessed for the mapped wetland types. The wetland functional analysis will include a spatially explicit component, if necessary, in which wetland types in different sections of the Project area will be noted as providing a wildlife habitat function for various wildlife species.
Agency consultation meeting	9/18/2012	Various	USACE, EPA, USFWS, ADEC	The consumptive uses wetland function should be evaluated for both actual uses (e.g., known hunting, berry picking areas) and potential uses (e.g., suitable wetland habitats for consumptive uses if access was increased).	In Section 11.7.4.3 of the RSP, the consumptive uses function is described to indicate that actual and potential uses will be assessed (pending adequate data from the recreation and subsistence studies). The wetland functional analysis will include a spatially explicit component, pending adequate data (as above), in which particular wetland types in different sections in the Project area will be noted as providing actual or

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					potential consumptive uses.
Agency consultation meeting	9/18/2012	Various	USACE, EPA, USFWS, ADEC	The effects of permafrost on wetland functions should be addressed, especially in light of the known degradation in permafrost associated with climate change.	Section 11.7.4.3 in the RSP notes that the existence of permafrost in wetlands in the Project area will be addressed in the wetland classification by categorizing wetlands as associated with permafrost or not. In this way, the functional capacities of permafrost and non-permafrost wetlands will be addressed.
Rare Plant Study (Section 11.8)					
				No comments.	
Invasive Plant Study (Section 11.9)					
				No comments.	
SECTION 12 RECREATION AND AESTHETIC RESOURCES					
General					
Memo	8/07/2012	Unspecified	NPS	Request AEA develop a schedule ensuring coordination between interdependent resource studies associated w/ Susitna-Watana Project. Recreation and Aesthetic studies are dependent on results of other biophysical resource studies (hydrology, instream flow, fluvial geomorphology, ice processes, fisheries, game studies).	Interdisciplinary coordination discussed in each resource study culminating in standard interdependencies charts presented in the schedule section of each study plan. Interdependencies for Recreation Resources and Aesthetic Resources studies discussed in Sections 12.5,6,7. Recreation and Aesthetic Resources interdependences diagrams present in Figures 12.5-2 and12.6-2.
Memo	8/07/2012	Unspecified	NPS	Critical Path Method, or comparable project mgmt. mechanism, should be key element of Susitna-Watana Project, especially w/ 58 studies, many occurring concurrently.	Each study area provides the key elements that area necessary inputs as well as outputs within the context of each particular study area. AEA maintains a schedule of each study including key predecessors and successors for studies as well as other activities in the planning and design of the Project.
Memo	8/07/2012	Unspecified	NPS	Transparent process needed for tracking critical milestones and progress of PSPs, w/ interdependencies IDed in each study plan.	See responses above.
Memo	8/07/2012	Unspecified	NPS	Summary of overall Critical Path schedule should be included as separate plan, and be made available on	Study plan schedules with interdependencies to other disciplines are presented in the RSP within each study

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				Susitna-Watana Project website for stakeholders to access.	section as, well as an overall schedule in Section 1. AEA's overall schedule is continuously updated as planning and progress advances and changes based on weather, contracting, and other key variables. Key schedule milestones and activities are regularly posted on the Project Website
Memo	8/07/2012	Unspecified	NPS	According to current published schedule, agencies and stakeholders will not have results of critical 2012 reconnaissance, baselining studies that are key to determining scope, adequacy of the 2013-14 ILP studies before NPS' final opportunity to comment on ILP studies. NPS is being asked to take AEA's word that if results of 2012 studies indicate a need to modify ILP studies, such modifications will be made voluntarily.	The results of 2012 work as well as all other previous analysis and information gathering for the Project have been used by the study team to develop the study plans. The study plans are based on the most current information AEA has to develop study methodologies that fit within the baseline conditions understood and articulated within the study plan as needed.
Recreation Resources Study (Section 12.5)					
Memo	8/07/2012	Unspecified	NPS	10.1. Intro – Recreation study focuses on recreational uses, demand rather than recreational opportunities, experiences. Need to be qualitative, not just quantitative, b/c experiences are likely to change post-project. NPS is relying on recreation surveys to tease-out qualitative information (quality of experience, preferences, etc.). Without seeing survey instruments and protocol, NPS does not have assurance that studies will be able to characterize these.	Agree that having the study be more explicit about how quality of experience and how the opportunity assessment will be carried out is appropriate, even if the qualitative methods are more loosely defined. The study plan has been updated throughout to mention where possible how the various study components can get at the quality and recreation supply/opportunity considerations. Section 12.5.4 describes the draft survey protocol. Attachment 12-3 is the draft intercept survey instrument.
Memo	8/07/2012	Unspecified	NPS	10.5.1. Gen. Description of Proposed Study – Add following to "specific goals of the study": Incorporate the results of the 2012 studies.	Agreed and the additional goal has been added to Section 12.5.1.
Memo	8/07/2012	Unspecified	NPS	10.5.2. Existing Info & Need for Additional Info – Claim that existing info was compiled in Recreation Data Gap Analysis and included in PAD is incorrect. PAD was filed 12/2011; NPS did not receive 2011 Gap Analysis until 3/2012, after much pleading. To NPS' knowledge, 2011 publication date for this	The draft Socioeconomic, Recreation, Air Quality and Transportation Data Gap Analysis report was completed by HDR on August 25, 2011. That resource information in that report was used in developing the PAD, however it was inadvertently left off the Project Website until early 2012.

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				document is inaccurate since it was not made public until 2012.	
Memo	8/07/2012	Unspecified	NPS	10.5.2. Existing Info & Need for Additional Info – Agencies, stakeholders will not have results from the "2012 data gathering efforts" until they are reported on 11/5/2012. NPS will not be able to incorporate comments on results by the 10/15/2012 due date for PSP comments.	The Study Plan comment period has been extended to November 14, 2012 however the published report for 2012 studies will not be ready for publication by that time. AEA study teams are using information gathered in 2012 to inform the study plan process in those instances that such information is applicable to customize or alter specific methodologies.
Memo	8/07/2012	Unspecified	NPS	10.5.4. Study Methods – With respect to interdependent analyses, and reliance of recreation and aesthetics studies on results from other disciplines, there is no detail in PSP explaining how timing will work. Schedule table at end of each PSP w/ study seasons and deliverables does not mention this. NPS needs details of how sequence will work. AEA cannot just say it will happen when it does not appear that results of other studies will be available before delivery date for this one.	Agree. Section 12.5.4, 12.6.4, and 12.7.4 have been updated to describe interdependencies and Figures 12.5-2, 12.6-2, 12.7-2 provide a graphical representation of the interdependencies.
Memo	8/07/2012	Unspecified	NPS	10.5.4. Study Methods, Regional Recreation Analysis – Study plan should note, early-on, distinction w/ subsistence hunting and fishing v. sport activities.	Agreed. Study Plan, section 12.5 makes this distinction.
Memo	8/07/2012	Unspecified	NPS	10.5.4. Study Methods, Regional Recreation Analysis – PSP states "Existing resource management plans relevant to the recreational resources of the study area will be reviewed and compiled." Isn't this being done in 2012?	Management plans were collected and revised during the 2012 study period. Additional analysis is necessary throughout 2013 and 2014 as the analyses develop. Text has been clarified in Section 12.5.4.
Memo	8/07/2012	Unspecified	NPS	10.5.4. Study Methods, Regional Recreation Analysis – 2012 info will be used to develop RSP. Will NPS see this prior to the 10/15/2012 due date for agency and public PSP comments? If not, how will agencies and public ensure that 2012 data are applied correctly? Timing problem points to larger problem of trying to finalize study plans for a project before reconnaissance level work is compete. This also	The Study Plan comment period has been extended to November 14, 2012; however, the published report for 2012 studies will not be ready for publication by that time. AEA study teams are using information gathered in 2012 to inform the study plan process in those instances that such information is applicable to customize or alter specific methodologies. Much of the work being done in 2012 has to do with collection of

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				applies to Aesthetics and Instream Recreation PSPs.	baseline information which by itself does not necessarily alter the study methods proposed. However, in many cases the 2012 work has informed the logistical and methodological considerations of the 2013-14 study The PAD, Data Gap report, and analysis of management plans and other existing published information related to recreation in addition to firsthand information gathering in 2012, all together comprise the body of information used to identify the data needs and develop the study plan methods to get at those data needs. .
Memo	8/07/2012	Unspecified	NPS	10.5.4. Study Methods, Regional Recreation Analysis – AEA needs to analyze effects of Susitna-Watana Project operations, not just "features." Nowhere in PSP is it explicitly acknowledged that Susitna-Watana Project may have effects on things like fish abundance (affecting sport fishing opportunities), moose, caribou, waterfowl, upland game bird populations due to migration barriers and alteration of habitat, due to altered fluvial morphology and riparian vegetation.	Agreed and the study plan has been updated in several places to clarify that the analysis is directed at providing the relevant information to form the basis to be able to understand how the Project construction operation may affect the resource.
Memo	8/07/2012	Unspecified	NPS	10.5.4. Study Methods, Recreation Carrying Capacity – Physical carrying capacity is just one of 4 elements of "carrying capacity" (physical, ecological, social, spatial). Area's physical capacity may / may not be most limiting, especially if Susitna-Watana Project results in greater access, which could cause use to exceed area's social carrying capacity. This is one reason why it is important to study experiential aspect of pre- and post-project recreational use. On rivers in particular, social capacity is almost always more sensitive than other aspects of capacity, w/ concerns about group size, encounter rates; competition for space at put-ins, take-outs, campsites; crowding at fishing holes, play boating features, etc.	Agreed. The discussion of carrying capacity has been expanded in Section 12.5.4 to clarify the various components being addressed. The recreation user intercept survey and regional resident household mail survey will gather some helpful information regarding the social aspect of the carrying capacity.

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Memo	8/07/2012	Unspecified	NPS	10.5.4. Study Methods, ID & Analysis of Salient Data from Existing Survey Research – Existing survey research appears biased towards "industrial tourism." Analysis needs to capture use by independent tourists (e.g. people driving up AK Hwy. and on to Denali Hwy.), and local (unguided AK resident) users, many of whom are able to access area without relying on air taxis or het boat charters.	Existing survey research, and AVSP VI specifically, is a statistically rigorous research project that measures all types of Alaska visitors and is not biased toward large-scale packaged tourism. As explained in Section 12.5.4, the survey methods are intended and expected to capture information about all types of users.
Memo	8/07/2012	Unspecified	NPS	10.5.4. Study Methods, ID & Analysis of Salient Data from Existing Survey Research – PSP states that AVSP Survey, which will be used in the study plan, is a statewide research program commissioned by the AK Dept. of Commerce, Community & Economic Development, that included 6,747 visitors to AK in Summer 2011 and 1,361 visitors in the Fall/Winter 2011/2012. Survey excludes spring season.	The study team believes this is a robust study that is appropriate to use in combination with other data sources. The AVSP VI survey is conducted year round. The "spring" season is not excluded; rather March and April are included in the fall/winter season reports, while May is included in the summer season report Section 12.5.4 has been expanded to discuss further detail about data sources and their applicability for the AEA proposed studies.
Memo	8/07/2012	Unspecified	NPS	10.5.4. Study Methods, Telephone Surveys of Railbelt Residents – Phone survey has very little value. Given the sample size, very few subjects are likely to be familiar with the Susitna-Watana Project area, and SCORP questions are too general to yield useful info about specific kinds of recreational opportunities in the area. Instead, USNPS suggest resources be focused on "executive interviews" – use snowball sampling method to find actual users of this area and others like it.	The survey study plan has been modified accordingly in Section 12.5.4. The study plan has been revised to include a mail survey in addition to intercept surveys and executive interviews. The SCORP is an important source of information for regional recreation characteristics and it is a formal document prepared explicitly for the purposes of helping recreation providers plan to meet future recreation needs. The SCORP should help the recreation planning effort for the Project and in the region, particularly with regards to identifying regional recreation supply and demand characteristics.
Memo	8/07/2012	Unspecified	NPS	10.5.4. Study Methods, Telephone Surveys of Railbelt Residents – Expecting cooperation from vendors and outfitters, who are being asked to take the time, effort to hand over private info on "actual users" be difficult. This underscores need to review survey instruments, protocols ASAP.	Agree. Information from private businesses needs to be handled with great sensitivity and at times with confidentiality to inform the demand assessment. Methods discussion has been expanded in 12.5.4

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Memo	8/07/2012	Unspecified	NPS	10.5.4. Study Methods, Telephone Surveys of Railbelt Residents – Even though the project is unique, such survey templates are fairly standard and should already have been developed and disseminated to agencies, stakeholders.	Agree. Examples of other surveys used in FERC relicensing applications provides some insight, however, the study area as defined is unique to some other projects in that it is an original licensing, and present information about current uses is limited. Survey research will need to be customized to meet the unique and disperse recreational use of the study area.
Memo	8/07/2012	Unspecified	NPS	10.5.4. Study Methods, Intercept Surveys & Structured Observation Visitor Counts – Where is the detail on this and other methods? USNPS needs to be developing instruments now, or at least deciding when they will be developed (prior to NPS' last chance to comment in mid-Oct. 2012).	Methods have been expanded in 12.5.4. Draft survey instruments are shown in Attachment 12-3, 12-4, and 12-5. A technical advisory group function has been added in the Study Plan, to meet quarterly, to provide input on survey instruments and other study functions.
Memo	8/07/2012	Unspecified	NPS	10.5.6. Schedule – Only one December (2013) will be sampled. No "wiggle room" should weather, other conditions render the limited sample seasons inadequate to represent actual project area conditions.	The studies are designed to understand recreation trends in addition to a 2013 snapshot. The studies in 2013 and 2014 are also intended to collect data from recent years, in addition to identifying recreation trends and uses, and quality of experience in past seasons. The survey sample plans for the recreational users intercept survey allow for flexibility if "make up" days are needed due to inclement weather or other issues (such as road closures, etc.) This is reflected in Table 12.5-1, and discussed in Section 12.5.4.
Memo	8/07/2012	Unspecified	NPS	10.5.6. Schedule – No mention of when results of other studies – ice, morphology, fish and game populations, etc. – will be in-hand, and how results will be incorporated in the Recreation Study report.	Interdisciplinary interdependency is being charted out by with AEA and its contractors/study leads. The Interdisciplinary coordination for Recreation and Aesthetic Resources studies is discussed in Section 12.5,6,7 and graphically illustrated in Figures 12.5-2, 12.6-2, 12.6-3.
Memo	9/20/2012	Cassie Thomas	NPS	A. Study of Recreation Resources Survey Methodology – Changes in flows, sediment transport, ice formation could likely result in significant changes in post-construction recreational opportunities downstream of Talkeetna. Baseline boating , fishing,	Sections 12.5.3, 12.6.3, 12.7.3 have been revised to indicate that study area may be changed during study implementation if analysis of specific findings from other study disciplines indicates recreation resource effects extend beyond currently anticipated study

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				winter use of Susitna River corridor from Talkeetna to its mouth needs to be assessed to determine project's impacts on recreation and aesthetics. FERC will need this info to balance power and non-power uses of Susitna River in its licensing decision; NPS will also need info to develop appropriate Section 10(a) recommended terms and conditions for the license. Only if studies of the river's post-project flows, morphology, ice processes, fish habitat, etc., determine that there will be negligible effect on relevant biophysical conditions in river corridor downstream of Talkeetna should recreational and aesthetics study areas be restricted to the river corridor upstream of the confluence w/ Talkeetna and Chulitna rivers.	boundaries. At this time, AEA elects to terminate the river recreation and flow study at river mile 83 where the George Parks Highway Bridge crosses the Susitna River. This termination point was selected based on the influence of the Chulitna and Talkeetna rivers on the channel shape and structure of the Susitan downstream of their confluence coupled with proximity of egress for non-motorized watercraft on the Susitna River. If results from other resource disciplines, i.e., ice processes, hydrology, and geomorphology, indicate that the Project will affect river flows in a way that changes the way recreationist currently use the lower Susitna River, the Project impact analysis will extend further downstream.
Memo	9/20/2012	Cassie Thomas	NPS	C.1. Access Points – Study efficiency could benefit if resources were re-programmed away from certain areas along Richardson and Glenn hwys. (e.g. Chickaloon, Sourdough, Paxson Lake). Would presumably help keep study costs in line, while including summer and winter access points downstream of Talkeetna. If goal of intercepting Chickaloon area residents is to sample subsistence activities, this effort is more appropriate under Subsistence survey.	Intercept locations have been revised to re-allocate effort and this is discussed in Section 12.5.4.
Memo	9/20/2012	Cassie Thomas	NPS	C.1. Access Points – Description of access points along Parks Hwy. leaves impression that Talkeetna is on the Parks. Might be better to say that it runs past Talkeetna Spur Rd.	Agreed, Section 12.5.4 has been updated accordingly.
Memo	9/20/2012	Cassie Thomas	NPS	C.1. Access Points – Fixed Wing Aircraft: Will effort be made to intercept private aircraft at Talkeetna Airport? If not, why not, in light of planned intercepts at Willow Airport and float plane dock?	Talkeetna Airport is included in the intercept survey plans, see Section 12.5.4
Memo	9/20/2012	Cassie	NPS	3. Survey Content – Boundary Project surveys	As discussed in TWG meetings 9/20 & 10/03, it is

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		Thomas		provide useful template for Susitna-Watana Project, but crucial difference between these two projects must be keep in mind ... Better questions to capture baseline recreational resource conditions in Susitna-Watana study area would focus more on recreational experiences currently sought by area visitors, in terms of attributes like remoteness, solitude, self-reliance, low encounter rates, absence of "combat fishing" atmosphere, etc. Instead of asking about the adequacy of existing facilities and services – none of which are provided by AEA – better questions for capturing pre- and post-project differences would assess demand for potential new facilities (such as reservoir-based fishing, serviced campgrounds, maintained trails, a hut system, etc.).	understood the the Boundary Project, is different that the setting for the Susitna-Watana Hydroelectric Project but the basic premise of the survey plan has some applicability. The survey plans for this Project have been customized to gather factors relevant to recreationists in the Susitna River region. The quality of experience aspect is discussed in Section 12.5.4 and outlined on the draft survey instrument in Attachment 12-3. The capacity analysis discussion, which includes pre and post conditions, is provided in Section12.5.4.
Memo	9/20/2012	Cassie Thomas	NPS	3. Survey Content – Need to determine whether some current area visitors might go elsewhere if Susitna-Watana Project significantly changed recreational character of the area.	The intercept and mail surveys will help address displacement. Executive interview research will also be used.
Memo	9/20/2012	Cassie Thomas	NPS	3. Survey Content – Party size is important recreational use parameter in its own right (e.g., helps characterize visitor experience); this info should be collected early in intercept survey.	Based on experience, group size questions are best situated close to questions regarding spending. Final placement of all questions will be determined during pre-testing of the survey instruments. A question regarding party size is included in the draft intercept survey instrument (Attachment 12-3).
Memo	9/20/2012	Cassie Thomas	NPS	3. Survey Content – Basic structure of the intercept survey will likely work as online survey, but some elements need revision; e.g.,NPS suggests the "don't know" and "refused" options be deleted from each question.	Agreed. Section 15.5.4 has been updated to more clearly explain the differences in some questions are based on the mode of delivery.
Memo	9/20/2012	Cassie Thomas	NPS	D. Mail & Online Survey – By surveying only registered voters, sample will be somewhat skewed in terms of demographics. Younger visitors are less likely to be registered in AK, as are military members and their dependents. Snowbirds may also be	Use of the voter registration database is a valid sample universe for the Regional Resident Household Mail Survey. The voter registration database is readily available, screens for those over age 18, and also contains a mailing address in addition to a physical

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				registered in another state, even if they own property in / near the study area. Is it possible to use power utility customer lists to generate a random sample? DMV records may also yield a less biased sample population.	address of those registered to vote. While it is understood that not all regional residents are registered to vote, this database represents a wider diversity of names and addresses than commercially purchased mailing lists (such as utility customers).
Memo	9/20/2012	Cassie Thomas	NPS	D. Mail & Online Survey – Contingency plan: Does AEA have plan for gathering recreation and aesthetics resource info if study area is affected by floods, other unusual or extreme weather, wildfires, earthquakes, road or railroad closures, etc., during critical survey periods? Or if Susitna River is subject to additional emergency Chinook sport fishing closures? These factors can have drastic effect on number of recreational users who want to / are able to access the study area. Study plans should include a detailed strategy for altering survey methods and / or extending study period in event the study area is affected by these forces beyond AEA's control.	The studies are designed to understand recreation trends in addition to a 2013 snapshot. The studies in 2013 and 2014 are also intended to collect data from recent years. There are a variety of source sources of information that can help define the baseline conditions and trends related to recreation. This is not a new or unique situation for any study, analysis endeavor or Project. In addition to trying to reach back and identify recreation trends and uses, and quality of experience in past seasons, AEA has 2014 to possibly perform further investigations related to recreation.
Memo	9/20/2012	Cassie Thomas	NPS	D. Mail & Online Survey – AEA proposes to reduce intercept survey frequency (fortnightly instead of weekly) to save money, if sufficient sample size can otherwise be ensured. AEA should also consider reprogramming its survey efforts as season progresses to respond to unforeseen weather, access, regulatory conditions.	Contingency for sample days disrupted by weather, access (road closures), etc. has been built into the survey sampling plan. The intercept survey timing description has been expanded in 12.5.4.
Memo	9/20/2012	Cassie Thomas	NPS	E. Executive Interviews – Project description: Would be helpful to provide more info for interview subjects about Susitna-Watana Project's possible effects on recreation, aesthetics. Many non-specialists have no context for Susitna-Watana study area, and project's footprint will be more than just a high dam and large reservoir.	AEA plans public outreach and to distribute fact sheets about the Project, as well as answering questions about Project features asked by interviewees. The draft executive interview protocols include a description of the project and study area to inform interviewees prior to the semi-structured questioning. The wording describing the project will be similar to that found on AEA's website for consistency (See Attachment 12-4).
Memo	9/20/2012	Cassie Thomas	NPS	E. Executive Interviews – Before project's final operations are determined (e.g., habitat maintenance,	The reference regarding the Project being planned to help meet renewable energy goals has been removed.

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				sediment flushing, ramping flows, which subtract from volume of water available to make power), and before total project costs are known, it is inappropriate to tell survey subjects that the project will "meet nearly 50% of the Railbelt's electrical demand."	See Attachment 12-4.
Memo	9/20/2012	Cassie Thomas	NPS	E. Executive Interviews – Goal of executive interviews is to gather more info about baseline conditions and potential project effects, not to "sell" project to recreationists.	Agreed. Interviews should strive for clarity and avoid bias. see – Attachment 12-4.
Memo	9/20/2012	Cassie Thomas	NPS	E. Executive Interviews – Add brief description of new road, new power line, changes in natural flows downstream of Susitna-Watana Dam, potential changes in snow and ice cover, etc., to executive survey intro.	The purpose of the executive interview research as defined in the study plan is to gather baseline recreation use data, not opinions about potential impacts. Adding descriptions of potential infrastructure and other impacts that have not been properly studied and determined could bias the process in collecting baseline information. See Attachment 12-4.
Memo	9/20/2012	Cassie Thomas	NPS	E. Executive Interviews – Would be useful to learn more about kinds of recreational experiences executive survey subjects seek in Susitna-Watana Project area.	The kind of experiences being sought will be included in the Executive Interviews research and where possible, be identified in the in the Intercept/Mail/Web surveys. See Attachments 12-3.
Memo	9/20/2012	Cassie Thomas	NPS	E. Executive Interviews – "Day use areas" could be added to examples of new facilities in Q.7.	This change has been included in the Executive Interview draft protocol. See Attachment 12-4.
Memo	9/20/2012	Cassie Thomas	NPS	E. Executive Interviews – Survey subjects: Based on 9/20/2012 meeting, appears that members of paddling clubs and highly skilled kayakers who have run Devils Canyon will be surveyed – good.	Comment noted.
Memo	9/20/2012	Cassie Thomas	NPS	Northern Economics Survey Request – NPS disagrees w/ assumption that Susitna-Watana Project will lead to "increases in visitation." Some kinds of baseline project area uses will likely decrease post-project; e.g., hunting in area inundated by project reservoir, floating the upper Susitna River downstream from Denali Hwy., potentially activities dependent on existing amount of fish habitat and existing extent and duration of stable winter ice cover.	It is assumed that some types of location specific/resource users might be displaced and the net effect may increase or decrease recreation use depending on the activity. The Demand Assessment will determine this effect.

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Memo	9/20/2012	Cassie Thomas	NPS	Northern Economics Survey Request – Recreational activities likely to be affected by Susitna-Watana Project include kayaking and ATV use.	Agreed. These activities are included in the survey research.
Memo	9/20/2012	Cassie Thomas	NPS	Intercept Survey – NPS recognizes need to keep length of survey short so subjects will agree to complete it. Some questions seem more appropriate to a relicensing situation, where adequacy of existing licensee-provided facilities and mgmt. is under review. In Susitna-Watana's case, primary need is more info about baseline recreational use in area that could be affected by the project. Such use can be further characterized by attributes, such as experiences sought and opportunities provided to the public.	The importance of understanding quality of experience is described in Section 12.5.4; and built into the draft survey instrument in Attachment 12-3. The designs of the surveys need to take into careful consideration that excessive length or detail may deter response and affect successful fielding. There is also a mail survey effort – which will allow for another avenue to gather information about recreation attributes. .
Memo	9/20/2012	Cassie Thomas	NPS	Intercept Survey, Q.3. – Why are subjects not being asked if they drove the Parks Hwy.?	This question will be adjusted according to location of the intercept survey. Attachment 12-3 is a sample for one area.
Memo	9/20/2012	Cassie Thomas	NPS	Intercept Survey, Q.13. & 14. Quality of Experience and Crowdedness and Q.19. Experiences Sought – Re-order these questions. Put what is now Q.19. before Q.13.	Final placement of questions will be determined during pre-testing of the survey.
Memo	9/20/2012	Cassie Thomas	NPS	Intercept Survey, Q.13. & 14. Quality of Experience and Crowdedness and Q.19. Experiences Sought – Re-word Q.13. and Q.14. to find out if project area lacks facilities or mgmt. that would enhance recreational experiences, if provided. Given low density, high dispersion of recreational use in Susitna-Watana Project area, linear quality and crowdedness assessments are unlikely to yield info useful to project design and mgmt. decisions.	Draft questions regarding quality of experience and carrying capacity are included in the draft intercept survey (Attachment 12-3) in an effort to gather some data to assist project design and management decisions, even in the environment where use is dispersed.
Memo	9/20/2012	Cassie Thomas	NPS	Intercept Survey, Q.15., 16., 17. – These questions seem more appropriate for assessing how well existing recreation management plan is working at an existing hydro project, than for assessing probability of displacement from areas that will be utilized or affected by Susitna-Watana Project. While there may	The survey questions are not intended to be based on AEA being a recreation provider, rather the intent is to understand how users in the area value the recreation experience and its attributes regardless of who is managing the use.

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				be existing conflicts between visitors to Susitna-Watana Project area, they are not necessarily AEA's responsibility to fix. Presumably AEA will want to exert – or be required to exert – more active mgmt. of project lands and waters post-construction, reducing conflicts due to littering, vandalism, gunfire too close to roads, trails and campsites, etc.	
Memo	9/20/2012	Cassie Thomas	NPS	Intercept Survey, Q.15., 16., 17. – Until USNPS knows more about kinds of new recreational facilities Susitna-Watana Project may provide; how project operations will affect boating, fishing, etc., downstream; and the mgmt. and access policies for the dam, road, transmission corridor right of way, reservoir, it will not be possible to design survey questions that will yield meaningful feedback on public preferences for such facilities and policies. Additional survey regarding such preferences will be needed after more is known about location of new road and transmission corridor, reservoir operations, boatability of the river downstream of the dam, etc.	Understanding preferences is useful early in the Project to inform the planning of possible recreation facilities.
Memo	9/20/2012	Cassie Thomas	NPS	Intercept Survey, Q.20(f). & (g). – Ask subjects about adequacy of trails, trailheads.	Questions regarding trailheads and adequacy of trails are included in the current draft of the intercept survey See Attachment 12-3.
Memo	9/20/2012	Cassie Thomas	NPS	Intercept Survey, Q.20(f). & (g). – Table should ask about need for Info. and Edu. resources: kiosks, signage, trail information, points of interest, geologic, historic and / or cultural information.	Questions regarding signage, etc. are included in the draft intercept survey. See Attachment 12.3.
Memo	9/20/2012	Cassie Thomas	NPS	Intercept Survey, Q.20(f). & (g). – Ask subjects about mgmt.: level of maintenance, staff presence, etc.	Questions regarding facility management were considered, but due to considerations for survey length are not in the current draft of the intercept survey. This line of question will be considered in the design of the mail survey.
Memo	9/20/2012	Cassie Thomas	NPS	Intercept Survey, Q.21. & 22. – Reverse order of these questions to ascertain which areas are most important to visitors before assessing whether	The final placement of will be determined during pre-testing of the survey instruments. .

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				anything interfered w/ their aesthetic enjoyment. Note that USNPS Aesthetic Resources study plan request included natural sounds, not just scenic values.	
Memo	9/20/2012	Cassie Thomas	NPS	Intercept Survey, Q.23. – Question should be closer to start of survey. It provides context for many more specific questions that follow. Could be combined with Q.10. to help keep survey from being too long.	The final placement of will be determined during pre-testing of the survey instruments. .
Memo	9/20/2012	Cassie Thomas	NPS	Intercept Survey, Q.24. – Determine party size earlier in survey. It is an important recreational attribute; it's important to capture this info before subjects potentially abandon the interview.	The final placement of questions will be determined during pre-testing of the survey instruments.
Memo	9/20/2012	Cassie Thomas	NPS	Incidental Observation Survey – Possible to get update on effectiveness of this survey prior to release of the 2012 study report?	There has been limited response as noted in TWG meeting of 10/03/12. However, it appears the instrument's design is effective. Follow-up with selected contractors will be conducted to gather additional information regarding their recreational use observations while in the study area. No design changes are expected to the Incidental Observation Survey. This form is shown in Attachment 12-1.
Aesthetic Resources Study (Section 12.6)					
Memo	8/07/2012	Unspecified	NPS	10.6.2. Existing Info & Need for Additional Info – Despite what PSP states, there was no aesthetics inventory (as would be understood by that term in 2011-12 as opposed to 1984, in the PAD).	Agreed, Section. 12.6.2 updated.
Memo	8/07/2012	Unspecified	NPS	10.6.2. Existing Info & Need for Additional Info – Despite what PSP states, there was no gap analysis.	Agreed, Section 12.6.2 updated.
Memo	8/07/2012	Unspecified	NPS	10.6.2. Existing Info & Need for Additional Info – PSP states "Through the prior processes, the FERC scoping process and incorporation of work group and other licensing participant recommendations, study methods for 2013-2014 were developed." This is incorrect, they are ***still being*** developed. This is strange language to include in a *proposed* study plan. USNPS has had little time, opportunity to see	Agreed, Section 12.6.2 updated.

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				products and engage consultants so far; it is extremely premature to claim this as *fait accompli.*	
Memo	8/07/2012	Unspecified	NPS	10.6.3. Study Area – Limiting downstream scope of this and other studies to Talkeetna is unfounded. Until results of the instream flow, ice, fluvial geomorphology, fish, and other studies are available, cannot say how far downstream project's measurable effects on visual, auditory resources will go. Vehemently disagree w/ this premature decision, which contradicts statements elsewhere in this and other PSPs acknowledging need to rely on the results of other studies.	Sections 12.5.3, 12.6.3, 12.7.3 have been edited to indicate that an extension of the study area to areas downstream of Talkeetna will occur based on the results of impact assessment modeling completed by the Ice Processes in the Susitna River Study.
Memo	8/07/2012	Unspecified	NPS	10.6.4. Study Methods, Estab. Key Observation Points (KOPs) – Does NPS, other resource agencies and stakeholders, get a say on KOPs? When? This is supposed to be "The Plan", not a plan to plan.	It is expected that final target analysis locations will be selected and mapped with continued interdisciplinary, Agency and licensing participant coordination during study implementation as noted in Section 12.6.3.
Memo	8/07/2012	Unspecified	NPS	10.6.4. Study Methods, Visual Distance Zones – No mention of assessing aesthetics of varying flows. This is a high volume glacial river flowing at up to 25 mph – the sight, sound of flows, color of water, mixing at clear water tributaries are major components of river-related recreation. Need to do this at KOPs along the river, in all seasons, using videography (sound).	Analysis locations (KOPs) will be placed in specific locations designed to assess aesthetic attributes of the river corridor across all seasons. Additional coordination will occur with the Ice Processes in the Susitna River Study/ Geomorphology Study /Riparian Vegetation Study Downstream of the Proposed Watana Dam to make use of videography collected at standard transect locations.
Memo	8/07/2012	Unspecified	NPS	10.6.4. Study Methods, Visual Distance Zones – Need to add to sound analysis.	A description of the soundscape analysis, including measurements of baseline, post project, and project-induced soundscapes in included in Section 12.6.4.
Memo	8/07/2012	Unspecified	NPS	10.6.4. Study Methods, Seasonal Surveys of Ambient Sound Levels – When does NPS decide where the 4 LT and 16 ST locations will be?	This is part of the study implementation as outlined in the study plan, see Table 12.6-3. Quarterly technical advisory meetings will be held to collaborate with agencies, as noted in Section 12.6.3. It is expected that final soundscape measurement

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					locations will be selected and mapped with continued interdisciplinary, Agency and licensing participant coordination during study implementation as noted in Section 12.6.3.
Memo	8/07/2012	Unspecified	NPS	10.6.4. Study Methods, Seasonal Surveys of Ambient Sound Levels – What if NPS thinks there should be more?	Final soundscape measurement locations will be selected and mapped with continued interdisciplinary, Agency and licensing participant coordination during study implementation as noted in Section 12.6.3.
Memo	8/07/2012	Unspecified	NPS	10.6.4. Study Methods, Seasonal Surveys of Ambient Sound Levels – Need to agree about this prior to 10/15/2012. NPS would like to have enough advance detail to involve NPS Soundscapes staff in reviewing this methodology.	Section 12.6.3 describes the process for selecting final soundscape measurement locations.
Memo	8/07/2012	Unspecified	NPS	10.6.6. Schedule – Schedule is very short; no work is conducted in any December.	AEA is not planning field surveys in December and January as it typically is a period of extreme cold and lack of daylight. Discussed in 12.5.4. Field studies will commence in February 2013.
Memo	8/07/2012	Unspecified	NPS	10.6.6. Schedule – Initial study report is scheduled for 12/13/2012 – will this allow integration of results of other biophysical studies?	Integration with other resources will occur systematically, and in an ongoing manner in 4Q 2012, and for the duration of the 2013/2014 studies.
River Recreation Flow and Access Study (Section 12.7)					
Agency consultation meeting	7/25/2012	Cassie Thomas	NPS	Collaboration regarding study methods, requested concentration on quality of experience rather than exclusively on quantification of use.	The River Recreation Flow and Access Study will focus on incorporating inputs from all sub-disciplines (i.e., use & demand, facilities and trails, flow-based recreation, aesthetics, and soundscape) to collectively describe experiential attributes (social, physical and managerial) under baseline and post-project conditions.(Sections 12.5 – 12.7).
Email	8/01/2012	Cassie Thomas	NPS	Contribution of detailed information about Susitna River reaches and access; reports of incidental observations.	Followed up in section 12.7; shown in Figure 12.7-1. Follow-up information on Incidental Observation form given at 10/03/12 TWG meeting.
Memo	8/07/2012	Unspecified	NPS	Consider changing title of study to "Flow Dependent Recreation," reflecting broader affected activities	The study plan name has changed to River Recreation Flow and Access Study.

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				beyond boating and fishing.	
Memo	8/07/2012	Unspecified	NPS	Study's title, some initial statements about scope are contradictory. Study goal is not merely to contribute data concerning recreational boating and access – it is to look at all forms of flow-dependent recreation. Includes activities like fishing that are affected by flows, regardless of whether recreationalists are doing it in a boat or from shore.	Agreed, study plan has been revised throughout Section 12.7.These studies are highly integrated, as mentioned throughout Sections 12.5 – 12.7.
Memo	8/07/2012	Unspecified	NPS	Aesthetics can be flow-dependent (stillwater in res. v. free-flowing stream; lost sight, sound of whitewater at high flows in DC; morphological, vegetation changes downstream due to changed flow regime). No mention of this in Recreation or Aesthetics PSPs.	Flow-dependent aesthetic attributes will be assessed at KOPs established up-and downstream of the proposed dam, and will include an evaluation of scenic quality metrics pertinent to flow and soundscape measurements. Scenic quality metrics will focus on assessing the degree of within channel heterogeneity (i.e, pool, riffle, rapids) expected at various flow levels and across seasons. Flow dependent aesthetic attributes will also be evaluated through executive interviews conducted as part of the River Recreation Flow and Access Study.
Memo	8/07/2012	Unspecified	NPS	No mention of whether impacts on recreation access and experiences due to changed ice, snow cover resulting from changed flow regime will be assessed under this PSP. This should be included.	The winter recreation study will include establishing baseline data on winter recreation activities within the Study Area, including those dependent on ice-dependent recreation for locations upstream of the Parks Highway Bridge. The impact analysis will be based on information obtained pertinent resource disciplines, e.g., hydrology (RSP Section 7), ice processes (RSP Section 7.6), HEC-RAS (RSP Section 8.5.4.3), and geomorphology (RSP Section 6). At this time, the River Recreation Flow and Access Study extends to river mile 83 where the George Parks Highway Bridge crosses the Susitna River. This termination point was selected based on the influence of the Chulitna and Talkeetna rivers on the channel shape and structure of the Susitna downstream of their

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					confluence coupled with proximity of egress for non-motorized watercraft on the Susitna River. In the fall of 2013, Recreation Resources Study leads will examine the preliminary results from other resource disciplines, e.g., hydrology (RSP Section 7), ice processes (RSP Section 7.6), HEC-RAS (RSP Section 8.5.4.3), and geomorphology (RSP Section 6), to assess the downstream longitudinal extent of the project on physical stream processes. If the results from these resource disciplines indicate that the Project will affect river flows and ice formation in a way that changes the way recreationists currently use the lower Susitna River now, the Project impact analysis may extend further downstream of the confluence with the Talkeetna and Chulitna Rivers. Recreation resource leads will determine if the downstream geographic scope for the River Recreation Flow and Access Study described in section 12.7.3 needs to be adjusted for the 2014 field season.
Memo	8/07/2012	Unspecified	NPS	10.7.1. Gen. Description of Proposed Study, Study Goals & Objectives – PSP includes "developing flow preference curves for each major river reach by type of use and equipment" as a study goal and objective. Unlikely that a preference curve can be developed for winter activities that require stable river ice. It will either be present or absent. What method will be used to assess this effect?	An investigation of river ice dependent winter recreation is included in Section 12.7 of the RSP. The Study will investigate winter recreation activities occurring within the bounds of the Susitna River channel that are dependent on river ice formation. The purpose of the 2013 ice-dependent recreation portion of the winter recreation program is to determine existing ice-dependent recreation, the purpose (i.e., transportation or recreation) and the conditions under which these activities occur. The ice dependent recreation activities are likely to include snowshoeing, skiing, dog sledding, trapping and snowmobiling as well as use of river ice for winter transportation corridor. Additional activities observed during the field investigations will be documented as well. A list of winter recreation and competitive events dependent on

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					river ice formation will also be compiled and analyzed. The river ice dependent winter recreation study will document winter recreation activity on the Susitna River ice using a combination of field observations, executive interviews and analysis of recreation and competitive events. The executive interviews and analysis of events will include data beyond the current 2-year field data collection period. Use patterns will be analyzed to determine spatial and temporal use preferences as well as frequency of use by month. The 2013 study area will be divided into the three river reaches identified for the River Recreation Flow and Access Study (RSP Section 12.7) starting at the Denali Highway Bridge (RM 290) and terminating at the George Parks Highway Bridge at Sunshine (RM 83). The 2013 work will be completed in coordination with the Ice Processes in the Susitna River Study (RSP Section 7.6). In the summer of 2013, results from the Ice Processes in the Susitna River Study will be examined to determine the extent to which impacts to ice-dependent recreation are expected as a result of the proposed project.
Memo	8/07/2012	Unspecified	NPS	10.7.3. Study Area – Do not understand the statement: "areas where the proposed reservoir would create the most flow changes." What is threshold for "most"? Who decides? When? Even assuming consensus on the standard to be used, how can this decision be made before the results of the instream flow, flow routing, ice processes, etc. studies are in hand? What if NPS, others disagree w/ AEA's geographic scope decision? Needs to be nailed down by 10/15/2012.	This statement has been deleted from Section 12.7.3.
Memo	8/07/2012	Unspecified	NPS	10.7.3. Study Area – Unfounded for AEA to arbitrarily stop Recreation River Flow Study at Talkeetna River.	At this time, the River Recreation Flow and Access Study extends to river mile 83 where the George Parks

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					Highway Bridge crosses the Susitna River. This termination point was selected based on the influence of the Chulitna and Talkeetna rivers on the channel shape and structure of the Susitna downstream of their confluence coupled with proximity of egress for non-motorized watercraft on the Susitna River. In the fall of 2013, Recreation Resource Study leads will examine the preliminary results from other resource disciplines, e.g., hydrology (RSP Section 7), ice processes (RSP Section 7.6), HEC-RAS (RSP Section 8.5.4.3), and geomorphology (RSP Section 6), to assess the downstream longitudinal extent of the project on physical stream processes. If the results from these resource disciplines indicate that the Project will affect river flows in a way that changes the way recreationists currently use the lower Susitna River now, the Project impact analysis may extend further downstream of the confluence with the Talkeetna and Chulitna Rivers. Recreation resource leads will determine if the downstream geographic scope for the River Recreation Flow and Access Study described in section 12.7.3 needs to be adjusted for the 2014 field season.
Memo	8/07/2012	Unspecified	NPS	10.7.3. Study Area – Contradicts prior commitments to rely on results of other studies to inform impacts on recreation. Those studies will not be completed for several years.	Study plan does not indicate "final" results rather they will be interim results as with many disciplines. See Section 12.7.3.
Memo	8/07/2012	Unspecified	NPS	10.7.4. Study Methods – Underscores why NPS needs to see proposed survey instruments, protocol, etc., to determine if Recreation Survey adequately addresses these issues.	Drafts have been provided. Attachments 12-4, 5.
Memo	8/07/2012	Unspecified	NPS	10.7.6. Schedule – No info about when / how Level 1 – 3 analyses fit in w/ this schedule.	Level 1 and 2 investigations were completed as part of the 2012 field studies. Level 3 investigation is now described in the RSP section 12.7.4. The study schedule is presented in section 12.7.6.

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Memo	8/07/2012	Unspecified	NPS	10.7.6. Schedule – Much of this study plan appears to have been cut-and-paste from the USNPS / OSU guide, without explanation of how methods will be applied to this particular project.	Section 12.7.6 has been revised overall. The study methods have been revised in response to agency comments and field observations during the 2012 field investigations. The revised study plan is directly applicable to the study area and proposed project.
Memo	8/07/2012	Unspecified	NPS	10.7.6. Schedule – Need specifics and agreement on who makes mid-point decisions to proceed (e.g., from Level 1 to 2, or 2 to 3, based on what criteria).	Level 1 and 2 investigations were completed as part of the 2012 field studies. Level 3 investigation is now described in the RSP section 12.7.4. The study schedule is presented in section 12.7.6.
Memo	8/07/2012	Unspecified	NPS	10.7.6. Schedule – Only 1 winter and 1 summer of study, and no Novembers or Decembers. This does not indicate a sincere concern for impacts on winter recreation. Arguably, AK's winter recreation season is longer than its summer season. It is certainly important to users, purveyors of equipment, local economy.	Section 10.7.6 now reflects field visits/surveys in all 4 seasons. Still no intercepts in Dec – Jan because of safety of surveyors in recreation study, 12.5.4. River Recreation Flow and Access Study data collection will be available to river recreationalists 24/7 to record trips.
Memo	8/07/2012	Unspecified	NPS	10.7.6. Schedule – 1 yr. of study is not an adequate sample size to support conclusions about important flow-dependent activities like sport fishing, float hunting. Note emergency Chinook closure this year – how can AEA study the most sought-after fish species in SC AK if harvest is prohibited during the only year of the study? Likewise, upland game hunting season is dependent on variable weather, etc. One season is not enough to document baseline opportunities and experiences when they are dependent on highly variable interannual conditions.	Historical data will also be integrated into the analysis. Most studies are front-loaded to 2013 data capture, with a safeguard to capture unusual 2013 circumstances in 2014. This is reflected in Table 12.7-2. Furthermore, the River Recreation Flow and Access Study will utilize an internet survey and executive interviews. Both tools will allow for capture of historic information (20-30 years) from users regarding individual trips on the river.
TWG meeting	8/08/2012	Harry Williamson, Cassie Thomas	NPS	Request for more information about a) inter-relationships of recreation, aesthetics, river flow surveys, b) request to see survey instruments, c) methodology for sound studies, d) KOP selection	Follow-up meetings were held 9/20/12 and 10/03/12 to concentrate on survey instruments – sound methodology is outlined in the study plan, and AEA will collaborate on soundscape analysis in 2013-14. Initial KOP analysis discussed at a 10-3-12 meeting. The resulting modifications to the Study Plan are shown in sections 12.5, 12.6. Draft survey instruments are shown in Attachments 12-3, 12-4, 12-5..

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TWG meeting	8/08/2012	Ken Wilcox	FERC	Request for list of potential locations of KOP's, intercept survey locations, and more description of river reaches/access.	Follow-up meetings were held 9-20-12 and 10/03/2012 and these were presented. The resulting modifications to the Study Plan are shown in Sections 12.5, 12.6, 12.7, and Figures 12.5-3, 12.6-1, 12.7-1.
Email	8/14/2012	Harry Williamson	NPS	Collaborative review of Boundary Project survey; survey contents	Follow-up meetings were held 9-20-12 and 10/03/2012 and these were presented. The resulting modifications to the Study Plan are shown in section 12.5.4.
Phone conversation	8/21/2012	Rebecca Schwanke	ADNR-ADF&G	Coordination to determine extent of data sources regarding hunting & fishing.	The Recreation Resources Study will coordinate with both Wildlife Resources and Fisheries and Aquatic Resources to establish baseline data on fisheries and wildlife harvest data. The Fish and Aquatics Resources Studies will provide fish harvest data characterizing baseline harvest levels and harvest locations for commercial, sport, personal use, and subsistence fisheries for Susitna-origin-resident and anadromous fish (3Q 2013). These data will be used to understand the geographic distribution and abundance of and fisheries-based recreation opportunities within the Study Area. The results of the impact analysis will be incorporated to understand potential changes in fisheries-based recreation opportunities that may result from changes in fisheries abundance and distribution (1Q 2015). The Wildlife Resources Study will provide baseline wildlife harvest data (1Q 2014, 3Q 2014), and will be used to characterize existing conditions and anticipated impacts to impacts to game species abundance, hunting opportunities, and hunter distribution.
TWG meeting	9/20/2012	Cory Larson	BLM	Contribution of detailed trails information, provided input about study area regarding trails.	Integrated into Section 12.5.4 Study Plan Trails Section.
Phone conversation	9/20/2012	Harry Williamson	NPS	Review of survey instruments/methods developed to date.	Suggestions integrated into Study Plan, Section 12.5.4.
TWG meeting	9/20/2012	Cassie Thomas	NPS	a)Prefers analysis go downstream of Talkeetna.b)Intercept Surveys – Prefers that concentration be south of Talkeetna, rather than the	a)12.5.3, 12.6.3, 12.7.3 have been edited to reflect that the study area may be changed if info from other disciplines inform changes.

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				Richardson Highway. b) suggestions for intercept sites. c)Suggestions for incidental observation form (currently deployed in 2012) to have wider use. d)Suggested AEA develop communications protocol so the USNPS could provide consultation outside of formal comment periods. e)Interested in additional TWG meeting to discuss recreation, aesthetics, and recreation river flow. f)Interested in reviewing Recreation River Flow survey instrument.	b) Section 12.5-4 – Intercept sites have been adjusted accordingly. c) Under development. d) AEA took this under advisement – not addressed in Section 12. e)Held 10/03/2012 f) Contained in SP as Attachment 12-4, 5.
TWG meeting	9/20/2012	Scott Miller	NMFS	a)Prefers analysis go downstream of Talkeetna. b)ndicated ADF&G Statewide Angler/log book surveys are biased. c)Suggestions as to Intercept survey sites.	a)12.5.3, 12.6.3, 12.7.3 have been edited to reflect that the study area may be changed if info from other disciplines inform changes. b) ADF&G data will be incorporated as one source of data for historical sport fishing; mentioned in 12.5.4. c) Under 2012 development.
TWG meeting	9/20/2012	Harry, Williamson	NPS	Question about timing/availability of survey database, review.	Summary results available 1Q 2014, as shown in Table 12.5-1. Raw data availability undetermined.
TWG meeting	10/03/2012	Joe Geifer	ADNR-ADF&G	Question about timing/availability of survey database, review.	Summary results available 1Q 2014, as shown in Table 12.5-1. Raw data availability undetermined.
TWG meeting	10/03/2012	Cassie Thomas, Harry Williamson	NPS	Request for clarification about "Target Analysis Locations"; night sky conditions, focus groups, river reaches, extent of river reach study area, web surveys, and contingency plans. Suggestions for executive interview respondents.	Study Plan developments in these topic areas are included in Sections 12.5 – 12-7.
TWG meeting	10/03/2012	Joe Geifer	ADNR-ADF&G	Concern about timing of review of the RSP, and request for response to comments previously contributed.	Study Plan comment period has been extended. Not addressed specifically in Section 12. AEA explained the timing of the release of RSP drafts and the agency comment period.
TWG meeting	10/03/2012	Dave Griffin	ADNR-DPOR	Question about compensation for affected recreation uses. Contribution of recreation data.	AEA explained this is an upper state-level consideration.

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SECTION 13 CULTURAL AND PALEONTOLOGICAL RESOURCES					
General					
				No comments.	
Cultural Resources Study (Section 13.5)					
TWG meetings	8/08/2012 & 9/07/2012	Lisa Wade & Angela Wade	Chickaloon Native Village	Request made for consideration of culturally modified trees (CMTs)	Section 13.5.4.3 has been added to the RSP to define CMTs (e.g. scar, plank removal, bark removal, burn) and methods for field discovery.
TWG meeting	8/08/2012	Frank Winchell	FERC	Would Alaska Native representatives be able to participate or monitor field studies?	The draft RSP has been updated to include an internship program to incorporate one or more Native interns in field and monitoring efforts to help inform licensing participants and develop shared perspectives on cultural resource inventory and evaluation.
TWG meeting	8/08/2012	Frank Winchell	FERC	Request made for more refined definition of indirect APE	Section 13.5.3 of the draft RSP has been updated to describe the indirect APE which includes Project-induced dispersed recreation, and other areas adjacent to Project facilities including potential visual impact areas. The indirect APE is depicted in Figure 13.5-2.
TWG meeting	8/08/2012	Frank Winchell	FERC	Request made for better definition of areas surveyed in 1980s and their intensity	Section 13.5.2 of the draft RSP describes the 1980s era survey data. .Figures 13.5-3 and 13.5-4 have been added to the draft RSP to identify survey coverage and intensity of these prior surveys. Sections 13.5.4.1 and 13.5.4.2 of the draft RSP have been updated to describe how these data are used in the development of the probabilistic model and sampling strategies.
TWG meeting	9/07/2012	Richard VanderHoek	ADNR-AOHA/ SHPO	Will reservoir direct effects APE include a margin around the normal high water pool elevation of 2,050 to account for landslides and permafrost areas affected by the reservoir filling (and to accommodate possible future reservoir recreation facilities along the shoreline like possible boat-in campgrounds found at other reservoirs)?	Figure 13.5.2 defining the direct APE for study area accommodates potential landslide zone and potential shoreline recreation by using the 2,075-foot elevation boundary. The direct APE may be modified based on the results of mass wasting and erosion studies.
TWG meeting	9/07/2012	John Jangala & Dara Glass	BLM CIRI	The plans need to consider any 14(h)(1) ANCSA selections in the study area and identify the current	The Cultural Resources Study team has identified one 14(h)(1) site within the study area. The 14(h)(1) sites

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				status of those (including information on BIA surveys of those areas)	had been excluded from the scope for the prior Data Gap Analysis; but arrangements have been made to acquire data from BIA and incorporate into the 2013-14 survey inventory prior to finalization of the RSP.
TWG meeting	9/07/2012	Frank Winchell and others	FERC	Need discussion of how the locational model developed in 2012 will be used in the study methodology.	Section 13.5.4.2, supplemented by Tables 13.5-1 and 13.5-2, has been added to the RSP to explain details of the site location model.
TWG meeting	9/07/2012	Fran Seager-Boss	Matanuska-Susitna Borough	Request made for inclusion of Matsu Borough archaeologists in field program	Agreement was reached to incorporate Matsu Borough archaeologists, as available, in the 2013-14 field effort and the draft RSP has been updated in Section 13.5.4 to reflect this.
TWG meeting	9/07/2012	Frank Winchell & others	FERC	Recommends describing how ethnogeography work will be analyzed or focused to areas that might be affected by the Project since the language area map encompasses such a large area.	Figure 13.5-1 has been added to the RSP to show Native language boundaries, with explanatory text in Section 13.5.2.2.
TWG meeting	9/07/2012	Frank Winchell & others	FERC	Request made for map of Native land ownership in study area	Figure 13.5.2 has been added to the RSP to show Native land ownership in the study area.
TWG meeting	9/24/2012	Dara Glass & Becky Long	CIRI & Coalition for Susitna Dam Alternatives	Adding trails that extend to the reservoir was considered appropriate for indirect effects analysis area but need to be clear of what sources are used to map the trails, or even segments of trails and indicate any designation or official status of trail, or whether the appear to be user-made trails. Note that the mapping of trails is to now way indicate that use of these trails is authorized.	Map legends have been updated to indicate that the mapping of the trails does not mean they are open or designated for public use.
TWG meeting	9/24/2012	John Jangala	BLM	Add Raptor Trail to indirect effects APE map as it does lead toward Watana Creek (which would be Watana Arm of the reservoir)	Figure 13.5.2 showing the indirect APE has been revised to include the Raptor Trail.
TWG meeting	9/24/2012	Dara Glass	CIRI	Recommend adding ANSCA Corporation boundaries to a map in cultural resources study plan to show current use areas in relation to historic language areas in particular.	Figure 13.1.1 has been added to the RSP to show Native land ownership in the study area.
TWG meeting	9/24/2012	Rich	SHPO/	Provide additional details of survey methods, both	Qualitative and quantitative details of the proposed

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		VanderHoek & various	ADNR-AOHA & various	qualitative and quantitative where possible.	survey methods have been added to the RSP in Sections 15.5.4.1, 15.5.4.2, and 15.5.4.3.
TWG meeting	9/24/2012	Richard VanderHoek	SHPO/ ADNR-AOHA	Request for clarity in applying trail information to both reconstruction of historic use versus defining potential impacts.	Agreement to develop data on three types of trails: BLM layer, field observation layer, and historic foot trail layer, as stated in Section 13.5.4.6 of the RSP.
Paleontological Resources Study (Section 13.6)					
				No comments.	
SECTION 14 SUBSISTENCE RESOURCES					
Subsistence Resources Study (Section 14.5)					
TWG meeting	8/08/2012	David Turner	FERC	Provide a survey instrument for the household surveys	Study plan has been updated to include survey instrument. The draft household harvest survey instrument is provided in Attachment 14.2 and key respondent interview protocol in Attachment 14.3.
Letter	9/14/2012	Lisa Wade	Chickaloon Village Traditional Council, Health and Social Services Dept	Comments were in reference to the HIA specifically but noted: "traditional knowledge should be gathered through qualitative discussions with Tribal communities to contribute to the completion of the HIA." "can't stress enough the importance of traditional knowledge .."	Traditional Knowledge (TK) interviews will be conducted in Chickaloon during the first half of 2013, interview questions regarding health will be developed in consultation with the HIA team and incorporated into the TK interview guide for use in all TK interviews. Section 14.5.4.5 and Table 14.5-3 present TK interview methods and communities slated to be interviewed including Chickaloon. Results will be shared with HIA study team as soon as they are available so that traditional knowledge can be incorporated into the HIA study process and analysis. Additionally, the Subsistence Resources Study team will identify key respondents for the HIA team for follow-up TK interviews specific to health.
Federal Advisory Board Meeting	10/15/2012	Gloria Stickwan	Southcentral Alaska Subsistence Regional Advisory	All eight villages in the Ahtna region hunt in that area, the study should incorporate these villages	The study plan has been updated to include Chistochina, Mendeltna, Mentasta Lake, Nabesna and Slana as study communities (Section 14.5.4.1 and Table 14.5.9). ADFG and the National Park Service are conducting subsistence surveys in Ahtna

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			Council (RAC)		communities not included in the Susitna studies, analysis of the results of the NPS/ADFG surveys will be conducted as part of activities identified in Section 14.5.4.1 and 14.5.4.6.
SECTION 15 SOCIOECONOMIC AND TRANSPORTATION RESOURCES					
General					
Letter	8/01/2012	John (Jack) DiMarchi	Citizen	Significant number of private landowners (approx. 200) congregated along AK Railroad corridor between Gold Creek and Hurricane, AK. FERC appears to recognize community of people who own land along railroad to south of Gold Creek (exp: Chase community), but does not appreciate large number of landowners north of Gold Creek; likely b/c we are not formally organized like Chase community is.	Social and economic effects on residents in the study area will be addressed in the Social Conditions and Public Goods and Services Study. Section 15.6.3 of the RSP has been revised so that a "railroad community" located north of Chase is among the communities considered to be in relatively close proximity to the proposed Project road and transmission line alternatives. The other communities are Cantwell, Trapper Creek, Chase, and Talkeetna.
Letter	8/01/2012	John (Jack) DiMarchi	Citizen	Under Environmental Justice language in NEPA, we should be recognized as a community; as lead permitting agency, FERC should open direct dialogue w/ this community to insure: 1 – Accurate info is delivered directly to community members; 2 – Public meetings are held at locations that facilitate community members to participate in NEPA process; 3 – Community's points of views (for or against Susitna-Watana Hydroelectric Project components) be given weight during development of project alternatives portion of EIS process.	The socioeconomic study will address populations and incomes and may identify whether there are any minority or low-income populations as defined under Executive Order 12898 on Environmental Justice. AEA's goal during these licensing studies is to provide accurate information to all interested parties, to hold meetings and provide opportunities at a variety of locations to facilitate public participation in the process from all interested parties.
Memo	8/07/2012	Unspecified	NPS	Metrics, analyses regarding socioeconomic costs and benefits of the Susitna-Watana Hydroelectric Project should extend beyond estimated value of increased recreation and tourism. Full accounting of all Susitna-Watana Hydroelectric Project-related impacts on the social environment must include an estimate of these values.	The socioeconomic studies are designed to account for a broad range of social and economic costs and benefits. In addition to the regional economic model analysis, social costs and benefits will be addressed. The assessment will be quantitative when possible but some social issues will need to be addressed qualitatively. Where the dollar cost of measures can be reasonably

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					ascertained, we will do so. However, for non-power resources such as aquatic habitat, fish and wildlife, recreation, and cultural and aesthetic values, to name just a few, the public interest cannot be evaluated adequately only by dollars and cents.
Memo	8/07/2012	Unspecified	NPS	With respect to Benefits Transfer methodology, this method is most reliable when reference, study sites, projects are very similar, and when the economic impact valuation study at reference site was performed at the highest standard. Given the dearth of large, original hydropower projects licensed on free-flowing rivers in remote locations in recent decades, NPS believes it will be challenging to ID appropriate reference project for Susitna-Watana Hydroelectric Project. There will be numerous assumptions, approximations associated w/ application of the benefits transfer method to the Susitna-Watana Hydroelectric Project. In contrast to lack of appropriate reference sites for benefits transfer analysis, however, the value of ecosystem services – including services associated with the Susitna River – is currently being studied in the Mat-Su Borough.	As described in Section 15.6.4.1 of the draft RSP, the benefits transfer approach will be used to supplement or compare unit values (e.g., value per-day of sport fishing) for recreational goods and services obtained from primary valuation methods. It will not be used as the sole method of estimating the value of changes in recreation activity in the Project area.
Memo	8/07/2012	Unspecified	NPS	NPS would like to participate in reviewing proposed survey methodology, ideally before ability to comment on the ILP study plans expires.	Meetings on the survey methodology were held on 9/20/2012 and 10/03/2012. Additional information on the proposed survey methodology is included in the draft RSP, in the attachment of the Regional Economic Evaluation Study
Regional Economic Evaluation Study (Section 15.5)					
Memo	8/07/2012	Unspecified	NPS	Page 263 – Indicates that PSP for Socioeconomics relies largely on results generated through Recreation and Aesthetics Resources studies. Having not seen survey instruments, protocol, NPS does not know how socioeconomic data will be gleaned from those surveys.	Study teams met with NPS and others on 9/20/2012 and 10/03/2012 to discuss survey instruments and protocols. Additional information on the proposed survey methodology is included in the revised study plan in Section 15.5.4 and the attachment to the Regional Economic Evaluation Study plan as well as in the Recreation and Aesthetic Resources RSPs

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					(Section 12).
TWG meeting	8/08/2012	Various	Variety of Agencies, Tribal Entities, and Interested Individuals	Review of study plans submitted in July 2012. 1) NPS and other requested more information on the type of people to be interviewed for the socioeconomic studies and the type of questions to be asked. 2) NPS and others requested draft study instruments for review.	1) Information on the type of people/groups to be interviewed and typical questions to be asked have been incorporated into the attachment of the Regional Economic Evaluation Study lan. 2) Draft survey instruments are still in development. Example survey instruments are included in the attachment to the Regional Economic Evaluation Study plan.
Social Conditions and Public Goods and Services Study (Section 15.6)					
TWG meeting	9/20/2012	Cassie Thomas	NPS	It is important to include different planning scenarios and future management regimes.	It is anticipated that the With Project and the Without Project alternatives will have different scenarios and likely different management regimes for at least some resources. Interviews will be held with agency and other personnel to develop the appropriate scenarios and potential management regimes.
Email	11/5/2012	Wanetta Ayers	DCCED-DED	In addition to data and information supplied by the Division on new opportunities that might come about as a result of the project, several comments were identified including: Study plans for other large hydroelectric projects should be reviewed to ensure that all topics are addressed; impacts should be discussed in terms of their short-term and long-term effects as well as direct and indirect effects; further attention should be given to lost opportunity and economic values; and better conceptualization and organization of the socioeconomic impacts was recommended.	Citations for three socioeconomic study plans that were reviewed for this work were added to each study plan. Language was added to the Socioeconomic Conditions and Public Goods and Services study plan to indicate that short-term and long-term effects will be discussed in the analysis, and indicating that direct and indirect effects will also be identified and discussed in the analysis. The Without Project alternative will provide the basis for the value of existing and anticipated activities and services, including environmental and ecosystem goods and services that would be lost with construction and operation of the Project. As noted in the study plan, the difference between the With Project and Without Project alternatives will enable us to assess the effects, both positive and negative.

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					The purpose of a study plan is to identify the methods, data and data sources to be used in preparing the FERC documents. The study plan guidance does not require that all of the impacts be identified but we do note that the organizational structure recommended will be useful in preparing the Socioeconomic Conditions and Public Goods and Services report.
Transportation Resources Study (Section 15.7)					
Letter	8/01/2012	John (Jack) DiMarchi	Citizen	DOT transportation access study: South Road and Hurricane alternatives – Landowners along railroad corridor, particularly between Gold Creek and Hurricane, stand to be disproportionately affected by 2 access roads under consideration. Although these landowners are not formally organized, they do represent a "community" that may be affected disproportionately (especially by proposed access roads from Hurricane and/or Gold Creek), compared to population at-large.	There are three access road corridors under consideration but at this point AEA is only proposing that one access road be developed. It is our plan to evaluate effects on residents and land owners in the areas that could be directly or indirectly affected by development of a Project access road. The methodology for the Transportation Resources Study (Section 15.7.4.3) acknowledges that we will need to interview licensing participant organizations and knowledgeable individuals about current transportation use as part of the data collection process. This will facilitate the evaluation of potential impacts of the Project on existing transportation resources and uses.
TWG meeting	8/08/2012	Various	Variety of Agencies, Alaska Native Entities, and Interested Individuals	Review of study plans submitted in July 2012. NPS emphasized the need to get information on the use of the river as a transportation corridor.	The Transportation Resources Study plan (Section 15.7.4.3) addresses how information on river use for transportation will be obtained. Existing published information by various land management agencies, access information gathered as part of other survey efforts (such as Recreation and Aesthetic Resources and Subsistence Resources), and interviews with knowledgeable people as discussed above – will all be used to document river use for transportation.
TWG meeting	9/20/2012	Becky Long	Coalition for Susitna Dam Alternatives	How will you get information on river transportation uses?	The Transportation Resources Study plan (Section 15.7.4.3) addresses how information on river use for transportation will be obtained as discussed above.

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Health Impact Assessment Study (Section 15.8)					
TWG meeting	8/08/2012		Variety of Agencies, Tribal Entities, and Interested Individuals	Review of study plans submitted in July 2012. Chickaloon Tribe asked if HIA would be a Rapid HIA or a Comprehensive HIA (CHIA) and how information on subsistence use would be gathered.	The HIA Study Plan (Section 15.8.1.1) clarifies that the HIA will be comprehensive and addresses how information will be gathered.
Letter	9/14/2012	Lisa Wade, Director	Chickaloon Village Health & Social Services	Stress importance of engaging community as early as possible, and keeping CHIA process as transparent as possible, throughout the process. Includes engaging community to contribute to, guide potential impact analysis, data gaps, developing and proposing mitigation strategies.	The HIA study (see Section 15.8.3) will rely on community input and best practices for HIA to develop a set of clear criteria which will help identify potentially affected communities (PACs) in a systematic way and facilitate the development of zones of impact for the Project. Local communities may provide additional criteria for consideration through written comments or consultation.
Letter	9/14/2012	Lisa Wade, Director	Chickaloon Village Health & Social Services	Area regarding Tribal engagement process to allow for provision and recognition of traditional knowledge as complementary to existing baseline health and other scientific info, needs to be strengthened. Tribal people hold history, knowledge of area; must be some mechanism made for acknowledging how this info will contribute to legitimacy of HIA Study Plan and data collection. Will ultimately strengthen this CHIA.	The HECs are fully described in the "Technical Guidance for HIA in AK", but there may be community level health concerns that are expressed holistically and do not fit this analytic structure. Section 15.8.4. 1 outlines how the study will coordinate with other social sciences study areas including the Traditional Knowledge interviews being done under the Subsistence Resources Study.
Letter	9/14/2012	Lisa Wade, Director	Chickaloon Village Health & Social Services	13.8.1.1. Study Goals & Objectives – Recommend revising "The goals and objectives of the HIA include the following" section to add engagement piece. Add bullet point reading: "Engage the community in a transparent process of identifying community health concerns for evaluation."	The HIA study plan, in Section 15.8.1.1 of the draft RSP, acknowledges that through scoping meetings and community engagement planning, AEA will seek to identify public issues and concerns about how community health might be affected during construction and operation of the Project.
Letter	9/14/2012	Lisa Wade, Director	Chickaloon Village Health & Social Services	13.8.1.1. Study Goals & Objectives – In recognition of federally recognized Tribal governments in potentially affected areas, revise bullet point #2 to read: "Collect baseline health data at the state, borough or census area, tribal, and potentially affected community, as possible."	Section 15.8.1.1 of the draft RSP has been revised to read: "Collect baseline health data at the state level, borough or census area level, tribal level, and at the level of the potentially affected community."

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Letter	9/14/2012	Lisa Wade, Director	Chickaloon Village Health & Social Services	13.8.1.1. Study Goals & Objectives – Question bullet point #3. Once data gaps are IDed, how will this trigger additional studies? Or, will there be weighting of data gaps to determine which are priorities for further review? Can this be addressed in this section?	Section 15.8.1.1 of the draft RSP has been updated to describe how AEA will attempt to identify gaps and determine the most efficient method to fill those gaps, through community consultation and coordination with other field studies such as subsistence, social and demographic studies.
Letter	9/14/2012	Lisa Wade, Director	Chickaloon Village Health & Social Services	13.8.1.1. Study Goals & Objectives – Revise bullet point #4 to read: "Evaluate the baseline data against the Project description to determine the magnitude of potential impacts, both positive and negative."	Section 15.8.1.1 of the draft RSP explains that the HIA will use methods and guidelines in the Alaska Department of Health and Human Services (DHSS) "Technical Guidance for HIA in Alaska" July 2011.
Letter	9/14/2012	Lisa Wade, Director	Chickaloon Village Health & Social Services	13.8.1.1. Study Goals & Objectives – Strongly believe a projective component for potential impacts and applied mitigation strategies should be attempted in CHIA.	As noted in Section 15.8.4.3 of the draft RSP, the information developed in this study may be used to prepare a Health Management Plan (HMP) which may include: Traditional Knowledge, perspectives, and activities that may represent uniquely tribal approaches to human wellness.
Letter	9/14/2012	Lisa Wade, Director	Chickaloon Village Health & Social Services	13.8.2. Existing Info & Need for Add'l. Info – Feel strongly that traditional knowledge should be gathered through qualitative discussions within Tribal communities to contribute to completion of HIA. Info should be given same weighting as other scientific info gathered.	Section 15.8.3 of the draft RSP has been updated to describe that the study will rely on community input and best practices for HIA to develop a set of clear criteria which will help identify PACs in a systematic way and facilitate the development of zones of impact for the project.
Letter	9/14/2012	Lisa Wade, Director	Chickaloon Village Health & Social Services	13.8.2. Existing Info & Need for Add'l. Info – Data gaps should not just be noted, but should attempt to be adequately addressed in further studies to be determined by community.	Section 15.8.1.1 of the draft RSP describes how we will identify gaps and determine the most efficient method to fill those gaps, through community consultation and coordination with other field studies such as subsistence, social and demographic studies.
Letter	9/14/2012	Lisa Wade, Director	Chickaloon Village Health & Social Services	13.8.3. Study Area – Tribal communities should have opportunities to: weigh-in on impact areas; in defining study area; in defining key subsistence resources rather than simply relying on ADF&G or USFWS as only viable source of info for CHIA.	Section 15.8.3 of the draft RSP has been updated to describe that local communities may provide additional criteria or considerations through written comments or consultations.
Letter	9/14/2012	Lisa Wade, Director	Chickaloon Village Health	13.8.4.1. – Community should have opportunity to ID the "Issues Summary."	Section 15.8.4 of the draft RSP has been updated to confirm that AEA intends to coordinate through

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			& Social Services		community engagement other social study areas, and through AEA licensing participant engagement programs to ensure there will be enough information to meet Health Impact Assessment Study needs.
Letter	9/14/2012	Lisa Wade, Director	Chickaloon Village Health & Social Services	13.8.4.1. – Comprehensive discussion pertaining to Social Determinants of Health (SDH) should occur to ID disparities affecting various community groups, and potential to project future impacts, both positive and negative.	Section 15.8.4.3 of the draft RSP outlines how AEA will undertake detailed consideration of impacts to Alaska Natives through the presentation of tribal health data and inclusion of the results of tribal health consultations in the HIA.
Letter	9/14/2012	Lisa Wade, Director	Chickaloon Village Health & Social Services	13.8.4.1. – Many local indigenous cultures pass down info orally. Traditional knowledge regarding past, present concerns related to similar development projects should be acknowledged as valid in addressing "Casual links between the proposed project and the anticipated health impacts." There must be consideration in CHIA for undocumented, yet authentic experiences conveyed orally.	Section 15.8.4.3 of the RSP outlines how AEA will undertake detailed consideration of impacts to Alaska Natives through the presentation of tribal health data and inclusion of the results of tribal health consultations in the HIA. The Traditional Knowledge interviews in the Subsistence Resource Study will also likely help AEA identify more information that could be of use in the HIA.
Letter	9/14/2012	Lisa Wade, Director	Chickaloon Village Health & Social Services	13.8.4.2. Phase 2: Baseline Data Collection – Clearer definition for study of subsistence issues and "reasonably close proximity" needed. Project will likely impact salmon and displace moose habitat significantly; therefore, definition will need to be discussed w/ scientific experts, local Tribal experts.	Section 15.8.4.2 of the draft RSP notes that the HIA Team will coordinate with communities and the Subsistence Resources Study team to address how subsistence issues interact with the proposed project locations, size, linear features, and potentially affected communities.
Letter	9/14/2012	Lisa Wade, Director	Chickaloon Village Health & Social Services	13.8.4.3. Phase 3: Impact Assessment – Suggest adding / revising following bullet point to include "An in-depth review of available state, regional, tribal, and local health data."	Section 15.8.4.3 of the draft RSP has been updated to include accommodation for an in-depth review of available state, regional, tribal, and local health data.
Letter	9/14/2012	Lisa Wade, Director	Chickaloon Village Health & Social Services	13.8.4.3. Phase 3: Impact Assessment – Suggest special emphasis be performed for impacts to tribal peoples; especially in relation to social determinants of health and subsistence impacts.	Section 15.8.4.3 of the draft RSP describes how AEA will access information from existing State disease-control programs and strategies to address information regarding background and conditions regarding social determinants (e.g. HIV/AIDS, hypertension, diabetes, substance abuse, etc.).
Letter	9/14/2012	Lisa Wade, Director	Chickaloon Village Health	13.8.4.3. Phase 3: Impact Assessment – Holistic approach to looking at health will help w/ development	The Traditional Knowledge interviews and studies outlined in the Subsistence Resources Study plan

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			& Social Services	of more effective Health Mgmt. Plan; however, if CHIA finds no place for Traditional Knowledge, a HMP could be one more document which compartmentalizes health in a way that is not helpful or applicable to local Tribal peoples.	(Section 14.5) describe how Traditional Knowledge information will be gathered and analyzed. Section 15.8.4.3 of the draft RSP describes how Traditional Knowledge, perspectives, and activities that may represent uniquely tribal approaches to human wellness will be assessed.
Letter	9/14/2012	Lisa Wade, Director	Chickaloon Village Health & Social Services	13.8.5. Consistency w/ Generally Accepted Scientific Practices – Stress importance of traditional knowledge, and how CHIA should make a place for this type of evidence-based knowledge.	Section 15.8.4.3 of the RSP describes how traditional knowledge (gathered both in HIA and Subsistence Resources studies), provides information and perspectives that may represent uniquely tribal approaches to human wellness.
Letter	9/14/2012	Lisa Wade, Director	Chickaloon Village Health & Social Services	13.8.6. Schedule – Not enough time allocated on front end to help w/ development of Project Overview and Issues Summary. Section is integral to getting community buy-in on the CHIA. If work is not done on the front end, it will not have credibility on the back end. Not enough to do this during Baseline Data Collection process. CHIA calls for more of a community-based participatory research approach. The community, whenever possible, should be included to have ownership over contributing to the document.	Section 15.8.4.2 of the RSP has been updated to describe that in addition to community engagement discussions, the HIA team will visit relevant communities during the field studies phase of the baseline data collection to document community food sources and make observations on critical community services, such as water, sanitation, and health care facilities.
Letter	9/14/2012	Lisa Wade, Director	Chickaloon Village Health & Social Services	This only constitutes commentary on sections 13.8. Have made several recommendations that will strengthen CHIA process. Have similar concerns pertaining to other parts of Section 13. Would like additional time to review these sections, as they all have direct impact on Tribal citizens.	Comments noted and AEA expects to continue to engage Chickaloon Village and other interested parties during the final study plan process and during implementation of studies and eventual development of AEA's License Application for the Susitna-Watana Hydroelectric Project.
Air Quality Study (Section 15.9)					
Email	10/30/2012	Herman Wong	EPA	It was not specifically stated that the project proponent would model the construction emissions. The emissions should be modeled.	Construction emissions would be estimated based on the equipment used for construction and construction traffic as discussed in Section 15.9.4.2. Construction emissions are expected to be temporary and not result in a substantial increase in emissions, therefore, modeling is not proposed for this task.

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Email	10/30/2012	Herman Wong	EPA	There was no mention of any type of combustion sources during operation of the hydro plant. It should be verified.	It is assumed that there will not be major combustion sources during operation.
Email	10/30/2012	Herman Wong	EPA	There is uncertainty if background air quality monitoring should be performed. Someone should decide particularly if EPA signs off on the plan.	AEA does not believe there is a need to conduct background air quality monitoring at the site as there are no major emission sources in the area. The existing conditions will be assessed as discussed in Section 15.9.4.1.
Email	10/30/2012	Herman Wong	EPA	It was not clear if the project proponents intends to model for air quality benefits (i.e., emissions from nearby units that the hydro plant would replace).	Analysis of potential air quality benefits from emission reductions at other power plants is included in the study as discussed in Section 15.9.4.4. Modeling using EPA dispersion model is not proposed for this task.
SECTION 16 PROJECT SAFETY					
General					
TWG Meeting	8/08/2012	Kim Nguyen	FERC	Contact Doug Johnson in Portland Regional Office to inquire about comments on PMF and Seismic Study Plans	Completed with call/meeting on August 29, 2012 between AEA, MWH and FERC PRO.
Meeting	8/20/2012	FERC Staff	FERC	FERC would like AEA to form Board of Consultants	FERC has approved Board of Consultant team.
Probable Maximum Flood Study (Section 16.5)					
Meeting	8/20/2012	FERC staff	FERC	PMF study plan should be reviewed by Board of Consultants (BoC) – at least 2 members.	Meeting planned for November to go over reports; BoC can start reviewing July PSP as soon as they have contracts in place.
Meeting	8/20/2012	FERC staff	FERC	FERC noted the NOAA Atlas 14, Volume 7, Version 2.0, Alaska (2012) had become available this year and should be considered in the revised study plan.	This new publication is for rainfall frequency only and contains no information on the PMP. Also, the rainfall frequency values are for point data (10 sq. mi.) and there are no areal reduction factors in the new publication, which means that the data cannot be directly applied to the 5,180 sq. mi. Susitna-Watana watershed.
Site-Specific Seismic Hazard Study (Section 16.6)					
Meeting	8/20/2012	FERC staff	FERC	Seismic study plan should be reviewed by Board of	Meeting planned for November to go over reports; BoC

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				Consultants (BoC) – at least 2 members.	can start reviewing July PSP as soon as they have contracts in place.
Meeting	8/20/2012	FERC staff	FERC	A seismologist needs to review the study plan.	MWH is having Norm Abrahamson review the Site-Specific Seismic Hazard Study plan and provide comments.
Meeting	8/20/2012	FERC staff	FERC	Incorporate and make use of "Recommendations for Probabilistic Seismic Hazard Analysis: Guidance on Uncertainty and Use of Experts" by Senior Seismic Hazard Analysis Committee (SSHAC) in 1997.	Defined and incorporated in revised study plan.