

Table 8.4-1. Summary of consultation on Instream Flow study plans.

Comment Format	Comment Date	Licensing Participant Name	Licensing Participant Affiliation	Comment	Response
<u>Fish and Aquatics Instream Flow Study (Section 8.5)</u>					
Email	08/01/2012	Betsy McCracken	USFWS	Relative to the proposed Instream Flow (ISF), Groundwater and Habitat Utilization study plans, would you please provide a summary of recent field work conducted or currently in the works from this summer (2012) season?	A summary of the 2012 field efforts will be provided in the RSP Section 8.5.4). Instream flow related field work 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	08/02/2012	Joseph Klein	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 9.09). The 2012 remote sensing habitat data will be available by 1 st 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 9.06). 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 3 rd Quarter 2014 (RSP Section 8.5.4).
Email	08/02/2012	Joseph Klein	ADF&G	As you know, this information is one of the initial steps for identifying sampling strategies	Regarding issue one, habitat modeling selection will be based on applying one or more

			<p>(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 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)?</p>	<p>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 the RSP 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 instream flow study, AEA will seek to reach TWG consensus on habitat model selection during the 2nd Quarter 2013 (RSP 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 RSP 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.</p>
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Email	08/23/2012	Joseph Klein	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 flow routing model in 4 th Quarter 2012 (see RSP Section 8.5.6). 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	08/23/2012	Joseph Klein	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 RSP Sec 8.5.4.5. Additional details of the recreation boating study are provided in RSP Section 12.
Email	08/23/2012	Joseph Klein	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	08/23/2012	Joseph Klein	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 envision the work group will get together?	AEA will seek to reach TWG consensus on major decisions. A schedule of major decisions is provided in RSP Table 8.5-4.
Email	08/23/2012	Joseph Klein	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 RSP Section 8.5.4: Study Integration.
Email	08/23/2012	Joseph Klein	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 RSP Section 8.5.4; additional details will be developed in coordination with the TWG after reviewing initial study results in 2014.
Email	08/23/2012	Joseph Klein	ADF&G	HSI data is needed for identified target species for each defined habitat type, over 2 years.	As described in RSP Section 8.5.4, 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	08/23/2012	Joseph Klein	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 6.0), mainstem habitat type (RSP Section 9.09) and potential fish barriers

					identified through studies of fish distribution and abundance (RSP Section 9.06). Additional details of process, criteria and schedule of fish passage/off-channel connectivity are described in RSP Section 9.12.
Email	08/23/2012	Joseph Klein	ADF&G	What criteria will be used to select and weight transect-derived models?	<p>As discussed at the September 14, 2012 TWG meeting, and described in RSP sec 8.5.4, criteria to select habitat models will include:</p> <ul style="list-style-type: none"> • All major habitat types sampled within each geomorphic reach • At least one Focus Area per geomorphic reach • Replicate sampling strategy for major habitat types • Include biologically important salmon spawning/rearing sites in main channel and lateral habitats • Tributary deltas included as habitat unit • Incorporate multiple study elements <p>Results of sites that are modeled using either 1D (i.e., transect) or 2D 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.</p>
Email	08/23/2012	Joseph Klein	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 2 nd

					Quarter 2013, in collaboration with the TWG (RSP Sec 8.5.4.6.1). 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 2D 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	08/23/2012	Joseph Klein	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 (RSP Sec 8.5.4.5).
Email	08/23/2012	Joseph Klein	ADF&G	Will 2D modeling include side channels and sloughs within study area?	Yes.
Email	08/23/2012	Joseph Klein	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 (RSP Sec 8.5.4.6.1.2). The mainstem 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	08/23/2012	Joseph Klein	ADF&G	What is the sampling strategy (e.g., representative reach, mesohabitat typing) for the defined habitat types?	As described in RSP Sec 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	09/01/2012	Betsy McCracken	USFWS	<p>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 1980's approaches to fisheries studies. The 1980's 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.</p>	<p>Draft criteria for the selection of study sites were presented during the 09/14/12 TWG meeting, discussed during the 10/02/12 TWG meeting, and are described further in the RSP (Sec 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 RSP Sec 8.5.4.2.2 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 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 instream flow study plan is not a repeat of the</p>
Susitna-Watana Hydroelectric Project FERC Project No. 14241				Page 8-7	<p>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</p>
					<p>Alaska Energy Authority 10/19/12</p>

Email	09/01/2012	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 4 th Quarter 2013 and 1 st Quarter 2014 (RSP Sec 8.5.4.5). The proposed instream 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	09/01/2012	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 1980's studies and using PHABSIM. Our concerns stated in earlier correspondence to AEA remain unaddressed and are reiterated here for emphasis.	Methods and model selection were presented during the October 2, 2012 TWG meeting and are discussed in more detail in RSP Sec 8.5.4.6. A suite of methods/models were identified during the meeting and are presented in the RSP Sec 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 (e.g., effective spawning/incubation, varial zone modeling) and habitat features (e.g. groundwater upwelling, turbidity) are also proposed.

Email	09/07/2012	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 RSP Section 8.5.5.
Email	09/07/2012	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.	RSP Section 8.5.5 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	09/07/2012	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).	Comment noted.
Email	09/07/2012	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	09/07/2012	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	Additional detail on study sequencing and integration between biological studies and habitat modeling studies is described in RSP Section 8.5.5. Fish distribution and abundance (RSP Section 9.06), and HSC/HSI

				<p>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.</p>	<p>data (RSP Section 8.5.4.4) 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.</p>
<p>Word document titled “ELH Juvenile Adult Fish D and A Riv Pro mb initial draft comments on PSP” attached to e-mail</p>	09/07/2012	Mike Buntjer	USFWS	<p>Early Life History and Juvenile Fish Distribution and Abundance in the Susitna River (USFWS Study Request; Enclosure 13)</p> <p>6. Collect and provide the Instream Flow study with habitat suitability criteria (HSC) data to support analysis of potential project impacts.</p> <p>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.</p>	<p>Data on the early life history of juvenile fish are being collected as part of the Fish Distribution and Abundance Studies (9.06) 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.</p> <p>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, RSP (Section 8.5.4.4) provides more details regarding methods (locations, survey methods, frequency of sampling, etc.) of HSC/HSI data collection.</p>
<p>Word document titled “ELH Juvenile Adult Fish D and A Riv Pro mb initial draft</p>	09/07/2012	Mike Buntjer	USFWS	<p>Early Life History and Juvenile Fish Distribution and Abundance in the Susitna River (USFWS Study Request; Enclosure 13)</p> <p>8. Evaluate the potential for stranding of juvenile fish and stranding mortality by season under proposed operational conditions.</p> <p>This Study Request objective is not addressed.</p>	<p>Stranding and trapping will be evaluated using the varial zone model described in Section 8.5.4.5.4. 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</p>

comments on PSP” attached to e-mail				Stranding is mentioned in Chapter 6, but the study approach is not discussed	trapped fish will be used to validate criteria developed from studies conducted at existing hydroelectric projects exhibiting load-following operations.
Word document titled “ELH Juvenile Adult Fish D and A Riv Pro mb initial draft comments on PSP” attached to e-mail	09/07/2012	Mike Buntjer	USFWS	<p>Early Life History and Juvenile Fish Distribution and Abundance in the Susitna River (USFWS Study Request; Enclosure 13)</p> <p>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.</p> <p>This Study Request objective is not addressed anywhere.</p>	This Study Request objective is addressed in RSP Section 9.06. 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, intragravel 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 intragravel 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 intragravel environment to be conducted during the winter of 2013-2014.
Word document titled “ELH Juvenile Adult Fish D and A Riv Pro mb initial draft	09/07/2012	Mike Buntjer	USFWS	<p>Adult Salmon Distribution, Abundance, Habitat Utilization and Escapement in the Susitna River (USFWS Study Request: Enclosure 15)</p> <p>9. Determine the availability and accessibility of spawning habitats by adult salmon to mainstem and tributary locations based upon flow regime.</p>	RSP Section 9.05 and 9.06 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 instream flow study program (RSP Section 8.5) and will include collection of data by

comments on PSP” attached to e-mail				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):	habitat type.
Word document titled “ELH Juvenile Adult Fish D and A Riv Pro mb initial draft comments on PSP” attached to e-mail	09/07/2012	Mike Buntjer	USFWS	Adult Salmon Distribution, Abundance, Habitat Utilization and Escapement in the Susitna River (USFWS Study Request: Enclosure 15) 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.	RSP Section 9.12 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 instream flow study program (RSP Section 8.5) and includes data collection by habitat type within Focus Areas and at potential passage barriers identified by biotelemetry studies (RSP Section 9.06)
Word document titled “ELH Juvenile Adult Fish D and A Riv Pro mb initial draft comments on PSP” attached to e-mail	09/07/2012	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	Studies to evaluate potential Project effects on salmonid spawning will integrate groundwater, geomorphology, ice processes and water quality (see RSP Section 8.5). 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 RSP Section 8.5.4.

				scouring of redds in Chapter 6, but no empirical baseline information to assess daily load-following operations.	
Email	09/12/2012	Eric Rothwell	NMFS	<u>General – All PSPs:</u> 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 as part of the schedule in RSP Section 8.5.6.
Email	09/12/2012	Eric Rothwell	NMFS	<u>General – All PSPs:</u> 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 summer mainstem flow routing model, calibration details will allow uncertainty to be calculated by comparing simulated versus observed conditions at different locations in the stream (RSP Section 8.5.4).
Email	09/12/2012	Eric Rothwell	NMFS	<u>General – All PSPs:</u> How will incomplete study components, data, or results be dealt with - situations where an extension of the study period is necessary.	The studies are designed to be adaptive so that 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	09/12/2012	Eric Rothwell	NMFS	<u>Site Selection Process:</u> 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.	Yes, as described in the RSP Section 9.06, data on fish distribution, and utilization by habitat type will be collected seasonally in both main channel and lateral habitats. Fish distribution and abundance data, intragravel 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

				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	be used to modify/add Focus Areas in March 2014 to allow additional data collection in 2014.
Email	09/12/2012	Eric Rothwell	NMFS	<u>Site Selection Process:</u> 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 9.09. The process and criteria used to identify proposed Focus Areas, and a list of the areas will be identified in RSP Section 8.5.4.
Email	09/12/2012	Eric Rothwell	NMFS	<u>Site Selection Process:</u> 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 fish studies.	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 (RSP Sec 8.5.4.2) provides the opportunity and flexibility to modify/add sites as new information becomes available.
Email	09/12/2012	Eric Rothwell	NMFS	<u>Site Selection Process:</u> 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	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.

				wasn't captured in the 1980s due to the methodologies available. We do not currently know the full spawning distribution.	Studies to identify the current spawning distribution, using recent advancements in survey techniques (e.g., DIDSON), are proposed in RSP Section 9.05 and 9.06.
Email	09/12/2012	Eric Rothwell	NMFS	<u>Site Selection Process</u> : 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	09/18/2012	Joe Klein	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	09/18/2012	Joe Klein	ADF&G	Please include a definition list for each study plan of key terms. We are not overly concerned about consistency between groups since different specialties often have their own terminology, however a list would help understand these differences/similarities.	Thank you for the suggestion. A list of key study terms will be provided as a table in each technical section of the RSP.
Email	09/18/2012	Joe Klein	ADF&G	After reading my notes, details about the sampling approaches discussed are not clear to me. For example, how many intensive sites are	Proposed Focus Areas for the Middle Susitna River were identified and described during the September 14, 2012 TWG meeting. A

				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?	description of proposed Focus Areas is provided in RSP Section 8.5.4. These Focus Areas may be modified in collaboration with the TWG in early spring 2013 after the habitat mapping results (RSP sec 9.09) are available. These Focus Areas will include sampling for Fish and Aquatics-Instream Flow, Riparian-Instream Flow, Groundwater, Geomorphology, Water Quality and Ice Processes Studies.
Email	09/18/2012	Joe Klein	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 will be described in the RSP and confirmed in collaboration with the TWG in late 1 st Quarter 2014.
Email	09/18/2012	Joe Klein	ADF&G	Likewise, we support and agree with the approach proposed for assessing surface water/ground water interactions.	Comment noted.
Agency consultation meeting	09/27/2012	Joe Klein	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 instream flow study are provided in RSP Sec 8.5.8.
Agency consultation meeting	09/27/2012	Joe Klein	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 (RSP Sec 8.6.4.6). Low gradient areas will be 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 remote

					sensing.
Agency consultation meeting	10/01/2012	Eric Rothwell	NMFS	Requests 2D 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 (RSP Sec 8.5.4.6).
Riparian Instream Flow Study (Section 8.6)					
Email	009/11/2012	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 RSP 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 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	09/11/2012	Bob Henszey	USFWS	<u>Study Goals and Objectives:</u> 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	Yes, section 6.6.4 Study Methods "Objectives of the modeling approach are to: (1) quantify riparian vegetation physical process relationships under <i>natural flow regime</i> , (2) assess potential impacts to riparian vegetation resulting from proposed Project operational flow regime." Section 6.6.4.7.2 Riparian

				<p>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 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.</p>	<p>Vegetation-Flow Response Goals states: "Criteria, metrics, indices will be developed for quantitatively describing riparian floodplain plant communities with varying natural flow regimes. The environmental flows will be used to develop riparian vegetation-flow response guilds... Development of a quantified relationship between individual riparian species, guilds and natural flow regime is the goal of the riparian Instream Flow study."</p> <p>Goals and specific objectives will be further clarified in RSP Sec 8.6.3.6.</p>
Email	09/11/2012	Bob Henszey	USFWS	<p><u>Study Goals and Objectives:</u> 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</p>	<p>The RSP will include each of the USFWS requested six objectives and these objectives will be specifically identified in the text of each appropriate RSP study plan section.</p> <p>Regarding USFWS Object 6, consistent with USFWS request, mapping riparian vegetation will be accomplished in both the Riparian IFS and Riparian Botanical Survey. Similar methods will be used in both Riparian studies. Impacts to shallow groundwater well users was added to the groundwater / surface water study overall objectives during PSP development. The shallow groundwater impact analysis will be moved to the Groundwater RSP.</p> <p>River ice, sediment transport and deposition, and water-level regime analyses will be studied individually and then integrated into</p>

				<p>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 to an unnatural target (e.g., non-floodplain plant communities).</p>	<p>the overall riparian vegetation physical processes modeling approach including 6.6.4.41 <i>Geomorphology and Ice Processes Modeling of Floodplain Vegetation Physical Template</i> and 6.6.4.5 <i>Physical Process Modeling—Groundwater / Surface Water Interaction Study</i>.</p> <p>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 will be clearly stated as such in RSP Sec 8.6.3.6.</p>
Email	09/11/2012	Bob Henszey	USFWS	<p><u>Study Area:</u> 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?</p>	<p>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 flood plain insurance rates, but we have not seen any studies that link it to physical processes.</p> <p>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.</p> <p>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</p>

					<p>delineated valley floor.</p> <p>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 alluvial surfaces, the “active floodplain.” Surface water / groundwater influences will be sampled and modeled in the groundwater / surface water interaction study.</p> <p>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.</p>
Email	09/11/2012	Bob Henszey	USFWS	<u>Study Methods:</u> 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	09/11/2012	Bob Henszey	USFWS	<u>Study Methods:</u> 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	09/11/2012	Bob Henszey	USFWS	<u>Study Methods:</u> 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	09/11/2012	Bob Henszey	USFWS	<p><u>RIFS-1 Synthesize Historical Data</u>: In addition to other North American hydro-projects, this review should also include a review of relatively undisturbed riverine systems.</p>	<p>Scientific literature available concerning relatively undisturbed riverine floodplain systems will be incorporated into the historical data synthesis.</p>
Email	09/11/2012	Bob Henszey	USFWS	<p><u>RIFS-2 Select and Design Study Sites</u>: 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 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/10.2307/1942661</p>	<p>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 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 RSP Sec 8.6.3.2..</p> <p>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.</p>

Email	09/11/2012	Bob Henszey	USFWS	<p><u>RISF-3 Characterize Seed Dispersal and Frequency of Establishment</u>: 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?</p>	<p>RISF 3 is addressed specifically in RSP Sec 8.6.3.3; methods proposed will be further documented with citations in this section.</p> <p>Bimodal peak flows will be addressed by measuring and modeling such flows at each Focus Area.</p> <p>"Second peak" seedling fate will be assessed in the seedling recruitment plot study by aging woody seedlings and quantifying these "recruitment flow regime" characteristics.</p> <p>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 Sec 7.5.</p> <p>Soil texture will be considered by sampling, measuring and describing soil stratigraphy using standard NRCS soils survey protocols (<u>Field Book for Describing and Sampling Soils</u> by Schoeneberger, Wysocki, Benham, and Broderson, 2002).</p>
Email	09/11/2012	Bob Henszey	USFWS	<p><u>RISF-3 Characterize Seed Dispersal and Frequency of Establishment</u> 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</p>	<p>Abundance will be measured as percent cover (herbs, shrubs) or stem density (trees, saplings). Abundance measurement methodological details and citations will be supplied in RSP Sec 8.6.3.7.</p> <p>"Elevation" references to plot elevations. Plot</p>

				<p>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?</p>	<p>elevations will be surveyed and tied into a project wide standard datum.</p> <p>Agreed, vegetation plot sample size and shape methods citations will be provided in RSP Sec 8.6.3.7.</p> <p>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.</p> <p>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.</p>
Email	09/11/2012	Bob Henszey	USFWS	<p><u>RISF-3 Characterize Seed Dispersal and Frequency of Establishment</u>; How will the results from this objective be used to predict potential Project-related changes in seedling establishment and recruitment into the population?</p>	<p>Natural seed dispersal hydro and sediment regime 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</p>

					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), RSP Sec 8.6.3.5 and Sec 8.6.3.7.
Email	09/11/2012	Bob Henszey	USFWS	<p><u>RISF-4 Characterize the Role of Ice in the Establishment, Survival and Recruitment of Riparian Species</u>: 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?</p>	<p>The ice processes (RSP Section 6.6.4.4.1) has been revised to clarify the methodology in light of 2012 summer field work and further development of the ice process study plan.</p> <p>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</p>

					<p>approach to characterizing role of river ice process in establishment, survival and future plant community development is presented in RSP Sec 8.6.3.4.</p> <p>Tree ice scars, first identified in summer 2012 field work, 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 (RSP Sec 8.6.4.3).</p>
Email	09/11/2012	Bob Henszey	USFWS	<p><u>RISF-5 Characterize the Role of Sediment Deposition in the Formation of Soils:</u> 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</p>	<p>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</p>

				<p>by feel should follow standard techniques (e.g., Thien 1979, http://soils.usda.gov/education/resources/lessons/texture/).</p>	<p>in the RSP.</p> <p>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.]</p> <p>Standard NRCS (2002) soil sampling protocols are 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.</p> <p>Sediment transport and deposition are being modeled in the Fluvial Geomorphology Study. The integration of the Fluvial Geomorphology Study and the Riparian IFS will be further described in the RSP.</p>
Email	09/11/2012	Bob Henszey	USFWS	<p><u>RISF-6 Characterize Water-Level Regime Required to Maintain Floodplain and Riparian Plant Communities</u>: 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.</p>	<p>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 Sec 7.5 for further details.</p>
Email	09/11/2012	Bob Henszey	USFWS	<p>Objective 6 combines hydrologic information from the groundwater study (PSP 5.7) and the</p>	<p>Groundwater methods will be moved from the Riparian PSP to the Groundwater RSP (RSP</p>

			<p>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).</p> <p>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 begin the discussion from that point.</p>	<p>Sec 7.5).</p>
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Interim Draft