

Susitna-Watana Hydroelectric Project Document

ARLIS Uniform Cover Page

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<p><i>This document comprises AEA responses to agency comments in Attachment B called: Record of consultation, development of 2013 project operational plan, Study 9.14</i></p> <p><i>The comments are in regard to: Implementation plan for the genetic baseline study for selected fish species in the Susitna River, Alaska. -- Draft.</i></p>		
<p>Notes:</p>		

All reports in the Susitna-Watana Hydroelectric Project Document series include an ARLIS-produced cover page and an ARLIS-assigned number for uniformity and citability. All reports are posted online



SUSITNA-WATANA HYDRO



Attachment C

Comment/Response Table for Development of Final 2013 Project Operational Plan

**Responses to Comments on Draft Implementation Plan for
the Genetic Baseline Study for Selected Fish Species in the Susitna River, Alaska.**

Reference Number	Commenter	Comment Date	Comment	AEA's Response
NMFS-1	NMFS	4/12/2013	<p>“Section 4.2.1 While the proposed sampling strategy is impressive, adult Chinook salmon are inherently difficult to sample because of their large size and preferred spawning habitat, often in fast deep water. This is clearly recognized in Table 2 as the preferred sample size is identified as 200 for each of the 6 sublocations above Devil’s Canyon, yet the expected cumulative total for all 6 aggregated sublocations is identified as only 50. Given anticipated sampling difficulties, it’s unclear whether ADF&G will be able to collect the minimum sample set of 50 representative Chinook salmon above Devil’s Canyon in just two years, especially above the proposed dam site. Even if successful, 50 appears to be a low number of samples to compare to identify genetic differences in related stocks. The authors should consider other options in case the realized sample numbers are too low to address project objectives.”</p>	<p>After considering other options, as requested, AEA has revised the Implementation Plan (IP) to include identifying tissues from juvenile Chinook as a potentially useful tool for augmenting adult collections. <i>See</i> Implementation Plan Section 4.6.2.</p>

Reference Number	Commenter	Comment Date	Comment	AEA's Response
NMFS-2	NMFS	4/12/2013	<p>“Section 4.7.1 Regarding the proposed preliminary analysis of the 10 samples collected in Kosina Creek in 2012, there is concern regarding the validity of the test. It’s possible given the small number of samples that the power of the test may not be strong enough to identify differences if they exist. It’s also possible that the small sample set could be biased in some way and therefore suggest differences where they may not exist. Because of this potential for misinterpretation, the authors should consider first performing some type of power analysis with existing populations of known genetic divergence to gauge the validity of comparing 10 samples from a single aggregation. If the test can’t statistically be done with 10 samples, it might be best to hold any comparison until the sample sets are strong enough for a statistically reliable test.”</p>	<p>Agreed. AEA will process the samples, but not test, analyze, or report until sample sizes are appropriate. AEA has revised IP to reflect this change. <i>See</i> Implementation Plan Section 4.7.1.</p>
NMFS-3	NMFS	4/12/2013	<p>“Regarding the sampling locations upstream of the proposed dam site, the authors should consider including adult and juvenile Chinook salmon sampling upstream of the Oshetna River (location 22 on Figure 2). My understanding is that the Oshetna River is the furthest upstream location that juvenile Chinook</p>	<p>No salmon have been documented in the Susitna watershed above the confluence of the Oshetna River. The salmon escapement study (Section 9.7) will apply radio tags to the salmon population to document fish distribution in the Upper River, including above the Oshetna River, in 2013 and 2014. With 10-15% of the</p>

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			salmon were identified in the past, but it's possible those juveniles could have originated from further upstream spawning aggregates and it's not clear whether locations upstream of the Oshetna River have been surveyed for even presence or absence of salmon; no apparent barrier to their migration is noted and habitat appears suitable."	fish radiotagged in the Middle River (1 in 5 to 1 in 7 fish) each year, radiotagging will detect very small aggregations of fish in the Upper River and this will provide the high-powered test to find any fish above the Oshetna River. Although AEA has not revised the IP in response to this comment, AEA acknowledges that the boundary may be reconsidered as information becomes available.
NMFS-4	NMFS	4/12/2013	"Given that previous studies were completed in the past regarding the proposed dam site, it would be helpful to determine whether samples such as scales are available from historical studies. DNA from historical scales might help differentiate between the 3 different hypotheses identified in 2.2.1."	AEA has contacted several experts and leads of historical studies, and determined that no Chinook salmon were sampled from above Devils Canyon during these studies. No change to IP based upon this comment.
NMFS-5	NMFS	4/12/2013	"Section 4.6 While the proposed tests will be used to differentiate between the three hypotheses, the specific level of divergence used to discriminate fish populations is unclear. This is presumably because the number of available samples will shape the utility of the potential tests and interpretation of the results will be done later in 2014 and 2015 in consultation with other laboratories."	Agreed. Our approach needs to be partially determined by samples and preliminary results. As proposed, we will confer with NMFS and USFWS before analysis begins.

Reference Number	Commenter	Comment Date	Comment	AEA's Response
NMFS-6	NMFS	4/12/2013	"Juvenile salmon species can be difficult to distinguish, thus the authors should include species ID for juveniles collected at least upstream of the proposed dam site and possibly below. Such an analysis might provide additional information regarding potential spawning success of all salmon species."	Agreed. Above Devils Canyon, AEA will collect tissues from all Pacific salmon captured and AEA will verify species through DNA analysis. Below Devils Canyon, field identification will be to Pacific salmon species, but DNA analysis will be used to verify that field species identification is being done correctly. AEA has revised IP in response to this comment. <i>See</i> Implementation Plan Sections 4.2.4.3 and 4.4.
NMFS-11	NMFS	4/12/2013	Comments 1-5 listed by NMFS as "minor grammatical suggestions"	Accepted. <i>See</i> various sections of the Implementation Plan.
NMFS-7	NMFS	4/12/2013	"Page 5, under "Objectives": might consider separating into primary and secondary objectives"	No change to IP. Objectives should remain as written in RSP.
NMFS-8	NMFS	4/12/2013	"Page 7, under "Sample collection targets": might consider separating into primary and secondary sampling goals"	AEA does not believe it is necessary to distinguish between primary and secondary goals. AEA has not revised IP in response to this comment.
NMFS-9	NMFS	4/12/2013	"Page 12, second paragraph: "... exclude from the baseline all ..." – are juveniles going to be included in the genetic baseline?"	Juveniles will be included in the baseline above Devils Canyon, if needed for supplementing adult collections (see response to NMFS-1). No juveniles collected below Devils Canyon will be used for baseline. <i>See</i> Implementation Plan Sections 4.2.1 and 4.6.2.
NMFS-10	NMFS	4/12/2013	"Page 32-36, Figures 2-6: helpful to identify the proposed dam site on the maps"	AEA has clarified in the caption in Figure 2 that the dam site is RM 184. Figures 3-6 do not include the area where the

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				proposed dam is located. <i>See</i> Implementation Plan Figure 2.
USFWS-1	USFWS	4/12/2013	“Page 3, Section 2.1.1, Assessing Chinook salmon population structure: This section could be improved by organizing it into three paragraphs, one for a description of each of the hypotheses of population structure above Devil’s Canyon. For Hypothesis 1a, temporal variation in allele frequencies may be seen in small, genetically isolated populations (Waples and Teel 1990).”	Agreed. In response to this comment, AEA has revised the IP. <i>See</i> Implementation Plan Section 2.1.1.
USFWS-2	USFWS	4/12/2013	“Page 5, Section 3, Objectives: In the last line of the paragraph introducing the objectives, it reads “...(3) assess the use of Lower and Middle River habitat by juvenile Chinook salmon originating in the Middle and Upper Susitna River.” Should this be “Lower River habitat” (delete the word Middle), to follow what is written in Objective 5, “...selected Lower River habitats...”?”	AEA has not changed the IP in response to this comment. Chinook salmon contributions to the Lower and Middle River from upstream sources are of interest (Goal 3). It is in the Lower River that we will examine contributions at the level of habitat type (Objective 5). Other studies will be sampling juveniles from the Middle River opportunistically. These samples will be preserved but only analyzed if needed.
USFWS-3	USFWS	4/12/2013	“Page 5, Section 3 Objectives, Objective #3: There needs to be justification on why samples outside of the Susitna River are being collected for Chinook salmon.”	AEA has not revised the IP in response to this comment. The IP includes this collection of samples because it was included in RSP, in response to FERC requests.
USFWS-4	USFWS	4/12/2013	“Page 6, Section 4.2, Samples to collect: This section about recommended sample	Agreed. AEA’s approach will be partially determined by samples and preliminary

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			sizes was confusing; some background information and citations seem to be missing (e.g., for the first sentence) or misplaced (e.g., Nei 1978). Sample sizes are partially dependent on the genetic divergence among stocks, the information content of the genetic markers, and adequate estimate of allele frequencies. A more thorough description or better references, for example the recent reports for chum salmon and sockeye salmon MSA, would be useful here.”	results. AEA will confer with technical representatives from NMFS and USFWS before analysis begins. AEA has modified the IP to include appropriate citations and clarify the rationale for appropriate sample sizes. <i>See</i> Implementation Plan Section 4.2.
USFWS-5	USFWS	4/12/2013	“Page 7, Section 4.2.1, Sample collection target #5 and Page 9, Section 4.2.4, Juvenile Chinook salmon collection above Three Rivers confluence: Why is only the Oshetna River being sampled for juveniles, since adults were collected in Kosina Creek and juveniles have been seen here? We have not checked the Anadromous Waters Catalog, but all tributaries above the Canyon should be sampled for juveniles. Chinook salmon juveniles can migrate quite some distances from their tributary of origin (e.g., Daum and Flannery 2011).”	From Devils Canyon to the Oshetna River, 4 tributaries will be targeted for sampling of juvenile Chinook salmon (Oshetna Creek, Kosina River, Fog Creek, and Cheechako Creek). Above the Oshetna River, results from the Salmon Escapement Study (RSP Section 9.7) in 2013-2014 will determine whether additional tributaries should be surveyed - see response for NMFS-3. AEA has revised the IP and RSP to add juvenile collection sites from above Devils Canyon to the Oshetna River. <i>See</i> Implementation Plan Sections 4.2.1 and 4.2.4.1.
USFWS-6	USFWS	4/12/2013	“There should be some justification on why juvenile samples collected below the falls that are used for “baseline” will	Agreed. Juvenile collections below Devils Canyon will not be used as baseline. Adult collections below Devils

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			likely not comprise a mixture of stocks (please see Specific Comment Page 13, for other suggestions on how these samples could be used.)”	Canyon should be sufficient. AEA has revised IP in response to this comment. <i>See</i> Implementation Plan Section 4.2.1.
USFWS-7	USFWS	4/12/2013	“Page 9, Section 4.2.6, Other species collections: It sounded like resident species are going to be in bulk collections. Is that a single bulk collection for the entire Susitna River, or a bulk collection for each sampling site (recommend the latter)?”	AEA has revised IP to specify five spatial groups: Chulitna R., Talkeetna R., Upper Susitna River, and Middle Susitna River (broken into above and below Devils Canyon). <i>See</i> Implementation Plan Section 4.2.5.
USFWS-8	USFWS	4/12/2013	“Page 12, Section 4.5, Data Retrieval and Quality Control: Elimination of siblings will only be done for juvenile collections for baseline?”	Clarified to IP to indicate adult salmon will be analyzed for sibling relationships, but adult siblings will still be used in tests. <i>See</i> Implementation Plan Section 4.6.2.
USFWS-9	USFWS	4/12/2013	“Page 12, Section 4.6.2, H-W Expectation: There may be some deviations from HW expectation by chance. Is it really necessary to delete the collection(s) from further analysis? Should HW testing be conducted after temporal pooling?”	No change to IP. AEA agrees that deviations from HWE may be by chance, and will confer with technical representatives from NMFS and USFWS prior to analysis.
USFWS-10	USFWS	4/12/2013	“Page 13, Section 4.6.8, Testing among hypotheses: This section needs to be expanded. The Evolutionary Criteria of Waples and Gaggiotti (2006) should be described, and related to Hypotheses 1a, 1b, and 2. What are the three levels of the hierarchical analysis? Evaluating the	AEA has revised IP to clarify. Upon determining sample sizes and results, AEA will select an appropriate approach after seeking input from NMFS and USFWS technical representatives. <i>See</i> Implementation Plan Section 4.6.9.

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			Evolutionary Criteria/Hypotheses through estimating effective population size may not be very powerful if confidence limits are large. Also, unless large sample sizes are achieved, estimating Ne may not be very successful (Waples 1989, England et al. 2005). It may not be possible to use the temporal method, because the time span in the samples collected may not be large enough. The collections of juveniles may be useful in Ne estimation, provided they represent a single cohort and population. It may be possible to determine if juveniles are from one cohort by measuring individual length to determine if sizes fall in a single mode.”	
USFWS-11	USFWS	4/12/2013	“Another possible analysis is to use the program MIGRATE to both estimate migration rates and direction and Ne _μ . This analysis may also be of interest for the juvenile collections above and below the canyon.”	No change to text, but AEA agrees to evaluate various analytical methods and will confer with technical representatives from NMFS and USFWS.
USFWS-12	USFWS	4/12/2013	“Page 14, Section 4.7.1 Assessing reporting groups (including above Devil’s Canyon for MSA: Delete preliminary test using Kosina Creek 2012, N=10. Wait until more samples are collected.”	Agreed. AEA will process the samples, but not test, analyze, or report. AEA revised IP text to reflect this change. <i>See</i> Implementation Plan Section 4.7.1.