



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

May 6, 2022

Amy Demboski, Municipality of Anchorage
Arthur Miller, Chugach Electric Association, Inc.
Tony Izzo, Matanuska Electric Association, Inc.

RE: Review of Eklutna's Year 2 Study Plans

Dear Ms. Demboski, Mr. Miller, and Mr Izzo:

The 1991 Fish and Wildlife Agreement: Snettisham and Eklutna Projects (1991 Agreement) requires the Eklutna Hydroelectric Project owners ("Utilities") to develop a Fish and Wildlife Program to protect, mitigate damages to, and enhance fish and wildlife impacted by the continued operation of the Eklutna Hydroelectric Project (Project). "The Governor shall establish a final Fish and Wildlife Program that adequately and equitably protects, mitigates damage to, and enhances fish and wildlife resources (including affected spawning grounds and habitat) affected by the Eklutna Project". This letter responds to the Utilities' April 1, 2022 request for concurrence with the Year 2 studies and makes suggestions for steps to move all parties towards October 2024 recommendations to the Governor we can support.

The 1991 Agreement states the Utilities shall consult with the agencies throughout the Fish and Wildlife Program development process. To date, we have experienced good communication among the Utilities, agencies, Native Village of Eklutna, and stakeholders. Our comments herein are to ensure those lines of communication remain open in support of a mutually agreeable outcome. The following points are crucial to maintaining high levels of amiable consultation between the parties leading up to the Governor's decision.

Our agency's mission includes supporting sustainable fisheries and protecting healthy ecosystems. In support of this mission, we use the best available science and information to protect, mitigate damages to, and enhance fish and wildlife. This includes understanding the fish habitat that can exist in the future in addition to the habitat that exists today. The current studies primarily focus on defining the existing condition. At least two additional steps necessary to understanding future habitat condition have not been completed. Foremost, proposing protection, mitigation, and enhancement (PME) measures would be a significant step for guiding future analysis and the path to achieving the goals of the 1991 Agreement. No PME or alternatives have been proposed or analyzed to date. Second, once the PME measures or alternatives that warrant analysis are agreed upon, the Utilities will need to evaluate each PME measure to ascertain its potential for successful restoration of fish habitat. Some tools (e.g. models) are being developed that will provide insight into possible future fish habitat. However, the Utilities are compiling those tools prior to identifying the PME measures or alternatives and therefore, those tools may need modification or augmentation.

Section 4 of the 1991 Agreement (Review of Findings) lays out the review process and responsibilities. As potential PME measures are developed, we recommend all interested parties



be included in a consultation process similar to that used to develop the year one studies. There should be a written record of all PME measures proposed by all parties and a record of the decision process and criteria for evaluating PME measures. The review process should provide an opportunity for written comments on the final list of PME measures to be considered before the in-depth evaluation begins.

The upper Eklutna dam has had the greatest impacts on the fish habitat in the 8.5 miles between the Thunderbird Creek confluence and the upper dam. More than 98 percent of the flow was removed from this upper river reach. For this reason, the PME measures should focus on mitigating effects in this 8.5 mile reach, including, most importantly, providing water 365 days-a-year to re-establish fish habitat including spawning and rearing grounds.

Infrequent, larger flow releases must be included among the PME measures evaluated to inform the future salmon habitat restoration under the Fish and Wildlife Program. Periodic channel maintenance flows every 20 years will be necessary to achieve the 1991 Agreement's goal to establish and maintain habitat for the freshwater life stages of Chinook salmon. While the consultants are confident their models can scale up to nine times above the highest 2021 calibration flow release (158 cfs), we are concerned that the collective investment into the development of this 35-year Fish and Wildlife Program is too great to rely on models used far above their normal prediction ability. The success of this process relies on the stakeholders' confidence in the data and analysis. That confidence in the analysis process could be strengthened with enhanced modeling assumptions using a broader range of calibration flows.

We concur with ten of twelve studies proposed for 2022 (Year 2 studies). The ten we concur with will likely be concluded in 2022 if the Year 2 study plan is followed. Our concern with the remaining two studies (Instream Flow Study and Geomorphology and Sediment Transport Study) is that the Utilities are unlikely to meet the study goals this year, and therefore additional study work might be required in 2023. The 1991 Agreement does not specify that studies must be completed in 2022; it does specify that the completed studies must serve to inform Governor's decision. Our detailed comments on the 12 study plans are in the attached enclosure.

We seek mutual agreement on the Draft Fish and Wildlife Program provided to the Governor in October of 2024, and, ultimately, enhanced fish habitat in the Eklutna River. Our goal is not to have the Utilities perform endless studies as that delays the salmon's return. Any further requests based on the 2022 study report will be to improve the information that supports effective habitat restoration.

Please contact Sean Eagan at sean.eagan@noaa.gov or by phone at 907-586-7345 if you have any questions.

Sincerely,



Gretchen Harrington
Assistant Regional Administrator
for Habitat Conservation

Enclosure: NMFS Comments on Eklutna Fish and Wildlife Program Year 2 Study Plans

cc: Amy Demboski, Municipality of Anchorage, Amy.Demboski@anchorageak.gov
Aaron Leggett, Native Village of Eklutna, Aleggett@anchoragemuseum.org
Arthur Miller, Chugach Electric Association, Inc Arthur.Miller@chugachelectric.com
Austin Williams, Trout Unlimited, austin.williams@tu.org
Brad Meiklejohn, The Conservation Fund, bmeiklejohn@conservationfund.org
Carol Mahara, USFWS, carol_mahara@fws.gov
Carrie Brophil, Native Village of Eklutna, cbrophil@eklutna.org
Curtis McQueen, Native Village of Eklutna, mcqueen.curtis@yahoo.com
Dustin Lorah, Native Village of Eklutna, 907realestate@gmail.com
Heather Hanson, USFWS, heather_hanson@fws.gov
Jennifer Spegon, USFWS, jennifer_j_spegon@fws.gov
Josh Brekken, ADF&G, josh.brekken@alaska.gov
Mark Lamoreaux, Native Village of Eklutna, marcl@eklutna.org
Maria Coleman, Native Village of Eklutna, maria.nve@eklutna.us
Mike Brodie, Chugach Electric Association, Inc., mike_brodie@chugachelectric.com
Ron Benkert, ADF&G, ronald.benkert@alaska.gov
Samantha Owen, McMillen Jacobs Associates, owen@mcmjac.com
Steve Connelly, Eklutna Inc., sconnelly@eklutnainc.com
Tony Izzo, Matanuska Electric Association, Inc, Tony.Izzo@mea.coop
Tony Zellers, Matanuska Electric Association, Inc., tony.zellers@mea.coop

Enclosure

NOAA Fisheries' Comments on Eklutna Fish and Wildlife Program Year 2 Study Plans

The first year studies funded by the Utilities began establishing a biological baseline for existing conditions. The Utilities completed some studies in 2021 and other studies require a second study season. The Utilities plan to complete the following four studies during the second study year (2022). We concur with the study design for the second year of these studies as they will likely provide the information needed to inform the Program development in their respective areas:

- Eklutna River Fish Species Composition and Distribution Study (3.3)
- Lake Aquatic Habitat and Fish Utilization Study (3.4)
- Water Quality Study (3.5)
- Wetland and Wildlife Habitat Study (3.9)

We will not comment on the Terrestrial Wildlife Study (3.10), Recreation Study (3.11), and Cultural Resources Study (3.13) as they are outside of our area of expertise.

For the following five studies, we offer specific comments. We concur with 3 studies with minor suggestions and withhold full concurrence on two studies; however, all five studies should be implemented this summer.

- Geomorphology and Sediment Transport (3.1)
- Instream Flow (3.2)
- Stream Gaging (3.6)
- Engineering Feasibility and Cost Assessment (3.7)
- Hydropower Evaluation (3.8)

Overall Schedule

The Planned Schedule (Table 1.1) has very little detail after May 2022. Providing more detail would be in keeping with the 1991 Agreement tenant of consultation with the agencies.

Geomorphology and Sediment Transport Study (3.1)

We do not concur that the Year 2 study plan evaluating geomorphology and sediment transport will meet all study goals. Additional work will be required. However, we do not wish to halt the proposed, valuable Year 2 work. The interim study report provided new information and we look forward to learning more from the continuing work. While some loose gravel and small cobbles moved short distances during the 2021 flow releases, those releases did not hit the threshold for large scale bedload movement. Bedload movement does not initiate at a single modelable flow nor does it progress in linear fashion. At some flow level, the entire bed becomes mobile and many miles of salmon gravels can be cleaned out and resorted during a brief event. In addition to

our concern for the 2022 flow releases as they relate to sediment movement, we offer the following comments on the geomorphology and sediment studies.

- ST-1 The third goal of the geomorphic study to provide a flow that disrupts the armor layer and moves interstitial fine sediment was not met. While the gravel armor layer was disrupted in a few places, the armor layer stayed intact within significant reaches of the river or was buried beneath new material in other reaches. Concluding the armor layer was disrupted in a significant portion of the channel is not accurate.
- ST-2 Where gravel existed, the armor layer was so weak that it did not meet the definition of an armor layer. We do not have sufficient information to calibrate the 1-D HEC RAS Sediment Transport model beyond the flows released in 2021. “The underlying reason why uncertainty in transport estimates is so large is that the formulas (actually, the underlying physical mechanisms) are strongly nonlinear.” (Wilcock, 2009). Based on this information, we do not recommend scaling the sediment transport model beyond its calibration.
- ST-3 Mr. Riser’s proposed sub-study of the four rockfall fish barriers (Cascades A - D) in the canyon is important. The study, as is currently proposed, is incomplete, as it does not investigate flows that change the rockfall piles to allow more fish to pass. Rocks will continue to fall from the canyon walls during earthquakes and during freeze/thaw cycles. The study should consider the volume or piece size of rockfall that can be made passable (rolled downstream, broken, or buried) by the erosional power of 150 cfs, 1,000 cfs, or 2,000 cfs. We recommend additionally evaluating other barrier removal options, such as hand tools or small explosives.
- ST-4 The fourth goal, channel migration (a stochastic process), is challenging to model. We will refrain from commenting until the 2022 LIDAR work is available.
- ST-5 “Identify and estimate input from major sediment sources” (page 34). Alluvial fans do not expand at a steady rate. To predict future channel dimensions, both bank erosion and fan growth should be considered. The 2022 LIDAR data may help answer this question.
- ST-6 The painted rocks sub-study touched on incipient motion; however, since those rocks were not imbedded in fines, they moved at an order of magnitude less flow than an imbedded, similar-sized particle.

Instream Flow Study (3.2)

We do not concur that the Year 2 study plan evaluating instream flow will meet all study goals. Additional work will be required. However, we do not wish to halt the proposed, valuable Year 2 work. The 2021 Instream Flow Study measured channel characteristics and hydraulics that existed after a week of 158 cfs flows released to reset the channel. These characteristics and hydraulics were measured during deliberate flow releases of 158 cfs, 75 cfs, and 25 cfs. We agree that within a certain flow range and in the existing channel, the Hydrologic Engineering Center’s River Analysis System (HEC-RAS) flow model coupled with the Physical Habitat Simulation System (PHAB-SIM) model will generally predict available salmon habitat. The

Utilities stated that this is the broadest range of flow they can study in 2021 or 2022 given the constraints of both the existing infrastructure and their legal obligation. While this may be true, these studies do not provide sufficient information to design a hydrograph to be included in a PME measure that will support self-sustaining spawning and juvenile rearing habitat. We offer the first three comments to support larger study flows to inform the restoration effort and three additional points dealing with specific sub-studies.

- IF-1 In rivers with a high sediment load, occasional bedload movement is necessary to remove the fines from the spawning gravels thereby allowing oxygenated water to reach the buried eggs. Juvenile fish need slow water habitat, which most often exists outside of the main channel. Side channel habitat is often created and maintained by flows that significantly exceed the bank full level and carve side channels through the floodplain.
- IF-2 It has been nine years since the flow topped 450 cfs (August, 2013), and 27 years since the flow topped 1,000 cfs (9/25/1995) and over 70 years since Eklutna was a free flowing river at 2,550 cfs (1951). Prior to dam constructions, the Eklutna River regularly experienced annual peak flows above 1,400 cfs (Figure 1). Alluvial fans and vegetation have encroached on the Eklutna River channel and it is currently unaccustomed to historic natural flows. In the existing channel, there is very little appropriate spawning gravels for large bodied salmon, and there is no off-channel, slow-water habitat that holds water during the winter above the Thunderbird confluence. The HEC-RAS models being developed are not being applied to the channel that future salmon population will likely inhabit. In order to create suitable salmon habitat, the channel dimensions will likely need to change thereby invalidating the HEC-RAS flow model. Therefore, larger test flows are appropriate to inform the restoration planning process.
- IF-3 “The Aquatics TWG generally agreed on an approach for the Instream Flow Study that includes conducting controlled flow releases in 2021, then using that information to determine if a larger spillway flow is warranted and if so, then define that larger spillway flow so that the Project Owners can evaluate the feasibility of conducting such a flow in 2022 as part of the study” (page 13). The Utilities rejected a larger release before the Instream Flow or Sediment Transport Year 1 study results were even complete. The Utilities have expressed logistical concerns but we remain unclear on what precise concerns supersede the interests for informing developing a comprehensive in stream flow study in the decision not to release larger flows in 2022.
- IF-4 The proposed 2-D HEC-RAS Flow model will not be useful above twice the highest calibration flow. If the 2022 study plans do not include a higher flow calibration, then the 2-D HEC-RAS Flow model may not provide usable data or be worth the expenditure.

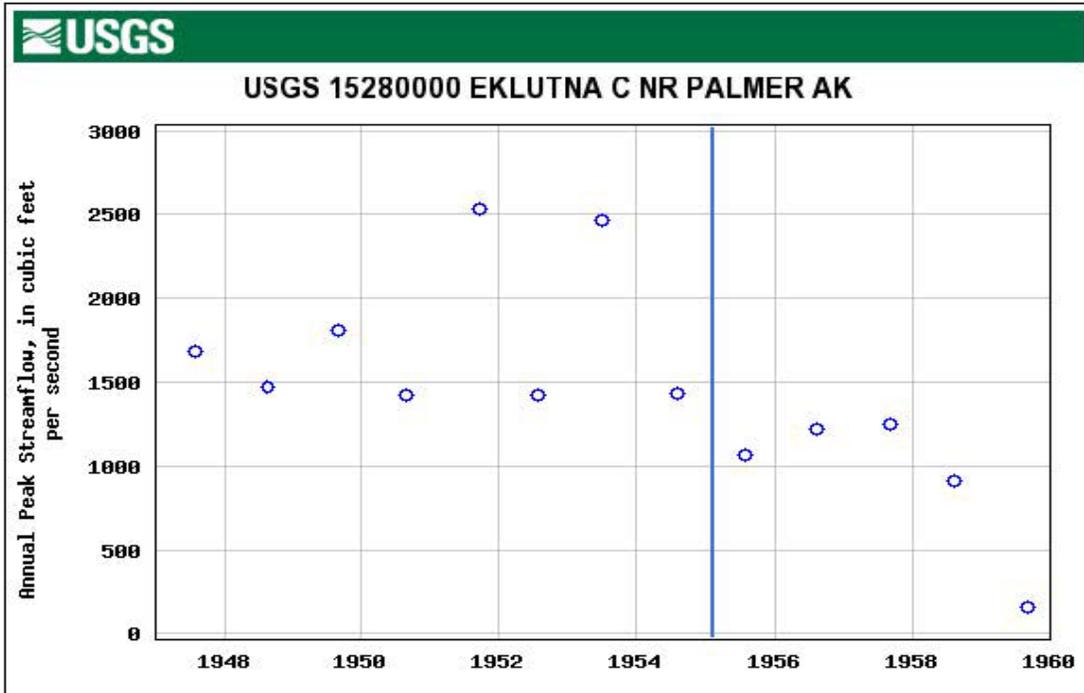


Figure 1: Peak stream flows before dam construction began (blue line).

- IF-5 In addition to a larger flow release to further calibrate the flow model, repeating the flow study with similar size releases in 2022 would move more material out of the former lower reservoir site. This will also adjust the river channel below the top of the old reservoir to closer to a post-dam removal equilibrium.
- IF-6 The 2021 fall release showed that much of the first 15 cfs that flowed through the 30-inch square gate went into the ground. It is important to know how long the Utilities need to release 15 cfs, to fill up the groundwater reservoir so that the majority of the released water remains at the surface and available to fish. This is an example of an evaluation tool not yet fully developed. This new study component is only necessary if there is a PME measure is being evaluated that does not call for a continuous release of 10 cfs or more from the dam.

Stream Gaging Study (3.6)

We concur with this Year 2 study plan. The Stream Gaging Study collected valuable discharge data at the three study sites in 2021. We anticipate similar data will be collect in 2022. At least one stream gage needs to be maintained, at a minimum, until the Governor makes a decision about the Program. Ideally, that gage would continue until the Program is implemented. We do not know how much ice is melting out of the glacier and that is important to this whole shared water agreement between electricity production, drinking water, and fish habitat. We do not want to repeat the mistakes of the Colorado Compact. We encourage the Utilities to commit to gaging the Eklutna River for the long-term.

Engineering Feasibility and Cost Assessment Study (3.7)

We concur with this study, which will commence in 2022.

- EF-1 We appreciate the proposed summer PME meetings. We recommend more defined timelines for all parties to provide written comments between the steps. This engineering study may take longer than the allocated time. Fifteen percent design drawings may be the level of detail provided in the allocated time; however, 15 percent designs rarely correctly predict costs.
- EF-2 The following suggestions support best practices for choosing and evaluating PME measures.
- The 1991 Agreement says the Utilities shall provide a draft copy of the Fish and Wildlife Program to the agencies for comments or recommendations. The 1991 Agreement does not specify how to choose between potential PME measures to evaluate but does state such measures shall be included in the draft Program submitted to agencies. Establishing criteria for evaluating PME measures in advance of the process of choosing which alternatives warrant evaluation and subsequent inclusion into the draft Program will promote trust among stakeholders.
 - Infrastructure changes will likely be financed by municipal bonds. We recommend comparing costs among PME alternatives using the monthly change in the average Anchorage household's electrical bill over the next 30 years.
 - There is precedent for non-ratepayer funding to finance major infrastructure changes to benefit fisheries restoration projects. Expensive infrastructure changes should be included in the analysis. Having infrastructure design options will allow the agencies to explore other options for financing these changes in support of the restoration program.

Hydropower Evaluation Study (3.8)

We concur with this study, which will commence in 2022.

- HE-1 We note that goal two, which includes revenue, is odd because as the cost of energy production rises over 35 years the rates charged to consumers will rise.
- HE-2 The potential for occasional releases of water through the spillway is a good attribute to evaluate. From the viewpoint of maintain spawning gravels, occasional overflow is a positive thing.

Citations

Wilcock, P., Pitlick, J., & Cui, Y. (2009). Sediment transport primer: estimating bed-material transport in gravel-bed rivers. *Gen. Tech. Rep. RMRS-GTR-226. Fort Collins, CO: US Department of Agriculture, Forest Service, Rocky Mountain Research Station. 78 p., 226.*