Native Village of Eklutna Comments on
Eklutna Hydroelectric Project 1991 Fish and Wildlife Agreement Implementation
Draft Study Plans October 2020

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Submitted by
Native Village of Eklutna Hydro Technical Workgroup Members

Overall, the Draft Study Plans assess restoring minimal flows for salmon habitat below Eklutna Lake, and interrelated mitigation studies fairly comprehensively. However, recommended larger flushing flows and salmon access between the lower Eklutna River and Eklutna Lake are not adequately addressed. An engineering study is needed to design new infrastructure that allows sustained and larger flushing flows from the lake, and provides salmon access to the lake. The draft study plan proposes only examining existing infrastructure for flow release potential, which appears inadequate even to provide sustained minimal sustained salmon habitat flows in the river with fluctuating lake levels, although it could provide an improvement over the existing regime with more consistent high lake levels. We believe that a deeper channel created through the primary earthen lake containment, with a new control structure dam, could allow release of desired flows at various lake levels. A fish ladder, or possibly salmon water cannon could facilitate salmon movement between river and lake.

Otherwise, the study plans are generally well done and admirably address relevant topics. This is appreciated. We largely support NMFS comments on the Draft Study Plans, which provide excellent constructive, technical and insightful critique. And, some new studies are strongly suggested to address fish passage to the lake and increase available water.

Two important questions we have missed being addressed are:

1. How much released flow will be lost in the channel and absorbed to groundwater, especially in the reaches just below the lake where the river is intermittently dry? This loss will increase the sustained flows needed to reach target flow levels and might increase additional flushing flow volumes.

2. How will freezing impact maintenance of sufficient wetted channel for incubation, also especially in the reaches just below the lake?

It seems these two questions might best be researched by measurement and adaptive management when flows are released.

Apologies if any of these questions have been addressed but we missed them.

3.2 Geomorphology/Sediment Transport Study

The sediment transport study and remediation flushing flows analysis should be for higher discharges. Only 150 cfs appears to be the highest discharge in a range proposed for assessment, to extrapolate to 375cfs. We refer to NMFS's comments that it should be

calibrated to more than twice this. The USFWS study (Hanson, 2019) recommends an average 1,402cfs flushing flow discharge one day per year. This would be beneficial to clean substrate and spawning gravels of fine sediment that has built up with low flows and from large washes of small tributaries. Some additional benefits of larger flushing flows are freeing up macroinvertebrate prey habitat and reducing turbidity. Also loosening, transport and re-accumulation of gravels and cobbles that have become imbedded, and cutting back the sediment fans of the washes, from the river bed. Larger flows would best accomplish these salmon habitat goals. More, and larger flushing flows will also be needed initially to re-establish a healthy channel where sediment and vegetation have accumulated over the years of restricted flow. This should be more cost effective than mechanically re-creating the channel. The Eklutna historically flowed above 800 cfs for months during the summer.

This all goes to why an engineering study is needed to design new infrastructure that allows sustained and larger flushing flows from the Eklutna Lake. Another questions to investigate is the potential impacts to and solutions for large flows on ADOT and ARRC bridges. It is likely that a new Glenn Highway bridge will need to be constructed in the not too distant future, to accommodate widening of the highway. This should be designed to accommodate restored flows, rather than re-instating low flows with impacted habitat.

The Eklutna pumped hydro storage battery would solve the problem of excessive costs to power companies from releasing large flows to the river, while allowing for full restoration of river flows, lake access, and stabilization of lake levels for salmon habitat. The Study Plans commits to coordinate on feasibility studies of Eklutna pumped energy storage, but does not include study planning throughout for new infrastructure that could take advantage of this to optimally restore flows for salmon habitat.

3.3 River Fish Species Composition and Distribution Study

3.3.1.1 Anadromous Salmon

Spawning

“Salmon spawning has been observed in the lower Eklutna River from the upper limit of tidal influence to the 1929 diversion dam and the accessible stretch of Thunderbird Creek (NVE, unpublished data).”

This is correct, except they spawned to obstructions that existed below the 1929 diversion dam. These have been removed by Eklutna, Inc.

We appreciate the coordination with, analyses and presentations of NVE studies.

3.3.4.1 Methods to Support Task 1, Eklutna River Fish Community

We are wary of electrofishing impacts on sensitive Eklutna salmon populations, and agree that at least those renewing use of the river above the 1929 dam should be excluded from this method.

3.10 Infrastructure Assessment Study

This section assesses only existing infrastructure and its "…suitability for handling any variation in flow rates proposed as Project alternatives." As noted elsewhere herein, confining the infrastructure planning analysis to existing infrastructure obviates optimal restoration flow rates and lake access potentials.

One clause in this section does appear to recognize that a new and deeper outflow channel may be required from the lake to deliver even minimal flows that will sustain salmon habitat downriver: "Investigate the hydraulic connection between Eklutna Dam and the original storage dam site to determine the minimum allowable water surface elevation required to continue to pass flow through the Eklutna Dam outlet, as required. Conduct surveying at the location of the original storage dam site to gain a better understanding of the reservoir stage that will maintain hydraulic connectivity between the Eklutna Reservoir and Eklutna Dam." Continuous high lake levels and no control structure would greatly improve lake salmon habitat and allow a natural flow variation regime downriver, but would not allow utilities seasonal draw-down flexibility.

Another idea in this section reads: "This investigation will include operating the existing dam outlet gate to verify its suitability for use as a controlled flow release structure." This would be a start on releasing minimal flows and alleviate a dry river in reaches below the dam. However, estimates are it would only provide about 10 cfs. Flows required for spawning and incubation range between 20 and 1,635 cfs during different salmon life stages, with an average of 109cfs over a year. Releases from the outlet gate would be beneficial for study purposes and initial flushing flows before a mitigation plan is approved, but will probably not be adequate for long term restoration.

Re-diverting Thachkatnu Creek into the Eklutna River would also provide only about 10 cfs, and be expensive and destructive to the ecology and private properties that have developed on its historic course.

The existing infrastructure does not support any fish movement to the lake and the upper river. If a plan to use the existing infrastructure is accepted, would there be investigation of the existing infrastructure to design a fish passage around or through the existing structure?

So, it appears that new infrastructure at the lake outlet is needed to restore flows to support thriving salmon habitat in the river below the lake and salmon access to the lake.

3.11.1 Engineering Feasibility and Cost Assessment Study

This might be a good place to include an engineering design study for new infrastructure that allows sustained and larger flushing flows from the lake, and provides salmon access to the lake. Something like a deeper channel through the primary earthen lake containment, with a new control structure dam could allow release of desired flows at various lake levels. A fish ladder, or possibly salmon water cannon could facilitate salmon movement between river and lake.

The current language in this section only allows that:" For each infrastructural component identified as requiring either modifications, rehabilitation, or upgrades to the structure, a preliminary engineering design will be performed to accommodate the proposed alternative operating regime.

Brad Meiklejohn has written: "In other parts of North America, including at Cooper Creek on the Kenai Peninsula, existing hydropower facilities have been retrofitted to allow for flow restoration and fish passage. A variety of techniques and technologies exist that are specific to each location, but engineering options exist that would allow for the modification of the Eklutna Lake and Eklutna River to accommodate river restoration, fish passage, power production and drinking water delivery. Undoubtedly these options have a wide range in price and effectiveness."

It is understood that costs of flow releases and new, redesigned infrastructure for the proposed purposes would be burdensome, but they are needed to truly restore system salmon habitat, mitigating hydro project impacts. The Eklutna pumped hydro storage battery would solve the problem of excessive costs to power companies from releasing large flows to the river, while allowing for full restoration of river flows, lake access, and stabilization of lake levels for salmon habitat. The Study Plans commits to coordinate on feasibility study of Eklutna pumped energy storage, but does not include study planning, notably in this section, for new infrastructure that could take advantage of this to optimally restore flows for salmon habitat. The pumped hydro potential analyses which have been conducted already are more than sufficient to recommend engineering design assessments for salmon lake access and higher flow releases than contemplated in the Draft Study Plans. It is possible that a natural outflow from the lake, with no control structures, could be accomplished with pumped hydro, while maintaining or increasing power and municipal water production. This would be a good,, win-win outcome. Pumped hydro could greatly increase the power generation capacity and profitability of the Eklutna hydro system, while allowing full restoration of river flows, lake access, and stabilization of lake levels for salmon habitat.

Government should supplement responsible restoration of the Eklutna River ecosystem, along with private enterprise that could profit from pumped hydro development. NVE is planning application for a cooperative pumped hydro feasibility study, and would be interested to help with contract of a lake access and increased flow release infrastructure feasibility study, and other components of developing these restoration objectives.

P.S.
After writing these comments we found the following section near cob 11/25:

"3.11.1 Engineering Feasibility and Cost Assessment Study

An engineering feasibility and cost assessment study will be required based on the proposed modifications found as a result of the Instream Flow Study (Section 3.1) and Infrastructure Assessment Study (Section 3.10). For each infrastructural component identified as requiring either modifications, rehabilitation, or upgrades to the structure, a preliminary engineering design will be performed to accommodate the proposed alternative operating regime. In addition, any new infrastructure identified in the year one studies will be conceptually designed in an effort to understand the overall layout of the Project and estimated cost impacts. An Association for the Advancement of Cost Engineering (AACE) Class 4 Opinion of Probable Construction Costs (OPCC) will be created to determine the estimated costs for constructing these modifications and/or improvements. It is notable that the identification of the appropriate alternative operational regimes to be assessed will be a collaborative process amongst the TWG members and will take place during and after the review of the 2021 study results. A design basis memorandum, including drawings and the results of the cost estimate will be provided to the TWG for review."

This section does include the possibility that new infrastructure may be designed. We hope this could be made more explicit, possibly by expanding and emphasizing this section to address the salmon lake access and larger flow issues raised in these comments.