



Eklutna Hydroelectric Project Fish and Wildlife Agreement

TWG Meeting
September 3, 2020



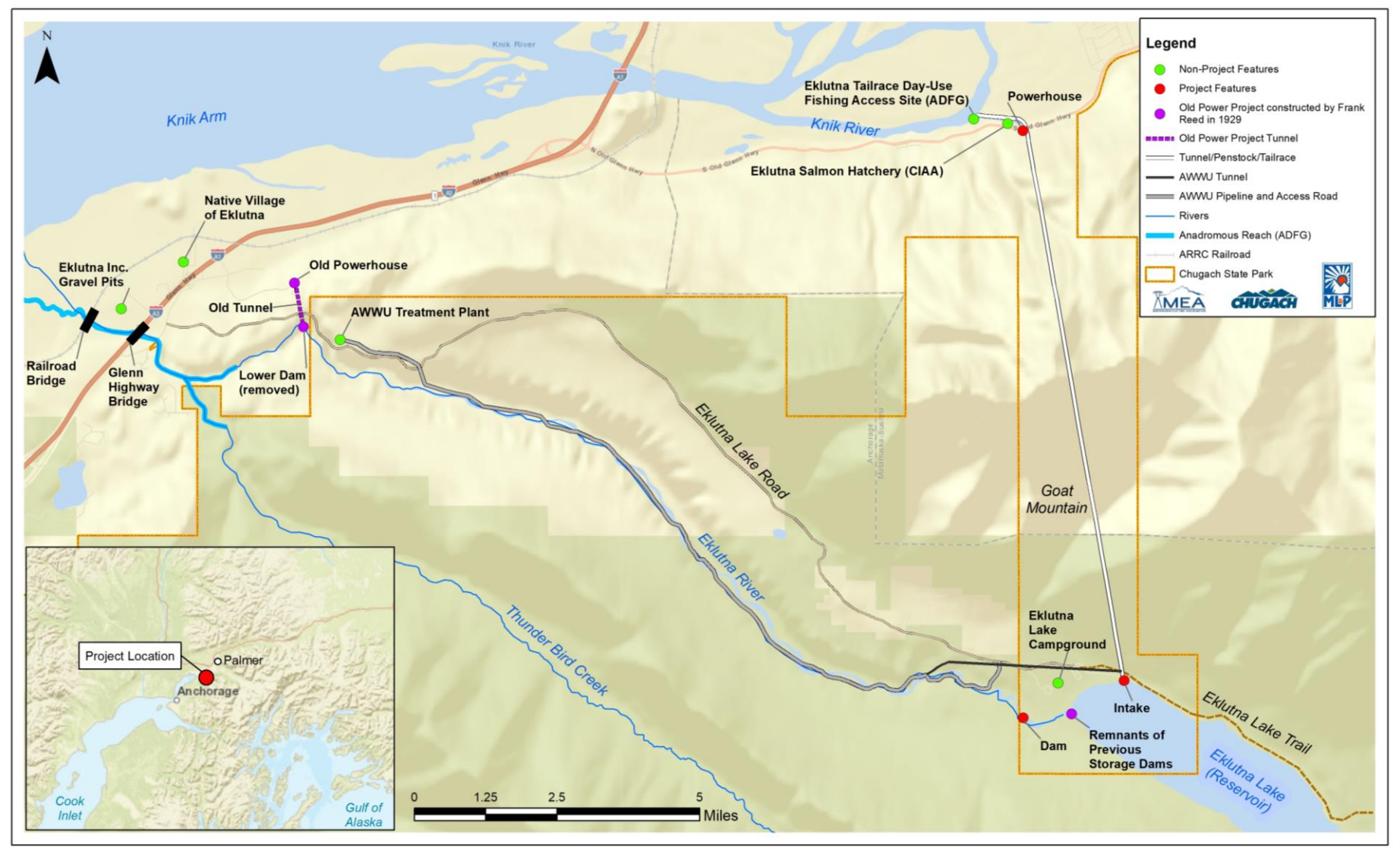
Meeting Agenda

- Introductions
- Updates since last TWG meeting
- Discuss proposed study program framework
- Discuss expanding TWG expertise
- Review study plan outline
- Review study planning schedule
- Agreements and next steps

Updates Since Last TWG Meeting

- Spherical videography of the Eklutna basin available online, <https://biglook360.com/eklutna/>
- Condition assessment of the spillway and drainage outlet gate
- Site Reconnaissance for Kathy Dube (Watershed GeoDynamics)
- Established additional transects and installed scour monitors in the Eklutna River to collect opportunistic data throughout the study program in case there is an anomalous natural spill event during the program
- Any updates on other ongoing efforts in the Eklutna basin? (ADFG, NVE, APU, TU)

Project Area




Proposed Study Program Framework

Year One Studies (2021)	Year Two Studies (2022)
Instream Flow Study	Engineering Feasibility and Cost Assessment Study
Geomorphology/Sediment Transport Study	Hydropower Valuation Study
Fish Species Composition and Distribution Study	Recreation Study
Water Quality Study	Wildlife Study
Macroinvertebrate Study	Wetlands/Riparian Habitat Study
Stream Gaging	Cultural Resources Study
Lake Aquatic Habitat and Fish Utilization Study	Fish Hatchery Assessment
Lake Shoreline Erosion Study	Imagery/LiDAR Support (if needed)
Hydro Operations Modeling Study	
Infrastructure Assessment Study	
Imagery/LiDAR Support (if needed)	

Proposed Study Program Points

- High-level description of proposed studies intended to proactively provide context
- Study plan review will provide formal review/comment mechanism
- Aquatic Tech Experts presenting the studies they'll be leading
- Other tech experts incorporated over the course of the next year related to other study areas
- More detail provided in year 1 studies than in year 2 studies as year 1 will assist in defining the year 2 efforts
 - Year 2 studies will go through a similar process prior to implementation
- Integrate our information, as necessary, with any relevant Traditional Ecological Knowledge provided by the village
- Questions/comments after every study description in the presentation



Year One Studies (2021)

Instream Flow Study

- **Goals:**
 - Determine current and estimate past and future reach specific fish habitat-flow relationships in the Eklutna River
 - Utilize relationships for determining habitats under varying operational flow release scenarios
 - Provide flow modeling framework to evaluate benefits to priority fish species and associated life stages at a series of instream flow regimes

Instream Flow Study

- **Methods –**
 - Macro-habitat mapping (videography, ground surveys, existing information)
 - Stratification and study site selection (geomorphic reach based)
 - Model review and selection (1-D and/or 2-D models)
 - Data collection:
 - Office – LiDAR (bathymetry); periodicity; Habitat Suitability Criteria (HSC)
 - Field – Controlled flow releases and data collection at transects (flow, WSE, depth, velocity, substrate, cover)
 - Data analysis: Derive preliminary habitat-flow relationships

Instream Flow Study

- *In year two this study will continue with:*
 - Finalizing habitat-flow relationships
 - Quantify project impacts (to the extent possible)
 - Identifying costs/benefits to a variety of potential operational scenarios
 - Conducting comparative time series analysis of those different scenarios

Geomorph/Sediment Transport Study

- **Goals** – Investigate the existing sediment conditions in the river and the role that sediment flushing flows might play in alternative flow regimes.
- **Focus** – River channel downstream from Eklutna Lake
 - Natural sediment sources downstream of Eklutna Lake
 - Sediment deposits stored upstream from former (lower) dam

Geomorph/Sediment Transport Study

- **Methods –**

- Establish geomorphic reaches (based on confinement, gradient, tributaries, sediment sources)
- Historical aerial photograph/LIDAR analysis of river channel and sediment source changes through time
- Field inventory of current sediment conditions in river downstream from Eklutna Lake
- Survey cross sections and pebble counts at representative transects to aid in sediment transport analysis; install scour monitors; assess changes following any spill events that occur during study period to help calibrate sediment transport analysis
- Sediment transport model (update, calibrate, and extend existing HEC-RAS model if appropriate) to help assess potential effects of sediment movement through the Eklutna River downstream from Eklutna Lake through time
- *In year two this study will continue with the evaluation of how sediment conditions would be affected by alternative flow regimes.*

Fish Species Composition/Distribution

- **Goals** – Characterize the existing fish populations in the river including seasonal presence, relative abundance, and distribution of fish species and life stages.
- **Study Area** – Eklutna River
 - Upper Eklutna (above old dam site) - Fish community
 - Lower Eklutna (below old dam site) – Anadromous spawning
- **Methods** – Electrofishing, minnow trapping, seining, adult salmon counts
- *In year two this study will continue with the evaluation of how fish populations would change under alternative operational scenarios.*

Water Quality Study

- **Goals** – Collect water quality data to establish baseline conditions, confirm the assumed high quality of water in the system and create a library of data for future modeling efforts, if necessary.
- **Study Area** – Eklutna River and Eklutna Lake
- **Methods** – Continuous temperature logging as well as *in-situ* water quality sampling above and below the lower dam site
 - Thermistor string in Eklutna Lake as well as near the dam
 - Stream temperature loggers at middle and lower reach of Eklutna River (above Thunderbird Creek)
 - *In-situ* turbidity and total suspended solids sampling at base flows and a minimum of 1 spill/flow release event.
 - Dissolved oxygen sampling logical lake and stream locations

Macroinvertebrate Study

- **Goals** – Collect baseline data on the macroinvertebrate community structure and density along the longitudinal profile of the Eklutna River.
- **Study Area** – Middle Reach of the Eklutna River (above diversion dam removal site) and two sites within the Lower Eklutna River (above and below Thunderbird Creek).
- **Methods** – Utilize modified ASCI methods (Major and Barbour, 2001) to generate the following community metrics:
 - Taxa Richness
 - EPT Richness
 - Percent EPT
 - Percent Diptera
 - Total Density (organisms/m²)
- *These data will also provide a qualitative assessment of existing conditions and may be used to compare/contrast future conditions.*
- *NOTE: This effort will be coordinated with the current study efforts by APU.*

Stream Gaging

- **Goals** – Install stream gages in the lower Eklutna River to continuously measure stream flows during the study program.
- **Gage Locations** – One upstream and one downstream of the confluence with Thunderbird Creek
- **Methods** –
 - Reference staff gage surveyed to a benchmark datum and correlated to an electronic stage recording device.
 - Stage data to be recorded once every 15-minutes, with gage maintenance and calibration to occur every 6-8 weeks.
 - Gage records will consist of mean daily flow data.
- *This effort will be coordinated with the current study efforts by APU and others.*

Lake Aquatic Habitat and Fish Community

- **Goals** – Characterize the fish community and habitat conditions in the lake and tributaries under existing hydro project operations.
- **Study Area** – Eklutna Lake, “pond”, and tributaries
- **Methods** –
 - Broad characterization of littoral and tributary habitat (depth, area, visible assessment of vegetation, substrate class, springs present)
 - Fish sampling with nets, visual surveys, collect scales and determine age of predominant lake species
- *In year two this study will continue with the evaluation of how those conditions would change under alternative operational scenarios.*

Lake Shoreline Erosion Study


- **Goals** – Evaluate existing evidence of shoreline erosion during high water conditions, including locations, causes (e.g., wave action, ice), and potential means of mitigation.
- **Focus** – Lakeside road/trails and other existing infrastructure along the shoreline
- **Methods** – Review historical aerial photographs to track erosion through time; field inventory to map areas that are eroding and collect information on soil/geology, factors contributing to erosion, slope, aspect, infrastructure affected, and other pertinent site conditions.
- *In year two this study will continue with the evaluation of how conditions would change under alternative reservoir operational scenarios and identify potential mitigation/erosion control measures.*

Hydro Operations Modeling

- **Goals** – Develop a hydro operations model to simulate current project operations (reservoir levels, spills, powerhouse flows and generation, AWWU flows) and potential alternative operational regimes for the hydropower project as the study program progresses.
- **Other Specific Study Components** –
 - Calculating historic inflows to Eklutna Lake utilizing the existing lake level and generation data
 - Surveying the natural glacial moraine and old dam remnants at the outlet of Eklutna Lake to better understand the hydraulic connection between the lake and the “pond”.
- *In year two the model will be utilized to evaluate operational alternatives.*

Infrastructure Assessment Study

- **Goals** – Develop a more complete understanding of existing infrastructure that could be affected by alternative operational regimes.
- **Focus** –
 - Hydropower infrastructure (spillway, drainage outlet/gate, etc.)
 - AWWU infrastructure (pipeline, portal, drain, access road/bridges/crossings)
 - Highway and railroad bridges
- **Methods** – Engineering review of available documentation. Information related to existing infrastructure will be obtained through additional consultation with the applicable entities.
- *In year two this study will continue with the evaluation of how existing infrastructure would be impacted by alternative operational regimes.*



Year Two Studies (2022)

Engineering Feasibility/Cost Assessment

- **Goals** – Evaluate the engineering feasibility and costs that would be required to implement alternative flow regimes and related PME measures.
 - Look at potential for modifying existing infrastructure
 - Potential for additional infrastructure
 - Fish passage

Hydropower Valuation Study

- **Goals –**
 - Quantitatively define the value of the hydroelectric power resource.
 - Evaluate how the value of the hydroelectric power resource would change under alternative operational regimes.

Recreation Study

- **Goals –**
 - Assess the current recreational activities and facilities in the project area (including the tailrace), including fishing, access, lake recreation, and their economic impact.
 - Evaluate how the current recreational resources would be affected by alternative operational regimes and related PME measures.

Wetlands/Riparian Habitat Assessment

- **Goals –**
 - Assess existing wetland and riparian habitat conditions in potentially affected areas of the river
 - Evaluate how existing conditions would be affected by any alternative operational regimes.

Wildlife Study

- **Goals –**
 - Assess key wildlife resources located in the project area.
 - Moose
 - Bears
 - Beluga
 - Migratory waterfowl
 - Evaluate how the current wildlife resources could be affected by alternative operational regimes and related PME measures.

Cultural Resources Study

- **Goals –**
 - Identify any cultural resources (e.g. historic properties, archaeological resources and traditional use areas) within the area of potential effect, including the hydropower project facilities.
 - Evaluate how any proposed operational changes, infrastructure modifications, or PME measures would affect the identified cultural resources.

Fish Hatchery Assessment

- **Goals –**
 - Better understand the continuing/future use of the facility by ADFG to imprint Chinook and coho salmon smolts prior to their release into the project tailrace, and the potential for CIAA to reestablish a hatchery utilizing water from the project tailrace.
 - Evaluate how current/future uses would be affected by any alternative operational regimes.

Need To Expand TWG Expertise

- Need to expand TWG expertise to address Infrastructure related topics **this** year for these year one studies:
 - Any need for existing TWG reps to add technical expertise?
 - Lake Shoreline Erosion Study (State Parks)
 - Hydro Operations Modeling Study (AWWU)
 - Infrastructure Assessment Study (AWWU, ADOT, ARRC)

Need To Expand TWG Expertise

- Need to expand TWG expertise next year for these year two studies:
 - Recreation Study (State Parks, ADFG)
 - Terrestrial (NVE, USFWS, ADFG, USACE)
 - Wildlife Study
 - Wetlands/Riparian Habitat Assessment
 - Cultural Resources Study (NVE, OHA)
 - Fish Hatchery Assessment (CIAA, ADFG)

*As needed, the owners will be adding technical expertise to their team to assess all requisite resource areas.

Study Plan Outline

- Introduction
- Study Program Framework
- Study Plans
 - Year One Studies
 - Background
 - Objectives
 - Study Area
 - Methodology
 - Reporting
 - Schedule
 - Preliminary Cost Estimate
 - Year Two Studies (Brief Summary)

Study Planning Schedule

- Expand TWG Expertise regarding Infrastructure Topics
- Drafting of the Study Plans by Owners' Technical Team
- TWG review and comment on Draft Study Plans
- Consultation with NVE
- Finalize Study Plans
- Approval of the Final Study Plans by the Parties to the 1991 Agreement
- Consultation with the Governor

Study Planning Schedule

Activity	Timeframe
Expand TWG and Draft Year 1 Study Plans	September – October 23, 2020
TWG Review and Comment Period	October 23, 2020 – November 20, 2020
TWG Meeting to Review Comments, and Consultation with NVE	Week of November 23, 2020
Prepare Comment/Response Table and Finalize Year 1 Study Plans	November 30, 2020 – December 18, 2020
Obtain Approval from Parties to the Agreement, then Submit Final Year 1 Study Plans to the Governor	December 18, 2020 – January 1, 2021
Governor's Review Period	January 1, 2021 – February 1, 2021
Brief Governor on Final Year 1 Study Plans and Obtain Feedback	Week of February 1, 2021
Discuss Governor's Feedback with TWG and Revise Year 1 Study Plans (if needed)	February 8, 2021 – February 26, 2021

Progress Today and Next Steps

- Is there agreement on:
 - Study Plan Components? (are we developing all the information we need to complete the information matrix?)
 - Timing of Studies? (year one vs year two)
 - Need this year to Expand TWG with Infrastructure Expertise?
 - Study Plan Outline?
 - Study Planning Schedule?
- Next Steps
 - Study plan drafting
 - TWG review/comment
 - Meet w/TWG to discuss comments