



**Nuyakuk River Hydroelectric Project (FERC No. 14873)
Initial Study Report Meeting Summary**

**December 5, 2023
1:00 PM – 4:00 PM (AK Time)
Hosted in-person in Nushagak Cooperative's
Boardroom and Virtually via Microsoft Teams**

Table 1. Initial Study Report Meeting Agenda.

TIME	TOPIC
1:00 – 1:10	Introduction of Meeting Participants, Logistics, Meeting Intent, etc.
1:10 – 1:30	Reminder of Current Project Status, Open Discussion
1:30 – 3:30	2023 Nuyakuk Project Feasibility Studies Presentation
3:30 – 4:00	Global Questions, Next Steps, Opportunity to Comment, Wrap-up
4:00	Adjourn

Initial Study Report Meeting Summary Attachments

Attachment A ISR Meeting Participant Lists (Sign-in Sheet and Virtual Attendees)
Attachment B: Initial Study Report Meeting Presentation
Attachment C: Federal Energy Regulatory Commission Presentation

Welcome, Introductions, Meeting Logistics, and Meeting Intent

At 1:00pm, Mr. Cory Warnock (McMillen) welcomed the meeting participants to the Nuyakuk River Hydroelectric Project (Project), afternoon Initial Study Report (ISR) Meeting.

Participant Introductions

The Project team members in attendance at the meeting are listed in Table 2. ISR Meeting attendees are listed in Attachment A.

Table 2. Nuyakuk River Hydroelectric Project Team Members in Attendance.

Name	Agency/Organization	Attendance Type
Will Chaney	Nushagak Electric & Telephone Cooperative (Cooperative)	In-person
Cory Warnock	McMillen, Inc. (McMillen)	In-person
Laura Johnson	McMillen	In-person
Chuck Sauvageau	McMillen	In-person
Dr. Mary Louise Keefe	Kleinschmidt Associates	In-person
Dr. Kevin Nebiolo	Kleinschmidt Associates	In-person
Audrey Thompson	Kleinschmidt Associates	In-person
Sean Ellenson	McMillen	Virtual
Noble Hendrix	QEDA Consulting	Virtual
Dave Jones	SLR Consulting	Virtual
Taryn Oleson-Yelle	R&M Alaska	Virtual
Maria Lewis	MLP&A	Virtual
Lindsey Kendall	MLP&A	Virtual
Cam Wobus	CK Blueshift	Virtual
Mike Yarborough	CRC Alaska	Virtual

Meeting Logistics and Meeting Intent

The presentation shown during the ISR Meeting is provided in Attachment B.

Mr. Matt Cutlip (Federal Energy Regulatory Commission; FERC) spoke to the participants regarding the purpose of the ISR meeting and next steps following the ISR meeting. Mr. Cutlip introduced himself as a fish biologist and Project Coordinator for FERC. He stated that the ISR is an interim report that summarizes data collection to date and should also discuss any variances from the study plan. Mr. Cutlip discussed the comment period and purpose of commenting, including modifications to the study program or requests for new studies. Per the approved process plan that issued by FERC last year, the Cooperative is required to file a meeting summary by December 31, 2023. Comments on the meeting summary, requested modifications to existing studies, or requests for new studies are due to FERC no later than January 30, 2024. Mr. Cutlip stated that the Cooperative is not required to re-file the ISR with edits or clarifications. FERC will only be responding to requests for new studies or study modifications. Mr. Cutlip provided

supplemental documentation following the meeting to the Cooperative, which is provided in Attachment C.

Mr. Cory Warnock (McMillen) provided guidance regarding the flow of the meeting, including the time designated for asking questions following the conclusion of the presentations on each of the natural resource study areas portion of the presentation. Mr. Warnock also documented the Cooperative's approach to presenting the plans for continuing the study program in 2024 and the formation of several Technical Working Groups later in the meeting.

Mr. Will Chaney (Nushagak Cooperative) welcomed the meeting participants. Mr. Chaney gave a brief overview of the Project and Project location, highlighting the fact that the Project design, which is a river diversion that does not include a dam. Mr. Chaney displayed a map of the proposed Project area and conceptual location of the transmission line, including the proximity of Dillingham and the four outlying villages (Koliganek, Ekwok, Levelock, and Stuyahok) that would receive electricity from the proposed Project. No roads are proposed as part of Project development. The Project site has been accessed by float plane, helicopter, and boat to date. The highest annual flows of the Nuyakuk River coincide with the peak of the generation needs for fish processing. Mr. Chaney discussed the need for the proposed Project, with respect to almost completely eliminating the need for fossil fuel. Mr. Chaney summarized other projects that have been evaluated by the Cooperative to date, and the reason why those projects were not pursued further. Thus far, the Nuyakuk Project has appeared more feasible for development and as a result, the Cooperative is continuing to advance the assessment of the proposed Project.

Mr. Will Chaney (Nushagak Cooperative) gave a description of the proposed Project site and Project facilities, including the limited footprint and short bypass reach. No dam is proposed as part of the Project, and instead natural flows will be utilized for generation. A groin, if needed, would be constructed out of rock from the Project site and would be used to control the water level near the intake when river flows are low.

Mr. Cory Warnock (McMillen) provided a summary of the Project efforts completed in 2023, including continued collaboration and meetings of the Aquatic Resources Working Group (ARWG), geotechnical investigation, establishment of the study camp at the Project site, permits acquired, development of several models including the Life Cycle Model and economic models and the completion of the 2023 portion of the study program. The 2023 study season had no safety incidents.

Mr. Will Chaney (Nushagak Cooperative) provided an overview of the Project goals, with respect to evaluating proposed Project feasibility and collaboration with the Bristol Bay community, Tribal entities, and individuals. The Cooperative is using the best possible science and regional experts to assess the feasibility of the proposed Project. If deemed feasible, licensed and ultimately constructed, the Project would provide a long-term, renewable power source for region, provide lower electricity rates over time, significantly reduce or eliminate the reliance on fossil fuels for electricity generation, and create short- and long-term employment opportunities in the region. A series of Sustainable Energy Meetings are planned in Dillingham and the outlying villages beginning next week and the Cooperative will be participating in those forums to continue the discussion regarding the proposed Project and anticipated benefits.

Natural Resource Study Program and 2023 Study Results

Mr. Cory Warnock (McMillen) displayed a list of the studies being conducted as part of the Project's natural resource study program, per the Revised Study Plan (RSP). Study leads then presented information about the studies conducted and preliminary results, as currently available.

Fish and Aquatic Resource Studies

Ms. Audrey Thompson (Kleinschmidt Associates) provided an overview of the Fish Community and Behavior Near the Project Area study results. The study utilized water surface elevation monitoring, United States Geologic Service (USGS) and Project site gage data, radio telemetry, Sockeye tagging, Sonar, predator tagging, and fish community sampling. Ms. Thompson described the radio telemetry array that was established at the Project site and the zones that were evaluated using the array. The preliminary results include evaluation of the telemetry detection success. Thus far, results indicate that 96% of the Sockeye salmon tagged below Nuyakuk Falls were detected passing through the Falls and exiting the study area. The next component of the Fish Community study will include development of the 2-Dimensional (2D) hydraulic model. The 2D model will include field data, the stage-discharge relationship, and water surface elevation. A rating curve will be developed, and the 2D model will incorporate (Light Detection and Ranging) LiDAR data collected at the proposed Project site. Ms. Thompson displayed a preliminary 2D model output of the river flow at high flow (18,000 cfs) and low flow (7,500 cfs).

Dr. Kevin Nebiolo (Kleinschmidt Associates) described the Agent-Based Model (ABM) that's been developed and is being refined for the Project. Each agent represents an individual fish and simulates fish behavior. The ABM will assist with understanding sockeye salmon passage through Nuyakuk Falls. The proof-of-concept of the ABM is complete and is currently undergoing refactoring to support vectorized operation. Validation of the model using site-specific telemetry data and expert opinion is planned for quarter 1 of 2024. Dr. Nebiolo provided initial results from the ABM, including imagery of passage routes, plots of agent movements, and agent (fish) lengths that were used in the model. Dr. Nebiolo displayed model output in the form of a video of agent movement through the Falls.

Dr. Kevin Nebiolo (Kleinschmidt Associates) provided an overview of the Fish Entrainment and Impingement Study, which will be conducted in 2024 and will utilize results from Year 1 of the Fish Community and Fish Passage studies. Dr. Nebiolo also presented an overview of Tailrace False Attraction Study, which will also be conducted in 2024 and will utilize Year 1 of the Fish Community and Fish Passage studies.

Dr. Noble Hendrix (QEDA Consulting) described the Chinook and Sockeye Life Cycle Model (LCM) that is currently being developed for the proposed Project. The purpose of the LCM is to provide a method for assessing proposed Project effects on different life cycles of Chinook and Sockeye salmon over multiple generations. Additionally, the LCM will allow for evaluation of proposed Project effects under different climate change and/or operational scenarios. The LCM relies on both local, site-specific data as well as long-term datasets from other regional systems. An initial "straw man" LCM has been developed and will be refined during 2024. Data from other sources/river system is being reviewed for potential inclusion in the LCM. Site-specific data collected in 2023 and 2024 will be utilized in the LCM.

Mr. Pat Vermillion (Royal Coachman Lodge) asked if there will be a pink salmon model. Dr. Hendrix replied that there will not be a pink salmon LCM.

The next steps for the LCM include further data collection and acquiring existing datasets, data analysis, integration of other Project models (climate and water flow scenarios) and continued calibration of the model.

Dr. Kevin Nebiolo presented the Integrated Risk Assessment (IRA) of Fish Populations. The IRA is proposed to evaluate potential Project impacts to fisheries resources at the fish population/community level. A strawman list of management objectives, risk sources, their elements, and receptors (species at risk) has been developed. A risk calculation spreadsheet for a single receptor with example risk matrix was displayed. A workshop is being hosted by the Cooperative on December 6th, 2023 to further develop the management objectives and risk sources.

Fish and Aquatic Resource Studies Questions and Discussion

Fritz Johnson (meeting attendee): asked if the Project work has come up with a different number of fish that have gone up the river versus the Alaska Department of Fish & Game's (ADF&G's) downstream fish counts, and also how many adult Chinook were observed at the Project site. Ms. Audrey Thompson (Kleinschmidt Associates) stated that abundance of adult Chinook was not estimated. Observations of Chinook salmon were made using underwater videography, but due to the high numbers of Sockeye salmon it was difficult to estimate the number of Chinook at the Project site.

Ms. Leah Ellis (ADF&G) asked if catch per unit effort (CPUE) data will be presented. Ms. Audrey Thompson (Kleinschmidt Associates) confirmed that CPUE data will be provided as part of the Updates Study Report (USR) and associated meeting but were not completed in time to be included in the ISR.

Mr. Mark Lisac (Nushagak Cooperative Board and community member) asked how much time it takes for fish to pass through the Falls. Ms. Audrey Thompson (Kleinschmidt Associates) stated that passage time ranged from 2-3 days to 20-24 days. Ms. Thompson stated that there does appear to be a correlation between higher river flows and longer passage times. Dr. MaryLouise Keefe (Kleinschmidt Associates) stated that there are two different datasets (the fish tagged at the Falls, and the fish tagged later in the season by the Bristol Bay Science and Research Institute (BBSRI)) that need to be evaluated. The two sites are approximately 17 miles apart. Mr. Bryan Nass (BBSRI) commented that these two datasets provide an opportunity to observe fish over a longer period of time.

Ms. Ali Eskelin (Alaska Department of Natural Resources (ADNR)) asked if there will be a IRA for other species of fish such as grayling. Dr. MaryLouise Keefe (Kleinschmidt Associates) responded that there is a list of resident fish that will be evaluated in the IRA after Chinook and Sockeye salmon are completed. Dr. Noble Hendrix (QEDA Consulting) stated that there will be some focused quantitative risk assessment associated with the LCM in addition to the qualitative risk assessment for species besides Chinook and Sockeye salmon. Ms. Eskelin (ADNR) asked if the team had a plan for tagging 100 Chinook salmon in the coming year as required by the study plan. Ms. Audrey Thompson (Kleinschmidt Associates) responded that lessons learned this year with respect to the dilution factor given the large number of Sockeye present at the same time,

tagging location, and tagging methods will enable the team to attempt to tag 100 Chinook salmon in 2024.

It was asked if there were Chinook salmon observed at the BBSRI counting tower. Mr. Bryan Nass (BBSRI) responded that the BBSRI team observed a number of larger fish that were likely Chinook salmon at the counting tower.

Ms. Kristina Andrew (meeting attendee) asked for more information about the 96% of fish passage, and whether the other 4% of fish die and go downstream. Ms. Thompson stated that there are several next steps to determine where the missing 4% of fish ended up to the extent possible, but that work has not been completed yet.

Mr. Dan Dunaway (meeting attendee) asked how outmigrating juvenile salmonids will be evaluated including with respect to potential Project impacts. Dr. MaryLouise Keefe (Kleinschmidt Associates) stated that the sonar array was used to detect outmigrating juvenile smolts. The Project team has high-quality data including abundance of outmigrating smolts. The team has distribution data and abundance of smolts from the sonar array. Ms. Audrey Thompson (Kleinschmidt Associates) stated that the ISR contains an example of the way that the sonar data were analyzed, and a visual example of what smolt sonar detections look like. The full analyses were not ready for the ISR, but will be used in the future. Mr. Bryan Nass (BBSRI) added that the sonar array was designed so that the team could look at both horizontal and vertical distribution of smolts in the water column.

Mr. Dan Dunaway (meeting attendee) asked about the potential use of fish-friendly turbines in the Project. Mr. Sean Ellenson (McMillen) stated that typical Kaplan turbines pass about 94-96% of smolts. Fish-friendly Kaplan turbines have a passage success rate of about 97-98%.

Mr. Andy Angstman (Tikchik Narrows Lodge) stated that he would like the Project team to investigate pink salmon. 2024 is an even-numbered year which is a pink salmon year. They are important upstream of the Falls. Mr. Cory Warnock (McMillen) asked Mr. Angstman to file these comments with FERC as well.

Dr. Daniel Schindler (University of Washington) encouraged the team to keep sonar equipment in the water longer to ensure that the smolt pulses are captured. Ms. Audrey Thompson (Kleinschmidt Associates) replied that the sonar array was kept in until mid-July and smolt detections had flatlined by the time it was removed. Dr. Schindler asked about climate change and fish migration time, and how risk would be evaluated based on potential future conditions. Dr. MaryLouise Keefe (Kleinschmidt Associates) stated that all of the models being run will have a climate change component incorporated into them. Dr. Keefe asked that if Dr. Schindler had any temperature projections for the Nuyakuk River system that he provide them to the Project team. Dr. Schindler replied that he wasn't sure that temperature projections had been completed but that he thought they were important.

Question from meeting chat: do fish ever draft off of other fish when in schools to conserve energy? Dr. Kevin Nebiolo (Kleinschmidt Associates) replied that yes, they are influenced by schools around them, however, tired fish will still fall back. A second question from the chat was "do fish try again"? Dr. Nebiolo responded they won't go back to the same place twice if they fail at passage the first time.

Ms. Ali Eskelin (ADNR) asked if fish passage success rates were equivalent to survival rates. Mr. Sean Ellenson (McMillen) confirmed that those rates are for survival at several different time periods including 24 or 48 hours after passage. The metrics provided earlier in the ISR Meeting for fish-friendly turbines were about 97-98% survival 48 hours after passage.

Ms. Ali Eskelin (ADNR) asked about pressure changes influencing fish and how that could impact survival. Mr. Kevin Nebiolo (Kleinschmidt Associates) responded that this is one of the aspects the team would be evaluating and noted that salmonids have a physostomous swim bladder and are able to expel excess gas from their swim bladder. Mr. Bryan Nass (BBSRI) confirmed this.

Mr. Cody Larson (Bristol Bay Native Association (BBNA)) asked about comment periods associated with the ISR. Mr. Cory Warnock (McMillen) responded that the Cooperative is listening to all comments, but comments about modifying studies should also be made to FERC. Mr. Larson asked whether the Cooperative had proposed any modifications or variances to the studies. Mr. Warnock responded that the Cooperative was not proposing study plan modifications. Mr. Larson stated that some of the studies hinge on the species periodicity. He asked that if the Cooperative doesn't have that information, when and how it would be generated. Dr. MaryLouise Keefe (Kleinschmidt Associates) responded that the Cooperative does have periodicity information but will be refining that information based on Project-specific data collected during the Project study program. Ms. Audrey Thompson (Kleinschmidt Associates) added that the data that will inform species periodicity have been collected and are currently undergoing quality control internally prior to being utilized in Year 2 of the study program.

Ms. Leah Ellis (ADF&G) asked if smolt passage through the rock reef groin will be evaluated during the fish entrainment and impingement study. Dr. MaryLouise Keefe (Kleinschmidt Associates) stated that the groin structure is part of the 2D model and that flow fields will be used and evaluated during the entrainment and impingement study.

Mr. Sean McDermott (National Marine Fisheries Service (NMFS)) asked if the calibration flows for the 2D model were complete, in terms of having a large enough range of flows for model calibration. Mr. Chuck Sauvageau (McMillen) described the site-specific stage-discharge relationship and rating curve. The 2D model is currently being calibrated for a range of flows using site-specific data. Mr. McDermott asked if there were any surprises in terms of the fish species observed that may affect entrainment. Ms. Audrey Thompson (Kleinschmidt Associates) replied that there were no surprises in terms of slow-moving resident fish in the intake vicinity. Mr. McDermott asked if there were any issues with interference or false detections of tags. Ms. Thompson stated that the receivers were set up in order to try to avoid this using different receiver frequencies and locations, and the data are currently being analyzed for false detection data. Mr. McDermott stated that downstream survival of smolts is key, and that the Project should meet NMFS passage criteria.

A question was asked in the meeting chat about whether fish survival through turbines decline over time due to the degradation of equipment. Mr. Sean Ellenson (McMillen) stated that if turbines were causing increased fish mortality, they would be overdue for being pulled for rehabilitation.

A question was asked in the meeting chat about whether the fish friendly turbines been used successful on rivers with large numbers of salmon such as the Nuyakuk. Mr. Sean Ellenson (McMillen) responded that the fish-friendly Kaplan turbines are used extensively in the Columbia

River system, where there are lots of salmon. Mr. Ellenson stated that he was unsure if this style of turbines had been used in systems with large numbers of Sockeye salmon.

Water Resources Studies

Mr. Chuck Sauvageau (McMillen) described the Water Quality study, which evaluated dissolved oxygen (DO) and water temperature in the Nuyakuk River. Mr. Sauvageau described the dissolved oxygen and water temperature data collection methods and results, compared to Alaska Department of Environmental Conservation (ADEC) water quality criteria. The Cooperative collected water temperature data from 2018-2021, and again from June 1-September 30, 2022. DO met ADEC criteria during the monitoring period. Overall, DO concentrations upstream and downstream of the Falls were similar overall with more fluctuation seen upstream of the falls. Water temperature was nearly always below 20 degrees C, with the exception of one exceedance in 2019 between July 5-11. In 2024, at ADF&G's request, DO monitoring will occur for 3-5 days during the period when large schools of adult sockeye salmon are staging at the base of Nuyakuk Falls.

Mr. Chuck Sauvageau (McMillen) described the Flow Duration Curve Assessment. A Project-specific gage was installed and will be used to more accurately define flow volumes used to generate flow duration curves at the Project site. The Project site gage at Nuyakuk Falls provides an excellent correlation with the USGS gage located at the outlet of Tikchik Lake into Nuyakuk River, 4.6 miles upstream of the Project site. The site-specific gage was installed when the Nuyakuk River was flowing at approximately 20,000 cfs, which resulted in an inability to install in a fashion where low flows during the winter months could be documented. That said, the USGS gage data at the lake outlet is available during this time. A follow-up effort was made toward the end of the field season to retrofit the gage by lowering the stilling well to enable data collection at lower flows and water levels. That work was successful. The non-stationarity detection tool developed by the U.S. Army Corps of Engineers will be used in 2024 to determine which time periods are most appropriate for developing flow duration curves for the Project-site.

Mr. Cam Wobus (CK Blueshift) provided an overview of the Future Flows Study. The Future Flows Study utilized a Global Change Model (GCM), made as site-specific as possible. Mr. Wobus presented a summary of MikeShe/Mike Hydro software package results. The model produces a flexible, integrated water-groundwater model with a choice of spatial and temporal scales and simple to complex solutions. The climate change model produced results showing decreased winter snowpack because more precipitation is projected to fall as rain, which leads to increased winter flows and decreased summer runoff by 2040, with more potential change by late century, depending on emissions scenarios.

Mr. Chuck Sauvageau (McMillen) presented an overview of the Ice Processes Assessment that is being conducted for the Project at the National Marine Fisheries Service's (NMFS's) request. The initial assessment includes a review of available imagery provided by NMFS, information gathering from a nearby hydroelectric project (Tazimina Falls) that has ice mitigation strategies, and collection of site-specific imagery near the proposed Project intake to assess frazil ice formation and ice breakup conditions at the Project site. The cameras failed to collect site-specific ice imagery during the winter of 2022/2023, likely due to harsh winter conditions at the Project site or a programming error. Additional, more weather-resistant cameras are now in place to capture ice conditions during the winter of 2023/2024. The Cooperative has had preliminary meetings with

George Hornberger, the General Manager of the Iliamna Newhalen Nondalton Electric Cooperative (INNEC), which owns and operates the Tazimina Falls Project that has been in service since 1998. Mr. Sauvageau showed some photographs of the Tazimina Falls Project, which included heated intake grates to minimize shutdowns from river icing. Mr. Will Chaney (Nushagak Cooperative) provided a summary of his conversations with Mr. Hornberger regarding the operations of Tazimina, where they have greatly reduced their diesel generation needs because they can produce electricity during periods of river icing due to the heated intake grates.

Water Resources Studies Questions and Discussion

Mr. Chuck Sauvageau (McMillen) stated a question in the meeting chat posed by Mr. Carl Reese (ADNR), asking if the Cooperative plans to operate within the existing ADF&G flow reservation LAS 28250 or request changes to the flow reservation. Mr. Sauvageau responded that the Cooperative needs to complete the Project feasibility assessment prior to making that decision. The Cooperative won't know the approach until the study program is complete.

Ms. Leah Ellis (ADF&G) commented that the Tazimina Falls Project has a natural fish barrier so there are no fish concerns with respect to the concrete groin. Ms. Ellis asked if the Cooperative had communicated with Igiugig regarding their in-river hydroelectric project. Mr. Chaney responded that the Cooperative works with Igiugig on the fiber project and corresponds with them, and that their hydroelectric project is a bit different but communication between the two entities occurs on a regular basis. Ms. Ellis asked about the stream gage and whether it was operated year-round. Mr. Chuck Sauvageau (McMillen) responded that it was, but that when it was installed at 20,000 cfs, the team could not see a bedrock shelf that was present below the gage, and the installation has since been adjusted slightly to measure water levels during lower river flow conditions in the winter. Ms. Ellis (ADF&G) inquired about the type of ice that's typically present at the Project site in the winter. Mr. Will Chaney (Nushagak Cooperative) stated that he suspects there is shelf ice with an open channel flowing during most of the winter. Ms. Ellis asked if the team plans to take wintertime discharge measurements. The Cooperative is not currently planning to due to logistical challenges. The Cooperative has conducted low flow discharge measurements down to 2,900 cfs, so additional data aren't necessary for 2D model calibration.

Mr. Pat Vermillion (Royal Coachman Lodge) asked how the Cooperative could suggest that diesel generation could be eliminated when wintertime river flows are low as 1,000 to 2,000 cfs. Mr. Will Chaney (Nushagak Cooperative) responded that there are scenarios where the Cooperative would be generating electricity by burning diesel fuel during low flow periods. However, the transmission lines that would be installed as part of the proposed Project would enable the more efficient diesel generators in Dillingham to supply the four outlying villages with electricity, thus negating the need to run the less efficient generators in those villages.

Mr. Bryan Nass (BBSRI) asked about the elevation of the groin and at what flows migrating smolts would encounter the groin. Mr. Sean Ellenson (McMillen) stated that the groin would be set at a relatively low elevation to raise the water level for generation during low flow periods, so most of the time, outmigrating smolts wouldn't encounter the groin. The groin may not be necessary as part of the Project, and the Cooperative will be evaluating the need for the structure.

Mr. Andy Angstman (Tikchik Narrows Lodge) stated that at least three lakes in the Tikchik Lake system are fed by glaciers, and once the glaciers are gone, summer flows may be affected and the

Cooperative should consider this factor. Mr. Cam Wobus (CK Blueshift) responded that glaciers were not specifically evaluated as a water source during the Future Flows Study, but that it's a good point. Mr. Will Chaney (Nushagak Cooperative) added that there is some information out there that could be utilized to assess glaciers. Mr. Pat Walsh, who retired from the Togiak National Wildlife Refuge, published a study about the retreat of the glaciers that may be able to be utilized (Walsh et al. 2015).

Mr. Cody Larson (BBNA) asked if the Cooperative would be modifying the natural resource study program to add a study to evaluate potential modifications to the ADF&G instream flow reservations. Mr. Chuck Sauvageau (McMillen) responded that any potential modifications to the ADF&G instream flow reservations would depend on the Project feasibility assessment results. The Cooperative will determine at a later time if revisions to the existing ADF&G instream flow reservations would be requested or necessary.

Terrestrial Resources Studies

Ms. Maria Lewis (MLP&A) presented the Wetlands and Botanical Study that was conducted for the Project. Ms. Lewis described the area studied and the data collected. The wetland delineation resulted in approximately 5 acres of wetlands within the nearly 90-acre study area. No non-native or invasive species were identified. One rare plant (*Primula spp.*) was potentially located in the Project study area, but the species identification was not certain and will be confirmed in 2024.

Ms. Lindsey Kendall (MLP&A) described the Caribou Population Evaluation that was conducted in 2023 to evaluate potential impacts to the Mulchatna Caribou Herd (MCH) in the proposed Project area. The study included a desktop literature review and analysis of survey & inventory (S&I) data collected by ADF&G. The study found that the Project may result in a small loss of habitat area, but it does not overlap current calving areas. A Terrestrial Resources Technical Working Group is being formed, and additional discussion regarding potential impacts to MCH will occur within that Technical Working Group.

Terrestrial Resources Studies Questions and Discussion

Mr. John Landsiedel (ADF&G) asked about subsistence hunting of caribou, and raised concerns about how caribou populations near the outlying villages may be affected by the proposed Project. Mr. Warnock (McMillen) mentioned that the Cooperative will be initiating Technical Working Groups (TWGs) for cultural, recreation, and terrestrial resources, and that anyone who is interested in discussing these resources should sign up for one or more of these TWGs.

Ms. Ali Eskelin (ADNR) stated that the airstrip isn't to scale and should be extended outside of the wetland study area to fully encompass the potential airstrip location. Ms. Eskelin discussed the placement of the transmission line and that the Cooperative may want to consider routing the line to Aleknagik through Ekwok which may have fewer impacts to caribou and improving the community's winter access routes between Aleknagik and the other outlying villages.

Mr. Cody Larson (BBNA) stated that traditional ecological knowledge may be useful to evaluate caribou use of the area, and that the subsistence study and terrestrial studies depend on one another. Mr. Cory Warnock (McMillen) agreed that the two studies will synergize and integrate with one another. Ms. Ingrid Brofman (FERC) asked for clarification on the discussion and how the studies

would be integrated. Mr. Warnock responded that there may be times that the Terrestrial and Cultural Resources TWGs would meet jointly, and that more information would be provided in the USR.

Ms. Leah Ellis (ADF&G) stated that the way the ISR is written, transmission lines may have a large or negligible impact on caribou populations. Ms. Ellis asked what else could be done to evaluate potential impacts to caribou. Mr. Cory Warnock (McMillen) suggested that Ms. Ellis join the Terrestrial Resources TWG to discuss the question further.

Cultural Resources Studies

Mr. Will Chaney (Nushagak Cooperative) provided an update regarding the implementation of the Subsistence Study. The Cooperative will utilize existing ADF&G data to assess current subsistence use and document potential impacts associated with the Project. The Cooperative has begun initial planning for the Subsistence Study including identifying the appropriate specialists to conduct the study, and the bulk of the study will be conducted in 2024.

Mr. Mike Yarborough (CRC Alaska) provided an overview of the Section 106 Evaluation that was conducted in 2023. A field investigation was conducted in a 90-acre study area, similar to the study area used by the Wetlands and Botanical Study. The survey and shovel testing identified several cultural resources, including the Nuyakuk portage trail, a pre-contact archaeological site, and two possible cache pits. The Project as currently proposed would likely not adversely affect either of the two potentially significant sites. Recent radiocarbon dating results of the artifacts at the Portage Trail site showed that the site likely dates back 3477 years. Mr. Yarborough stated that it's unlikely that any further field work needs to be conducted, but a significant amount of consultation will occur in 2024. A set of letters initiating cultural resources consultation was distributed in 2023 but received a limited response.

Cultural Resources Studies Questions/Discussion

Mr. Andy Angstman (Tikchik Narrows Lodge) stated that the Project infrastructure location appears to overlap the Portage Trail, thereby impacting the trail. Mr. Will Chaney (Nushagak Cooperative) responded that current Project conceptual design would be offset from the Portage Trail to avoid potential impacts. Mr. Sean Ellenson (McMillen) added that the tunnel will be located underground, thus reducing the potential for impacts to this resource. Ms. Ingrid Brofman (FERC) requested that the USR provide clarification on the Portage Trail location relative to the Project conceptual design.

Ms. Ingrid Brofman (FERC) asked if Local Research Assistants (LRAs) have been identified for the Subsistence Surveys. Mr. Will Chaney (Nushagak Cooperative) responded that there was an effort to involve community members in the study, which is still a goal for the study program. Ms. Brofman stated that hiring community members may be a long process.

Mr. Felipe Farley (BBNA) stated that there are burial sites all over Alaska and asked if the Cooperative plans to walk the Project site with local Tribal elders. Mr. Will Chaney (Nushagak Cooperative) responded that they can do that, and stated that he expects Koliganek may be most affected due to their village's proximity to the Project site.

Mr. Cody Larson (BBNA) asked if there were variances in the cultural studies from the Revised Study Plan (RSP), because the RSP was more detailed with respect to the Cultural Resources study than the ISR. Mr. Mike Yarborough (CRC Alaska) said he didn't think there were any variances. Mr. Larson stated that local knowledge and mapping usage of the area is important. He stated that comprehensive efforts to communicate and engaging with the Tribal governments is important. Mr. Warnock stated that the Cooperative is committed to all of the aforementioned items and plans to conduct the study as described in the RSP.

Ms. Ingrid Brofman (FERC) asked about the Area of Potential Effects (APE) as described in the RSP, stating that it seemed to be different in the ISR. In RSP, it was stated that the APE will be defined by consultation with FERC, SHPO, and Tribes. Ms. Brofman inquired as to the changes to the APE and the process that was used to revise it. Also, Ms. Brofman stated that the RSP says that the APE will be signed off on by SHPO prior to field surveys, but FERC is not aware of correspondence with SHPO. Mr. Mike Yarborough (CRC Alaska) responded saying that formal definition of the APE still needs to be completed which will include the appropriate consultation. Mr. Yarborough stated that the SHPO commented on the study plan and their comments were incorporated, but SHPO did not formally sign off on the APE following the RSP. Mr. Yarborough stated that the Cultural Resources Technical Working Group will be convened and will discuss the APE definition.

Ms. Ingrid Brofman (FERC) asked about the high and low sensitivity zones described in the Section 106 Evaluation and how those were identified. Ms. Aubrey Morrison (CRC Alaska) described the initial desktop analysis using LiDAR data, followed by an on-site evaluation of the site topography and characteristics via pedestrian transects, and how those were used for testing. Ms. Brofman asked for additional explanation about the low sensitivity areas and their characteristics in the USR. Ms. Brofman requested that the Cooperative host a call prior to January 30 to discuss the APE and Cultural Resources study. Mr. Cory Warnock (McMillen) confirmed that the Cooperative would organize a call as requested and would include both Ms. Brofman and Mr. Matt Cutlip (FERC).

Recreation and Aesthetic Studies

Mr. Dave Jones (SLR Consulting) presented the Noise Study. The study measured ambient sound levels at four locations near the proposed Project, modeled future sound levels, and investigated potential noise impacts from the Project including construction and operations. The study results show that the proposed Project is expected to have increased sound levels during the daytime only, near the Project site. No change in noise level is expected at the Royal Coachman Lodge. The study also evaluated the construction blasting noise and the aircraft operations associated with the proposed Project. Noise impacts due to blasting are anticipated to be infrequent and during daytime hours. Noise impacts due to aircraft operations will be significantly lower at the Royal Coachman Lodge compared to existing activities. The noise impacts due to long-term operations is expected to be extremely minimal.

Ms. Taryn Oleson-Yelle (R&M Alaska) provided a summary of the Recreation Inventory that was conducted during 2023. Recreation and intercept surveys were conducted in 2023. In 2024, study efforts will focus on resident surveys, based on paper and online surveys, as well as community visits to conduct in-person interviews in Spring 2024. Recreational business operator surveys will also be conducted in 2024.

Recreation and Aesthetic Studies Questions and Discussion

Ms. Ingrid Brofman (FERC) stated that the RSP listed objectives including identifying existing noise levels, sensitive wildlife habitats, and existing trails. Mr. Dave Jones (SLR) responded that the noise impacts were evaluated across the study area, which includes a noise model of the existing environment. Ms. Brofman stated that FERC was looking for the study to identify the sensitive wildlife, subsistence, or other locations in the ISR. Mr. Cory Warnock (McMillen) stated that he envisions a refinement of the noise study data to complete FERC's request for the noise study which will be presented in the USR. Ms. Brofman asked that the caribou habitat be mapped relative to noise impacts in the USR. If the noise impacts do not overlap caribou habitat, FERC would appreciate clear discussion of that finding. Ms. Brofman asked about noise impacts on the transmission line corridor, including construction. Mr. Jones responded that transmission line corridor noise impacts will be evaluated in 2024 and addressed in the USR.

Ms. Ingrid Brofman (FERC) asked about the schedule for recreation field work. Ms. Taryn Oleson-Yelle (R&M Alaska) discussed several variances based on schedules or schedule constraints with respect to the recreation surveys, and that the recreation surveys will be aligned with subsistence surveys to avoid survey fatigue. Ms. Brofman asked if paper and online surveys would be conducted, and Ms. Oleson-Yelle confirmed that both methods would be utilized to improve response success. Ms. Brofman stated that FERC would like to see metrics in the USR regarding response rates. Ms. Brofman asked about the consistency of non-recreation staff taking observations. Ms. Oleson-Yelle responded that the other study leads had been instructed to note recreation when observed and confirmed that only the one observation was reported via non-recreation staff. No recreation-specific surveys are planned for 2024. Mr. Cory Warnock (McMillen) added that a camp manager is on-site during the entire study period and will observe recreational activities in the area.

Mr. Pat Vermillion (Royal Coachman Lodge) asked about recreation hotspots and noise impact overlaps. Mr. Dave Jones (SLR Consulting) stated that a 3-decibel impact is barely perceptible. Ms. Taryn Oleson-Yelle (R&M Alaska) pointed out that the South Eddy recreation site would be most impacted by proposed Project noise. Mr. Jones added that sound attenuators can be added to the fans installed on the powerhouse to reduce noise impacts from the proposed Project.

Ms. Ali Eskelin (ADNR) stated that 2023 was abnormal due to the recreation season being very rainy which may have affected recreation use. Ms. Eskelin stated that next year's survey should ask about modifications to the state park and how recreation use would change due to Project implementation. Ms. Eskelin suggested that the Recreation Inventory should be a Recreation Study. Also, Ms. Eskelin stated that recreational use is very different during moose hunting season.

Mr. Pat Vermillion (Royal Coachman Lodge) asked how you quantify the loss of such a rare and beautiful spot and how the Cooperative will report on that impact in the USR. Ms. Taryn Oleson-Yelle (R&M Alaska) responded that survey data collection will inquire about the current value of the recreation resources, and once impacts are identified, then loss is quantified for the development of mitigation measures. Mr. Will Chaney (Nushagak Cooperative) responded that it is a rare and beautiful spot and impacts will be identified. The Cooperative's goal is to reduce impacts to the degree possible and provide mitigation measures as necessary.

Conceptual Project Design and Operations

Mr. Sean Ellenson (McMillen) described two alternatives that have been evaluated for design of the proposed Project. Alternative 1 will utilize 30% of the flow in the Falls for generation purposes (estimated at 9 MW peak), and Alternative 2 is based on projected future regional power needs (estimated at 14 MW peak). Mr Chaney and Mr. Ellenson emphasized that these scenarios were conducted to accurately document potential and were in no way meant to imply that the Cooperative was not cognizant of and adhering to the current Senate Bill 91 flow allowance. Mr. Ellenson showed summary graphs showing the potential power output of each alternative and flow remaining in the Falls in an average year. Mr. Ellenson also presented the variation in flow between dry, average, and wet years.

Conceptual Project Design and Operations Questions and Discussion

Ms. Ali Eskelin (ADNR) asked what the definition of a mature hydro project is. Mr. Will Chaney (Nushagak Cooperative) responded that maturity is achieved when the Project installation cost is paid off. The length of time for this to occur depends on grants, funding, and construction costs.

Ms. Leah Ellis (ADF&G) asked about the groin and under what conditions it would be needed. Mr. Ellenson responded that the groin, if needed, would only be visible during low flow conditions.

Ms. Ingrid Brofman (FERC) stated that the ISR indicated that data for the Environmental Justice study was collected but not yet analyzed. Ms. Brofman stated that new American Community Survey (ACS) datasets will be coming out in January 2024, and the Cooperative should utilize these data in their Environmental Justice study. Mr. Cory Warnock (McMillen) confirmed that the Cooperative will use the most recent datasets available.

Meeting Conclusion

Mr. Cory Warnock (McMillen) stated that Technical Working Groups for Terrestrial, Cultural, and Recreation resources will be started shortly, and people that are interested in these resources should sign the sheets in the entryway (if attending in-person) or email ljohnson@mcmillen.com (if attending virtually) to be included in the respective TWGs.

Mr. Cory Warnock (McMillen) provided an overview of the ILP timeline and milestones. Mr. Warnock described the FERC comment period associated with the ISR and ISR meeting, and also the ability to file comments about the Project at any time. Mr. Warnock described the community survey that the Cooperative has launched to gather additional input on the proposed Project. Mr. Will Chaney (Nushagak Cooperative) provided a conclusion statement to the meeting participants, including the need for the proposed Project and the cost and risks to Cooperative members of continuing to use diesel generation. The meeting adjourned at 5:58pm Alaska Time.

References

Walsh, P., D. Kaufman, T. McDaniel, and J. Chowdhry Beeman. 2015. Historical Retreat of

Alpine Glaciers in the Ahklun Mountains, Western Alaska. Journal of Fish and Wildlife Management, Vol. 6, Issue 1. June 2015.

Attachment A
ISR Meeting Participant Lists (Sign-in Sheet and Virtual Attendees)

[illegible]

1. Summary

Meeting title	Nuyakuk River Hydroelectric Project Initial Study Report Meeting (Afternoon)
Attended participants	70
Unidentified participants	1
Start time	12/05/23, 1:29:47 PM
End time	12/05/23, 10:11:04 PM
Meeting duration	8h 41m 17s
Average attendance time	3h 8m 20s

2. Participants

Name	First Join	Last Leave	In-Meeting Duration	Email	Participant ID (UPN)	Role
Aleknagik Traditional Council	12/05/23, 2:04:23 PM	12/05/23, 5:14:44 PM	3h 10m 20s			Presenter
Alice Ruby	12/05/23, 2:07:40 PM	12/05/23, 5:00:37 PM	2h 52m 57s	alice@bbedc.com	alice@bbedc.com	Presenter
Alisha Falberg - NOAA	12/05/23, 2:07:28 PM	12/05/23, 4:03:16 PM	1h 55m 47s			Presenter
Alvarez, Monica M (DNR)	12/05/23, 2:04:23 PM	12/05/23, 5:05:02 PM	3h 39s	monica.alvarez@alaska.gov	monica.alvarez@alaska.gov	Presenter
Andy Wink	12/05/23, 2:00:32 PM	12/05/23, 10:11:04 PM	8h 10m 32s			Presenter
Anna Sattler	12/05/23, 3:54:14 PM	12/05/23, 3:56:42 PM	2m 28s	asattler@avec.org	asattler@avec.org	Presenter
Aubrey Morrison Cultural Resource Consultants	12/05/23, 2:00:31 PM	12/05/23, 7:06:10 PM	5h 5m 38s			Presenter
Branden Bornemann	12/05/23, 2:07:28 PM	12/05/23, 6:49:05 PM	4h 41m 37s	branden.bornemann@TNC.ORG	branden.bornemann@TNC.ORG	Presenter
Cam Wobus	12/05/23, 2:58:03 PM	12/05/23, 4:53:06 PM	1h 55m 3s	cwobus@ckblueshift.com	cwobus@ckblueshift.com	Presenter
Cameron Poindexter	12/05/23, 2:07:44 PM	12/05/23, 5:34:47 PM	3h 27m 3s	cameron@choggiung.com	cameron@choggiung.com	Presenter
Conner Johns	12/05/23, 5:43:58 PM	12/05/23, 7:06:11 PM	1h 22m 12s			Presenter
Daniel Schindler	12/05/23, 2:28:43 PM	12/05/23, 3:58:42 PM	1h 29m 59s	deschind@uw.edu	deschind@uw.edu	Presenter
David M. Jones	12/05/23, 2:05:59 PM	12/05/23, 7:06:20 PM	4h 58m 46s	dmjones@slrconsulting.com	dmjones@slrconsulting.com	Presenter
Delores Larson	12/05/23, 2:04:22 PM	12/05/23, 3:36:04 PM	1h 31m 41s			Presenter
Dillon R. Bennett	12/05/23, 2:04:58 PM	12/05/23, 3:29:35 PM	1h 24m 36s	dbennett@bbahc.org	dbennett@bbahc.org	Presenter
Earl, Rob E (DNR)	12/05/23, 2:00:32 PM	12/05/23, 6:03:08 PM	4h 2m 35s	rob.earl@alaska.gov	rob.earl@alaska.gov	Presenter
Ellenson, Sean	12/05/23, 1:59:04 PM	12/05/23, 6:58:39 PM	4h 59m 35s	ellenson@mcmillen.com	ellenson@mcmillen.com	Presenter
Eskelin, Alison M (DNR)	12/05/23, 2:26:04 PM	12/05/23, 5:06:40 PM	1h 50m 10s	alison.eskelin@alaska.gov	alison.eskelin@alaska.gov	Presenter
Felipe Farley	12/05/23, 2:04:23 PM	12/05/23, 6:58:39 PM	4h 54m 16s	felipe.farley@bbna.com	felipe.farley@bbna.com	Presenter
Gease, Ricky John (DNR)	12/05/23, 2:07:00 PM	12/05/23, 6:55:09 PM	4h 48m 8s	ricky.gease@alaska.gov	ricky.gease@alaska.gov	Presenter
George Gilmour	12/05/23, 2:04:23 PM	12/05/23, 3:37:34 PM	1h 29m 15s	ggilmour@meridianenv.onmicrosoft.com	ggilmour@meridianenv.onmicrosoft.com	Presenter
Golbahar Mirhosseini	12/05/23, 2:00:32 PM	12/05/23, 7:00:02 PM	4h 59m 30s	Golbahar.Mirhosseini@ferc.gov	Golbahar.Mirhosseini@ferc.gov	Presenter
Gundelfinger, Clint E (DNR)	12/05/23, 2:00:32 PM	12/05/23, 6:13:21 PM	4h 12m 49s	clint.gundelfinger@alaska.gov	clint.gundelfinger@alaska.gov	Presenter
Ingrid Brofman	12/05/23, 2:03:17 PM	12/05/23, 7:00:40 PM	4h 53m 24s	Ingrid.Brofman@ferc.gov	Ingrid.Brofman@ferc.gov	Presenter
Isha Deo	12/05/23, 2:04:22 PM	12/05/23, 4:45:00 PM	2h 40m 37s	Isha.Deo@Kleinschmidtgroup.com	Isha.Deo@KleinschmidtGroup.com	Presenter
John & Sonja Marx	12/05/23, 6:55:12 PM	12/05/23, 7:06:14 PM	11m 1s			Presenter
Johnson, Laura	12/05/23, 1:30:10 PM	12/05/23, 7:00:09 PM	5h 29m 58s	ljohnson@mcmillen.com	ljohnson@mcmillen.com	Organizer
Kastning, Andrew C (DFG)	12/05/23, 2:04:22 PM	12/05/23, 5:38:33 PM	2h 4m 7s	andrew.kastning@alaska.gov	andrew.kastning@alaska.gov	Presenter
Katherine	12/05/23, 2:00:31 PM	12/05/23, 7:05:36 PM	5h 5m 4s			Presenter
Klein, Joseph P (DFG)	12/05/23, 2:04:23 PM	12/05/23, 7:00:23 PM	4h 56m	joe.klein@alaska.gov	joe.klein@alaska.gov	Presenter
Kristina Andrew	12/05/23, 2:15:10 PM	12/05/23, 5:04:57 PM	2h 49m 46s	krandrew@bbna.com	krandrew@bbna.com	Presenter
Lacroix, Matthew	12/05/23, 2:04:23 PM	12/05/23, 6:58:39 PM	4h 54m 15s	LaCroix.Matthew@epa.gov	LaCroix.Matthew@epa.gov	Presenter
Laib Allensworth	12/05/23, 2:17:55 PM	12/05/23, 3:46:47 PM	1h 28m 52s	Laib.Allensworth@akleg.gov	Laib.Allensworth@akleg.gov	Presenter
lindsey.saxon.kendall	12/05/23, 2:00:32 PM	12/05/23, 2:00:39 PM	7s	lindsey.saxon.kendall@gmail.com	lindsey.saxon.kendall_gmail.com#EXT	Presenter
Maria Lewis	12/05/23, 2:00:32 PM	12/05/23, 7:01:51 PM	5h 1m 19s			Presenter

Mark Bielefeld	12/05/23, 2:04:23 PM	12/05/23, 5:11:55 PM	3h 7m 32s	mark@choggiung.com	mark@choggiung.com	Presenter
MaryLouise Keefe	12/05/23, 5:34:36 PM	12/05/23, 6:38:45 PM	1h 4m 9s	MaryLouise.Keefe@kleinschmidtgroup.com	MaryLouise.Keefe@KleinschmidtGroup.com	Presenter
Matt Cutlip	12/05/23, 2:02:19 PM	12/05/23, 6:41:28 PM	4h 39m 8s	Matt.Cutlip@ferc.gov	matt.cutlip@ferc.gov	Presenter
Megan Condon	12/05/23, 2:07:28 PM	12/05/23, 7:00:05 PM	4h 52m 37s	MCondon@narf.org	MCondon@narf.org	Presenter
Meitl, Sarah J (DNR)	12/05/23, 2:04:22 PM	12/05/23, 5:07:03 PM	3h 2m 41s	sarah.meitl@alaska.gov	sarah.meitl@alaska.gov	Presenter
Michael Rovito	12/05/23, 2:17:07 PM	12/05/23, 2:58:06 PM	40m 58s	MRovito@alaskapower.org	MRovito@alaskapower.org	Presenter
Mike Yarborough (Guest)	12/05/23, 2:00:31 PM	12/05/23, 7:00:33 PM	5h 2s			Presenter
Mischa Ellanna	12/05/23, 2:07:28 PM	12/05/23, 6:45:50 PM	4h 4m 34s	mellanna@bbnc.net	mellanna@BBNC.NET	Presenter
Noble Hendrix	12/05/23, 2:00:32 PM	12/05/23, 7:06:15 PM	5h 5m 43s	noble@qedaconsulting.com	noble@qedaconsulting.com	Presenter
O'Neal, Sarah	12/05/23, 2:11:51 PM	12/05/23, 3:40:35 PM	1h 28m 44s	Sarah.O_Neal@evergreen.edu	Sarah.O_Neal@evergreen.edu	Presenter
Pat Vermillion	12/05/23, 2:33:03 PM	12/05/23, 6:59:57 PM	4h 26m 54s			Presenter
Patricia Buholm	12/05/23, 2:34:01 PM	12/05/23, 4:29:10 PM	1h 51m 1s	planner@dillinghamak.us	planner@dillinghamak.us	Presenter
Reese, Carl D (DNR)	12/05/23, 2:08:28 PM	12/05/23, 4:54:09 PM	2h 45m 40s	carl.reese@alaska.gov	carl.reese@alaska.gov	Presenter
Rinaldi, Todd A (DFG)	12/05/23, 2:36:02 PM	12/05/23, 5:20:14 PM	2h 44m 12s	todd.rinaldi@alaska.gov	todd.rinaldi@alaska.gov	Presenter
Romo, Natalie R (DFG)	12/05/23, 2:04:22 PM	12/05/23, 6:04:09 PM	3h 59m 47s	natalie.romo@alaska.gov	natalie.romo@alaska.gov	Presenter
Sager, Kimberly R (DNR)	12/05/23, 2:15:47 PM	12/05/23, 5:21:54 PM	3h 6m 6s	kimberly.sager@alaska.gov	kimberly.sager@alaska.gov	Presenter
Sauvageau, Charles	12/05/23, 1:31:08 PM	12/05/23, 7:06:44 PM	5h 35m 35s	Sauvageau@mcmillen.com	Sauvageau@mcmillen.com	Presenter
Shryock, Benjamin (DNR)	12/05/23, 2:00:32 PM	12/05/23, 6:02:46 PM	3h 51m 21s	benjamin.shryock@alaska.gov	benjamin.shryock@alaska.gov	Presenter
Taryn Oleson-Yelle	12/05/23, 2:00:31 PM	12/05/23, 7:06:14 PM	5h 5m 42s	TOleson@rmconsult.com	TOleson@rmconsult.com	Presenter
Tiffany Phelan	12/05/23, 2:00:31 PM	12/05/23, 6:57:36 PM	4h 57m 4s			Presenter
Vega, Stacy L (DFG)	12/05/23, 2:00:31 PM	12/05/23, 2:49:33 PM	49m 1s	stacy.vega@alaska.gov	stacy.vega@alaska.gov	Presenter
Wanda Wahl	12/05/23, 2:10:25 PM	12/05/23, 6:58:29 PM	4h 41m 48s	wjwahl@alaska.edu	wjwahl@alaska.edu	Presenter
Warnock, Cory	12/05/23, 1:29:52 PM	12/05/23, 7:06:48 PM	5h 35m 48s	Warnock@mcmillen.com	Warnock@mcmillen.com	Presenter
Warren E. Downs	12/05/23, 2:04:23 PM	12/05/23, 6:24:57 PM	4h 20m 34s	warren@choggiung.com	warren@choggiung.com	Presenter
	14062232994	12/05/23, 2:00:40 PM	12/05/23, 4:25:50 PM	2h 25m 9s		Attendee
	19078431713	12/05/23, 2:00:40 PM	12/05/23, 4:17:02 PM	2h 13m 28s		Attendee
	19078422080	12/05/23, 2:04:31 PM	12/05/23, 5:26:50 PM	3h 22m 19s		Attendee
	19078431045	12/05/23, 2:04:31 PM	12/05/23, 4:01:12 PM	1h 45m 55s		Attendee
	19074932121	12/05/23, 2:06:08 PM	12/05/23, 3:12:27 PM	59m 41s		Attendee
	13609184352	12/05/23, 2:08:31 PM	12/05/23, 4:21:00 PM	8m 59s		Attendee
	19078431040	12/05/23, 2:34:10 PM	12/05/23, 4:41:00 PM	2h 6m 50s		Attendee
	19075966018	12/05/23, 3:23:58 PM	12/05/23, 4:06:28 PM	40m 39s		Attendee
	19078431905	12/05/23, 4:15:30 PM	12/05/23, 4:19:36 PM	4m 6s		Attendee

3. In-Meeting Activities

Name	Join Time	Leave Time	Duration	Email	Role
Johnson, Laura	12/05/23, 1:30:10 PM	12/05/23, 7:00:09 PM	5h 29m 58s	ljohnson@mcmillen.com	Organizer
Warnock, Cory	12/05/23, 1:29:52 PM	12/05/23, 1:51:58 PM	22m 5s	Warnock@mcmillen.com	Presenter
Warnock, Cory	12/05/23, 1:53:04 PM	12/05/23, 7:06:48 PM	5h 13m 43s	Warnock@mcmillen.com	Presenter
Sauvageau, Charles	12/05/23, 1:31:08 PM	12/05/23, 7:06:44 PM	5h 35m 35s	Sauvageau@mcmillen.com	Presenter

		13607391887	12/05/23, 1:42:08 PM	12/05/23, 1:43:01 PM	52s		Attendee
Ellenson, Sean	12/05/23, 1:59:04 PM	12/05/23, 6:58:39 PM	4h 59m 35s	ellenson@mcmillen.com	Presenter		
Mike Yarborough (Guest)	12/05/23, 2:00:31 PM	12/05/23, 7:00:33 PM	5h 2s		Presenter		
Vega, Stacy L (DFG)	12/05/23, 2:00:31 PM	12/05/23, 2:49:33 PM	49m 1s	stacy.vega@alaska.gov	Presenter		
Katherine	12/05/23, 2:00:31 PM	12/05/23, 7:05:36 PM	5h 5m 4s		Presenter		
Aubrey Morrison Cultural							
Resource Consultants	12/05/23, 2:00:31 PM	12/05/23, 7:06:10 PM	5h 5m 38s		Presenter		
Taryn Oleson-Yelle	12/05/23, 2:00:31 PM	12/05/23, 7:06:14 PM	5h 5m 42s	TOleson@rmconsult.com	Presenter		
Tiffany Phelan	12/05/23, 2:00:31 PM	12/05/23, 6:57:36 PM	4h 57m 4s		Presenter		
Andy Wink	12/05/23, 2:00:32 PM	12/05/23, 10:11:04 PM	8h 10m 32s		Presenter		
lindsey.saxon.kendall	12/05/23, 2:00:32 PM	12/05/23, 2:00:39 PM	7s	lindsey.saxon.kendall@gmail.com	Presenter		
Gundelfinger, Clint E (DNR)	12/05/23, 2:00:32 PM	12/05/23, 6:13:21 PM	4h 12m 49s	clint.gundelfinger@alaska.gov	Presenter		
Maria Lewis	12/05/23, 2:00:32 PM	12/05/23, 7:01:51 PM	5h 1m 19s		Presenter		
Earl, Rob E (DNR)	12/05/23, 2:00:32 PM	12/05/23, 6:03:08 PM	4h 2m 35s	rob.earl@alaska.gov	Presenter		
Golbahar Mirhosseini	12/05/23, 2:00:32 PM	12/05/23, 7:00:02 PM	4h 59m 30s	Golbahar.Mirhosseini@ferc.gov	Presenter		
Shryock, Benjamin (DNR)	12/05/23, 2:00:32 PM	12/05/23, 3:30:21 PM	1h 29m 49s	benjamin.shryock@alaska.gov	Presenter		
Shryock, Benjamin (DNR)	12/05/23, 3:33:02 PM	12/05/23, 5:28:30 PM	1h 55m 28s	benjamin.shryock@alaska.gov	Presenter		
Shryock, Benjamin (DNR)	12/05/23, 5:36:42 PM	12/05/23, 6:02:46 PM	26m 4s	benjamin.shryock@alaska.gov	Presenter		
Noble Hendrix	12/05/23, 2:00:32 PM	12/05/23, 7:06:15 PM	5h 5m 43s	noble@qedaconsulting.com	Presenter		
			12/05/23,				
	14062232994	12/05/23, 2:00:40 PM	4:25:50 PM	2h 25m 9s			Attendee
			12/05/23,				
	19078431713	12/05/23, 2:00:40 PM	2:14:51 PM	14m 11s			Attendee
			12/05/23,				
	19078431713	12/05/23, 2:17:45 PM	4:17:02 PM	1h 59m 17s			Attendee
Matt Cutlip	12/05/23, 2:02:19 PM	12/05/23, 6:41:28 PM	4h 39m 8s	Matt.Cutlip@ferc.gov	Presenter		
Ingrid Brofman	12/05/23, 2:03:17 PM	12/05/23, 2:05:09 PM	1m 52s	Ingrid.Brofman@ferc.gov	Presenter		
Ingrid Brofman	12/05/23, 2:05:40 PM	12/05/23, 2:07:07 PM	1m 27s	Ingrid.Brofman@ferc.gov	Presenter		
Ingrid Brofman	12/05/23, 2:08:22 PM	12/05/23, 2:14:17 PM	5m 54s	Ingrid.Brofman@ferc.gov	Presenter		
Ingrid Brofman	12/05/23, 2:14:28 PM	12/05/23, 2:15:54 PM	1m 26s	Ingrid.Brofman@ferc.gov	Presenter		
Ingrid Brofman		12/05/23, 2:17:54 PM		Ingrid.Brofman@ferc.gov	Presenter		
Ingrid Brofman	12/05/23, 2:17:54 PM	12/05/23, 7:00:40 PM	4h 42m 45s	Ingrid.Brofman@ferc.gov	Presenter		
Meitl, Sarah J (DNR)	12/05/23, 2:04:22 PM	12/05/23, 5:07:03 PM	3h 2m 41s	sarah.meitl@alaska.gov	Presenter		
Kastning, Andrew C (DFG)	12/05/23, 2:04:22 PM	12/05/23, 2:59:59 PM	55m 36s	andrew.kastning@alaska.gov	Presenter		
Kastning, Andrew C (DFG)	12/05/23, 4:30:01 PM	12/05/23, 5:38:33 PM	1h 8m 31s	andrew.kastning@alaska.gov	Presenter		
Romo, Natalie R (DFG)	12/05/23, 2:04:22 PM	12/05/23, 6:04:09 PM	3h 59m 47s	natalie.romo@alaska.gov	Presenter		
Delores Larson	12/05/23, 2:04:22 PM	12/05/23, 3:36:04 PM	1h 31m 41s		Presenter		
Isha Deo	12/05/23, 2:04:22 PM	12/05/23, 4:45:00 PM	2h 40m 37s	Isha.Deo@Kleinschmidtgroup.com	Presenter		
Alvarez, Monica M (DNR)	12/05/23, 2:04:23 PM	12/05/23, 5:05:02 PM	3h 39s	monica.alvarez@alaska.gov	Presenter		
Lacroix, Matthew	12/05/23, 2:04:23 PM	12/05/23, 6:58:39 PM	4h 54m 15s	LaCroix.Matthew@epa.gov	Presenter		
Felipe Farley	12/05/23, 2:04:23 PM	12/05/23, 6:58:39 PM	4h 54m 16s	felipe.farley@bbna.com	Presenter		
Mark Bielefeld	12/05/23, 2:04:23 PM	12/05/23, 5:11:55 PM	3h 7m 32s	mark@choggiung.com	Presenter		
Warren E. Downs	12/05/23, 2:04:23 PM	12/05/23, 6:24:57 PM	4h 20m 34s	warren@choggiung.com	Presenter		
Klein, Joseph P (DFG)	12/05/23, 2:04:23 PM	12/05/23, 7:00:23 PM	4h 56m	joe.klein@alaska.gov	Presenter		
Aleknagik Traditional Council	12/05/23, 2:04:23 PM	12/05/23, 5:14:44 PM	3h 10m 20s		Presenter		
George Gilmour	12/05/23, 2:04:23 PM	12/05/23, 2:33:32 PM	29m 9s	ggilmour@meridianenv.onmicrosoft.c	Presenter		
George Gilmour	12/05/23, 2:35:01 PM	12/05/23, 3:24:31 PM	49m 30s	ggilmour@meridianenv.onmicrosoft.c	Presenter		

George Gilmour	12/05/23, 3:26:57 PM	12/05/23, 3:37:34 PM	10m 36s	ggilmour@meridianenv.onmicrosoft.c	Presenter	
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Dillon R. Bennett	12/05/23, 2:04:58 PM	12/05/23, 3:29:35 PM	1h 24m 36s	dbennett@bbahc.org	Presenter	
David M. Jones	12/05/23, 2:05:59 PM	12/05/23, 2:18:01 PM	12m 2s	dmjones@slrconsulting.com	Presenter	
David M. Jones	12/05/23, 2:19:36 PM	12/05/23, 7:06:20 PM	4h 46m 44s	dmjones@slrconsulting.com	Presenter	
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	19074932121	12/05/23, 2:21:07 PM	12/05/23, 3:12:27 PM	51m 19s		Attendee
Gease, Ricky John (DNR)	12/05/23, 2:07:00 PM	12/05/23, 6:55:09 PM	4h 48m 8s	ricky.gease@alaska.gov	Presenter	
Megan Condon	12/05/23, 2:07:28 PM	12/05/23, 7:00:05 PM	4h 52m 37s	MCondon@narf.org	Presenter	
Branden Bornemann	12/05/23, 2:07:28 PM	12/05/23, 6:49:05 PM	4h 41m 37s	branden.bornemann@TNC.ORG	Presenter	
Mischa Ellanna	12/05/23, 2:07:28 PM	12/05/23, 5:35:14 PM	3h 27m 45s	mellanna@bbnc.net	Presenter	
Mischa Ellanna	12/05/23, 6:09:00 PM	12/05/23, 6:45:50 PM	36m 49s	mellanna@bbnc.net	Presenter	
Alisha Falberg - NOAA	12/05/23, 2:07:28 PM	12/05/23, 4:03:16 PM	1h 55m 47s		Presenter	
Alice Ruby	12/05/23, 2:07:40 PM	12/05/23, 5:00:37 PM	2h 52m 57s	alice@bbcdc.com	Presenter	
Cameron Poindexter	12/05/23, 2:07:44 PM	12/05/23, 5:34:47 PM	3h 27m 3s	cameron@choggiung.com	Presenter	
Reese, Carl D (DNR)	12/05/23, 2:08:28 PM	12/05/23, 4:54:09 PM	2h 45m 40s	carl.reese@alaska.gov	Presenter	
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	13609184352	12/05/23, 3:40:08 PM	12/05/23, 3:44:26 PM	4m 17s		Attendee
	13609184352	12/05/23, 4:19:39 PM	12/05/23, 4:21:00 PM	1m 21s		Attendee
Wanda Wahl	12/05/23, 2:10:25 PM	12/05/23, 6:34:45 PM	4h 24m 20s	wjwahl@alaska.edu	Presenter	
Wanda Wahl	12/05/23, 6:41:01 PM	12/05/23, 6:58:29 PM	17m 28s	wjwahl@alaska.edu	Presenter	
O'Neal, Sarah	12/05/23, 2:11:51 PM	12/05/23, 3:40:35 PM	1h 28m 44s	Sarah.O_Neal@evergreen.edu	Presenter	
Kristina Andrew	12/05/23, 2:15:10 PM	12/05/23, 5:04:57 PM	2h 49m 46s	krandrew@bbna.com	Presenter	
Sager, Kimberly R (DNR)	12/05/23, 2:15:47 PM	12/05/23, 5:21:54 PM	3h 6m 6s	kimberly.sager@alaska.gov	Presenter	
Michael Rovito	12/05/23, 2:17:07 PM	12/05/23, 2:58:06 PM	40m 58s	MRovito@alaskapower.org	Presenter	
Laib Allensworth	12/05/23, 2:17:55 PM	12/05/23, 3:46:47 PM	1h 28m 52s	Laib.Allensworth@akleg.gov	Presenter	
Eskelin, Alison M (DNR)	12/05/23, 2:26:04 PM	12/05/23, 3:03:47 PM	37m 43s	alison.eskelin@alaska.gov	Presenter	
Eskelin, Alison M (DNR)	12/05/23, 3:07:30 PM	12/05/23, 3:31:11 PM	23m 41s	alison.eskelin@alaska.gov	Presenter	
Eskelin, Alison M (DNR)	12/05/23, 4:17:53 PM	12/05/23, 5:06:40 PM	48m 46s	alison.eskelin@alaska.gov	Presenter	
Daniel Schindler	12/05/23, 2:28:43 PM	12/05/23, 3:58:42 PM	1h 29m 59s	deschind@uw.edu	Presenter	
Pat Vermillion	12/05/23, 2:33:03 PM	12/05/23, 6:59:57 PM	4h 26m 54s		Presenter	
Patricia Buholm	12/05/23, 2:34:01 PM	12/05/23, 3:46:10 PM	1h 12m 9s	planner@dillinghamak.us	Presenter	
Patricia Buholm	12/05/23, 3:50:17 PM	12/05/23, 4:29:10 PM	38m 52s	planner@dillinghamak.us	Presenter	
	19078431040	12/05/23, 2:34:10 PM	12/05/23, 4:41:00 PM	2h 6m 50s		Attendee
Rinaldi, Todd A (DFG)	12/05/23, 2:36:02 PM	12/05/23, 5:20:14 PM	2h 44m 12s	todd.rinaldi@alaska.gov	Presenter	
Cam Wobus	12/05/23, 2:58:03 PM	12/05/23, 4:53:06 PM	1h 55m 3s	cwobus@ckblueshift.com	Presenter	
	19075966018	12/05/23, 3:23:58 PM	12/05/23, 3:46:26 PM	22m 27s		Attendee

Anna Sattler	19075966018	12/05/23, 3:48:16 PM	12/05/23, 3:56:42 PM	12/05/23, 4:06:28 PM	18m 12s asattler@avec.org	Presenter	Attendee
MaryLouise Keefe	19078431905	12/05/23, 4:15:30 PM	12/05/23, 6:38:45 PM	12/05/23, 4:19:36 PM	4m 6s	Presenter	Attendee
Conner Johns		12/05/23, 5:34:36 PM	12/05/23, 7:06:11 PM	1h 4m 9s	MaryLouise.Keefe@kleinschmidtgroup	Presenter	
John & Sonja Marx		12/05/23, 5:43:58 PM	12/05/23, 7:06:14 PM	1h 22m 12s		Presenter	
		12/05/23, 6:55:12 PM		11m 1s		Presenter	

Attachment B
Initial Study Report Meeting Presentation

Nuyakuk River Hydroelectric Project (P-14873)

Initial Study Report (ISR) Meeting

December 5, 2023



LOGISTICS

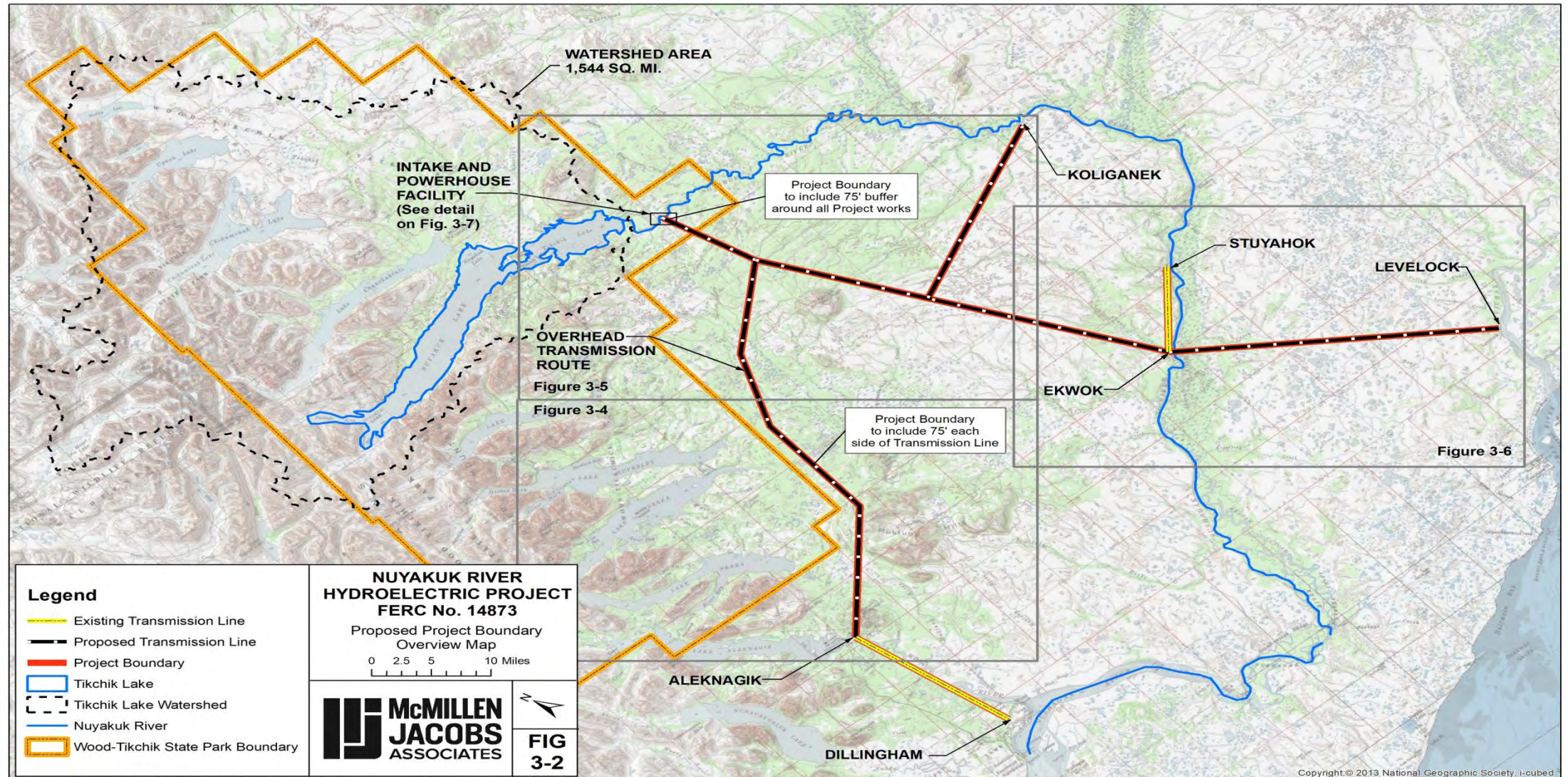
- Refreshments
- Bathrooms
- Meeting Recording
- Sign-in Sheet
- RWG Sign-up Sheets

MEETING INTENT

- FERC input – Matt Cutlip
- Describe results from all studies conducted in 2023
 - Prelude to your respective reviews
- Intent of ISR
- Reminder of current Project concept
- Questions and comments on work conducted and results
 - State your name
- Describe plans for 2024
- Formation of additional technical working groups
- Lay out the remainder of the FERC process
 - Key milestones into the future
- Discuss upcoming future meetings, communications w/FERC, opportunities for informal input
- Global questions and comments

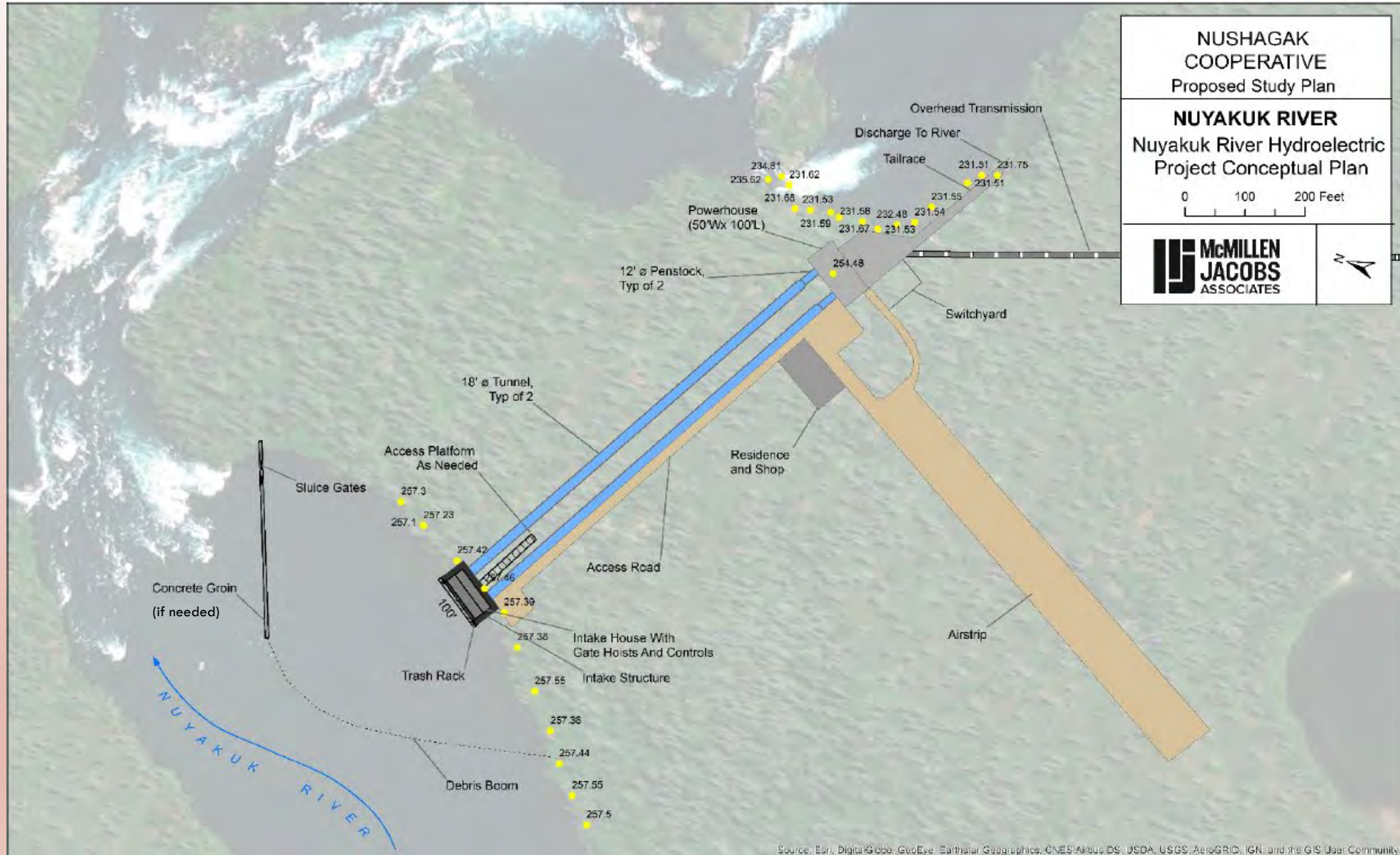


PROJECT AREA



KEY PROJECT FEATURES

- Currently proposed between 10-14MW
- No dam – utilization of existing natural control
- Limited footprint and short bypass reach through limited aquatic habitat zone
- No lengthy access roads necessary – Air or via river
- Highest annual flows coincide with peak run timing for key salmonid species, renewable hydro generation would allow for power production for 100% of the fish processing effort
- As currently conceptualized, would take Dillingham/Aleknagik and four remote villages almost completely off fossil fuel generation annually
- Based on analysis, most appealing renewable option in the region. Multiple options have been analyzed over the past 10 years



KEY DEVELOPMENTS OVER THE PAST YEAR

- Collaborative ARWG and public involvement related to technical study plan improvements (collective development, review and commenting)
 - Bi-monthly ARWG meetings
 - Website updates and emails to contact list throughout process
 - Review/comment period associated with the RSP
- Geotechnical analysis
- Biological study camp established
- All requisite natural resource permit applications submitted
 - ADNR Land-use Permit
 - ADFG Fish Habitat Permit
 - ADFG Fish Resource Permit
- 2023 Study season completed
- Development of life cycle and economic models
- Cooperative agreements reached with BBSRI, BBNA and NMFS related to certain study elements
- Multiple ARWG and public meetings along with presentation at relevant regional conferences

PROJECT GOALS

- Respect the environment and all local/regional interests
- At the current phase – Assess the feasibility of the Project via:
 - Natural resource studies
 - Geotechnical evaluations
 - Preliminary design concepts
 - Dialogue with the local and regional stakeholders
- Use the best possible science and regional experts to assess feasibility
- If deemed environmentally feasible, the Project will
 - Significantly reduce (if not eliminate) current reliance on fossil fuel resources for electricity
 - Represent a long-term, renewable power source for the region
 - Lower power rates, over time
 - Provide short and long-term employment opportunities for the region
- Consistently collaborate with, inform and involve all interested regional individuals, Tribal entities, and public interest groups throughout the process

2023 STUDY RESULTS

NATURAL RESOURCE STUDY PROGRAM

➤ Fisheries/Aquatics

- Fish Community and Behavior Near the Project Area
- Falls Fish Passage Study
- Entrainment and Impingement Study
- Tailrace False Attraction Evaluation
- Chinook and Sockeye Life Cycle Modeling
- Integrated Risk Assessment of Fish Populations

➤ Water Resources

- Dissolved Oxygen and Water Temperature Focus
- Flow Duration Curve/Stationarity Assessment*
- Future Flows Study*
- Ice Processes Assessment

➤ Terrestrial

- Botanical Impact Assessment
- Wetlands Impact Assessment
- Caribou Population Evaluation

➤ Cultural

- Subsistence Study
- Section 106 Evaluation

➤ Recreation and Aesthetics

- Noise Study
- Recreation Inventory

**Voluntary study, not required by FERC*

FISHERIES/AQUATICS

FISH COMMUNITY AND BEHAVIOR NEAR THE PROJECT AREA

Methods

- Underwater Video
- Snorkel Surveys (stage dependent)
- Net/ trap sampling
- Predator Angling
- Observation Tower [BBSRI]
- Sonar Smolt Monitoring

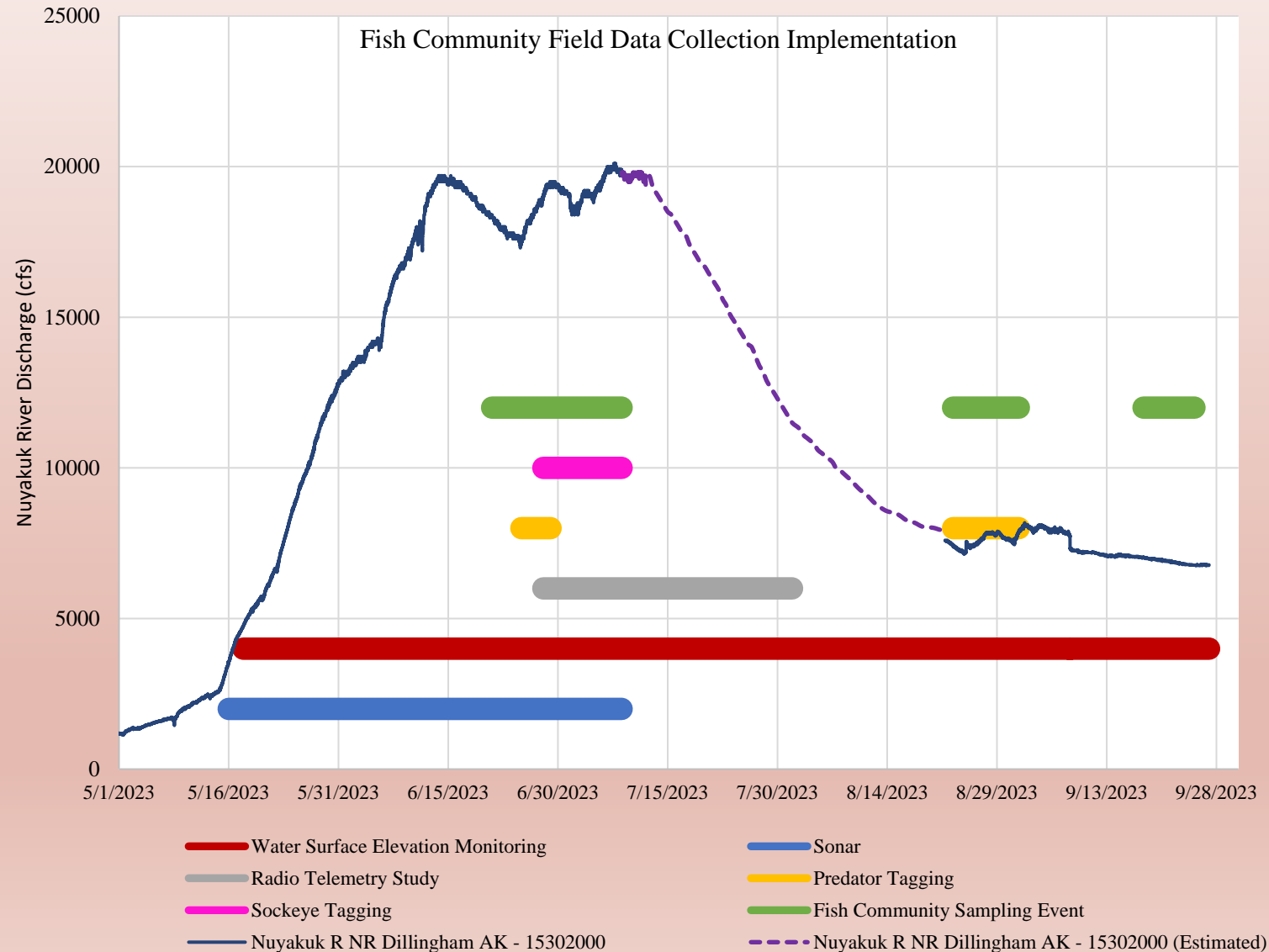
FISH COMMUNITY AND BEHAVIOR NEAR THE PROJECT AREA

Results

Common Name	Species Name	Life Stage	Project Zone	Encounter Method	Observation Period
Chinook Salmon	<i>Oncorhynchus tshawytscha</i>	fry	1	SE, VO	June 15-July 16
		smolt	1, 2, 3	SE, VO	June 15-Aug 15
		adult	2	VO	July 2
Sockeye Salmon	<i>Oncorhynchus nerka</i>	fry	1, 2, 3	SE, VO, MT	May 15-Sept 30
		smolt	1, 2, 3	SE, VO, MT	May 15-Sept 30
		adult	1, 2, 3	GN, AN, VO	June 15-Aug 30
Grayling	<i>Thymallus thymallus</i>	adult	1, 2, 3	AN, VO	June 15-Aug 30
		juvenile	1, 3	VO	Aug 28-Sept 1
		smolt	1	SE	Aug 26
Pink Salmon	<i>Oncorhynchus gorbuscha</i>	fry	1, 3	SE, VO	June 15-July 15
Coho Salmon	<i>Oncorhynchus kisutch</i>	fry	1, 3	MT, SE	June 24
		smolt	1, 3	SE	June 25-Aug 15
Arctic Lamprey	<i>Lampetra camtschatica</i>	smolt	1	MT	June 24
Chum Salmon	<i>Oncorhynchus keta</i>	adult	1	VO	July 4
Pike	<i>Esox lucius</i>	adult	3	VO	June 15-Sept 30
		juvenile	1	SE	Aug 26
Humpback Whitefish	<i>Coregonus pidschian</i>	juvenile	1	SE	June 25
Pygmy Whitefish	<i>Prosopium coulterii</i>	juvenile	1, 3	SE	June 30-Sept 30
Burbot	<i>Lota coulter</i>		3	MT	Aug 23
Sculpin ³	<i>Cottoidea</i>	juvenile	1, 3	SE	June 25
		adult	1, 3	MT	June 30-Sept 30
Lake Trout	<i>Salvelinus namaycush</i>	adult	2	AN	Aug 25
Rainbow Trout	<i>Oncorhynchus mykiss</i>	adult	1, 2, 3	AN	May 15-Sept 30
3 Spined Stickleback	<i>Gasterosteus aculeatus</i>	adult	1, 2, 3	SE	May 15-Sept 30
9 Spined Stickleback	<i>Pungitius pungitius</i>	adult	1, 2, 3	SE	May 15-Sept 30

FISH COMMUNITY AND BEHAVIOR NEAR THE PROJECT AREA

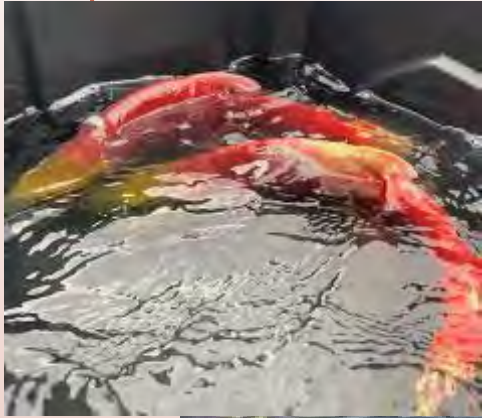
Results



FISH COMMUNITY AND BEHAVIOR NEAR THE PROJECT AREA

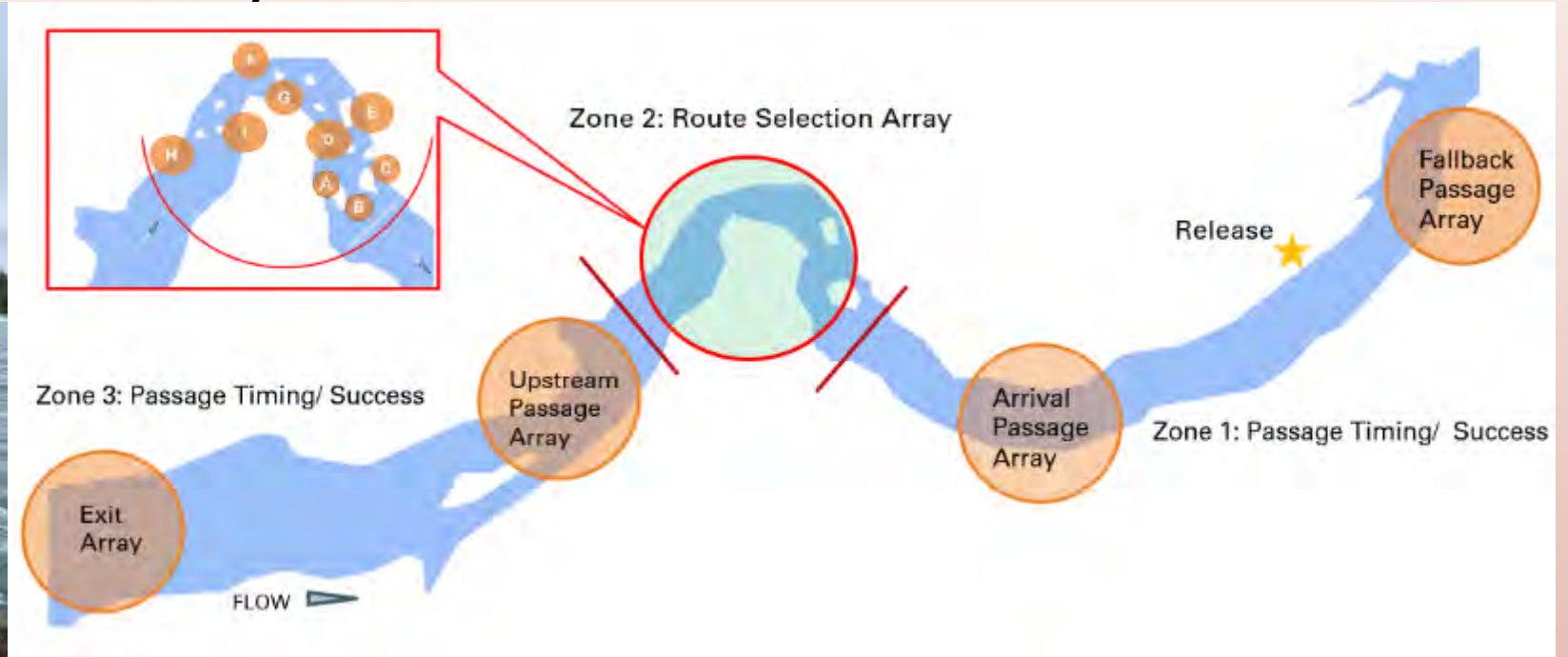


FISH COMMUNITY AND BEHAVIOR NEAR THE PROJECT AREA



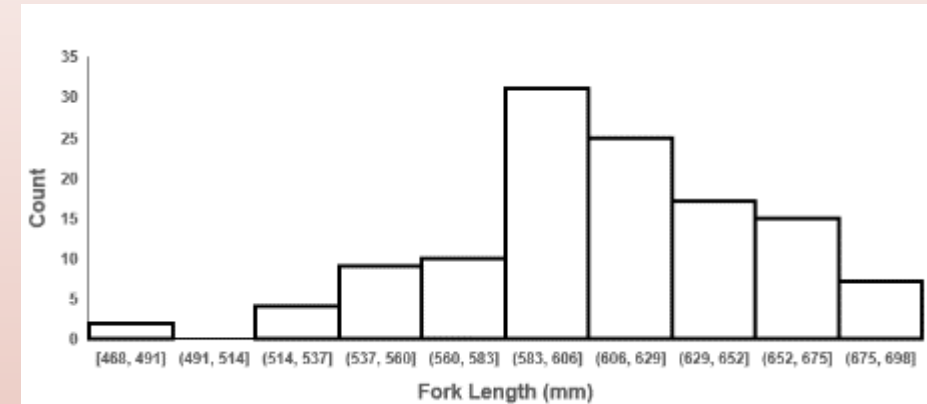
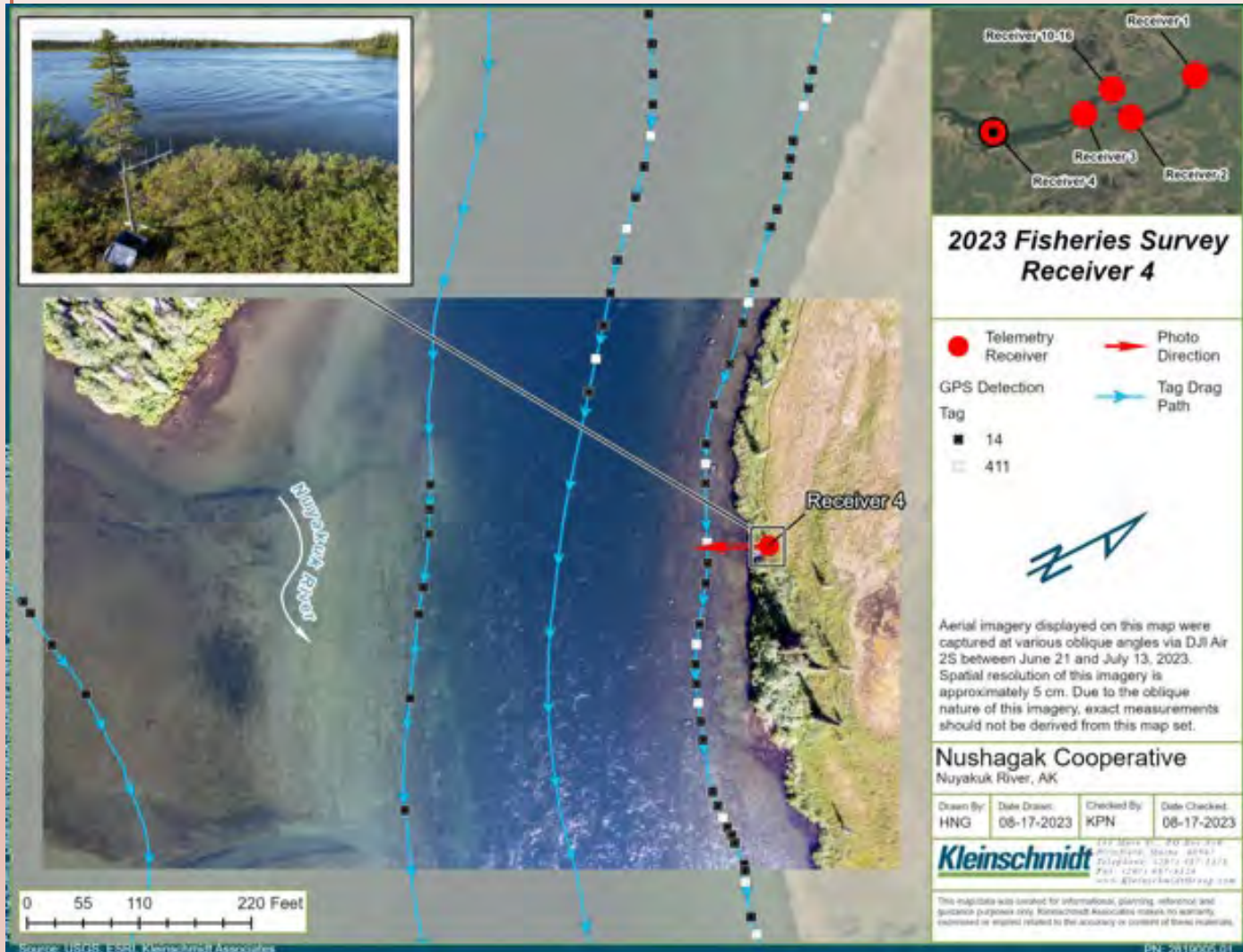
FALLS FISH PASSAGE STUDY

Telemetry Field Methods



FALLS FISH PASSAGE STUDY

Telemetry Field Results



Preliminary results indicate that 96% of Sockeye tagged in Zone 1 successfully passed through the Falls Reach in Zone 2 and exited the study area past receivers located in Zone 3.

Preliminary results indicate that passage rate through the Falls Reach was related to flow.

FALLS FISH PASSAGE STUDY

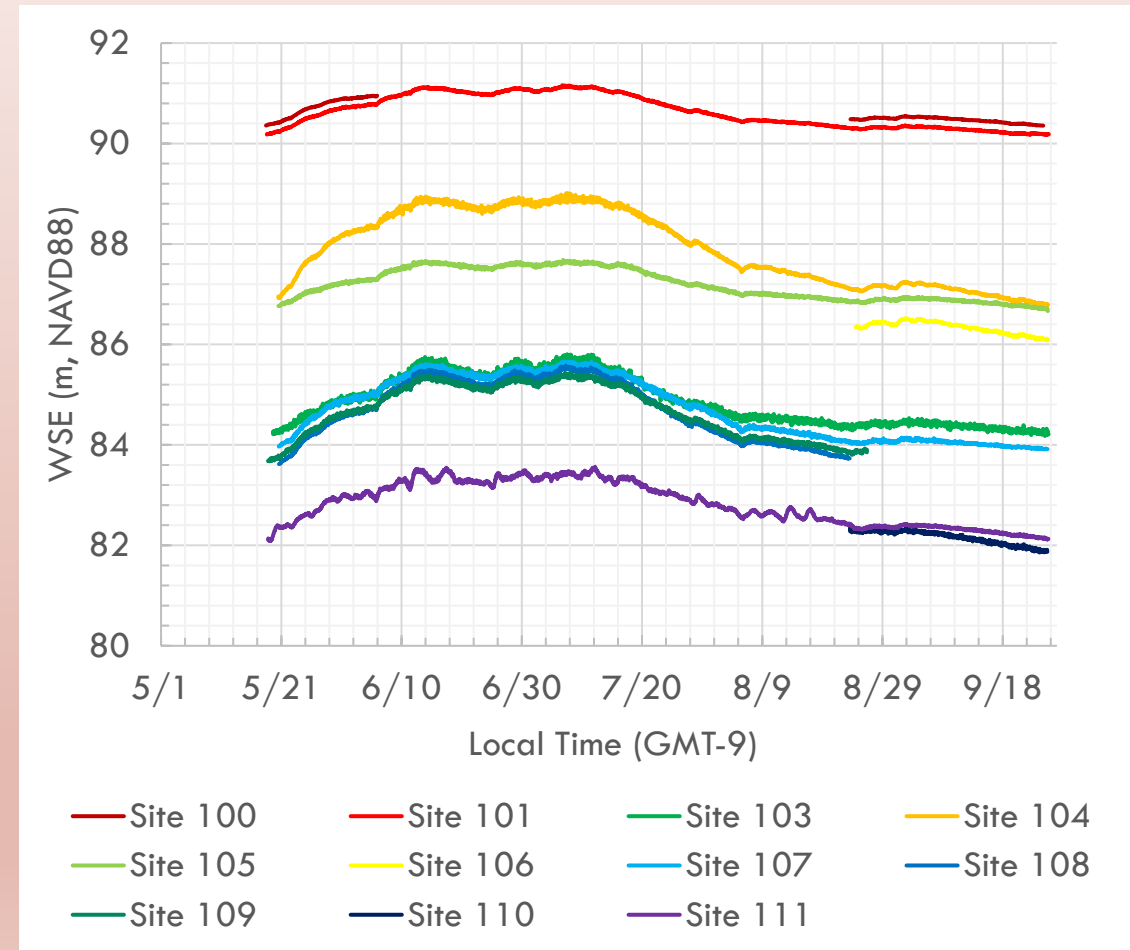
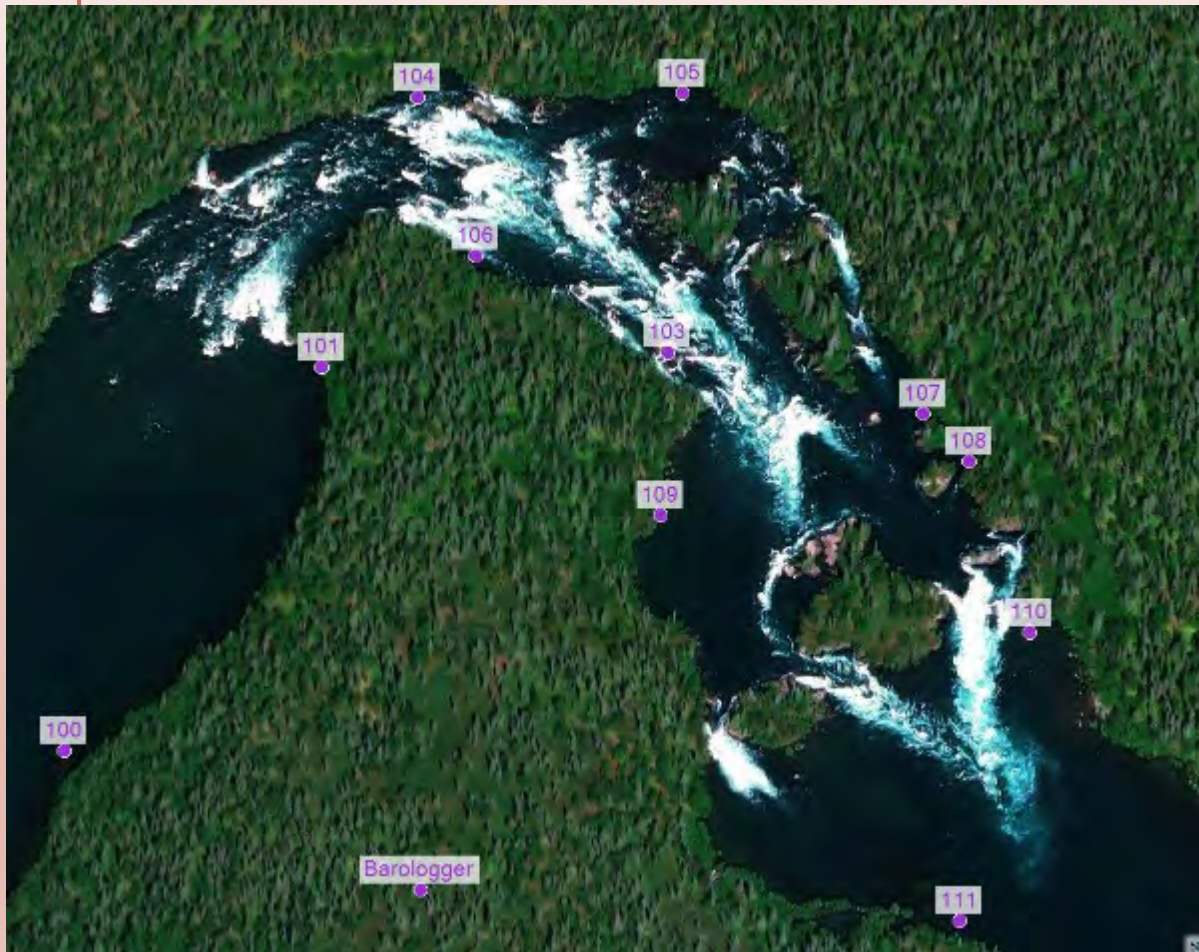
2D Hydraulic [Habitat] Modeling Methods

Methods: Fish passage habitat model

- 1. Establish boundary conditions
- 2. Update fish species periodicity
- 3. Construct 2 dimensional model
 - Feld data on flow, stage-discharge relationship, and water surface elevation
 - Develop a rating curve
 - Incorporate LiDAR

FALLS FISH PASSAGE STUDY

Preliminary 2D Hydraulic [Habitat] Modeling Results

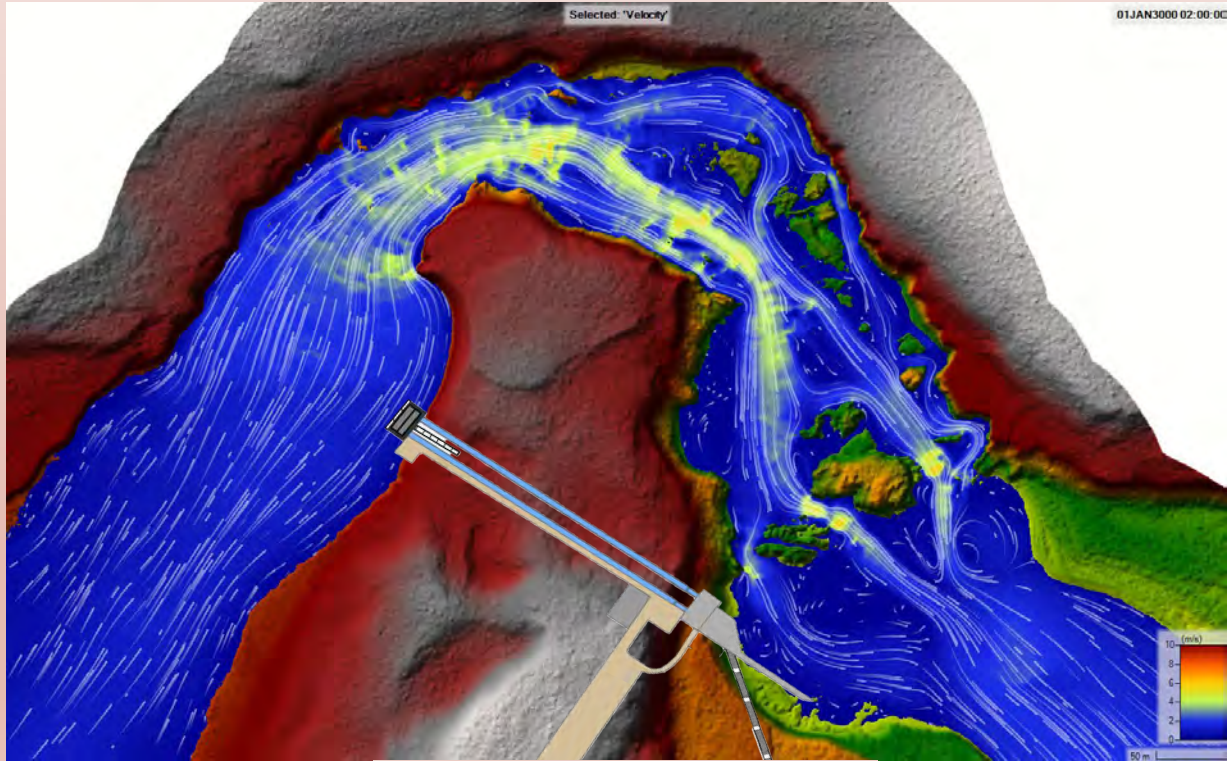


Water surface elevation calibration field data collection results

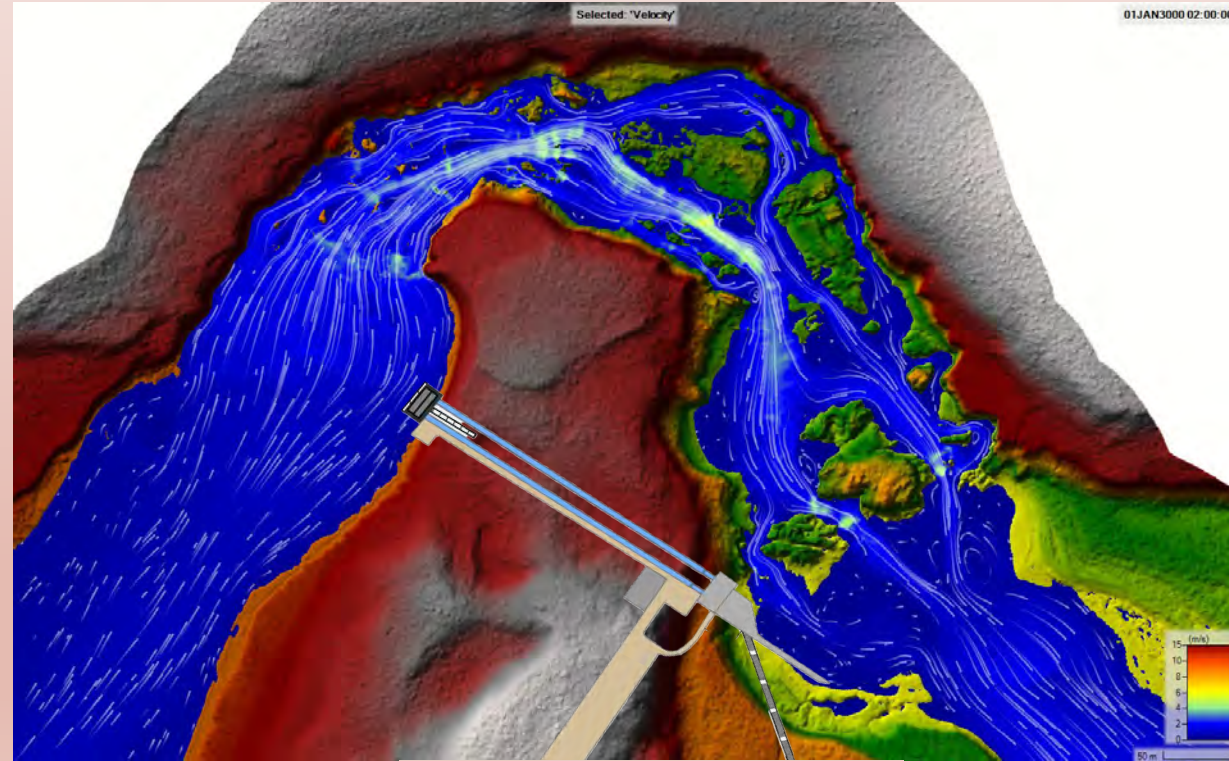
FALLS FISH PASSAGE STUDY

Preliminary 2D Hydraulic [Habitat] Modeling Results

HIGH FLOW



LOW FLOW



FALLS FISH PASSAGE STUDY

ABM Modeling Methods

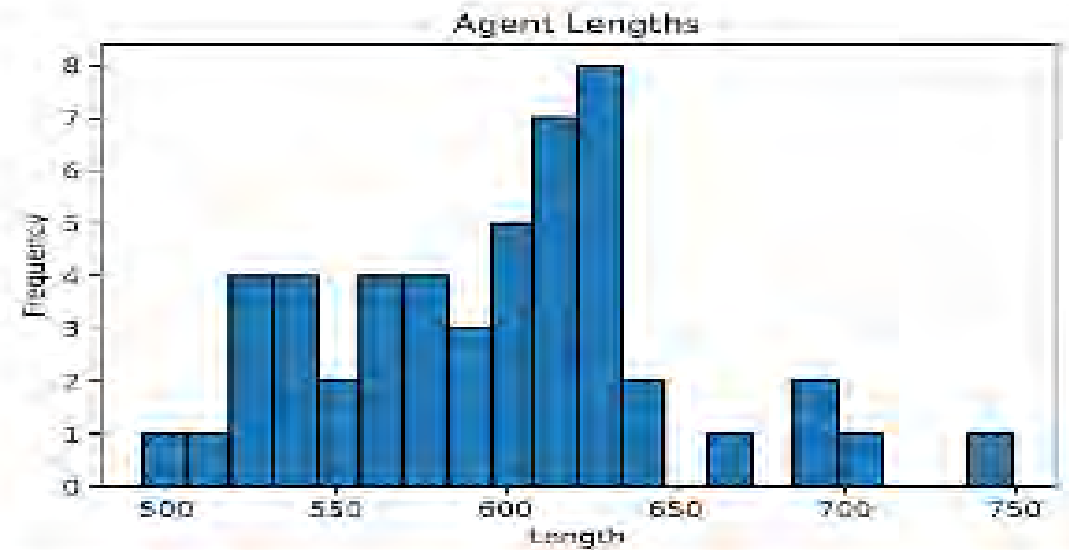
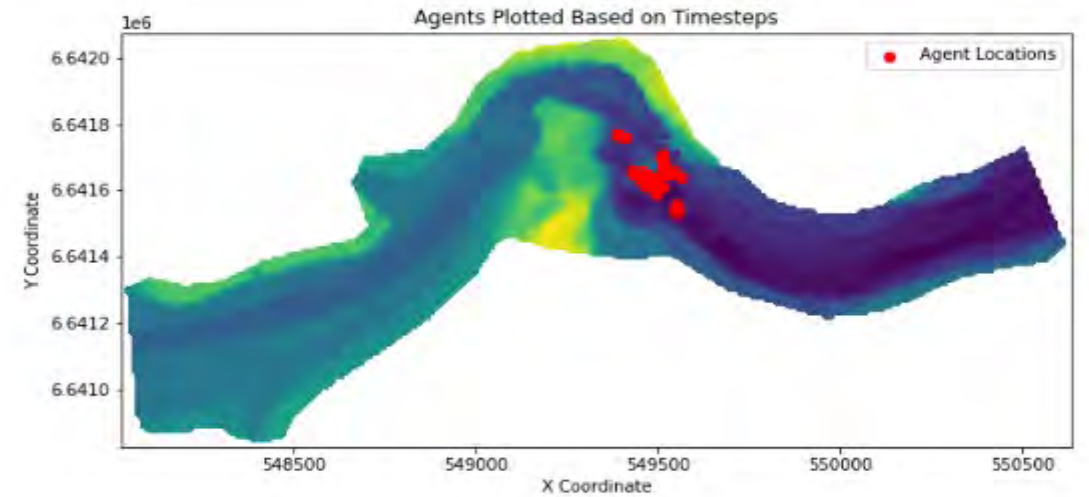
- Developed ELAM-type Agent-Based-Model to understand Sockeye Salmon passage over cascade reach
 - Written in Python 3.9.x and licensed open source
 - Incorporates models and parameters from literature with preference given to species specific and regional citations
 - Goal is to validate model with telemetry data and expert opinion

FALLS FISH PASSAGE STUDY

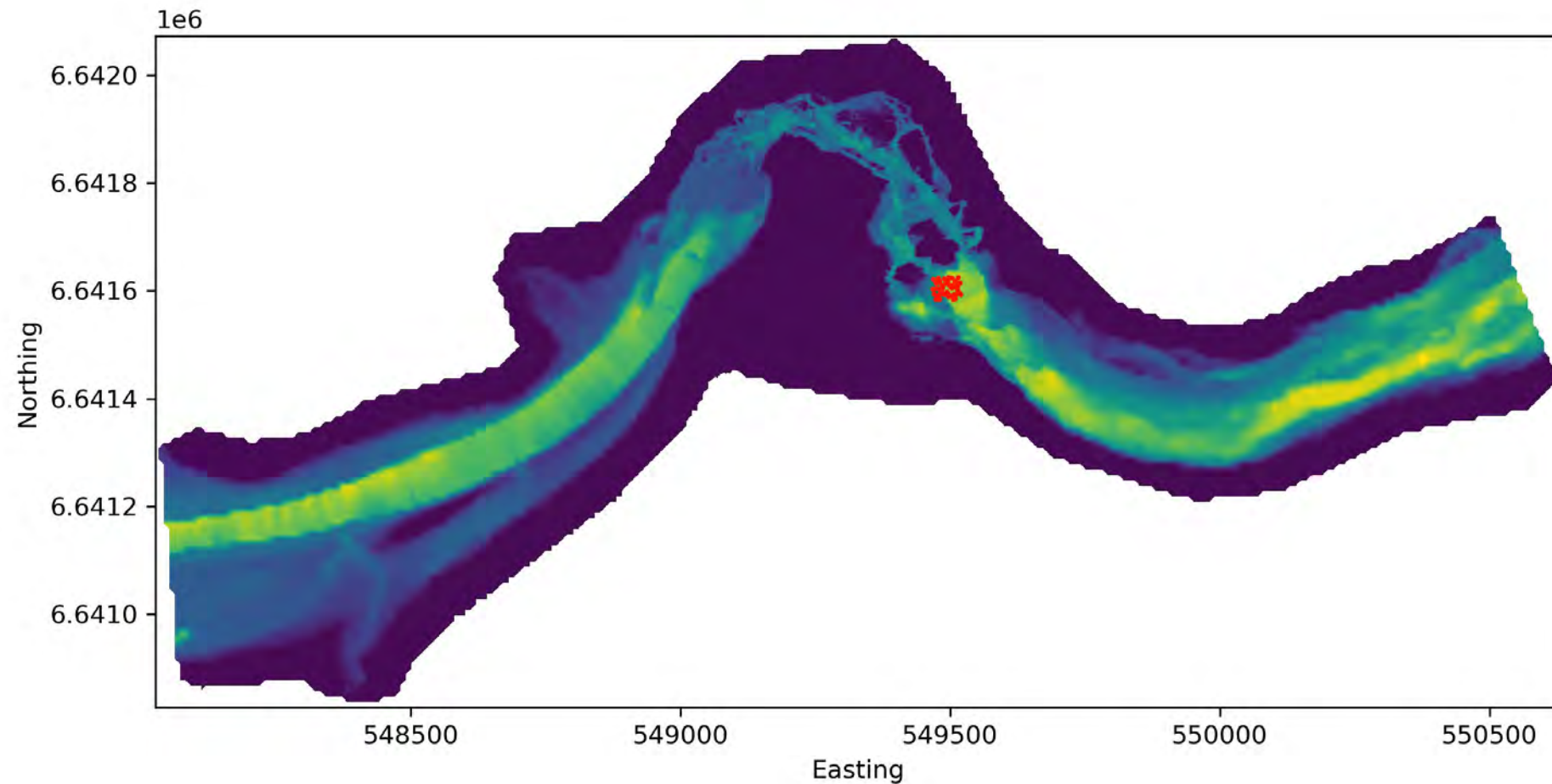
ABM Modeling Results

- Proof of concept complete, however too slow for models with sufficient number of agents. (unit tests complete)
- Refactoring to Structure-of-Arrays architecture to support vectorized operations and potentially GPU processing (unit tests and debugging ongoing)
- Summary functions complete, able to:
 - Calculate passage success, survival, rates
 - Identify passage routes
 - Identify areas of refuge, etc.
- On going:
 - Debugging & QC identified need for PID controller to modulate thrust
 - Validation pushed back to Q1 '24

FALLS FISH PASSAGE STUDY



FALLS FISH PASSAGE STUDY



ENTRAINMENT AND IMPINGEMENT STUDY

Methods

1. Conduct a literature review of hydroelectric diversion projects to inform the risk of and ability to avoid fish injury and mortality.
2. Use 2D model output to evaluate approach velocities at the intake and flowlines resulting from groin alternatives.
3. Conduct an analysis of potential injury and mortality that may be associated with entrainment or impingement at the Project or passage through the Falls under altered flow conditions.

This study will make use of Year 1 (2023) study results from Fish Community and Fish Passage studies including operational and bypass flow projections, fish distributions, and the updated fish periodicity

ENTRAINMENT AND IMPINGEMENT STUDY

Results

➤ As this study relies on results from Year 1 studies, only literature review has been initiated and there are no results to present at this time.

TAILRACE FALSE ATTRACTION EVALUATION

Methods

Study steps.

1. Conduct a review of available information on existing tailrace designs to minimize potential for false attraction.
2. Conduct a brainstorming session with the ARWG to select 2 or 3 conceptual design alternatives.
3. Use the 2D flow model to evaluate feasibility and compare alternatives.
4. Conduct the preliminary design of tailrace exclusion refinements as needed after alternative analysis.

➤ This study will make use of Year 1 (2023) study results from Fish Community and Fish Passage studies including operational and bypass flow projections, fish distributions, and the updated fish periodicity.

TAILRACE FALSE ATTRACTION EVALUATION

Results

➤ As this study relies on results from Year 1 studies, there are no results to present at this time.

CHINOOK AND SOCKEYE LIFE CYCLE MODELING

Methods

➤ 2023

- Collaboration with the ARWG on key inputs and necessary results
- Literature review
- Data assessments from other regional systems
- Development of “straw man” LCM for refinement during the remainder of the study and feasibility period, based on site-specific fisheries data collection

CHINOOK AND SOCKEYE LIFE CYCLE MODELING

Results

- Straw man constructed
- Current version of the model
 - Reviews and summary of existing data from other sources
 - Chignik
 - Afognak
 - Kvichak
 - Harvest of returning salmon
 - Escapement estimates
 - 30-year outlook currently, but will be modified to reflect longer time periods as site-specific data is input and analysis are conducted in 2024
 - Placeholders for the data collected this year and 2024

CHINOOK AND SOCKEYE LIFE CYCLE MODELING

Next Steps

- Per the RSP and based on the utilization of site-specific fisheries data collected in 2023 and 2024
 - Further data acquisition and input into model
 - Continued model calibration
 - Development of expected Project effects
 - Incorporate future climate and water flow scenarios
 - Evaluate Project effects

INTEGRATED RISK ASSESSMENT OF FISH POPULATIONS

Methods

- IRA proposed to evaluate potential project impacts to fisheries resources at the fish population/community level
- Intent is to integrate accumulated knowledge and anecdotal observations from regional experts to members of the community
- At the very least the framework accounts for uncertainty by estimating the likelihood and magnitude of risks
- Final analytical framework determined from management objectives – hierarchical, system impacts, etc.

INTEGRATED RISK ASSESSMENT OF FISH POPULATIONS

Results

- Put forth a strawman list of management objectives, risk sources, their elements, and receptors (species at risk).
- Put forth an example risk calculation spreadsheet for a single receptor with example risk matrix
- Management objective workshop (December 06, 2023)
 - Identify management objectives, and possibly receptors and stressors
- From this workshop, develop an objective function (optimization), and advise on an analytical approach

INTEGRATED RISK ASSESSMENT OF FISH POPULATIONS

Results

Risk Source:			
Cor			
Passage Efficiency Objective (1)			
Objective Scores			-13
Risk Element	Magnitude	Likelihood of Occurrence	Risk Score
False attraction	Minor Negative	Likely	-4
Quantity of Suitable Upstream Passage Habitat	Minor Negative	Likely	-4
Quality of Suitable Upstream Passage Habitat	Major Positive	Likely	8
Change in relative abundance of spawners upstream of the project	Major Negative	Possible	-6
Change in adult delayed mortality through the project	Minor Negative	Possible	-3
Quantity of Suitable Downstream Passage Habitat	Minor Negative	Likely	-4

Note: the classifications made of magnitude and likelihood of occurrence are for illustrative purposes only and are intended to demonstrate how the end user can update classifications and how their choices affect the risk matrix.

Risk Matrix			
Risk Sources		Maintain a similar or better upstream and downstream passage efficiency (survival, success, time to passage) for returning adult Sockeye salmon and out-migrating juvenile Sockeye. Nexus 1,4.	Maintain a similar or better quantity and quality of upstream migratory, downstream migratory, and juvenile rearing, and spawning habitat for sockeye. Nexus 1,2,3,4.
	Construction and Operation of a hydroelectric project	-13	-4
	Fishing Pressure (Recreational and Commercial)	0	0
	Climate Change - direct and indirect effects	0	0

QUESTIONS?

WATER RESOURCES

DISSOLVED OXYGEN AND WATER TEMPERATURE

Study Goals and Objectives

- Collect baseline, continuous dissolved oxygen(DO) data during periods of peak water temperatures (July – August) for a minimum of 72 hours. Determine if DO concentrations are substantially different above and below Nuyakuk Falls.
- Collect baseline, continuous water temperature data for a minimum of one calendar year (January – December).
- Compare the study results to DO and water temperature criteria established by the Alaska Department of Environmental Conservation (ADEC).

Methods

- Deployed calibrated U26-001 DO and U22-001 ProV2 water temperature loggers above and below Nuyakuk Falls.
- DO calibration and field procedures followed manufacturers specifications while water temperature loggers adhered to techniques described in Ward (2011).

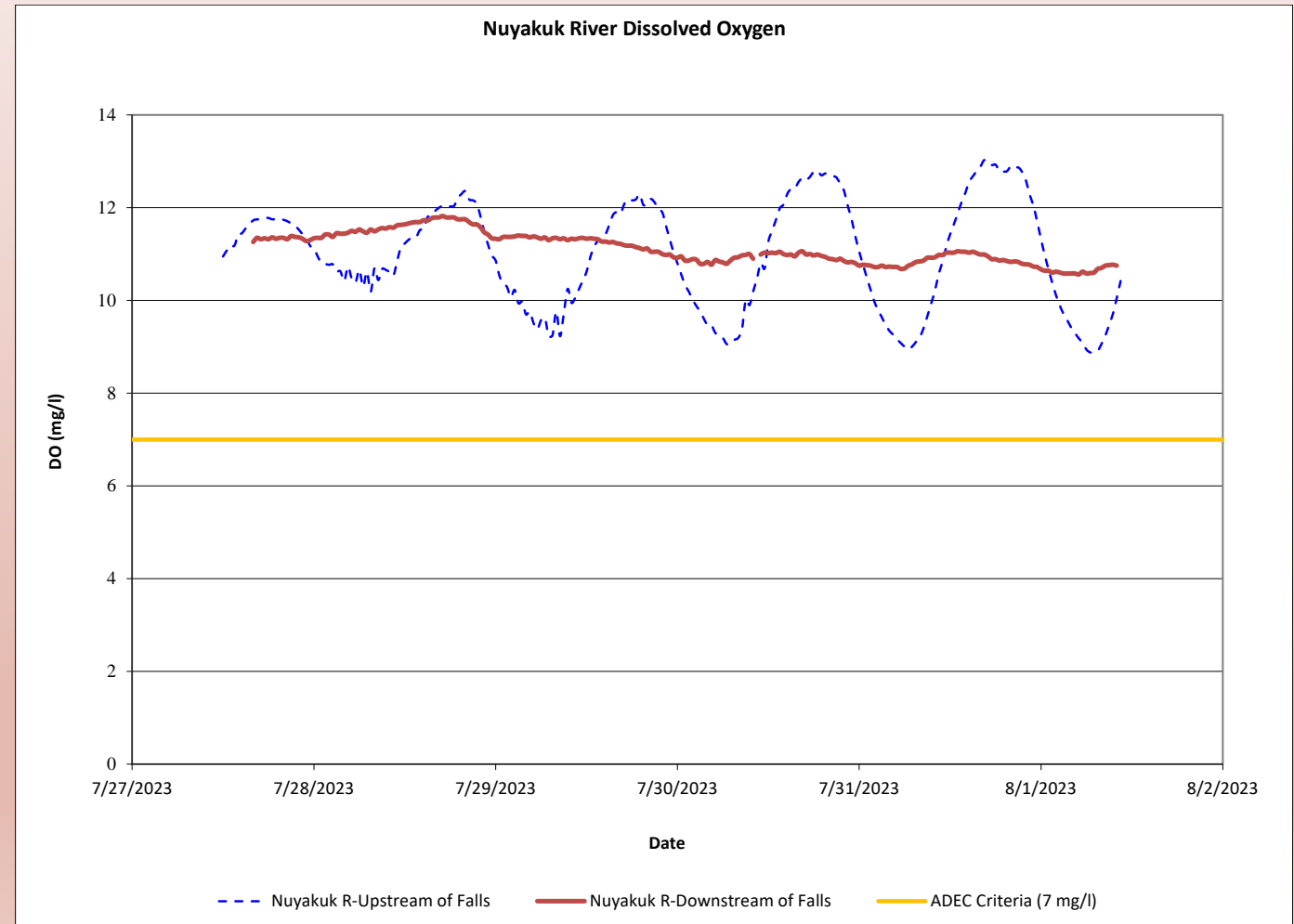
DISSOLVED OXYGEN AND WATER TEMPERATURE

Results – Dissolved Oxygen

ADEC criteria for water use category (C)*

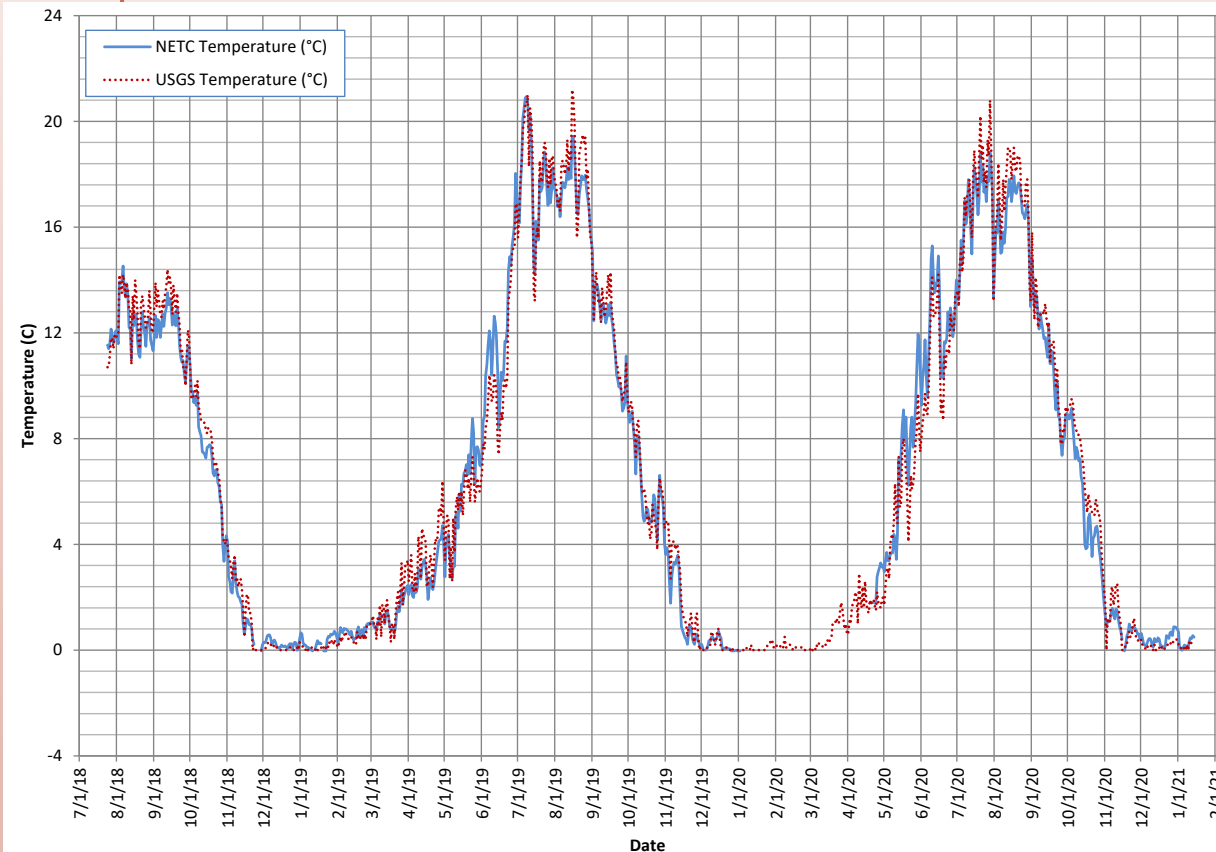
Parameter	Criteria								
Dissolved Oxygen	greater than 7 mg/l								
Temperature	May not exceed 20°C at any time. The following maximum temperatures may not be exceeded, where applicable: <table><tr><td>Migration routes</td><td>15°C</td></tr><tr><td>Spawning areas</td><td>13°C</td></tr><tr><td>Rearing areas</td><td>15°C</td></tr><tr><td>Egg & fry incubation</td><td>13°C</td></tr></table>	Migration routes	15°C	Spawning areas	13°C	Rearing areas	15°C	Egg & fry incubation	13°C
Migration routes	15°C								
Spawning areas	13°C								
Rearing areas	15°C								
Egg & fry incubation	13°C								

*growth and propagation of fish, shellfish, other aquatic life and wildlife.

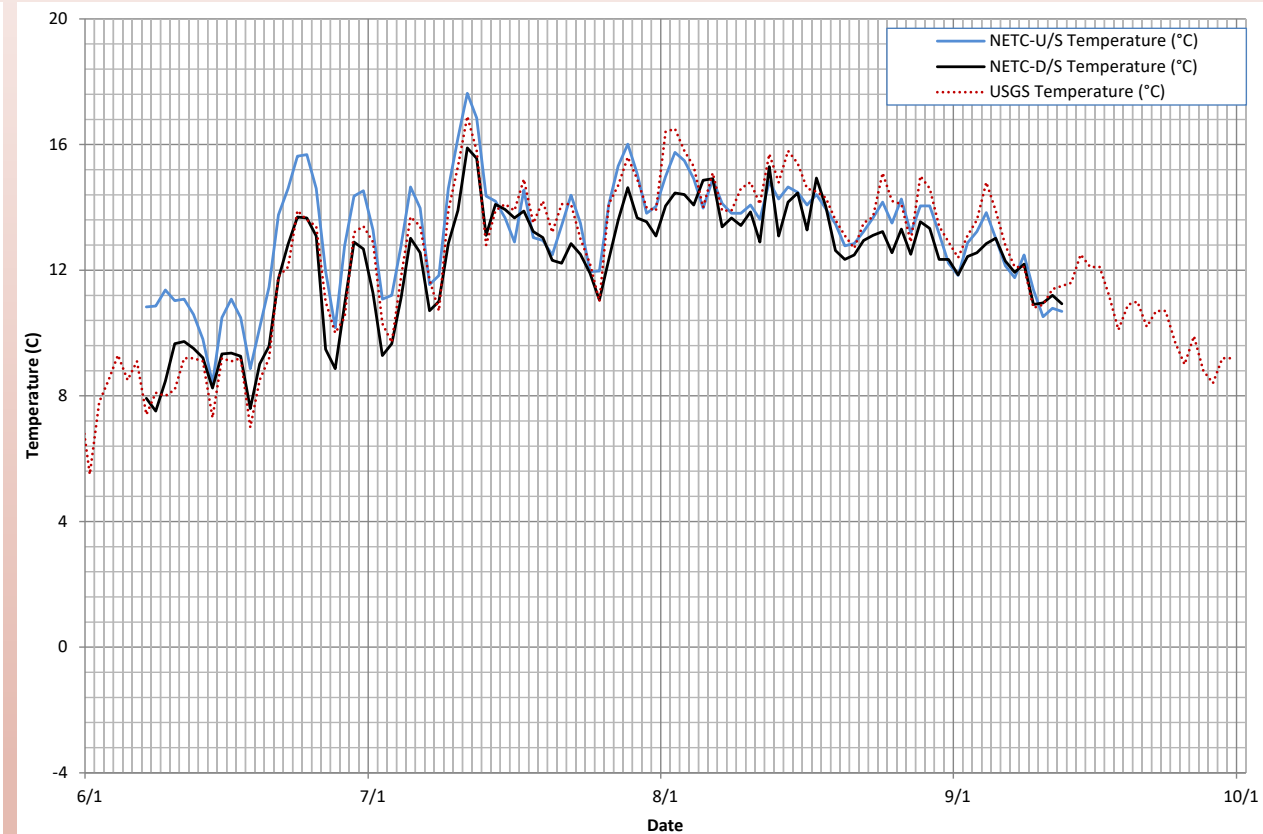


DISSOLVED OXYGEN AND WATER TEMPERATURE

Results-Water Temperature



Nuyakuk River Daily Maximum Water Temperatures (July 24, 2018 – January 4, 2021)



Nuyakuk River Daily Maximum Water Temperatures (June 1 – September 30, 2022)

DISSOLVED OXYGEN AND WATER TEMPERATURE

Year 1 Study Summary

- DO concentrations met ADEC criteria of 7 mg/L.
- Intra-daily DO levels fluctuated upstream of the Falls but mean daily DO concentrations were nearly identical above and below Nuyakuk Falls.
- Water temperatures met the 20°C daily maximum criteria in 2018 and 2022
- One exceedance of 20°C was noted in 2019 from July 5-11.

Year 2 Study Efforts

- At the request of Alaska Department of Fish and Game, continuous DO monitoring for 3-5 days will occur during a period when large schools of sockeye are staging at base of Nuyakuk Falls (typically late June to mid-July).
- Continue water temperature monitoring through the fall of 2024.

FLOW DURATION CURVE/STATIONARITY ASSESSMENT

Study Goals and Objectives

- Evaluate changes in the flow duration curve for the Nuyakuk River that have happened during the United States Geological Survey (USGS) gage 15302000 record which spans 70 years (1953-2023).
- Develop a discharge record at the Project site so that all flow duration curves, as well as additional hydrologic and hydraulic data assessments (e.g., 2-D model) are based on accurate flow volumes.

Methods

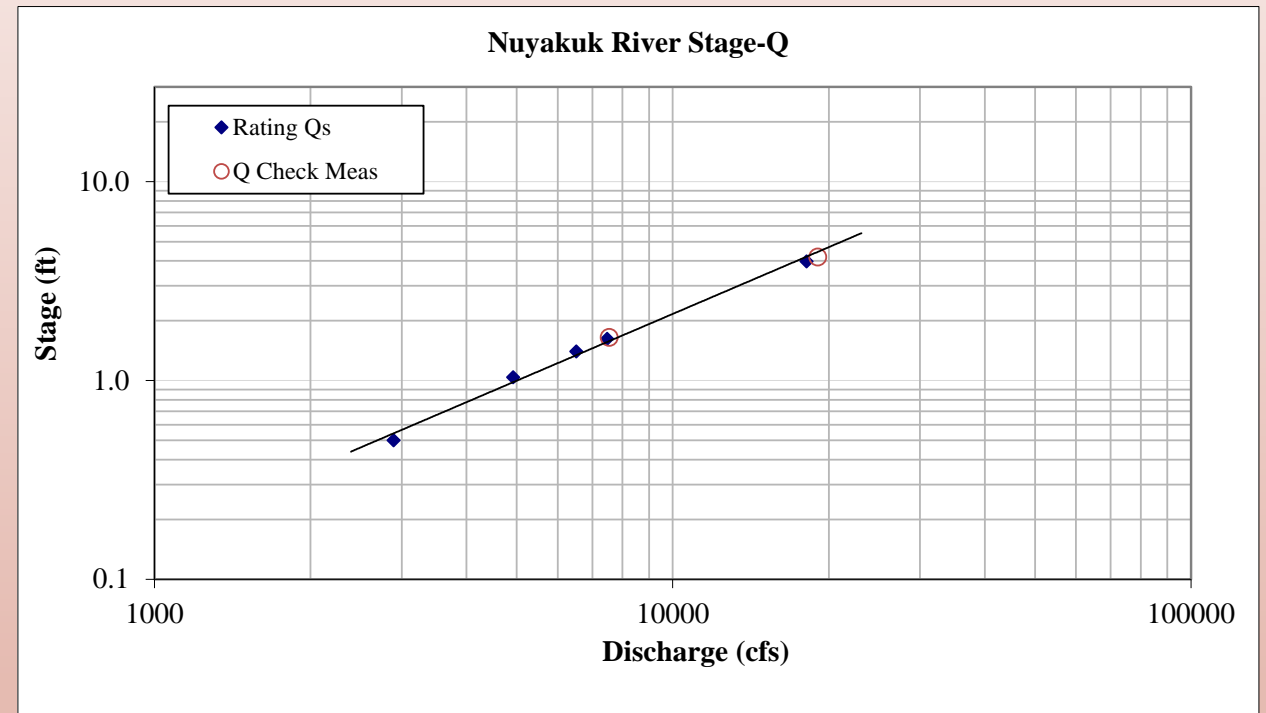
- Installed, maintained, and calibrated a stream gage utilizing standard USGS stream gaging techniques (Rantz, et al, 1982).

FLOW DURATION CURVE/STATIONARITY ASSESSMENT

Results

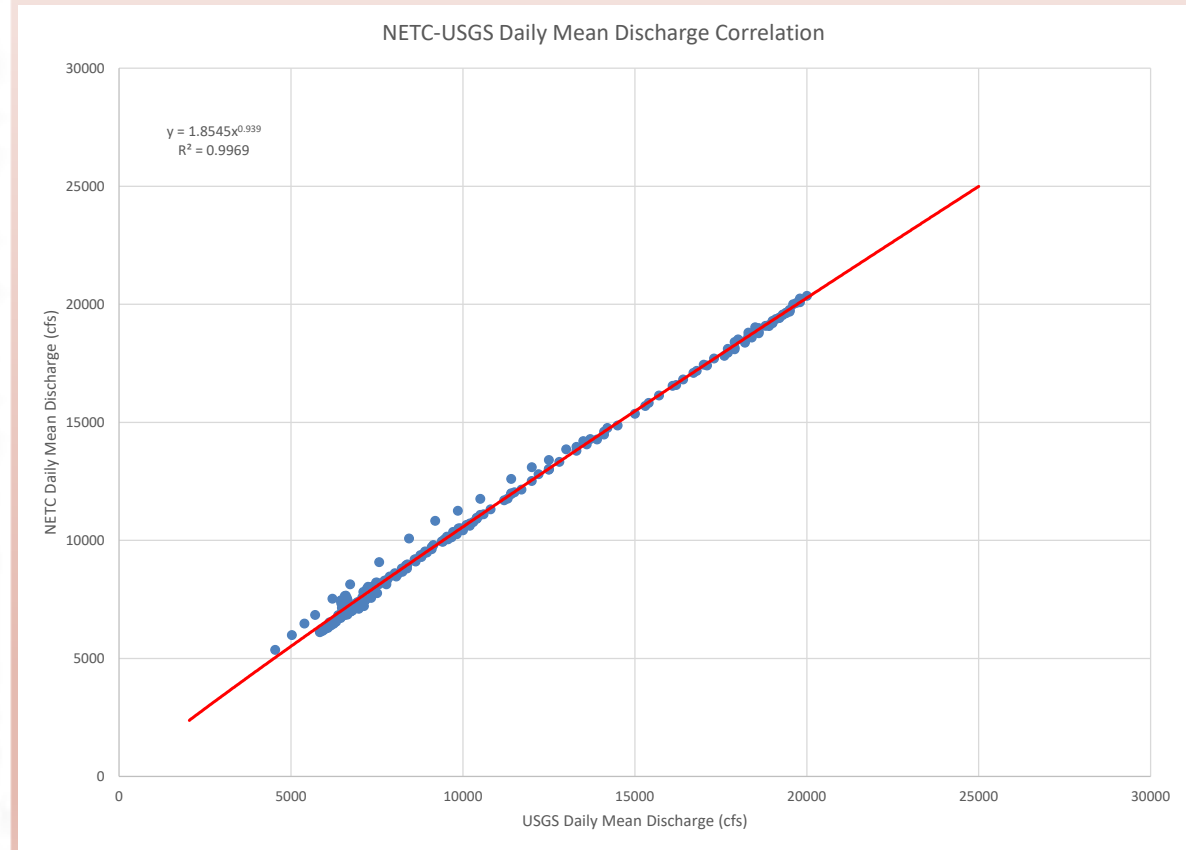
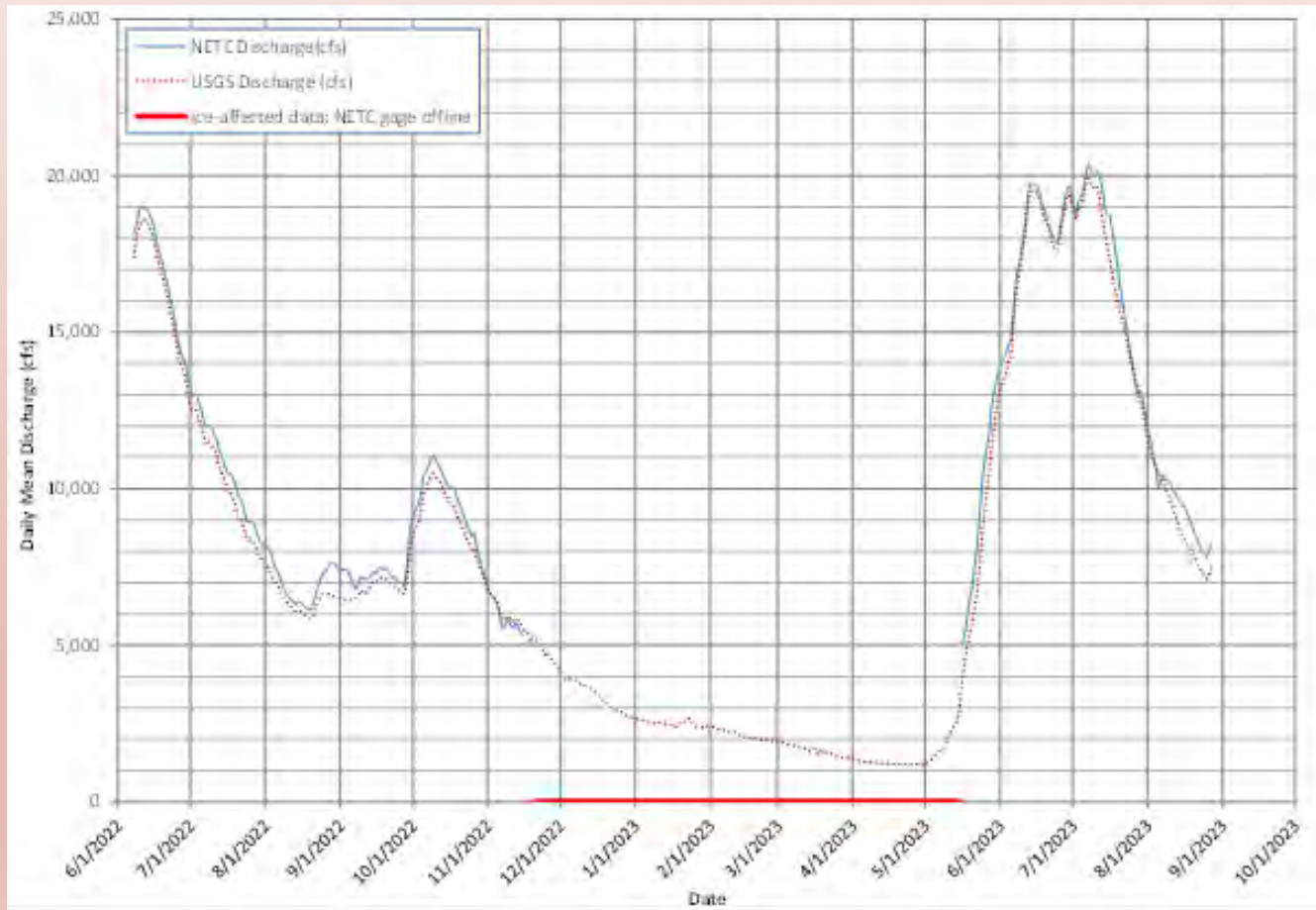
Discharge Summary Table at the Nuyakuk River Project Site.

Meas. No.	Date	Stage (ft)	Measured Discharge (cfs)	Rated Discharge (cfs)	Percent Difference
1	5/12/2023	0.50	2,893	2,882	0.4%
2	5/16/2023	1.04	4,921	4,997	-1.5%
3	5/19/2023	1.40	6,510	6,480	0.5%
4	5/21/2023	1.62	7,476	7,410	0.9%
5	6/21/2023	3.98	18,124	18,160	-0.2%
6	7/3/2023	4.19	19,041	19,169	-0.7%
7	8/24/2023	1.65	7,537	7,538	0.0%
Rating 1: Flow = 3338.63*(Stage + 0.38)^1.1502 (based on meas. No. 1-5)					



FLOW DURATION CURVE/STATIONARITY ASSESSMENT

Results



FLOW DURATION CURVE/STATIONARITY ASSESSMENT

Year 1 Study Summary

- The installation of a stream gage at the Project site in June of 2022 was successful, providing an excellent correlation to USGS gaging station 15302000 during periods of ice-free operation (R^2 of 0.9969).
- Accretion (i.e., flow increases) from the USGS station downstream to the Project ranged from 97.1 cfs to 1650 cfs with an average of 509 cfs.

Year 2 Study Efforts

- Continued operation of the Project site stream gage to develop a winter discharge record and build on the ice-free dataset.
- Run the non-stationarity detection tool with the model provided by the United States Army Corps of Engineers (Version 1.1, January 2016)
- Provide flow duration curve summaries based non-stationarity outputs (i.e. periods of similar hydrologic data)

FUTURE FLOWS STUDY

Study Objectives

- Evaluate changes in hydrology in the Nuyakuk watershed under future climate conditions
 - Snow accumulation and melt
 - Magnitude and timing of hydrograph peak
 - Changes in monthly flows and flow duration
- Provide data to inform Nuyakuk Falls Hydropower evaluation
 - Implications for fish habitat
 - Implications for hydropower generation

FUTURE FLOWS STUDY

Methods

- Use of appropriate components from the GCM dataset
 - Made as site-specific as possible

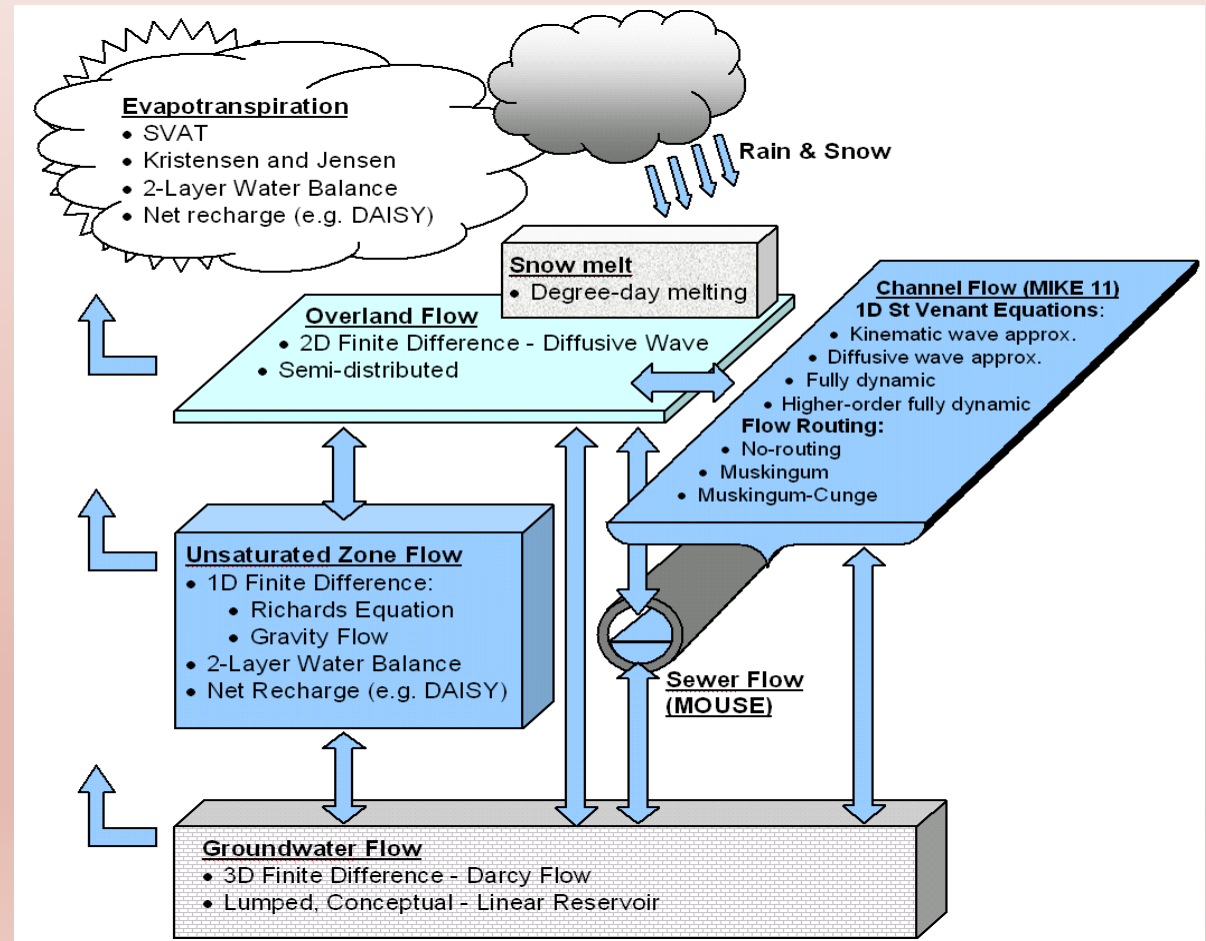
- Hydrologic Modeling
 - MIKE/SHE model utilized
 - Compatibility
 - BBNC and BBRSD funded a Nushagak watershed model using the MIKE/SHE system

- Technical Memo
 - Summarizing potential climate change effects in the Project area
 - Potential impacts to long-term Project operational capabilities
 - Incorporated into the USR and the overall Project feasibility assessment

FUTURE FLOWS STUDY

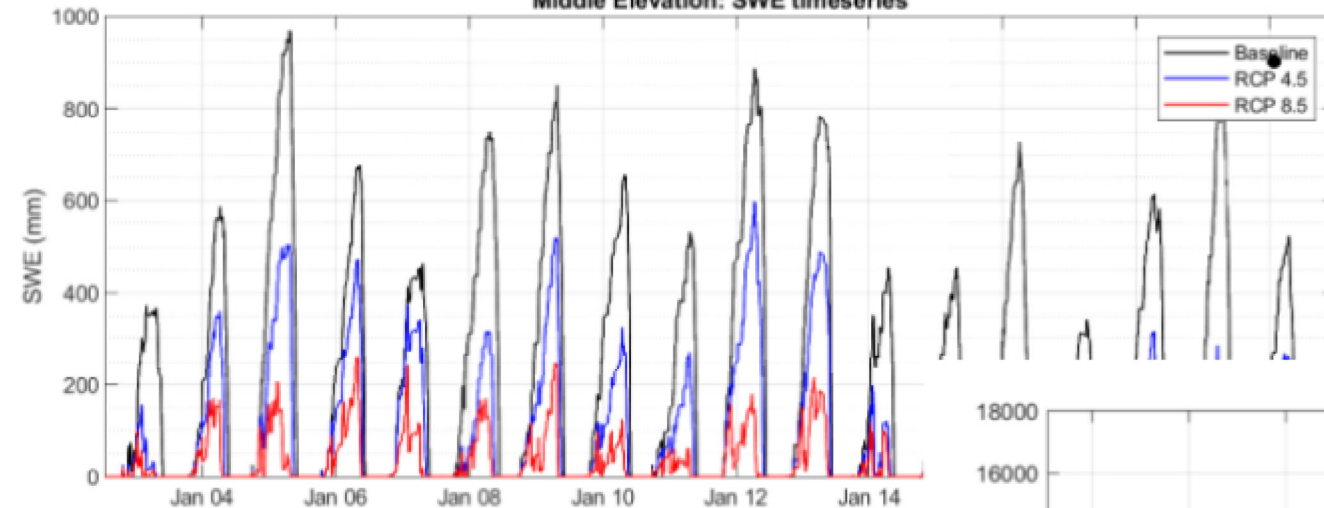
(MODEL: MIKESHE/MIKE HYDRO)

- Flexible, integrated surface water-groundwater model
- Groundwater flow – similar to MODFLOW.
- FEMA-approved surface water hydraulic model (MIKE Hydro)
- Choice of spatial and temporal scales (depends on processes)
- Simple to complex solution options



Initial Results – Snow and Flow

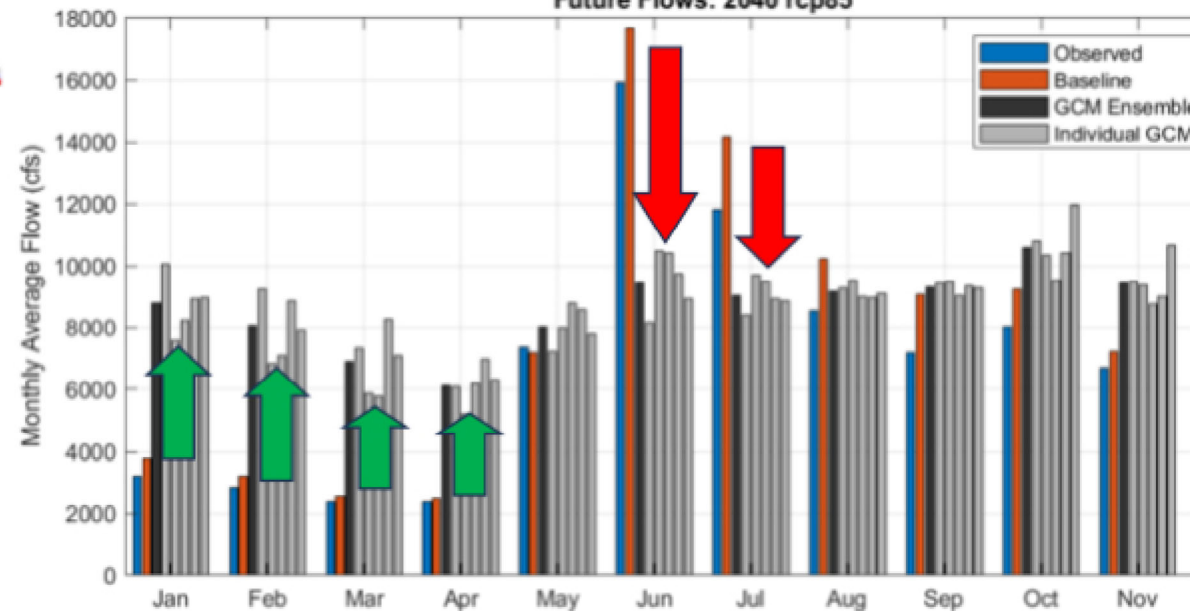
Middle Elevation: SWE timeseries



Projected warming REDUCE winter snowpack since more storms now fall as rain...

...leading to INCREASED winter flows and DECREASED summer runoff

Future Flows: 2040 rcp85



FUTURE FLOWS STUDY

Next Steps

- Site-specific results from relevant hydrologic studies in 2023 and 2024 will be utilized
- Run natural future flow scenarios
- Run project-related future flow scenarios
- Comprehensive results and climate change impact assessments will be provided in the USR

ICE PROCESSES ASSESSMENT

Study Goals and Objectives

- Desktop assessments of satellite imagery to evaluate historical icing conditions near the proposed Project intake.
- Information gathering from nearby hydroelectric projects (e.g., Tazimina Falls Project P-11316) on how they mitigate for icing conditions that could impact operations and infrastructure.
- Collect site-specific imagery near the proposed intake to assess frazil ice formation and ice breakup conditions.

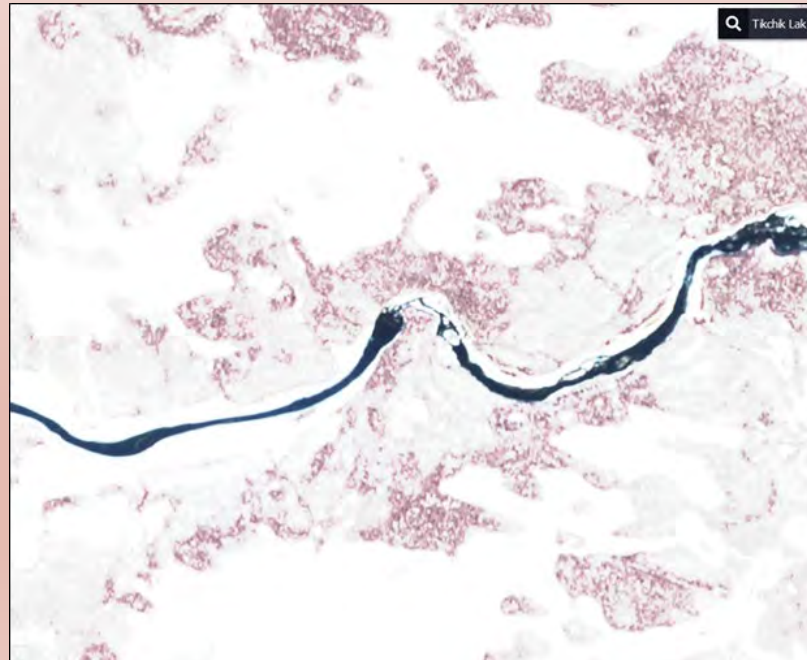
Year 1 Study Summary

- Deployed cameras in 2022 failed to log photos over the winter.
- Preliminary meetings with George Hornberger, General Manager of the Iliamna Newhalen Nondalton Electric Cooperative (INNEC) occurred on October 23, 2023. INNEC owns and operates the Tazimina Falls Project.

ICE PROCESSES ASSESSMENT

Year 2 Study Efforts

- Updated and re-deployed cameras in the fall of 2023 at two locations viewing the Project intake.
- Additional meetings with INNEC to discuss design options and operational techniques to operate over the winter during intermittent icing events.
- Summarize and log historical satellite imagery available from <https://www.sentinel-hub.com/> (example image provided below).
- All study efforts to be summarized and presented in the USR (December of 2024).



Satellite Imagery of Nuyakuk River Falls on April 18, 2023



2016/12/21



2018/03/19

QUESTIONS?

TERRESTRIAL

BOTANICAL IMPACT ASSESSMENT

Objective

- Classify and prepare maps in the proposed Project boundary.
- Desktop study of vegetation mapping
- Wetlands and waters of the US (WOTUS)
- Special status and invasive plants

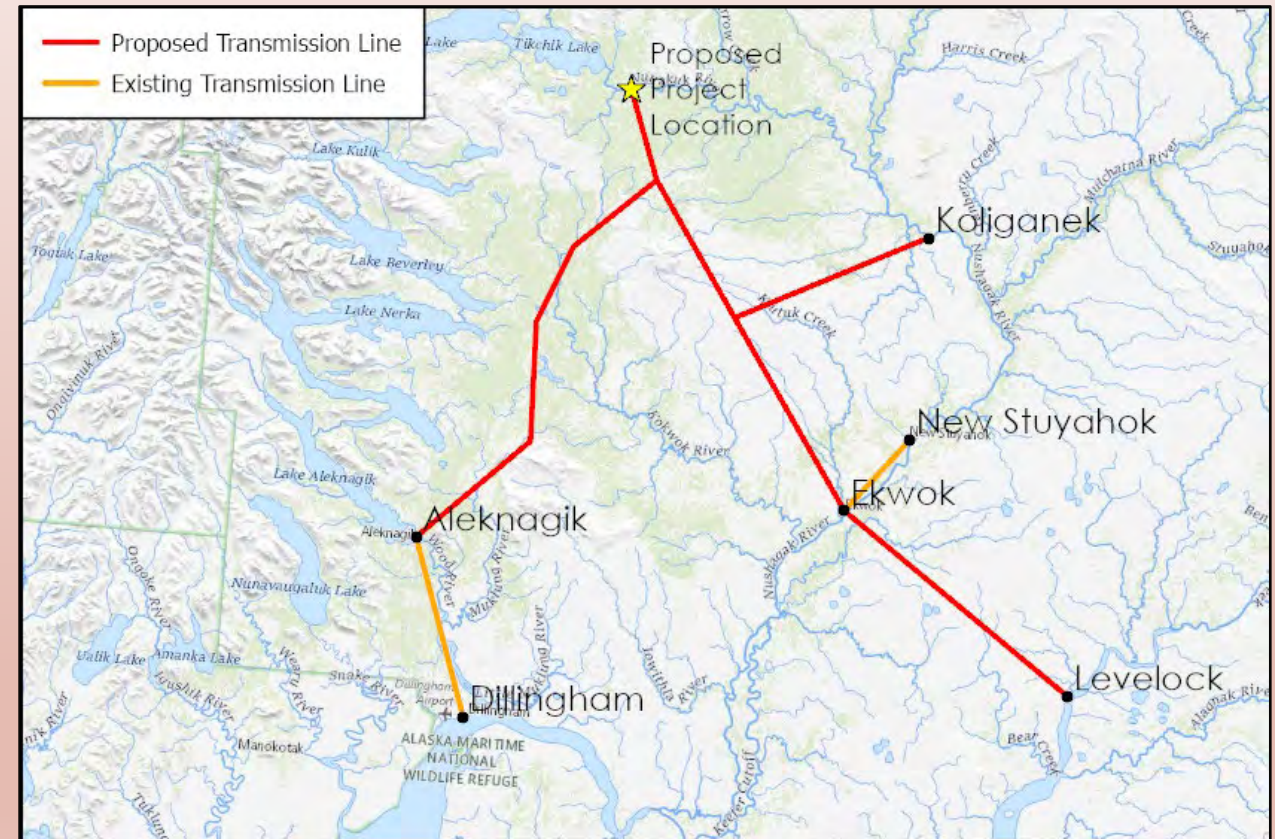


BOTANICAL IMPACT ASSESSMENT

Study Areas



Project Facility Study Area



Transmission Line Study Area

BOTANICAL IMPACT ASSESSMENT

Methods

- Preliminary mapping of botanical and wetland areas using available data
 - i.e., federal and state resources
- No USFWS National Wetland Inventory coverage
- Alaska Center for Conservation Science
 - Sphagnum moss
 - Sedge
- U.S. Geological Survey
 - Hydrology
 - Satellite-derived contours
- Adjusted map selection after field survey of Project facility study area.



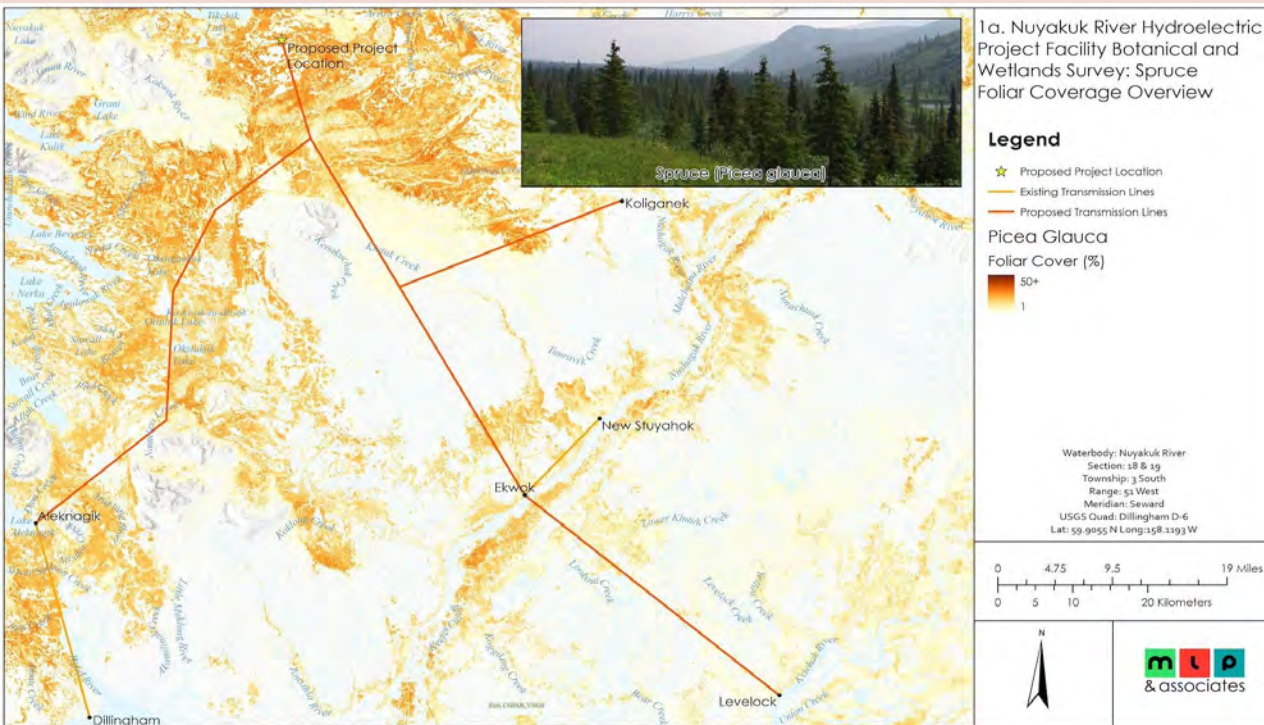
Mapped Plant Species

Scientific Name	Common Name
<i>Picea glauca</i>	white spruce
<i>Alnus spp.</i>	alder shrubs
<i>Rhododendron spp.</i>	Labrador teas
<i>Empetrum nigrum</i>	crowberry
<i>Sedge spp.</i>	sedges

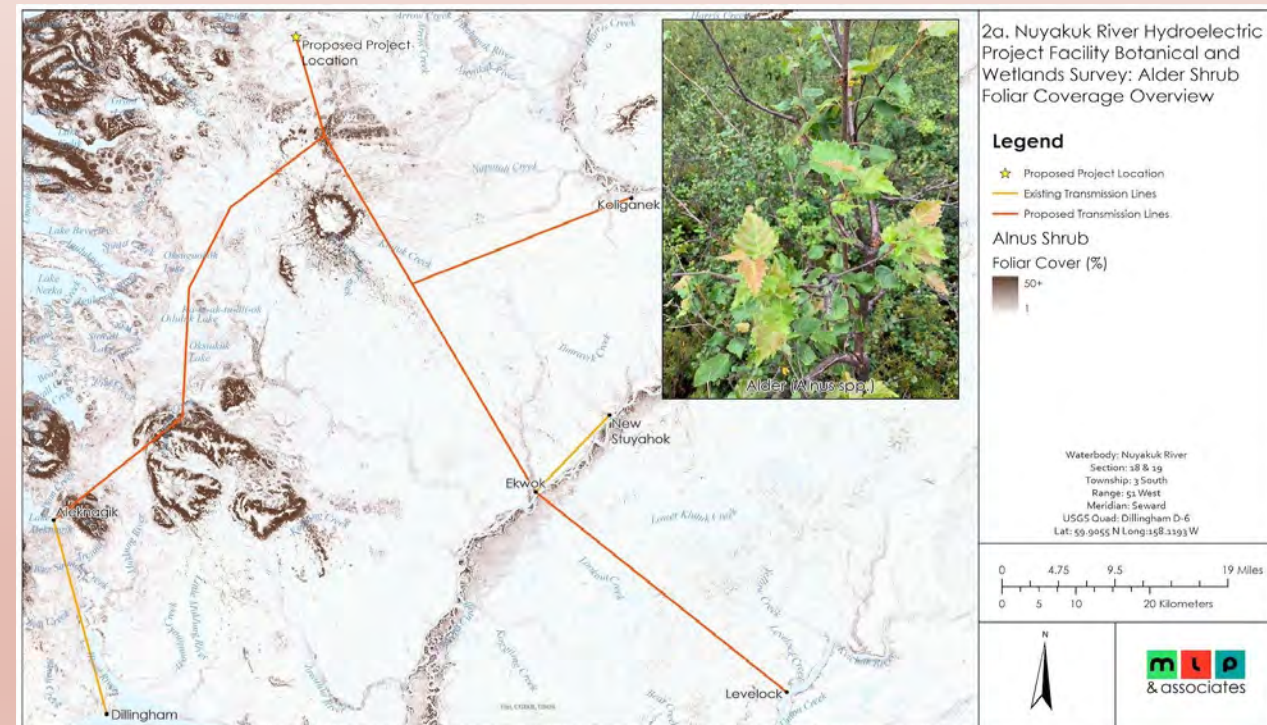
BOTANICAL IMPACT ASSESSMENT

Results

- Lower probability of wetlands in areas of high white spruce and alder likelihood
- Poor correlation between other species mapping and wetlands (widespread and adaptable)



White spruce

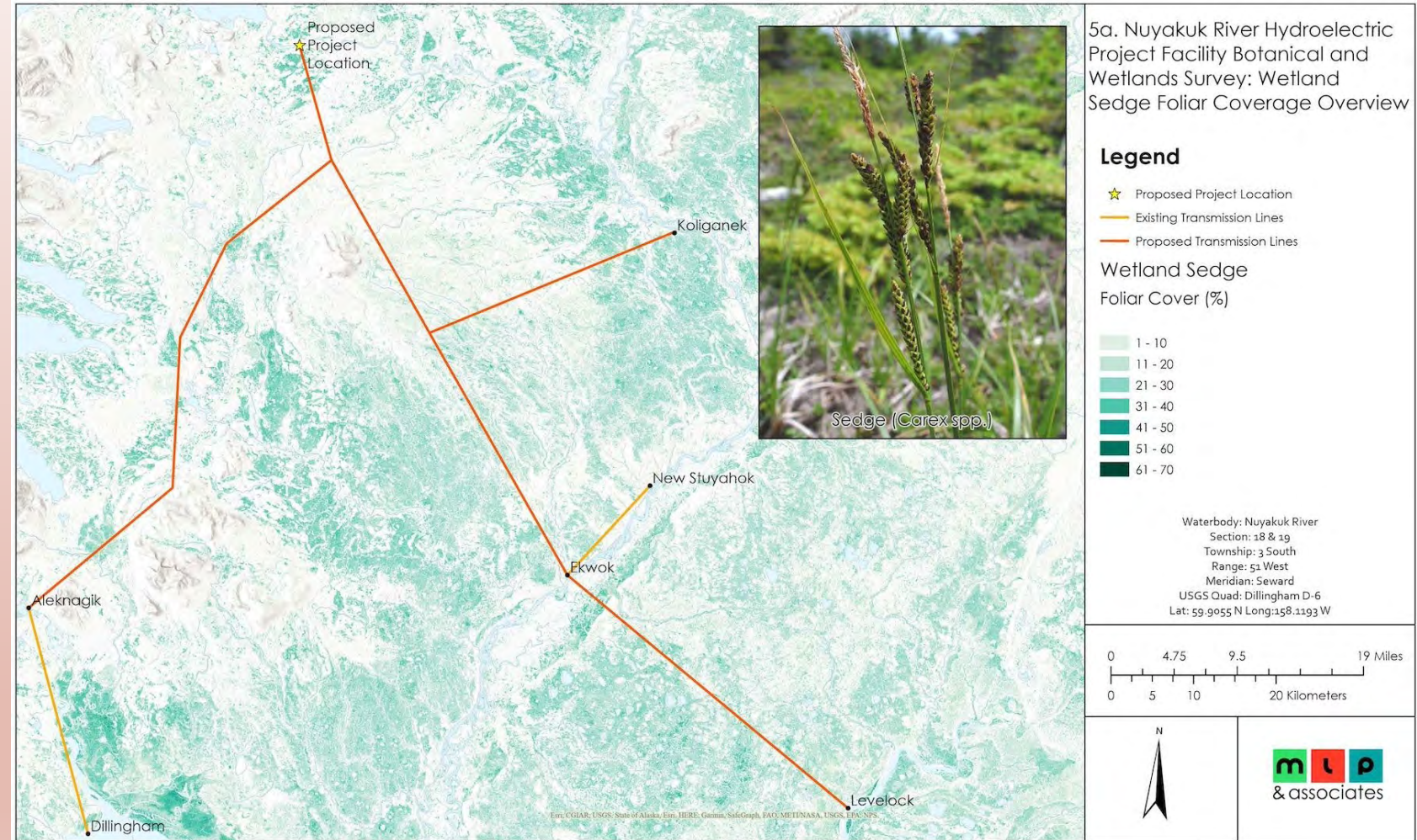


Alder species

BOTANICAL IMPACT ASSESSMENT

Results

➤ Good correlation between sedge mapping and field-verified emergent wetlands (but not scrub-shrub wetlands)



WETLANDS IMPACT ASSESSMENT

Objective

- Wetlands delineation in the Project Facility Study Area
- Identify BLM Alaska Special Status plant species
- Identify Non-native plants



WETLANDS IMPACT ASSESSMENT

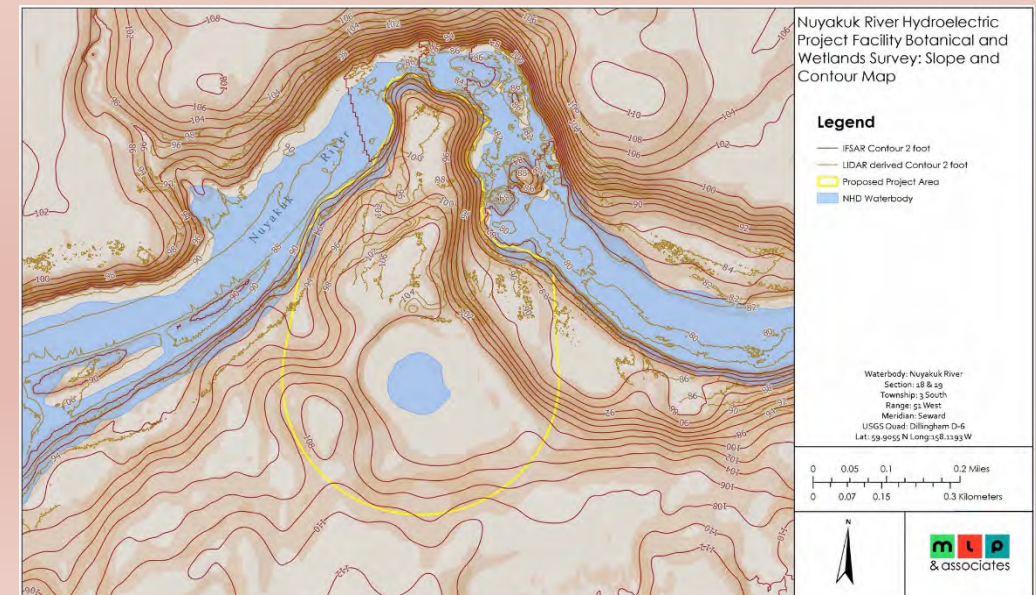
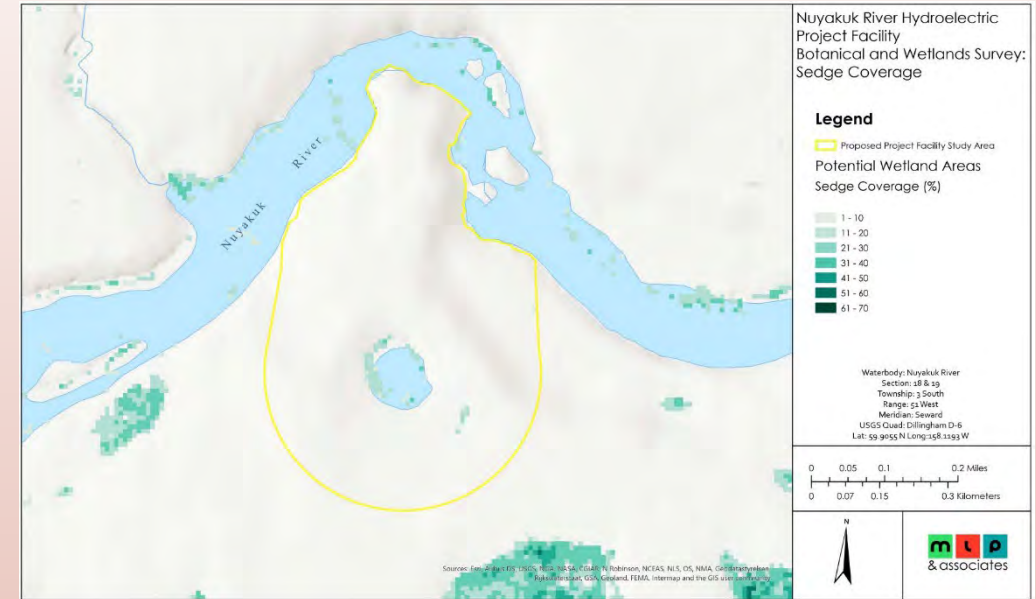
Project Facility Study Area



WETLANDS IMPACT ASSESSMENT

Methods

- Desktop study of available data in the Project Facility Study Area
 - ACCS Sphagnum moss
 - ACCS Sedges
 - USGS Hydrology
 - USGS Satellite-derived contours
- Revised map selection after field survey



WETLANDS IMPACT ASSESSMENT

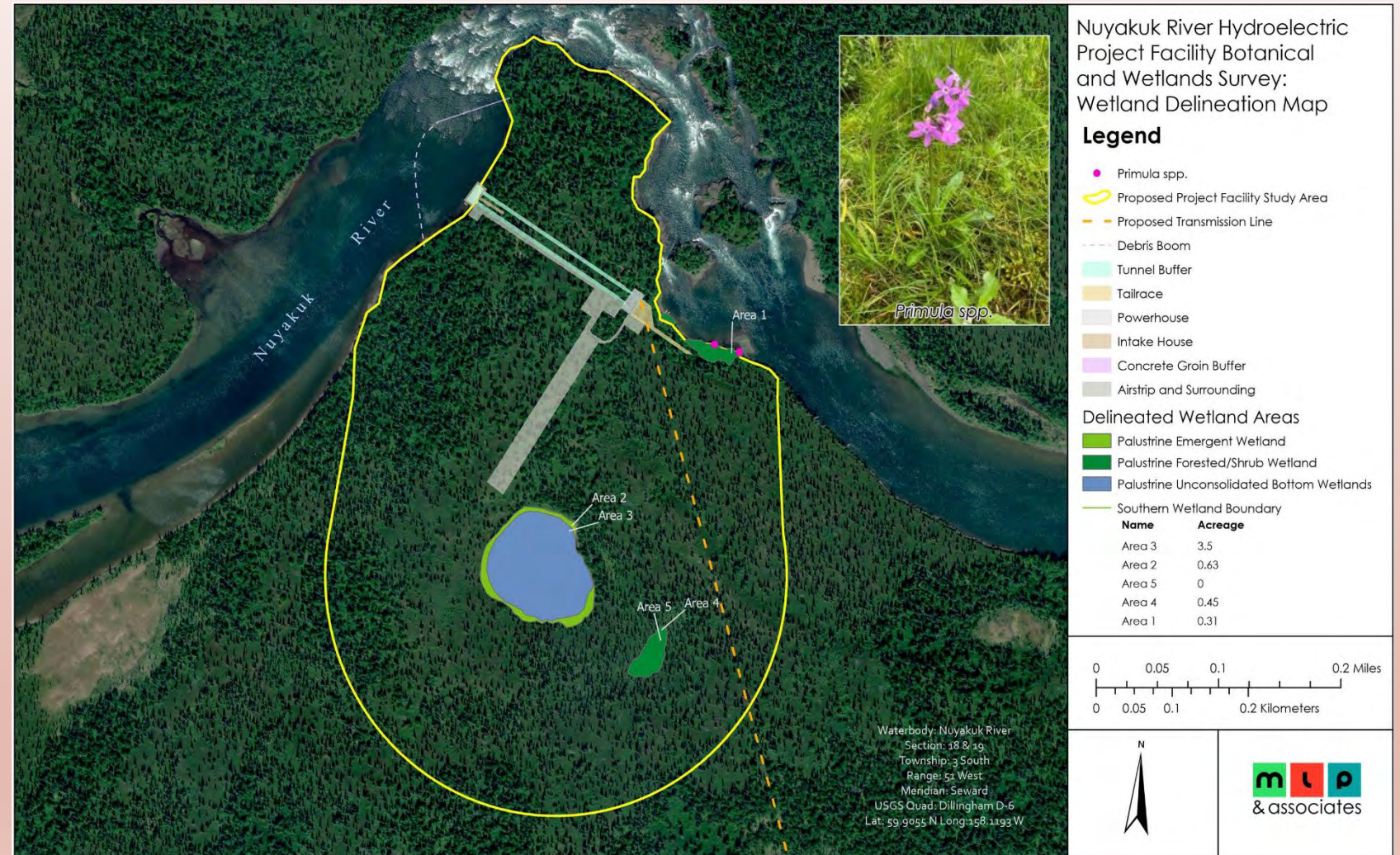
Wetland Delineation – Field Survey



WETLANDS IMPACT ASSESSMENT

Results

- 5 wetland areas
- 3 wetland types
 - Palustrine Emergent (PEM)
 - Palustrine Scrub-Shrub (PSS)
 - Palustrine Unconsolidated Bottom (PUB)
- Rare Plants
 - *Primula* spp.
 - *P. tschuktschorum* or *P. pumila*
- Non-native Plants
 - None observed



CARIBOU POPULATION EVALUATION

Objective

Evaluate potential impacts of the proposed Project development on the Mulchatna Caribou Herd (MCH) within the study area.



CARIBOU POPULATION EVALUATION

Study Area

➤ State Game Management Units

➤ 17B – Project Facility

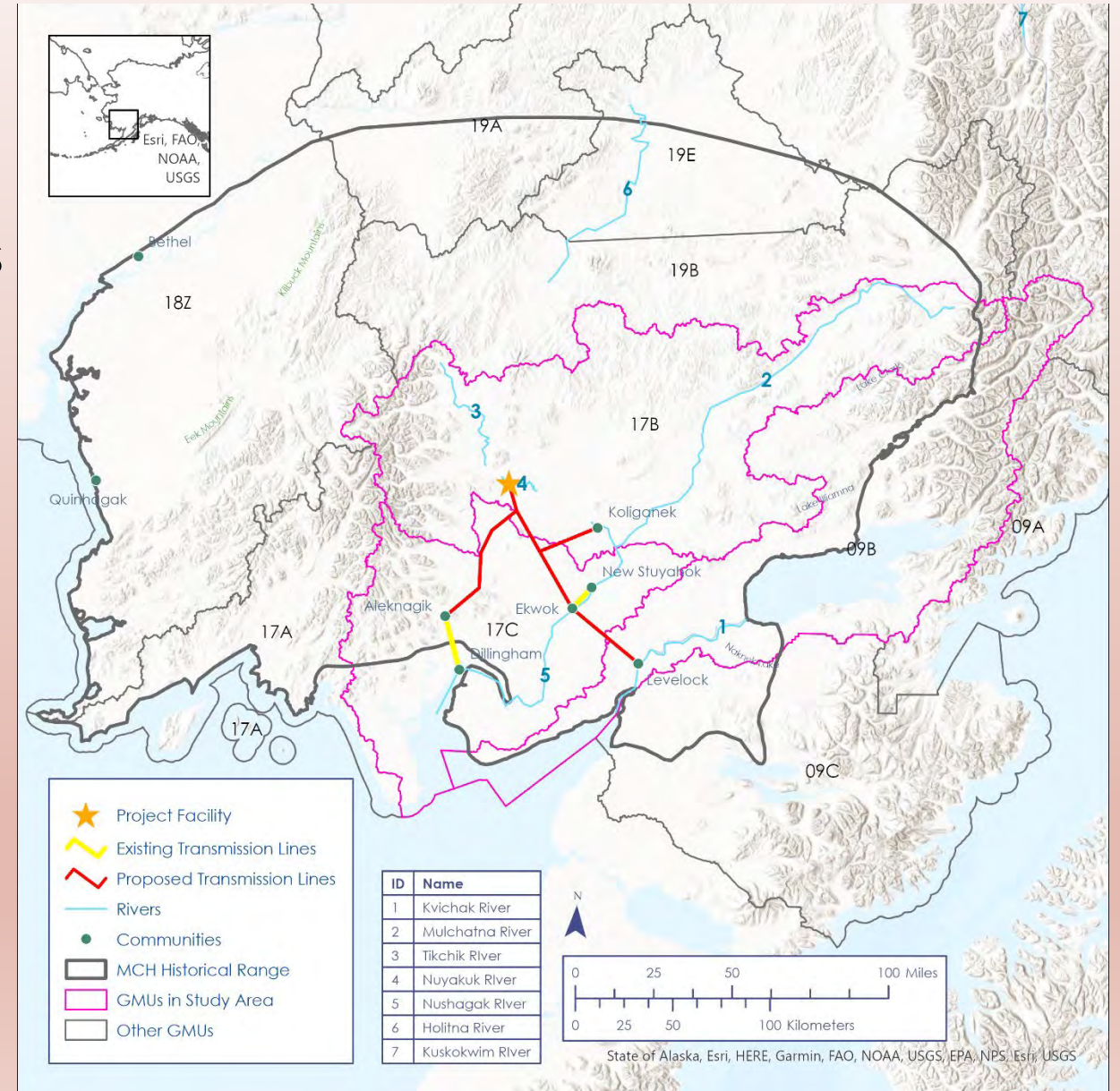
➤ 17C – Transmission Line

➤ 9B – Transmission Line

➤ Study Area

➤ ~63,500 km²

➤ ~24,500 mi²



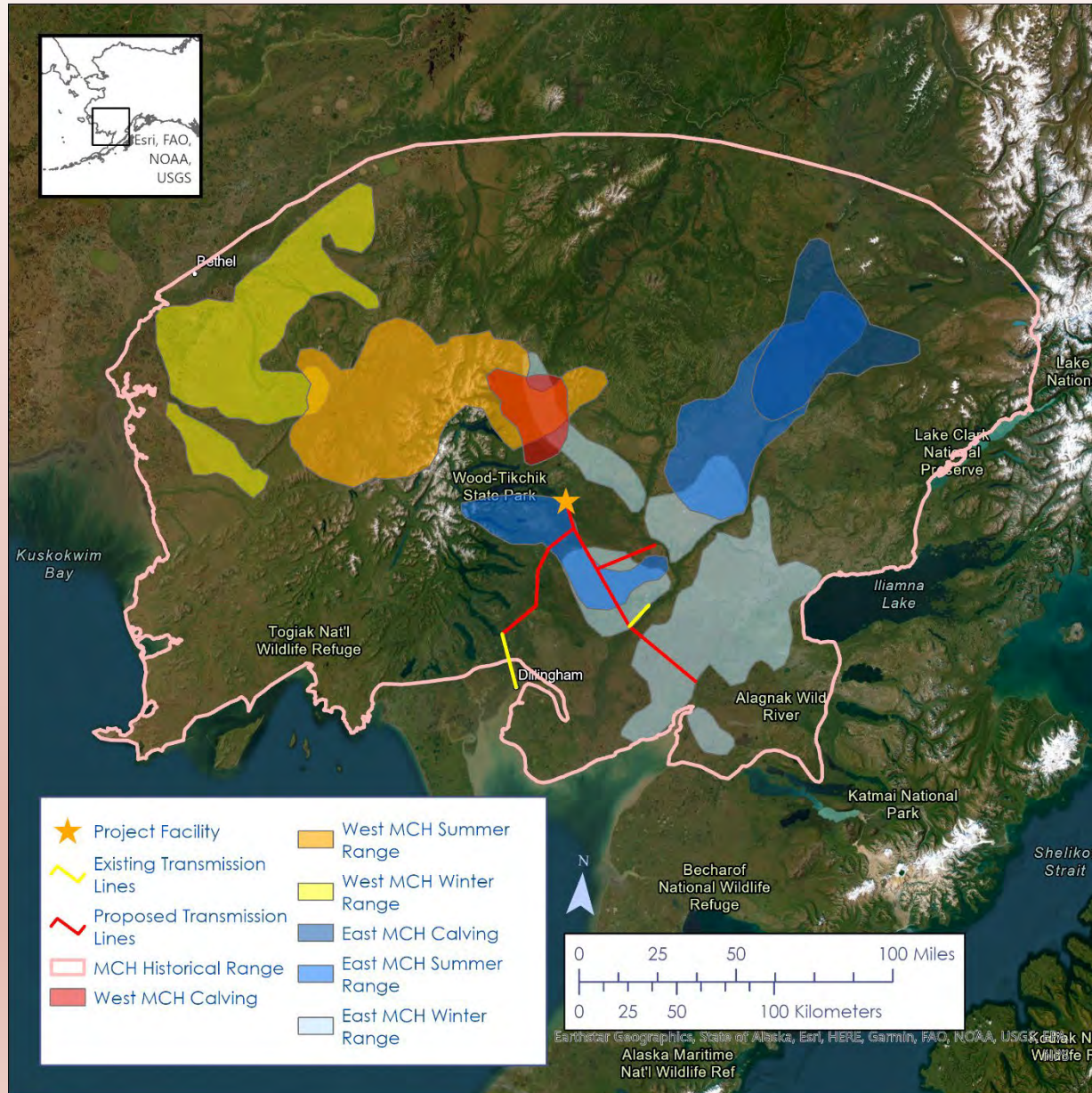
CARIBOU POPULATION EVALUATION

Methods

- Literature Review
 - Peer reviewed and gray literature
- ADFG Reports-Survey and Inventory (S&I) Program
 - Extracted data from ADFG reports
 - Overlaid historical and seasonal distribution data (shapefiles) with the study area



CARIBOU POPULATION EVALUATION



Results

- Direct habitat loss (Project footprint)
 - ~1% of MCH habitat
 - West Segment
 - Does not transect
- East Segment
 - Transects summer and winter range
- Does not overlap current calving areas

Moving Forward

- Form a working group
- Continue to evaluate impacts
- Potential limited impacts may include:
 1. Habitat fragmentation/loss
 2. Behavior Responses
 3. Physiological Responses
 4. Increased Predation
 5. Increased Anthropogenic Activities

CULTURAL

SUBSISTENCE STUDY

Goals and Objectives

Goal

- Document traditional and contemporary subsistence harvest and use in the Project area

Objectives

- Utilize existing ADFG data to assess current subsistence use and document any potential impacts associated with Project development
- Comprehensive efforts to communicate with the public in Dillingham, New Stuyahok and Koliganek
 - In-person meetings/workshops
 - Proactive communication to all locations will occur to ensure as much participation as possible

SUBSISTENCE STUDY

Results/Next Steps

- Proactive efforts in 2023 to identify appropriate specialist and define methods
- As planned initially, study to be completed in 2024
- Results and analysis to be incorporated into the USR

SECTION 106 EVALUATION

Methods

- The goal of the study was to: 1.) Identify historic properties that could be eligible for the National Register of Historic Places and 2.) Assess potential effects of the Project on any such properties.
- Prior to fieldwork, the desktop study identified high probability areas using topography, aerial imagery, previously reported sites, and ethnographic and historic data.
- The field study included pedestrian survey and shovel testing within a 90-acre area. Shovel testing focused on high probability areas but also sampled other zones.

SECTION 106 EVALUATION

Results

- The survey and shovel testing identified a portage trail (DIL-00272), a pre-contact archaeological site (DIL-00271), and two possible cache pits (DIL-00270 and DIL-00273).
- The Nuyakuk Falls Portage Trail (DIL-00272) and archaeological site DIL-00271 are likely significant enough to be eligible for the National Register.
- DIL-00271 radiocarbon dates as old as 3477 BP (1527 BCE)

SECTION 106 EVALUATION

Results

- Constructing the Project as currently proposed would likely not constitute an adverse effect on either potentially significant site.
- Consultation will occur over the winter of 2023 and into 2024 to identify any intangible cultural resources such as traditional cultural properties and cultural landscapes.

SECTION 106 EVALUATION

➤ Possible cache pit
(DIL-00273)



SECTION 106 EVALUATION

- Portage trail
(DIL-00272)
- Archaeological site
(DIL-00271)



QUESTIONS?

RECREATION AND AESTHETICS

NOISE STUDY

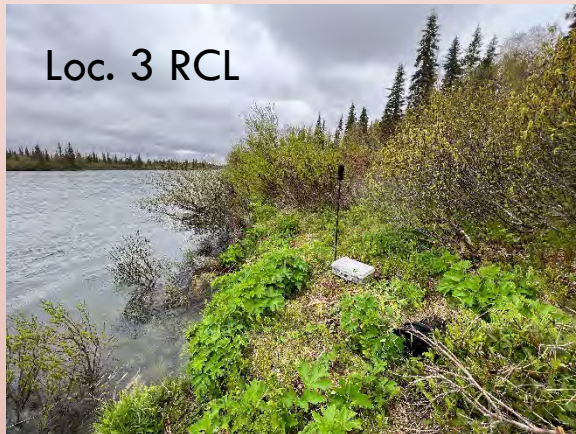
Methods

- Measure overnight sound levels at 4 locations:
 - 1: Project Site
 - 2: 11,000 feet west of Project
 - 3&4: Royal Coachman Lodge (RCL)
- Model future sound levels
 - General construction
 - Construction blasting
 - Air traffic
 - Operations
- Evaluate the potential impact / change in sound level



NOISE STUDY

Measurement Locations



Loc.1 Project Site

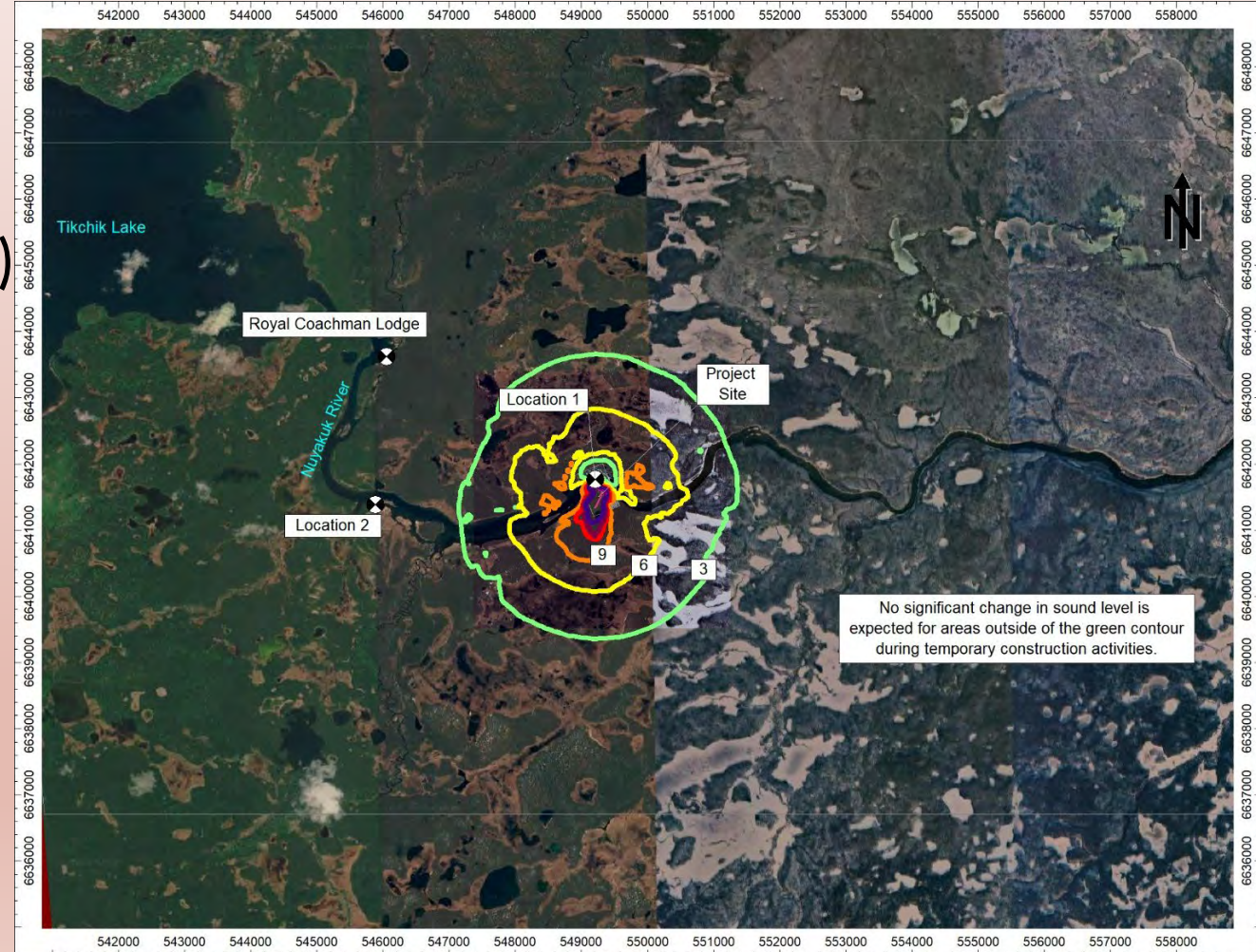


NOISE STUDY

Impact Assessment – General Construction (Temporary)

- Daytime only
- 5 dBA increase (noticeable) at edge of project area
- 1.1 dBA increase (imperceptible) at 11,000 feet
- No increase at Royal Coachman Lodge

3 dBA (barely perceptible),
6 dBA (noticeable), and
9 dBA (twice as loud) impact
contours are shown ➡



NOISE STUDY

Impact Assessment – Construction Blasting and Aircraft (Short-term)

➤ Blasting during construction

- No specific blasting plan has been developed given feasibility stage
- Blasting will be infrequent and during daytime hours
- Depending on the criteria selected, charge weights will be selected to ensure that the criteria sound levels are met

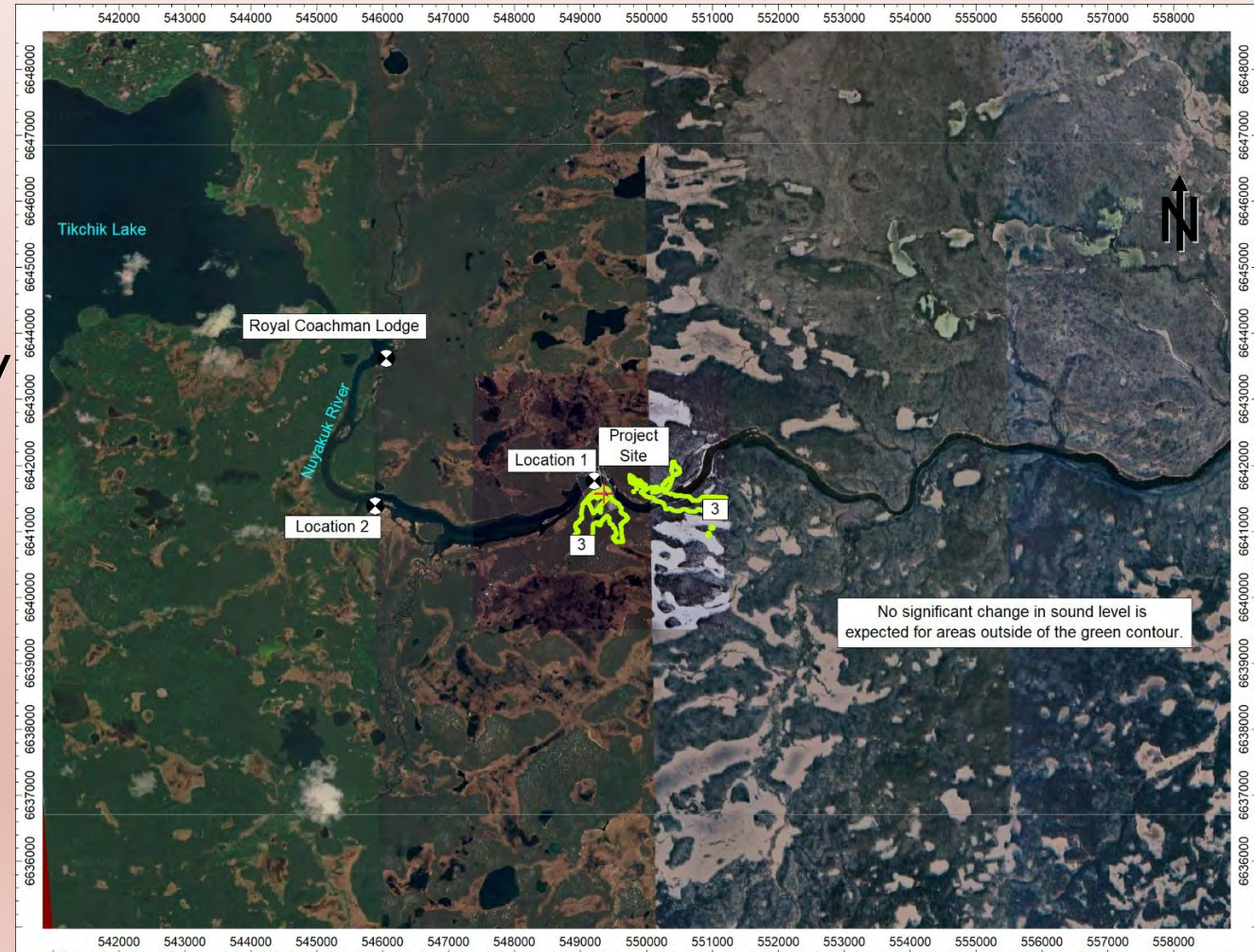
➤ Aircraft Operations

- Typical aircraft will be used
- At the RCL, aircraft sound levels will be significantly lower than existing aircraft operations due to distance (36 dBA Project vs. 80 dBA existing)

NOISE STUDY

Impact Assessment – Operations (Permanent)

- Only significant noise sources are the power-house ventilation fans
- Only a very small area would see a greater than 3 dBA (barely perceptible) increase
- 3 dBA increase area is shown inside the green contour ➡



RECREATION INVENTORY

Methods - 2023

- On Site Field Observation & Intercept Surveys at Nuyakuk River Falls
 - July 14th -19th, 2023
- Engagement with Tikchik Narrows Lodge and Royal Coachman Lodge



RECREATION INVENTORY

Results

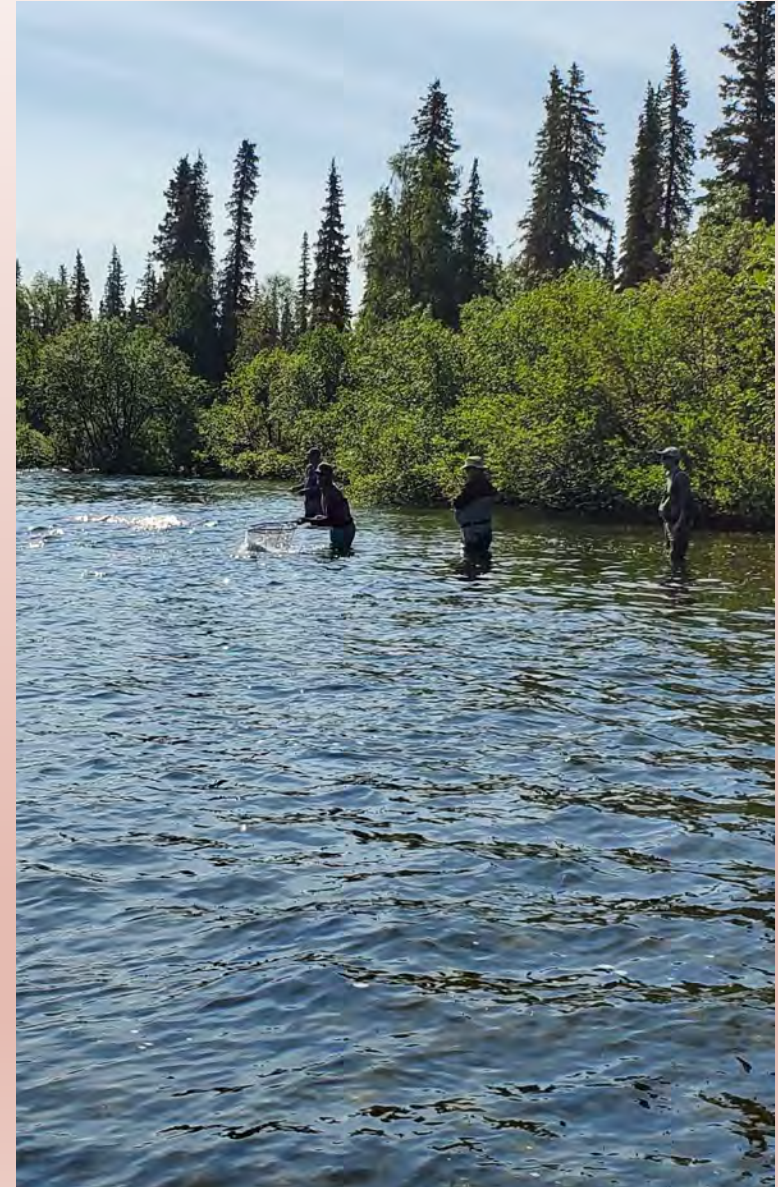
- Activities observed in the study area occurred at the Lower Falls:
 - Fishing/Angling
 - Scenic Viewing
 - Motorized Boating
 - One instance of rafting & camping was observed by non-rec study staff in August
 - Photography
- 38 total visits, 27 unique client-visitors observed
 - Visits by guided fishing groups are regular, almost daily
- All observed recreators on land or in the water were part of a guided fishing experience with Tikchik Narrows Lodge or Royal Coachman Lodge
 - Tikchik Narrows Lodge accesses the lower falls via float plan & staged motorized boat downriver
 - Royal Coachman Lodge boats downriver to above the falls, hikes Portage Trail to lower falls



RECREATION INVENTORY

Results

- 8 Intercept Survey Responses:
 - Primary recreational activity and purpose was sport fishing/angling
 - All males over 55 years of age
 - Expected to visit the falls only once during their entire trip (ranging from 9 to 14 day durations)
 - Experiences rated as “important” or “very important” (as rated on a 5-point scale where 1 = “not at all important” and 5 = “very important”):
 - Experiencing new and different things (mean = 4.57)
 - Enjoying the sights and smells of nature (mean = 4.25)
 - Being with friends, getting away from the usual demands of life, and being away from crowds (mean = 4.125)



RECREATION INVENTORY

2024 Methods

➤ Resident Surveys

- Paper & online surveys will be developed & distributed in the communities of Dillingham, Aleknagik, Ekwok, New Stuyahok, Levelock, & Koliganek
- Community Visits in Spring to conduct surveys & in Fall to report results

➤ Recreational Business Operator Data Collection & Analysis

- Data collection form will be distributed to collect at a minimum 2023-2024 data, with a request for information from 2018-2024

RECREATION INVENTORY



QUESTIONS?

CONCEPTUAL DESIGN/POTENTIAL OPERATIONS

PROJECT SIZING

Alternative 1:

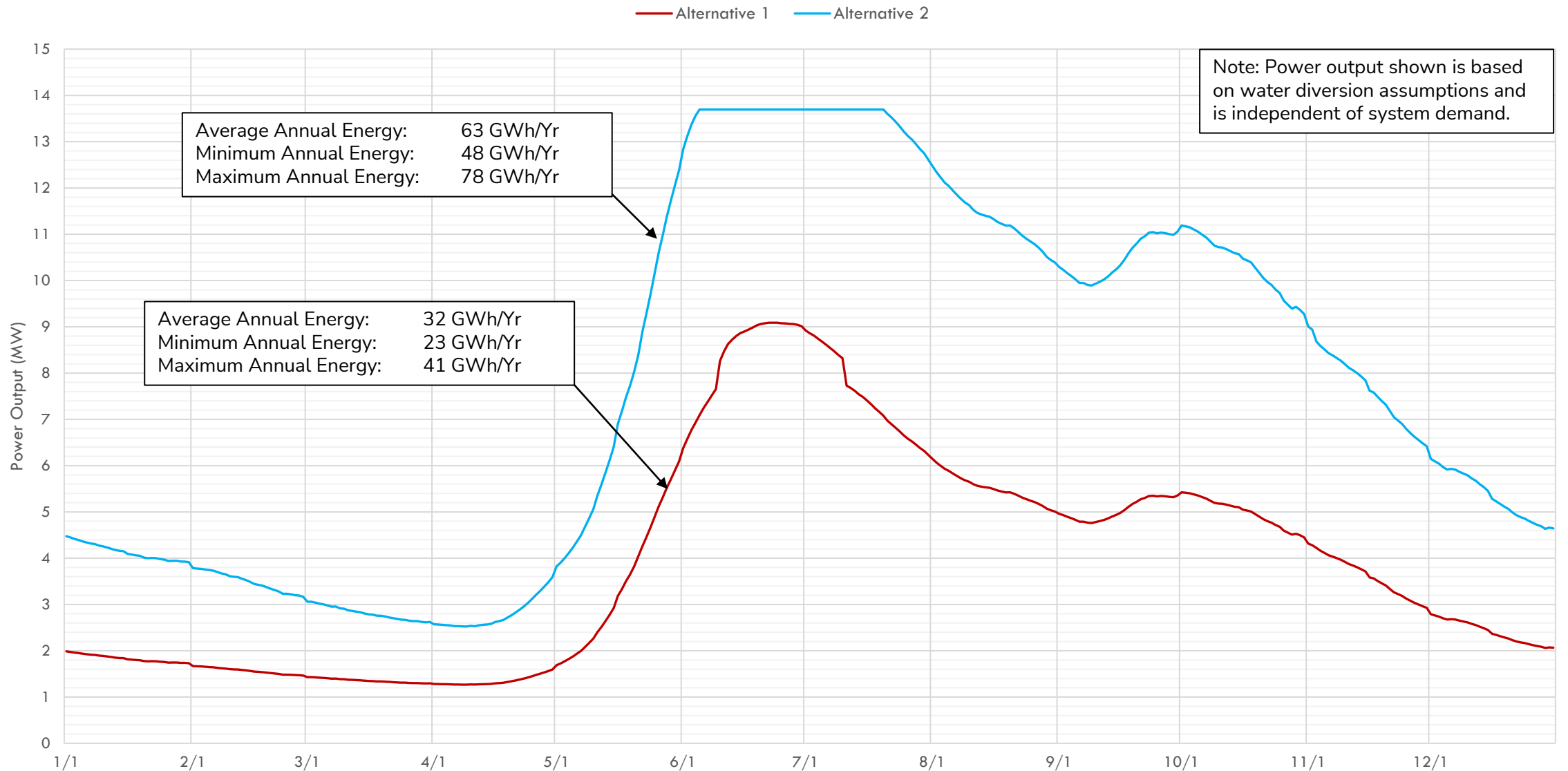
- Sized to utilize 30% of the flow in the falls for generation purposes (est. 9 MW Peak)

Alternative 2:

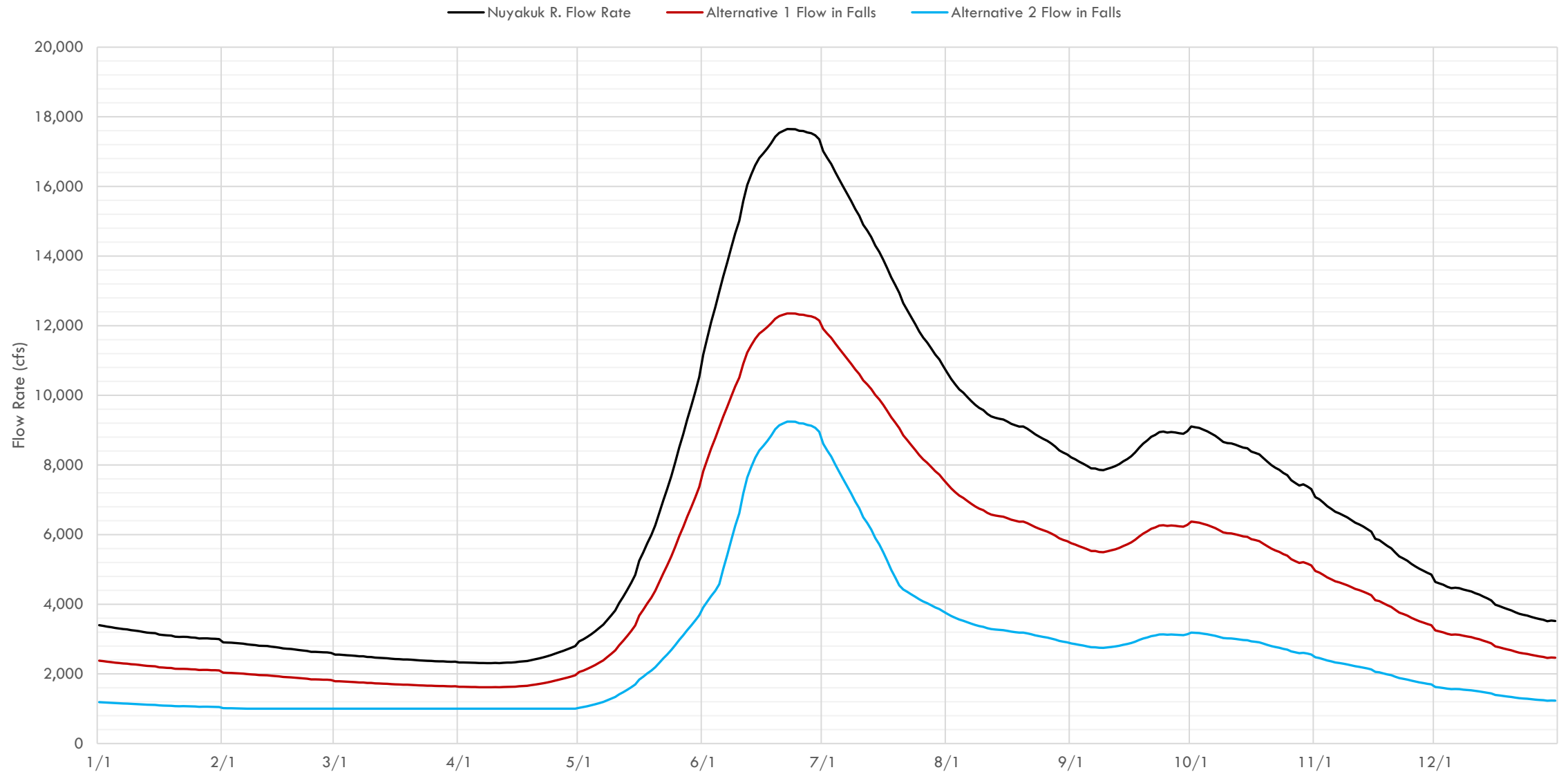
- Sized based on projected future regional power needs (Est. 14 MW Peak)
- Investigated to better understand water diversions based on maximum seasonal demand



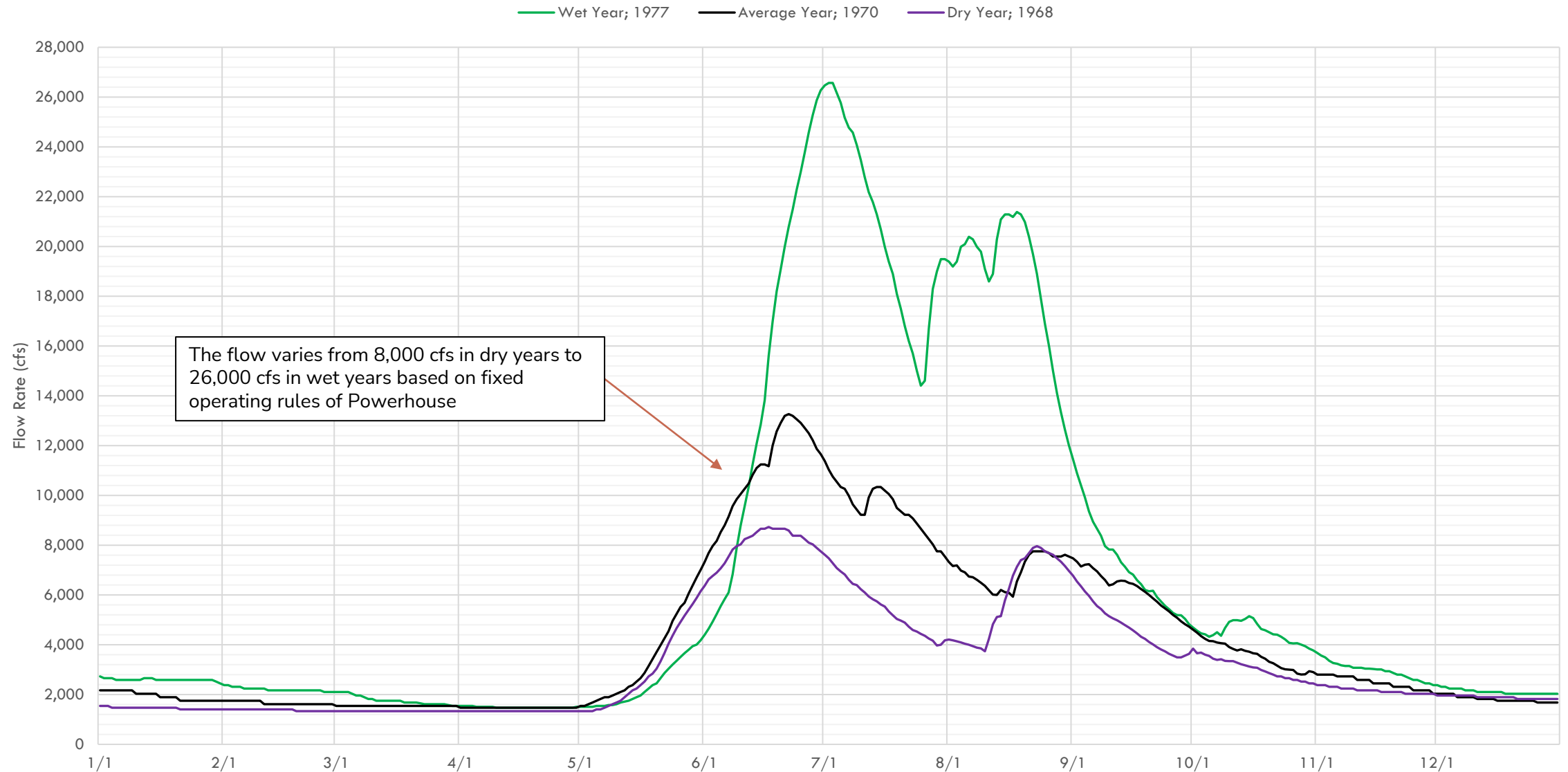
SEASONAL POWER OUTPUT — AVERAGE YEAR



FLOW REMAINING IN FALLS — AVERAGE YEAR



FLOW REMAINING IN FALLS — DRY / AVERAGE/ WET YEAR



QUESTIONS?

TECHNICAL WORKING GROUPS

- Cooperative forming 3 additional Technical Working Groups (TWG)
 - Terrestrial
 - Cultural (formation in process)
 - Recreation
- Assess 2023 results relative to overall study program and discuss need for any methodological modifications currently defined in the RSP
- Provide consistent status reports on study implementation, results and respective impact assessments
- Bi-monthly meetings (virtual) during 2024
- Sign-up sheets for in-person attendees and ljohnson@mcmillen.com or meeting chat, for those attending virtually

OVERALL PROJECT LICENSING SCHEDULE

Key FERC Milestones*

- Comprehensive Study Seasons – 2023 and 2024
- Study Reporting – 2023 and 2024
- Study Reporting Meetings – 2023 and 2024
- Ongoing Infrastructural and Site Analysis and Design – 2023-2024
- Further Geotechnical Analysis –2024
- Preliminary Licensing Proposal – 2024/early 2025
- PLP Comment Period – 2024/early 2025
- Final License Application – 2025
- FERC input – Matt Cutlip

**Both mandated and informal commenting periods will be available throughout.*

ISR COMMENTS AND COMMUNITY INPUT

ISR Comments

- Comments on ISR due to FERC on/before January 30th (Tuesday)
 - e-Filing encouraged, any questions, reach out
- If questions arise during review, reach out to the Cooperative via:
 - ljohnson@mcmillen.com

General Community Input on Potential Project Benefits and Concerns

- As communicated in mid-November and per request, survey created to receive input on the Project
- Not required by FERC process (separate), Cooperative is genuinely interested in public input
- <https://form.jotform.com/233195473949066>



- Responses may be left anonymously or with contact information
- Great objective input received thus far, thank you!

IN CLOSING, THE WHY

Documents, Plans and Reports

Alaska Fuel Price Report: Current Community Conditions

Bristol Bay Energy Policy and Energy Crisis Recovery Plan

Implementation Strategies for the Bristol Bay Energy Policy and Energy Recovery Plan May 6, 2008

A Winter Energy Saver Tip!

Bristol Bay Energy Policy & Implementation Strategies -Status Report—Update—2014

Alaska Strategic Energy Plan & Planning Handbook August 2013

Alaska Fuel Price Report – January 2015

Bristol Bay Regional Energy Plan

Phase I Resource Inventory Report November 2013

Phase II Stakeholder Engagement September 2015

Implementation Strategies for the Bristol Bay Energy Policy and Energy Crisis Recovery Plan: Phase Two

May 6, 2008

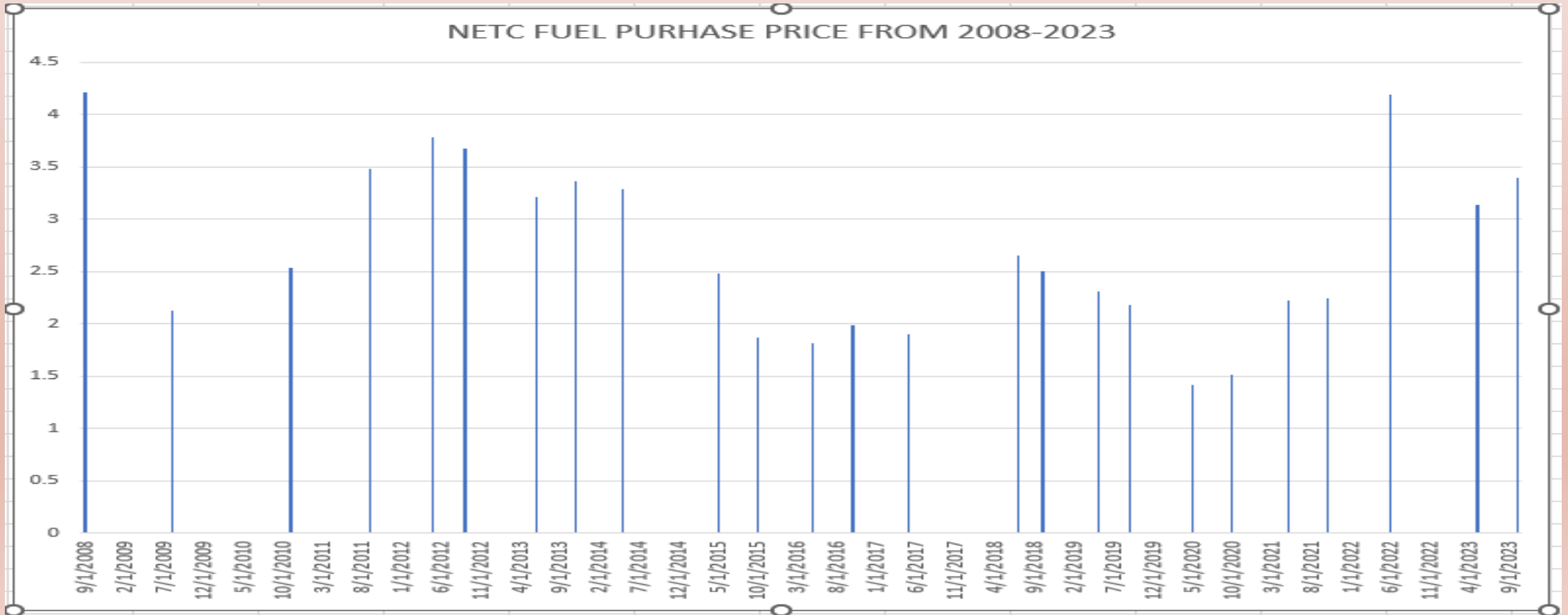


OPERATING COSTS

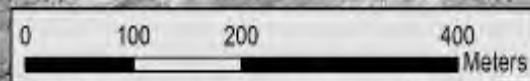
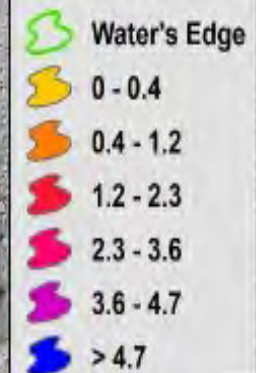
Annual maintenance on the diesels and fuel systems approximately \$400,000

Consulting ,source testing, and spill plan compliance approximately \$300,000.

During the peak of Salmon processing we can use up to 5,000 gallons daily.



Nuyakuk River Depth in Meters



Questions,
Comments,
Discussion

NIR Intensity Image

(First returns with the NIR sensor
within the water's edge boundary)



Attachment C
Federal Energy Regulatory Commission Presentation



Initial Study Report

- The purpose of the meeting is to discuss the Initial Study Report (ISR) for the Nuyakuk Hydroelectric Project FERC No. 14873-001.
- The ISR is a progress report summarizing the Cooperative's overall progress in implementing the study plan to date. The ISR should also include:
 - Variances from approved study plan
 - Any applicant proposals to modify or implement new studies



ISR Meetings

- Goals:
 - Discuss the study results.
 - Discuss the Cooperative's and any other participant's proposals to modify the study plan or develop new studies based on the data collected during the first study season.
 - If any agreements are reached, they would be documented in the Cooperative's ISR meeting summary.



Comments on ISR

- Stakeholder comment period on ISR is intended to specifically focus on disagreements about the need to modify the study plan moving forward.
- No requirement for the Cooperative to formally respond to or edit and refile the ISR.
- FERC will only act on requests to modify the study plan or new studies.

ISR Comment Period and Schedule



- Per the approved process plan that was last updated on Feb. 15, 2023, the Cooperative must file a meeting summary by **December 31, 2023**.
- Stakeholder disagreements or other requests to modify the study plan or develop new studies are due within 30 days of the ISR meeting summary due date [**by January 30, 2024**].
- Reply comments from any stakeholder due 30 days later [**February 29, 2024**].
- FERC study modification determination to follow 30 days after, if necessary [**March 30, 2024**].

Study Plan Modification



- Study Modification Requests – 18 CFR 5.15(d)(1)-(2)
- Must be accompanied by showing of good cause why the modification should be approved, and demonstrate:
 - Study was not conducted as approved; or
 - Study was conducted under anomalous environmental conditions.

New Study Requests



- New Study Requests – 18 CFR 5.15(e)
- Must Explain:
 - **(1)** Any material changes in the law or regulations applicable to the information request;
 - **(2)** Why the goals and objectives of any approved study could not be met with the approved study methodology;
 - **(3)** Why the request was not made earlier;
 - **(4)** Significant changes in the project proposal or that significant new information material to the study objectives has become available; and
 - **(5)** Why the new study request satisfies the study criteria in § 5.9(b) (e.g., project nexus, study need, accepted scientific practices)



Questions?

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