Eklutna Hydroelectric Project

Wetlands and Wildlife Habitat

Study Report

DRAFT

Prepared by:
Wendy Davis
Sue Ives
Charles Schick
ABR, Inc.

March 2023

This page intentionally left blank.

TABLE OF CONTENTS

Appendices

List of Tables

List of Figures

Terms, Acronyms, and Abbreviations

1991 Agreement	1991 Fish and Wildlife Agreement
APT	antecedant precipitation tool
AWWU	Anchorage Water and Wastewater Utility
cfs	cubic feet per second
DEM	digital elevation model
E2EM1P	Estuarine Intertidal Irregularly Flooded Persistent Emergent
E2SS1P	Estuarine Intertidal Irregularly Flooded Broad-leaved Deciduous Scrub-Shrub
E2US3N	Estuarine Intertidal Regularly Flooded Mud Unconsolidated Shore
EC	electrical conductivity
FAC	facultative plant
FACU	facultative upland plant
FACW	facultative wetland plant
FGDC	Federal Geographic Data Committee
GIS	Geographic Information System
GPS	Global Positioning System
HGM	hydrogeomorphic
HUC	Hydrologic Unit Code
IFSAR	Interferometric Synthetic Aperture Radar
L1UBH	Lacustrine Limnetic Permanently Flooded Unconsolidated Bottom
LiDAR	light detection and ranging
MOA	Municipality of Anchorage
NI	
NMFS	National Marine Fisheries Service
NRCS	Natural Resources Conservation Service
NVE	Native Village of Eklutna
NWI	National Wetlands Inventory
OBL	Obligate wetland plant
PME	protection, mitigation, and enhancement
POWTEC	Prince of Wales Tribal Enterprise Consortium
PSS1C	Palustrine Seasonally Flooded Broad-leaved Deciduous Scrub-Shrub
PWS	Professional Wetland Scientist
R3UBH	Riverine Upper Perennial Permanently Flooded Unconsolidated Bottom
U	upland
Us	upland fill
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	U.S. Geological Survey

1 INTRODUCTION

The 1991 Fish and Wildlife Agreement (1991 Agreement) was executed amongst the Municipality of Anchorage (MOA), Chugach Electric Association, Inc., Matanuska Electric Association, Inc. (collectively "Project Owners"), U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), and the State of Alaska as part of the sale of the Eklutna Hydroelectric Project (Project) from the Federal government to the now Project Owners. The 1991 Agreement requires that the Project Owners conduct studies that examine and quantify, if possible, the impacts to fish and wildlife from the Project. The studies must also examine and develop protection, mitigation, and enhancement (PME) measures for fish and wildlife affected by such hydroelectric development. This examination shall consider the impact of fish and wildlife measures on other resources, including wetlands and wildlife habitat, as well as available means to mitigate these impacts. The Project Owners initiated consultation in 2019 and have implemented studies to inform the development of the future Fish and Wildlife Program for the Project. As part of these studies, the Project Owners contracted ABR, Inc. to describe and evaluate wetlands and wildlife habitat in the Project area.

The Eklutna River valley has been the site of multiple development projects since the early 20th century, with apparent cumulative impacts to wetlands and wildlife habitats in addition to the ongoing effects of the current hydroelectric and waterline project. Operation of the existing project continues to impact habitats in the area through dewatering of the Eklutna River and large, seasonal fluctuations in the water level of Eklutna Lake.

Although coarse-scale National Wetlands Inventory (NWI) mapping (USFWS 2022) exists for the Eklutna River Valley, to date no comprehensive and fine-scale wetland and wildlife habitat mapping has been conducted for the area, with the goal of assessing impacts of the current project throughout the river drainage. The U.S. Army Corps of Engineers (USACE) conducted 2 studies focused on the lower river to evaluate the extent of cumulative, historical impacts to fish and wildlife habitat, and propose potential mitigation measures to stabilize the most degraded habitats (POWTEC 2007, USACE 2011). The Native Village of Eklutna (NVE) also developed a Wetland Program Plan (NVE 2014), which included the establishment of the Eklutna River Estuary Conservation Easement, protecting lands bordering Knik Arm from the Palmer Hay Flats State Game Refuge northeast of Eklutna to Beach Lake southwest of Eklutna.

2 STUDY OBJECTIVES

The overall goal of this study is to assess change in wetlands and wildlife habitats in the project area over time by comparing the current mapping to historical mapping based on aerial photographs from 2022 and 1950. The GIS layers developed to assess change in wildlife habitats were also used to support the Wildlife Habitat Evaluation for the project (Welch et al. 2023). The specific study objectives are to:

1. Prepare a wetland and wildlife habitat map for the study area using the most recent high-resolution satellite imagery, recent light detection and ranging (LiDAR) data, previous wetland and land cover mapping that includes the project area, and field ground-reference data collected in 2022.

2. Add vegetation, macrotopography, and disturbance attributes to all map polygons including uplands to facilitate the development of wildlife habitat and wetland functional type maps using an Integrated Terrain Unit methodology (Wells et al. 2020).
3. Prepare a wetland functional assessment applied to wetland functional types developed in the classification to support the retrospective image analysis by identifying the highest value wetlands in the study area.
4. Collaborate with project wildlife biologists to develop a set of wildlife habitat types that accurately represent use by the wildlife species evaluated in the Terrestrial Wildlife Studies (Welch et al. 2023).
5. Compare the extent and ecological function of current wetlands and wildlife habitats to historic conditions by preparing a historical wetland and wildlife habitat map based on a set of black and white aerial photographs of the area taken in 1950.

The wetland mapping and wetland functional assessment prepared in this study are not intended to support any Section 404 Clean Water Act wetland permitting needs because no fill in waters of the U.S. is expected to occur when implementing the final Fish and Wildlife Program for the project.

3 STUDY AREA

The study area encompasses the entire length of the Eklutna River drainage, including the estuary and beaver complex in the lower river, the alluvial fan downstream of the Old Glenn Highway bridge, the active and inactive floodplain along the river corridor up to the Eklutna Lake Dam, the pond between the dam and the lake outlet, and the lake outlet itself (limited to the extent of wetlands occupying the lacustrine fringe along the lakeshore). The boundary of the study area and the geomorphic features included in it were interpreted by digitizing polygons in ArcGIS (ArcMap) using photo-signatures visible in the 2022 project imagery and data available in the 2022 project LiDAR. The study area encompasses 1,357.5 acres (Figure 3.1-1), and is located within portions of 4 Hydrologic Unit Code (HUC) level-12 subwatersheds: Eklutna Lake, Thunderbird Creek, Outlet Eklutna River, and Knik Arm-Frontal Cook Inlet (USGS 2019).

The georeferencing technique used for the 1950 aerial photographs placed the black and white imagery very close to the reference points visible in both the 1950 and 2022 imagery, but control was not exact and the study area boundaries had to be adjusted for the 1950s mapping. Both study areas include all riverine-influenced areas that were assessed in the current mapping. The boundaries of the 1950 study area, encompassing 1,414.3 acres, were digitized using the same ArcGIS delineation technique described above. The total mapped area in the 1950 is larger than the area mapped in 2022, which is likely due to errors associated with the 2D georeferencing technique.

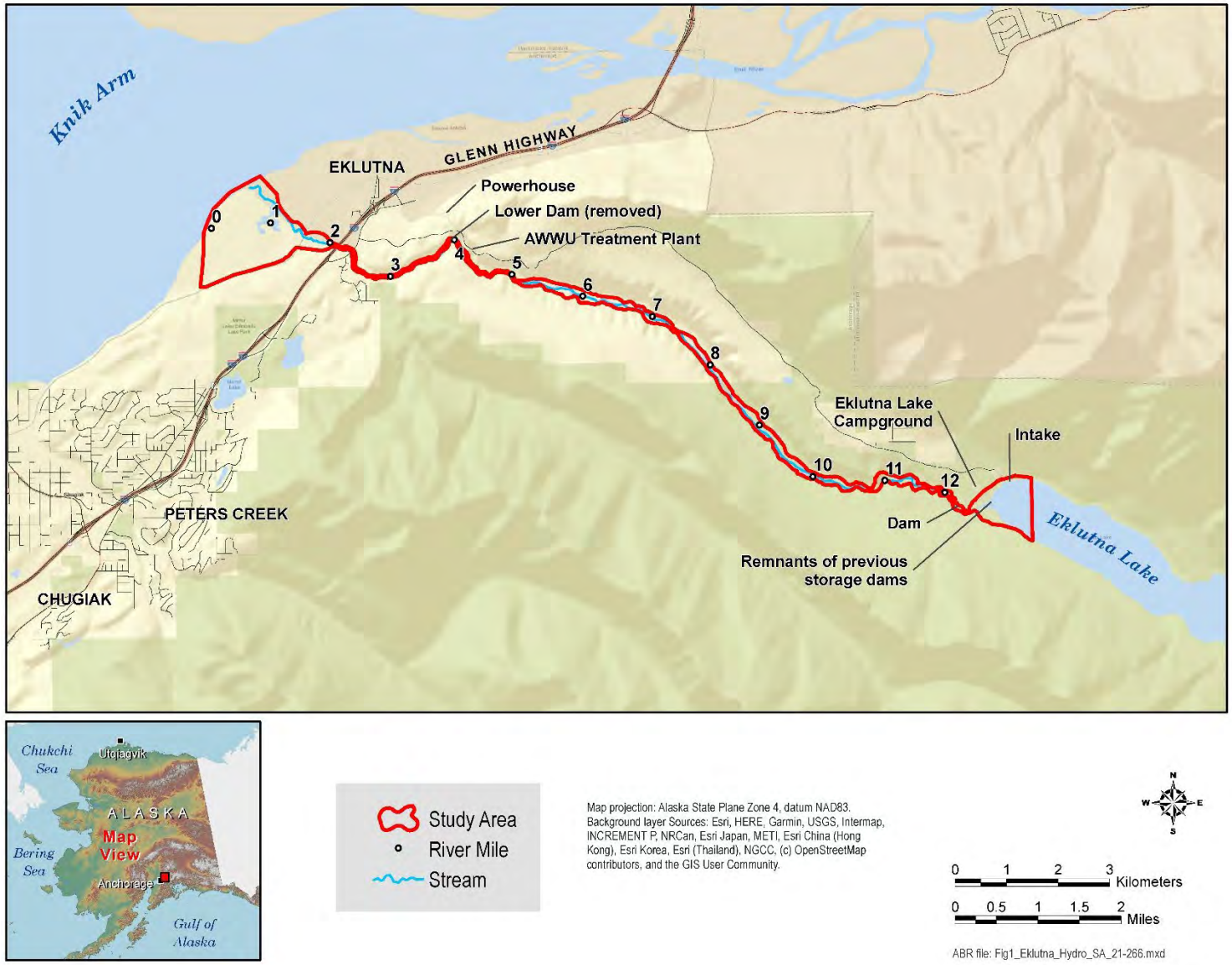


Figure 3.1-1. Wetlands and Wildlife Habitat Study area, Eklutna Hydroelectric Project, 2022.

4 METHODS

4.1. Compile Existing Data

A preliminary wetland and vegetation map was prepared prior to the field survey using data available from existing map layers (MOA 2022, USFWS2022) and by photo-interpretation of landforms, topography, color photo-signature, and hydrologic features visible in the high-resolution satellite imagery for the study area. The most recent project aerial imagery was acquired by NV5 Geospatial–Alaska on 15 May 2022; this is a 4-band aerial mosaic at 0.15 m pixel resolution, which was supplemented with an additional imagery acquired by NV5 Geospatial–Alaska for the project on 28 May 2020 at 0.15 m pixel resolution. Two black and white contact prints acquired in September 1950 were obtained from U.S. Geological Survey (USGS) and georeferenced using the ArcGIS spline transformation with approximately 20 2D reference points selected per frame. The preliminary map was used to identify focus areas for the field survey.

The historical aerial photographs and ground-based photography obtained from NV5 Geospatial–Alaska and compiled by McMillen Jacobs Associates were reviewed and evaluated for suitability in the change-detection process. The 1950 black and white USGS aerial images were selected on the basis of clarity, scale, and time period. The 1950 imagery predates the large-scale gravel extraction and diversion of the Eklutna River near the estuary, the construction of the existing Eklutna Hydroelectric Project in 1955 and the diversion of Eklutna Lake water from the river (excepting spill events), the construction of the Anchorage Water and Wastewater Utility (AWWU) waterline and access road, the construction of the New Glenn Highway bridge, and the large fluctuations in the water level of Eklutna Lake seen today. The narrow steel railroad bridge, the Old Glenn Highway bridge, the lower river dam, and previous Eklutna Lake storage dams were all present and identifiable in the 1950 imagery.

Data relevant to the Wetland and Wildlife Habitat Study were compiled and reviewed, including:

- high-resolution imagery depicting current conditions
    - Project-specific aerial photography and LiDAR collected by NV5 Geospatial–Alaska in May 2020 and May 2022
    - historical aerial photography from 1950, USGS scanned and georectified contact prints
- topographic contours
    - Interferometric Synthetic Aperture Radar (IFSAR) digital elevation model (DEM; USGS 2019) at 5-m resolution
    - LiDAR data collected for the project area by NV5 Geospatial–Alaska in 2020 and 2022
- wetlands mapping
    - current National Wetlands Inventory (NWI) mapping (USFWS 2022)
        - eastern portion of the study area was photo-interpreted using 1:65,000 scale, color-infrared imagery from 1978
        - western portion of the study area was photo-interpreted using 1:24,000 scale, true color imagery from 2002

    - current MOA wetlands mapping (MOA 2022)
- relevant technical reports
    - Anchorage Wetlands Management Plan (MOA 2014)
    - Native Village of Eklutna Wetland Program Plan (NVE 2014)
    - Floristic survey of the Eklutna River valley (Marvin 1986)
    - Eklutna River aquatic ecosystem restoration technical report (USACE 2011)

4.2. Field Survey

A field survey was conducted to confirm the types and locations of wetlands, waters, and wildlife habitats present in the study area. Over the course of 4 days, 2 ABR vegetation ecologists sampled a preselected set of wetland determination plots representative of the wetland and wildlife habitat photo-signatures visible in the 2022 imagery. Wetland determination plots were sampled following the USACE 3-parameter approach for defining wetlands (Environmental Laboratory 1987) and the methodology described in the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Alaska Region (USACE 2007). At each wetland determination plot, we recorded the USACE-required data to determine the presence of hydrophytic vegetation, hydric soils, and wetland hydrology.

The absolute cover of each vascular plant species at each plot was visually estimated within a 10 m radius and the presence of hydrophytic vegetation was determined using the Dominance Test (ratio of wetland versus upland-dominant plants) and/or the Prevalence Index (weighted average of all species present). Plant taxonomic nomenclature was based on Viereck and Little (2007) for trees and shrubs, Skinner et al. (2012) for grasses, and Hultén (1968) for all other vascular taxa. The wetland indicator status for each vascular plant species was defined following the 2020 National Wetland Plant List v.3.5: Alaska (USACE 2020). Wetland determination plot dimensions were modified to linear, oblong areas when sampling along small drainages to properly characterize the plant communities in those areas.

Hydric soils form under conditions of saturation, flooding, or ponding that persist long enough during the growing season to cause anaerobic conditions to develop in the upper 12 inches of the soil. Hydric soils often have thick organic deposits (histosols, histels, or histic epipedons) or a low-chroma mineral soil matrix color with redoximorphic features, indicating a reducing environment. Soil pits were excavated to approximately 20 inches and the soil profile was described. Key characteristics, including color (Munsell 2010) and the occurrence and abundance of redoximorphic features, were recorded. Soil profile descriptions were compared with hydric soil criteria in the current version of the *Field Indicators of Hydric Soils in the United States* (USDA NRCS 2018).

Wetland hydrology is defined as the presence of flooded or ponded surface water or saturation within the upper 12 inches of the soil profile that persists for at least 14 consecutive days during the growing season, in at least 5 years out of 10. Surface and subsurface direct and indirect indicators of wetland hydrology were recorded at each site when present; these included surface water, saturated soils, presence of and depth to water table, drift or sediment deposits, drainage patterns, and geomorphic position, as noted in the standard USACE wetland determination data form (USACE 2007).

Photographs of the sample plot area, the ground surface and vegetation present, and the soil profile from the soil pit were taken at each plot, and global positioning system (GPS) location coordinates were also recorded. In addition to wetland determination plots, we also sampled map verification plots, at which a subset of wetland data were collected to verify the wetland or upland status for photo-signatures that had been previously sampled with full wetland determination plots. Sampling was also conducted in non-wetland areas to document the wildlife habitat types occurring in jurisdictional upland areas that were not mapped in the wetlands layer.

In addition to the standard suite of wetland delineation data, we recorded hydrogeomorphic (HGM) class (USDA NRCS 2008), Viereck Level IV type (Viereck et al. 1992), physiography type, geomorphic type, measurements of ground and surface water acidity or alkalinity (pH), electrical conductivity (EC) as an index of salinity, and any evidence of wildlife use. These additional variables were used to support the wetland functional assessment and wildlife habitat classification.

All field data were recorded on customized, ABR-prepared apps, running on Android tablet computers. Navigation at the site was done using ArcGIS Collector (accessed through ArcGIS online), which allowed real-time depictions of plot locations in the field on the same satellite imagery used in the wetland mapping. Upon completion of field work, the data were uploaded to a wetland-specific relational database maintained on ABR servers, and were subjected to a set of sequential data quality assurance/quality control procedures to ensure their accuracy before being used to prepare the wetland map for the project. The ABR wetland database facilitates preparation of the required wetland data forms for each wetland determination plot following USACE guidelines (USACE 2007).

To place the hydrological conditions in the study area at the time of sampling in mid-August 2022 in context, we performed a precipitation analysis similar to the USACE's Antecedent Precipitation Tool (APT). This involved summarizing precipitation data from the nearest meteorological station and filling any missing records with data from the next nearest station. Data from the meteorological station nearest to the study area (Matanuska-Experiment Farm station in Palmer, AK) with both long-term averages and daily precipitation values for the current season (see Arguez et al. [2012] and Menne et al. [2012]), were downloaded and temperature and precipitation in 2022 were compared to long-term averages. Current-year 30-day rolling precipitation sums were compared with 30 years of 30-day rolling precipitation sums at the 30th and 70th percentiles, which are a reasonable interpretation of normal conditions.

4.3. Wetland Mapping and Classification

All wetland and upland boundaries were digitized using ArcGIS software at a scale of approximately 1:2,000. Map polygons were attributed with NWI wetland classes following the Federal Geographic Data Committee (FGDC 2013), which is the approach typically used by the U.S. Fish and Wildlife Service's NWI program (Dahl et al. 2015). Each polygon was also attributed with HGM class (USDA NRCS 2008), Viereck et al. (1992) Level IV vegetation class, a macrotopography class, and a disturbance class.

The digital, high-resolution satellite imagery and aerial photography (current and historical eras, respectively, see Section 3.1 above) was used as the geographic basis for the identification of wetland boundaries. Wetlands were identified based on specific image signatures, presence or absence of surface water, and landscape positions (as determined from the imagery or available LiDAR data) that could support wetland soils. Wetland boundaries were delineated by photo-interpreting vegetation classes, HGM classes, local topography, and surface water connections evident in the imagery, in conjunction with site-specific information from the field survey data.

4.4. Wildlife Habitat Map Development

Wildlife habitats were derived by combining NWI wetland types and Viereck Level IV vegetation classes, incorporating additional macrotopography and disturbance attributes as needed, and aggregating the composite, multivariate map classes by habitat characteristics known to be important for wildlife. Important wildlife habitat characteristics include vegetation structure, forage quality or quantity, and the spatial and temporal arrangement of habitats, which translate to food availability and security, shelter, denning, or breeding habitat. We worked closely with the project wildlife biologists to develop mapped habitat types known to be used by the wildlife species that have been recorded or are expected to occur in the study area. We also assisted the wildlife biologists in assessing habitat use for the wildlife species evaluated and in assigning categorical habitat-value rankings for the mapped wildlife habitats in the Wildlife Habitat Evaluation (Welch et al. 2023).

4.5. Wetland Functional Assessment

The purpose of the wetland functional assessment for this report is to generally identify the highest value wetlands currently found within the study area. This was done to support the retrospective image analysis (see below) and generally identify the most significant losses to wetland function in the area over time. This functional assessment is not intended to support a specific impact analysis or calculation of wetland debits and credits for compensatory mitigation. In the functional assessment, wetland functional classes (groups of wetland types that share the same ecological functions) were defined for the wetlands and waters mapped in the study area, and were included with the wildlife habitat types. In addition to wildlife habitat characteristics of wetlands, typical wetland functions (see below) were also considered in deriving wetland functional classes. The functional assessment was based on best professional judgment, classifying each wetland functional class into higher, lower, or absent rankings depending on standard indicators of wetland function used in the Alaska Functional Ranking System (ranking system developed by ABR to be used in a variety of regions within Alaska), with additional indicators from the Anchorage Wetland Management Plan (MOA 2014). The functions evaluated include fish habitat suitability, avian and mammal habitat support, organic matter production and export, sediment nutrient and toxicant removal, flood attenuation and storage, erosion control and shoreline stabilization, groundwater discharge and recharge, and educational, scientific, recreational, or subsistence use. The functional rankings were assigned values of 2 = higher function, 1 = lower function, and 0 = absent function. The totals for each wetland functional class were then used to identify the highest functioning wetlands within the study area.

4.6. Retrospective Image Analysis

Wetland and wildlife habitat mapping based on current satellite imagery was compared to the mapping based on historical imagery, to assess the extent and general locations where habitat change has occurred. The set of wetland and wildlife habitat types developed for the current map layer was used to help delineate the 1950 study area by overlaying the current mapping on the 1950 black and white imagery, with the assumption that no different wildlife habitats were present in 1950. As noted above in Section 4.1, disturbance had occurred in the area prior to 1950 but no suitable earlier imagery covering the entire river drainage was available for this historical analysis. Therefore, historical disturbance was assessed using the conditions in 1950 as a baseline and evaluating changes in wetlands and wildlife habitats that occurred after the federal project initiated operations in 1955, which resulted in substantial changes in the conditions in the river and lake. Habitat gains or losses from 1950 were assessed by comparing the total acreage of similar habitats between the current and historical map layers. In addition, each polygon in the current map layer was assigned a change class of no change, disturbed, or disturbed and revegetated. The no change class includes naturally occurring vegetation types occurring on typical unaltered macrotopographic features and is devoid of evidence of disturbance. Disturbed habitats include open water, barrens, or partially vegetated surfaces with human modified macrotopography, and show evidence of disturbance. The disturbed and revegetated class includes completely revegetated habitats occurring on disturbed topographic features. Classification of the type of change allowed us to identify those habitats that are most resilient across a variety of disturbances.

5 RESULTS

5.1. Field Survey

Field surveys were conducted from 9–12 August 2022 by Sue Ives (Professional Wetland Scientist [PWS] #2623) and Robert McNown (PWS #3554) of ABR. Standard USACE 3-parameter wetland determinations were completed at 31 field plots (Appendix A). In addition, map verification plots were completed at 25 locations (Appendix B). GPS accuracy for the locations of the sampled plots ranged from 1 to 4 meters, with a median accuracy of 1 meter. All vascular species observed during the field survey are listed in Appendix C by the NWI type they occurred in.

The meteorological station nearest to the study area with both long-term averages and daily precipitation values for the current season is the Matanuska Experiment Farm (station USC00505733), located approximately 10 miles from the study area (see Arguez et al. [2012] and Menne et al. [2012]). Compared to the long-term averages for this station, the growing season temperatures in 2022 were near normal (Table 5.1-1). May and June 2022 were slightly drier than normal, with 65–75% of the normal monthly precipitation. July and August, however, were substantially wetter than normal with nearly twice the normal amount of rainfall.

Table 5.1-1. Monthly mean (May 1–August 31, 2022) and long-term normal (1991–2020) values for air temperature (°C) and total monthly precipitation (mm) for the Matanuska Experiment Farm weather station, AK (station id USC00505733).

	Temperature (°C)			Precipitation (mm)			
Month	2022	1991–2020	Difference from Normal	2022	1991–2020	% of Normal	n
May	9.6	9.1	0.5	13.6	18.3	74.4	31
June	15.2	13.4	1.8	20.7	31.0	66.7	30
July	15.2	15.1	0.0	95.3	48.8	195.3	31
August	13.0	13.7	-0.7	121.7	63.0	193.2	31

To place the hydrological conditions in the study area at the time of sampling in mid-August 2022 in context, we performed a precipitation analysis similar to the USACE's APT (Figure 5.1-1). The Matanuska Experiment Farm station provides 96% of the long-term data for the APT. Two stations in Eagle River (Eagle River 5 SE and Eagle River Nature Center, stations USC00502656 and USC00502642, respectively) were used to gapfill most of the missing records. Figure 5.1-1 suggests that hydrologic conditions were wetter than normal immediately preceding and during the field visit from 9–12 August 2022, and direct observations of wetland hydrology could be expected for any wetlands within the study area.

Flows at river miles 2, 8, and 12 were 121, 16, and 0 (dry channel) cubic feet per second (cfs) at the time of the field survey (project gaging data, Charles Sauvageau, McMillen, Inc. *pers. comm.*). The only special water release from the upper dam in 2022 occurred on 21 August, after the field survey, which emptied the pond upstream from the upper dam temporarily. During the time of the field survey, flows were in the normal range with normal dam operations (no release from the upper dam).

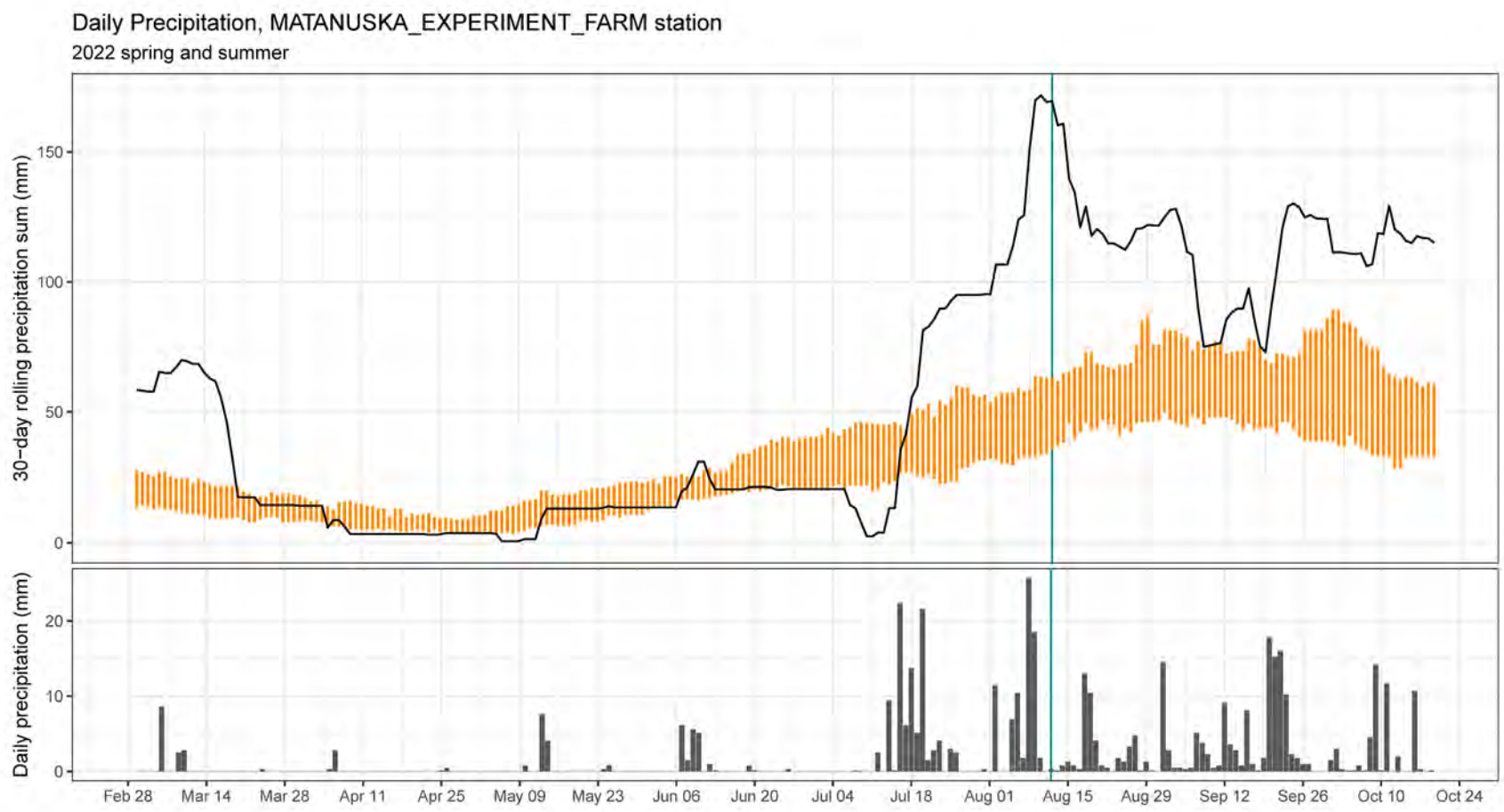


Figure 5.1-1. Antecedent Precipitation for the Wetlands and Wildlife Habitat Study area, Eklutna Hydroelectric Project, 2022.

5.2. Wetland Mapping and Classification

A total of 23 NWI types were identified in the study area: 12 water, 9 wetland, and 2 upland types. Each NWI type is described in Table 5.2-1. Supporting field data are presented in Appendices A and B, and Appendix C presents a list of all vascular plant species observed in the field. A map of the wetland types in the study area is presented in Appendix D.

Waters comprise 307.0 acres (22.6% of the study area) in the current imagery, and 444.9 acres (31.5% of the study area) in the historical imagery (Table 5.2-2). Lacustrine Limnetic Permanently Flooded Unconsolidated Bottom (L1UBH) is the most observed water type in both the current and historical imagery. All L1UBH waters in the study area are Eklutna Lake. Estuarine Intertidal Regularly Flooded Mud Unconsolidated Shore (E2US3N) is the second-most common water type in the current imagery. E2US3N waters include the coastal mudflats of Knik Arm, V-shaped tidal gullies, and the lowermost portion of the Eklutna River channel where the system changes from riverine to estuarine (Table 5.2-1). The second-most common water type in the historical imagery is Riverine Upper Perennial Permanently Flooded Unconsolidated Bottom (R3UBH), which is the Eklutna River.

Wetlands comprise 548.8 acres (40.4% of the study area) in the current imagery, and 472.1 acres (33.4% of the study area) in the historical imagery (Table 5.2-2). Estuarine Intertidal Irregularly Flooded Persistent Emergent (E2EM1P) is the most observed type in both the current and historical imagery (Table 5.2-2). As described in Table 5.2-1, these salt-tolerant sedge meadows are dominated by *Carex lyngbyei* (Lyngbye's Sedge), with saturation and water table at the surface. Estuarine Intertidal Irregularly Flooded Broad-leaved Deciduous Scrub-Shrub (E2SS1P) is the second-most common wetland type observed in the current imagery. E2SS1P wetlands have substantial microtopography, with *Myrica gale* (sweetgale) or *Salix* spp. (willows) growing on organic and soil hummocks surrounded by brackish water. Palustrine Seasonally Flooded Broad-leaved Deciduous Scrub-Shrub (PSS1C) is the second-most commonly observed wetland type in the historical imagery, and is composed of low and tall shrubs in the Eklutna River floodplain.

Uplands comprise 501.7 acres (37.0% of the study area) in the current imagery, and 497.2 acres (35.2% of the study area) in the historical imagery (Table 5.2-2). While upland types are variable throughout the study area, mature needleleaf or mixed forests are the most abundant vegetation types (Table 5.2-1). These forests typically have moist to dry soils with very little evidence of extended saturation or flooding, and do not meet any hydric soil or wetland hydrology indicators. Upland fill (Us) covers 10.0 acres (0.7% of the study area) in the current imagery, and was not observed in the historical imagery.

Table 5.2-1. Description of waters, wetlands, and uplands mapped in the Wetlands and Wildlife Habitat Study area, Eklutna Hydroelectric Project, 2022.

Category	NWI Code	NWI Description	HGM Class	Representative Vegetation
Waters	E1UBL	Estuarine Subtidal Unconsolidated Bottom (E1UBL) waters are flooded excavations in the estuary, west of the railroad tracks. These brackish waters are unvegetated and assumed to be permanently flooded. As characterized by plot eklutna-52 in Appendix A, E1UBL waters include small areas in the vicinity of new beaver dams in the estuary. While these areas appear to be tall closed alder communities in the imagery, beavers are actively constructing a dam immediately downstream and shrubs were in at least 10 in of standing water at the time of the site visit. These areas were coded as E1UBL waters in anticipation of shrub mortality.	Depressional	Unvegetated
	E2US3N	Estuarine Intertidal Regularly Flooded Mud Unconsolidated Shore (E2US3N) waters are the coastal mudflats of Knik Arm, including V-shaped tidal gullies and the lowermost portions of the Eklutna River where the system transitions from riverine to estuarine. The unvegetated fine substrate is flooded by the tides at least once per day.	Estuarine Fringe	Unvegetated
	R1UBV	Riverine Tidal Permanently Flooded-Tidal Fresh Unconsolidated Bottom (R1UBV) waters are the lower portion of the Eklutna River, west of the railroad tracks. Hydrology is driven primarily by nontidal inputs, but tidal forces do influence these waters. Water levels in these permanently flooded areas rise and fall in response to daily tides, and ocean-derived salts measure less than 0.5ppt. As mapped, R1UBV waters include small portions of Riverine Tidal Regularly Flooded-Tidal Fresh Unconsolidated Shore (R1USQ) waters below the minimum map unit size (see eklutna-43 in Appendix A).	Riverine	Unvegetated
	R1USQ	Riverine Tidal Regularly Flooded-Tidal Fresh Unconsolidated Shore (R1USQ) waters are associated with the R1UBV portion of Eklutna River. R1USQ areas have fine substrates, are barren to partially vegetated, and are tidally flooded daily for variable periods during the growing season.	Riverine	Unvegetated

Table 5.2-1, continued.

Category	NWI Code	NWI Description	HGM Class	Representative Vegetation
Water	R3UBH	Riverine Upper Perennial Permanently Flooded Unconsolidated Bottom (R3UBH) waters within the study area are the Eklutna River upstream of the estuarine zone. As documented by numerous field points (Appendices A and B), the high gradient system has high velocity clear water, limited floodplain development, and coarse substrates that are often comprised of gravels and cobbles. The Eklutna River was characterized as an R3UBH water for all but approximately 2 miles in the upper river, where it transitions to an intermittent stream below the dam (see R4SBC below).	Riverine	Unvegetated
	R3USA	Riverine Upper Perennial Temporarily Flooded Unconsolidated Shore (R3USA) waters occur adjacent to the upper perennial section of the Eklutna River. These barren to partially vegetated areas are covered by surface water for days to weeks at a time, but otherwise have a water table well below the surface. Large portions of the Eklutna River channel are currently classified as R3USA, because the reduced flow limits the establishment of permanently flooded areas (R3UBH) to only a small portion of the channel bed. R3USA waters are likely over-represented in the current conditions map, as they were often difficult to distinguish from partially vegetated PSS1C shrub wetlands using imagery alone, and R3USA was used if there was uncertainty about which type was present.	Riverine	Unvegetated

Table 5.2-1, continued.

Category	NWI Code	NWI Description	HGM Class	Representative Vegetation
Water	R4SBC	Riverine Seasonally Flooded Intermittent Streambed (R4SBC) waters were mapped in two locations, the uppermost Eklutna River and a tributary to the Eklutna River. The uppermost section of the Eklutna River, extending approximately two miles downstream of the dam to a beaver pond (PUBHb), is classified as R4SBC. Although water was observed in the channel during the 2022 wetland field surveys (see field plot Eklutna-08 in Appendix A and Eklutna-15 in Appendix B), the Year 1 Instream Flow Study interim report (Reiser and Gagner 2022) includes this stretch of river in Reach 11, which was described as mostly dry in previous studies. The small R4SBC tributary to the Eklutna River occurs where numerous seeps and springs at the toe of a steep slope coalesce into what appears to be a intermittent stream. As characterized by plot eklutna-18 in Appendix B, shallow clear water is approximately 6 inches deep and the bottom of the water is covered by leaves and detritus.	Riverine	Unvegetated
	L1UBH	Lacustrine Limnetic Permanently Flooded Unconsolidated Bottom (L1UBH) waters in the study area are Eklutna Lake. This large, deep waterbody extends for several miles outside of the study area; only the portion of the lake nearest the outlet is included in the study area. See plot eklutna-01 in Appendix B for representative photographs.	Depressional	Unvegetated
	L2US2C	Lacustrine Littoral Seasonally Flooded Unconsolidated Sand Shore (L2US2C) is the barren shore of Eklutna Lake, where sediments are exposed as lake levels fall and flooded as lake levels rise. See plot eklutna-03 in Appendix B for representative photographs.	Lacustrine Fringe	Unvegetated
	PUBH	Palustrine Permanently Flooded Unconsolidated Bottom (PUBH) waters are 3 small ponds within the study area. These ponds are all located in the eastern portion of the study area, see plots eklutna-07 and eklutna-33 in Appendix A for representative photographs. These small, shallow ponds are visible in the aerial imagery. Narrow fringes of emergent vegetation may be included in the mapped PUBH ponds.	Depressional	Unvegetated

Table 5.2-1, continued.

Category	NWI Code	NWI Description	HGM Class	Representative Vegetation
Water	PUBHb	Palustrine Permanently Flooded Unconsolidated Bottom (beaver modified) (PUBHb) waters are 2 beaver ponds in the study area. One PUBHb is located above the canyon and extends approximately 2,000 ft along the Eklutna River. This third PUBHb encompasses new, existing ponds observed during the field survey but not shown in the imagery, and areas recently drained to mitigate access trail flooding that we assume are likely to be reflooded by beavers in the near future (see eklutna-27 in Appendix B and eklutna-23 in Appendix A). The second PUBHb is more limited in extent and is located just above the first AWWU low water crossing; this PUBHb is visible in the 2022 aerial imagery and extends for 300 feet.	Depressional	Unvegetated
	PUBHx	Palustrine Permanently Flooded Unconsolidated Bottom (excavated) (PUBHx) are ponded excavations, and 14 individual PUBHx waters are within the study area. Two PUBHx waters are located near the lake outlet, and the remaining twelve are in the former gravel mine near the estuary.	Depressional	Unvegetated
Wetlands	E2EM1N	Estuarine Intertidal Regularly Flooded Persistent Emergent (E2EM1N) wetlands are located in the estuarine zone. These halophytic wet sedge meadows typically have standing water.	Estuarine Fringe	Halophytic wet sedge meadow dominated by *Carex lyngbyei* (OBL)
	E2EM1P	Estuarine Intertidal Irregularly Flooded Persistent Emergent (E2EM1P) wetlands are located in the estuarine zone. These halophytic wet sedge meadows are flooded by tides less often than daily, and typically have less surface water than E2EM1N wetlands. As characterized by plots eklutna-39 and eklutna-41 in Appendices A and B, respectively, these wetlands have fine textured soils that meet multiple hydric soil indicators, including Histic Epipedon (A2) and Alaska Gleyed Without Hue 5Y or Redder Underlying Layer. Shallow surface water was observed, as well as saturation and water table depths of 0 inches, meeting wetland hydrology indicators Surface Water (A1), High Water Table (A2), and Saturation (A3).	Estuarine Fringe	Halophytic wet sedge meadow dominated by *Carex lyngbyei* (OBL)

Table 5.2-1, continued.

Category	NWI Code	NWI Description	HGM Class	Representative Vegetation
Wetlands	E2SS1P	Estuarine Intertidal Irregularly Flooded Broad-leaved Deciduous Scrub-Shrub (E2SS1P) wetlands are located in the estuarine zone. Similar to E2EM1P wetlands, E2SS1P wetlands are flooded by tides less often than daily. As characterized by plot eklutna-40 in Appendix A, E2SS1P wetlands have substantial microtopography, with shrubs and less salt or water-tolerant vegetation growing atop pedestals. While field data documents Myrica gale as the dominant shrub, imagery suggests that some E2SS1P wetlands in the study area are dominated by tall willows (*Salix* sp.). No soil pit was dug due to inundation, and multiple wetland hydrology indicators were met including Surface Water (A1).	Estuarine Fringe	Open Low Sweetgale-Graminoid Shrub Bog dominated by the shrub *Myrica gale* (OBL) and the herbs *Carex lyngbyei* (OBL), *Calamagrostis canadensis* (FAC), and *Trientalis europaea* (FACU).
	PEM1F	Palustrine Semipermanently Flooded Persistent Emergent (PEM1F) wetlands are located just above the estuarine zone, west of the railroad tracks. Although no field plots were located in PEM1F wetlands, they are visible in the imagery in the vicinity of the former gravel mine, west of the railroad tracks. PEM1F wetlands are likely dominated by robust sedges and have shallow surface water.	Depressional	Subarctic Lowland Sedge Wet Meadow and Fresh Sedge Marsh, likely dominated by *Carex aquatilis* (OBL)
	PEM1E	Palustrine Seasonally Flooded-Saturated Persistent Emergent (PEM1E) wetlands are located in two areas: the shores of Eklutna Lake (see eklutna-02 and eklutna-05 in Appendix A), and a depressional feature in the former gravel pit (see eklutna-54 in Appendix A). Both PEM1E wetlands met wetland hydrology indicator Surface Water (A1), and hydric soils were assumed present based on inundation.	Depressional, Lacustrine Fringe	Subarctic Lowland Sedge Wet Meadow dominated by *Carex aquatilis* (OBL), *C, kelogiii* (OBL), and *Equisetum fluviatile* (OBL) and Subarctic Lowland Grass Wet Meadow dominated by *Calamagrostis canadensis* (FAC)

Table 5.2-1, continued.

Category	NWI Code	NWI Description	HGM Class	Representative Vegetation
Wetlands	PSS1E	Palustrine Seasonally Flooded-Saturated Broad-leaved Deciduous Scrub-Shrub (PSS1E) wetlands are located in two places in the study area, at the toe of steep slopes. As characterized by plot eklutna-16 and eklutna-25 in Appendix A, these are areas of flooded forest where sediments on the ground surface, hydrogen sulfide odor when digging soil pit, and positive reaction to alpha, alpha-dipyridol indicating the presence of reduced iron all suggest that these areas are likely saturated to the surface for prolonged periods.	Slope	Black Cottonwood Woodland dominated by the tree *Populus balsamifera* (FACU), the shrub *Alnus viridis* (FAC), and the herb *Equisetum pratense* (FACW)
	PMLD	Palustrine Continuously Saturated Moss-Lichen (PMLD) wetlands are located at four places in the study area. As characterized by plots eklutna-12 and eklutna-17 in Appendix A, these wetlands appear to have calcareous substrate evidenced by marl deposits, slightly basic water, and effervescent sediments. Soils either met the problematic hydric soil indicators Alaska Gleyed without Hue 5Y or Redder Underlying Layer, had a positive reaction to alpha, alpha-dipyridol indicating the presence of reduced iron, or were assumed to be hydric because of inundation. Shallow surface water was present in places, with a water table and saturation at the surface.	Slope	Wet Bryophyte communities with low covers of vascular plants, dominated by the shrubs *Salix myrtillifolia* (FACW) and *Dasifora fruticosa* (FAC), and the herbs *Equisetum variegatum* (FACW), *Triglochin palustris* (OBL), and *Juncus castaneus* (FACW)

Table 5.2-1, continued.

Category	NWI Code	NWI Description	HGM Class	Representative Vegetation
Wetlands	PSS1C	Palustrine Seasonally Flooded Broad-leaved Deciduous Scrub-Shrub (PSS1C) wetlands are located throughout the study area. A narrow band of willows along the Eklutna Lake shores was characterized by plot eklutna-04 (Appendix B), and tall willows in the former gravel pit were mapped based on aerial imagery. All other PSS1C wetlands in the study area are riparian communities associated with Eklutna River. As characterized by plots eklutna-13, eklutna-25, eklutna-35, and eklutna-37 in Appendix A, these communities typically had problematic hydric soils. The fluvial materials have insufficient organic content for development of redox features (see Chapter 5 of USACE 2007). The primary hydrology indicators Sediment Deposits (B2) and Drift Deposits (B3) were frequently observed, indicating that Eklutna River water levels get high enough to flood these communities. PSS1C wetlands are likely underrepresented in the current conditions map, as they were often difficult to distinguish from R3USA and PUSA using imagery alone, and R3USA or PUSA was used if there was uncertainty in the amount of shrub cover.	Depressional, Lacustrine Fringe, Riverine	Open to Closed Tall Willow and Tall Alder Willow dominated by the tree *Populus balsamifera* (FACU); the shrubs *Alnus viridis* (FAC), *Cornus stolonifera* (NI), *Salix alaxensis* (FAC), and *S, barclayi* (FAC); and the herbs *Calamagrostis canadensis* (FAC), *Coptidium lapponicum* (OBL), and *Equisetum pratense* (FACW)

Table 5.2-1, continued.

Category	NWI Code	NWI Description	HGM Class	Representative Vegetation
Wetlands	PFO1C	Palustrine Seasonally Flooded Broad-leaved Deciduous Forest (PFO1C) wetlands are located west of the highway, in an area of complex hydrology with numerous small channels and sheet flow across the ground surface. As characterized by plots eklutna-46 and eklutna-49 in Appendix A, these areas meet wetland hydrology indicator Surface Water (A1). Soils were problematic, with a positive reaction to alpha, alpha-dipyridol indicating the presence of reduced iron.	Riverine	Open Black Cotton-wood Forest dominated by the trees *Betula neoalaskana* (FACU), *Populus balsamifera* (FACU), and *Salix alaxensis* (FAC); the shrub *Alnus viridis* (FAC); and the herbs *Arctagrostis latifolia* (FACW), *Coptidium lapponicum* (OBL), *Equisetum pratense* (FACW), *Galium boreale* (FACU), *Mertensia paniculata* (FACU), and *Thalictrum sparsiflorum* (FACU)
	PUSA	Palustrine Temporarily Flooded Unconsolidated Bottom (PUSA) wetlands are located only in the upper 2 miles of the Eklutna River valley. PUSA wetlands are very similar to the R3USA wetlands mapped lower in the Eklutna River valley, but because they occur adjacent to the intermittent and often dry stream channel (R4SBC) in the upper river, they are treated as palustrine, not riverine wetlands. These barren to partially vegetated areas can be covered by surface water for days to weeks at a time, but otherwise have a water table well below the surface. PUSA waters are likely over-represented in the current conditions map, as they were often difficult to distinguish from partially vegetated PSS1C shrub wetlands using imagery alone, and PUSA was used if there was uncertainty about which type was present.	Riverine	Unvegetated

Table 5.2-1, continued.

Category	NWI Code	NWI Description	HGM Class	Representative Vegetation
Uplands	U	Upland (U) are present throughout the study area. While U encompasses a broad array of communities in the study area, the most abundant are mature needleleaf or mixed forests. Soils were typically moist to dry with high value and chroma, and plots within U communities did not meet hydric soil or wetland hydrology indicators (Appendix A).	N/A	Various
	Us	Upland (fill) (Us) is present throughout the study area and includes features such as the utility corridor access trail, the Glenn Highway, and the railroad. The access trail is mapped as U, not Us, where it appears to be cleared but not filled.	N/A	Unvegetated

Table 5.2-2. Areal extent (acres and percent of study area) of waters, wetlands, and uplands mapped in the Wetlands and Wildlife Habitat Study area, Eklutna Hydroelectric Project, 2022.

Category	NWI Code	NWI Description	Current Conditions		Historical Conditions	
			Area (acres)	% of Study Area	Area (acres)	% of Study Area
Waters	E1UBL	Estuarine Subtidal Unconsolidated Bottom	9.2	0.7		
	E2US3N	Estuarine Intertidal Regularly Flooded Mud Unconsolidated Shore	97.3	7.2	50.9	3.6
	R1UBV	Riverine Tidal Permanently Flooded-Tidal Fresh Unconsolidated Bottom	4.3	0.3	10.0	0.7
	R1USQ	Riverine Tidal Regularly Flooded-Tidal Fresh Unconsolidated Shore	1.8	0.1		
	R3UBH	Riverine Upper Perennial Permanently Flooded Unconsolidated Bottom	12.2	0.9	108.7	7.7
	R3USA	Riverine Upper Perennial Temporarily Flooded Unconsolidated Shore	11.1	0.8	42.3	3.0
	R4SBC	Riverine Seasonally Flooded Intermittent Streambed	0.8	0.1		
	L1UBH	Lacustrine Limnetic Permanently Flooded Unconsolidated Bottom	117.3	8.6	220.2	15.6
	L2US2C	Lacustrine Littoral Seasonally Flooded Unconsolidated Sand Shore	52.9	3.9	12.7	0.9
	PUBH	Palustrine Permanently Flooded Unconsolidated Bottom	4.0	0.3		
	PUBHb	Palustrine Permanently Flooded Unconsolidated Bottom (beaver modified)	2.3	0.2		
	PUBHx	Palustrine Permanently Flooded Unconsolidated Bottom (excavated)	10.8	0.8		
		Total Waters	307.0	22.6	444.9	31.5
Wetlands	E2EM1N	Estuarine Intertidal Regularly Flooded Persistent Emergent	26.7	2.0		
	E2EM1P	Estuarine Intertidal Irregularly Flooded Persistent Emergent	223.2	16.4	259.8	18.4
	E2SS1P	Estuarine Intertidal Irregularly Flooded Broad-leaved Deciduous Scrub-Shrub	124.4	9.2	61.2	4.3
	PEM1F	Palustrine Semipermanently Flooded Persistent Emergent	3.1	0.2		
	PEM1E	Palustrine Seasonally Flooded-Saturated Persistent Emergent	61.1	4.5		
	PSS1E	Palustrine Seasonally Flooded-Saturated Broad-leaved Deciduous Scrub-Shrub	0.6	<0.1		
	PMLD	Palustrine Continuously Saturated Moss-Lichen	0.9	0.1		
	PSS1C	Palustrine Seasonally Flooded Broad-leaved Deciduous Scrub-Shrub	46.3	3.4	151.1	10.7
	PFO1C	Palustrine Seasonally Flooded Broad-leaved Deciduous Forest	43.4	3.2		
	PUSA	Palustrine Temporarily Flooded Unconsolidated Bottom	2.0	0.1		
		Total Wetlands	548.8	40.4	472.1	33.4

Table 5.2-2, continued.

Ecotype	NWI Code	NWI Description	Current Conditions		Historical Conditions	
			Area (acres)	% of Study Area	Area (acres)	% of Study Area
Uplands	U	Upland	491.7	36.2	497.2	35.2
	Us	Upland (fill)	10.0	0.7		
		Total Uplands	501.7	37.0	497.2	35.2
		Grand Total	1,357.5	100.0	1,414.3	100.0

5.3. Wildlife Habitat Map

A total of 23 wildlife habitat types were identified in the study area. Acreages are provided in Table 5.3-1, detailed descriptions of the habitats are presented in Table 5.3-2, and a map of the habitats in the study area is provided in Appendix E.

The Eklutna River estuary includes 6 habitats influenced directly by the influx of saltwater (Intertidal Mudflat, Tidal River, Tidal River Bar, Brackish Pond, Brackish Sedge Marsh and Brackish Deciduous Shrub Scrub), which when combined, comprise 487.0 acres (35.9% of the study area) in the current imagery, and 381.9 acres (27.0% of the study area) in the historical imagery (Table 5.3-1). The Intertidal Mudflat is inundated completely or partially at least once a day through diurnal tidal fluctuations, whereas the remaining estuarine habitats are influenced to some extent by fresh groundwater sources. Most of the estuarine wildlife habitats are typical of those found along a salinity gradient in Cook Inlet estuaries; however, the brackish ponds likely represent depressions resulting from gravel extraction activities that have subsequently been filled with fresh and saltwater.

Lentic waters and associated habitats include 4 wildlife habitats (Freshwater Lake, Intermittently Exposed Freshwater Littoral Zone, Freshwater Pond, and Beaver Modified Freshwater Pond) that together encompass 248.4 acres (18.3% of the study area) in the current imagery and 232.9 acres (16.5% of the study area) in the historical imagery (Table 5.3-1). Freshwater lake includes a small portion of the Eklutna Lake outlet that was included in the study area and the associated littoral zone, which is a broad area of exposed sediment and revegetating aquatic sedges and herbs that has developed when lake levels are reduced in spring and early summer. Freshwater ponds have developed throughout the study area, exclusively because of excavations or beaver activity along the main channel of the Eklutna River.

Lotic waters within the study area include Tidal River, Upper Perennial River and Intermittent Stream that together encompass 17.3 acres (1.3% of the study area) in the current imagery and 118.7 acres (8.4% of the study area) in the historical imagery (Table 5.3-1). The Eklutna River is an Intermittent Stream for the uppermost 2 miles, then an Upper Perennial River until it begins to show tidal characteristics and EC values consistent with seasonal saltwater input within the Eklutna estuary. Thunderbird Creek is considered an Upper Perennial River tributary, and a small Intermittent Stream tributary was mapped where supported by field data (see field plot Eklutna-18 in Appendix B). Intermittent tributaries to the Eklutna River, especially when small, likely occur more commonly than represented in the mapping because they are difficult to detect using photo-interpretation alone. Tidal River Bar and Upper Perennial River Bars associated with the Eklutna River are unique riverine barrens wildlife habitats, and together encompass 14.9 acres or 1.1% of the study area. Much of the Upper Perennial River Bar habitat mapped in the current imagery represents the dewatered portions of the historic extent of the Eklutna River (see Section 5.6 below).

Table 5.3-1. Areal extent (acres and percent of study area) of wildlife habitat and wetland functional classes in the Wetlands and Wildlife Habitat Study area, Eklutna Hydroelectric Project, 2022.

		Current Conditions		Historical Conditions	
Category	**Wildlife Habitat and Wetland Functional Class**	**Area (Acres)**	**% of Study Area**	**Area (acres)**	**% of Study Area**
Wetlands and Waters	Intertidal Mudflat	97.3	7.2	50.9	3.6
	Tidal River	4.3	0.3	10.0	0.7
	Tidal River Bar	1.8	0.1		
	Brackish Pond	9.2	0.7		
	Brackish Sedge Marsh	249.9	18.4	259.8	18.4
	Brackish Deciduous Shrub Scrub	124.4	9.2	61.2	4.3
	Freshwater Lake	117.3	8.6	220.2	15.6
	Intermittently Exposed Freshwater Littoral Zone	114.0	8.4	12.7	0.9
	Freshwater Pond	14.8	1.1		
	Freshwater Pond (beaver modified)	2.3	0.2		
	Upper Perennial River	12.2	0.9	108.7	7.7
	Upper Perennial River Bar	13.1	1.0	42.3	3.0
	Freshwater Seeps or Springs	0.9	0.1		
	Freshwater Sedge Marsh	3.1	0.2		
	Intermittent Stream	0.8	0.1		
	Seasonally Flooded Low and Tall Alder-Willow Shrub Scrub	46.9	3.5	151.1	10.7
	Flooded Forest	42.5	3.1		
Uplands	Upland Low and Tall Alder-Willow Shrub Scrub	58.6	4.3	17.7	1.2
	Mixed Deciduous-Spruce Forest	230.8	17.0	401.6	28.4
	Black Cottonwood Forest	118.2	8.7	60.4	4.3
	Spruce Forest	49.2	3.6		
	Rocky Cliff and Steep Banks	10.3	0.8	17.6	1.2
	Human Modified Barrens	35.4	2.6		
	Grand Total	1,357.5	100.0	1,414.3	100.0

Table 5.3-2. Description of wildlife habitats and wetland functional classes mapped in the Wetlands and Wildlife Habitat Study area, Eklutna Hydroelectric Project, 2022.

Wildlife Habitat and Wetland Functional Classes	Characteristics
Wetlands	
Intertidal Mudflat	Unvegetated marine silts and clays within the intertidal zone of Knik Arm, located at the western extent of the study area. This class is regularly flooded by tides at least once a day, and soils are permanently saturated. The NWI code E2US3N is included in this class.
Tidal River	Located west of the railroad tracks, these waters include portions of the Eklutna River and smaller tributaries whose hydrology is driven primarily by fresh water sources, but which are also influenced by tidal forces. This section of the Eklutna River has undergone significant changes over multiple decades, including a period of dewatering when the river channel was diverted to accommodate gravel extraction activities in the 1970s (MJA 2020). The channel is somewhat braided in the tidally influenced reach, with one main low-gradient shallow channel, and is classified as NWI code R1UBV.
Tidal River Bar	Barren or partially vegetated side and mid-channel bars within the tidally influenced section of the Eklutna River. These areas are flooded during high tides and storm surges, and have near surface saturation when surface water is absent. Soils are marine silts and clays, similar to those in intertidal mudflats. The NWI code R1USQ is included in this class.
Brackish Pond	Located at the western extent of the study area, Brackish Ponds are permanently flooded excavations and natural depressions. These brackish waters receive salt water input from seasonal high tides and storm surges. Pond substrates are likely organic and well-developed littoral marsh communities are present. The NWI class E1UBL is included in this class.
Brackish Sedge Marsh	Estuarine marsh and sedge wet meadow communities typically located between intertidal mudflats and brackish deciduous shrub scrub habitats at the western extent of the study area. These communities are either permanently flooded marshes, or saturated wet meadows with fluctuating water levels because of daily tides. Dominant sedges include *Carex lyngbei* and *C. pluriflora* with codominant forbs including *Stellaria humifusa* and *Triglochin palustris*. Soils are gleyed marine silts and clays with moderately thick surface organic horizons that may develop into histic epipedons. The NWI classes E2EM1N and E2EM1P are included in this class.
Brackish Deciduous Shrub Scrub	Estuarine communities typically located inland of Brackish Sedge Marsh that are irregularly inundated with salt water. Deciduous shrubs dominate this class, including *Myrica gale*, *Salix barclayi*, and *S. lasiandra*. Willow (*Salix* spp.) dominated communities were observed along the edges of tidal guts and sweetgale (*Myrica gale*) dominated communities were observed at the estuarine/palustrine interface. Brackish Deciduous Shrub Scrub wetlands have high water tables, saturated soils, and fluctuating surface water depths. Soils are gleyed marine silts and clays with widespread evidence of sediment deposition. NWI class E2SS1P is in this class.
Freshwater Lake	One Freshwater Lake is located in the study, Eklutna Lake. This large limnetic lake is subject to large fluctuations in water level. The current dam is located 1,400 feet downstream of the historic lake outlet, and prevents any flows from Eklutna Lake being released in the Eklutna River. The lake water level is impacted by diversions for power generation and water supply for Anchorage. Lake level decreases over the winter with the increased power demand and reduced inflows from Eklutna Glacier and tributary streams; lake level then increases over the summer when power demand declines and inflows increase. Eklutna Lake is not considered an impoundment and includes the NWI code L1UBH.

Table 5.3-2, continued.

Wildlife Habitat and Wetland Functional Classes	Characteristics
Intermittently Exposed Freshwater Littoral Zone	Exposed mud flats and wet sedge meadows at the outlet of Eklutna Lake. Wet sedge meadows are dominated by the sedges *Carex kelloggii* and *C. aquatilis*, with the co-dominant herbaceous species *Equisetum palustre*, *E. fluviatile* and *Comarum palustre*. Silty lake bottom barren substrates are exposed as water levels drop throughout the summer season, but the sedge meadows are likely continuously saturated and often with surface water. The NWI codes L2US2C and PEM1E are included in this class.
Freshwater Pond	Freshwater Ponds are located throughout the study area, forming either naturally or within depressions caused by past disturbance. These unvegetated open waters are often surrounded by uplands (non-wetlands) and include the NWI codes PUBH and PUBHx.
Freshwater Pond (beaver modified)	Beaver dam impoundments in the upper and middle sections of the Eklutna River. These open water impoundments are typically interspersed with dead stems of tall shrubs and poplar. Beaver activity is controlled by AWWU in the upper river with the aim of reducing erosion to the access road, and the current condition may not be accurately reflected in the project imagery and associated mapping. Flooded, concave gravel extraction sites recently colonized by beaver at the western end of the study area are included in the class Brackish Pond because those waters are tidally influenced. The NWI code PUBHb is included in this class.
Upper Perennial River	This class encompasses the permanently flooded freshwater portion of the Eklutna River, extending from approximately 2 miles below the lake outlet to the transition to tidally influenced river in the estuary. The NWI code R3UBH is included in this class.
Upper Perennial River Bar	Barren and partially flooded bars along the freshwater section of the Eklutna River. While this class includes some naturally occurring riverine deposits, it is primarily exposed substrate in the dewatered sections of the river between the upper dam and Thunderbird Creek. These temporarily flooded fluvial soils have little to no organic accumulation and little recolonizing vegetation. Water levels fluctuate with spring breakup and episodic heavy summer precipitation events. The identification and mapping of temporarily flooded habitats in the upper river rely heavily on field data collected in 2022, which document a narrow band of fluctuating water levels evidenced by the presence of sediment and drift deposits (see field plots eklutna-11 in Appendix B and Eklutna-13 in Appendix A for characteristics, and Appendix E for plot locations). Temporarily flooded habitats such as Upper Perennial River Bar may be overrepresented in the mapping as they were often difficult to distinguish from partially vegetated Seasonally Flooded Low and Tall Alder-Willow Shrub Scrub using imagery alone, and Upper Perennial River Bar was used if there was uncertainty about which type was present. The NWI codes R3USA and PUSA are included in this class.
Freshwater Seeps or Springs	These wetlands are located in toeslope landscape positions and are driven by groundwater discharge, where seeps provide continuous near-surface saturation. Small, shallow areas of surface water were observed and there was no evidence of channel formation. Vascular plants were sparse but these wetlands have a well-developed moss layer. The NWI code PMLD is included in this class.
Freshwater Sedge Marsh	Associated with flooded gravel mine excavations near the Eklutna estuary, these wetlands are flooded pond edges and depressions supporting dense sedge communities dominated by *Carex lyngbei*. Surface water present is throughout and forms an interconnected network of ponds and wet meadows through infilling depressions and subsequent beaver activity. Substrates are assumed to be organic, and the NWI code PEM1F is included in this class.

Table 5.3-2, continued.

Wildlife Habitat and Wetland Functional Classes	Characteristics
Intermittent Stream	Intermittent Streams are located in the upper reaches of the study area: the uppermost two miles of the Eklutna River and a small tributary to the Eklutna River. Intermittent Streams are presumed to support flow during snowmelt or heavy precipitation events. Mapping of this type was limited to sites where field data were collected, and because small intermittent streams are difficult to detect using aerial imagery alone, this extent of habitat is likely underrepresented. The NWI code R4SBC is included in this class.
Seasonally Flooded Low and Tall Alder-Willow Shrub Scrub	Located throughout the study area, this class encompasses Eklutna River floodplain, lacustrine fringe vegetation at the high water mark of Eklutna Lake, and revegetated raised convex features within the abandoned gravel extraction area near the estuary. Typically a mix of tall alder and willow species and occasionally sapling black cottonwood, this class is located on coarse and well-drained substrates with little to no organics. Seasonal flooding comes from rises in lake levels, Eklutna River flooding, and high waters impounded in the network of depressions associated with the gravel extraction site. The identification and mapping of seasonally flooded habitats in the upper river rely heavily on field data collected in 2022, which document a narrow band of seasonal water fluctuation evidenced by the presence of sediment and drift deposits (see field plots eklutna-11 in Appendix B and Eklutna-13 in Appendix A for characteristics, and Appendix E for plot locations). Seasonally Flooded Low and Tall Alder-Willow Shrub Scrub may be underrepresented in the current conditions map, as this type was (when partially vegetated) often difficult to distinguish from Upper Perennial River Bar using imagery alone, and Upper Perennial River Bar was used if there was uncertainty about which type was present. The NWI code PSS1C is included in this class.
Flooded Forest	Occupies the historical braided outwash plain between the New Glenn Highway bridge and the railroad bridge, and downstream of the railroad bridge above the estuary. The area consists of open canopy poplar forest with an understory of open canopy tall alder and willow shrubs. Hydrology is a complex network of seasonally flooded channels. The substrate is composed of well-drained sands and gravels with very little organic development and numerous wrack lines. The NWI code PFO1C is included in this class.
Uplands	
Upland Low and Tall Alder-Willow Shrub Scrub	Open canopy tall alder-willow communities typically found on revegetated disturbed surfaces including old clearings for access road construction and raised concave features associated with gravel extraction. Species include *Salix lasiandra*, *Alnus viridus*, *Rosa acicularis* and *Calamagrostis canadensis*. These upland areas have moist soils, show no signs of flooding, and are distinct from the seasonally flooded shrub communities associated with Eklutna River flooding.
Mixed Deciduous-Spruce Forest	Observed in lower slope and toeslope landscape positions in undisturbed sections of the Eklutna valley, and also within disturbed and revegetated areas where the channel was dewatered or gravel extraction activities occurred. Composed of a mixed forest canopy of *Populus balsamifera*, *Picea glauca* and *Betula neoalaskana* with typical upland forest understory species including *Rosa acicularis*, *Ribes triste*, *Calamagrostis canadensis*, and *Pyrola asarifolia*. These upland areas have moist soils and show no signs of flooding.
Black Cottonwood Forest	Mature black cottonwood forests frequently observed in the middle river atop abandoned riverine deposits. These forests are located both in undisturbed areas and where the dewatered channel has exposed well-drained fluvial soils. Forests are dominated by *Populous balsamifera* and *Betula neoalaskana* trees; *Salix scouleriana*,

Table 5.3-2, continued.

Wildlife Habitat and Wetland Functional Classes	Characteristics
	Alnus viridus, *Rosa asicularis* and *Sheperdia canadensis* shrubs; and *Orthilia secunda*, *Equisetum arvense* and *Pyrola asarifolia* herbs.
Spruce Forest	The vast majority of spruce forests within the study area are associated with abandoned floodplains, which are presumably no longer flooded by the dewatered channel. The open canopy forests are dominated by *Picea glauca* trees with a sparse understory of *Shepherdia canadensis* shrubs, *Hedysarum mackenzii* and *Geocaulon lividum* herbs, and feathermosses such as *Hylacomium splendens*.
Rocky Cliff and Steep Banks	Steep barren or partially vegetated rocky cliffs within the canyon area and barren areas caused by landslides and colluvial deposits. While no field data document these habitats, they are readily identified using LiDAR-generated contours.
Human Modified Barrens	Human modified barrens within the study area encompass trails, roads, pads, excavations, and berms of active and inactive human developments. This habitat class is located throughout the study area, from the outlet of Eklutna Lake to trails through the former gravel mine. While the vast majority of this habitat is Upland (non-wetland), two trails through the flooded forest are classified as PSS1C wetlands.

The remaining 4 wildlife habitats that are also considered wetlands include Freshwater Seeps and Springs, Freshwater Sedge Marsh, Seasonally Flooded Low and Tall Alder-willow Shrub Scrub, and Flooded Forest. Together, these classes encompass 93.4 acres (6.9% of the study area) in the current imagery, and 151.1 acres (10.7 % of the study area) in the historical imagery. Freshwater Seeps and Springs are limited in extent in the current imagery and occur along lower slopes or toeslopes where groundwater discharges to the surface. This class was not observed in the historical imagery, because it could not be detected in the lower resolution 1950 black and white imagery. Freshwater Sedge Marsh is exclusively mapped in the gravel extraction site near the estuary where depressions have gradually revegetated. Because this type is related to recovery from disturbance, it was not observed in the historical imagery. Seasonally Flooded Low and Tall Alder-willow Shrub Scrub primarily occurs in portions of the dewatered Eklutna River channel that have revegetated with deciduous shrubs in the current imagery, and in natural floodplain communities in the historical imagery. The Flooded Forest, as described in Table 5.3-2, occurs in a portion of the original braided outwash plain of the Eklutna River, which is now disconnected from the groundwater table so that multiple side channels are no longer flooded enough to inhibit the establishment of broadleaf deciduous forest (see Tile X in Appendix E). Because of its development from human disturbance, this type was not observed in the historical imagery.

A total of 6 upland wildlife habitats were identified totaling 502.5 acres or 37.0% of the study area (Table 5.3-1). With the exception of human modified barrens and some of the Upland Low and Tall Alder-willow Shrub Scrub, the upland types tend to be relatively undisturbed mature forest habitats. Human Modified Barrens includes the AWWU access road as well as fill associated with the upper dam and the highway and railroad crossings. Upland Low and Tall Alder-willow Shrub Scrub in some instances included revegetated and well-drained convex surfaces associated with gravel extraction sites. The remaining upland habitats (Mixed

Deciduous-Spruce Forest, Black Cottonwood Forest and Spruce Forest) are primarily upland mature forest types occupying well-drained abandoned riverine surfaces.

5.4. Wetland Functional Assessment

As noted above, wildlife habitat types were separated into wetland and uplands, and the wetland habitats correspond directly to 17 wetland functional classes. Characteristics of the wetland functional classes are described in detail in Table 5.3-2, and acreages are provided in Table 5.3-1. The best professional judgment rankings for each wetland functional class are provided in Table 5.4-1.

The highest ranking wetland functional class is Freshwater Sedge Marsh, which has the highest possible ranking for all functions assessed. Freshwater Sedge Marsh is primarily a newly established wetland bordering or encompassing flooded depressions caused by the gravel extraction activities in the estuary. The location of the wetland downstream of multiple road crossings, railroad crossings, and other urban development suggests that pollutants are entering the system. Robust obligate wetland sedge cover provides good filtering capability and reduces the chance of further erosion, and the typically depressed concave features this type occurs in provide floodwater storage capacity. Freshwater Sedge Marsh is a resilient wetland type capable of reestablishment after complete vegetation removal.

Brackish Sedge Marsh, Brackish Deciduous Shrub Scrub, and Seasonally Flooded Low and Tall Alder-Willow Shrub Scrub ranked overall high for wetland function, with a total rank score of 15 (Table 5.4-1). Brackish Sedge Marsh and Brackish Deciduous Shrub Scrub ranked higher for all assessed functions except for fish habitat suitability, on the basis that while they may provide some low value shelter during high tides they do not specifically border any fish bearing waterbodies. The tidally influenced portions of the Eklutna River show extensive change over time especially after the diversion of the river away from the gravel extraction operation and the eventual reestablishment of the channel. Significant coastal erosion and channel migration can be seen in sequential historical photos, and the brackish sedge and shrub communities have a high capacity for rapid reestablishment when they can provide high wetland function. Seasonally Flooded Low and Tall Alder-Willow Shrub Scrub also ranked in the higher category for all functions except for groundwater discharge and recharge. This type, as mapped in the current imagery and also as noted above, largely occurs in revegetated portions of the dewatered Eklutna River channel. This, along with its high function rankings, indicates that it is both a valuable wetland class with the capability to establish relatively quickly after disturbance.

The lowest ranking wetland functional classes overall include Upper Perennial River Bar, Intermittent Stream, Freshwater Seeps and Springs, Tidal River Bar and Intertidal Mudflat. In general, the low ranking wetlands may be too small and isolated and too far downstream to have any effect on watershed quality, or as in the case of Upper Perennial River Bar, they are disturbed communities with a lower capacity to recover after disturbance.

This page intentionally left blank.

Table 5.4-1. Functional assessment of wetland functional classes in the Wetlands and Wildlife Habitat Study area, Eklutna Hydroelectric Project, 2022.

Month	Intertidal Mudflat	Tidal River	Tidal River Bar	Brackish Pond	Brackish Sedge Marsh	Brackish Deciduous Shrub Scrub	Freshwater Lake	Intermittently Exposed Freshwater Littoral Zone	Freshwater Pond	Freshwater Pond (beaver modified)	Upper Perennial River	Upper Perennial River Bar	Freshwater Seeps or Springs	Freshwater Sedge Marsh	Intermittent Stream	Seasonally Flooded Low and Tall Alder-Willow Shrub Scrub	Flooded Forest
General fish habitat suitability	2	2	2	1	1	1	2	1	1	1	1	1	0	2	1	2	1
General avian and mammal habitat support	2	2	2	2	2	2	2	2	2	2	2	2	1	2	1	2	2
Organic matter production and export	0	0	0	0	2	2	0	1	0	0	0	0	1	2	0	2	1
Sediment nutrient and toxicant removal	0	0	1	1	2	2	1	1	1	1	1	1	1	2	1	2	1
Flood attenuation and storage	0	0	0	2	2	2	2	2	2	2	0	0	0	2	0	2	1
Erosion control and shoreline stabilization	0	0	0	0	2	2	0	0	0	0	0	0	0	2	0	2	1
Groundwater discharge and recharge	0	2	0	1	2	2	2	0	2	2	2	0	2	2	2	1	0
Educational, scientific, recreational, or subsistence use	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Total	6	8	7	9	15	15	11	9	10	10	8	6	7	16	7	15	9

Notes:
0 = Absence of function
1 = lower ranking for function
2 = higher ranking for function

This page intentionally left blank.

5.5. Retrospective Image Analysis

A total of 9 wetland and wildlife habitat classes mapped using the current imagery were not detected in the 1950 black and white imagery (Table 5.3-1). Tidal River Bar, Freshwater Seeps and Spring, and Intermittent Stream are all small in extent and are almost certain to have been present in 1950 but could not be detected on the black and white imagery with no associated 1950s elevation data. Brackish Pond, Freshwater Pond, and Freshwater Pond (beaver modified) were not detected in the 1950 imagery; these types likely all represent flooded depressional features created through various human disturbances and beaver activity. The Flooded Forest is an entirely new community resulting from the establishment of poplar forest where the hydrology in the braided outwash plain of the Eklutna River has been severely disrupted (see below).

While much of the study area has been heavily impacted through multiple development projects, much of the area remains unchanged. Areas that have shown no change comprise 841.5 acres (62.0% of the study area) in the current imagery (Table 5.5-1, Figure 5.5-1). These areas include the waters of Eklutna Lake, upland forests on riverine terraces, and estuarine waters and wetlands outside the footprint of the historical gravel mining area in the lower river. Disturbed areas that have not revegetated comprise 115.6 acres (8.5% of the study area) in the current imagery. These areas include current trails, clearings, and ponds created by excavations. Disturbed areas that have revegetated were typically identified through photo-interpretation of landforms, landscape position, and comparison to historical photography; these areas comprise 400.4 acres (29.5% of the study area) in the current imagery. Substantial areas where revegetation has occurred were delineated within the abandoned gravel extraction area in the lower river near the estuary, the dewatered channel in the upper and middle reaches of the Eklutna River, the intermittently exposed littoral zone at the outlet of Eklutna Lake, and the formerly braided portions of the outwash plain (the Flooded Forest) that have undergone significant hydrologic changes.

The impacts associated with gravel extraction near the estuary and the associated diversion of the Eklutna River channel have resulted in the most significant impacts to the natural functioning of the estuary. The gravel extraction was operated by the Alaska Railroad to support the construction of the current bridge (USACE 2011). The gravel mining operation removed all overburden and recontoured the ground surface to a series of mounded gravel rises and isolated depressions, while the channel diversion altered the hydrology by reducing sinuosity and reducing flow in the natural channel. The four habitats mapped in the current imagery within the gravel extraction area boundary include Brackish Sedge Marsh, Brackish Deciduous Shrub Scrub, Brackish Pond, Freshwater Sedge Marsh, Freshwater Pond, and Upland Low and Tall Alder-Willow Shrub Scrub. The high value wetland, Brackish Sedge Marsh, has become established on approximately 26.4 acres of disturbed surfaces, including impounded pond margins and depressions that are being recolonized by marsh vegetation. Upland Low and Tall Alder-willow Shrub Scrub has recolonized 61.1 acres of raised, well-drained convex features within the abandoned gravel mining area footprint (Table 5.5-1).

Table 5.5-1. Areal extent (acres) of wildlife habitat and wetland functional class changes from historical to current conditions in the Wetlands and Wildlife Habitat Study area, Eklutna Hydroelectric Project, 2022.

	Area (acres)		
Wildlife Habitat	**Undisturbed**	**Disturbed**	**Disturbed, revegetated**
Wetlands and Waters			
Intertidal Mudflat	97.3		
Tidal River	4.3		
Tidal River Bar	1.8		
Brackish Pond		9.2	
Brackish Sedge Marsh	220.3	3.2	26.4
Brackish Deciduous Shrub Scrub	121.0		3.4
Freshwater Lake	117.3		
Intermittently Exposed Freshwater Littoral Zone	15.2	37.7	61.1
Freshwater Pond	0.1	14.7	
Freshwater Pond (beaver modified)		2.3	
Upper Perennial River	12.2		
Upper Perennial River Bar	<0.1	13.1	
Freshwater Seeps or Springs	0.9		
Freshwater Sedge Marsh			3.1
Intermittent Stream	<0.1	0.8	
Seasonally Flooded Low and Tall Alder-Willow Shrub Scrub	1.8		45.0
Flooded Forest			42.5
Uplands			
Upland Low and Tall Alder-Willow Shrub Scrub	0.5		58.0
Mixed Deciduous-Spruce Forest	148.1		82.7
Black Cottonwood Forest	88.4		29.8
Spruce Forest	1.7		47.5
Rocky Cliff and Steep Banks	10.3		
Human Modified Barrens		34.6	0.8
Total	842.2	114.8	400.4

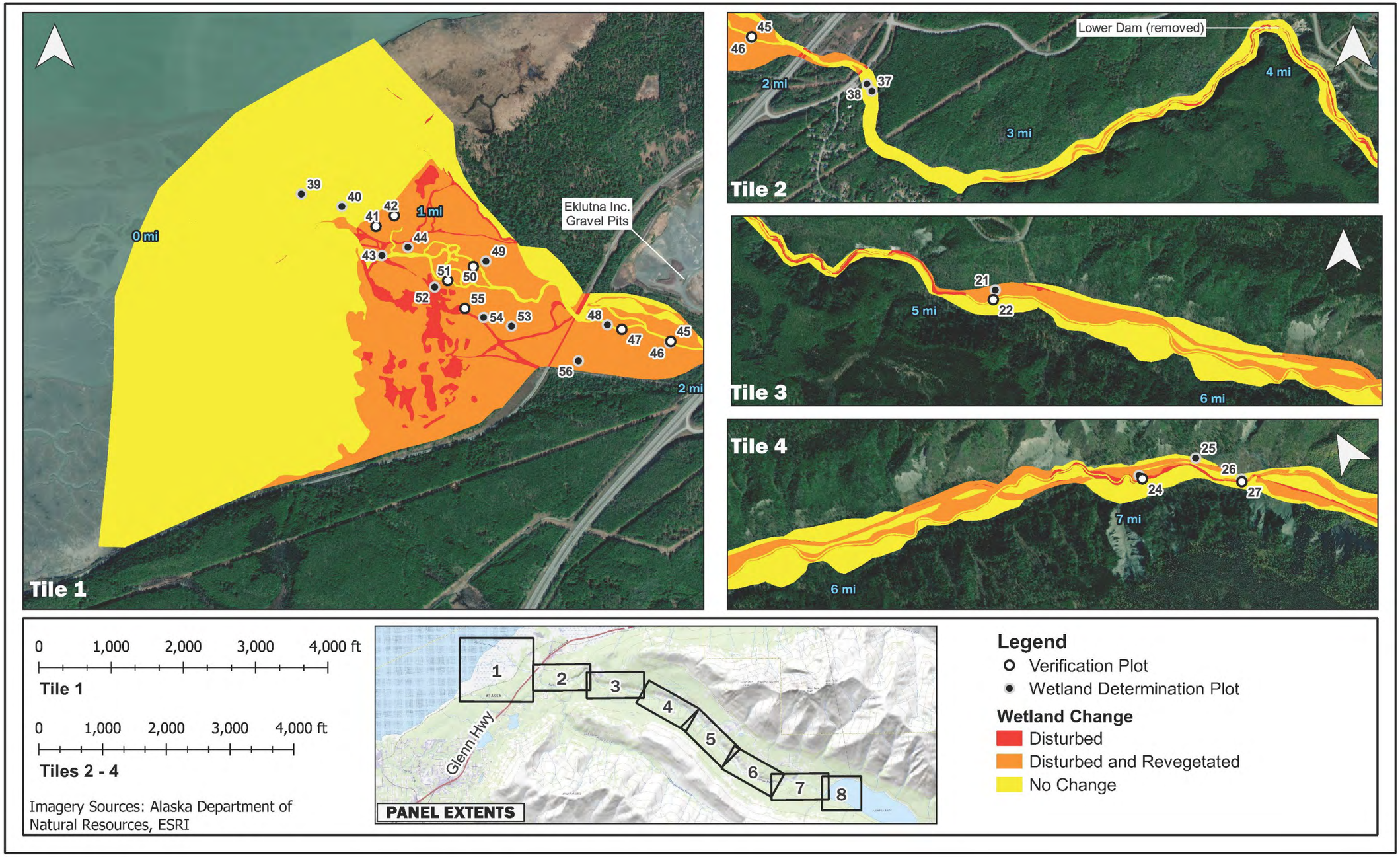


Figure 5.5-1. Wildlife habitat and wetland functional class changes from historical to current conditions in the Wetlands and Wildlife Habitat Study area, Eklutna Hydroelectric Project, 2022.

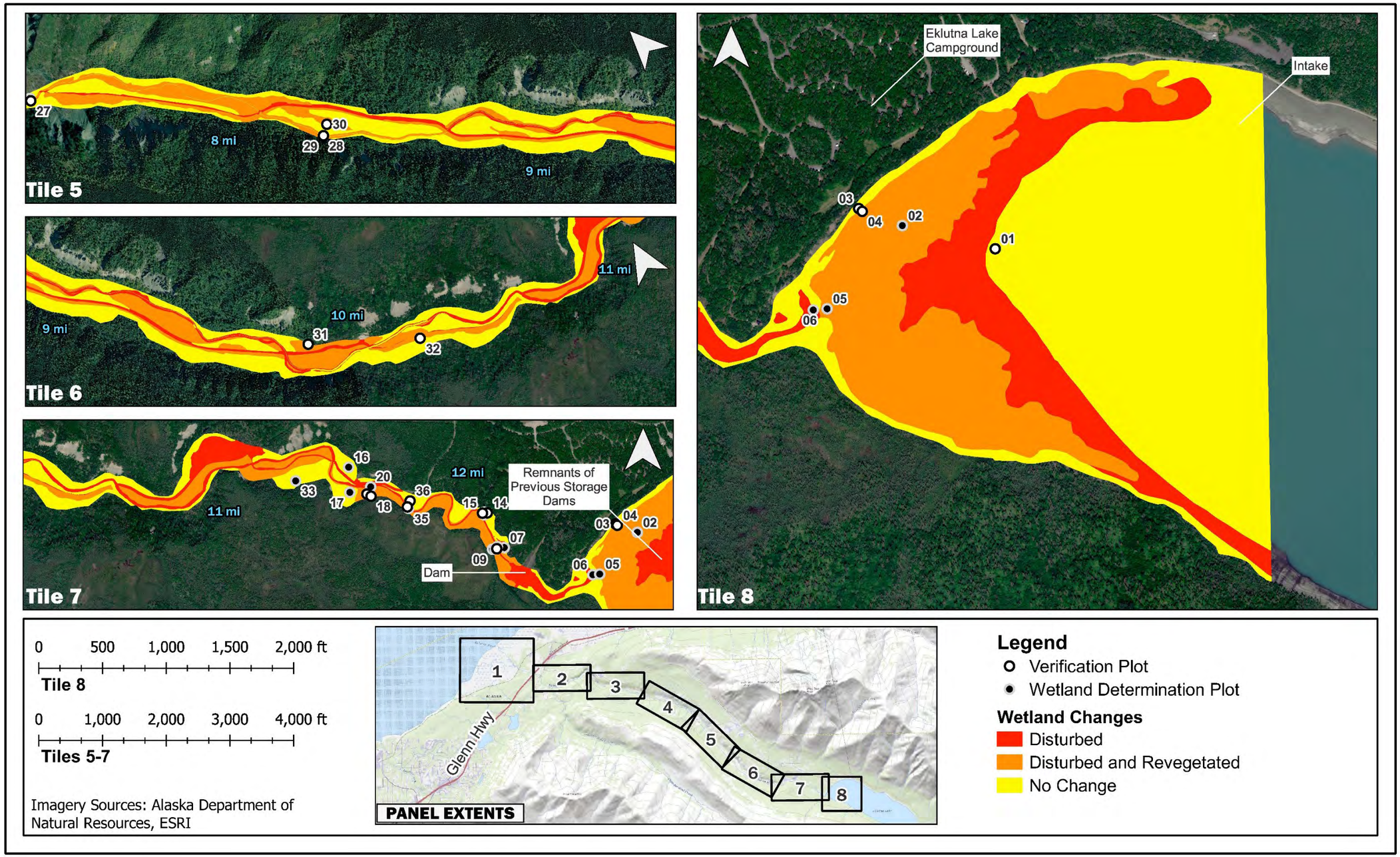


Figure 5.5-1, continued.

The dewatering of the upper and middle reaches of the Eklutna River after the construction of the existing hydroelectric and waterline project has had significant effects beyond the limits of the historical river channel. Peak flows in the Eklutna River in 1950 reached 1,420 cfs and fell to 162 cfs in 1959 after the hydroelectric project began operation (USGS 2022), leaving most of the historical river channel substrate exposed (MJA 2020). The operation of the connected AWWU waterline project starting in 1988 would not have further reduced peak flows rates because the utility diverts a portion of the water that was already being diverted for the hydroelectric project. After 63 years of significantly reduced flow, the historical river channel has converted to approximately 45.0 acres of Seasonally Flooded Low and Tall Alder-Willow Shrub Scrub, 13.1 acres of unvegetated Upper Perennial River Bar, and 0.8 acres of Intermittent Stream (Table 5.5-1). The total area of Seasonally Flooded Low and Tall Alder-Willow Shrub Scrub mapped in the current imagery is 46.9 acres or 3.9% of the study area, whereas the total for this habitat is 151.1 acres or 10.7% of the study area in the 1950 imagery (Table 5.3-1). It is likely that the surfaces immediately adjacent to the river channel during high-flow periods were receiving regular flood water input sufficient to support a robust riparian shrub habitat. Currently, the same surfaces are now well-drained uplands that are gradually converting to mixed deciduous and coniferous upland forest habitats, which has ramifications for the wildlife species that use riparian shrub habitats heavily in the Eklutna River drainage (see Welch et al. 2023).

Across all wetland functional classes, the Seasonally Flooded Low and Tall Alder-Willow Shrub Scrub class provides higher wetland function for all assessed functions except groundwater discharge and recharge (Table 5.4-1).

Fluctuations in lake levels throughout the year have exposed a significant littoral zone at the Eklutna Lake outlet that was not present in 1950. This area was mapped as Intermittently Exposed Freshwater Littoral Zone (Table 5.3-2). This class encompasses 12.7 acres (0.9% of the study area) in the historical imagery, and 114.0 acres (8.4% of the study area) in the current imagery (Table 5.3-1). In the current imagery, 15.2 acres of the Intermittently Exposed Freshwater Littoral Zone habitat are classified in the change category of undisturbed, 37.7 acres as disturbed, exposed and unvegetated lake substrate, and 61.1 acres as supporting a seasonal wet sedge meadow exposed at low water levels. Overall, the Intermittently Exposed Freshwater Littoral Zone ranks as low to moderate in wetland function, with the primary functions being storage capacity and some increased avian and mammal habitat support (Table 5.4-1).

The Flooded Forest is a degraded reach of the Eklutna River between the Glenn Highway and Alaska Railroad bridges, where formerly braided and unvegetated outwash plain is reverting to poplar forest (POWTEC 2007, USACE 2011). In the current imagery, 42.5 acres of this type are included in the disturbed and revegetated change category (Table 5.5-1); however, the wetland functions for this type were ranked as low to moderate. In the Flooded Forest, the aggradation of alluvial material over time has raised the surface well above the groundwater table allowing upland tree species to colonize the area. The substrate remains largely alluvial sands and gravels with a low organic component because seasonal floods and occasional water releases flush most of the organic buildup downstream. This forested wetland type may provide some higher-value avian and wildlife habitat relative to a series of braided river channels and largely barren river bars in an outwash plain (see Wildlife Habitat Evaluation, Welch et al. 2023) but it remains a relatively unstable habitat.

6 CONCLUSIONS

The results and conclusions from this study will be utilized during the alternatives analysis to evaluate any potential impacts to wetlands and wildlife habitat that may result from future water management changes.

The field study was conducted in late August 2022 during an exceptionally rainy late summer season in southcentral Alaska. During the four days of field sampling, wetlands and wildlife habitat data were collected in all photo-signatures, including some of the more difficult to detect types, or habitats undergoing rapid change. The level of detail in the field observations is suitable for the broad-scale nature of this investigation and met the objectives of the study plan.

Based on 2022 imagery, the attribution of map polygons in the study area with wetland and vegetation classes and other landscape variables adequately supported the identification and classification of 23 wildlife habitat types. Avian and mammal wildlife scientists were consulted to determine that suitable habitat for the bird and mammal species known or expected to occur in the study area were represented in the mapping. In addition to the delineation of wildlife habitats, the classification was expanded to include wetland functional characteristics resulting in an integrated list of wetland functional classes and wildlife habitats.

A total of 14 wetland and wildlife habitats were identified in the georectified 1950s aerial imagery using the same classification developed for current conditions. Comparison of acreages between the current and historical conditions allowed for detection of habitat change because of specific human activities over time, including impacts specific to the current operations. The availability of high-quality aerial photography and detailed accounts of past activities supported a clear understanding of impacts ongoing as a result of current versus historical activities.

Wetland and wildlife habitats were used in a best professional judgment ranking of typical wetlands functions important for Alaskan riparian wetlands as well as a separate ranking considering wildlife habitat use in the wildlife habitat evaluation in the Terrestrial Wildlife Studies Report (Welch et al. 2023). The rankings for wetland functional classes were used in the wetland and wildlife habitat change assessment to determine the extent of change over time in the study area of the highest value wetlands and wildlife habitats. The primary impacts of the current operations include the loss of significant areas of seasonally flooded scrub shrub communities occupying the historical floodplain that are gradually converting to upland forest habitats.

7 VARIANCES FROM FINAL STUDY PLAN AND PROPOSED MODIFICATIONS

The study plan proposed a full wetland functional assessment be done using a quantitative method agreed on in consultation with the Technical Working Group. Originally, the goal of the wetland functional assessment was to potentially support any wetland permitting needs that may be needed for any future mitigation efforts to address some impacts over the life of the Eklutna Hydroelectric project. However, since no permitting or compensatory mitigation efforts are planned at this time and no potential projects have been identified, ABR conducted a wetland functional assessment based primarily on best professional judgment. This assessment allowed

identification of the most significant impacts to wetlands and wetland function over time at a broad level appropriate for the current project.

8 REFERENCES

Arguez, A., I. Durre, S. Applequist, R. Vose, M. Squires, X. Yin, R. Heim, and T. Owen, 2012: NOAA's 1981–2010 climate normals: An overview. Bull. Amer. Meteor. Soc., 93, 1687-1697.

Dahl, T. E., J. Dick, J. Swords, and B. O. Wilen. 2015. Data Collection Requirements and Procedures for Mapping Wetland, Deepwater and Related Habitats of the United States. Division of Habitat and Resource Conservation (version 2), National Standards and Support Team, Madison, WI. 92 pp.

Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. Vicksburg, MS: U.S. Army Engineer Waterways Experiment Station. [Online] https://www.lrh.usace.army.mil/Portals/38/docs/USACE%2087%20Wetland%20Delineation%20Manual.pdf (Accessed October 15, 2020).

Federal Geographic Data Committee (FGDC). 2013. Classification of Wetlands and Deepwater Habitats of the United States. FGDC-STD-004-2013. Second Edition. Wetlands Subcommittee, Federal Geographic Data Committee and U.S. Fish and Wildlife Service, Washington, DC.

Hultén, E. 1968. Flora of Alaska and neighboring territories: a manual of the vascular plants. Stanford, CA: Stanford University Press. 1,008 pp.

Marvin, LuDean C. 1986. A Floristic Study of the Eklutna Valley. Master of Science Thesis, Department of Botany and Range Sciences, Brigham Young University. April 1986.

McMillen Jacobs Associates (MJA). 2020. Eklutna Hydroelectric Project, 1991 Fish & Wildlife Agreement Implementation, Final Initial Information Package. Available at https://eklutnahydro.com/documents/. Accessed 7 December 2022. 173 pp. + appendices.

Menne, M .J., I. Durre, B. Korzeniewski, S. McNeal, K. Thomas, X. Yin, S. Anthony, R. Ray, R.S. Vose, B.E. Gleason, and T.G. Houston. 2012. Global Historical Climatology Network - Daily (GHCN-Daily), Version 3. NOAA National Climatic Data Center. doi:10.7289/V5D21VHZ.

Municipality of Anchorage (MOA). 2014. Anchorage Wetland Management Plan. Planning Division, Community Development Department. Anchorage AK. https://www.muni.org/Departments/OCPD/Planning/Physical/EnvPlanning/Documents/Anchorage%20Wetlands%20Management%20Plan-2014.pdf

Municipality of Anchorage (MOA). 2022. MOA Wetland Mapping, Interactive Map. [online] https://muniorg.maps.arcgis.com/apps/webappviewer/index.html?id=f0bef139a7584820ad9d60c9eeea8a5f

Munsell Color (Firm). 2010. Munsell Soil Color Charts: with Genuine Munsell Color Chips. Revised edition. Grand Rapids, MI: Munsell Color

Native Village of Eklutna (NVE). 2014. Wetland Program Plan. 120 pp.

Prince of Wales Tribal Enterprise Consortium (POWTEC). 2007. Habitat assessment of the lower Eklutna River. Prepared for U.S. Army Corps of Engineers by Prince of Wales Tribal Enterprise Corsortium, Haines, Alaska, 14 May 2007.

Reiser, D. and M. Gagner. 2022. Eklutna Hydroelectric Project Instream Flow Study, Year 1 Interim Report (Draft). Available at https://eklutnahydro.com/documents/. Accessed 7 December 2022. 133 pp.

Skinner, Q. D., S. J. Wright, R. J. Henszey, J. L. Henszey, and S. K. Wyman. 2012. A field guide to Alaska grasses. Cumming, GA: Education Resources LLC. 384 pp.

U.S. Army Corps of Engineers (USACE). 2007. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Alaska Region (Version 2.0), ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-07-24. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

U.S. Army Corps of Engineers (USACE). 2011. Eklutna River Aquatic Ecosystem Restoration Technical Report. November 2011. 84 pp.

U.S. Army Corps of Engineers (USACE). 2020. National Wetland Plant List. Version 3.5. [online] http://wetland-plants.usace.army.mil/nwpl_static/v34/home/home.html

U.S. Fish and Wildlife Service (USFWS). 2022. National Wetlands Inventory Mapping. Available online at https://www.fws.gov/program/national-wetlands-inventory. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C.

United States Department of Agriculture Natural Resources Conservation Service (USDA NRCS). 2008. Hydrogeomorphic Wetland Classification System: An Overview and Modification to Better Meet the Needs of the Natural Resources Conservation Service. Technical Note No. 190–8–76. 8 pp.

United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS). 2018. Field Indicators of Hydric Soils in the United States, Version 8.2. Edited by L. M. Vasilas, G. W. Hurt, and J. F. Berkowitz. Report prepared by USDA, NRCS, in cooperation with the National Technical Committee for Hydric Soils.

U.S. Geological Survey (USGS). 2019. National Hydrography Dataset. Available online at https://www.usgs.gov/core-science-systems/ngp/national-hydrography/access-national-hydrography-products

U.S. Geological Survey (USGS). 2022. National Water Information System: Web Interface. Peak Streamflow: USGS 15280000 Eklutna C NR Palmer AK. Accessed online: https://nwis.waterdata.usgs.gov/nwis/peak?site_no=15280000&agency_cd=USGS&format=html

Viereck, L. A., C. T. Dyrness, A. R. Batten, and K. J. Wenzlick. 1992. The Alaska vegetation classification. U.S. Dept. of Agric., Forest Serv., Pacific Northwest Research Station, Portland, OR. Gen. Tech. Rep. PNW-GTR-286. 278 pp.

Viereck, L. A., and E. L. Little, Jr. 2007. Alaska trees and shrubs, 2nd edition. Fairbanks, AK: University of Alaska Press. 359 pp.

Welsh, J., A. Bankert, R. McGuire, A. Prichard, and C. Schick. ABR, Inc. 2023. Eklutna Hydroelectric Project Terrestrial Wildlife Study Report, Draft. Prepared for Municipality of Anchorage, Chugach Electric Association, Inc., and Matanuska Electric Association.

Wells, A. F., G.V. Frost, M.J. Macander, M.T. Jorgenson, J.E. Roth, W.A. Davis, and E.R. Pullman. 2021. Integrated terrain unit mapping on the Beaufort Coastal Plain, North Slope, Alaska, USA. Landscape Ecol. (2021) 36:549–579

Appendix A: Wetland Determination Forms

Table A.1-1. Wetland determination field plots index table for the Wetlands and Wildlife Habitat Study area, Eklutna Hydroelectric Project, 2022.

Plot	NWI Code	HGM Code	Viereck Level IV Class
eklutna-02	PEM1E	Lacustrine Fringe HGM	Subarctic Lowland Sedge Wet Meadow
eklutna-05	PEM1E	Lacustrine Fringe HGM	Subarctic Lowland Sedge Wet Meadow
eklutna-06	PUBH	Depressional HGM	Fresh Water
eklutna-07	PUBH	Depressional HGM	Fresh Water
eklutna-08	R4SBC	Riverine HGM	Fresh Water
eklutna-09	U	Not Applicable (Upland)	Open Black Cottonwood-White Spruce
eklutna-10	U	Not Applicable (Upland)	Closed Tall Alder-Willow
eklutna-12	PMLD	Slope HGM	Wet Bryophyte
eklutna-13	PSS1C	Riverine HGM	Closed Tall Alder-Willow
eklutna-16	PSS1E	Slope HGM	Black Cottonwood Woodland
eklutna-17	PMLD	Slope HGM	Wet Bryophyte
eklutna-20	R4SBC	Riverine HGM	Fresh Water
eklutna-21	U	Not Applicable (Upland)	White Spruce Woodland
eklutna-23	PUBHb	Depressional HGM	Seral Herbs
eklutna-25	PSS1E	Slope HGM	Black Cottonwood Woodland
eklutna-26	U	Not Applicable (Upland)	Open Black Cottonwood Forest
eklutna-33	PUBH	Depressional HGM	Fresh Water
eklutna-35	PSS1C	Riverine HGM	Closed Tall Alder-Willow
eklutna-37	PSS1C	Riverine HGM	Closed Tall Alder-Willow
eklutna-38	U	Not Applicable (Upland)	Closed Black Cottonwood-White Spruce
eklutna-39	E2EM1P	Estuarine Fringe HGM	Halophytic Sedge Wet Meadow
eklutna-40	E2SS1P	Estuarine Fringe HGM	Open Low Sweetgale-Graminoid Shrub Bog
eklutna-43	R1USQ	Riverine HGM	Brackish Water
eklutna-44	E2SS1P	Estuarine Fringe HGM	Open Low Willow
eklutna-46	PFO1C	Riverine HGM	Open Black Cottonwood Forest
eklutna-48	U	Not Applicable (Upland)	Closed Black Cottonwood
eklutna-49	PFO1C	Riverine HGM	Open Black Cottonwood Forest
eklutna-52	E1UBL	Estuarine Fringe HGM	Open Tall Alder
eklutna-53	U	Not Applicable (Upland)	Closed Paper Birch-Balsam Poplar
eklutna-54	PEM1E	Depressional HGM	Wet Graminoid Meadow
eklutna-56	U	Not Applicable (Upland)	Open Black Cottonwood Forest

Wetland Determination Data Form - Alaska Region

Project/Site: Eklutna Hydro Wetlands Borough/City: Municipality of Anchorage Sampling Date: 2022-08-09
Applicant/Owner: McMillan Jacobs Sampling Point: eklutna-02
Investigator(s): SLI, RWM Landform (hillside, terrace, hummocks, etc.): Lake Margins
Local relief (concave, convex, none): none Slope: 8.7 % / 5.0 ° Elevation: 899
Subregion: Cook Inlet Lowlands Lat.: 61.4058 Long.: -149.1401 Datum: WGS84
Soil Map Unit Name: Doroshin peat, 0 to 7 percent slopes NWI classification: PEM1E
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ____
Hydric Soil Present? Yes ✓ No ____
Wetland Hydrology Present? Yes ✓ No ____

Is the Sampled Area within a Wetland? **Yes** ✓ **No** ____

Remarks: Problematic hydric soil indicator (Ch5), and secondary hydrology indicator (C4) alpha alpha dipyridyl test positive at 6-10 inches.

Vegetation - Use scientific names of plants. List all species in the plot.

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
	Total Cover:	0.0		
	50% of total cover: 0.0	20% of total cover: 0.0		
	Sapling/Shrub Stratum			
	Total Cover:	0.0		
	50% of total cover: 0.0	20% of total cover: 0.0		
	Herb Stratum			
1.	Carex kelloggii	30.0	✓	OBL
2.	Carex aquatilis	15.0	✓	OBL
3.	Equisetum palustre	7.0		FACW
4.	Equisetum fluviatile	5.0		OBL
5.	Comarum palustre	2.0		OBL
6.	Calamagrostis canadensis	0.1		FAC
	Total Cover:	59.1		
	50% of total cover: 29.6	20% of total cover: 11.8		

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across all Strata: 2 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	52.0	× 1 =	52.0
FACW Species	7.0	× 2 =	14.0
FAC Species	0.1	× 3 =	0.3
FACU Species	0.0	× 4 =	0.0
UPL Species	0.0	× 5 =	0.0
Column Totals:	59.1 (A)		66.3 (B)

Prevalence Index = B/A = 1.122

Hydrophytic Vegetation Indicators:
✓ Dominance Test is > 50%
✓ Prevalence Index is ≤ 3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators or hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Plot size (radius, or length × width) 10m radius
% Cover of Wetland Bryophytes (Where applicable) ____
% Bare Ground 30.0
Total Cover of Bryophytes 60.0

Hydrophytic Vegetation Present? **Yes** ✓ **No** ____

Remarks:

SOIL

Sampling Point: eklutna-02

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks
0-3	/		/		A		peat		ec 171. 6.42
3-9	n 2.5/	0.0	/		A		mucky peat		
9-16	n 2.5/	0.0	/		A		loamy fine sand		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, A=Absent [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators:

- ____ Histosol or Histel (A1)
- __✓__ Histic Epipedon (A2)
- __✓__ Hydrogen Sulfide (A4)
- ____ Thick Dark Surface (A12)
- ____ Alaska Gleyed (A13)
- ____ Alaska Redox (A14)
- ____ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ____ Alaska Color Change (TA4)[4]
- ____ Alaska Alpine Swales (TA5)
- ____ Alaska Redox With 2.5Y Hue
- ____ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- __✓__ Other (Explain in Remarks)

[3]One indicator or hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: None
Depth (inches):

Hydric Soil Present? Yes __✓__ No ____

Remarks: Problematic hydric soil indicator (Ch5) alpha alpha dipyridyl test positive at 6-10 inches.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

- __✓__ Surface Water (A1)
- __✓__ High Water Table (A2)
- __✓__ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Surface Soil Cracks (B6)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Marl Deposits (B15)
- __✓__ Hydrogen Sulfide Odor (C1)
- ____ Dry-Season Water Table (C2)
- __✓__ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____ Water Stained Leaves (B9)
- ____ Drainage Patterns (B10)
- ____ Oxidized Rizospheres along Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Salt Deposits (C5)
- ____ Stunted or Stressed Plants (D1)
- ____ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopographic Relief (D4)
- __✓__ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	✓	No		Depth (inches):	2
Water Table Present?	Yes	✓	No		Depth (inches):	0
Saturation Present? (includes capillary fringe)	Yes	✓	No		Depth (inches):	0

Wetland Hydrology Present? Yes __✓__ No ____

Recorded Data (stream gauge, monitor well, aerial photo, previous inspection) if available:

Remarks: Wetlands on the margin of Eklutna lake. Alpha alpha test for presence of reduced iron positive at 6-10 inches (C4)

Sampling Point: eklutna-02
NWI classification: PEM1E

Hydric Soil Indicators: Other (explain in remarks), Histic Epipedon (A2), Hydrogen Sulfide (A4)
Wetland Hydrology Indicators: Surface Water (A1), Hydrogen Sulfide Odor (C1), Saturation (A3), FAC-Neutral Test (D5), Other (explain in remarks), High Water Table (A2)

Wetland Determination Data Form - Alaska Region

Project/Site: Eklutna Hydro Wetlands Borough/City: Municipality of Anchorage Sampling Date: 2022-08-09
Applicant/Owner: McMillan Jacobs Sampling Point: eklutna-05
Investigator(s): RWM, SLI Landform (hillside, terrace, hummocks, etc.): Lake Margins
Local relief (concave, convex, none): concave Slope: 3.5 % / 2.0 ° Elevation: 900
Subregion: Cook Inlet Lowlands Lat.: 61.4040 Long.: -149.1435 Datum: WGS84
Soil Map Unit Name: Doroshin peat, 0 to 7 percent slopes NWI classification: PEM1E
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks: Lake outlet above old dam. Band of Equisetum fluviatile in what is presumably the low area surrounding drainage. Scattered embedded downed wood. Surrounding community transitions to sedge dominated.

Vegetation - Use scientific names of plants. List all species in the plot.

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
	Total Cover:	0.0		
	50% of total cover: 0.0		20% of total cover: 0.0	
	Sapling/Shrub Stratum			
	Total Cover:	0.0		
	50% of total cover: 0.0		20% of total cover: 0.0	
	Herb Stratum			
1.	Equisetum fluviatile	40.0	✓	OBL
2.	Carex aquatilis	10.0	____	OBL
3.	Equisetum palustre	2.0	____	FACW
	Total Cover:	52.0		
	50% of total cover: 26.0		20% of total cover: 10.4	

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across all Strata: 1 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	50.0	× 1 =	50.0
FACW Species	2.0	× 2 =	4.0
FAC Species	0.0	× 3 =	0.0
FACU Species	0.0	× 4 =	0.0
UPL Species	0.0	× 5 =	0.0
Column Totals:	52.0 (A)		54.0 (B)

Prevalence Index = B/A = 1.038

Hydrophytic Vegetation Indicators:
✓ Dominance Test is > 50%
✓ Prevalence Index is ≤ 3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators or hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Plot size (radius, or length × width) 5m radius
% Cover of Wetland Bryophytes (Where applicable) ____
% Bare Ground 5.0
Total Cover of Bryophytes 1.0

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: Lake outlet above old dam. Band of Equisetum fluviatile in what is presumably the low area surrounding drainage. The surrounding community transitions to be more sedge dominated further from the drainage feature.

SOIL

Sampling Point: eklutna-05

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks
0-2	2.5y 4/2		/		A		peat		
2-18	n 2.5/		/		A		peat		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, A=Absent [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators:

- ✓ Histosol or Histel (A1)
- ____ Histic Epipedon (A2)
- ____ Hydrogen Sulfide (A4)
- ____ Thick Dark Surface (A12)
- ____ Alaska Gleyed (A13)
- ____ Alaska Redox (A14)
- ____ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ____ Alaska Color Change (TA4)[4]
- ____ Alaska Alpine Swales (TA5)
- ____ Alaska Redox With 2.5Y Hue
- ____ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ____ Other (Explain in Remarks)

[3]One indicator or hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: None

Depth (inches):

Hydric Soil Present? Yes ✓ No ____

Remarks: Equisetum peat

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

- ____ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ____ Water Marks (B1)
- ✓ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Surface Soil Cracks (B6)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Marl Deposits (B15)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Dry-Season Water Table (C2)
- ____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____ Water Stained Leaves (B9)
- ____ Drainage Patterns (B10)
- ____ Oxidized Rizospheres along Living Roots (C3)
- ✓ Presence of Reduced Iron (C4)
- ____ Salt Deposits (C5)
- ____ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopographic Relief (D4)
- ✓ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	✓	No	____	Depth (inches):	3
Water Table Present?	Yes	✓	No	____	Depth (inches):	5
Saturation Present? (includes capillary fringe)	Yes	✓	No	____	Depth (inches):	0

Wetland Hydrology Present? Yes ✓ No ____

Recorded Data (stream gauge, monitor well, aerial photo, previous inspection) if available:

Remarks: Scattered small patches of surface water with biogenic sheen, sediment deposits, essentially no nonvascular cover suggesting this area is typically flooded. Scattered embedded downed wood.

Sampling Point: eklutna-05
NWI classification: PEM1E

Hydric Soil Indicators: Histosol or Histel (A1)
Wetland Hydrology Indicators: High Water Table (A2), Sediment Deposits (B2), Presence of Reduced Iron (C4), Saturation (A3), FAC-Neutral Test (D5), Geomorphic Position (D2)

Wetland Determination Data Form - Alaska Region

Project/Site: Eklutna Hydro Wetlands Borough/City: Municipality of Anchorage Sampling Date: 2022-08-09
Applicant/Owner: McMillan Jacobs Sampling Point: eklutna-06
Investigator(s): SLI Landform (hillside, terrace, hummocks, etc.): Basins Or Depressions
Local relief (concave, convex, none): concave Slope: 631.4 % / ___ ° Elevation: 906
Subregion: Cook Inlet Lowlands Lat.: 61.4040 Long.: -149.1441 Datum: WGS84
Soil Map Unit Name: Doroshin peat, 0 to 7 percent slopes NWI classification: PUBH
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓
Are Vegetation ____, Soil ✓, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** **Yes** ✓ **No** ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks: Small basin adjacent to old dam. Water levels currently low, assume typically ponded.

Vegetation - Use scientific names of plants. List all species in the plot.

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
	Total Cover:	0.0		
	50% of total cover: 0.0		20% of total cover: 0.0	
	Sapling/Shrub Stratum			
	Total Cover:	0.0		
	50% of total cover: 0.0		20% of total cover: 0.0	
	Herb Stratum			
1.	Utricularia macrorhiza	15.0	✓	OBL
2.	Potamogeton gramineus	15.0	✓	OBL
	Total Cover:	30.0		
	50% of total cover: 15.0		20% of total cover: 6.0	

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across all Strata: 2 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	30.0	× 1 =	30.0
FACW Species	0.0	× 2 =	0.0
FAC Species	0.0	× 3 =	0.0
FACU Species	0.0	× 4 =	0.0
UPL Species	0.0	× 5 =	0.0
Column Totals:	30.0 (A)		30.0 (B)

Prevalence Index = B/A = 1.000

Hydrophytic Vegetation Indicators:
✓ Dominance Test is > 50%
✓ Prevalence Index is ≤ 3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators or hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Plot size (radius, or length × width)	5m radius
% Cover of Wetland Bryophytes (Where applicable)	0.0
% Bare Ground	0.0
Total Cover of Bryophytes	0.0

Hydrophytic Vegetation Present? **Yes** ✓ **No** ____

Remarks:

SOIL

Sampling Point: eklutna-06

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, A=Absent [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators:

- ____Histosol or Histel (A1)
- ____Histic Epipedon (A2)
- ____Hydrogen Sulfide (A4)
- ____Thick Dark Surface (A12)
- ____Alaska Gleyed (A13)
- ____Alaska Redox (A14)
- ____Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ____Alaska Color Change (TA4)[4]
- ____Alaska Alpine Swales (TA5)
- ____Alaska Redox With 2.5Y Hue
- ____Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- __✓__Other (Explain in Remarks)

[3]One indicator or hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: None

Depth (inches):

Hydric Soil Present? Yes __✓__ No ____

Remarks: Assume hydric soils, flooded basin.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

- __✓__Surface Water (A1)
- ____High Water Table (A2)
- ____Saturation (A3)
- ____Water Marks (B1)
- ____Sediment Deposits (B2)
- ____Drift Deposits (B3)
- ____Algal Mat or Crust (B4)
- ____Iron Deposits (B5)
- ____Surface Soil Cracks (B6)
- ____Inundation Visible on Aerial Imagery (B7)
- ____Sparsely Vegetated Concave Surface (B8)
- ____Marl Deposits (B15)
- ____Hydrogen Sulfide Odor (C1)
- ____Dry-Season Water Table (C2)
- ____Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____Water Stained Leaves (B9)
- ____Drainage Patterns (B10)
- ____Oxidized Rizospheres along Living Roots (C3)
- ____Presence of Reduced Iron (C4)
- ____Salt Deposits (C5)
- ____Stunted or Stressed Plants (D1)
- __✓__Geomorphic Position (D2)
- ____Shallow Aquitard (D3)
- ____Microtopographic Relief (D4)
- __✓__FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	__✓__	No	____	Depth (inches):	999
Water Table Present?	Yes	____	No	__✓__	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes	____	No	__✓__	Depth (inches):	

Wetland Hydrology Present? Yes __✓__ No ____

Recorded Data (stream gauge, monitor well, aerial photo, previous inspection) if available:

Remarks: Surface water depth unknown, water levels currently low based on sediment deposits and exposed aquatic vegetation.

Sampling Point: eklutna-06
NWI classification: PUBH

Hydric Soil Indicators: Other (explain in remarks)
Wetland Hydrology Indicators: FAC-Neutral Test (D5), Geomorphic Position (D2), Surface Water (A1)

NO SOIL PHOTO TAKEN

Wetland Determination Data Form - Alaska Region

Project/Site: Eklutna Hydro Wetlands Borough/City: Municipality of Anchorage Sampling Date: 2022-08-09
Applicant/Owner: McMillan Jacobs Sampling Point: eklutna-07
Investigator(s): SLI Landform (hillside, terrace, hummocks, etc.): Basins Or Depressions
Local relief (concave, convex, none): concave Slope: 0.0 % / 0.0 ° Elevation: 874
Subregion: Cook Inlet Lowlands Lat.: 61.4052 Long.: -149.1520 Datum: WGS84
Soil Map Unit Name: Deception-Cryorthents complex, 45 to 90 percent slopes NWI classification: PUBH
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ____
Hydric Soil Present? Yes ✓ No ____
Wetland Hydrology Present? Yes ✓ No ____

Is the Sampled Area within a Wetland? **Yes** ✓ **No** ____

Remarks: Small shallow pond visible in imagery.

Vegetation - Use scientific names of plants. List all species in the plot.

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
	Total Cover:	0.0		
	50% of total cover: 0.0		20% of total cover: 0.0	
	Sapling/Shrub Stratum			
	Total Cover:	0.0		
	50% of total cover: 0.0		20% of total cover: 0.0	
	Herb Stratum			
1.	Utricularia sp.	10.0	✓	
	Total Cover:	10.0		
	50% of total cover: 5.0		20% of total cover: 2.0	

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across all Strata: 1 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0.0	× 1 =	0.0
FACW Species	0.0	× 2 =	0.0
FAC Species	0.0	× 3 =	0.0
FACU Species	0.0	× 4 =	0.0
UPL Species	0.0	× 5 =	0.0
Column Totals:	0.0 (A)		0.0 (B)

Prevalence Index = B/A = 0.000

Hydrophytic Vegetation Indicators:
____ Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
✓ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators or hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Plot size (radius, or length × width) 5m radius
% Cover of Wetland Bryophytes (Where applicable) ____
% Bare Ground 100.0
Total Cover of Bryophytes 0.0

Hydrophytic Vegetation Present? **Yes** ✓ **No** ____

Remarks: Shallow unvegetated pond. Sedge fringe, may not be visible in imagery, map with pond.

SOIL

Sampling Point: eklutna-07

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, A=Absent [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators:

- ____Histosol or Histel (A1)
- ____Histic Epipedon (A2)
- ____Hydrogen Sulfide (A4)
- ____Thick Dark Surface (A12)
- ____Alaska Gleyed (A13)
- ____Alaska Redox (A14)
- ____Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ____Alaska Color Change (TA4)[4]
- ____Alaska Alpine Swales (TA5)
- ____Alaska Redox With 2.5Y Hue
- ____Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- __✓__Other (Explain in Remarks)

[3]One indicator or hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: None

Depth (inches):

Hydric Soil Present? Yes __✓__ No ____

Remarks: Inundated, assume hydric soils.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

- __✓__Surface Water (A1)
- ____High Water Table (A2)
- ____Saturation (A3)
- ____Water Marks (B1)
- ____Sediment Deposits (B2)
- ____Drift Deposits (B3)
- ____Algal Mat or Crust (B4)
- ____Iron Deposits (B5)
- ____Surface Soil Cracks (B6)
- __✓__Inundation Visible on Aerial Imagery (B7)
- ____Sparsely Vegetated Concave Surface (B8)
- ____Marl Deposits (B15)
- ____Hydrogen Sulfide Odor (C1)
- ____Dry-Season Water Table (C2)
- ____Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____Water Stained Leaves (B9)
- ____Drainage Patterns (B10)
- ____Oxidized Rizospheres along Living Roots (C3)
- ____Presence of Reduced Iron (C4)
- ____Salt Deposits (C5)
- ____Stunted or Stressed Plants (D1)
- __✓__Geomorphic Position (D2)
- ____Shallow Aquitard (D3)
- ____Microtopographic Relief (D4)
- ____FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	✓	No		Depth (inches):	18
Water Table Present?	Yes		No	✓	Depth (inches):	0
Saturation Present? (includes capillary fringe)	Yes		No	✓	Depth (inches):	0

Wetland Hydrology Present? Yes __✓__ No ____

Recorded Data (stream gauge, monitor well, aerial photo, previous inspection) if available:

Remarks:

Sampling Point: eklutna-07
NWI classification: PUBH

Hydric Soil Indicators: Other (explain in remarks)
Wetland Hydrology Indicators: Surface Water (A1), Inundation Visible in Aerial Imagery (B7), Geomorphic Position (D2)

NO SOIL PHOTO TAKEN

Wetland Determination Data Form - Alaska Region

Project/Site: Eklutna Hydro Wetlands Borough/City: Municipality of Anchorage Sampling Date: 2022-08-09
Applicant/Owner: McMillan Jacobs Sampling Point: eklutna-08
Investigator(s): SLI Landform (hillside, terrace, hummocks, etc.):
Local relief (concave, convex, none): _____ Slope: 0.0 % / 0.0 ° Elevation: 879
Subregion: Cook Inlet Lowlands Lat.: 61.4053 Long.: -149.1526 Datum: WGS84
Soil Map Unit Name: Deception-Cryorthents complex, 45 to 90 percent slopes NWI classification: R4SBC
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ✓, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓
Are Vegetation ✓, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks: Active channel Eklutna River. Water at time of visit 6 inches deep. Channel ranges from 5 to 10 feet wide with a cobble substrate. It is braided, and should be possible to map using lidar. There are small log jams (beaver dams?) scattered throughout.

Vegetation - Use scientific names of plants. List all species in the plot.

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
Total Cover:	0.0		
50% of total cover: 0.0		20% of total cover: 0.0	
Sapling/Shrub Stratum			
Total Cover:	0.0		
50% of total cover: 0.0		20% of total cover: 0.0	
Herb Stratum			
Total Cover:	0.0		
50% of total cover: 0.0		20% of total cover: 0.0	

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across all Strata: 0 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0.0	× 1 =	0.0
FACW Species	0.0	× 2 =	0.0
FAC Species	0.0	× 3 =	0.0
FACU Species	0.0	× 4 =	0.0
UPL Species	0.0	× 5 =	0.0
Column Totals:	0.0 (A)		0.0 (B)

Prevalence Index = B/A = 0.000

Hydrophytic Vegetation Indicators:
____ Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
✓ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators or hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Plot size (radius, or length × width) _____
% Cover of Wetland Bryophytes (Where applicable) 0.0
% Bare Ground 0.0
Total Cover of Bryophytes 0.0

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: Unvegetated active channel.

SOIL

Sampling Point: eklutna-08

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, A=Absent [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators:

- ____Histosol or Histel (A1)
- ____Histic Epipedon (A2)
- ____Hydrogen Sulfide (A4)
- ____Thick Dark Surface (A12)
- ____Alaska Gleyed (A13)
- ____Alaska Redox (A14)
- ____Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ____Alaska Color Change (TA4)[4]
- ____Alaska Alpine Swales (TA5)
- ____Alaska Redox With 2.5Y Hue
- ____Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- __✓__Other (Explain in Remarks)

[3]One indicator or hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: None

Depth (inches):

Hydric Soil Present? Yes __✓__ No ____

Remarks: Active channel of the Eklutna River, assume hydric soils

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

- __✓__Surface Water (A1)
- ____High Water Table (A2)
- ____Saturation (A3)
- ____Water Marks (B1)
- ____Sediment Deposits (B2)
- ____Drift Deposits (B3)
- ____Algal Mat or Crust (B4)
- ____Iron Deposits (B5)
- ____Surface Soil Cracks (B6)
- ____Inundation Visible on Aerial Imagery (B7)
- ____Sparsely Vegetated Concave Surface (B8)
- ____Marl Deposits (B15)
- ____Hydrogen Sulfide Odor (C1)
- ____Dry-Season Water Table (C2)
- ____Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____Water Stained Leaves (B9)
- ____Drainage Patterns (B10)
- ____Oxidized Rizospheres along Living Roots (C3)
- ____Presence of Reduced Iron (C4)
- ____Salt Deposits (C5)
- ____Stunted or Stressed Plants (D1)
- __✓__Geomorphic Position (D2)
- ____Shallow Aquitard (D3)
- ____Microtopographic Relief (D4)
- ____FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	__✓__	No	____	Depth (inches):	6
Water Table Present?	Yes	____	No	__✓__	Depth (inches):	0
Saturation Present? (includes capillary fringe)	Yes	____	No	__✓__	Depth (inches):	0

Wetland Hydrology Present? Yes __✓__ No ____

Recorded Data (stream gauge, monitor well, aerial photo, previous inspection) if available:

Remarks: Active channel Eklutna River.

Sampling Point: eklutna-08
NWI classification: R4SBC

Hydric Soil Indicators: Other (explain in remarks)
Wetland Hydrology Indicators: Surface Water (A1), Geomorphic Position (D2)

No Soil Photo Taken

Wetland Determination Data Form - Alaska Region

Project/Site: Eklutna Hydro Wetlands Borough/City: Municipality of Anchorage Sampling Date: 2022-08-09
Applicant/Owner: McMillan Jacobs Sampling Point: eklutna-09
Investigator(s): SLI, RWM Landform (hillside, terrace, hummocks, etc.): Plateau
Local relief (concave, convex, none): none Slope: 0.0 % / 0.0 ° Elevation: 888
Subregion: Cook Inlet Lowlands Lat.: 61.4052 Long.: -149.1530 Datum: WGS84
Soil Map Unit Name: Deception-Cryorthents complex, 45 to 90 percent slopes NWI classification: U
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ✓	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks: Terrace above Eklutna River.

Vegetation - Use scientific names of plants. List all species in the plot.

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1.	Populus balsamifera	25.0	✓	FACU
2.	Picea glauca	25.0	✓	FACU
	Total Cover:	50.0		
	50% of total cover: 25.0		20% of total cover: 10.0	
	Sapling/Shrub Stratum			
1.	Alnus viridis	5.0	✓	FAC
2.	Rosa acicularis	5.0	✓	FACU
3.	Salix myrtillifolia	5.0	✓	FACW
4.	Viburnum edule	2.0		FACU
5.	Linnaea borealis	2.0		FACU
	Total Cover:	19.0		
	50% of total cover: 9.5		20% of total cover: 3.8	
	Herb Stratum			
1.	Cornus canadensis	10.0	✓	FACU
2.	Pyrola asarifolia	7.0	✓	FACU
3.	Coptidium lapponicum	3.0		OBL
4.	Calamagrostis canadensis	2.0		FAC
5.	Orthilia secunda	2.0		FACU
6.	Geocaulon lividum	1.0		FACU
7.	Streptopus amplexifolius	1.0		FACU
8.	Equisetum pratense	0.1		FACW
	Total Cover:	26.1		
	50% of total cover: 13.0		20% of total cover: 5.2	

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across all Strata: 7 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 28.6% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	3.0	× 1 =	3.0
FACW Species	5.1	× 2 =	10.2
FAC Species	7.0	× 3 =	21.0
FACU Species	80.0	× 4 =	320.0
UPL Species	0.0	× 5 =	0.0
Column Totals:	95.1	(A)	354.2 (B)

Prevalence Index = B/A = 3.725

Hydrophytic Vegetation Indicators:
____ Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators or hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Plot size (radius, or length × width) 5m radius
% Cover of Wetland Bryophytes (Where applicable) ____
% Bare Ground 0.0
Total Cover of Bryophytes 7.0

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks: Mixed canopy forest, cottonwood and white spruce co-dominant. Non-vasculars include Hylocomium splendens and Pleurozium schreberi.

SOIL

Sampling Point: eklutna-09

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks
0-1	10yr 2/2		/		A		fibric		
1-2	10yr 2/2		/		A		hemic		
2-18	10yr 3/1		/		A		silt loam	gravelly	
18-20	10yr 4/1		/		A		silt loam	v. gravelly	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, A=Absent [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators:

- ____Histosol or Histel (A1)
- ____Histic Epipedon (A2)
- ____Hydrogen Sulfide (A4)
- ____Thick Dark Surface (A12)
- ____Alaska Gleyed (A13)
- ____Alaska Redox (A14)
- ____Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ____Alaska Color Change (TA4)[4]
- ____Alaska Alpine Swales (TA5)
- ____Alaska Redox With 2.5Y Hue
- ____Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ____Other (Explain in Remarks)

[3]One indicator or hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: None

Depth (inches): 0

Hydric Soil Present? Yes ____ No ✓

Remarks: No hydric soil indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

- ____Surface Water (A1)
- ____High Water Table (A2)
- ____Saturation (A3)
- ____Water Marks (B1)
- ____Sediment Deposits (B2)
- ____Drift Deposits (B3)
- ____Algal Mat or Crust (B4)
- ____Iron Deposits (B5)
- ____Surface Soil Cracks (B6)
- ____Inundation Visible on Aerial Imagery (B7)
- ____Sparsely Vegetated Concave Surface (B8)
- ____Marl Deposits (B15)
- ____Hydrogen Sulfide Odor (C1)
- ____Dry-Season Water Table (C2)
- ____Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____Water Stained Leaves (B9)
- ____Drainage Patterns (B10)
- ____Oxidized Rizospheres along Living Roots (C3)
- ____Presence of Reduced Iron (C4)
- ____Salt Deposits (C5)
- ____Stunted or Stressed Plants (D1)
- ____Geomorphic Position (D2)
- ____Shallow Aquitard (D3)
- ____Microtopographic Relief (D4)
- ____FAC-neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): 0

Water Table Present? Yes ____ No ✓ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches):

Wetland Hydrology Present? Yes ____ No ✓

Recorded Data (stream gauge, monitor well, aerial photo, previous inspection) if available:

Remarks: No wetland hydrology indicators.

Sampling Point: eklutna-09
NWI classification: U

Hydric Soil Indicators: None
Wetland Hydrology Indicators: None

Wetland Determination Data Form - Alaska Region

Project/Site: Eklutna Hydro Wetlands Borough/City: Municipality of Anchorage Sampling Date: 2022-08-09
Applicant/Owner: McMillan Jacobs Sampling Point: eklutna-10
Investigator(s): RWM, SLI Landform (hillside, terrace, hummocks, etc.): Flat or fluvial related
Local relief (concave, convex, none): _____ Slope: 3.5 % / 2.0 ° Elevation: 895
Subregion: Cook Inlet Lowlands Lat.: 61.4052 Long.: -149.1528 Datum: WGS84
Soil Map Unit Name: Deception-Cryorthents complex, 45 to 90 percent slopes NWI classification: U
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks: Inactive floodplain of Eklutna River. Perhaps inundated during releases, but there are no signs of recent flooding (no rafted debris, sediment deposits). Active riparian is currently limited to a very narrow corridor around the river.

Vegetation - Use scientific names of plants. List all species in the plot.

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1.	Picea glauca	3.0		FACU
	Total Cover:	3.0		
	50% of total cover: 1.5		20% of total cover: 0.6	
	Sapling/Shrub Stratum			
1.	Alnus viridis	20.0	✓	FAC
2.	Salix alaxensis	7.0		FAC
3.	Rosa acicularis	5.0		FACU
4.	Viburnum edule	5.0		FACU
5.	Ribes laxiflorum	2.0		FACU
6.	Rubus idaeus	1.0		FACU
	Total Cover:	40.0		
	50% of total cover: 20.0		20% of total cover: 8.0	
	Herb Stratum			
1.	Calamagrostis canadensis	7.0	✓	FAC
2.	Pyrola asarifolia	1.0		FACU
3.	Orthilia secunda	0.1		FACU
4.	Coptidium lapponicum	0.1		OBL
5.	Equisetum variegatum	0.1		FACW
6.	Equisetum arvense	0.1		FAC
7.	Corallorhiza trifida	0.1		FACW
	Total Cover:	8.5		
	50% of total cover: 4.2		20% of total cover: 1.7	

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across all Strata: 2 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0.1	× 1 =	0.1
FACW Species	0.2	× 2 =	0.4
FAC Species	34.1	× 3 =	102.3
FACU Species	17.1	× 4 =	68.4
UPL Species	0.0	× 5 =	0.0
Column Totals:	51.5 (A)		171.2 (B)

Prevalence Index = B/A = 3.324

Hydrophytic Vegetation Indicators:
✓ Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators or hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Plot size (radius, or length × width) -
% Cover of Wetland Bryophytes (Where applicable) ____
% Bare Ground 0.0
Total Cover of Bryophytes 15.0

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: Hamatocaulis vernicosus dominates nonvascular cover.

SOIL

Sampling Point: eklutna-10

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks
0-6	10yr 2/2		/		A		fibric		
									stopped at 8.5 due to encountering stones/
6-8	10yr 2/2		/		A		fibric	v. stoney	cobbles

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, A=Absent [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators:

- ____Histosol or Histel (A1)
- ____Histic Epipedon (A2)
- ____Hydrogen Sulfide (A4)
- ____Thick Dark Surface (A12)
- ____Alaska Gleyed (A13)
- ____Alaska Redox (A14)
- ____Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ____Alaska Color Change (TA4)[4]
- ____Alaska Alpine Swales (TA5)
- ____Alaska Redox With 2.5Y Hue
- ____Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ____Other (Explain in Remarks)

[3]One indicator or hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: None
Depth (inches):

Hydric Soil Present? Yes ____ No ✓

Remarks: No hydric soil indicators, soil pit to 8.5 inches where river cobbles where encountered.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

- ____Surface Water (A1)
- ____High Water Table (A2)
- ____Saturation (A3)
- ____Water Marks (B1)
- ____Sediment Deposits (B2)
- ____Drift Deposits (B3)
- ____Algal Mat or Crust (B4)
- ____Iron Deposits (B5)
- ____Surface Soil Cracks (B6)
- ____Inundation Visible on Aerial Imagery (B7)
- ____Sparsely Vegetated Concave Surface (B8)
- ____Marl Deposits (B15)
- ____Hydrogen Sulfide Odor (C1)
- ____Dry-Season Water Table (C2)
- ____Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____Water Stained Leaves (B9)
- ____Drainage Patterns (B10)
- ____Oxidized Rizospheres along Living Roots (C3)
- ____Presence of Reduced Iron (C4)
- ____Salt Deposits (C5)
- ____Stunted or Stressed Plants (D1)
- ____Geomorphic Position (D2)
- ____Shallow Aquitard (D3)
- ____Microtopographic Relief (D4)
- ____FAC-neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): 0
Water Table Present? Yes ____ No ✓ Depth (inches):
Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches):

Wetland Hydrology Present? Yes ____ No ✓

Recorded Data (stream gauge, monitor well, aerial photo, previous inspection) if available:

Remarks: No wetland hydrology indicators.

Sampling Point: eklutna-10
NWI classification: U

Hydric Soil Indicators: None
Wetland Hydrology Indicators: None

Wetland Determination Data Form - Alaska Region

Project/Site: Eklutna Hydro Wetlands Borough/City: Municipality of Anchorage Sampling Date: 2022-08-09
Applicant/Owner: McMillan Jacobs Sampling Point: eklutna-12
Investigator(s): SLI Landform (hillside, terrace, hummocks, etc.):
Local relief (concave, convex, none): _____ Slope: 8.7 % / 5.0 ° Elevation: 878
Subregion: Cook Inlet Lowlands Lat.: 61.4068 Long.: -149.1537 Datum: WGS84
Soil Map Unit Name: Deception-Cryorthents complex, 45 to 90 percent slopes NWI classification: PMLD
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓
Are Vegetation ✓, Soil ✓, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks: Shallow swale with mosses, bare soil, and running water. No channel morphology, hence a Palustrine system. Calcareous substrate upstream of this drainage, evidenced by effervescent sediments, slightly basic water, and marl deposits. Steps up to upland forest, map bounds using lidar.

Vegetation - Use scientific names of plants. List all species in the plot.

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
	Total Cover:	0.0		
	50% of total cover: 0.0		20% of total cover: 0.0	
	Sapling/Shrub Stratum			
	Total Cover:	0.0		
	50% of total cover: 0.0		20% of total cover: 0.0	
	Herb Stratum			
1.	Coptidium lapponicum	0.1	____	OBL
2.	Equisetum arvense	0.1	____	FAC
3.	Arctagrostis latifolia	0.1	____	FACW
	Total Cover:	0.3		
	50% of total cover: 0.2		20% of total cover: 0.1	

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across all Strata: 0 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0.1	× 1 =	0.1
FACW Species	0.1	× 2 =	0.2
FAC Species	0.1	× 3 =	0.3
FACU Species	0.0	× 4 =	0.0
UPL Species	0.0	× 5 =	0.0
Column Totals:	0.3 (A)		0.6 (B)

Prevalence Index = B/A = 2.000

Hydrophytic Vegetation Indicators:
____ Dominance Test is > 50%
✓ Prevalence Index is ≤ 3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
✓ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators or hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Plot size (radius, or length × width)	2x10m
% Cover of Wetland Bryophytes (Where applicable)	0.0
% Bare Ground	50.0
Total Cover of Bryophytes	50.0

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: Trace vascular plants. 50% cover non-vasculars, dominated by Calliergon sp.

SOIL

Sampling Point: eklutna-12

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, A=Absent [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators:

- ____Histosol or Histel (A1)
- ____Histic Epipedon (A2)
- ____Hydrogen Sulfide (A4)
- ____Thick Dark Surface (A12)
- ____Alaska Gleyed (A13)
- ____Alaska Redox (A14)
- ____Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ____Alaska Color Change (TA4)[4]
- ____Alaska Alpine Swales (TA5)
- ____Alaska Redox With 2.5Y Hue
- ____Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ✓ Other (Explain in Remarks)

[3]One indicator or hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: None

Depth (inches):

Hydric Soil Present? Yes ✓ No ____

Remarks: Inundated, assume hydric soils. Light colored soils, effervescent.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

- ✓ Surface Water (A1)
- ____High Water Table (A2)
- ____Saturation (A3)
- ____Water Marks (B1)
- ____Sediment Deposits (B2)
- ____Drift Deposits (B3)
- ____Algal Mat or Crust (B4)
- ____Iron Deposits (B5)
- ____Surface Soil Cracks (B6)
- ____Inundation Visible on Aerial Imagery (B7)
- ____Sparsely Vegetated Concave Surface (B8)
- ✓ Marl Deposits (B15)
- ____Hydrogen Sulfide Odor (C1)
- ____Dry-Season Water Table (C2)
- ____Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____Water Stained Leaves (B9)
- ____Drainage Patterns (B10)
- ____Oxidized Rizospheres along Living Roots (C3)
- ____Presence of Reduced Iron (C4)
- ____Salt Deposits (C5)
- ____Stunted or Stressed Plants (D1)
- ____Geomorphic Position (D2)
- ____Shallow Aquitard (D3)
- ____Microtopographic Relief (D4)
- ____FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	✓	No	____	Depth (inches):	4
Water Table Present?	Yes	✓	No	____	Depth (inches):	0
Saturation Present? (includes capillary fringe)	Yes	✓	No	____	Depth (inches):	0

Wetland Hydrology Present? Yes ✓ No ____

Recorded Data (stream gauge, monitor well, aerial photo, previous inspection) if available:

Remarks: Shallow swale with flowing water over bare soils.

Sampling Point: eklutna-12
NWI classification: PMLD

Hydric Soil Indicators: Other (explain in remarks)
Wetland Hydrology Indicators: Surface Water (A1), Marl Deposits (B15)

No Soil Photo Taken

Wetland Determination Data Form - Alaska Region

Project/Site: Eklutna Hydro Wetlands Borough/City: Municipality of Anchorage Sampling Date: 2022-08-09
Applicant/Owner: McMillan Jacobs Sampling Point: eklutna-13
Investigator(s): RWM, SLI Landform (hillside, terrace, hummocks, etc.): Flat or fluvial related
Local relief (concave, convex, none): none Slope: 0.0 % / 0.0 ° Elevation: 878
Subregion: Cook Inlet Lowlands Lat.: 61.4066 Long.: -149.1538 Datum: WGS84
Soil Map Unit Name: Deception-Cryorthents complex, 45 to 90 percent slopes NWI classification: PSS1C
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓
Are Vegetation ____, Soil ✓, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

Summary of findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks: Narrow band of riparian alder-willow, with rafted debris (wood, leaves) entrained in shrubs. Adjacent upland hillside with steeper slope and open canopy cottonwood-white spruce forest.

Vegetation - Use scientific names of plants. List all species in the plot.

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1.	Populus balsamifera	7.0	✓	FACU
	Total Cover:	7.0		
	50% of total cover: 3.5		20% of total cover: 1.4	
	Sapling/Shrub Stratum			
1.	Alnus viridis	35.0	✓	FAC
2.	Salix barclayi	20.0	✓	FAC
3.	Salix alaxensis	7.0		FAC
4.	Salix myrtillifolia	2.0		FACW
5.	Picea glauca	0.1		FACU
6.	Rubus idaeus	0.1		FACU
	Total Cover:	64.2		
	50% of total cover: 32.1		20% of total cover: 12.8	
	Herb Stratum			
1.	Calamagrostis canadensis	15.0	✓	FAC
2.	Thalictrum sparsiflorum	3.0		FACU
3.	Orthilia secunda	0.1		FACU
4.	Pyrola asarifolia	0.1		FACU
5.	Parnassia palustris	0.1		FACW
6.	Moehringia lateriflora	0.1		FACU
7.	Equisetum arvense	0.1		FAC
8.	Trientalis europaea	0.0		FACU
	Total Cover:	18.5		
	50% of total cover: 9.2		20% of total cover: 3.7	

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across all Strata: 4 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 75.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0.0	× 1 =	0.0
FACW Species	2.1	× 2 =	4.2
FAC Species	77.1	× 3 =	231.3
FACU Species	10.5	× 4 =	42.0
UPL Species	0.0	× 5 =	0.0
Column Totals:	89.7 (A)		277.5 (B)

Prevalence Index = B/A = 3.094

Hydrophytic Vegetation Indicators:
✓ Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators or hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Plot size (radius, or length × width) 2x10m
% Cover of Wetland Bryophytes (Where applicable) ____
% Bare Ground 0.0
Total Cover of Bryophytes 50.0

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: Riparian alder-willow, with scattered cottonwood trees.

SOIL

Sampling Point: eklutna-13

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks
0-4	10yr 2/2		/		A		hemic		
4-6	10yr 3/1		/		A		silt loam	gravelly	color mostly from parent material
6-12	2.5y 4/1		/		A		silt loam	ext. gravelly	color from parent material
12-17	10yr 4/1		/		A		silt loam	ext. gravelly	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, A=Absent [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators:

- ____Histosol or Histel (A1)
- ____Histic Epipedon (A2)
- ____Hydrogen Sulfide (A4)
- ____Thick Dark Surface (A12)
- ____Alaska Gleyed (A13)
- ____Alaska Redox (A14)
- ____Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ____Alaska Color Change (TA4)[4]
- ____Alaska Alpine Swales (TA5)
- ____Alaska Redox With 2.5Y Hue
- ____Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ✓ Other (Explain in Remarks)

[3]One indicator or hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: None
Depth (inches):

Hydric Soil Present? Yes ✓ No ____

Remarks: Other--fluvial soils with insufficient organic content for development f redox features.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

- ____Surface Water (A1)
- ____High Water Table (A2)
- ____Saturation (A3)
- ____Water Marks (B1)
- ____Sediment Deposits (B2)
- ✓ Drift Deposits (B3)
- ____Algal Mat or Crust (B4)
- ____Iron Deposits (B5)
- ____Surface Soil Cracks (B6)
- ____Inundation Visible on Aerial Imagery (B7)
- ____Sparsely Vegetated Concave Surface (B8)
- ____Marl Deposits (B15)
- ____Hydrogen Sulfide Odor (C1)
- ____Dry-Season Water Table (C2)
- ____Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____Water Stained Leaves (B9)
- ____Drainage Patterns (B10)
- ____Oxidized Rizospheres along Living Roots (C3)
- ____Presence of Reduced Iron (C4)
- ____Salt Deposits (C5)
- ____Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ____Shallow Aquitard (D3)
- ____Microtopographic Relief (D4)
- ____FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	____	No	✓	Depth (inches):	0
Water Table Present?	Yes	✓	No	____	Depth (inches):	15
Saturation Present? (includes capillary fringe)	Yes	✓	No	____	Depth (inches):	13

Wetland Hydrology Present? Yes ✓ No ____

Recorded Data (stream gauge, monitor well, aerial photo, previous inspection) if available:

Remarks: Narrow band of riparian alder-willow with rafted debris throughout.

Sampling Point: eklutna-13
NWI classification: PSS1C

Hydric Soil Indicators: Other (explain in remarks)
Wetland Hydrology Indicators: Geomorphic Position (D2), Drift Deposits (B3)

Wetland Determination Data Form - Alaska Region

Project/Site: Eklutna Hydro Wetlands Borough/City: Municipality of Anchorage Sampling Date: 2022-08-09
Applicant/Owner: McMillan Jacobs Sampling Point: eklutna-16
Investigator(s): SLI, RWM Landform (hillside, terrace, hummocks, etc.):
Local relief (concave, convex, none): _____ Slope: 0.0 % / 0.0 ° Elevation: 877
Subregion: Cook Inlet Lowlands Lat.: 61.4088 Long.: -149.1658 Datum: WGS84
Soil Map Unit Name: Deception-Cryorthents complex, 45 to 90 percent slopes NWI classification: PSS1E
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks: Flooded section of forest. Water levels may be unusually high because of recent rain, but sediments on surface, H2S odor, and positive reaction to alpha alpha dipyridol dye indicate the area is saturated for prolonged periods. Immediately adjacent to area with surface water are saturated soils with open canopy cottonwood and heavy Ranunculus lapponicus cover.

Vegetation - Use scientific names of plants. List all species in the plot.

		Absolute % Cover	Dominant Species?	Indicator Status
	Tree Stratum			
1.	Populus balsamifera	10.0	✓	FACU
	Total Cover:	10.0		
	50% of total cover: 5.0		20% of total cover: 2.0	
	Sapling/Shrub Stratum			
1.	Alnus viridis	40.0	✓	FAC
2.	Salix commutata	1.0	____	FAC
3.	Ribes laxiflorum	0.1	____	FACU
	Total Cover:	41.1		
	50% of total cover: 20.6		20% of total cover: 8.2	
	Herb Stratum			
1.	Equisetum pratense	40.0	✓	FACW
2.	Arctagrostis latifolia	3.0	____	FACW
3.	Coptidium lapponicum	3.0	____	OBL
4.	Parnassia palustris	2.0	____	FACW
5.	Polemonium acutiflorum	0.1	____	FAC
6.	Epilobium sp.	0.1	____	____
	Total Cover:	48.2		
	50% of total cover: 24.1		20% of total cover: 9.6	

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across all Strata: 3 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 66.7% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	3.0	× 1 =	3.0
FACW Species	45.0	× 2 =	90.0
FAC Species	41.1	× 3 =	123.3
FACU Species	10.1	× 4 =	40.4
UPL Species	0.0	× 5 =	0.0
Column Totals:	99.2 (A)		256.7 (B)

Prevalence Index = B/A = 2.588

Hydrophytic Vegetation Indicators:
✓ Dominance Test is > 50%
✓ Prevalence Index is ≤ 3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators or hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Plot size (radius, or length × width) _____
% Cover of Wetland Bryophytes (Where applicable) ____
% Bare Ground 50.0
Total Cover of Bryophytes 0.0

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

SOIL

Sampling Point: eklutna-16

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks
0-0	5y 2.5/1			/	A		mucky peat		
0-4	5y 2.5/1			/	A		sandy loam		
4-13	n 2.5/	90	7.5yr 3/4	10	C	PL	silt loam		positive alpha alpha at 8-12. h2s smell on cutting the plug open

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, A=Absent [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators:

- ____ Histosol or Histel (A1)
- ____ Histic Epipedon (A2)
- ✓ Hydrogen Sulfide (A4)
- ____ Thick Dark Surface (A12)
- ____ Alaska Gleyed (A13)
- ____ Alaska Redox (A14)
- ____ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ____ Alaska Color Change (TA4)[4]
- ____ Alaska Alpine Swales (TA5)
- ____ Alaska Redox With 2.5Y Hue
- ____ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ✓ Other (Explain in Remarks)

[3]One indicator or hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: None

Depth (inches):

Hydric Soil Present? Yes ✓ No ____

Remarks: Colors may be indicative of parent material, but multiple indicators met. Other--positive reaction alpha alpha dipyridol dye. Sediments are effervescent indicating a calcareous parent material on site or being deposited from upslope.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Surface Soil Cracks (B6)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Marl Deposits (B15)
- ✓ Hydrogen Sulfide Odor (C1)
- ____ Dry-Season Water Table (C2)
- ____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____ Water Stained Leaves (B9)
- ____ Drainage Patterns (B10)
- ____ Oxidized Rizospheres along Living Roots (C3)
- ✓ Presence of Reduced Iron (C4)
- ____ Salt Deposits (C5)
- ____ Stunted or Stressed Plants (D1)
- ____ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopographic Relief (D4)
- ____ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	✓	No	____	Depth (inches):	4
Water Table Present?	Yes	✓	No	____	Depth (inches):	0
Saturation Present? (includes capillary fringe)	Yes	✓	No	____	Depth (inches):	0

Wetland Hydrology Present? Yes ✓ No ____

Recorded Data (stream gauge, monitor well, aerial photo, previous inspection) if available:

Remarks: Water flowing through site, but it is potentially higher than usual because of recent rains. No channel morphology, water moving through plot as sheet flow. Micro topographic highs with nonvascular plants, lows with sediments.

Sampling Point: eklutna-16
NWI classification: PSS1E

Hydric Soil Indicators: Other (explain in remarks), Hydrogen Sulfide (A4)
Wetland Hydrology Indicators: High Water Table (A2), Presence of Reduced Iron (C4), Hydrogen Sulfide Odor (C1), Saturation (A3), Surface Water (A1)

Wetland Determination Data Form - Alaska Region

Project/Site: Eklutna Hydro Wetlands Borough/City: Municipality of Anchorage Sampling Date: 2022-08-09
Applicant/Owner: McMillan Jacobs Sampling Point: eklutna-17
Investigator(s): RWM, SLI Landform (hillside, terrace, hummocks, etc.): Toeslope
Local relief (concave, convex, none): _____ Slope: 8.7 % / 5.0 ° Elevation: 854
Subregion: Cook Inlet Lowlands Lat.: 61.4077 Long.: -149.1658 Datum: WGS84
Soil Map Unit Name: Deception-Cryorthents complex, 45 to 90 percent slopes NWI classification: PMLD
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks: Toe slope discharge from adjacent steep hillside. Surface water with marl deposits.

Vegetation - Use scientific names of plants. List all species in the plot.

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
	Total Cover:	0.0		
	50% of total cover: 0.0		20% of total cover: 0.0	
	Sapling/Shrub Stratum			
1.	Salix myrtillifolia	7.0	✓	FACW
2.	Dasiphora fruticosa	5.0	✓	FAC
3.	Picea glauca	0.1	____	FACU
	Total Cover:	12.1		
	50% of total cover: 6.0		20% of total cover: 2.4	
	Herb Stratum			
1.	Equisetum variegatum	7.0	✓	FACW
2.	Triglochin palustris	3.0	✓	OBL
3.	Juncus castaneus	3.0	✓	FACW
4.	Equisetum pratense	2.0	____	FACW
5.	Carex aquatilis	1.0	____	OBL
6.	Parnassia palustris	1.0	____	FACW
7.	Juncus biglumis	0.1	____	OBL
8.	Equisetum fluviatile	0.1	____	OBL
	Total Cover:	17.2		
	50% of total cover: 8.6		20% of total cover: 3.4	

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 5 (A)
Total Number of Dominant Species Across all Strata: 5 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	4.2	× 1 =	4.2
FACW Species	20.0	× 2 =	40.0
FAC Species	5.0	× 3 =	15.0
FACU Species	0.1	× 4 =	0.4
UPL Species	0.0	× 5 =	0.0
Column Totals:	29.3 (A)		59.6 (B)

Prevalence Index = B/A = 2.034

Hydrophytic Vegetation Indicators:
✓ Dominance Test is > 50%
✓ Prevalence Index is ≤ 3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators or hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Plot size (radius, or length × width) -
% Cover of Wetland Bryophytes (Where applicable) ____
% Bare Ground 50.0
Total Cover of Bryophytes 75.0

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

SOIL

Sampling Point: eklutna-17

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks
0-4		/		/	A		peat		
4-7	2.5y	4/1		/	A		silt loam		
7-16	n	4/		/	A		silt loam		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, A=Absent [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators:

- ____Histosol or Histel (A1)
- ____Histic Epipedon (A2)
- ____Hydrogen Sulfide (A4)
- ____Thick Dark Surface (A12)
- ____Alaska Gleyed (A13)
- ____Alaska Redox (A14)
- ____Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ____Alaska Color Change (TA4)[4]
- ____Alaska Alpine Swales (TA5)
- ____Alaska Redox With 2.5Y Hue
- ✓ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ✓ Other (Explain in Remarks)

[3]One indicator or hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: None
Depth (inches):

Hydric Soil Present? Yes ✓ No ____

Remarks: Other--positive reaction to alpha alpha dipyridol.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ____Water Marks (B1)
- ____Sediment Deposits (B2)
- ____Drift Deposits (B3)
- ____Algal Mat or Crust (B4)
- ____Iron Deposits (B5)
- ____Surface Soil Cracks (B6)
- ____Inundation Visible on Aerial Imagery (B7)
- ____Sparsely Vegetated Concave Surface (B8)
- ✓ Marl Deposits (B15)
- ____Hydrogen Sulfide Odor (C1)
- ____Dry-Season Water Table (C2)
- ____Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____Water Stained Leaves (B9)
- ____Drainage Patterns (B10)
- ____Oxidized Rizospheres along Living Roots (C3)
- ____Presence of Reduced Iron (C4)
- ____Salt Deposits (C5)
- ____Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ____Shallow Aquitard (D3)
- ____Microtopographic Relief (D4)
- ✓ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	✓	No	____	Depth (inches):	4
Water Table Present?	Yes	✓	No	____	Depth (inches):	0
Saturation Present? (includes capillary fringe)	Yes	✓	No	____	Depth (inches):	0

Wetland Hydrology Present? Yes ✓ No ____

Recorded Data (stream gauge, monitor well, aerial photo, previous inspection) if available:

Remarks: Toeslope discharge from adjacent steep slope. Water flows through site towards Eklutna River. No channel morphology, more like sheet flow. Micro-topographic highs with non-vasculars, microtopographic-lows with sediment deposits and surface water.

Sampling Point: eklutna-17
NWI classification: PMLD

Hydric Soil Indicators: Other (explain in remarks), Alaska Gleyed without Hue 5Y or Redder Underlaying Layer
Wetland Hydrology Indicators: High Water Table (A2), Surface Water (A1), Marl Deposits (B15), Saturation (A3), Geomorphic Position (D2), FAC-Neutral Test (D5)

Wetland Determination Data Form - Alaska Region

Project/Site: Eklutna Hydro Wetlands Borough/City: Municipality of Anchorage Sampling Date: 2022-08-09
Applicant/Owner: McMillan Jacobs Sampling Point: eklutna-20
Investigator(s): SLI Landform (hillside, terrace, hummocks, etc.):
Local relief (concave, convex, none): _____ Slope: 0.0 % / 0.0 ° Elevation: 855
Subregion: Cook Inlet Lowlands Lat.: 61.4079 Long.: -149.1639 Datum: WGS84
Soil Map Unit Name: Eklutna very cobbly sand, 0 to 3 percent slopes NWI classification: R4SBC
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓
Are Vegetation ✓, Soil ✓, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks: Eklutna River. Cobble substrate, flowing water 4 inches deep, 10 feet wide. Shrubs currently submerged indicate water levels are high (Dryas, Dasifora).

Vegetation - Use scientific names of plants. List all species in the plot.

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
Total Cover:	0.0		
50% of total cover: 0.0		20% of total cover: 0.0	
Sapling/Shrub Stratum			
Total Cover:	0.0		
50% of total cover: 0.0		20% of total cover: 0.0	
Herb Stratum			
Total Cover:	0.0		
50% of total cover: 0.0		20% of total cover: 0.0	

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across all Strata: 0 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0.0	× 1 =	0.0
FACW Species	0.0	× 2 =	0.0
FAC Species	0.0	× 3 =	0.0
FACU Species	0.0	× 4 =	0.0
UPL Species	0.0	× 5 =	0.0
Column Totals:	0.0 (A)		0.0 (B)

Prevalence Index = B/A = 0.000

Hydrophytic Vegetation Indicators:
____ Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
✓ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators or hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Plot size (radius, or length × width) _____
% Cover of Wetland Bryophytes (Where applicable) 0.0
% Bare Ground 0.0
Total Cover of Bryophytes 0.0

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: unvegetated active channel Eklutna River

SOIL

Sampling Point: eklutna-20

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, A=Absent [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators:

- ____Histosol or Histel (A1)
- ____Histic Epipedon (A2)
- ____Hydrogen Sulfide (A4)
- ____Thick Dark Surface (A12)
- ____Alaska Gleyed (A13)
- ____Alaska Redox (A14)
- ____Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ____Alaska Color Change (TA4)[4]
- ____Alaska Alpine Swales (TA5)
- ____Alaska Redox With 2.5Y Hue
- ____Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- _✓_Other (Explain in Remarks)

[3]One indicator or hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes _✓_ No ____

Remarks: assume hydric soil, active channel Eklutna River

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

- _✓_Surface Water (A1)
- ____High Water Table (A2)
- ____Saturation (A3)
- ____Water Marks (B1)
- ____Sediment Deposits (B2)
- ____Drift Deposits (B3)
- ____Algal Mat or Crust (B4)
- ____Iron Deposits (B5)
- ____Surface Soil Cracks (B6)
- ____Inundation Visible on Aerial Imagery (B7)
- ____Sparsely Vegetated Concave Surface (B8)
- ____Marl Deposits (B15)
- ____Hydrogen Sulfide Odor (C1)
- ____Dry-Season Water Table (C2)
- ____Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____Water Stained Leaves (B9)
- ____Drainage Patterns (B10)
- ____Oxidized Rizospheres along Living Roots (C3)
- ____Presence of Reduced Iron (C4)
- ____Salt Deposits (C5)
- ____Stunted or Stressed Plants (D1)
- ____Geomorphic Position (D2)
- ____Shallow Aquitard (D3)
- ____Microtopographic Relief (D4)
- ____FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	_✓_	No	____	Depth (inches):	4
Water Table Present?	Yes	____	No	_✓_	Depth (inches):	0
Saturation Present? (includes capillary fringe)	Yes	____	No	_✓_	Depth (inches):	0

Wetland Hydrology Present? Yes _✓_ No ____

Recorded Data (stream gauge, monitor well, aerial photo, previous inspection) if available:

Remarks: Cobble substrate, flowing water 4 inches deep, 10 feet wide.

Sampling Point: eklutna-20
NWI classification: R4SBC

Hydric Soil Indicators: Other (explain in remarks)
Wetland Hydrology Indicators: Surface Water (A1)

NO SOIL PHOTO TAKEN

Wetland Determination Data Form - Alaska Region

Project/Site: Eklutna Hydro Wetlands Borough/City: Municipality of Anchorage Sampling Date: 2022-08-10
Applicant/Owner: McMillan Jacobs Sampling Point: eklutna-21
Investigator(s): SLI, RWM Landform (hillside, terrace, hummocks, etc.): Channel
Local relief (concave, convex, none): concave Slope: 3.5 % / 2.0 ° Elevation: 398
Subregion: Cook Inlet Lowlands Lat.: 61.4443 Long.: -149.3054 Datum: WGS84
Soil Map Unit Name: Eklutna very cobbly sand, 0 to 3 percent slopes NWI classification: U
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ✓	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks: Relict channel of Eklutna River, no indications that the channel floods. Well vegetated ground surface, no sediment deposits or rafted debris.

Vegetation - Use scientific names of plants. List all species in the plot.

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1.	Picea glauca	15.0	✓	FACU
2.	Populus tremuloides	5.0	✓	FACU
	Total Cover:	20.0		
	50% of total cover: 10.0		20% of total cover: 4.0	
	Sapling/Shrub Stratum			
1.	Alnus viridis	20.0	✓	FAC
2.	Salix alaxensis	7.0	✓	FAC
3.	Linnaea borealis	5.0		FACU
4.	Ribes triste	5.0		FAC
5.	Cornus stolonifera	3.0		
6.	Rosa acicularis	3.0		FACU
7.	Salix barclayi	2.0		FAC
8.	Viburnum edule	2.0		FACU
9.	Rubus idaeus	1.0		FACU
10.	Calamagrostis canadensis	1.0		FAC
	Total Cover:	49.0		
	50% of total cover: 24.5		20% of total cover: 9.8	
	Herb Stratum			
1.	Spinulum annotinum	33.0	✓	FACU
2.	Cornus canadensis	30.0	✓	FACU
3.	Actaea rubra	1.0		FAC
4.	Mertensia paniculata	1.0		FACU
5.	Oplopanax horridus	1.0		FACU
6.	Orthilia secunda	0.1		FACU
7.	Pyrola asarifolia	0.1		FACU
8.	Galium triflorum	0.1		FAC
9.	Chamaenerion angustifolium	0.1		FACU
10.	Achillea millefolium	0.1		FACU
	Total Cover:	66.5		
	50% of total cover: 33.2		20% of total cover: 13.3	

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across all Strata: 6 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 33.3% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0.0	× 1 =	0.0
FACW Species	0.0	× 2 =	0.0
FAC Species	36.1	× 3 =	108.3
FACU Species	96.4	× 4 =	385.6
UPL Species	0.0	× 5 =	0.0
Column Totals:	132.5 (A)		493.9 (B)

Prevalence Index = B/A = 3.728

Hydrophytic Vegetation Indicators:
____ Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators or hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Plot size (radius, or length × width) 5x10m
% Cover of Wetland Bryophytes (Where applicable) ____
% Bare Ground 0.0
Total Cover of Bryophytes 5.0

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks: Plot restricted to what is rooted in abandoned channel. Ground over a mix of deciduous litter and feather mosses (Hylacomium splendens), and liverworts.

SOIL

Sampling Point: eklutna-21

Depth	Matrix			Redox Features						
(inches)	Color (moist)		%	Color (moist)		%	Type[1]	Loc[2]	Texture	Mod	Remarks
0-3	10yr	2/2			/		A		fibric		
3-6	10yr	3/2	90	10yr	3/3	10	C	PL			
6-16	2.5y	3/1			/		A		loamy coarse sand	v. cobbly	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, A=Absent [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators:

- ____Histosol or Histel (A1)
- ____Histic Epipedon (A2)
- ____Hydrogen Sulfide (A4)
- ____Thick Dark Surface (A12)
- ____Alaska Gleyed (A13)
- ____Alaska Redox (A14)
- ____Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ____Alaska Color Change (TA4)[4]
- ____Alaska Alpine Swales (TA5)
- ____Alaska Redox With 2.5Y Hue
- ____Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ____Other (Explain in Remarks)

[3]One indicator or hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: None
Depth (inches):

Hydric Soil Present? **Yes** ____ **No** ✓

Remarks: No hydric soil indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

- ____Surface Water (A1)
- ____High Water Table (A2)
- ____Saturation (A3)
- ____Water Marks (B1)
- ____Sediment Deposits (B2)
- ____Drift Deposits (B3)
- ____Algal Mat or Crust (B4)
- ____Iron Deposits (B5)
- ____Surface Soil Cracks (B6)
- ____Inundation Visible on Aerial Imagery (B7)
- ____Sparsely Vegetated Concave Surface (B8)
- ____Marl Deposits (B15)
- ____Hydrogen Sulfide Odor (C1)
- ____Dry-Season Water Table (C2)
- ____Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____Water Stained Leaves (B9)
- ____Drainage Patterns (B10)
- ____Oxidized Rizospheres along Living Roots (C3)
- ____Presence of Reduced Iron (C4)
- ____Salt Deposits (C5)
- ____Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ____Shallow Aquitard (D3)
- ____Microtopographic Relief (D4)
- ____FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	____	No	✓	Depth (inches):	0
Water Table Present?	Yes	✓	No	____	Depth (inches):	15
Saturation Present? (includes capillary fringe)	Yes	✓	No	____	Depth (inches):	15

Wetland Hydrology Present? Yes ____ **No** ✓

Recorded Data (stream gauge, monitor well, aerial photo, previous inspection) if available:

Remarks: D2--abandoned channel of Eklutna River.

Sampling Point: eklutna-21
NWI classification: U

Hydric Soil Indicators: None
Wetland Hydrology Indicators: Geomorphic Position (D2)

Wetland Determination Data Form - Alaska Region

Project/Site: Eklutna Hydro Wetlands Borough/City: Municipality of Anchorage Sampling Date: 2022-08-10
Applicant/Owner: McMillan Jacobs Sampling Point: eklutna-23
Investigator(s): RWM, SLI Landform (hillside, terrace, hummocks, etc.): Basins, Drained
Local relief (concave, convex, none): concave Slope: 0.0 % / 0.0 ° Elevation: 547
Subregion: Cook Inlet Lowlands Lat.: 61.4375 Long.: -149.2600 Datum: WGS84
Soil Map Unit Name: Eklutna very cobbly sand, 0 to 3 percent slopes NWI classification: PUBHb
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ✓, Soil ✓, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

Summary of findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** **Yes** ✓ **No** ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks: Drained beaver pond, dam breached by utility company this season. Consider not normal conditions, site will meet hydrology and soils, but this is not reflective of current conditions. See hydrology remarks. Section F of the 1987 manual (p.73-74) discusses atypical situations. Though this precise situation is not discussed, the human alteration of a beaver dam fits with the general discussion in this section. It seems likely that without further action, the beavers will rebuild the dam and reflood this area returning it to the currently "normal circumstances".

VEGETATION - Use scientific names of plants. List all species in the plot.

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1.	Populus balsamifera	5.0		FACU
	Total Cover:	5.0		
	50% of total cover: 2.5		20% of total cover: 1.0	
	Sapling/Shrub Stratum			
1.	Salix alaxensis	5.0	✓	FAC
2.	Salix bebbiana	3.0	✓	FAC
3.	Alnus viridis	3.0	✓	FAC
4.	Rubus idaeus	2.0		FACU
	Total Cover:	13.0		
	50% of total cover: 6.5		20% of total cover: 2.6	
	Herb Stratum			
1.	Equisetum arvense	30.0	✓	FAC
2.	Mertensia paniculata	1.0		FACU
3.	Taraxacum officinale	1.0		FACU
4.	Galium boreale	0.1		FACU
5.	Calamagrostis canadensis	0.1		FAC
	Total Cover:	32.2		
	50% of total cover: 16.1		20% of total cover: 6.4	

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across all Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0.0	× 1 =	0.0
FACW Species	0.0	× 2 =	0.0
FAC Species	41.1	× 3 =	123.3
FACU Species	9.1	× 4 =	36.4
UPL Species	0.0	× 5 =	0.0
Column Totals:	50.2	(A)	159.7 (B)

Prevalence Index = B/A = 3.181

Hydrophytic Vegetation Indicators:

✓ Dominance Test is > 50%

_____ Prevalence Index is ≤ 3.0

_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators or hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Plot size (radius, or length × width)	10m radius
% Cover of Wetland Bryophytes (Where applicable)	
% Bare Ground	10.0
Total Cover of Bryophytes	0.0

Hydrophytic Vegetation Present? **Yes** ✓ **No** ____

Remarks: Characterizing live vegetation. Abundant dead alder and willow. Ground over predominantly silt, with deciduous and woody litter and one patch of water in low area. Raspberry seedlings and Equisetum throughout.

SOIL

Sampling Point: eklutna-23

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks
0-2	n	4/		/	A		silt loam		
2-4	Variegated	/		/	A		fine sand		
4-16	n	4/	90 10yr	4/4	10 C	PL	silt loam		there are multiple thin layers with organics, but the general horizon is consistent, reduced sil

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, A=Absent [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators:

- ____ Histosol or Histel (A1)
- ____ Histic Epipedon (A2)
- ____ Hydrogen Sulfide (A4)
- ____ Thick Dark Surface (A12)
- ____ Alaska Gleyed (A13)
- ✓ Alaska Redox (A14)
- ____ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ____ Alaska Color Change (TA4)[4]
- ____ Alaska Alpine Swales (TA5)
- ____ Alaska Redox With 2.5Y Hue
- ✓ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ____ Other (Explain in Remarks)

[3]One indicator or hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: None
Depth (inches):

Hydric Soil Present? Yes ✓ No ____

Remarks: No reaction alpha alpha dipyridol, but soils are not retaining much water. The beaver dam may not have been present long enough for sufficient Iron reduction to occur. The gleyed color of the matrix may be partially due to the parent material; however the oxidized features indicate that the area was flooded.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ✓ Water Marks (B1)
- ✓ Sediment Deposits (B2)
- ✓ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Surface Soil Cracks (B6)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Marl Deposits (B15)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Dry-Season Water Table (C2)
- ____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____ Water Stained Leaves (B9)
- ____ Drainage Patterns (B10)
- ____ Oxidized Rizospheres along Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Salt Deposits (C5)
- ____ Stunted or Stressed Plants (D1)
- ____ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopographic Relief (D4)
- ____ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	✓	No	____	Depth (inches):
Water Table Present?	Yes	____	No	✓	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	____	No	✓	Depth (inches):

Wetland Hydrology Present? Yes ✓ No ____

Recorded Data (stream gauge, monitor well, aerial photo, previous inspection) if available:

Remarks: Patches of surface water remain, likely from recent heavy rains. Sediment deposits and water marks throughout, but not indicative of current conditions. Based on water lines, when beaver dam was intact ponded water was several feet deep. The 1987 manual discusses natural events, unauthorized activities, and man-induced wetlands in its discussion of atypical situations. Beavers are discussed but in the context of creating wetlands that do not yet meet particular indicators. The normal circumstances must be determined, and whether a new normal has been established. In this case, it seems likely that the beavers will reestablish a dam in the area and return the site to its flooded state. Thus, the normal conditions have been altered, but the human deconstruction of the beaver dam and it is likely that, without further steps, the beavers will rebuild their dam and return this area to its flooded state.

Sampling Point: eklutna-23
NWI classification: PUBHb

Hydric Soil Indicators: Alaska Redox (A14), Alaska Gleyed without Hue 5Y or Redder Underlaying Layer
Wetland Hydrology Indicators: Drift Deposits (B3), Sediment Deposits (B2), Water Marks (B1)

Wetland Determination Data Form - Alaska Region

Project/Site: Eklutna Hydro Wetlands Borough/City: Municipality of Anchorage Sampling Date: 2022-08-10
Applicant/Owner: McMillan Jacobs Sampling Point: eklutna-25
Investigator(s): SLI, RWM Landform (hillside, terrace, hummocks, etc.): Toeslope
Local relief (concave, convex, none): none Slope: 0.0 % / 0.0 ° Elevation: 574
Subregion: Cook Inlet Lowlands Lat.: 61.4370 Long.: -149.2548 Datum: WGS84
Soil Map Unit Name: Eklutna very cobbly sand, 0 to 3 percent slopes NWI classification: PSS1E
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ____
Hydric Soil Present? Yes ✓ No ____
Wetland Hydrology Present? Yes ✓ No ____

Is the Sampled Area within a Wetland? **Yes** ✓ **No** ____

Remarks: Seeps and springs at toe of adjacent slope. Surface water flowing through forest, sheet flow rather than channelized. Groundcover is predominantly sediment deposits.

Vegetation - Use scientific names of plants. List all species in the plot.

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1.	Alnus viridis	15.0	✓	FAC
2.	Populus balsamifera	7.0	✓	FACU
	Total Cover:	22.0		
	50% of total cover: 11.0		20% of total cover: 4.4	
	Sapling/Shrub Stratum			
1.	Alnus viridis	15.0	✓	FAC
2.	Cornus stolonifera	7.0	✓	
3.	Picea glauca	5.0		FACU
4.	Rosa acicularis	5.0		FACU
5.	Salix lasiandra	5.0		FACW
6.	Salix alaxensis	3.0		FAC
7.	Viburnum edule	1.0		FACU
	Total Cover:	41.0		
	50% of total cover: 20.5		20% of total cover: 8.2	
	Herb Stratum			
1.	Equisetum pratense	30.0	✓	FACW
2.	Arctagrostis latifolia	3.0		FACW
3.	Actaea rubra	3.0		FAC
4.	Orthilia secunda	1.0		FACU
5.	Mertensia paniculata	0.1		FACU
6.	Galium triflorum	0.1		FAC
	Total Cover:	37.2		
	50% of total cover: 18.6		20% of total cover: 7.4	

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across all Strata: 5 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 60.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0.0	× 1 =	0.0
FACW Species	38.0	× 2 =	76.0
FAC Species	36.1	× 3 =	108.3
FACU Species	19.1	× 4 =	76.4
UPL Species	0.0	× 5 =	0.0
Column Totals:	93.2 (A)		260.7 (B)

Prevalence Index = B/A = 2.797

Hydrophytic Vegetation Indicators:
✓ Dominance Test is > 50%
✓ Prevalence Index is ≤ 3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators or hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Plot size (radius, or length × width) 10m radius
% Cover of Wetland Bryophytes (Where applicable) 0.0
% Bare Ground 0.0
Total Cover of Bryophytes 0.0

Hydrophytic Vegetation Present? **Yes** ✓ **No** ____

Remarks: Rosa acularis in both high and low sites. Actea rubra, Viburnum edule in microhighs.

SOIL

Sampling Point: eklutna-25

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks
0-1	Variegated	/	/		A		fine sand		
1-5	n	4/	/		A		silt loam		positive alpha alpha
5-16	n	5/	/		A		silt loam		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, A=Absent [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators:

- ____Histosol or Histel (A1)
- ____Histic Epipedon (A2)
- ____Hydrogen Sulfide (A4)
- ____Thick Dark Surface (A12)
- ____Alaska Gleyed (A13)
- ____Alaska Redox (A14)
- ____Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ____Alaska Color Change (TA4)[4]
- ____Alaska Alpine Swales (TA5)
- ____Alaska Redox With 2.5Y Hue
- ✓ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ✓ Other (Explain in Remarks)

[3]One indicator or hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: None
Depth (inches):

Hydric Soil Present? Yes ✓ No ____

Remarks: Other--positive reaction alpha alpha dipyridyl.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

- ✓ Surface Water (A1)
- ____High Water Table (A2)
- ____Saturation (A3)
- ____Water Marks (B1)
- ✓ Sediment Deposits (B2)
- ____Drift Deposits (B3)
- ____Algal Mat or Crust (B4)
- ____Iron Deposits (B5)
- ____Surface Soil Cracks (B6)
- ____Inundation Visible on Aerial Imagery (B7)
- ____Sparsely Vegetated Concave Surface (B8)
- ____Marl Deposits (B15)
- ____Hydrogen Sulfide Odor (C1)
- ____Dry-Season Water Table (C2)
- ____Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____Water Stained Leaves (B9)
- ____Drainage Patterns (B10)
- ____Oxidized Rizospheres along Living Roots (C3)
- ✓ Presence of Reduced Iron (C4)
- ____Salt Deposits (C5)
- ____Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ____Shallow Aquitard (D3)
- ____Microtopographic Relief (D4)
- ____FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	✓	No	____	Depth (inches):	1
Water Table Present?	Yes	✓	No	____	Depth (inches):	6
Saturation Present? (includes capillary fringe)	Yes	✓	No	____	Depth (inches):	0

Wetland Hydrology Present? Yes ✓ No ____

Recorded Data (stream gauge, monitor well, aerial photo, previous inspection) if available:

Remarks: Shallow surface water flowing across approximately half of plot. Sediment deposits comprise most of groundcover, suggesting forest floor floods from adjacent seeps at some point.

Sampling Point: eklutna-25
NWI classification: PSS1E

Hydric Soil Indicators: Alaska Gleyed without Hue 5Y or Redder Underlaying Layer, Other (explain in remarks)
Wetland Hydrology Indicators: Geomorphic Position (D2), Sediment Deposits (B2), Presence of Reduced Iron (C4), Surface Water (A1)

Wetland Determination Data Form - Alaska Region

Project/Site: Eklutna Hydro Wetlands Borough/City: Municipality of Anchorage Sampling Date: 2022-08-10
Applicant/Owner: McMillan Jacobs Sampling Point: eklutna-26
Investigator(s): RWM, SLI Landform (hillside, terrace, hummocks, etc.): Plateau
Local relief (concave, convex, none): none Slope: 3.5 % / 2.0 ° Elevation: 549
Subregion: Cook Inlet Lowlands Lat.: 61.4352 Long.: -149.2522 Datum: WGS84
Soil Map Unit Name: Eklutna very cobbly sand, 0 to 3 percent slopes NWI classification: U
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ✓	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks: Upland forest adjacent to Eklutna River. Recent beaver activity in stream immediately adjacent to this plot, water backed up over access trail (over 3 feet deep at trail).

Vegetation - Use scientific names of plants. List all species in the plot.

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1.	Populus balsamifera	40.0	✓	FACU
	Total Cover:	40.0		
	50% of total cover: 20.0		20% of total cover: 8.0	
	Sapling/Shrub Stratum			
1.	Alnus viridis	50.0	✓	FAC
2.	Salix alaxensis	10.0	____	FAC
3.	Picea glauca	7.0	____	FACU
4.	Rosa acicularis	5.0	____	FACU
5.	Cornus stolonifera	3.0	____	____
	Total Cover:	75.0		
	50% of total cover: 37.5		20% of total cover: 15.0	
	Herb Stratum			
1.	Taraxacum officinale	2.0	✓	FACU
2.	Equisetum arvense	2.0	✓	FAC
3.	Pyrola asarifolia	1.0	____	FACU
4.	Achillea millefolium	0.1	____	FACU
	Total Cover:	5.1		
	50% of total cover: 2.6		20% of total cover: 1.0	

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across all Strata: 4 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0.0	× 1 =	0.0
FACW Species	0.0	× 2 =	0.0
FAC Species	62.0	× 3 =	186.0
FACU Species	55.1	× 4 =	220.4
UPL Species	0.0	× 5 =	0.0
Column Totals:	117.1 (A)		406.4 (B)

Prevalence Index = B/A = 3.471

Hydrophytic Vegetation Indicators:
____ Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators or hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Plot size (radius, or length × width) 5m radius
% Cover of Wetland Bryophytes (Where applicable) ____
% Bare Ground 0.0
Total Cover of Bryophytes 5.0

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks:

SOIL

Sampling Point: eklutna-26

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks
0-1	10yr 2/2		/		A		fibric		
1-7	2.5y 4/1		/		A		silt loam		
7-18	2.5y 3/1	100	/		A		loamy sand	gravelly	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, A=Absent [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators:

- ____Histosol or Histel (A1)
- ____Histic Epipedon (A2)
- ____Hydrogen Sulfide (A4)
- ____Thick Dark Surface (A12)
- ____Alaska Gleyed (A13)
- ____Alaska Redox (A14)
- ____Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ____Alaska Color Change (TA4)[4]
- ____Alaska Alpine Swales (TA5)
- ____Alaska Redox With 2.5Y Hue
- ____Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ____Other (Explain in Remarks)

[3]One indicator or hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: None
Depth (inches):

Hydric Soil Present? Yes ____ No ✓

Remarks: No hydric soil indicators

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

- ____Surface Water (A1)
- ____High Water Table (A2)
- ____Saturation (A3)
- ____Water Marks (B1)
- ____Sediment Deposits (B2)
- ____Drift Deposits (B3)
- ____Algal Mat or Crust (B4)
- ____Iron Deposits (B5)
- ____Surface Soil Cracks (B6)
- ____Inundation Visible on Aerial Imagery (B7)
- ____Sparsely Vegetated Concave Surface (B8)
- ____Marl Deposits (B15)
- ____Hydrogen Sulfide Odor (C1)
- ____Dry-Season Water Table (C2)
- ____Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____Water Stained Leaves (B9)
- ____Drainage Patterns (B10)
- ____Oxidized Rizospheres along Living Roots (C3)
- ____Presence of Reduced Iron (C4)
- ____Salt Deposits (C5)
- ____Stunted or Stressed Plants (D1)
- ____Geomorphic Position (D2)
- ____Shallow Aquitard (D3)
- ____Microtopographic Relief (D4)
- ____FAC-neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): 0
Water Table Present? Yes ____ No ✓ Depth (inches):
Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches):

Wetland Hydrology Present? Yes ____ No ✓

Recorded Data (stream gauge, monitor well, aerial photo, previous inspection) if available:

Remarks: No wetland hydrology indicators.

Sampling Point: eklutna-26
NWI classification: U

Hydric Soil Indicators: None
Wetland Hydrology Indicators: None

Wetland Determination Data Form - Alaska Region

Project/Site: Eklutna Hydro Wetlands Borough/City: Municipality of Anchorage Sampling Date: 2022-08-10
Applicant/Owner: McMillan Jacobs Sampling Point: eklutna-33
Investigator(s): SLI Landform (hillside, terrace, hummocks, etc.): Basins Or Depressions
Local relief (concave, convex, none): concave Slope: 0.0 % / 0.0 ° Elevation: 852
Subregion: Cook Inlet Lowlands Lat.: 61.4082 Long.: -149.1706 Datum: WGS84
Soil Map Unit Name: Deception-Cryorthents complex, 45 to 90 percent slopes NWI classification: PUBH
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ✓, Soil ✓, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ____
Hydric Soil Present? Yes ✓ No ____
Wetland Hydrology Present? Yes ✓ No ____

Is the Sampled Area within a Wetland? **Yes** ✓ **No** ____

Remarks: Small pond at toe of slope, surrounded by upland mixed cottonwood and white spruce forest.

Vegetation - Use scientific names of plants. List all species in the plot.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum			
Total Cover:	0.0		
50% of total cover: 0.0		20% of total cover: 0.0	
Sapling/Shrub Stratum			
Total Cover:	0.0		
50% of total cover: 0.0		20% of total cover: 0.0	
Herb Stratum			
Total Cover:	0.0		
50% of total cover: 0.0		20% of total cover: 0.0	

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across all Strata: 0 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0.0	× 1 =	0.0
FACW Species	0.0	× 2 =	0.0
FAC Species	0.0	× 3 =	0.0
FACU Species	0.0	× 4 =	0.0
UPL Species	0.0	× 5 =	0.0
Column Totals:	0.0 (A)		0.0 (B)

Prevalence Index = B/A = 0.000

Hydrophytic Vegetation Indicators:
____ Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
✓ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators or hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Plot size (radius, or length × width) 2x10m
% Cover of Wetland Bryophytes (Where applicable) ____
% Bare Ground 100.0
Total Cover of Bryophytes 0.0

Hydrophytic Vegetation Present? **Yes** ✓ **No** ____

Remarks: Small pond at the toe of a slope. Very narrow vegetated fringe, otherwise surrounded by uplands.

SOIL

Sampling Point: eklutna-33

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, A=Absent [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators:

- ____Histosol or Histel (A1)
- ____Histic Epipedon (A2)
- ____Hydrogen Sulfide (A4)
- ____Thick Dark Surface (A12)
- ____Alaska Gleyed (A13)
- ____Alaska Redox (A14)
- ____Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ____Alaska Color Change (TA4)[4]
- ____Alaska Alpine Swales (TA5)
- ____Alaska Redox With 2.5Y Hue
- ____Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- __✓__Other (Explain in Remarks)

[3]One indicator or hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: None

Depth (inches):

Hydric Soil Present? Yes __✓__ No ____

Remarks: Inundated pond, assume hydric soils.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

- __✓__Surface Water (A1)
- __✓__High Water Table (A2)
- __✓__Saturation (A3)
- ____Water Marks (B1)
- ____Sediment Deposits (B2)
- ____Drift Deposits (B3)
- ____Algal Mat or Crust (B4)
- ____Iron Deposits (B5)
- ____Surface Soil Cracks (B6)
- ____Inundation Visible on Aerial Imagery (B7)
- ____Sparsely Vegetated Concave Surface (B8)
- ____Marl Deposits (B15)
- ____Hydrogen Sulfide Odor (C1)
- ____Dry-Season Water Table (C2)
- ____Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____Water Stained Leaves (B9)
- ____Drainage Patterns (B10)
- ____Oxidized Rizospheres along Living Roots (C3)
- ____Presence of Reduced Iron (C4)
- ____Salt Deposits (C5)
- ____Stunted or Stressed Plants (D1)
- __✓__Geomorphic Position (D2)
- ____Shallow Aquitard (D3)
- ____Microtopographic Relief (D4)
- ____FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	✓	No		Depth (inches):	24
Water Table Present?	Yes	✓	No		Depth (inches):	0
Saturation Present? (includes capillary fringe)	Yes	✓	No		Depth (inches):	0

Wetland Hydrology Present? Yes __✓__ No ____

Recorded Data (stream gauge, monitor well, aerial photo, previous inspection) if available:

Remarks:

Sampling Point: eklutna-33
NWI classification: PUBH

Hydric Soil Indicators: Other (explain in remarks)
Wetland Hydrology Indicators: Saturation (A3), Surface Water (A1), High Water Table (A2), Geomorphic Position (D2)

No Soil Photo Taken

Wetland Determination Data Form - Alaska Region

Project/Site: Eklutna Hydro Wetlands Borough/City: Municipality of Anchorage Sampling Date: 2022-08-10
Applicant/Owner: McMillan Jacobs Sampling Point: eklutna-35
Investigator(s): RWM, SLI Landform (hillside, terrace, hummocks, etc.): Flat or fluvial related
Local relief (concave, convex, none): concave Slope: 0.0 % / 0.0 ° Elevation: 874
Subregion: Cook Inlet Lowlands Lat.: 61.4070 Long.: -149.1605 Datum: WGS84
Soil Map Unit Name: Deception-Cryorthents complex, 45 to 90 percent slopes NWI classification: PSS1C
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓
Are Vegetation ____, Soil ✓, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ____
Hydric Soil Present? Yes ✓ No ____
Wetland Hydrology Present? Yes ✓ No ____

Is the Sampled Area within a Wetland? Yes ✓ No ____

Remarks: Characterizing small band of tall shrub and inactive channel. Transitions to Upland at cottonwood-white spruce forest.

Vegetation - Use scientific names of plants. List all species in the plot.

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1.	Populus balsamifera	7.0	✓	FACU
	Total Cover:	7.0		
	50% of total cover: 3.5		20% of total cover: 1.4	
	Sapling/Shrub Stratum			
1.	Alnus viridis	50.0	✓	FAC
2.	Salix alaxensis	20.0	✓	FAC
3.	Shepherdia canadensis	3.0		FACU
4.	Rosa acicularis	0.1		FACU
5.	Dasiphora fruticosa	0.1		FAC
	Total Cover:	73.2		
	50% of total cover: 36.6		20% of total cover: 14.6	
	Herb Stratum			
1.	Calamagrostis canadensis	2.0		FAC
2.	Chamaenerion angustifolium	0.1		FACU
3.	Astragalus sp.	0.1		
4.	Aquilegia formosa	0.1		FACU
5.	Achillea millefolium	0.1		FACU
	Total Cover:	2.4		
	50% of total cover: 1.2		20% of total cover: 0.5	

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across all Strata: 3 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 66.7% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0.0	× 1 =	0.0
FACW Species	0.0	× 2 =	0.0
FAC Species	72.1	× 3 =	216.3
FACU Species	10.4	× 4 =	41.6
UPL Species	0.0	× 5 =	0.0
Column Totals:	82.5 (A)		257.9 (B)

Prevalence Index = B/A = 3.126

Hydrophytic Vegetation Indicators:
✓ Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators or hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Plot size (radius, or length × width) -
% Cover of Wetland Bryophytes (Where applicable) ____
% Bare Ground 0.0
Total Cover of Bryophytes 0.0

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

SOIL

Sampling Point: eklutna-35

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks
0-1	10yr 2/2		/		A		fibric		
2-3	Variegated	/	/		A		loamy sand		
3-7		/	/		A			ext. cobbly	river bed cobbles

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, A=Absent [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators:

- ____Histosol or Histel (A1)
- ____Histic Epipedon (A2)
- ____Hydrogen Sulfide (A4)
- ____Thick Dark Surface (A12)
- ____Alaska Gleyed (A13)
- ____Alaska Redox (A14)
- ____Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ____Alaska Color Change (TA4)[4]
- ____Alaska Alpine Swales (TA5)
- ____Alaska Redox With 2.5Y Hue
- ____Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ✓ Other (Explain in Remarks)

[3]One indicator or hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: None
Depth (inches):

Hydric Soil Present? Yes ✓ No ____

Remarks: Fluvial soils, with insufficient organics for development of redox features.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

- ____Surface Water (A1)
- ____High Water Table (A2)
- ____Saturation (A3)
- ____Water Marks (B1)
- ✓ Sediment Deposits (B2)
- ✓ Drift Deposits (B3)
- ____Algal Mat or Crust (B4)
- ____Iron Deposits (B5)
- ____Surface Soil Cracks (B6)
- ____Inundation Visible on Aerial Imagery (B7)
- ____Sparsely Vegetated Concave Surface (B8)
- ____Marl Deposits (B15)
- ____Hydrogen Sulfide Odor (C1)
- ____Dry-Season Water Table (C2)
- ____Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____Water Stained Leaves (B9)
- ____Drainage Patterns (B10)
- ____Oxidized Rizospheres along Living Roots (C3)
- ____Presence of Reduced Iron (C4)
- ____Salt Deposits (C5)
- ____Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ____Shallow Aquitard (D3)
- ____Microtopographic Relief (D4)
- ____FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	____	No	✓	Depth (inches): 0
Water Table Present?	Yes	____	No	✓	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	____	No	✓	Depth (inches):

Wetland Hydrology Present? Yes ✓ No ____

Recorded Data (stream gauge, monitor well, aerial photo, previous inspection) if available:

Remarks: Rafted debris approximately 2.5 feet above current water level, AJ Avitia (bear guard) says this is related to June high water. Because of flooding well into the growing season, assume surface water is present long enough to meet wetland hydrology parameters.

Sampling Point: eklutna-35
NWI classification: PSS1C

Hydric Soil Indicators: Other (explain in remarks)
Wetland Hydrology Indicators: Geomorphic Position (D2), Drift Deposits (B3), Sediment Deposits (B2)

Wetland Determination Data Form - Alaska Region

Project/Site: Eklutna Hydro Wetlands Borough/City: Municipality of Anchorage Sampling Date: 2022-08-11
Applicant/Owner: McMillan Jacobs Sampling Point: eklutna-37
Investigator(s): SLI, RWM Landform (hillside, terrace, hummocks, etc.): Flat or fluvial related
Local relief (concave, convex, none): concave Slope: 0.0 % / 0.0 ° Elevation: 137
Subregion: Cook Inlet Lowlands Lat.: 61.4490 Long.: -149.3691 Datum: WGS84
Soil Map Unit Name: Rock outcrop NWI classification: PSS1C
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ____
Hydric Soil Present? Yes ✓ No ____
Wetland Hydrology Present? Yes ✓ No ____

Is the Sampled Area within a Wetland? Yes ✓ No ____

Remarks: Tall shrub riparian wetlands adjacent to Eklutna River, transitions to upland on steeper slopes with deciduous forest. Map boundary with combination of lidar and imagery.

Vegetation - Use scientific names of plants. List all species in the plot.

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1.	Alnus viridis	20.0	✓	FAC
	Total Cover:	20.0		
	50% of total cover: 10.0		20% of total cover: 4.0	
	Sapling/Shrub Stratum			
1.	Salix alaxensis	35.0	✓	FAC
2.	Alnus viridis	30.0	✓	FAC
3.	Cornus stolonifera	10.0		
4.	Salix myrtillifolia	5.0		FACW
5.	Salix lasiandra	5.0		FACW
6.	Viburnum edule	0.1		FACU
7.	Sorbus aucuparia	0.0		
	Total Cover:	85.1		
	50% of total cover: 42.6		20% of total cover: 17.0	
	Herb Stratum			
1.	Coptidium lapponicum	25.0	✓	OBL
2.	Equisetum arvense	5.0		FAC
3.	Viola sp.	3.0		
4.	Thalictrum sparsiflorum	2.0		FACU
5.	Gymnocarpium dryopteris	2.0		FACU
6.	Arctagrostis latifolia	1.0		FACW
7.	Athyrium filix-femina	1.0		
8.	Taraxacum officinale	0.1		FACU
9.	Streptopus amplexifolius	0.1		FACU
10.	Sanguisorba canadensis	0.1		FACW
11.	Piperia dilatata	0.1		FACW
12.	Galium triflorum	0.1		FAC
13.	Equisetum variegatum	0.1		FACW
	Total Cover:	39.6		
	50% of total cover: 19.8		20% of total cover: 7.9	

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 4 (A)
Total Number of Dominant Species Across all Strata: 4 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	25.0	× 1 =	25.0
FACW Species	11.3	× 2 =	22.6
FAC Species	90.1	× 3 =	270.3
FACU Species	4.3	× 4 =	17.2
UPL Species	0.0	× 5 =	0.0
Column Totals:	130.7 (A)		335.1 (B)

Prevalence Index = B/A = 2.564

Hydrophytic Vegetation Indicators:
✓ Dominance Test is > 50%
✓ Prevalence Index is ≤ 3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators or hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Plot size (radius, or length × width) 2x10m
% Cover of Wetland Bryophytes (Where applicable) ____
% Bare Ground 0.0
Total Cover of Bryophytes 15.0

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

SOIL

Sampling Point: eklutna-37

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type[1]	Loc[2]	Texture	Mod	Remarks
0-1		/			/		A		fibric		deciduous leaf duff
1-3	2.5y	3/1			/		A		silt loam		
3-10	Variegated	/			/		A		fine sand		
											positive alpha alpha at 10.water table at 16.
10-18	n	2.5/	90	7.5yr	3/4	10	C	PL		cobbly	saturation at 13. ph 6.48 . ec 587

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, A=Absent [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators:

- ____Histosol or Histel (A1)
- ____Histic Epipedon (A2)
- ____Hydrogen Sulfide (A4)
- ____Thick Dark Surface (A12)
- ____Alaska Gleyed (A13)
- ____Alaska Redox (A14)
- ____Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ____Alaska Color Change (TA4)[4]
- ____Alaska Alpine Swales (TA5)
- ____Alaska Redox With 2.5Y Hue
- ____Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ✓ Other (Explain in Remarks)

[3]One indicator or hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: None
Depth (inches):

Hydric Soil Present? Yes ✓ No ____

Remarks: Positive reaction to alpha alpha dipyridyl dye at 10 inches.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

- ____Surface Water (A1)
- ____High Water Table (A2)
- ____Saturation (A3)
- ____Water Marks (B1)
- ____Sediment Deposits (B2)
- ✓ Drift Deposits (B3)
- ____Algal Mat or Crust (B4)
- ____Iron Deposits (B5)
- ____Surface Soil Cracks (B6)
- ____Inundation Visible on Aerial Imagery (B7)
- ____Sparsely Vegetated Concave Surface (B8)
- ____Marl Deposits (B15)
- ____Hydrogen Sulfide Odor (C1)
- ____Dry-Season Water Table (C2)
- ____Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____Water Stained Leaves (B9)
- ____Drainage Patterns (B10)
- ____Oxidized Rizospheres along Living Roots (C3)
- ____Presence of Reduced Iron (C4)
- ____Salt Deposits (C5)
- ____Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ____Shallow Aquitard (D3)
- ____Microtopographic Relief (D4)
- ✓ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	____	No	✓	Depth (inches):	0
Water Table Present?	Yes	✓	No	____	Depth (inches):	16
Saturation Present? (includes capillary fringe)	Yes	✓	No	____	Depth (inches):	13

Wetland Hydrology Present? Yes ✓ No ____

Recorded Data (stream gauge, monitor well, aerial photo, previous inspection) if available:

Remarks: Rafted debris several feet above current water level.

Sampling Point: eklutna-37
NWI classification: PSS1C

Hydric Soil Indicators: Other (explain in remarks)
Wetland Hydrology Indicators: Drift Deposits (B3), FAC-Neutral Test (D5), Geomorphic Position (D2)

Wetland Determination Data Form - Alaska Region

Project/Site: Eklutna Hydro Wetlands Borough/City: Municipality of Anchorage Sampling Date: 2022-08-11
Applicant/Owner: McMillan Jacobs Sampling Point: eklutna-38
Investigator(s): SLI, RWM Landform (hillside, terrace, hummocks, etc.): Flat or fluvial related
Local relief (concave, convex, none): none Slope: 5.2 % / 3.0 ° Elevation: 133
Subregion: Cook Inlet Lowlands Lat.: 61.4493 Long.: -149.3695 Datum: WGS84
Soil Map Unit Name: Rock outcrop NWI classification: U
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ✓	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks: Terrace above Eklutna River. Relatively level at plot before steep ascent to Thunderbird Falls trailhead.

Vegetation - Use scientific names of plants. List all species in the plot.

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1.	Populus balsamifera	40.0	✓	FACU
2.	Picea glauca	30.0	✓	FACU
3.	Betula neoalaskana	15.0		FACU
	Total Cover:	85.0		
	50% of total cover: 42.5		20% of total cover: 17.0	
	Sapling/Shrub Stratum			
1.	Rosa acicularis	20.0	✓	FACU
2.	Ribes triste	15.0	✓	FAC
3.	Alnus viridis	7.0		FAC
4.	Viburnum edule	7.0		FACU
5.	Ribes laxiflorum	5.0		FACU
6.	Picea glauca	5.0		FACU
7.	Cornus stolonifera	5.0		
8.	Linnaea borealis	3.0		FACU
	Total Cover:	67.0		
	50% of total cover: 33.5		20% of total cover: 13.4	
	Herb Stratum			
1.	Calamagrostis canadensis	5.0	✓	FAC
2.	Pyrola asarifolia	5.0	✓	FACU
3.	Angelica lucida	2.0		FACU
4.	Actaea rubra	2.0		FAC
5.	Mertensia paniculata	0.1		FACU
6.	Galium triflorum	0.1		FAC
7.	Chamaenerion angustifolium	0.1		FACU
	Total Cover:	14.3		
	50% of total cover: 7.2		20% of total cover: 2.9	

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across all Strata: 6 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 33.3% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0.0	× 1 =	0.0
FACW Species	0.0	× 2 =	0.0
FAC Species	29.1	× 3 =	87.3
FACU Species	132.2	× 4 =	528.8
UPL Species	0.0	× 5 =	0.0
Column Totals:	161.3 (A)		616.1 (B)

Prevalence Index = B/A = 3.820

Hydrophytic Vegetation Indicators:
____ Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators or hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Plot size (radius, or length × width) 5m radius
% Cover of Wetland Bryophytes (Where applicable) ____
% Bare Ground 0.0
Total Cover of Bryophytes 3.0

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks:

SOIL

Sampling Point: eklutna-38

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks
0-2					A		fibric		mostly leaf litter.
2-6	10yr 2/2				A		hemic		
6-9	10yr 3/3				A		loamy sand	v. gravelly	
9-16	10yr 3/2				A		loamy sand	v. cobbly	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, A=Absent [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators:

- ____Histosol or Histel (A1)
- ____Histic Epipedon (A2)
- ____Hydrogen Sulfide (A4)
- ____Thick Dark Surface (A12)
- ____Alaska Gleyed (A13)
- ____Alaska Redox (A14)
- ____Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ____Alaska Color Change (TA4)[4]
- ____Alaska Alpine Swales (TA5)
- ____Alaska Redox With 2.5Y Hue
- ____Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ____Other (Explain in Remarks)

[3]One indicator or hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: None
Depth (inches):

Hydric Soil Present? Yes ____ No ✓

Remarks: No hydric soil indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

- ____Surface Water (A1)
- ____High Water Table (A2)
- ____Saturation (A3)
- ____Water Marks (B1)
- ____Sediment Deposits (B2)
- ____Drift Deposits (B3)
- ____Algal Mat or Crust (B4)
- ____Iron Deposits (B5)
- ____Surface Soil Cracks (B6)
- ____Inundation Visible on Aerial Imagery (B7)
- ____Sparsely Vegetated Concave Surface (B8)
- ____Marl Deposits (B15)
- ____Hydrogen Sulfide Odor (C1)
- ____Dry-Season Water Table (C2)
- ____Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____Water Stained Leaves (B9)
- ____Drainage Patterns (B10)
- ____Oxidized Rizospheres along Living Roots (C3)
- ____Presence of Reduced Iron (C4)
- ____Salt Deposits (C5)
- ____Stunted or Stressed Plants (D1)
- ____Geomorphic Position (D2)
- ____Shallow Aquitard (D3)
- ____Microtopographic Relief (D4)
- ____FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	____	No	✓	Depth (inches):	0
Water Table Present?	Yes	____	No	✓	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes	____	No	✓	Depth (inches):	

Wetland Hydrology Present? Yes ____ No ✓

Recorded Data (stream gauge, monitor well, aerial photo, previous inspection) if available:

Remarks: No wetland hydrology indicators.

Sampling Point: eklutna-38
NWI classification: U

Hydric Soil Indicators: None
Wetland Hydrology Indicators: None

Wetland Determination Data Form - Alaska Region

Project/Site: Eklutna Hydro Wetlands Borough/City: Municipality of Anchorage Sampling Date: 2022-08-11
Applicant/Owner: McMillan Jacobs Sampling Point: eklutna-39
Investigator(s): SLI, RWM Landform (hillside, terrace, hummocks, etc.):
Local relief (concave, convex, none): none Slope: 0.0 % / 0.0 ° Elevation: 67
Subregion: Cook Inlet Lowlands Lat.: 61.4571 Long.: -149.4089 Datum: WGS84
Soil Map Unit Name: Typic Cryaquent and Typic Cryaquept soils, 0 to 2 percent slopes NWI classification: E2EM1P
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ____
Hydric Soil Present? Yes ✓ No ____
Wetland Hydrology Present? Yes ✓ No ____

Is the Sampled Area within a Wetland? Yes ✓ No ____

Remarks:

Vegetation - Use scientific names of plants. List all species in the plot.

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
	Total Cover:	0.0		
	50% of total cover: 0.0		20% of total cover: 0.0	
	Sapling/Shrub Stratum			
	Total Cover:	0.0		
	50% of total cover: 0.0		20% of total cover: 0.0	
	Herb Stratum			
1.	Carex lyngbyei	40.0	✓	OBL
2.	Carex pluriflora	5.0		OBL
3.	Stellaria humifusa	3.0		OBL
4.	Triglochin palustris	2.0		OBL
5.	Potentilla egedii ssp. grandis	1.0		
6.	Atriplex gmelinii	0.1		FACW
	Total Cover:	51.1		
	50% of total cover: 25.6		20% of total cover: 10.2	

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across all Strata: 1 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	50.0	× 1 =	50.0
FACW Species	0.1	× 2 =	0.2
FAC Species	0.0	× 3 =	0.0
FACU Species	0.0	× 4 =	0.0
UPL Species	0.0	× 5 =	0.0
Column Totals:	50.1 (A)		50.2 (B)

Prevalence Index = B/A = 1.002

Hydrophytic Vegetation Indicators:
✓ Dominance Test is > 50%
✓ Prevalence Index is ≤ 3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators or hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Plot size (radius, or length × width) 10m radius
% Cover of Wetland Bryophytes (Where applicable) 0.0
% Bare Ground 99.0
Total Cover of Bryophytes 0.0

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

SOIL

Sampling Point: eklutna-39

Depth	Matrix			Redox Features						
(inches)	Color (moist)		%	Color (moist)		%	Type[1]	Loc[2]	Texture	Mod	Remarks
0-10	5y	2.5/1		/			A		peat		positive alpha alpha from 1-4in
10-16	n	4/		/			A		silt loam		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, A=Absent [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators:

- ____ Histosol or Histel (A1)
- __✓__ Histic Epipedon (A2)
- ____ Hydrogen Sulfide (A4)
- ____ Thick Dark Surface (A12)
- ____ Alaska Gleyed (A13)
- ____ Alaska Redox (A14)
- ____ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ____ Alaska Color Change (TA4)[4]
- ____ Alaska Alpine Swales (TA5)
- ____ Alaska Redox With 2.5Y Hue
- __✓__ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ____ Other (Explain in Remarks)

[3]One indicator or hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: None

Depth (inches):

Hydric Soil Present? Yes __✓__ No ____

Remarks: Other--positive reaction for alpha alpha dipyridyl

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

- __✓__ Surface Water (A1)
- __✓__ High Water Table (A2)
- __✓__ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Surface Soil Cracks (B6)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Marl Deposits (B15)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Dry-Season Water Table (C2)
- ____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____ Water Stained Leaves (B9)
- ____ Drainage Patterns (B10)
- ____ Oxidized Rizospheres along Living Roots (C3)
- __✓__ Presence of Reduced Iron (C4)
- ____ Salt Deposits (C5)
- ____ Stunted or Stressed Plants (D1)
- __✓__ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopographic Relief (D4)
- __✓__ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	✓	No		Depth (inches):	2
Water Table Present?	Yes	✓	No		Depth (inches):	0
Saturation Present? (includes capillary fringe)	Yes	✓	No		Depth (inches):	0

Wetland Hydrology Present? Yes __✓__ No ____

Recorded Data (stream gauge, monitor well, aerial photo, previous inspection) if available:

Remarks: Tidally influenced. Sampling 2 hours before low tide.

Sampling Point: eklutna-39
NWI classification: E2EM1P

Hydric Soil Indicators: Alaska Gleyed without Hue 5Y or Redder Underlaying Layer, Histic Epipedon (A2)
Wetland Hydrology Indicators: FAC-Neutral Test (D5), Presence of Reduced Iron (C4), Saturation (A3), High Water Table (A2), Surface Water (A1), Geomorphic Position (D2)

Wetland Determination Data Form - Alaska Region

Project/Site: Eklutna Hydro Wetlands Borough/City: Municipality of Anchorage Sampling Date: 2022-08-11
Applicant/Owner: McMillan Jacobs Sampling Point: eklutna-40
Investigator(s): SLI, RWM Landform (hillside, terrace, hummocks, etc.):
Local relief (concave, convex, none): none Slope: 0.0 % / 0.0 ° Elevation: 62
Subregion: Cook Inlet Lowlands Lat.: 61.4566 Long.: -149.4057 Datum: WGS84
Soil Map Unit Name: Typic Cryaquent and Typic Cryaquept soils, 0 to 2 percent slopes NWI classification: E2SS1P
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ____
Hydric Soil Present? Yes ✓ No ____
Wetland Hydrology Present? Yes ✓ No ____

Is the Sampled Area within a Wetland? Yes ✓ No ____

Remarks: Higher mounds form small islands for less wet/salt tolerant species. Substantial microtopography with shrubs on mounds a foot above water. Water fills all space between the shrubby mounds. At high tide the mounds are probably just at water level.

Vegetation - Use scientific names of plants. List all species in the plot.

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
	Total Cover:	0.0		
	50% of total cover: 0.0		20% of total cover: 0.0	
	Sapling/Shrub Stratum			
1.	Myrica gale	60.0	✓	OBL
2.	Salix fuscescens	3.0		FACW
	Total Cover:	63.0		
	50% of total cover: 31.5		20% of total cover: 12.6	
	Herb Stratum			
1.	Carex lyngbyei	15.0	✓	OBL
2.	Calamagrostis canadensis	15.0	✓	FAC
3.	Trientalis europaea	15.0	✓	FACU
4.	Triglochin palustris	3.0		OBL
5.	Carex ramenskii	1.0		OBL
6.	Potentilla egedii ssp. grandis	1.0		
7.	Rumex transitorius	0.1		FACW
	Total Cover:	50.1		
	50% of total cover: 25.0		20% of total cover: 10.0	

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across all Strata: 4 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 75.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	79.0	× 1 =	79.0
FACW Species	3.1	× 2 =	6.2
FAC Species	15.0	× 3 =	45.0
FACU Species	15.0	× 4 =	60.0
UPL Species	0.0	× 5 =	0.0
Column Totals:	112.1 (A)		190.2 (B)

Prevalence Index = B/A = 1.697

Hydrophytic Vegetation Indicators:
✓ Dominance Test is > 50%
✓ Prevalence Index is ≤ 3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators or hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Plot size (radius, or length × width) 10m radius
% Cover of Wetland Bryophytes (Where applicable) 0.0
% Bare Ground 40.0
Total Cover of Bryophytes 0.0

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: Myrica, Calamagrostis, and Trientalis on pedastals above inundation. All other species in troughs with standing water at time of site visit (close to low tide).

SOIL

Sampling Point: eklutna-40

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, A=Absent [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators:

- ____Histosol or Histel (A1)
- ____Histic Epipedon (A2)
- ____Hydrogen Sulfide (A4)
- ____Thick Dark Surface (A12)
- ____Alaska Gleyed (A13)
- ____Alaska Redox (A14)
- ____Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ____Alaska Color Change (TA4)[4]
- ____Alaska Alpine Swales (TA5)
- ____Alaska Redox With 2.5Y Hue
- ____Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- __✓__Other (Explain in Remarks)

[3]One indicator or hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: None

Depth (inches):

Hydric Soil Present? Yes __✓__ No ____

Remarks: Inundated site. No pit excavated.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

- __✓__Surface Water (A1)
- __✓__High Water Table (A2)
- __✓__Saturation (A3)
- ____Water Marks (B1)
- ____Sediment Deposits (B2)
- ____Drift Deposits (B3)
- ____Algal Mat or Crust (B4)
- ____Iron Deposits (B5)
- ____Surface Soil Cracks (B6)
- ____Inundation Visible on Aerial Imagery (B7)
- ____Sparsely Vegetated Concave Surface (B8)
- ____Marl Deposits (B15)
- ____Hydrogen Sulfide Odor (C1)
- ____Dry-Season Water Table (C2)
- ____Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____Water Stained Leaves (B9)
- ____Drainage Patterns (B10)
- ____Oxidized Rizospheres along Living Roots (C3)
- ____Presence of Reduced Iron (C4)
- ____Salt Deposits (C5)
- ____Stunted or Stressed Plants (D1)
- __✓__Geomorphic Position (D2)
- ____Shallow Aquitard (D3)
- __✓__Microtopographic Relief (D4)
- __✓__FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	✓	No		Depth (inches):	5
Water Table Present?	Yes	✓	No		Depth (inches):	0
Saturation Present? (includes capillary fringe)	Yes	✓	No		Depth (inches):	0

Wetland Hydrology Present? Yes __✓__ No ____

Recorded Data (stream gauge, monitor well, aerial photo, previous inspection) if available:

Remarks: Sampled about 90 minutes prior to low tide. water is filling all space between Myrica/Calamagrostis "mounds"

Sampling Point: eklutna-40
NWI classification: E2SS1P

Hydric Soil Indicators: Other (explain in remarks)
Wetland Hydrology Indicators: High Water Table (A2), Microtopographic Relief (D4), FAC-Neutral Test (D5), Surface Water (A1), Geomorphic Position (D2), Saturation (A3)

NO SOIL PHOTO TAKEN

Wetland Determination Data Form - Alaska Region

Project/Site: Eklutna Hydro Wetlands Borough/City: Municipality of Anchorage Sampling Date: 2022-08-11
Applicant/Owner: McMillan Jacobs Sampling Point: eklutna-43
Investigator(s): SLI Landform (hillside, terrace, hummocks, etc.): Channel
Local relief (concave, convex, none): concave Slope: 3.5 % / 2.0 ° Elevation: 48
Subregion: Cook Inlet Lowlands Lat.: 61.4547 Long.: -149.4026 Datum: WGS84
Soil Map Unit Name: Water, fresh NWI classification: R1USQ
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓
Are Vegetation ✓, Soil ✓, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ____
Hydric Soil Present? Yes ✓ No ____
Wetland Hydrology Present? Yes ✓ No ____

Is the Sampled Area within a Wetland? **Yes** ✓ **No** ____

Remarks: Active channel Eklutna River at low tide.

Vegetation - Use scientific names of plants. List all species in the plot.

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
Total Cover:	0.0		
50% of total cover: 0.0		20% of total cover: 0.0	
Sapling/Shrub Stratum			
Total Cover:	0.0		
50% of total cover: 0.0		20% of total cover: 0.0	
Herb Stratum			
Total Cover:	0.0		
50% of total cover: 0.0		20% of total cover: 0.0	

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across all Strata: 0 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0.0	× 1 =	0.0
FACW Species	0.0	× 2 =	0.0
FAC Species	0.0	× 3 =	0.0
FACU Species	0.0	× 4 =	0.0
UPL Species	0.0	× 5 =	0.0
Column Totals:	0.0 (A)		0.0 (B)

Prevalence Index = B/A = 0.000

Hydrophytic Vegetation Indicators:
____ Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
✓ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators or hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Plot size (radius, or length × width) 2x10m
% Cover of Wetland Bryophytes (Where applicable) 0.0
% Bare Ground 0.0
Total Cover of Bryophytes 0.0

Hydrophytic Vegetation Present? **Yes** ✓ **No** ____

Remarks:

SOIL

Sampling Point: eklutna-43

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, A=Absent [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators:

- ____Histosol or Histel (A1)
- ____Histic Epipedon (A2)
- ____Hydrogen Sulfide (A4)
- ____Thick Dark Surface (A12)
- ____Alaska Gleyed (A13)
- ____Alaska Redox (A14)
- ____Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ____Alaska Color Change (TA4)[4]
- ____Alaska Alpine Swales (TA5)
- ____Alaska Redox With 2.5Y Hue
- ____Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- __✓__Other (Explain in Remarks)

[3]One indicator or hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: None

Depth (inches):

Hydric Soil Present? Yes __✓__ No ____

Remarks: Active channel Eklutna River, assume hydric soils.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

- __✓__Surface Water (A1)
- ____High Water Table (A2)
- ____Saturation (A3)
- ____Water Marks (B1)
- ____Sediment Deposits (B2)
- ____Drift Deposits (B3)
- ____Algal Mat or Crust (B4)
- ____Iron Deposits (B5)
- ____Surface Soil Cracks (B6)
- ____Inundation Visible on Aerial Imagery (B7)
- ____Sparsely Vegetated Concave Surface (B8)
- ____Marl Deposits (B15)
- ____Hydrogen Sulfide Odor (C1)
- ____Dry-Season Water Table (C2)
- ____Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____Water Stained Leaves (B9)
- ____Drainage Patterns (B10)
- ____Oxidized Rizospheres along Living Roots (C3)
- ____Presence of Reduced Iron (C4)
- ____Salt Deposits (C5)
- ____Stunted or Stressed Plants (D1)
- ____Geomorphic Position (D2)
- ____Shallow Aquitard (D3)
- ____Microtopographic Relief (D4)
- ____FAC-neutral Test (D5)

Field Observations:

Surface Water Present? Yes __✓__ No ____ Depth (inches):

Water Table Present? Yes ____ No __✓__ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ____ No __✓__ Depth (inches):

Wetland Hydrology Present? Yes __✓__ No ____

Recorded Data (stream gauge, monitor well, aerial photo, previous inspection) if available:

Remarks:

Sampling Point: eklutna-43
NWI classification: R1USQ

Hydric Soil Indicators: Other (explain in remarks)
Wetland Hydrology Indicators: Surface Water (A1)

No Soil Photo Taken

Wetland Determination Data Form - Alaska Region

Project/Site: Eklutna Hydro Wetlands Borough/City: Municipality of Anchorage Sampling Date: 2022-08-11
Applicant/Owner: McMillan Jacobs Sampling Point: eklutna-44
Investigator(s): RWM, SLI Landform (hillside, terrace, hummocks, etc.): Flat or fluvial related
Local relief (concave, convex, none): none Slope: 0.0 % / 0.0 ° Elevation: 55
Subregion: Cook Inlet Lowlands Lat.: 61.4550 Long.: -149.4005 Datum: WGS84
Soil Map Unit Name: Water, fresh NWI classification: E2SS1P
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ____
Hydric Soil Present? Yes ✓ No ____
Wetland Hydrology Present? Yes ✓ No ____

Is the Sampled Area within a Wetland? Yes ✓ No ____

Remarks: Low to tall willows with a variety of graminoids. Adjacent areas are slightly lower with Carex lyngbyei, Poa eminens, and standing water. An E.C. of 1175.00 microsiemens is higher than the cutoff listed in FGDC 2013 (1013 microsiemens, 0.5 ppt). So this site should be considered estuarine.

Vegetation - Use scientific names of plants. List all species in the plot.

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1.	Salix lasiandra	15.0	✓	FACW
	Total Cover:	15.0		
	50% of total cover: 7.5		20% of total cover: 3.0	
	Sapling/Shrub Stratum			
1.	Salix barclayi	25.0	✓	FAC
2.	Salix lasiandra	5.0		FACW
	Total Cover:	30.0		
	50% of total cover: 15.0		20% of total cover: 6.0	
	Herb Stratum			
1.	Carex lyngbyei	25.0	✓	OBL
2.	Potentilla egedii	25.0	✓	
3.	Festuca saximontana	15.0	✓	
4.	Lathyrus palustris	15.0	✓	OBL
5.	Elymus repens	15.0	✓	FACU
6.	Calamagrostis stricta ssp. inexpansa	15.0	✓	
7.	Parnassia palustris	5.0		FACW
8.	Hordeum brachyantherum	2.0		FACW
9.	Conioselinum pacificum	1.0		FACW
10.	Dodecatheon sp.	1.0		
11.	Equisetum arvense	1.0		FAC
12.	Equisetum pratense	1.0		FACW
13.	Hedysarum alpinum	1.0		FACU
14.	Triglochin palustris	1.0		OBL
15.	Achillea millefolium	0.1		FACU
	Total Cover:	123.1		
	50% of total cover: 61.6		20% of total cover: 24.6	

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 4 (A)
Total Number of Dominant Species Across all Strata: 8 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	41.0	× 1 =	41.0
FACW Species	29.0	× 2 =	58.0
FAC Species	26.0	× 3 =	78.0
FACU Species	16.1	× 4 =	64.4
UPL Species	0.0	× 5 =	0.0
Column Totals:	112.1 (A)		241.4 (B)

Prevalence Index = B/A = 2.153

Hydrophytic Vegetation Indicators:
____ Dominance Test is > 50%
✓ Prevalence Index is ≤ 3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators or hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Plot size (radius, or length × width) 10m radius
% Cover of Wetland Bryophytes (Where applicable) ____
% Bare Ground 0.0
Total Cover of Bryophytes 0.0

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: A variety of graminoids among tall willows. Unsure of best NWI code.

SOIL

Sampling Point: eklutna-44

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks
0-10	5y 4/1	95	10yr 3/4	5	C	PL	silt loam		
10-16	n 4/	90	10yr 3/4	10	C	PL	silt loam		gleyed matrix but likely due to parent material color as alpha alpha was negtive
0.0-0.0	/		/		A				

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, A=Absent [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators:

- ____ Histosol or Histel (A1)
- ____ Histic Epipedon (A2)
- ____ Hydrogen Sulfide (A4)
- ____ Thick Dark Surface (A12)
- ____ Alaska Gleyed (A13)
- ____ Alaska Redox (A14)
- ____ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ____ Alaska Color Change (TA4)[4]
- ____ Alaska Alpine Swales (TA5)
- ____ Alaska Redox With 2.5Y Hue
- ✓ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ____ Other (Explain in Remarks)

[3]One indicator or hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: None

Depth (inches):

Hydric Soil Present? Yes ✓ No ____

Remarks: No reaction alpha alpha dipyridyl. Possible that gley colors are from parent material.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

- ____ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ____ Water Marks (B1)
- ✓ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Surface Soil Cracks (B6)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Marl Deposits (B15)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Dry-Season Water Table (C2)
- ____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____ Water Stained Leaves (B9)
- ____ Drainage Patterns (B10)
- ____ Oxidized Rizospheres along Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Salt Deposits (C5)
- ____ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopographic Relief (D4)
- ✓ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	____	No	✓	Depth (inches):	0
Water Table Present?	Yes	✓	No	____	Depth (inches):	11
Saturation Present? (includes capillary fringe)	Yes	✓	No	____	Depth (inches):	5

Wetland Hydrology Present? Yes ✓ No ____

Recorded Data (stream gauge, monitor well, aerial photo, previous inspection) if available:

Remarks: Sediment deposits, salt tolerant vegetation indicate this area is inundated by tides.

Sampling Point: eklutna-44
NWI classification: E2SS1P

Hydric Soil Indicators: Alaska Gleyed without Hue 5Y or Redder Underlaying Layer
Wetland Hydrology Indicators: Saturation (A3), High Water Table (A2), FAC-Neutral Test (D5), Sediment Deposits (B2), Geomorphic Position (D2)

Wetland Determination Data Form - Alaska Region

Project/Site: Eklutna Hydro Wetlands Borough/City: Municipality of Anchorage Sampling Date: 2022-08-11
Applicant/Owner: McMillan Jacobs Sampling Point: eklutna-46
Investigator(s): SLI, RWM Landform (hillside, terrace, hummocks, etc.): Flat or fluvial related
Local relief (concave, convex, none): none Slope: 0.0 % / 0.0 ° Elevation: 104
Subregion: Cook Inlet Lowlands Lat.: 61.4513 Long.: -149.3799 Datum: WGS84
Soil Map Unit Name: Water, fresh NWI classification: PFO1C
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ____
Hydric Soil Present? Yes ✓ No ____
Wetland Hydrology Present? Yes ✓ No ____

Is the Sampled Area within a Wetland? **Yes** ✓ **No** ____

Remarks: Between Glen Highway and railroad tracks, where Eklutna River braids into numerous small channels through forest. Small channels surround soil pit, water also moves through plot as sheet flow.

Vegetation - Use scientific names of plants. List all species in the plot.

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1.	Populus balsamifera	50.0	✓	FACU
2.	Salix alaxensis	15.0	✓	FAC
	Total Cover:	65.0		
	50% of total cover: 32.5		20% of total cover: 13.0	
	Sapling/Shrub Stratum			
1.	Alnus viridis	35.0	✓	FAC
2.	Salix alaxensis	5.0		FAC
3.	Alnus viridis	3.0		FAC
4.	Ribes glandulosum	1.0		FAC
5.	Shepherdia canadensis	1.0		FACU
	Total Cover:	45.0		
	50% of total cover: 22.5		20% of total cover: 9.0	
	Herb Stratum			
1.	Coptidium lapponicum	2.0	✓	OBL
2.	Arctagrostis latifolia	1.0	✓	FACW
3.	Mertensia paniculata	1.0	✓	FACU
4.	Thalictrum sparsiflorum	1.0	✓	FACU
5.	Artemisia tilesii	0.1		FACU
6.	Equisetum pratense	0.1		FACW
7.	Aconitum delphiniifolium	0.1		FAC
8.	Pyrola grandiflora	0.0		FAC
	Total Cover:	5.3		
	50% of total cover: 2.6		20% of total cover: 1.1	

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 4 (A)
Total Number of Dominant Species Across all Strata: 7 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 57.1% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	2.0	× 1 =	2.0
FACW Species	1.1	× 2 =	2.2
FAC Species	59.1	× 3 =	177.3
FACU Species	53.1	× 4 =	212.4
UPL Species	0.0	× 5 =	0.0
Column Totals:	115.3 (A)		393.9 (B)

Prevalence Index = B/A = 3.416

Hydrophytic Vegetation Indicators:
✓ Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators or hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Plot size (radius, or length × width) 10m radius
% Cover of Wetland Bryophytes (Where applicable) ____
% Bare Ground 15.0
Total Cover of Bryophytes 5.0

Hydrophytic Vegetation Present? **Yes** ✓ **No** ____

Remarks:

SOIL

Sampling Point: eklutna-46

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks
0-3	2.5y 3/1		/		A		loamy fine sand		
3-4	n 4/		/		A		mucky peat		buried leaf litter seems to be impeding drainage of surface flooding, reducing the minerals in this layer and creating a gleyed Oi horizon
3-10	2.5y 3/1		/		A		silty clay loam	v. gravelly	positive alpha alpha at 6-10
10-18	2.5y 3/1		/		A		silt loam	ext. gravelly	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, A=Absent [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators:

- ____ Histosol or Histel (A1)
- ____ Histic Epipedon (A2)
- ____ Hydrogen Sulfide (A4)
- ____ Thick Dark Surface (A12)
- ____ Alaska Gleyed (A13)
- ____ Alaska Redox (A14)
- ____ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ____ Alaska Color Change (TA4)[4]
- ____ Alaska Alpine Swales (TA5)
- ____ Alaska Redox With 2.5Y Hue
- ____ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ✓ Other (Explain in Remarks)

[3]One indicator or hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: None

Depth (inches):

Hydric Soil Present? Yes ✓ No ____

Remarks: Other--positive reaction alpha alpha dipyridyl from 6 to 10in.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

- ✓ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ✓ Sediment Deposits (B2)
- ✓ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Surface Soil Cracks (B6)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Marl Deposits (B15)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Dry-Season Water Table (C2)
- ____ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____ Water Stained Leaves (B9)
- ____ Drainage Patterns (B10)
- ____ Oxidized Rizospheres along Living Roots (C3)
- ✓ Presence of Reduced Iron (C4)
- ____ Salt Deposits (C5)
- ____ Stunted or Stressed Plants (D1)
- ____ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopographic Relief (D4)
- ____ FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	✓	No	____	Depth (inches): 4
Water Table Present?	Yes	____	No	✓	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	____	No	✓	Depth (inches):

Wetland Hydrology Present? Yes ✓ No ____

Recorded Data (stream gauge, monitor well, aerial photo, previous inspection) if available:

Remarks: Small channels flow through plot, as well as non-channelized sheet flow. No water table or saturated soils in pit, which is 2 feet from sheet flow, suggesting a surface water groundwater disconnect. Sediment deposits throughout forest comprise the majority of groundcover. Rafted leaves, sticks, and detritus throughout. Positive reaction alpha alpha dipyridyl dye indicates presence of reduced iron.

Sampling Point: eklutna-46
NWI classification: PFO1C

Hydric Soil Indicators: Other (explain in remarks)
Wetland Hydrology Indicators: Presence of Reduced Iron (C4), Sediment Deposits (B2), Drift Deposits (B3), Surface Water (A1)

Wetland Determination Data Form - Alaska Region

Project/Site: Eklutna Hydro Wetlands Borough/City: Municipality of Anchorage Sampling Date: 2022-08-11
Applicant/Owner: McMillan Jacobs Sampling Point: eklutna-48
Investigator(s): RWM, SLI Landform (hillside, terrace, hummocks, etc.):
Local relief (concave, convex, none): none Slope: 5.2 % / 3.0 ° Elevation: 99
Subregion: Cook Inlet Lowlands Lat.: 61.4520 Long.: -149.3848 Datum: WGS84
Soil Map Unit Name: Water, fresh NWI classification: U
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ____
Hydric Soil Present? Yes ____ No ✓
Wetland Hydrology Present? Yes ____ No ✓

Is the Sampled Area within a Wetland? Yes ____ No ✓

Remarks: Cottonwood forest, areas of rafted debris but no surface water or sediment deposits as at plot 46. This area may only flood during high water events, such as releases or spring runoff. Opening to the north, visible in imagery, with sediment deposits and ponding. Less braiding, small channels, sheet flow than upstream. Talk to project hydrologists when mapping.

Vegetation - Use scientific names of plants. List all species in the plot.

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1.	Populus balsamifera	75.0	✓	FACU
	Total Cover:	75.0		
	50% of total cover: 37.5		20% of total cover: 15.0	
	Sapling/Shrub Stratum			
1.	Alnus viridis	30.0	✓	FAC
2.	Salix alaxensis	10.0	✓	FAC
3.	Alnus viridis	10.0	✓	FAC
4.	Cornus stolonifera	5.0		
5.	Rosa acicularis	5.0		FACU
6.	Salix lasiandra	3.0		FACW
	Total Cover:	63.0		
	50% of total cover: 31.5		20% of total cover: 12.6	
	Herb Stratum			
1.	Achillea millefolium	0.1		FACU
2.	Calamagrostis canadensis	0.1		FAC
3.	Chamaenerion angustifolium	0.1		FACU
4.	Hedysarum mackenzii	0.1		
5.	Mertensia paniculata	0.1		FACU
6.	Orthilia secunda	0.1		FACU
7.	Streptopus amplexifolius	0.1		FACU
	Total Cover:	0.7		
	50% of total cover: 0.4		20% of total cover: 0.1	

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across all Strata: 4 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 75.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0.0	× 1 =	0.0
FACW Species	3.0	× 2 =	6.0
FAC Species	50.1	× 3 =	150.3
FACU Species	80.5	× 4 =	322.0
UPL Species	0.0	× 5 =	0.0
Column Totals:	133.6 (A)		478.3 (B)

Prevalence Index = B/A = 3.580

Hydrophytic Vegetation Indicators:
✓ Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators or hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Plot size (radius, or length × width) 10m radius
% Cover of Wetland Bryophytes (Where applicable) ____
% Bare Ground 0.0
Total Cover of Bryophytes 5.0

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

SOIL

Sampling Point: eklutna-48

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks
0-2	10yr 2/2		/		A		fibric		
2-3	2.5y 4/1		/		A		silty clay loam		
3-10	2.5y 3/2	100	/		A		loamy fine sand		
10-15	2.5y 3/1	100	/		A		fine sandy loam	ext. gravelly	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, A=Absent [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators:

- ____Histosol or Histel (A1)
- ____Histic Epipedon (A2)
- ____Hydrogen Sulfide (A4)
- ____Thick Dark Surface (A12)
- ____Alaska Gleyed (A13)
- ____Alaska Redox (A14)
- ____Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ____Alaska Color Change (TA4)[4]
- ____Alaska Alpine Swales (TA5)
- ____Alaska Redox With 2.5Y Hue
- ____Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ____Other (Explain in Remarks)

[3]One indicator or hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: None
Depth (inches):

Hydric Soil Present? Yes ____ No ✓

Remarks: No hydric soil indicators

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

- ____Surface Water (A1)
- ____High Water Table (A2)
- ____Saturation (A3)
- ____Water Marks (B1)
- ____Sediment Deposits (B2)
- ____Drift Deposits (B3)
- ____Algal Mat or Crust (B4)
- ____Iron Deposits (B5)
- ____Surface Soil Cracks (B6)
- ____Inundation Visible on Aerial Imagery (B7)
- ____Sparsely Vegetated Concave Surface (B8)
- ____Marl Deposits (B15)
- ____Hydrogen Sulfide Odor (C1)
- ____Dry-Season Water Table (C2)
- ____Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____Water Stained Leaves (B9)
- ____Drainage Patterns (B10)
- ____Oxidized Rizospheres along Living Roots (C3)
- ____Presence of Reduced Iron (C4)
- ____Salt Deposits (C5)
- ____Stunted or Stressed Plants (D1)
- ____Geomorphic Position (D2)
- ____Shallow Aquitard (D3)
- ____Microtopographic Relief (D4)
- ____FAC-neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): 0
Water Table Present? Yes ____ No ✓ Depth (inches):
Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches):

Wetland Hydrology Present? Yes ____ No ✓

Recorded Data (stream gauge, monitor well, aerial photo, previous inspection) if available:

Remarks: Ne wetland hydrology indicators

Sampling Point: eklutna-48
NWI classification: U

Hydric Soil Indicators: None
Wetland Hydrology Indicators: None

Wetland Determination Data Form - Alaska Region

Project/Site: Eklutna Hydro Wetlands Borough/City: Municipality of Anchorage Sampling Date: 2022-08-12
Applicant/Owner: McMillan Jacobs Sampling Point: eklutna-49
Investigator(s): NONE Landform (hillside, terrace, hummocks, etc.):
Local relief (concave, convex, none): _____ Slope: 0.0 % / 0.0 ° Elevation: 79
Subregion: _____ Lat.: 61.4545 Long.: -149.3944 Datum: WGS84
Soil Map Unit Name: Pits, gravel NWI classification: PFO1C
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓
Are Vegetation ✓, Soil ✓, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks: Similar to flooded forest between highway and railroad. Sheet flow through cottonwood forest. Equisetum and Galium rooted in water, so these conditions are not permanent, but rafted debris along tree trunks indicated the area does flood.

Vegetation - Use scientific names of plants. List all species in the plot.

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1.	Populus balsamifera	30.0	✓	FACU
2.	Betula neoalaskana	30.0	✓	FACU
3.	Salix alaxensis	10.0	____	FAC
	Total Cover:	70.0		
	50% of total cover: 35.0		20% of total cover: 14.0	
	Sapling/Shrub Stratum			
	Total Cover:	0.0		
	50% of total cover: 0.0		20% of total cover: 0.0	
	Herb Stratum			
1.	Galium boreale	15.0	✓	FACU
2.	Equisetum pratense	10.0	✓	FACW
	Total Cover:	25.0		
	50% of total cover: 12.5		20% of total cover: 5.0	

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across all Strata: 4 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 25.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0.0	× 1 =	0.0
FACW Species	10.0	× 2 =	20.0
FAC Species	10.0	× 3 =	30.0
FACU Species	75.0	× 4 =	300.0
UPL Species	0.0	× 5 =	0.0
Column Totals:	95.0 (A)		350.0 (B)

Prevalence Index = B/A = 3.684

Hydrophytic Vegetation Indicators:
____ Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
✓ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators or hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Plot size (radius, or length × width)	5m radius
% Cover of Wetland Bryophytes (Where applicable)	0.0
% Bare Ground	0.0
Total Cover of Bryophytes	0.0

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

SOIL

Sampling Point: eklutna-49

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, A=Absent [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators:

- ____Histosol or Histel (A1)
- ____Histic Epipedon (A2)
- ____Hydrogen Sulfide (A4)
- ____Thick Dark Surface (A12)
- ____Alaska Gleyed (A13)
- ____Alaska Redox (A14)
- ____Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ____Alaska Color Change (TA4)[4]
- ____Alaska Alpine Swales (TA5)
- ____Alaska Redox With 2.5Y Hue
- ____Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- _✓_Other (Explain in Remarks)

[3]One indicator or hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes _✓_ No ____

Remarks: assume hydric soil based on extensive surface water, indications of periodic flooding

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

- _✓_Surface Water (A1)
- ____High Water Table (A2)
- ____Saturation (A3)
- _✓_Water Marks (B1)
- ____Sediment Deposits (B2)
- _✓_Drift Deposits (B3)
- ____Algal Mat or Crust (B4)
- ____Iron Deposits (B5)
- ____Surface Soil Cracks (B6)
- ____Inundation Visible on Aerial Imagery (B7)
- ____Sparsely Vegetated Concave Surface (B8)
- ____Marl Deposits (B15)
- ____Hydrogen Sulfide Odor (C1)
- ____Dry-Season Water Table (C2)
- ____Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____Water Stained Leaves (B9)
- ____Drainage Patterns (B10)
- ____Oxidized Rizospheres along Living Roots (C3)
- ____Presence of Reduced Iron (C4)
- ____Salt Deposits (C5)
- ____Stunted or Stressed Plants (D1)
- ____Geomorphic Position (D2)
- ____Shallow Aquitard (D3)
- ____Microtopographic Relief (D4)
- ____FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	_✓_	No	____	Depth (inches):	2
Water Table Present?	Yes	____	No	_✓_	Depth (inches):	0
Saturation Present? (includes capillary fringe)	Yes	____	No	_✓_	Depth (inches):	0

Wetland Hydrology Present? Yes _✓_ No ____

Recorded Data (stream gauge, monitor well, aerial photo, previous inspection) if available:

Remarks:

Sampling Point: eklutna-49
NWI classification: PFO1C

Hydric Soil Indicators: Other (explain in remarks)
Wetland Hydrology Indicators: Surface Water (A1), Drift Deposits (B3), Water Marks (B1)

NO SOIL PHOTO TAKEN

Wetland Determination Data Form - Alaska Region

Project/Site: Eklutna Hydro Wetlands Borough/City: Municipality of Anchorage Sampling Date: 2022-08-12
Applicant/Owner: McMillan Jacobs Sampling Point: eklutna-52
Investigator(s): SLI Landform (hillside, terrace, hummocks, etc.): Flat or fluvial related
Local relief (concave, convex, none): none Slope: 0.0 % / 0.0 ° Elevation: 49
Subregion: Cook Inlet Lowlands Lat.: 61.4535 Long.: -149.3984 Datum: WGS84
Soil Map Unit Name: Pits, gravel NWI classification: E1UBL
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ____
Hydric Soil Present? Yes ✓ No ____
Wetland Hydrology Present? Yes ✓ No ____

Is the Sampled Area within a Wetland? Yes ✓ No ____

Remarks: New beaver dam immediately downstream, beavers actively working on dam during site visit. Pond surrounded by estuarine vegetation, assume tidal influence. Tall shrubs in 10 inches of silty water and in poor condition, transition to E1UBL appears to be occurring.

Vegetation - Use scientific names of plants. List all species in the plot.

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
	Total Cover:	0.0		
	50% of total cover: 0.0	20% of total cover: 0.0		
	Sapling/Shrub Stratum			
1.	Alnus viridis	25.0	✓	FAC
2.	Salix barclayi	10.0	✓	FAC
3.	Salix lasiandra	5.0		FACW
4.	Salix alaxensis	5.0		FAC
	Total Cover:	45.0		
	50% of total cover: 22.5	20% of total cover: 9.0		
	Herb Stratum			
1.	Equisetum palustre	1.0		FACW
2.	Arctagrostis latifolia	0.1		FACW
	Total Cover:	1.1		
	50% of total cover: 0.6	20% of total cover: 0.2		

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across all Strata: 2 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0.0	× 1 =	0.0
FACW Species	6.1	× 2 =	12.2
FAC Species	40.0	× 3 =	120.0
FACU Species	0.0	× 4 =	0.0
UPL Species	0.0	× 5 =	0.0
Column Totals:	46.1 (A)		132.2 (B)

Prevalence Index = B/A = 2.868

Hydrophytic Vegetation Indicators:
✓ Dominance Test is > 50%
✓ Prevalence Index is ≤ 3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators or hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Plot size (radius, or length × width) -
% Cover of Wetland Bryophytes (Where applicable) ____
% Bare Ground 99.0
Total Cover of Bryophytes 0.0

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: Closed canopy alder in imagery, but current cover substantially less. Alders and willows in 10in silty water and in poor condition with chlorotic and sparse leaves. Anticipate high (total?) mortality and transition to E1UBL in near future.

SOIL

Sampling Point: eklutna-52

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, A=Absent [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators:

- ____Histosol or Histel (A1)
- ____Histic Epipedon (A2)
- ____Hydrogen Sulfide (A4)
- ____Thick Dark Surface (A12)
- ____Alaska Gleyed (A13)
- ____Alaska Redox (A14)
- ____Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ____Alaska Color Change (TA4)[4]
- ____Alaska Alpine Swales (TA5)
- ____Alaska Redox With 2.5Y Hue
- ____Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- __✓__Other (Explain in Remarks)

[3]One indicator or hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: None

Depth (inches):

Hydric Soil Present? Yes __✓__ No ____

Remarks: Cannot extract soil plug due to surface water and loose, saturated silty soils, but soils from 2 inches below ground are positive for alpha alpha dipyridyl.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

- __✓__Surface Water (A1)
- ____High Water Table (A2)
- ____Saturation (A3)
- ____Water Marks (B1)
- ____Sediment Deposits (B2)
- ____Drift Deposits (B3)
- ____Algal Mat or Crust (B4)
- ____Iron Deposits (B5)
- ____Surface Soil Cracks (B6)
- ____Inundation Visible on Aerial Imagery (B7)
- ____Sparsely Vegetated Concave Surface (B8)
- ____Marl Deposits (B15)
- ____Hydrogen Sulfide Odor (C1)
- ____Dry-Season Water Table (C2)
- ____Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____Water Stained Leaves (B9)
- ____Drainage Patterns (B10)
- ____Oxidized Rizospheres along Living Roots (C3)
- ____Presence of Reduced Iron (C4)
- ____Salt Deposits (C5)
- ____Stunted or Stressed Plants (D1)
- ____Geomorphic Position (D2)
- ____Shallow Aquitard (D3)
- ____Microtopographic Relief (D4)
- ____FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	✓	No		Depth (inches): 10
Water Table Present?	Yes		No	✓	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes		No	✓	Depth (inches):

Wetland Hydrology Present? Yes __✓__ No ____

Recorded Data (stream gauge, monitor well, aerial photo, previous inspection) if available:

Remarks: Relatively new beaver dam immediately downstream, extensive flooding not visible in imagery. Only localized high points are currently above water level.

Sampling Point: eklutna-52
NWI classification: E1UBL

Hydric Soil Indicators: Other (explain in remarks)
Wetland Hydrology Indicators: Surface Water (A1)

NO SOIL PHOTO TAKEN

Wetland Determination Data Form - Alaska Region

Project/Site: Eklutna Hydro Wetlands Borough/City: Municipality of Anchorage Sampling Date: 2022-08-12
Applicant/Owner: McMillan Jacobs Sampling Point: eklutna-53
Investigator(s): RWM, SLI Landform (hillside, terrace, hummocks, etc.): Flat or fluvial related
Local relief (concave, convex, none): concave Slope: 0.0 % / 0.0 ° Elevation: 71
Subregion: Cook Inlet Lowlands Lat.: 61.4520 Long.: -149.3924 Datum: WGS84
Soil Map Unit Name: Pits, gravel NWI classification: U
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks: Plot in former gravel pit, many mounded areas and small depressions. No indications that any of these areas flood, even in small depressions.

Vegetation - Use scientific names of plants. List all species in the plot.

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1.	Populus balsamifera	40.0	✓	FACU
2.	Salix scouleriana	20.0	✓	FAC
3.	Betula neoalaskana	20.0	✓	FACU
4.	Picea glauca	7.0		FACU
	Total Cover:	87.0		
	50% of total cover: 43.5		20% of total cover: 17.4	
	Sapling/Shrub Stratum			
1.	Alnus viridis	10.0	✓	FAC
2.	Salix scouleriana	10.0	✓	FAC
3.	Rosa acicularis	0.1		FACU
	Total Cover:	20.1		
	50% of total cover: 10.0		20% of total cover: 4.0	
	Herb Stratum			
1.	Orthilia secunda	5.0	✓	FACU
2.	Equisetum arvense	5.0	✓	FAC
3.	Equisetum pratense	5.0	✓	FACW
4.	Chamaenerion angustifolium	3.0		FACU
5.	Achillea millefolium	1.0		FACU
6.	Pyrola asarifolia	1.0		FACU
	Total Cover:	20.0		
	50% of total cover: 10.0		20% of total cover: 4.0	

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 5 (A)
Total Number of Dominant Species Across all Strata: 8 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 62.5% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0.0	× 1 =	0.0
FACW Species	5.0	× 2 =	10.0
FAC Species	45.0	× 3 =	135.0
FACU Species	77.1	× 4 =	308.4
UPL Species	0.0	× 5 =	0.0
Column Totals:	127.1 (A)		453.4 (B)

Prevalence Index = B/A = 3.567

Hydrophytic Vegetation Indicators:
✓ Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators or hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Plot size (radius, or length × width) -
% Cover of Wetland Bryophytes (Where applicable) ____
% Bare Ground 0.0
Total Cover of Bryophytes 5.0

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

SOIL

Sampling Point: eklutna-53

Depth	Matrix		Redox Features						
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks
0-2	10yr 2/2		/		A		fibric		
2-8	Variegated	/	/		A		loamy coarse sand	ext. gravelly	
8-16	Variegated	/	/		A		loamy coarse sand	v. cobbly	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, A=Absent [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators:

- ____Histosol or Histel (A1)
- ____Histic Epipedon (A2)
- ____Hydrogen Sulfide (A4)
- ____Thick Dark Surface (A12)
- ____Alaska Gleyed (A13)
- ____Alaska Redox (A14)
- ____Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ____Alaska Color Change (TA4)[4]
- ____Alaska Alpine Swales (TA5)
- ____Alaska Redox With 2.5Y Hue
- ____Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- ____Other (Explain in Remarks)

[3]One indicator or hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: None
Depth (inches):

Hydric Soil Present? Yes ____ No ✓

Remarks: No hydric soil indicators

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

- ____Surface Water (A1)
- ____High Water Table (A2)
- ____Saturation (A3)
- ____Water Marks (B1)
- ____Sediment Deposits (B2)
- ____Drift Deposits (B3)
- ____Algal Mat or Crust (B4)
- ____Iron Deposits (B5)
- ____Surface Soil Cracks (B6)
- ____Inundation Visible on Aerial Imagery (B7)
- ____Sparsely Vegetated Concave Surface (B8)
- ____Marl Deposits (B15)
- ____Hydrogen Sulfide Odor (C1)
- ____Dry-Season Water Table (C2)
- ____Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____Water Stained Leaves (B9)
- ____Drainage Patterns (B10)
- ____Oxidized Rizospheres along Living Roots (C3)
- ____Presence of Reduced Iron (C4)
- ____Salt Deposits (C5)
- ____Stunted or Stressed Plants (D1)
- ____Geomorphic Position (D2)
- ____Shallow Aquitard (D3)
- ____Microtopographic Relief (D4)
- ____FAC-neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): 0
Water Table Present? Yes ____ No ✓ Depth (inches):
Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches):

Wetland Hydrology Present? Yes ____ No ✓

Recorded Data (stream gauge, monitor well, aerial photo, previous inspection) if available:

Remarks: No wetland hydrology indicators, soil consists of coarse gravels and cobbles with some soil development in the upper horizons.

Sampling Point: eklutna-53
NWI classification: U

Hydric Soil Indicators: None
Wetland Hydrology Indicators: None

Wetland Determination Data Form - Alaska Region

Project/Site: Eklutna Hydro Wetlands Borough/City: Municipality of Anchorage Sampling Date: 2022-08-12
Applicant/Owner: McMillan Jacobs Sampling Point: eklutna-54
Investigator(s): SLI Landform (hillside, terrace, hummocks, etc.):
Local relief (concave, convex, none): _____ Slope: 0.0 % / 0.0 ° Elevation: 71
Subregion: Cook Inlet Lowlands Lat.: 61.4523 Long.: -149.3946 Datum: WGS84
Soil Map Unit Name: Pits, gravel NWI classification: PEM1E
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓
Are Vegetation ____, Soil ✓, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks: Inactive channel, flooded at time of site visit. Visible in lidar. About 10 feet wide, with a step up to Uplands on either side (see ek-53 for Uplands).

Vegetation - Use scientific names of plants. List all species in the plot.

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
	Total Cover:	0.0		
	50% of total cover: 0.0	20% of total cover: 0.0		
	Sapling/Shrub Stratum			
	Total Cover:	0.0		
	50% of total cover: 0.0	20% of total cover: 0.0		
	Herb Stratum			
1.	Calamagrostis canadensis	30.0	✓	FAC
2.	Equisetum arvense	5.0	____	FAC
	Total Cover:	35.0		
	50% of total cover: 17.5	20% of total cover: 7.0		

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across all Strata: 1 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0.0	× 1 =	0.0
FACW Species	0.0	× 2 =	0.0
FAC Species	35.0	× 3 =	105.0
FACU Species	0.0	× 4 =	0.0
UPL Species	0.0	× 5 =	0.0
Column Totals:	35.0 (A)		105.0 (B)

Prevalence Index = B/A = 3.000

Hydrophytic Vegetation Indicators:
✓ Dominance Test is > 50%
✓ Prevalence Index is ≤ 3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators or hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Plot size (radius, or length × width) _____
% Cover of Wetland Bryophytes (Where applicable) ____
% Bare Ground 90.0
Total Cover of Bryophytes 10.0

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: Characterizing vegetation rooted in channel. Alders and willows rooted in adjacent uplands overhang the channel, obscuring it in the imagery.

SOIL

Sampling Point: eklutna-54

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, A=Absent [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators:

- ____Histosol or Histel (A1)
- ____Histic Epipedon (A2)
- ____Hydrogen Sulfide (A4)
- ____Thick Dark Surface (A12)
- ____Alaska Gleyed (A13)
- ____Alaska Redox (A14)
- ____Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ____Alaska Color Change (TA4)[4]
- ____Alaska Alpine Swales (TA5)
- ____Alaska Redox With 2.5Y Hue
- ____Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- __✓__Other (Explain in Remarks)

[3]One indicator or hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: None

Depth (inches):

Hydric Soil Present? Yes __✓__ No ____

Remarks: Inundated, assume hydric soil.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

- __✓__Surface Water (A1)
- ____High Water Table (A2)
- ____Saturation (A3)
- ____Water Marks (B1)
- ____Sediment Deposits (B2)
- ____Drift Deposits (B3)
- ____Algal Mat or Crust (B4)
- ____Iron Deposits (B5)
- ____Surface Soil Cracks (B6)
- ____Inundation Visible on Aerial Imagery (B7)
- ____Sparsely Vegetated Concave Surface (B8)
- ____Marl Deposits (B15)
- ____Hydrogen Sulfide Odor (C1)
- ____Dry-Season Water Table (C2)
- ____Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ____Water Stained Leaves (B9)
- ____Drainage Patterns (B10)
- ____Oxidized Rizospheres along Living Roots (C3)
- ____Presence of Reduced Iron (C4)
- ____Salt Deposits (C5)
- ____Stunted or Stressed Plants (D1)
- __✓__Geomorphic Position (D2)
- ____Shallow Aquitard (D3)
- ____Microtopographic Relief (D4)
- ____FAC-neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	✓	No		Depth (inches):	8
Water Table Present?	Yes	✓	No		Depth (inches):	0
Saturation Present? (includes capillary fringe)	Yes	✓	No		Depth (inches):	0

Wetland Hydrology Present? Yes __✓__ No ____

Recorded Data (stream gauge, monitor well, aerial photo, previous inspection) if available:

Remarks: Inactive channel, flooded at time of site visit

Sampling Point: eklutna-54
NWI classification: PEM1E

Hydric Soil Indicators: Other (explain in remarks)
Wetland Hydrology Indicators: Geomorphic Position (D2), Surface Water (A1)

No Soil Photo Taken

Wetland Determination Data Form - Alaska Region

Project/Site: Eklutna Hydro Wetlands Borough/City: Municipality of Anchorage Sampling Date: 2022-08-12
Applicant/Owner: McMillan Jacobs Sampling Point: eklutna-56
Investigator(s): SLI, RWM Landform (hillside, terrace, hummocks, etc.): Flat or fluvial related
Local relief (concave, convex, none): concave Slope: 0.0 % / 0.0 ° Elevation: 97
Subregion: Cook Inlet Lowlands Lat.: 61.4506 Long.: -149.3871 Datum: WGS84
Soil Map Unit Name: Eklutna very cobbly sand, 0 to 3 percent slopes NWI classification: U
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ✓	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks: Complex terrain, presumably from old gravel mining operations. Well drained soils, with no indications of flooding, even in microtopographic lows.

Vegetation - Use scientific names of plants. List all species in the plot.

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1.	Populus balsamifera	40.0	✓	FACU
2.	Picea glauca	15.0	✓	FACU
	Total Cover:	55.0		
	50% of total cover: 27.5		20% of total cover: 11.0	
	Sapling/Shrub Stratum			
1.	Alnus viridis	15.0	✓	FAC
2.	Picea glauca	7.0	✓	FACU
3.	Rosa acicularis	7.0	✓	FACU
4.	Shepherdia canadensis	5.0		FACU
5.	Ribes triste	2.0		FAC
6.	Viburnum edule	0.1		FACU
	Total Cover:	36.1		
	50% of total cover: 18.0		20% of total cover: 7.2	
	Herb Stratum			
1.	Pyrola asarifolia	20.0	✓	FACU
2.	Orthilia secunda	7.0	✓	FACU
3.	Geocaulon lividum	3.0		FACU
4.	Chamaenerion angustifolium	2.0		FACU
	Total Cover:	32.0		
	50% of total cover: 16.0		20% of total cover: 6.4	

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across all Strata: 7 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 14.3% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0.0	× 1 =	0.0
FACW Species	0.0	× 2 =	0.0
FAC Species	17.0	× 3 =	51.0
FACU Species	106.1	× 4 =	424.4
UPL Species	0.0	× 5 =	0.0
Column Totals:	123.1	(A)	475.4 (B)

Prevalence Index = B/A = 3.862

Hydrophytic Vegetation Indicators:
____ Dominance Test is > 50%
____ Prevalence Index is ≤ 3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators or hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Plot size (radius, or length × width) 10m radius
% Cover of Wetland Bryophytes (Where applicable) ____
% Bare Ground 0.0
Total Cover of Bryophytes 5.0

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks: Groundcover nearly all deciduous litter.

SOIL

Sampling Point: eklutna-56

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks
0-6	10yr 2/2		/		A		fibric		
6-11	10yr 2/2		/		A		hemic	v. gravelly	
11-16	2.5y 3/2	100	/		A		loamy coarse sand	ext. gravelly	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, A=Absent [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators:

- _____Histosol or Histel (A1)
- _____Histic Epipedon (A2)
- _____Hydrogen Sulfide (A4)
- _____Thick Dark Surface (A12)
- _____Alaska Gleyed (A13)
- _____Alaska Redox (A14)
- _____Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- _____Alaska Color Change (TA4)[4]
- _____Alaska Alpine Swales (TA5)
- _____Alaska Redox With 2.5Y Hue
- _____Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
- _____Other (Explain in Remarks)

[3]One indicator or hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: None
Depth (inches):

Hydric Soil Present? Yes _____ No ✓

Remarks: No hydric soil indicators, pit dug in a microtopographic low.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

- _____Surface Water (A1)
- _____High Water Table (A2)
- _____Saturation (A3)
- _____Water Marks (B1)
- _____Sediment Deposits (B2)
- _____Drift Deposits (B3)
- _____Algal Mat or Crust (B4)
- _____Iron Deposits (B5)
- _____Surface Soil Cracks (B6)
- _____Inundation Visible on Aerial Imagery (B7)
- _____Sparsely Vegetated Concave Surface (B8)
- _____Marl Deposits (B15)
- _____Hydrogen Sulfide Odor (C1)
- _____Dry-Season Water Table (C2)
- _____Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- _____Water Stained Leaves (B9)
- _____Drainage Patterns (B10)
- _____Oxidized Rizospheres along Living Roots (C3)
- _____Presence of Reduced Iron (C4)
- _____Salt Deposits (C5)
- _____Stunted or Stressed Plants (D1)
- _____Geomorphic Position (D2)
- _____Shallow Aquitard (D3)
- _____Microtopographic Relief (D4)
- _____FAC-neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): 0
Water Table Present? Yes _____ No ✓ Depth (inches):
Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches):

Wetland Hydrology Present? Yes _____ No ✓

Recorded Data (stream gauge, monitor well, aerial photo, previous inspection) if available:

Remarks: No wetland hydrology indicators.

Sampling Point: eklutna-56
NWI classification: U

Hydric Soil Indicators: None
Wetland Hydrology Indicators: None

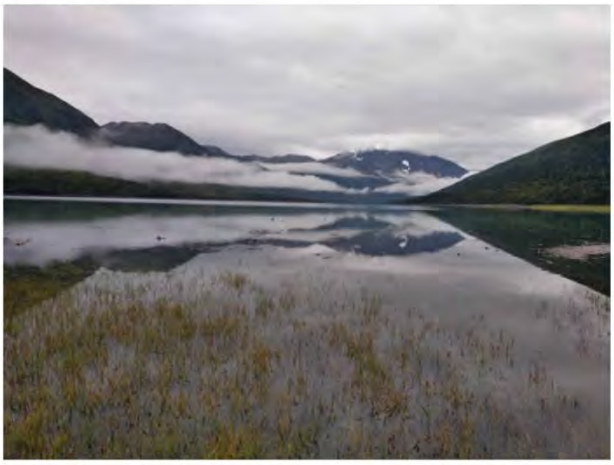
Appendix B: Photo Verification Forms

Table B.1-1. Photo verification field plots index table for the Wetlands and Wildlife Habitat Study area, Eklutna Hydroelectric Project, 2022.

Plot	NWI Code	HGM Code	Viereck Level IV Class
eklutna-01	L1UBH	Depressional HGM	Fresh Water
eklutna-03	L2US2C	Lacustrine Fringe HGM	Barren
eklutna-04	PSS1C	Lacustrine Fringe HGM	Open Low Willow
eklutna-11	PSS1C	Riverine HGM	Closed Tall Alder-Willow
eklutna-14	U	Not Applicable (Upland)	Open Black Cottonwood-White Spruce
eklutna-15	R4SBC	Riverine HGM	Fresh Water
eklutna-18	R4SBC	Riverine HGM	Fresh Water
eklutna-19	U	Not Applicable (Upland)	Closed White Spruce
eklutna-22	R3UBH	Riverine HGM	Fresh Water
eklutna-24	R3UBH	Riverine HGM	Fresh Water
eklutna-27	PUBHb	Riverine HGM	Fresh Water
eklutna-28	R3UBH	Riverine HGM	Fresh Water
eklutna-29	PSS1C	Riverine HGM	Closed Tall Alder-Willow
eklutna-30	U	Not Applicable (Upland)	Spruce-Balsam Poplar Woodland
eklutna-31	U	Not Applicable (Upland)	Closed Black Cottonwood-White Spruce
eklutna-32	U	Not Applicable (Upland)	Black Cottonwood-Sitka Spruce Woodland
eklutna-34	R4SBC	Riverine HGM	Fresh Water
eklutna-36	U	Not Applicable (Upland)	Closed Black Cottonwood-White Spruce
eklutna-41	E2EM1P	Estuarine Fringe HGM	Halophytic Sedge Wet Meadow
eklutna-42	U	Not Applicable (Upland)	Closed Tall Alder-Willow
eklutna-45	R3UBH	Riverine HGM	Fresh Water
eklutna-47	R3UBH	Riverine HGM	Fresh Water
eklutna-50	PSS1C	Riverine HGM	Open Low Shrub
eklutna-51	PUSC	Riverine HGM	Open Tall Alder
eklutna-55	U	Not Applicable (Upland)	Open Black Cottonwood Forest

Sampling Point: eklutna-01
Site: Eklutna Hydro Wetlands
Date: 2022-08-09
NWI classification: L1UBH
Viereck code: Fresh Water
Species:

Notes: Eklutna Lake (L1UBH). Water high at time of site visit, flooded sedges along lake margin, grebes near shore. Clear water, EC 181 pH 6.14



Sampling Point: eklutna-03
Site: Eklutna Hydro Wetlands
Date: 2022-08-09
NWI classification: L2US2C
Viereck code: Barren
Species:

Notes: Narrow band of unvegetated shoreline. Sand to coarse gravels with large driftwood along wrack line.

Sampling Point: eklutna-04
Site: Eklutna Hydro Wetlands
Date: 2022-08-09
NWI classification: PSS1C
Viereck code: Open Low Willow
Species: *Salix barclayi, Salix alaxensis, Equisetum palustre, Calamagrostis canadensis, Trifolium hybridum, Juncus castaneus, Comarum palustre*

Notes: Narrow band of willows between lower and wetter sedges, higher and drier beach

Sampling Point: eklutna-11
Site: Eklutna Hydro Wetlands
Date: 2022-08-09
NWI classification: PSS1C
Viereck code: Closed Tall Alder-Willow
Species: *Alnus viridis, Salix alaxensis, Equisetum variegatum, Parnassia palustris, Juncus supiniformis*

Notes: Rafted debris and sediment deposits in streamside willows. Active riparian zone is very narrow, limited to mid-channel islands and zone immediately adjacent to stream.

Sampling Point: eklutna-14
Site: Eklutna Hydro Wetlands
Date: 2022-08-09
NWI classification: U
Viereck code: Open Black Cottonwood-White Spruce
Species: *Picea glauca, Populus balsamifera, Alnus viridis, Rosa acicularis, Shepherdia canadensis, Juniperus communis, Linnaea borealis, Trientalis europaea, Orthilia secunda, Geocaulon lividum, Chamaenerion angustifolium*

Notes: Upland forest adjacent to Eklutna River. Open canopy cottonwood-white spruce forest several feet higher in elevation than Eklutna River.

Sampling Point: eklutna-15
Site: Eklutna Hydro Wetlands
Date: 2022-08-09
NWI classification: R4SBC
Viereck code: Fresh Water
Species:

Notes: Eklutna River. Channel 7-10ft wide, water 3-12+in deep. Cobble substrate, clear water, large woody debris.

Sampling Point: eklutna-18
Site: Eklutna Hydro Wetlands
Date: 2022-08-09
NWI classification: R4SBC
Viereck code: Fresh Water
Species:

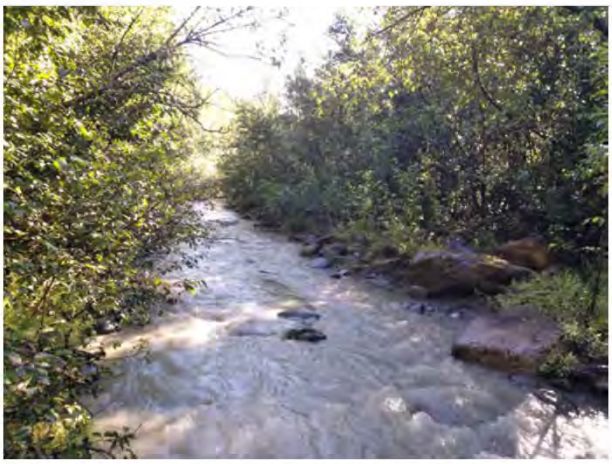
Notes: Small stream runs along toe of steep slope. Numerous seeps from hillside flow down into stream, will be unidentifiable on imagery. Shallow, less than 6 inches deep and 5 feet wide at this point. Clear water, leaves and detritus on bottom. This is likely a seasonal stream.

Sampling Point: eklutna-19
Site: Eklutna Hydro Wetlands
Date: 2022-08-09
NWI classification: U
Viereck code: Closed White Spruce
Species: *Picea glauca, Populus balsamifera, Shepherdia canadensis, Hedysarum mackenzii, Geocaulon lividum*

Notes: Upland forest in level terrain.

Sampling Point: eklutna-22
Site: Eklutna Hydro Wetlands
Date: 2022-08-10
NWI classification: R3UBH
Viereck code: Fresh Water
Species:

Notes: Active channel Eklutna River, visible in imagery. Stone to boulder substrate, turbid water. Very little riparian wetland. Tall Salix alaxensis along banks with rafted debris. The bank then transitions to upland white spruce forest.



Sampling Point: eklutna-24
Site: Eklutna Hydro Wetlands
Date: 2022-08-10
NWI classification: R3UBH
Viereck code: Fresh Water
Species:

Notes: Active channel Eklutna River through drained beaver pond. Dam was breached this season, see plot 23 for drained beaver pond. Channel ca 5ft wide, silt substrates, turbid water. Extent of water in imagery presumably shows extent of seasonal flooding, which is more than current conditions. Atypical conditions present as this channel would become a PUBHb when beavers rebuild their dam.

Sampling Point: eklutna-27
Site: Eklutna Hydro Wetlands
Date: 2022-08-10
NWI classification: PUBHb
Viereck code: Fresh Water
Species:

Notes: Recent beaver activity in Eklutna River. Dam has backed water up to adjacent uplands, over 3 feet deep at access trail.

Sampling Point: eklutna-28
Site: Eklutna Hydro Wetlands
Date: 2022-08-10
NWI classification: R3UBH
Viereck code: Fresh Water
Species:

Notes: Active channel Eklutna River. Approximately 7 feet wide, with a stone to boulder substrate. Very little riparian wetland, confined to tall shrub within 5 feet of stream.

Sampling Point: eklutna-29
Site: Eklutna Hydro Wetlands
Date: 2022-08-10
NWI classification: PSS1C
Viereck code: Closed Tall Alder-Willow
Species: *Alnus viridis, Salix alaxensis, Arctagrostis latifolia*

Notes: Narrow band of riparian wetlands. Sediment deposits and rafted debris observed. Picea and Populus trees mark transition to Upland forest. Includes small R3USC inactive channel.

Sampling Point: eklutna-30
Site: Eklutna Hydro Wetlands
Date: 2022-08-10
NWI classification: U
Viereck code: Spruce-Balsam Poplar Woodland
Species: *Populus balsamifera, Picea glauca, Shepherdia canadensis, Arctostaphylos uva-ursi*

Notes: Upland forest with mixed cottonwood-white spruce forest and sparse understory. Groundcover dominated by lichens (Cladonis Stellaris, Cladonia uncialis, Flavocetraria nivalis, Cladonia stygia, Cladonia rangiferina).

Sampling Point: eklutna-31
Site: Eklutna Hydro Wetlands
Date: 2022-08-10
NWI classification: U
Viereck code: Closed Black Cottonwood-White Spruce
Species: *Populus balsamifera, Picea glauca, Dryas sp., Chamaenerion angustifolium*

Notes: Uplands between access trail and this point. Raised mound in lidar is pushed up pile of gravel.

Sampling Point: eklutna-32
Site: Eklutna Hydro Wetlands
Date: 2022-08-10
NWI classification: U
Viereck code: Black Cottonwood-Sitka Spruce Woodland
Species: *Dryas sp., Picea glauca, Populus tremuloides, Shepherdia canadensis, Chamaenerion angustifolium, Taraxacum officinale, Orthilia secunda*

Notes: Previously cleared uplands.

Sampling Point: eklutna-34
Site: Eklutna Hydro Wetlands
Date: 2022-08-10
NWI classification: R4SBC
Viereck code: Fresh Water
Species:

Notes: Active channel of Eklutna River. Channel approximately 15 feet wide, gravel to stone substrate. Rafted debris is about 2.5 feet above current water level, AJ Avitia (bear guard) states this likely related to high water he observed while minnow trapping here in June.

Sampling Point: eklutna-36
Site: Eklutna Hydro Wetlands
Date: 2022-08-10
NWI classification: U
Viereck code: Closed Black Cottonwood-White Spruce
Species: *Picea glauca, Populus balsamifera, Shepherdia canadensis, Geocaulon lividum*

Notes: Upland white spruce-cottonwood forest. Very thin non-vasculars over cobbles to stones.

Sampling Point: eklutna-41
Site: Eklutna Hydro Wetlands
Date: 2022-08-11
NWI classification: E2EM1P
Viereck code: Halophytic Sedge Wet Meadow
Species: *Carex lyngbyei, Plantago maritima, Potentilla egedii, Hordeum jubatum, Leymus mollis, Triglochin palustris, Schoenoplectus tabernaemontani*

Notes: Scirpus and Carex lyngbyei in wettest portion of this plot, Plantago maritima in portions with exposed sediments and no water at time of visit.

Sampling Point: eklutna-42
Site: Eklutna Hydro Wetlands
Date: 2022-08-11
NWI classification: U
Viereck code: Closed Tall Alder-Willow
Species: *Salix lasiandra, Rosa acicularis, Alnus viridis, Sambucus racemosa, Calamagrostis canadensis*

Notes: Uplands with very tall tree-form Salix lasiandra, tall shrubs, and numerous dead/down trees. Possible old disturbance, with surface materials pushed into large mound

Sampling Point: eklutna-45
Site: Eklutna Hydro Wetlands
Date: 2022-08-11
NWI classification: R3UBH
Viereck code: Fresh Water
Species:

Notes: Eklutna River, braided section between Glen Highway and railroad tracks. Channels visible in lidar. Cottonwoods rooted in channels. Water level higher than ground surface in adjacent forest characterized by ek-46.

Sampling Point: eklutna-47
Site: Eklutna Hydro Wetlands
Date: 2022-08-11
NWI classification: R3UBH
Viereck code: Fresh Water
Species:

Notes: Small channel through forest. Eklutna still braided, but fewer braids/sheet flow through forest. Indications of flooding (sediment deposits in inactive channels) but less persistent than at 45 and 46.

Sampling Point: eklutna-50
Site: Eklutna Hydro Wetlands
Date: 2022-08-12
NWI classification: PSS1C
Viereck code: Open Low Shrub
Species: *Populus balsamifera, Alnus viridis*

Notes: Gravels with open shrub in imagery, but sheet flow through shrubs at time of site visit. Water 4-6 inches deep, unvegetated silts and gravels beneath water.

Sampling Point: eklutna-51
Site: Eklutna Hydro Wetlands
Date: 2022-08-12
NWI classification: PUSC
Viereck code: Open Tall Alder
Species:

Notes: Water in imagery, channel appears to have migrated. Sediment deposits throughout, bases of shrubs appear to be buried. Alders in poor condition, with chlorotic, sparse leaves.

Sampling Point: eklutna-55
Site: Eklutna Hydro Wetlands
Date: 2022-08-12
NWI classification: U
Viereck code: Open Black Cottonwood Forest
Species: *Populus balsamifera, Betula neoalaskana, Alnus viridis*

Notes: Marking extent of current flooding from beavers. Extends a little further back on the trail, but this is the transition from flooded, presumably dying, broadleaf forest to well-drained upland broadleaf forest. See ek-52 for characteristic flooded area, and ek-53 for well-drained upland forest.

Page intentionally left blank.

Appendix C: Species List

Table C.1-1. Vascular plant species list for wetland determination and photo verification plots sampled in the Wetlands and Wildlife Habitat Study area, Eklutna Hydroelectric Project, 2022.

NWI Code	Species	Common Name	Indicator Status	Number of Plots
E1UBL	*Alnus viridis*	Sitka Alder	FAC	2
E1UBL	*Arctagrostis latifolia*	Broad-Leaf Arctic-Bent	FACW	2
E1UBL	*Equisetum palustre*	Marsh Horsetail	FACW	1
E1UBL	*Salix alaxensis*	Felt-Leaf Willow	FAC	1
E1UBL	*Salix barclayi*	Barclay's Willow	FAC	1
E1UBL	*Salix lasiandra*	Pacific Willow	FACW	1
E2EM1P	*Atriplex gmelinii*	Gmelin's Saltbush	FACW	1
E2EM1P	*Carex lyngbyei*	Lyngbye's Sedge	OBL	2
E2EM1P	*Carex pluriflora*	Several-Flower Sedge	OBL	1
E2EM1P	*Hordeum jubatum*	Fox-Tail Barley	FACU	1
E2EM1P	*Leymus mollis*	American Lyme Grass	FAC	1
E2EM1P	*Plantago maritima*	Goosetongue	FACW	1
E2EM1P	*Potentilla egedii*		NI	1
E2EM1P	*Potentilla egedii* ssp. *grandis*		NI	1
E2EM1P	*Schoenoplectus tabernaemontani*	Soft-Stem Club-Rush	OBL	1
E2EM1P	*Stellaria humifusa*	Saltmarsh Starwort	OBL	1
E2EM1P	*Triglochin palustris*	Marsh Arrow-Grass	OBL	2
E2SS1P	*Achillea millefolium*	Common Yarrow	FACU	3
E2SS1P	*Calamagrostis canadensis*	Bluejoint	FAC	1
E2SS1P	*Calamagrostis stricta* ssp. *inexpansa*		NI	1
E2SS1P	*Carex lyngbyei*	Lyngbye's Sedge	OBL	2
E2SS1P	*Carex ramenskii*	Ramensk's Sedge	OBL	1
E2SS1P	*Conioselinum pacificum*	Pacific Hemlock-Parsley	FACW	1
E2SS1P	*Dodecatheon* sp.		NI	1
E2SS1P	*Elymus repens*	Creeping Wild Rye	FACU	1
E2SS1P	*Equisetum arvense*	Field Horsetail	FAC	1
E2SS1P	*Equisetum pratense*	Meadow Horsetail	FACW	1
E2SS1P	*Festuca saximontana*		NI	1
E2SS1P	*Hedysarum alpinum*	Alpine Sweet-Vetch	FACU	3
E2SS1P	*Hordeum brachyantherum*	Meadow Barley	FACW	1
E2SS1P	*Lathyrus palustris*	Marsh Vetchling	OBL	1
E2SS1P	*Myrica gale*	Sweetgale	OBL	1
E2SS1P	*Parnassia palustris*	Marsh Grass-of-Parnassus	FACW	1
E2SS1P	*Potentilla egedii*		NI	1
E2SS1P	*Potentilla egedii* ssp. *grandis*		NI	1
E2SS1P	*Rumex transitorius*	Pacific Willow Dock	FACW	1
E2SS1P	*Salix barclayi*	Barclay's Willow	FAC	1
E2SS1P	*Salix fuscescens*	Alaska Bog Willow	FACW	1

Table C.1-1, continued.

NWI Code	Species	Common Name	Indicator Status	Number of Plots
E2SS1P	*Salix lasiandra*	Pacific Willow	FACW	2
E2SS1P	*Trientalis europaea*	Arctic Starflower	FACU	3
E2SS1P	*Triglochin palustris*	Marsh Arrow-Grass	OBL	2
PEM1E	*Calamagrostis canadensis*	Bluejoint	FAC	2
PEM1E	*Carex aquatilis*	Leafy Tussock Sedge	OBL	4
PEM1E	*Carex kelloggii*	Kellogg's Sedge	OBL	1
PEM1E	*Comarum palustre*	Purple Marshlocks	OBL	1
PEM1E	*Equisetum arvense*	Field Horsetail	FAC	1
PEM1E	*Equisetum fluviatile*	Water Horsetail	OBL	2
PEM1E	*Equisetum palustre*	Marsh Horsetail	FACW	2
PFO1C	*Aconitum delphiniifolium*	Larkspur-Leaf Monkshood	FAC	1
PFO1C	*Alnus viridis*	Sitka Alder	FAC	4
PFO1C	*Arctagrostis latifolia*	Broad-Leaf Arctic-Bent	FACW	2
PFO1C	*Artemisia tilesii*	Tilesius' Wormwood	FACU	3
PFO1C	*Betula neoalaskana*	Alaska Paper Birch	FACU	1
PFO1C	*Coptidium lapponicum*		OBL	1
PFO1C	*Equisetum pratense*	Meadow Horsetail	FACW	2
PFO1C	*Galium boreale*	Northern Bedstraw	FACU	1
PFO1C	*Mertensia paniculata*	Tall Bluebells	FACU	1
PFO1C	*Populus balsamifera*	Balsam Poplar	FACU	4
PFO1C	*Pyrola grandiflora*	Arctic Wintergreen	FAC	1
PFO1C	*Ribes glandulosum*	Skunk Currant	FAC	1
PFO1C	*Salix alaxensis*	Felt-Leaf Willow	FAC	3
PFO1C	*Shepherdia canadensis*	Russet Buffalo-Berry	FACU	1
PFO1C	*Thalictrum sparsiflorum*	Few-Flower Meadow-Rue	FACU	1
PMLD	*Arctagrostis latifolia*	Broad-Leaf Arctic-Bent	FACW	2
PMLD	*Carex aquatilis*	Leafy Tussock Sedge	OBL	2
PMLD	*Coptidium lapponicum*		OBL	1
PMLD	*Dasiphora fruticosa*	Golden-Hardhack	FAC	1
PMLD	*Equisetum arvense*	Field Horsetail	FAC	1
PMLD	*Equisetum fluviatile*	Water Horsetail	OBL	1
PMLD	*Equisetum pratense*	Meadow Horsetail	FACW	1
PMLD	*Equisetum variegatum*	Variegated Scouring-Rush	FACW	2
PMLD	*Juncus biglumis*	Two-Flower Rush	OBL	1
PMLD	*Juncus castaneus*	Chestnut Rush	FACW	3
PMLD	*Parnassia palustris*	Marsh Grass-of-Parnassus	FACW	1
PMLD	*Picea glauca*	White Spruce	FACU	1
PMLD	*Salix myrtillifolia*	Blueberry Willow	FACW	2
PMLD	*Triglochin palustris*	Marsh Arrow-Grass	OBL	1
PSS1C	*Achillea millefolium*	Common Yarrow	FACU	3

Table C.1-1, continued.

NWI Code	Species	Common Name	Indicator Status	Number of Plots
PSS1C	*Alnus viridis*	Sitka Alder	FAC	14
PSS1C	*Aquilegia formosa*	Crimson Columbine	FACU	1
PSS1C	*Arctagrostis latifolia*	Broad-Leaf Arctic-Bent	FACW	4
PSS1C	*Astragalus* sp.		NI	1
PSS1C	*Athyrium filix-femina*		NI	1
PSS1C	*Calamagrostis canadensis*	Bluejoint	FAC	3
PSS1C	*Chamaenerion angustifolium*	Narrow-Leaf Fireweed	FACU	2
PSS1C	*Comarum palustre*	Purple Marshlocks	OBL	1
PSS1C	*Coptidium lapponicum*		OBL	1
PSS1C	*Cornus stolonifera*		NI	1
PSS1C	*Dasiphora fruticosa*	Golden-Hardhack	FAC	1
PSS1C	*Equisetum arvense*	Field Horsetail	FAC	2
PSS1C	*Equisetum palustre*	Marsh Horsetail	FACW	1
PSS1C	*Equisetum variegatum*	Variegated Scouring-Rush	FACW	4
PSS1C	*Galium triflorum*	Fragrant Bedstraw	FAC	1
PSS1C	*Gymnocarpium dryopteris*	Northern Oak Fern	FACU	1
PSS1C	*Juncus castaneus*	Chestnut Rush	FACW	3
PSS1C	*Juncus supiniformis*	Hairy-Leaf Rush	OBL	1
PSS1C	*Moehringia lateriflora*	Blunt-Leaf Grove-Sandwort	FACU	1
PSS1C	*Orthilia secunda*	Sidebells	FACU	2
PSS1C	*Parnassia palustris*	Marsh Grass-of-Parnassus	FACW	2
PSS1C	*Picea glauca*	White Spruce	FACU	1
PSS1C	*Piperia dilatata*	Scentbottle	FACW	1
PSS1C	*Populus balsamifera*	Balsam Poplar	FACU	6
PSS1C	*Pyrola asarifolia*	Pink Wintergreen	FACU	1
PSS1C	*Rosa acicularis*	Prickly Rose	FACU	1
PSS1C	*Rubus idaeus*	Common Red Raspberry	FACU	1
PSS1C	*Salix alaxensis*	Felt-Leaf Willow	FAC	6
PSS1C	*Salix barclayi*	Barclay's Willow	FAC	2
PSS1C	*Salix lasiandra*	Pacific Willow	FACW	1
PSS1C	*Salix myrtillifolia*	Blueberry Willow	FACW	4
PSS1C	*Sanguisorba canadensis*	Canadian Burnet	FACW	1
PSS1C	*Shepherdia canadensis*	Russet Buffalo-Berry	FACU	1
PSS1C	*Sorbus aucuparia*		NI	1
PSS1C	*Streptopus amplexifolius*	Clasping Twistedstalk	FACU	1
PSS1C	*Taraxacum officinale*	Common Dandelion	FACU	1
PSS1C	*Thalictrum sparsiflorum*	Few-Flower Meadow-Rue	FACU	2
PSS1C	*Trientalis europaea*	Arctic Starflower	FACU	3
PSS1C	*Trifolium hybridum*	Alsike Clover	FAC	1

Table C.1-1, continued.

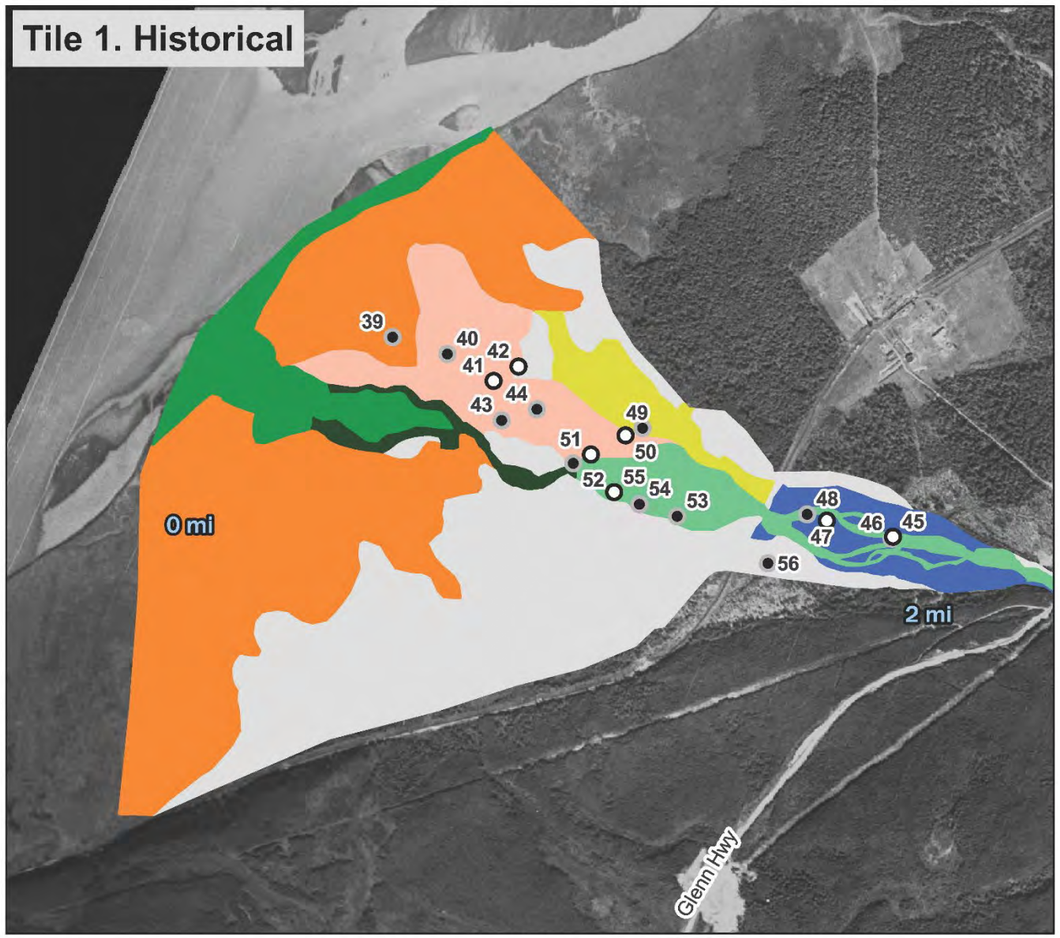
NWI Code	Species	Common Name	Indicator Status	Number of Plots
PSS1C	*Viburnum edule*	Squashberry	FACU	1
PSS1C	*Viola* sp.		NI	1
PSS1E	*Actaea rubra*	Red Baneberry	FAC	1
PSS1E	*Alnus viridis*	Sitka Alder	FAC	6
PSS1E	*Arctagrostis latifolia*	Broad-Leaf Arctic-Bent	FACW	4
PSS1E	*Coptidium lapponicum*		OBL	1
PSS1E	*Cornus stolonifera*		NI	1
PSS1E	*Epilobium* sp.		NI	1
PSS1E	*Equisetum pratense*	Meadow Horsetail	FACW	2
PSS1E	*Galium triflorum*	Fragrant Bedstraw	FAC	1
PSS1E	*Mertensia paniculata*	Tall Bluebells	FACU	1
PSS1E	*Orthilia secunda*	Sidebells	FACU	2
PSS1E	*Parnassia palustris*	Marsh Grass-of-Parnassus	FACW	1
PSS1E	*Picea glauca*	White Spruce	FACU	1
PSS1E	*Polemonium acutiflorum*	Tall Jacob's-Ladder	FAC	1
PSS1E	*Populus balsamifera*	Balsam Poplar	FACU	4
PSS1E	*Ribes laxiflorum*	Trailing Black Currant	FACU	1
PSS1E	*Rosa acicularis*	Prickly Rose	FACU	1
PSS1E	*Salix alaxensis*	Felt-Leaf Willow	FAC	1
PSS1E	*Salix commutata*	Under-Green Willow	FAC	1
PSS1E	*Salix lasiandra*	Pacific Willow	FACW	1
PSS1E	*Viburnum edule*	Squashberry	FACU	1
PUBH	*Potamogeton gramineus*	Grassy Pondweed	OBL	1
PUBH	*Utricularia macrorhiza*	Greater Bladderwort	OBL	1
PUBH	*Utricularia sp.*		NI	1
PUBHb	*Alnus viridis*	Sitka Alder	FAC	2
PUBHb	*Calamagrostis canadensis*	Bluejoint	FAC	1
PUBHb	*Equisetum arvense*	Field Horsetail	FAC	1
PUBHb	*Galium boreale*	Northern Bedstraw	FACU	1
PUBHb	*Mertensia paniculata*	Tall Bluebells	FACU	1
PUBHb	*Populus balsamifera*	Balsam Poplar	FACU	2
PUBHb	*Rubus idaeus*	Common Red Raspberry	FACU	1
PUBHb	*Salix alaxensis*	Felt-Leaf Willow	FAC	1
PUBHb	*Salix bebbiana*	Gray Willow	FAC	1
PUBHb	*Taraxacum officinale*	Common Dandelion	FACU	1
U	*Achillea millefolium*	Common Yarrow	FACU	12
U	*Actaea rubra*	Red Baneberry	FAC	2
U	*Alnus viridis*	Sitka Alder	FAC	24
U	*Angelica lucida*	Seacoast Angelica	FACU	1
U	*Arctostaphylos uva-ursi*	Red Bearberry	UPL	1

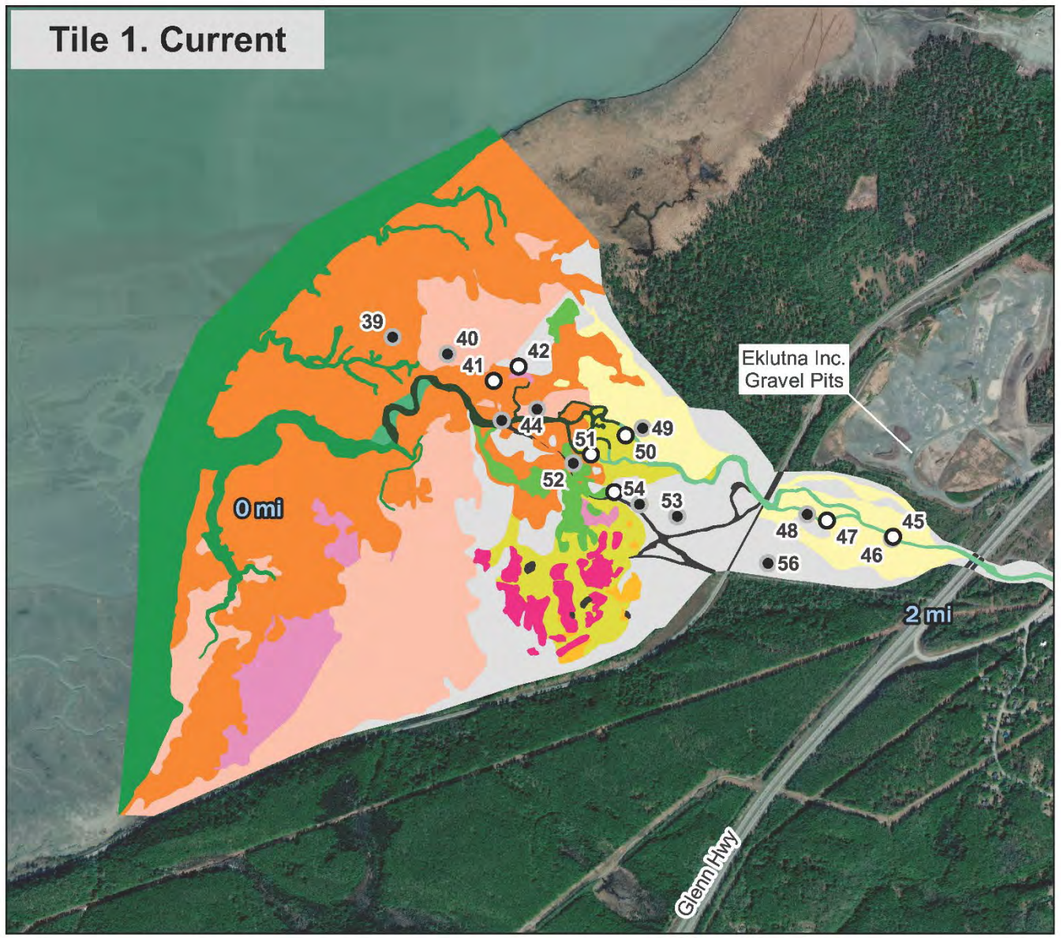
Table C.1-1, continued.

NWI Code	Species	Common Name	Indicator Status	Number of Plots
U	*Betula neoalaskana*	Alaska Paper Birch	FACU	3
U	*Calamagrostis canadensis*	Bluejoint	FAC	6
U	*Chamaenerion angustifolium*	Narrow-Leaf Fireweed	FACU	16
U	*Coptidium lapponicum*		OBL	2
U	*Corallorhiza trifida*	Yellow Coralroot	FACW	1
U	*Cornus canadensis*	Canadian Bunchberry	FACU	2
U	*Cornus stolonifera*		NI	4
U	*Dryas* sp.		NI	2
U	*Equisetum arvense*	Field Horsetail	FAC	3
U	*Equisetum pratense*	Meadow Horsetail	FACW	2
U	*Equisetum variegatum*	Variegated Scouring-Rush	FACW	2
U	*Galium triflorum*	Fragrant Bedstraw	FAC	2
U	*Geocaulon lividum*	False Toadflax	FACU	5
U	*Hedysarum mackenzii*		NI	2
U	*Juniperus communis*	Common Juniper	UPL	1
U	*Linnaea borealis*	American Twinflower	FACU	4
U	*Mertensia paniculata*	Tall Bluebells	FACU	3
U	*Oplopanax horridus*	Devil's-Club	FACU	1
U	*Orthilia secunda*	Sidebells	FACU	16
U	*Picea glauca*	White Spruce	FACU	15
U	*Populus balsamifera*	Balsam Poplar	FACU	24
U	*Populus tremuloides*	Quaking Aspen	FACU	2
U	*Pyrola asarifolia*	Pink Wintergreen	FACU	7
U	*Ribes laxiflorum*	Trailing Black Currant	FACU	2
U	*Ribes triste*	Swamp Red Currant	FAC	3
U	*Rosa acicularis*	Prickly Rose	FACU	10
U	*Rubus idaeus*	Common Red Raspberry	FACU	2
U	*Salix alaxensis*	Felt-Leaf Willow	FAC	4
U	*Salix barclayi*	Barclay's Willow	FAC	1
U	*Salix lasiandra*	Pacific Willow	FACW	2
U	*Salix myrtillifolia*	Blueberry Willow	FACW	2
U	*Salix scouleriana*	Scouler's Willow	FAC	2
U	*Sambucus racemosa*	Red Elder	FACU	1
U	*Shepherdia canadensis*	Russet Buffalo-Berry	FACU	6
U	*Spinulum annotinum*	Interrupted Club-Moss	FACU	1
U	*Streptopus amplexifolius*	Clasping Twistedstalk	FACU	2
U	*Taraxacum officinale*	Common Dandelion	FACU	2
U	*Trientalis europaea*	Arctic Starflower	FACU	3
U	*Viburnum edule*	Squashberry	FACU	5

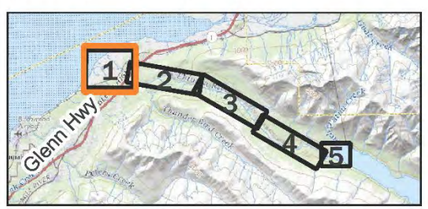
Appendix D: National Wetland Inventory (NWI) wetland types mapped from current (2022) and historical (1950) imagery in the Wetlands and Wildlife Habitat Study area, Eklutna Hydroelectric Project, 2022

Page intentionally left blank.





0 0.1 0.2 0.3 mi



Imagery Sources: Alaska Department of Natural Resources, ESRI

Legend

- Verification Plot
- Wetland Determination Plot

Waters

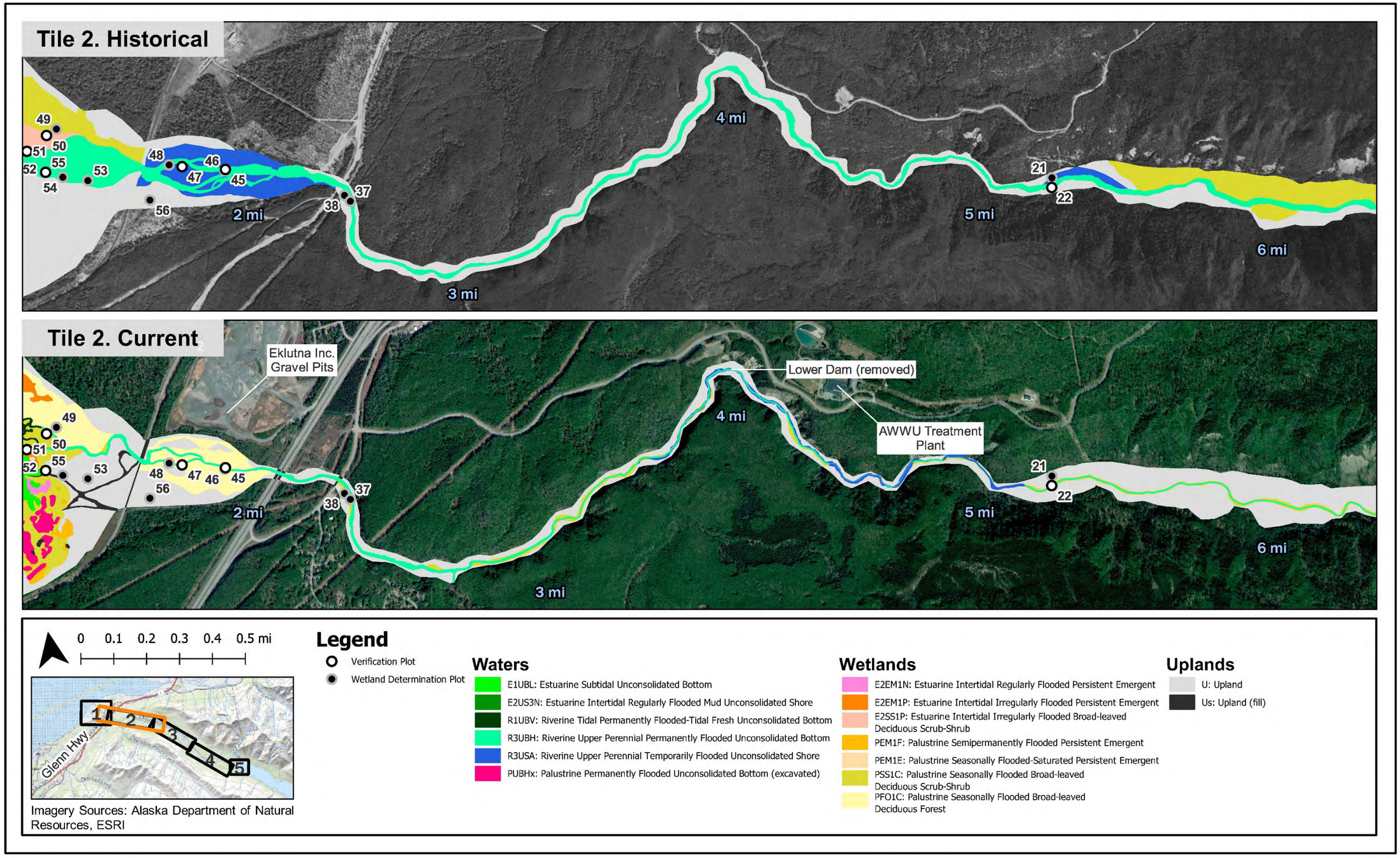
- E1UBL: Estuarine Subtidal Unconsolidated Bottom
- E2US3N: Estuarine Intertidal Regularly Flooded Mud Unconsolidated Shore
- R1UBV: Riverine Tidal Permanently Flooded-Tidal Fresh Unconsolidated Bottom
- R1USQ: Riverine Tidal Regularly Flooded-Tidal Fresh Unconsolidated Shore
- R3UBH: Riverine Upper Perennial Permanently Flooded Unconsolidated Bottom
- R3USA: Riverine Upper Perennial Temporarily Flooded Unconsolidated Shore
- PUBHx: Palustrine Permanently Flooded Unconsolidated Bottom (excavated)

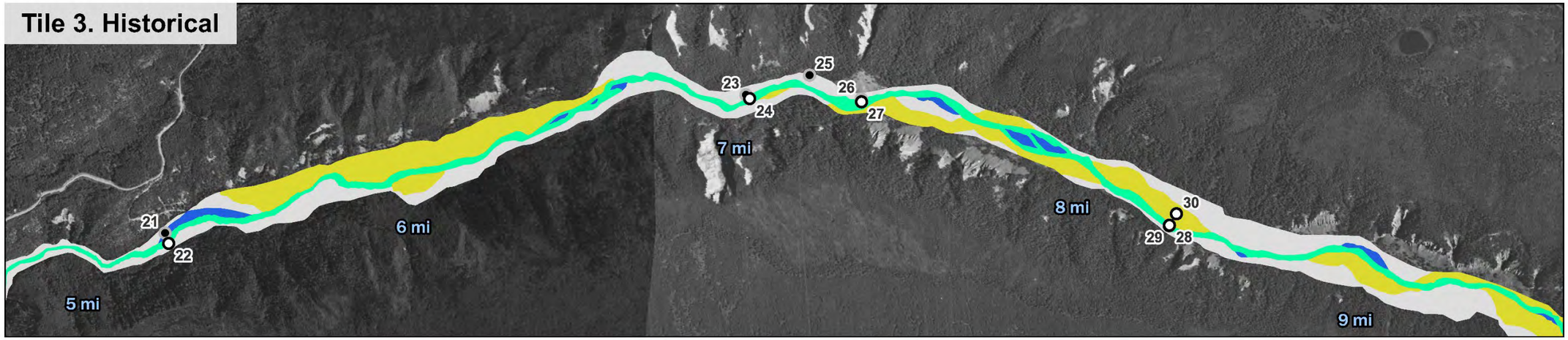
Wetlands

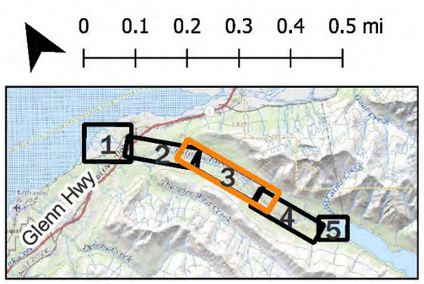
- E2EM1N: Estuarine Intertidal Regularly Flooded Persistent Emergent
- E2EM1P: Estuarine Intertidal Irregularly Flooded Persistent Emergent
- E2SS1P: Estuarine Intertidal Irregularly Flooded Broad-leaved Deciduous Scrub-Shrub
- PEM1F: Palustrine Semipermanently Flooded Persistent Emergent
- PEM1E: Palustrine Seasonally Flooded-Saturated Persistent Emergent
- PSS1C: Palustrine Seasonally Flooded Broad-leaved Deciduous Scrub-Shrub
- PFO1C: Palustrine Seasonally Flooded Broad-leaved Deciduous Forest

Uplands

- U: Upland
- Us: Upland (fill)


Tile 2. Historical
49
50
51
52
55
53
54
48
47
46
45
56
2 mi
37
38
3 mi
4 mi
5 mi
21
22
6 mi
Tile 2. Current
Eklutna Inc.
Gravel Pits
Lower Dam (removed)
AWWU Treatment
Plant
0 0.1 0.2 0.3 0.4 0.5 mi
Glenn Hwy
1
2
3
4
5
Imagery Sources: Alaska Department of Natural Resources, ESRI
Legend
Verification Plot
Wetland Determination Plot
Waters
E1UBL: Estuarine Subtidal Unconsolidated Bottom
E2US3N: Estuarine Intertidal Regularly Flooded Mud Unconsolidated Shore
R1UBV: Riverine Tidal Permanently Flooded-Tidal Fresh Unconsolidated Bottom
R3UBH: Riverine Upper Perennial Permanently Flooded Unconsolidated Bottom
R3USA: Riverine Upper Perennial Temporarily Flooded Unconsolidated Shore
PUBHx: Palustrine Permanently Flooded Unconsolidated Bottom (excavated)
Wetlands
E2EM1N: Estuarine Intertidal Regularly Flooded Persistent Emergent
E2EM1P: Estuarine Intertidal Irregularly Flooded Persistent Emergent
E2SS1P: Estuarine Intertidal Irregularly Flooded Broad-leaved Deciduous Scrub-Shrub
PEM1F: Palustrine Semipermanently Flooded Persistent Emergent
PEM1E: Palustrine Seasonally Flooded-Saturated Persistent Emergent
PSS1C: Palustrine Seasonally Flooded Broad-leaved Deciduous Scrub-Shrub
PFO1C: Palustrine Seasonally Flooded Broad-leaved Deciduous Forest
Uplands
U: Upland
Us: Upland (fill)





Imagery Sources: Alaska Department of Natural Resources, ESRI

Legend

- Verification Plot
- Wetland Determination Plot

Waters

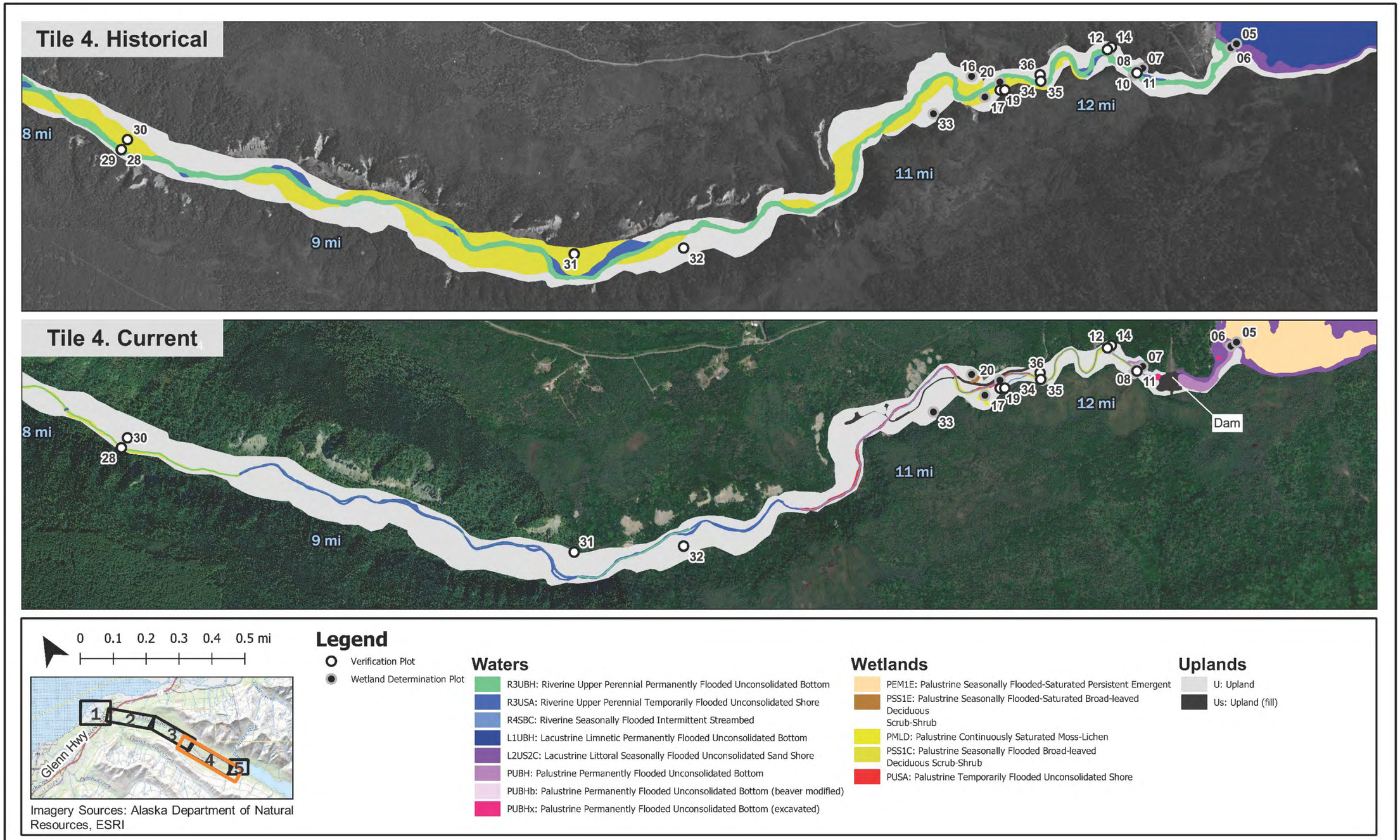
- R3UBH: Riverine Upper Perennial Permanently Flooded Unconsolidated Bottom
- R3USA: Riverine Upper Perennial Temporarily Flooded Unconsolidated Shore
- PUBHb: Palustrine Permanently Flooded Unconsolidated Bottom (beaver modified)

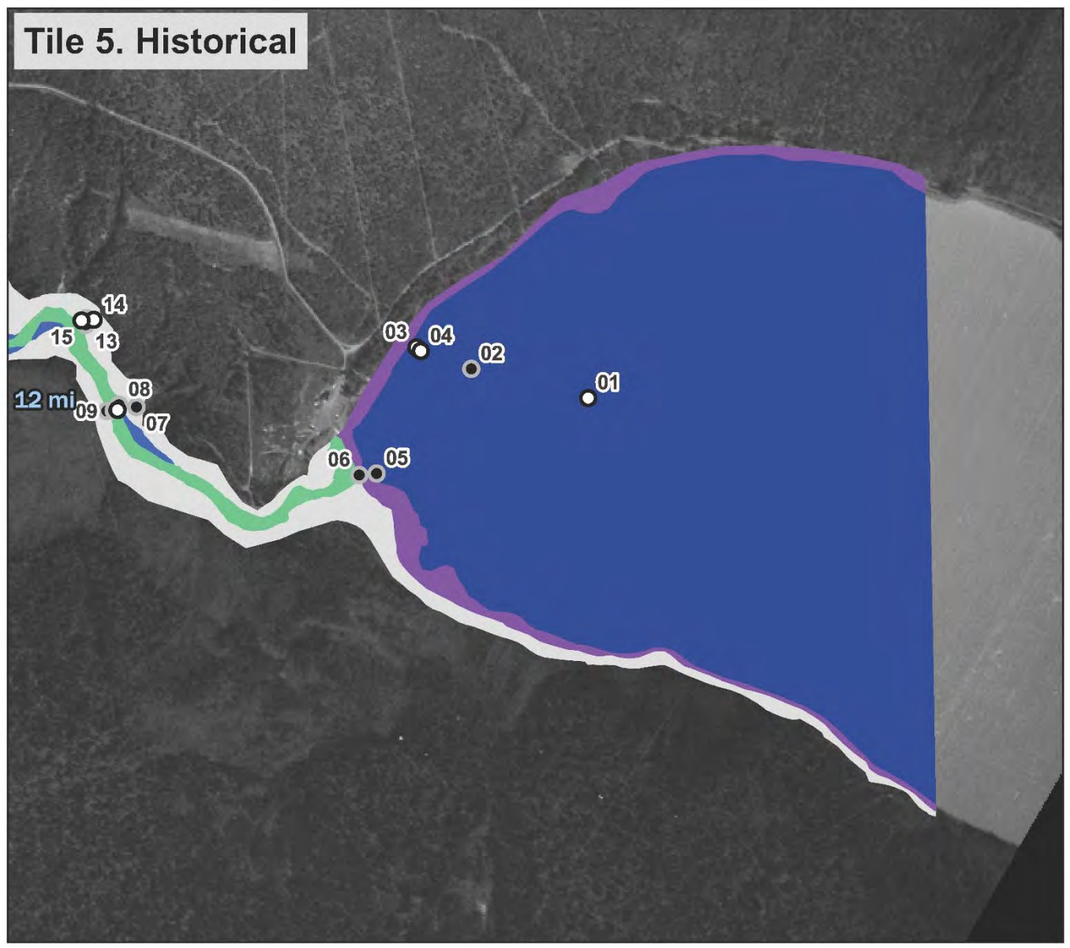
Wetlands

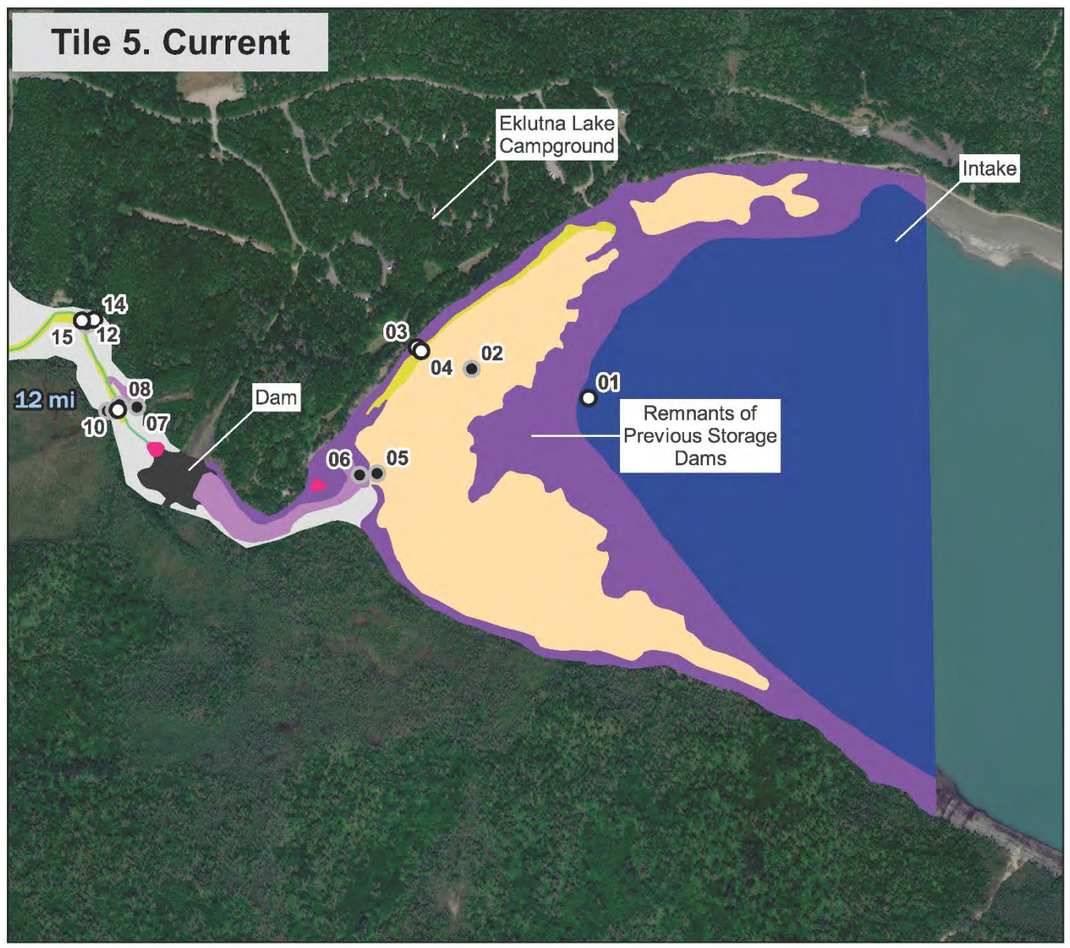
- PSS1E: Palustrine Seasonally Flooded-Saturated Broad-leaved Deciduous Scrub-Shrub
- PMLD: Palustrine Continuously Saturated Moss-Lichen
- PSS1C: Palustrine Seasonally Flooded Broad-leaved Deciduous Scrub-Shrub

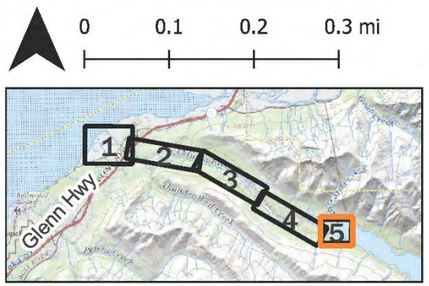
Uplands

- U: Upland


Tile 4. Historical
8 mi
9 mi
11 mi
12 mi
Tile 4. Current
Dam
Glenn Hwy
0 0.1 0.2 0.3 0.4 0.5 mi
Imagery Sources: Alaska Department of Natural Resources, ESRI
Legend
Verification Plot
Wetland Determination Plot
Waters
R3UBH: Riverine Upper Perennial Permanently Flooded Unconsolidated Bottom
R3USA: Riverine Upper Perennial Temporarily Flooded Unconsolidated Shore
R4SBC: Riverine Seasonally Flooded Intermittent Streambed
L1UBH: Lacustrine Limnetic Permanently Flooded Unconsolidated Bottom
L2US2C: Lacustrine Littoral Seasonally Flooded Unconsolidated Sand Shore
PUBH: Palustrine Permanently Flooded Unconsolidated Bottom
PUBHb: Palustrine Permanently Flooded Unconsolidated Bottom (beaver modified)
PUBHx: Palustrine Permanently Flooded Unconsolidated Bottom (excavated)
Wetlands
PEM1E: Palustrine Seasonally Flooded-Saturated Persistent Emergent
PSS1E: Palustrine Seasonally Flooded-Saturated Broad-leaved Deciduous Scrub-Shrub
PMLD: Palustrine Continuously Saturated Moss-Lichen
PSS1C: Palustrine Seasonally Flooded Broad-leaved Deciduous Scrub-Shrub
PUSA: Palustrine Temporarily Flooded Unconsolidated Shore
Uplands
U: Upland
Us: Upland (fill)







Imagery Sources: Alaska Department of Natural Resources, ESRI

0 0.1 0.2 0.3 mi

Legend

- Verification Plot
- Wetland Determination Plot

Waters

- R3UBH: Riverine Upper Perennial Permanently Flooded Unconsolidated Bottom
- R3USA: Riverine Upper Perennial Temporarily Flooded Unconsolidated Shore
- R4SBC: Riverine Seasonally Flooded Intermittent Streambed
- L1UBH: Lacustrine Limnetic Permanently Flooded Unconsolidated Bottom
- L2US2C: Lacustrine Littoral Seasonally Flooded Unconsolidated Sand Shore
- PUBH: Palustrine Permanently Flooded Unconsolidated Bottom
- PUBHb: Palustrine Permanently Flooded Unconsolidated Bottom (beaver modified)
- PUBHx: Palustrine Permanently Flooded Unconsolidated Bottom (excavated)

Wetlands

- PEM1E: Palustrine Seasonally Flooded-Saturated Persistent Emergent
- PSS1E: Palustrine Seasonally Flooded-Saturated Broad-leaved Deciduous Scrub-Shrub
- PMLD: Palustrine Continuously Saturated Moss-Lichen
- PSS1C: Palustrine Seasonally Flooded Broad-leaved Deciduous Scrub-Shrub

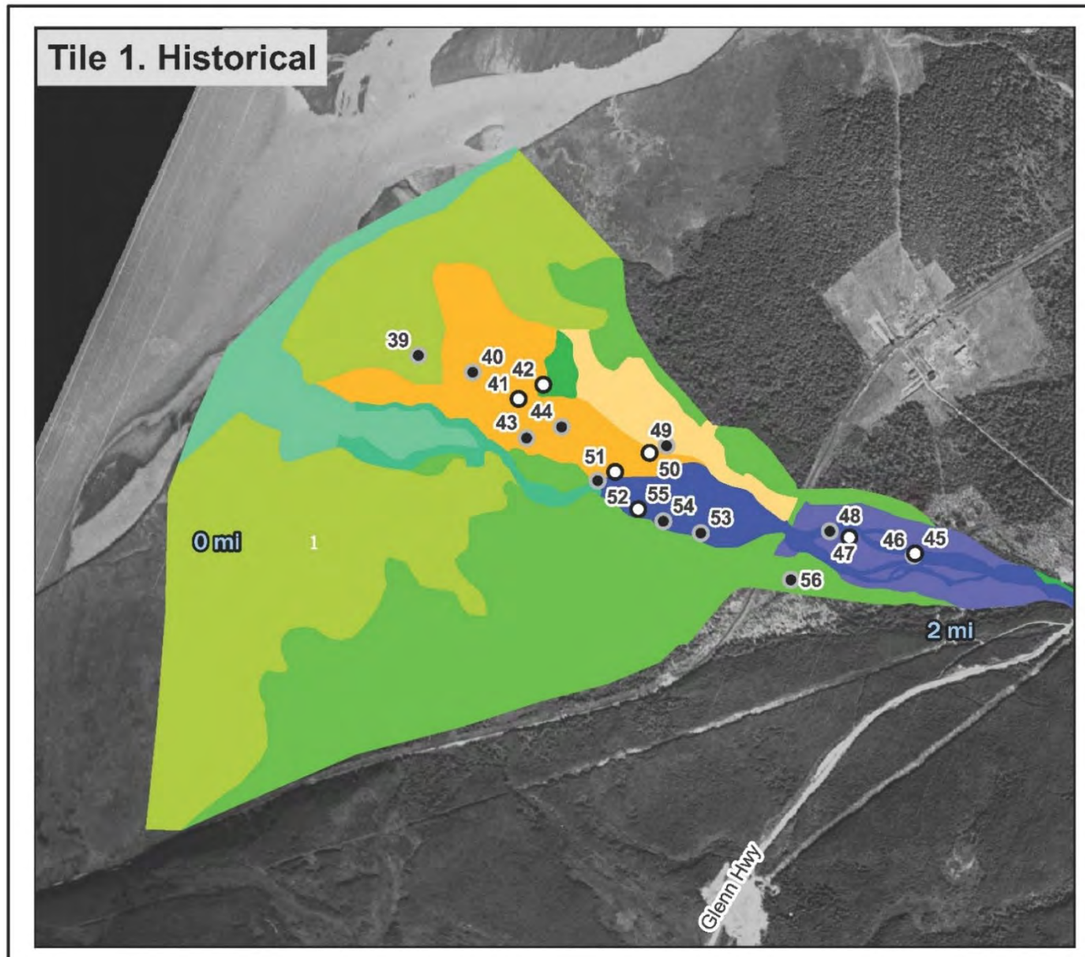
Uplands

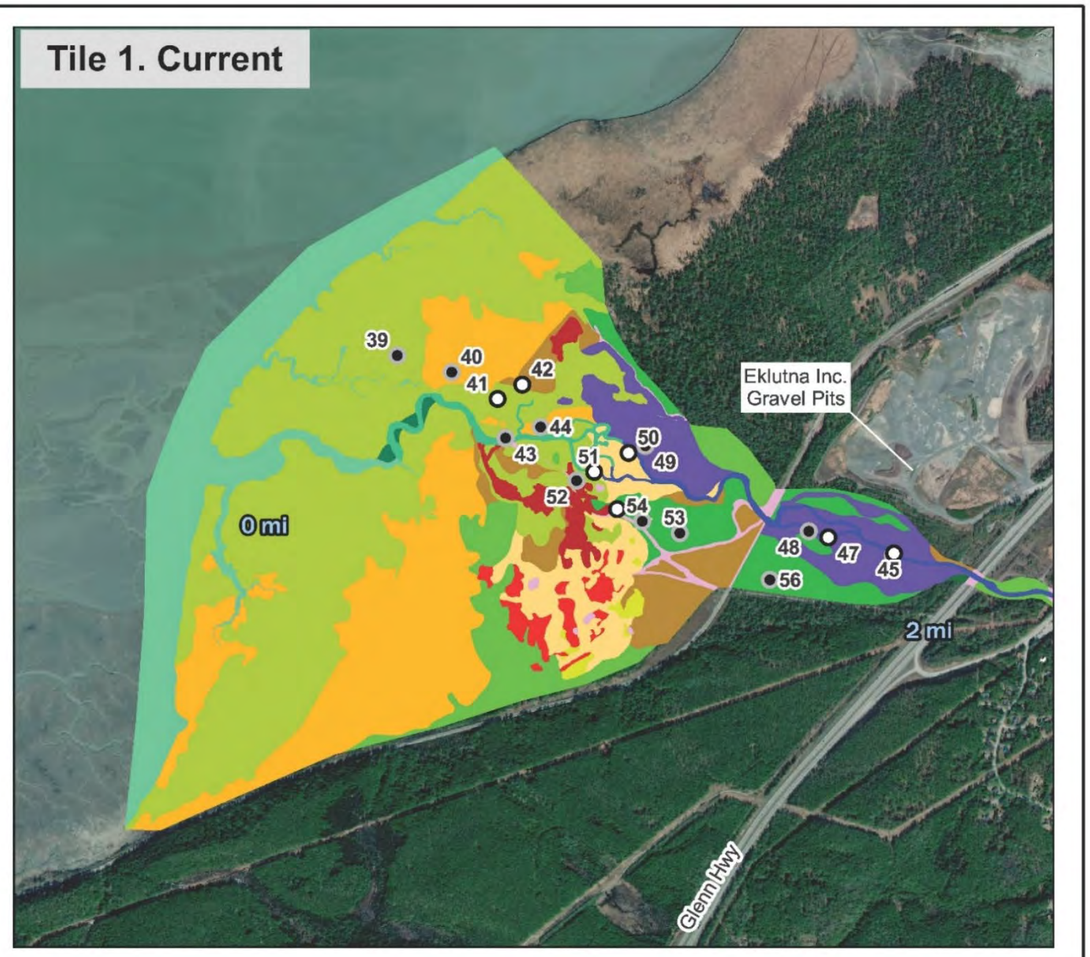
- U: Upland
- Us: Upland (fill)

Page intentionally left blank.

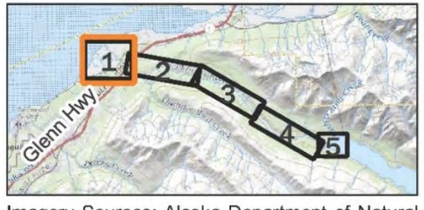
Appendix E: Wildlife habitats and wetland functional classes mapped from current (2022) and historical (1950) imagery in the Wetlands and Wildlife Habitat Study area, Eklutna Hydroelectric Project, 2022

Page intentionally left blank.





0 0.1 0.2 0.3 mi



Imagery Sources: Alaska Department of Natural Resources, ESRI

Legend

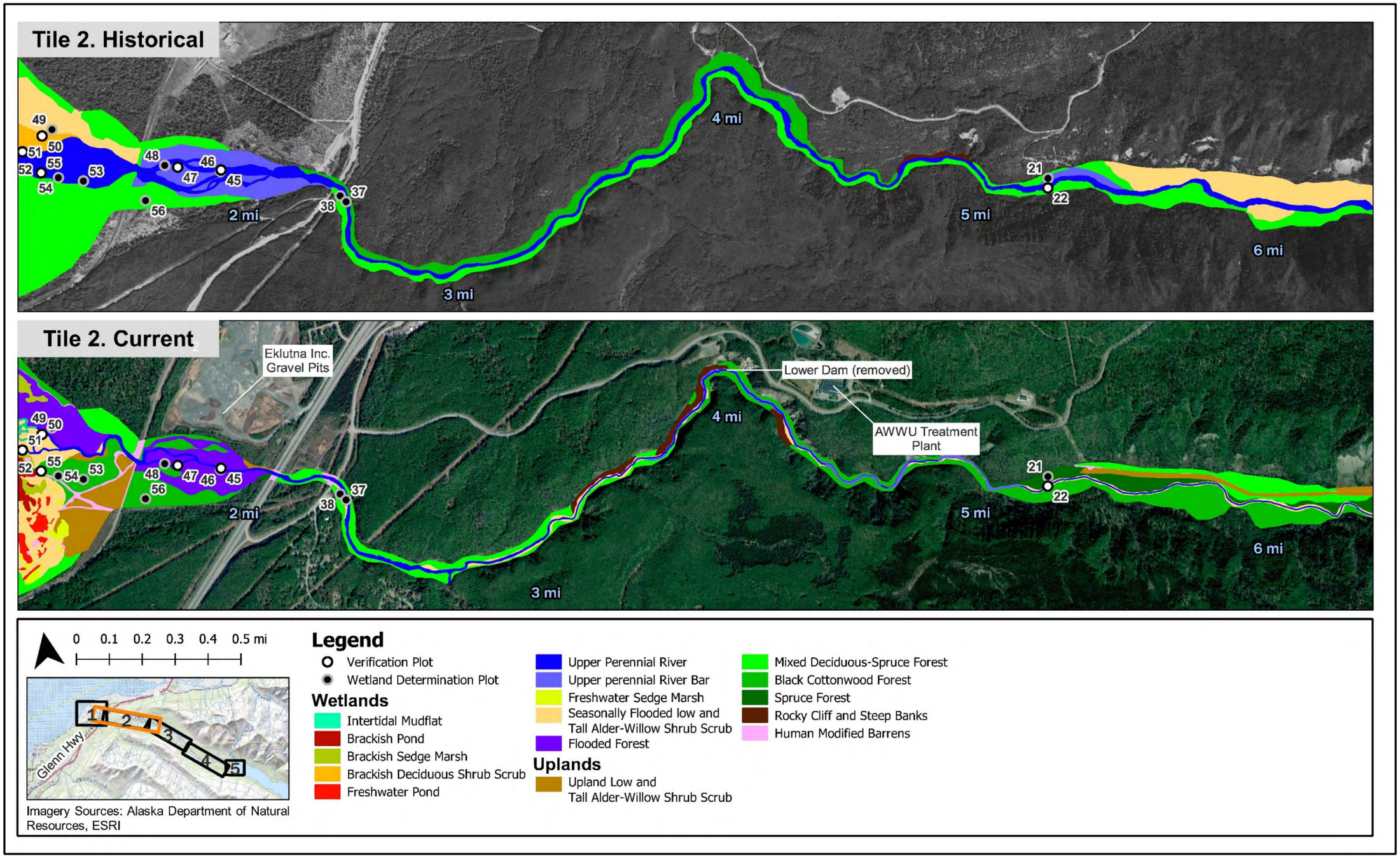
- Verification Plot
- Wetland Determination Plot

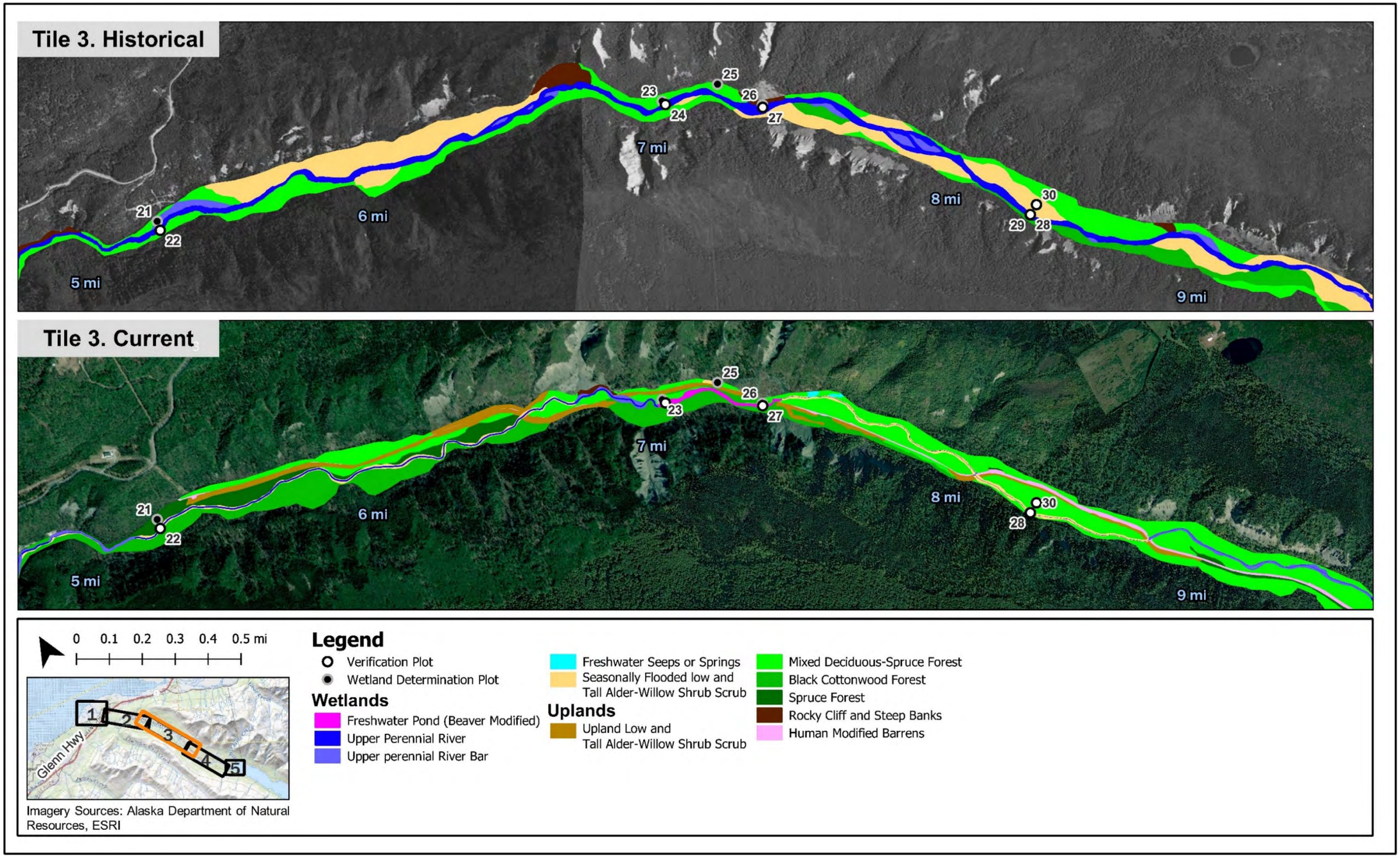
Wetlands

- Intertidal Mudflat
- Tidal River Bar
- Brackish Pond
- Brackish Sedge Marsh
- Brackish Deciduous Shrub Scrub
- Freshwater Pond
- Upper Perennial River
- Upper perennial River Bar
- Freshwater Sedge Marsh
- Seasonally Flooded low and Tall Alder-Willow Shrub Scrub
- Flooded Forest

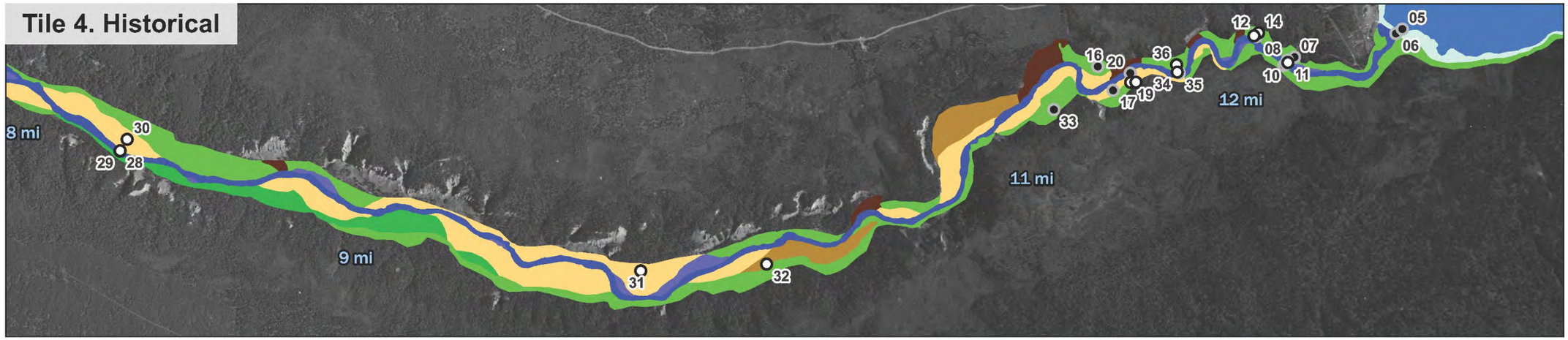
Uplands

- Upland Low and Tall Alder-Willow Shrub Scrub
- Mixed Deciduous-Spruce Forest
- Black Cottonwood Forest
- Spruce Forest
- Rocky Cliff and Steep Banks
- Human Modified Barrens


Tile 2. Historical
49
50
51
52
55
53
54
48
46
47
45
56
37
38
2 mi
3 mi
4 mi
5 mi
21
22
6 mi
Tile 2. Current
Eklutna Inc.
Gravel Pits
Lower Dam (removed)
AWWU Treatment
Plant
0 0.1 0.2 0.3 0.4 0.5 mi
Glenn Hwy
1
2
3
4
5
Imagery Sources: Alaska Department of Natural Resources, ESRI
Legend
Verification Plot
Wetland Determination Plot
Wetlands
Intertidal Mudflat
Brackish Pond
Brackish Sedge Marsh
Brackish Deciduous Shrub Scrub
Freshwater Pond
Upper Perennial River
Upper perennial River Bar
Freshwater Sedge Marsh
Seasonally Flooded low and Tall Alder-Willow Shrub Scrub
Flooded Forest
Uplands
Upland Low and Tall Alder-Willow Shrub Scrub
Mixed Deciduous-Spruce Forest
Black Cottonwood Forest
Spruce Forest
Rocky Cliff and Steep Banks
Human Modified Barrens

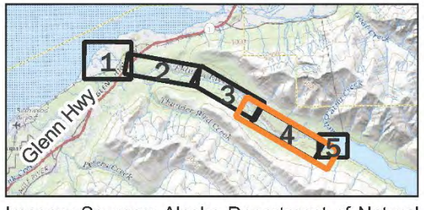

Tile 3. Historical
21
22
23
24
25
26
27
28
29
30
5 mi
6 mi
7 mi
8 mi
9 mi
Tile 3. Current
21
22
23
25
26
27
28
30
5 mi
6 mi
7 mi
8 mi
9 mi
0 0.1 0.2 0.3 0.4 0.5 mi
Glenn Hwy
1
2
3
4
5
Imagery Sources: Alaska Department of Natural Resources, ESRI
Legend
Verification Plot
Wetland Determination Plot
Wetlands
Freshwater Pond (Beaver Modified)
Upper Perennial River
Upper perennial River Bar
Freshwater Seeps or Springs
Seasonally Flooded low and Tall Alder-Willow Shrub Scrub
Uplands
Upland Low and Tall Alder-Willow Shrub Scrub
Mixed Deciduous-Spruce Forest
Black Cottonwood Forest
Spruce Forest
Rocky Cliff and Steep Banks
Human Modified Barrens

Tile 4. Historical



Tile 4. Current

0 0.1 0.2 0.3 0.4 0.5 mi



Imagery Sources: Alaska Department of Natural Resources, ESRI

Legend

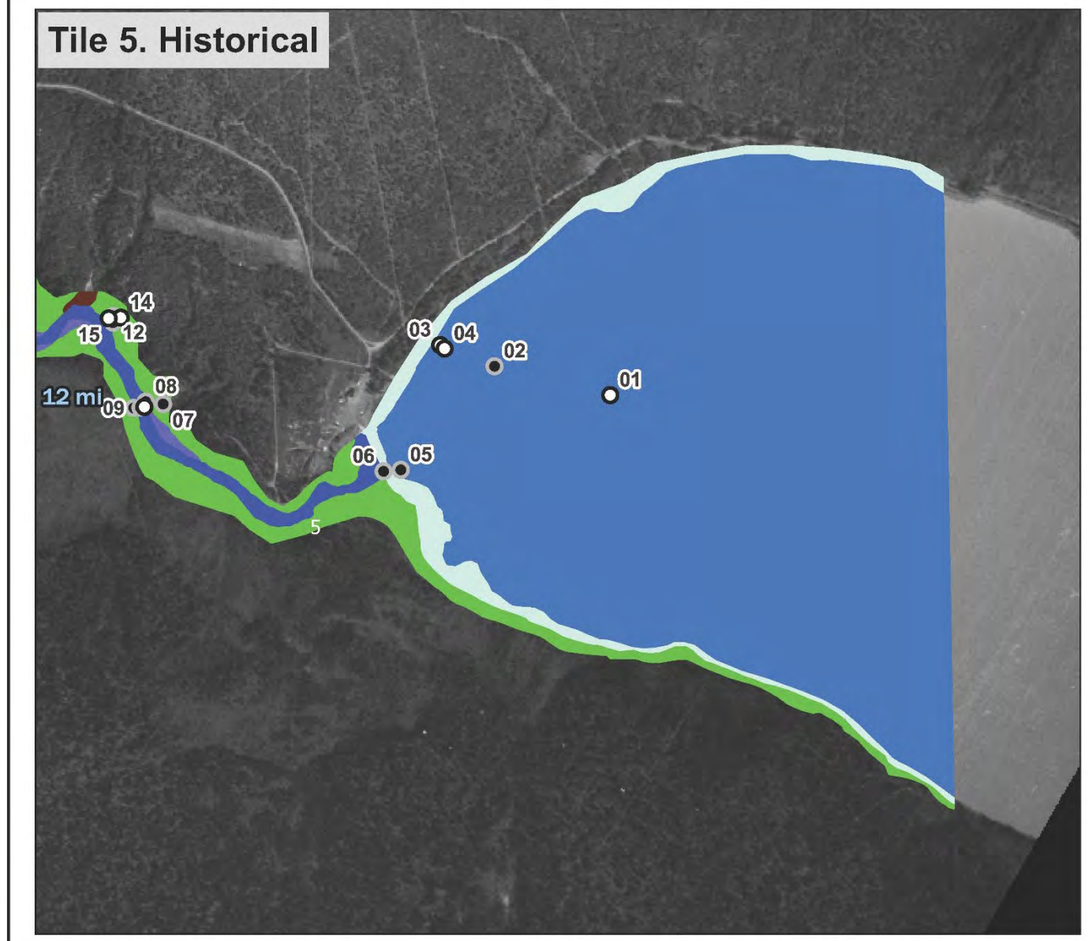
- Verification Plot
- Wetland Determination Plot

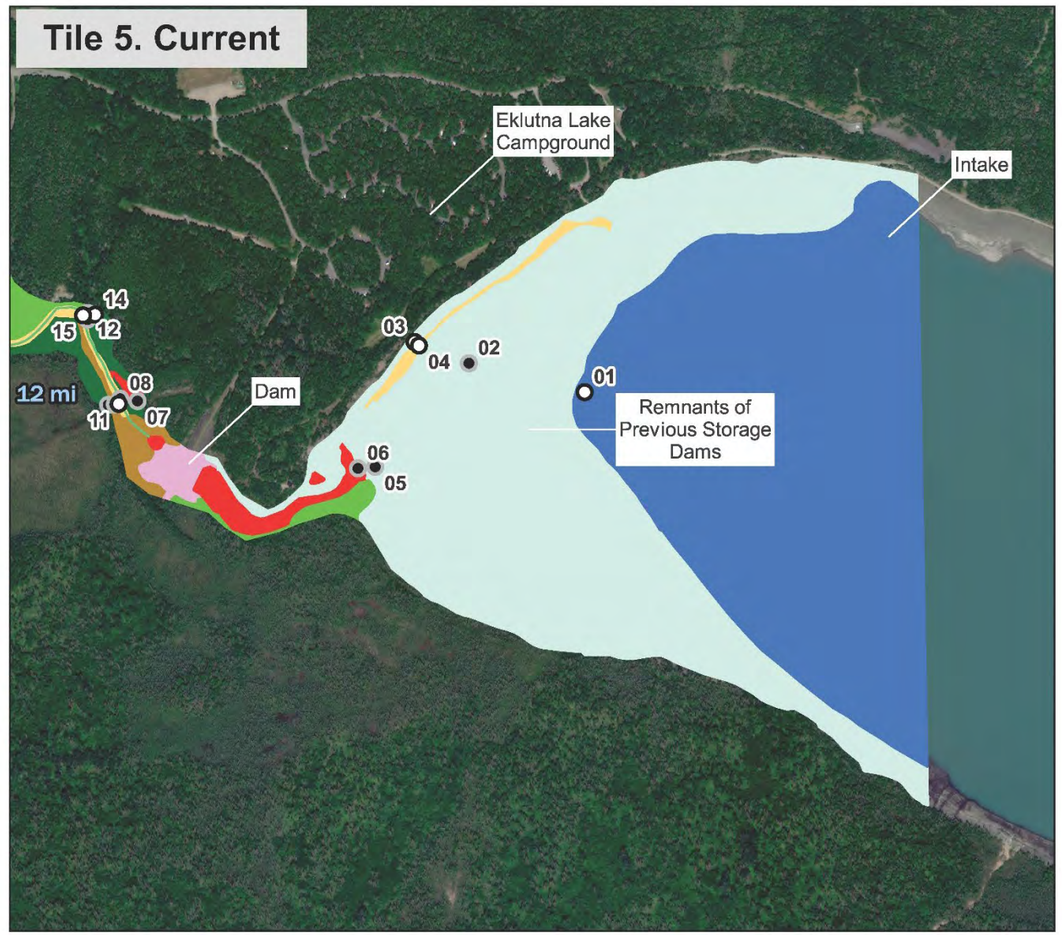
Wetlands

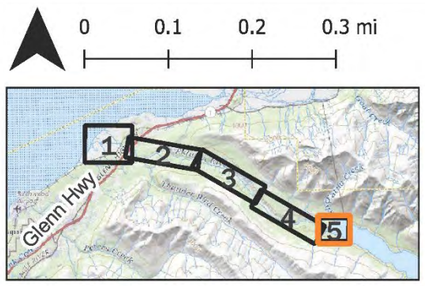
- Freshwater Lake
- Intermittently Exposed Freshwater
- Littoral Zone
- Freshwater Pond
- Freshwater Pond (Beaver Modified)
- Upper Perennial River
- Upper perennial River Bar
- Freshwater Seeps or Springs
- Intermittent Stream
- Seasonally Flooded low and Tall Alder-Willow Shrub Scrub

Uplands

- Upland Low and Tall Alder-Willow Shrub Scrub
- Mixed Deciduous-Spruce Forest
- Black Cottonwood Forest
- Spruce Forest
- Rocky Cliff and Steep Banks
- Human Modified Barrens







Imagery Sources: Alaska Department of Natural Resources, ESRI

Legend

- Verification Plot
- Wetland Determination Plot

Wetlands

- Freshwater Lake
- Intermittently Exposed Freshwater Littoral Zone
- Freshwater Pond
- Freshwater Pond (Beaver Modified)
- Upper Perennial River
- Upper perennial River Bar
- Freshwater Seeps or Springs
- Intermittent Stream
- Seasonally Flooded low and Tall Alder-Willow Shrub Scrub

Uplands

- Upland Low and Tall Alder-Willow Shrub Scrub
- Mixed Deciduous-Spruce Forest
- Black Cottonwood Forest
- Spruce Forest
- Rocky Cliff and Steep Banks
- Human Modified Barrens