Grant Lake Hydroelectric Project (FERC No. 13212)

Terrestrial Resources Study Final Report

> Prepared for Kenai Hydro, LLC

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ACRONYMS AND ABBREVIATIONS

ac	acre
ac-ft	acre-feet
ADEC	.Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish & Game
AEPIC	Alaska Exotic Plant Information Clearinghouse
AKNHP	Alaska Natural Heritage Program
ALMS	Alaska Landbird Monitoring System
BE	Biological Evaluation
BGEPA	Bald and Golden Eagle Protection Act
BMP	best management practices
CFR	Code of Federal Regulations
cfs	cubic feet per second
Corps Manual	1987 Corps of Engineers Wetland Delineation Manual
CWA	Clean Water Act
DLA	Draft License Application
DP	Wetland determination point
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
FPA	Federal Power Administration
ft	feet
GIS	Geographic Information System
GPS	Global Positioning System
in	inch
KHL	Kenai Hydro, LLC
kW	kilowatt
MBTA	Migratory Bird Treaty Act
MW	megawatt
NOI	Notice of Intent
NWI	National Wetland Inventory
NAVD 88	North American Vertical Datum of 1988
NGVD 29	National Geodetic Vertical Datum of 1929
OP	Wetland observation point
PAD	Pre-Application Document
Project	Grant Lake Hydroelectric Project (FERC No. 13212)

Regional Supplement	Alaska Regional Supplement to the Corps of Engineers Wetland
	Delineation Manual
RGL	Regulatory Guidance Letter
RNA	Research Natural Area
ROW	right-of-way
Section 404	Section 404 of the Clean Water Act
Study Plan	March 2013 Grant Lake Terrestrial Resources Study Plan
SWE	surface water elevation
TLP	Traditional Licensing Process
USACE	U.S. Army Corps of Engineers
USFS	U.S. Forest Service
USGS	U.S. Geological Survey
USFWS	U.S. Fish & Wildlife Service

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1 INTRODUCTION

On August 6, 2009, Kenai Hydro, LLC (KHL) filed a Pre-Application Document (PAD; KHL 2009), along with a Notice of Intent (NOI) to file an application for original license, for a combined Grant Lake/Falls Creek Project (Federal Energy Regulatory Commission [FERC] No. 13211/13212 ["Project" or "Grant Lake Project"]) under Part I of the Federal Power Act (FPA). On September 15, 2009, FERC approved the use of the Traditional Licensing Process (TLP) for development of the License Application and supporting materials. As described in more detail below, the Project has been modified to eliminate the diversion of water from Falls Creek to Grant Lake.

The Project will be located near the community of Moose Pass, Alaska, in the Kenai Peninsula Borough, approximately 25 miles north of Seward, Alaska, and just east of the Seward Highway (State Route 9). Figure 1.0-1 provides a general vicinity map for the Project.

The Terrestrial Resources Study Report presents the results of the 2013 Project analysis conducted in accordance with the approved March 2013 Grant Lake Terrestrial Resources Study Plan (Study Plan; KHL 2013). This report builds upon previous Project-related reports (Ebasco 1984, HDR 2011, and KHL 2011) and presents a summary of existing information relative to the scope and context of potential effects of the Project. Specifically, this report describes the 2013 study results of the five primary terrestrial study components outlined in the Study Plan: 1) General Vegetation Type Mapping; 2) Sensitive Plant Survey; 3) Invasive Plant Survey; 4) Wetland and Waters Mapping; and 5) Wildlife Resources. The Study Plan also included provisions for Timber Resources assessment; however, given the probability that project design and operation could eliminate any impact to the timber resource and that an existing timber assessment currently exists, this assessment was not conducted at this time and is therefore not included in this report.

The Terrestrial Resources Study Report is organized in the following manner: Section 1 provides an introduction to the Terrestrial Resource Study component of the Project and a general description of the proposed Project; Section 2 reviews the overarching goals of the Terrestrial Resources Studies; Section 3 is a focused review of the objectives, methods, results, conclusions, and variances of the 2013 Botanical Resources, Invasive Species, and Sensitive Plant Species Study; Section 4 is a focused review of the objectives, methods, results, conclusions, and variances of the 2013 Wetland and Waters Study; and Section 5 is a focused review of the objectives, methods, results, conclusions, and variances of the 2013 Wetland and Waters Study; and Section 5 is a focused review of the objectives, methods, results, conclusions, and variances of the 2013 Wetland and Waters Study; and Section 5 is a focused review of the objectives, methods, results, conclusions, and variances of the 2013 Wetland and Waters Study; and Section 5 is a focused review of the objectives, methods, results, conclusions, and variances of the 2013 Wetland and Waters Study; and Section 5 is a focused review of the objectives, methods, results, conclusions, and variances of the 2013 Wildlife Resources Study.

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1.1. Proposed Project Description

The Project is located near the community of Moose Pass, (population of 206), approximately 25 miles north of Seward and just east of the Seward Highway. This highway connects Anchorage to Seward. The Alaska Railroad parallels the route of the Seward Highway, and is also adjacent to the Project area. The town of Cooper Landing is located 24 miles to the northwest and is accessible via the Sterling Highway (State Route 1), which connects to the Seward Highway approximately 10 miles northwest of Moose Pass.

The Project lies within Section 13 of Township 4 North, Range 1 West; Sections 1, 2, 5, 6, 7, and 18 of Township 4 North, Range 1 East; and Sections 27, 28, 29, 31, 32, 33, 34, 35, and 36 of Township 5 North, Range 1 East, Seward Meridian (U.S. Geological Survey [USGS] Seward B-6 and B-7 Quadrangles).

The Project would be composed of an intake structure at the outlet to Grant Lake, a tunnel, a surge tank, a penstock, and a powerhouse. It would also include a tailrace detention pond, a switchyard with disconnect switch and step-up transformer, and an overhead or underground transmission line. The preferred alternative would use approximately 15,900 acre-feet of water storage during operations between pool elevations of approximately 692 and up to 705 feet North American Vertical Datum of 1988 (NAVD 88)¹. Note that the previous PAD (KHL 2009) included diverting water from Falls Creek into Grant Lake to provide additional flows and power generation at the Grant Creek powerhouse. The Falls Creek diversion has been removed from the Project proposal.

An intake structure would be constructed approximately 500 feet east of the natural outlet of Grant Lake. An approximate 3,200-foot-long, 10-foot diameter horseshoe tunnel would convey water from the intake to directly above the powerhouse at about elevation 628 feet NAVD 88. At the outlet to the tunnel, a 360-foot-long section of penstock will convey water to the powerhouse located at about elevation 531 feet NAVD 88. An off-stream detention pond will be created to provide a storage reservoir for flows generated during the rare instance when the units being used for emergency spinning reserve are needed to provide full load at maximum ramping rates. The tailrace would be located in order to minimize impacts to fish habitat by returning flows to Grant Creek upstream of the most productive fish habitat.

Two concepts are currently being evaluated for water control at the outlet of Grant Lake. The first option would consist of a natural lake outlet that would provide control of flows out of Grant Lake. A new low-level outlet would be constructed on the south side of the natural outlet to release any required environmental flows when the lake is drawdown below the natural outlet level. The outlet works would consist of a 48-inch diameter pipe extending back into Grant Lake, a gate house, regulating gate, controls and associated monitoring equipment. The outlet would discharge into Grant Creek immediately below the natural lake outlet.

¹ The elevations provided in previous licensing and source documents are referenced to feet mean sea level in NGVD 29 [National Geodetic Vertical Datum of 1929] datum, a historical survey datum. The elevations presented in the Grant Lake natural resources study reports are referenced to feet NAVD 88 datum, which results in an approximate +5-foot conversion to the NGVD 29 elevation values.

In the second option, a concrete gravity diversion structure would be constructed near the outlet of Grant Lake. The gravity diversion structure would raise the pool level by a maximum height of approximately 2 feet (from 703 to 705 feet NAVD 88), and the structure would have an overall width of approximately 120 feet. The center 60 feet of the structure would have an uncontrolled spillway section with a crest elevation at approximately 705 feet NAVD 88. Similar to the first option, a low-level outlet would be constructed on the south side of the natural outlet to release any required environmental flows when the lake is drawn down below the natural outlet level. The outlet works would consist of a 48-inch diameter pipe extending back into Grant Lake, a gate house, a regulating gate, controls, and associated monitoring equipment. The outlet would discharge into Grant Creek immediately below the diversion structure. Figure 1.1-1 illustrates the Project infrastructure and features.

Figure 1.1-2 displays the global natural resources study area for the efforts undertaken in 2013 and 2014. Further discussions related to specifics of the aforementioned Project infrastructure along with the need and/or feasibility of the diversion dam will take place with stakeholders in 2014 concurrent with the engineering feasibility work for the Project. Refined Project design information will be detailed in both the Draft License Application (DLA) and any other ancillary engineering documents related to Project development. The current design includes two Francis turbine generators with a combined rated capacity of approximately 5.0 megawatts (MW) with a total design flow of 385 cubic feet per second. Additional information about the Project can be found on the Project website: http://www.kenaihydro.com/index.php.





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1.2. Terrestrial Resources Study Area

In general, from west to east, the Terrestrial Resources Study area extends from east of the Seward Highway and Alaska Railroad adjacent to Moose Pass, to just past the eastern shoreline of Grant Lake. From south to north, the study area extends south along the highway to just south of Grant Creek and north to just beyond the north shoreline of Grant Lake (see Figure 1.0-1).

Grant Lake is located approximately 1.5 miles southeast from Moose Pass in the steep mountainous terrain that rises above the community. It has a maximum depth of nearly 300 feet and surface area of 2.6 square miles (Ebasco 1984). Grant Lake's total drainage area is approximately 44 square miles. Tributaries include Inlet Creek at the headwaters and numerous glacial-fed streams and drainages that run down the steep mountain slopes to Grant Lake. The slopes are heavily vegetated with deciduous and coniferous forest communities that end abruptly at the lakeshore (approximately 700 feet NAVD 88). The lake is ringed by mountains of the Kenai Mountain Range to the east, north, and south, with elevations ranging from 4,500 to 5,500 feet NAVD 88.

Grant Lake's only outlet, Grant Creek, runs west approximately 1 mile from the south end of Grant Lake to drain into the narrows between Upper Trail and Lower Trail lakes. Trail River drains Lower Trail Lake, which subsequently flows into Kenai Lake. Kenai Lake drains to the Kenai River at its west end near Cooper Landing (Ebasco 1984). Grant Creek has a mean annual flow of 193 cfs and is 5,180 feet long with an average gradient of 207 feet/mile; its substrate includes cobble and boulder alluvial deposits and gravel shoals (Ebasco 1984). The stream is 25 feet wide on average. In its upper half, the stream passes through a rocky gorge with three substantial waterfalls; in its lower half, the stream becomes less turbulent as it passes over gravel shoals and diminishing boulder substrate (Ebasco 1984). A thick coniferous and deciduous mixed forest flanks the north and south side of Grant Creek. Depressional wetlands and several ponds are interspersed throughout the forest on the south side of the Project area. Several intermittent/ephemeral drainages run down the steep slopes above the upper portion of Grant Creek and contribute to seasonal flow volumes.

The terrestrial resources were evaluated with respects to each resource's potential nexus to the Project features described above and the Project's potential influence on Grant Lake and Grant Creek. Figure 1.1-2 illustrates the Terrestrial Resources Study area which captures all of the Project features described in Section 1.1 above, including Grant Lake. The Terrestrial Resources Study area includes the area determined to conservatively capture the spatial limits of potential direct and indirect impacts to the five resource disciplines evaluated in this report. Within this collective Terrestrial Resources Study area, each resource discipline has its own focused assessment area which are presented in Section 3, Terrestrial Vegetation; Section 4, Wetlands and Waters; and Section 5, Wildlife Resources.



In addition to Figure 1.1-2, Photos 1 through 6 show Project area features and locations.

Photo 1. Inlet Creek entering Grant Lake. Photo taken at east end of lake, looking west.



Photo 2. Inlet Creek entering Grant Lake. Photo taken at southeast corner of Grant Lake, looking northeast.



Photo 3. Grant Lake outlet and the uppermost portion of Grant Creek, looking downstream towards the west.



Photo 4. Representative photo of the canyon reach of upper Grant Creek. Photo taken on the south side of Grant Creek looking upstream.



Photo 5. Representative photo of lower Grant Creek near Trail Lake confluence. Photo taken on the north side of Grant Creek looking upstream.



Photo 6. Representative photo of a depressional wetland located on the south side of Grant Creek.

2 STUDY OBJECTIVES

The Terrestrial Resources Study was developed with the goal of providing supporting information for assessment of potential resource impacts of the Project. Impacts were identified during compilation of the PAD (KHL 2009), public comment, FERC scoping for the License Application, and consideration of subsequent changes to Project design to address stakeholder concerns. Study goals were then developed based on the potential impacts identified and the need for additional information gathering.

The following study goals were identified in the Study Plan:

- Assess the impact of Project construction and operation on wildlife distribution and abundance.
- Assess the impact of Project construction and operation on wildlife during critical life stages.
- Assess the impact of Project construction and operation (lake level fluctuations) on Grant Lake shoreline vegetation and/or habitats used by wildlife species.
- Assess the impact of Project construction and operation (lake level fluctuations and Project roads and facilities) on distribution and abundance of invasive plant species.
- Assess the impact of Project construction and operation (lake level fluctuations and Project facilities) on distribution and abundance of rare plant species.
- Assess the impact of Project construction and operation on breeding and rearing habitat and nesting success of waterbirds on Grant Lake and Inlet Creek.
- Assess the impact of Project construction and operation (road/transmission corridor, facilities, and lake level fluctuations at the lake inlet) on wetlands and waters.
- Assess the impact of Project construction and operation on wildlife use of wetland, riparian, and littoral habitats.
- Assess the impact of Project construction and operation on wildlife movement across the bench between Grant, Upper Trail, and Lower Trail lakes.
- Assess the impact of Project transmission lines (if not buried in the road grade) on bird populations (potential collision deaths).

In order to achieve these overall objectives, the Study Plan outlined a more refined set of objectives for the individual study components of the botanical resources and wildlife resources. The refined objectives for the botanical resources are listed below, and organized by the four botanical study components: Vegetation Type Mapping, Sensitive Plant Survey, Invasive Plant Survey, and Wetland and Waters Mapping.

- The objective of the *Vegetation Type Mapping* was to refine the existing vegetation type map of the Project vicinity using existing GIS layers, existing aerial photography, and available satellite imagery.
- The objective of the *Sensitive Plant Survey* was to satisfy U.S. Department of Agriculture, Forest Service (USFS) requirements for a Biological Evaluation (BE) of plants on lands under its jurisdiction.
- The objective of the *Invasive Plant Survey* was to locate and document populations of invasive plants in areas potentially affected by Project construction and operation.

• The objective of the *Wetlands and Waters Mapping* was to identify and describe the wetlands and other waters of the U.S. that will be potentially impacted by the Project. This objective was further refined after the Study Plan was finalized to include an assessment of potential secondary impacts to wetlands and waters that may be affected by fluctuating lake levels and an altered Grant Creek flow regime.

The refined objectives for the wildlife resources were as follows, organized by the four Wildlife Study components: Raptor Nesting, Breeding Landbirds and Shorebirds, Winter Waterbirds, and Terrestrial Mammal surveys.

- The primary objective of the *Raptor Survey* was to determine the distribution, abundance, and nesting status of large diurnal raptors near the Project area. The survey effort focused on protected, sensitive, or high-profile species such as bald and golden eagles, northern goshawks, and ospreys. Tree and cliff-nesting raptor nest locations will be identified and mapped; a list of raptor species nesting in the Project vicinity will be compiled; and the potential Project effects and potential impact minimization strategies will be assessed. Raptor Survey data was collected in 2010 and 2013. Note, however, that the 2013 Raptor Survey focused on northern goshawks only. An additional Goshawk Survey is planned for 2014.
- The objective of the *Breeding Landbird and Shorebird Study* was to collect baseline data on breeding landbirds and shorebirds near the Project area. More specifically, the objectives of this study were to assess landbird and shorebird species use of the study area during the breeding season, qualitatively determine the occurrence and estimate the numbers of landbird and shorebird species of conservation concern that occur in the study area, estimate the relative abundance and distribution of breeding landbirds and shorebirds. Breeding landbird and shorebird survey data was collected in 2010 and 2013. The 2013 study focused on collecting additional data for landbirds only.
- The purpose of the *Waterbird Study* was to allow determination of the effects of fluctuation and flow changes on waterbird nesting habitat on Grant Lake and Grant Creek and to determine if winter waterbird habitat is present on Grant Lake. The specific objectives for this study component were to describe species composition of waterbirds using Grant Lake and Grant Creek during breeding season, determine locations of nesting areas for waterbirds to allow determination of effects of potential water level fluctuations on nesting habitat, determine the occurrence and numbers of waterbird species of conservation concern that occur in the study area, and determine winter use by waterbirds in open water habitat of Grant Lake. Waterbird survey data was collected in 2010 and 2013. The 2013 study focused on the collecting additional data for winter waterbird habitat on Grant Lake only. An additional winter Waterbird Survey is planned for 2014.
- The *Terrestrial Mammal Survey* includes an assessment of potential Project effects on the distribution and population of black and brown bears, moose, mountain goats, Dall sheep, and bats. Note that the 2013 study effort focused on winter surveys of moose distribution only. An additional winter Moose Survey is planned for 2014. The remaining terrestrial mammal data relies on information gathered during previous field studies conducted in 2010.

3 BOTANTICAL RESOURCES: TERRESTRIAL VEGETATION, INVASIVE PLANTS, AND SENSITIVE PLANTS

This section provides a description of general upland vegetation types, their distribution within the Project area, and descriptions of the occurrence of sensitive and invasive plant species in the Project area.

3.1. Study Area

The study areas for the general upland vegetation survey, invasive plant survey, and sensitive plant survey are different from each other and are described below.

3.1.1. General Vegetation Type Survey

The study area for the general vegetation mapping survey was based on the nexus to Project effects, and includes the Project boundary and all Project facilities, as well as the outer extent of the assessment areas for the wildlife, wetland, sensitive plants, and invasive plants surveys (see Figure 3.1-1). Around Grant Lake, the general vegetation mapping survey area includes all areas up to an elevation of 733 feet NAVD 88. The description of upland vegetation types is found in this section, as opposed to the description of wetland vegetation types, which is found in Section 4, Wetlands and Other Waters of the U.S.

3.1.2. Invasive Plant Survey

The study area for the invasive plant survey (see Figure 3.1-2) includes:

- USFS, private, and State lands in the Project area;
- 5 vertical feet above Grant Lake normal maximum elevation of 703 feet NAVD 88,
- A 50-foot buffer along the road and transmission line,
- A 100-foot buffer around all other Project features.

3.1.3. Sensitive Plant Survey

The study area for the sensitive plant survey was limited to USFS lands within the study area (see Figure 3.1-3), and includes:

- 5 vertical feet above Grant Lake normal maximum elevation of 703 feet NAVD 88,
- A 50-foot buffer along the road and transmission line,
- A 100-foot buffer around all other Project features.

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3.2. Methods

The methods used to conduct the general vegetation mapping study, the sensitive plant survey, and the invasive plant survey are described in the Study Plan. Methods for each survey are summarized below.

3.2.1. General Vegetation

The methods used to map and describe upland vegetation types in the study area involved a combination of field observation, ground truthing the existing vegetation cover type maps, and aerial photo interpretation. The following vegetation classification systems were used to update vegetation types: NatureServe 2008, DeVelice et al. 1999, and Viereck et al. 1992. Existing Geographic Information System (GIS) vegetation cover type layers and existing aerial photographs were acquired from available sources. Vegetation boundaries in aerial photos or other imagery were used to update vegetation type polygon boundaries in the study area. A final vegetation type map that displays vegetation type polygon boundaries, the study area, and specific Project components and impact areas was produced. The vegetation type map was used to produce a table of vegetation types and to calculate the total acres and percentages of each vegetation type present in the study area.

3.2.2. Invasive Plant Survey

The following methods and activities were performed to document the presence of invasive plants in the study area. For the purposes of this study, invasive plants are those not considered native to Alaska. Existing information on nearby known locations of invasive vascular plants was compiled and reviewed. Previous data collection points in GIS databases from prior studies were identified. When invasive species were identified in the field, the location was recorded with a Global Positioning System (GPS) unit. When large populations of a particular species were found, only one data point was recorded to represent the general area of infestation. If a particular species was found at many sites close to one another, only one data point was recorded. At least one data point for each unique invasive plant species that was encountered was recorded.

The Alaska Exotic Plants Information Clearinghouse (AKEPIC) field form is recommended for use by AKEPIC and the USFS for invasive plant surveys on USFS land. When invasive plant species were located, GPS location information, data, observers, observer affiliation, detailed site information, detailed location information and specific species information were recorded. In addition, completed field form copies were submitted to AKEPIC for the statewide database record.

3.2.3. Sensitive Plant Survey

The study methods for the sensitive plant survey are based on the Procedures for Sensitive Plant Biological Evaluations (Stensvold 2002). As referenced throughout the Study Plan, sensitive plants are plant species formally identified by Region 10 of the USFS (Goldstein et al. 2009). Prior to field surveys, a pre-field review of the study area was prepared (Beck 2013). A total of 17 plant species and 1 lichen species have been designated as Sensitive on the Alaska Regional Forester's list (see Appendix 1a, Table A.1a-1, Alaska Region sensitive plants, February 2011); 13 of these are known or suspected to occur on the Chugach National Forest. No species on the Alaska Region Sensitive Plant list have been documented previously in or near the study area, although two species have been documented previously in the Seward Ranger District. The potential presence of federally listed threatened or endangered plant species in the study area was reviewed.

Habitat information in the study area was assessed based on information obtained from GIS, reviews of aerial photographs and discussion with resource specialists. Habitat types potentially occurring in the study area include: coniferous forest, deciduous forest, mixed conifer/deciduous forest, forest edge, tall shrublands, rocky areas, rock outcrops, cliffs, gravel, scree, talus, seeps, wet areas, riparian areas, streambanks, waterfalls, lake margins, shallow freshwater marshes, sphagnum bogs, fens, and heaths. Based on the variety of habitats present, it was determined that eight of the sensitive species on the Alaska Region Sensitive Plant List have a reasonable potential to occur in the analysis area.

Of the species with habitats similar to those present within the Project area, only one of these species, pale poppy, had been documented previously on the Seward Ranger District. The Seward Ranger District is also within the potential range of an additional six species that are suspected to occur on the District. Table 3.2-1 summarizes the general habitat requirements of the plant species that have habitats potentially present within the study area that are either known to occur or suspected to occur on the Seward Ranger District.

Scientific Name	Common Name	Presence ¹	Habitat ²
Aphragmus eschscholtzianus	Eschscholtz's little nightmare	Known	Alpine and subalpine heath meadows; wet rocky or mossy seeps
Botrychium tunux	Moosewort fern	Suspected	Well-drained sandy beaches and alpine sites
Botrychium yaaxudakeit	Moonwort fern	Suspected	Well drained open meadows, upper beach meadows, coastal dunes
Cypripedium guttatum	Spotted lady's slipper	Suspected	Open forest, tall shrublands, wet meadows
Ligusticum calderi	Calder's lovage	Suspected	Limestone, wet to moist sites in the subalpine and alpine, rock habitats, meadows, forest edges
Papaver alboroseum	Pale poppy	Known	Open areas, areas with sandy, gravelly, well-drained soils, mesic to dry alpine, recently deglaciated areas.
Piperia unalascensis	Alaska rein orchid	Suspected	Dry open sites, tall shrub in riparian zones, mesic meadows, dry forests, low elevation to subalpine
Romanzoffia unalaschensis	Unalaska mist-maid	Suspected	Rock outcrop ledges and crevices, gravelly stream sides, beach terraces

Table 3.2-1. Know	n or suspected	sensitive	plants in	the Seward	Ranger District
1 abit 3.2-1. Know	n or suspected	sensitive	plants in	ine beward	Ranger District.

Notes:

1. Known = known to occur in the Seward Ranger District;

Suspected = suspected to occur in the Seward Ranger District.

2. Habitat descriptions are taken from Goldstein et al. 2009.
Field surveys for sensitive plants included the USFS-owned portions of the Grant Lake shoreline. There are no Project components on USFS land. A variety of habitat types and aspects were surveyed. Surveys on the lake were primarily done with a boat traveling close to the shore because steep terrain and dense vegetation restricted the ability for much of the shoreline to be surveyed on foot. Sections of the shoreline were walked where slope and vegetation density allowed.

Level 5 intuitive controlled surveys for sensitive plants were conducted in the study area. Refer to USFS Survey Intensity Levels for Plants, found in Appendix 1b, for a general description of survey intensity levels for plants. This survey type involves identifying suitable habitat for targeted species and then focusing the survey effort within those identified habitats. Field surveys were conducted at an appropriate time of year to identify targeted species.

A Biological Evaluation (BE) will be prepared for plants in the study area (lands under USFS jurisdiction) with the baseline information collected during the sensitive plant survey.

3.3. Results

Field surveys were conducted in the general upland vegetation mapping, invasive plant, and sensitive plant study areas from July 18 to July 24, 2013. The Grant Lake water level elevation was estimated to be between 698 and 699 feet NAVD 88 at the time of the survey. Results of the General Vegetation, Invasive Plant, and Sensitive Plant surveys are provided below.

3.3.1. General Vegetation

Upland vegetation types within the general vegetation study area were delineated and refined using aerial photograph imagery obtained from the Chugach National Forest dating from between 1996 and 2004 (see Figure 3.3-1). In addition, upland vegetation types were ground truthed in the field. Figure 3.3-2 through Figure 3.3-6 are more detailed maps of the upland vegetation in the study area. Wetland vegetation types are discussed in detail in Section 4, Wetlands and Other Waters of the U.S. The 570.5-acre study area contains a total of 5 upland vegetation types, including Coniferous Forest, Coniferous-Deciduous Forest, Alder Scrub, Grass-Forb Meadow, and Floodplain Forest and Scrub. The 2013 upland vegetation types, total acres, percentages of the total study area, and their corresponding NatureServe ecological systems (NatureServe 2008) are presented in Table 3.3-1. Each of the 2013 vegetation types is widespread in the region. The characteristics and general distribution of the 2013 upland vegetation types are described below.

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2013 Vegetation Type	Acres ¹	Percent	NatureServe Ecological System
			Alaska Sub-boreal White-Lutz Spruce Forest and Woodland - CES 105 102 Alaskan Pacific Maritime Mountain Hemlock
Coniferous Forest	173.7	30.5%	Forest - CES 204.142, Alaska Sub-boreal Mountain Hemlock- White Spruce Forest - CES 204.103
Coniferous- Deciduous Forest	177.1	31.0%	Alaska Sub-boreal White Spruce-Hardwood Forest - CES 105.136
Alder Scrub	34.5	6.0%	Alaska Sub-boreal Avalanche Slope Shrubland - CES 105.111
Grass-Forb Meadow	2.2	0.4%	Western North American Sub-boreal Mesic Bluejoint Meadow - CES 105.114
Floodplain Forest and Scrub	106.0	18.6%	Western North American Boreal Montane Floodplain Forest and Shrubland - CES 105.141
			WNAB Montane Floodplain Forest and Shrubland – CES 105.141, WNAB Riparian Stringer Forest and Shrubland – CES 104.144, WNAB Deciduous Shrub Swamp – CES.122, WNAB Low Shrub Peatland – CES 105.140, WNAB Freshwater Aquatic Bed – CES 105.125, WNAB Freshwater Emergent Marsh – CES
Wetlands	77.1	13.5%	105.123, WNAB Wet Meadow – CES 105.124
Total	570.5	100.0%	

Table 3.3-1. 2013 upland vegetation types, acres, percentages, and NatureServe Ecological Systems.

Notes:

1. Differences in wetland acreages presented in Table 3.3-1 and Tables 4.3-1 and 4.3-2 are due to rounding errors

3.3.1.1. Coniferous Forest

Coniferous Forest is a common vegetation type in the study area, occurring on 173.7 acres, and comprising 30.5 percent of the vegetated area. In the study area, this vegetation type is represented by stands of Lutz spruce (*Picea x lutzii*), mountain hemlock (*Tsuga mertensiana*), and mixed Lutz spruce and mountain hemlock. Lutz spruce is a hybrid between Sitka spruce (*Picea sitchensis*) and white spruce (*Picea glauca*). Much of the forest in the study area is old growth. Evidence of past logging of some larger trees within the study area was observed in the vicinity of the Alaska Railroad and the Seward Highway. Lutz spruce and mountain hemlock trees average 50 feet in height in some forested stands. Spruce snags are common throughout this forest type, most likely killed by the massive spruce beetle outbreak on the Kenai Peninsula during the 1990s (Berg et al. 2006).

Large continuous stands of open to closed canopied coniferous forest occur along the upper reaches of Grant Creek and the Project feature corridor, the Grant Lake elbow area, and the southeast end of Grant Lake. Smaller patches of coniferous forest also occur along the Grant Lake shoreline. The understory layer tends to be dense with tall shrub species. Common shrubs include rusty menziesia (*Menziesia ferruginea*), early blueberry (*Vaccinium ovalifolium*), and Alaska huckleberry (*Vaccinium alaskaense*). Common low-shrubs and forbs include: five-leaf bramble (*Rubus pedatus*), twinflower (*Linnaea borealis*), lingonberry (*Vaccinium vitis-idaea*), bunchberry (*Cornus canadensis*), crowberry (*Empetrum nigrum*), Labrador tea (*Ledum groenlandicum*), oakfern (*Gymnocarpium dryopteris*), and northern comandra (*Geocaulon lividum*). In many areas, moss and lichen species form a continuous cover on the forest floor. Forest openings often support stands of Sitka alder (*Alnus viridis* ssp. *sinuata*), Sitka mountainash (*Sorbus sitchensis*), trailing black currant (*Ribes laxiflorum*), fireweed (*Chamerion angustifolium*) and bluejoint reedgrass (*Calamagrostis canadensis*).

3.3.1.2. Coniferous-Deciduous Forest

The Coniferous-Deciduous Forest is the most common vegetation type in the study area, occurring on 177.1 acres, and comprising 31.0 percent of the vegetated area. It is characterized by codominant stands of paper birch (*Betula papyrifera*) and Lutz spruce on typically well-drained, upland terrain. Mountain hemlock, poplar (*Populus balsamifera*), and quaking aspen (*Populus tremuloides*) may be present in the overstory canopy. Common understory shrubs include rusty menziesia, trailing black currant, prickly rose (*Rosa acicularis*), Beauvard spiraea (*Spiraea stevenii*) and highbush cranberry (*Viburnum edule*). Common low shrubs and forbs include bunchberry, twinflower, crowberry, fireweed, oak fern, and bluejoint reedgrass. Open sites often support stands of Sitka alder. In the study area, Coniferous-Deciduous forest occurs intermittently along the northwest shore of Grant Lake, along the southeast shore of Grant Lake; and in large stands along Grant Creek and the lower portion of the Project corridor in the vicinity of Lower Trail and Upper Trail lakes.

3.3.1.3. Alder Scrub

The Alder Scrub vegetation type is represented by stands of often closed canopy Sitka alder on the steep, avalanche-prone slopes around Grant Lake. It occurs on 34.5 acres and comprises 6.0 percent of the vegetated area. High snowfall and frequent avalanche activity determine the distribution of Alder Scrub and other plant communities on these slopes. These often dense stands of Sitka alder frequently have a sparse understory or an understory that is dominated by shorter shrubs, including goatsbeard, willow species, and devil's club, as well as forbs such as tall fireweed, cow parsnip, and lady fern. Smaller patches of herbaceous vegetation (Grass-Forb Meadow, discussed below) are common within Alder Scrub, and form a matrix with it. Coniferous tree seedlings and saplings were also observed in this vegetation type.

3.3.1.4. Grass-Forb Meadow

In the study area, the Grass-Forb Meadow vegetation type forms a mosaic with the Alder Scrub vegetation type, as described above, and is mostly included as small, unmapped patches on the steep slopes above Grant Lake. Several larger Grass-Forb Meadows are mapped in the study area; one at the east end of Grant Lake and a larger one at the west end of the lake, south of the Grant Creek outlet. The Grass-Forb Meadow vegetation type is the least common type in the study area, occurring on 2.2 acres, and comprising 0.4 percent of the vegetated area. The dominant plant species in this vegetation type is the tall, rhizomatous grass species bluejoint reedgrass, which often forms extensive swards. Forb associates are often diverse and commonly include tall fireweed, oak fern, northern geranium (*Geranium erianthum*), arctic starflower (*Trientalis europaea*), cow parsnip (*Heracleum maximum*), larkspur (*Delphinium glaucum*), Sitka burnet (*Sanguisorba canadensis*), tall Jacob's-ladder (*Polemonium acutiflorum*), wood fern (*Dryopteris expansa*), common horsetail (*Equisetum arvense*) and monkshood (*Aconitum delphinifolium*). Shrub species include goatsbeard, red raspberry (*Rubus idaeus*), and highbush cranberry. The relative abundance of grass and forbs from site to site is variable.

3.3.1.5. Floodplain Forest and Scrub

The Floodplain Forest and Scrub vegetation type covers 106.0 acres of the study area, constituting 18.6 percent of the vegetated area. This vegetation type occurs on floodplain gravel bars that are successively colonized by herbaceous, shrub, and tree species; and this type is often comprised of a mosaic of upland and wetland areas. Vegetation succession on gravel bars can be represented by the following seral stages: barren or herbaceous, willow or willow-alder, alder, poplar or spruce-poplar, and then spruce (NatureServe 2008), all of which occur in the study area on the wide floodplain associated with Inlet Creek, on outwash fans and floodplains associated with the small drainages around Grant Lake, and on the floodplain where Grant Creek enters the Trail Lake Narrows. The substrate of this vegetation type is typically well-drained sand, silt, gravel, and cobble; it includes a diversity of habitats including bare areas, shrublands, forests, oxbows, wet depressions and herbaceous wetlands. Wetlands included in this vegetation type are described in the Wetlands section (Section 4). Upland portions within this type include: forests comprised of Lutz spruce, balsam poplar, and sometimes paper birch; stands of large poplar, stands of Sitka alder, and Sitka alder stands with willow species such as feltleaf willow, Barclay willow, and Sitka willow (Salix alaxensis, S. barclayi, and S. sitchensis). In the earliest seral areas, herbaceous meadows are dominated by sedge species (*Carex* species), river beauty (Chamerion latifolium) bluegrass species (Poa species), bluejoint reedgrass, and horsetail species (Equisetum species). Stands of mature poplar can be found on the extensive alluvial area adjacent Inlet Creek.

3.3.1.6. Barren/Sparsely Vegetated

Barren and sparsely vegetated areas include talus slopes, cliffs, and avalanche chutes having less than 10 percent vegetation cover. In the study area, barren and sparsely vegetated areas form a mosaic with the Alder Scrub vegetation type on steep, avalanche prone, often dry, sometimes seepy slopes around Grant Lake. These polygons are generally not large enough to be individually mapped.

3.3.1.7. Wetland Communities

Refer to Section 4, Wetlands and Waters of the U.S. for a detailed discussion about the distribution, types, and functions of the wetland and water resources throughout the Project area.

3.3.2. Invasive Plant Survey

Data about invasive plants were extracted from the USFS's Natural Resource Information System Threatened, Endangered, and Sensitive Plants and Invasive Species Application (USFS NRIS 2013). This application supports national data collection standards from combined Threatened, Endangered, and Sensitive plants and invasive species surveys and inventories. Populations of the following invasive plant species have been documented previously within 0.25 mile of the study area: timothy (*Phleum pratense*), common plantain (*Plantago major*), annual bluegrass (*Poa annua*), Kentucky bluegrass (*Poa pratensis*), common dandelion (*Taraxacum officinale*), white clover (*Trifolium repens*) and alsike clover (*T. hybridum*). Most of these invasive plants were located along the Seward Highway and Alaska Railroad in the area between Upper Trail and Lower Trail lakes. Within the Project vicinity, few populations of invasive plants have been documented very far from highways, railroad right-of-ways (ROW), and other developments (USFS NRIS 2013). A list of invasive plants considered most likely to be located in the study area is presented in Appendix 1a, Table A.1a-2, Invasive plant populations in the vicinity of Grant Lake, June 2013.

The invasive plant survey was conducted concurrently with the sensitive plant survey and took place within areas potentially affected by the Project. Areas of particular focus included: roadsides, motorized vehicle travel routes, boat traffic routes, existing trails, lake and stream access points, developed and social recreation sites, and other human use areas.

Overall, very few populations of invasive plants were located in the invasive plant study area. Populations of the following four invasive plants were documented: annual bluegrass, Kentucky bluegrass, common dandelion, and white clover. Populations of each of these invasive species have previously been mapped in the vicinity of the Project area on State of Alaska lands (USFS NRIS 2013). AKEPIC Field Data Sheets for these invasive plant populations are included in Appendix 1b.

In the study area, common dandelion and white clover were located along the Seward Highway ROW. Common dandelion was located along the Alaska Railroad ROW. Annual bluegrass, Kentucky bluegrass and common dandelion were located on the Grant Lake Trail where it enters the study area on the west end of the north shore of Grant Lake (USFS land). Ten scattered small- to medium-sized populations of common dandelion were scattered around Grant Lake in areas with exposed soil or gravel on State of Alaska and USFS lands. Wave action and ice scouring on exposed substrates along the Grant Lake shore constitute a natural disturbance regime which favors the establishment of common dandelion. The Grant Lake dandelion populations are comprised of a combination of common dandelion and horned dandelion (*Taraxacum ceratophorum*). Horned dandelion is a native, noninvasive plant whose appearance is similar to common dandelion and is distinguished with a combination of technical characters.

In the study area, invasive plants were most likely to be located in areas where the substrate has been disturbed or where bare soil has been exposed. Except for the Grant Lake shoreline, invasive plants were not observed in areas that do not experience appreciable human disturbance.

3.3.3. Sensitive Plant Survey

A map of areas surveyed for sensitive plants is included on Figure 3.3-7 and Figure 3.3-8. A list of all plant species observed in the combined sensitive plant and invasive plant study areas is included in Appendix 1a as Table A.1a-3. A USFS Plant Survey Field Form describing the sensitive plant survey is included in Appendix 1b. The species list is divided into three areas: the Project Corridor, which is located on State of Alaska land; the State of Alaska owned portion of Grant Lake; and the USFS owned portion of Grant Lake. Aleutian shield fern (*Polystichum aleuticum*) is the only federally listed or proposed plant species within the range of the Project area (USFWS 2013). Because no habitat for it is present within the Project vicinity, it was not expected to occur, and was not observed during fieldwork.

A BE for sensitive plants in the Project area on lands under USFS jurisdiction will be prepared for the Draft License Application. A small population of the USFS sensitive plant pale poppy

(*Papaver alboroseum*) was located in the sensitive plant study area and is discussed below. In addition, two plant species tracked by the Alaska Natural Heritage Program as rare plants were located in the combined sensitive plant and invasive plant study areas and are discussed below.

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3.3.3.1. Pale Poppy (Papaver alboroseum)

A small population of pale poppy was located on the north shore of Grant Lake, northwest of the island (see Figure 3.3-8). Figure 3.3-8, above, presents a map of the pale poppy populations. A USFS sighting form for the pale poppy is presented in Appendix 1b (R10 TES Plant Element Occurrence Field Form), along with photographs of pale poppy plants and its habitat in the study area (Appendix 1b, Photos A.1b-1 –A.1b-3). Fifteen pale poppy plants were growing on a semi-stabilized, sparsely vegetated, south-facing creek outwash area near the Grant Lake shore, on a cobble, sand, and gravel substrate. The population is located in the Floodplain Forest and Scrub vegetation type. Vegetation present at the site was an early successional community with shrubs, forbs, and graminoids. The plants nearest in proximity to the lake were located approximately 12 feet away. Plants were between 2 and 5 feet higher than the surface water level elevation (SWE) at the time of the survey (SWE estimated to be between 698 and 699 feet NAVD 88).

Pale poppy is distributed from the Kuril Islands to south central Alaska and is disjunct to north central British Columbia (Goldstein et al. 2009). Pale poppy requires an open, well-drained habitat, and occasional disturbance either creates or maintains this habitat. One-time (as opposed to recurring) disturbances by humans can create habitat for the poppy. Examples include stabilized road sides, railroad trackbeds, and disturbed gravelly areas such as old gravel pits. While some human disturbance may help maintain suitable open habitat, repeated disturbance may have affect the plant's ability to reproduce (Charnon 2007). Pale poppy plants observed on nearby Cooper Lake are able to tolerate some inundation during the growing season (HDR 2005).

3.3.3.2. Additional Findings

A small population of Yellowstone draba (*Draba incerta*) was located on USFS land, on the north shore of Grant Lake, southeast of the island. While it is not listed by the USFS as a sensitive species, this yellow-flowered species in the mustard family is listed by the Alaska Natural Heritage Program as an S3 species (AKNHP 2013). An S3 designation means that the species is "Rare within the state; at moderate risk of extirpation because of restricted range, narrow habitat specificity, recent population decline, small population sizes, and a moderate number of occurrences" (AKNHP 2013). There are nearly 20 occurrences of this species in Alaska, of which 2 are on the Kenai Peninsula (AKNHP 2013).

A small population of western fescue (*Festuca occidentalis*) was located within the 50-foot study area buffer on State of Alaska land along the proposed access route west of the detention pond. This grass species is listed by the Alaska Natural Heritage Program as an S1 species (AKNHP 2013). An S1 designation means that the species is "Critically imperiled within the state; at very high risk of extirpation because of extremely few occurrences, declining populations, or extremely limited range and/or habitat" (AKNHP 2013). There are a total of 4 occurrences of this species in Alaska, of which 2 are on the Kenai Peninsula (AKNHP 2013). In the study area, several western fescue plants were located in an opening in white spruce forest on a well-drained, southwest-facing hummock.

3.4. Conclusions

This section summarizes the findings of the general upland vegetation study and the invasive plant and sensitive plant surveys. In addition, potential qualitative direct and indirect impacts of the construction and operation of the Project on general upland vegetation and sensitive plants are discussed. In general, construction-related impacts are considered short-term, while impacts associated with Project infrastructure and operations would likely be longer-term or permanent. Direct impacts are those that would occur immediately or soon after the implementation of the action (Dillman et al. 2009). Indirect impacts are those impacts that are reasonably likely to occur at a later point in time after the Project has been implemented.

In general, potential direct impacts of the construction of the Project on upland vegetation or sensitive plants involve physical damage to or inundation of individual plants, entire populations, or vegetation habitat. Indirect impacts of the construction and operation of the Project may include the following:

- Changes in Grant Lake hydrology: increased water levels might result in the death or decline in vigor of plants not adapted to higher sustained water levels; or, conversely, a sustained decrease in water levels might result in the death or decline of plants adapted to wetland conditions.
- Changes in Grant Creek hydrology: changes to in-stream flow regime of Grant Creek may result in the death or decline in vigor of plants, or a shift in riparian vegetation community composition in response to the new flow regime.
- Changes in light levels: partial or complete removal of tree canopy in forested areas or shrub cover in dense scrub areas can result in increased light levels in the understory, potentially resulting in light levels beyond the tolerance of shade dependent species.
- Shifts to earlier successional vegetation types in disturbed areas.
- Introduction and spread of invasive plants: ground disturbing activities and increased light levels can create conditions conducive to the establishment of invasive plant populations. Invasive plants compete with native plants for preferred habitat.

3.4.1. General Vegetation

Five general upland vegetation types were mapped within the study area, including Coniferous Forest, Coniferous-Deciduous Forest, Alder Scrub, Grass-Forb Meadow, and Floodplain Forest and Scrub.

Potential direct impacts of the construction of the Project on general upland vegetation may include: clearing of vegetation, the smothering of vegetation by the placement of fill material, damage to vegetation by machinery, soil disturbance, altering of the natural grade, and inundation. Potential indirect impacts of the construction of the Project on upland vegetation may include: the introduction and spread of invasive plant species, soil erosion, poor native vegetation reestablishment, vegetation type changes due to changes in light or moisture levels, and shifts to earlier successional vegetation types in disturbed areas.

The primary potential direct impact of the operation of the Project with regard to upland vegetation is the loss of natural vegetation. Potential indirect impacts of the operation of the

Project on upland vegetation may include: the introduction and spread of invasive plant species, the alteration or loss of some vegetation types, and the maintenance of earlier successional vegetation types. While these direct and indirect impacts have the potential to occur to some degree, Best Management Practices (BMPs) will be collaboratively developed with the agencies prior to the initiation of construction to minimize impacts to general vegetation. These potential impacts to general upland vegetation are summarized by Project component in Table 3.4-1. Refer to Section 4.4, Wetlands Conclusions, for a summary of potential impacts to wetland and water communities. Engineering feasibility work is being conducted in parallel with the natural resource investigations for the Project. The "Potential Qualitative Construction and Operational Impacts" listed in Table 3.4-1 below will be further refined once the operational scenario(s) is selected. This scenario will be developed collaboratively with the input of stakeholders. These refinements will be detailed in the DLA.

3.4.2. Invasive Plant Survey

Few populations of invasive plants were documented in the study area. Invasive plant species observed in the study area included common dandelion, white clover, Kentucky bluegrass, and annual bluegrass. Except for the common dandelion populations around Grant Lake, all of the invasive plant populations in the study area are associated with human disturbance areas. Potential impacts of Project construction and operations on invasive plant populations include:

- invasive plant populations in the Project area could become larger,
- invasive plant populations could spread to new areas within the Project area,
- new species of invasive plants could spread to areas affected by the Project, and
- invasive plant populations could spread out of the Project area into adjacent areas.

Potential direct and indirect impacts of the construction and operation of the Project on upland vegetation and sensitive plants with regard to invasive plants are summarized in Tables 3.4-1 and 3.4-2, respectively. While direct and indirect impacts have the potential to occur to some degree, BMPs will be collaboratively developed with the agencies and incorporated into an Invasive Plant Management Plan prior to the initiation of construction, in order to minimize potential invasive plant impacts associated with the Project.

Project Component	Potential Qualitative Construction Impacts ^{1,2}		Potential Qualitative Operational Impacts ^{1,2}		
jFF	Direct	Indirect	Direct	Indirect	
GRANT CREEK					
Natural Outlet Option	Vegetation clearing, soil disturbance, altered natural grade, fill material placement, damage by machinery	Weed infestation; soil erosion; poor native veg re- establishment; change of light or moisture levels; shift to earlier successional vegetation types	Loss of natural vegetation; inundation, Grant Lake water level fluctuations, drawdowns, Grant Creek flow regime changes	Weed infestation; effects of the new lake level fluctuation regime and the new creek flow regime on upland vegetation; alteration and/or loss of upland vegetation types	
Concrete Dam Option	Vegetation clearing, soil disturbance, altered natural grade, fill material placement, damage by machinery	Weed infestation; soil erosion; poor native veg re- establishment; change of light or moisture levels; shift to earlier successional vegetation types	Loss of natural vegetation; inundation, Grant Lake water level fluctuations, drawdowns, Grant Creek flow regime changes	Weed infestation; effects of new lake level fluctuation regime and the new creek flow regime on upland vegetation; alteration and/or loss of upland vegetation types	
WATER CONVEYANCE					
Intake Structure	Vegetation clearing, soil disturbance, altered natural grade, fill material placement, damage by machinery	Weed infestation; soil erosion; poor native veg re- establishment; change of light or moisture levels; shift to earlier successional vegetation types	Loss of natural vegetation; inundation, Grant Lake water level fluctuations, drawdowns, Grant Creek flow regime changes	Weed infestation; effects of new lake level fluctuation regime and the new creek flow regime on upland vegetation; alteration and/or loss of upland vegetation types	
Tunnel	At surficial entrance and exit of tunnel: vegetation clearing; soil disturbance; altered natural grade; fill material placement; damage by machinery	At surficial entrance and exit of tunnel: weed infestation; soil erosion; poor native veg re- establishment; change of light or moisture levels, shift to earlier successional vegetation types	At surficial entrance and exit of tunnel: loss of natural vegetation	At surficial entrance and exit of tunnel: weed infestation; soil erosion; poor native veg re- establishment; alteration or loss of upland vegetation types	

Table 3.4-1. General upland vegetation potential qualitative impact table, Grant Lake Project.

Table 3.4-1,	continued
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Project Component	Potential Qualita Impa	tive Construction	Potential Qualit Imp	ative Operational acts ^{1,2}
	Direct	Indirect	Direct	Indirect
Penstock	Vegetation clearing, soil disturbance, altered natural grade, fill material placement, damage by machinery	Weed infestation; soil erosion; poor native veg re- establishment; change of light or moisture levels; shift to earlier successional vegetation types	Loss of natural vegetation	Weed infestation; soil erosion, poor native veg re- establishment; alteration or loss of upland vegetation types
Tailrace	Vegetation clearing, soil disturbance, altered natural grade, fill material placement, damage by machinery	Weed infestation; soil erosion; poor native veg re- establishment; change of light or moisture levels; shift to earlier successional vegetation types	Loss of natural vegetation	Weed infestation; soil erosion, poor native veg re- establishment; alteration or loss of upland vegetation types
Tailrace Detention Pond	Vegetation clearing; soil disturbance; altered natural grade, damage by machinery, fill material placement	Weed infestation; soil erosion; poor native veg re- establishment; change of light or moisture levels; shift to earlier successional vegetation types	Periodic inundation of wetland and adjacent upland areas	Weed infestation; possible expansion of wetland fringe around water edge into upland vegetation; soil erosion, sedimentation/burial of upland vegetation; poor native veg re- establishment. The amount and nature of upland vegetation impacts will be dependent on the frequency, timing, duration of inundation
POWERHOUSE				
Powerhouse Structure	Vegetation clearing; soil disturbance; altered natural grade; fill material placement; damage by machinery	Weed infestation; soil erosion; poor native veg re- establishment; change of light or moisture levels; shift to earlier successional vegetation types	Loss of natural vegetation	Weed infestation; soil erosion, poor native veg re- establishment; alteration or loss of upland vegetation types

Table 3.4-1, continued...

Project Component	Potential Qualitative Construction Impacts ^{1,2}		Potential Qualitative Operational Impacts ^{1,2}	
	Direct	Indirect	Direct	Indirect
TRANSMISSION LINE/ SWITCHYARD				
Above Ground Option	Vegetation clearing; soil disturbance; altered natural grade; fill material placement; damage by machinery	Weed infestation; soil erosion; poor native veg re- establishment; change of light or moisture levels; shift to earlier successional vegetation types	Loss of natural vegetation	Weed infestation; soil erosion, poor native veg re- establishment. Shift to earlier successional vegetation community if ROW is maintained clear of woody vegetation as many utility corridors are
Below Ground Option	Vegetation clearing; soil disturbance; altered natural grade; fill material placement; damage by machinery	Weed infestation; soil erosion; poor native veg re- establishment; change of light or moisture levels; shift to earlier successional vegetation types	Loss of natural vegetation	Weed infestation; soil erosion; poor native veg re- establishment; alteration or loss of upland vegetation types
ACCESS ROADS & BRIDGE		·		
Access Roads & Bridge	Vegetation clearing; soil disturbance; altered natural grade; fill material placement; damage by machinery	Weed infestation; soil erosion; poor native veg re- establishment; change of light or moisture levels; shift to earlier successional vegetation types	Loss of natural vegetation	Weed infestation; soil erosion; poor native veg re- establishment; alteration or loss of upland vegetation types

Notes:

1. The potential impacts discussed in this table are preliminary and based primarily on the terrestrial natural resource studies and the limited amount of engineering feasibility work conducted prior to this report being developed. This table and the associated impacts will be fully refined and vetted once the licensing associated engineering work is completed. A full discussion of refined environmental impacts will be included in the DLA.

2. Project would be constructed over a 30-36 month time period.

3.4.3. Sensitive Plant Survey

The sensitive plant survey occurred on USFS lands in areas potentially affected by the Project. The survey was conducted at the proper time of year to identify sensitive plants recognized as

having the potential to occur in the study area. A small population of pale poppy was located in the study area.

Potential direct and indirect impacts to sensitive plants include potential impacts to known populations and potential impacts to undetected populations on suitable habitat. Potential impacts to USFS lands would primarily be Grant Lake level changes related to the implementation of the Project. No components associated with the Project (Grant Lake Diversion dam and Grant Lake Powerhouse, water conveyance, transmission line, or access roads and bridge) are located on USFS lands, thus USFS lands would not be directly impacted by their construction or operation. While direct and indirect impacts have the potential to occur to some degree, BMPs will be collaboratively developed with the agencies and incorporated into a Sensitive Plant Management Plan prior to the implementation of construction, in order to minimize impacts to sensitive plant populations. Potential direct and indirect impacts of the Project on sensitive plants are discussed below and are summarized in Table 3.4-2. Engineering feasibility work is being conducted in parallel with the natural resource investigations for the Project. The potential qualitative impacts listed in Table 3.4-2 below will be further refined once the operational scenario(s) is selected. This scenario will be developed collaboratively with the input of stakeholders. These refinements will be detailed in the DLA.

3.4.3.1. Eschscholtz's Little Nightmare

Eschscholtz's little nightmare grows in alpine and subalpine heath meadows and wet, rocky, or mossy seeps (Goldstein et al. 2009). It is known to occur in the Seward Ranger District, but was not observed during field surveys conducted for the Project. The study area does not have alpine or subalpine habitats and is well below the alpine and subalpine zone, thus potential habitat is not present in the study area. The Project would have no direct or indirect effects to known populations or habitat of Eschscholtz's little nightmare.

3.4.3.2. Moosewort Fern

Moosewort fern grows in well-drained sandy beaches and alpine sites (Goldstein et al. 2009). It is suspected to occur on the Chugach National Forest, but was not observed during field surveys conducted for the Project. The study area does not have well-drained sandy beaches and is well below the alpine zone, thus potential habitat is not present within the study area. The Project would have no direct or indirect effects to known populations or habitat of moosewort fern.

3.4.3.3. Moonwort Fern

Moonwort fern grows in well drained open meadows, upper beach meadows, and coastal dunes (Goldstein et al. 2009). It is suspected to occur on the Chugach National Forest, but was not observed during field surveys conducted for the Project. The study area does not have well drained open meadows, upper beach meadows, or coastal dunes, thus potential habitat is not present within the study area. The Project would have no direct or indirect effects on known populations or habitat of moonwort fern.

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suitable habitat
Alaska rein orchidDry, open sites,YesShorelineInundation ofSpread of
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<i>unalascensis</i>) shrub in water level undetected plants plants; light or
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Table 3.4-2. Sensitive plant potential qualitative impact table, Grant Lake Project.

Notes:

- 1. The potential impacts discussed in this table are preliminary based primarily on the terrestrial natural resources studies and the limited amount of engineering feasibility work conducted prior to this report being fully developed. This table and the associated impacts will be fully refined and vetted once the licensing engineering work is completed. A full discussion of refined environmental impacts will be included in the Draft License Application.
- 2. Project would be constructed over a 30-36 month time period.

3.4.3.4. Spotted Lady's Slipper

Spotted lady's slipper orchid grows in open forests, tall shrublands, and wet meadows (Goldstein et al. 2009). It is suspected to occur on the Chugach National Forest but was not observed during field surveys conducted for the Project. The study area does have open forests, tall shrublands, and wet meadows, thus potential habitat is present within the study area.

The Project would have no effects to known populations of spotted lady's slipper orchid. Although potential habitat is present, this species has not been found on the Chugach National Forest or the study area and was not located during field surveys conducted for this Project. Potential impacts in the study area resulting from Project implementation (Grant Lake level change, inundation, water level fluctuations, lake drawdown) could affect potential habitat for this species and thus potentially affect undetected populations. Direct effects could occur through inundation, fluctuations, and drawdown. Indirect effects are also possible, including the introduction and spread of invasive plant species, soil erosion, vegetation type changes due to changes in light or moisture levels, and shifts to earlier successional vegetation types. Because this species may grow in a variety of habitats, some of the potential impacts that would result from Project implementation have the potential to disturb potential spotted lady's slipper habitat and undetected individuals.

3.4.3.5. Calder's Lovage

Calder's lovage typically grows on forest edges and dry and wet meadows in the subalpine and alpine zones (Goldstein et al. 2009). It is suspected to occur on the Chugach National Forest but was not observed during field surveys conducted for the Project. The study area does not have calcareous substrates and is well below the alpine and subalpine zones, thus potential habitat is not present within the study area. The Project would have no direct or indirect effects to known populations or habitat of Calder's lovage.

3.4.3.6. Pale Poppy

Pale poppy grows in open areas, areas with sandy, gravelly, well-drained soils; mesic to dry alpine; and recently deglaciated areas (Goldstein et al. 2009). A small population of 15 plants was located on USFS land during field surveys conducted for the Project. Other habitat with similar sandy, gravelly well-drained soils was surveyed in the study area and no other populations were found.

The Project could potentially have direct effects on the pale poppy population in the study area because some or all of the plants might be partially or completely inundated by proposed changes to the lake's surface water elevation, although the duration and frequency of these lake level fluctuations are unknown at this time. Indirect effects to plants not inundated are also possible, potentially occurring as a result of light or water level changes resulting from inundation or the introduction of invasive plants. The presence of additional undetected populations in the study area is possible. Potential impacts to the study area resulting from Project implementation (lake elevation changes, water level fluctuations, and drawdowns) could affect potential habitat for this species and thus potentially affect undetected populations. Indirect effects are also possible, including the introduction and spread of invasive plant species,

soil erosion, vegetation type changes due to changes in light or moisture levels, and shifts to earlier successional vegetation types. Because this species' habitat is discontinuously present around the perimeter of Grant Lake, some of the potential impacts that would result from Project implementation would have the potential to disturb pale poppy habitat and undetected individuals.

3.4.3.7. Alaska Rein Orchid

Alaska rein orchid grows in dry open sites, tall shrubs in riparian zones, mesic meadows, and dry forests at low elevation to subalpine elevations (Goldstein et al. 2009). It is suspected to occur on the Chugach National Forest but was not observed during field surveys conducted for the Project. The study area does have dry open sites, tall shrubs in riparian zones, mesic meadows, and dry forests, thus potential habitat is present within the study area.

The Project would have no effects on known populations of Alaska rein orchid. Although potential habitat is present, this species is not known to occur in Chugach National Forest or the study area and was not located during field surveys conducted for this Project. Potential impacts to the study area resulting from Project implementation (Grant Lake level change, inundation, water level fluctuations, drawdown) could affect potential habitat for this species and thus potentially affect undetected populations. Direct effects could occur through inundation, fluctuations and drawdown. Indirect effects are also possible, including the introduction and spread of invasive plant species, soil erosion, vegetation type changes due to changes in light or moisture levels, and shifts to earlier successional vegetation types. Because this species may grow in a variety of habitats, some of the potential impacts that would result from Project implementation have the potential to disturb potential Alaska rein orchid habitat and undetected individuals.

3.4.3.8. Unalaska Mist-Maid

Unalaska mist-maid typically grows on gravelly stream sides, rock outcrop ledges, rock crevices, and beach terraces (Goldstein et al. 2009). It is suspected to occur on the Chugach National Forest but was not observed during field surveys conducted for the proposed Project. The study area does have gravelly streamsides, rock outcrop ledges and crevices, thus potential habitat is present within the study area.

The Project would have no effects to known populations of Unalaska mist-maid. Although potential habitat is present, this species is not known to occur in Chugach National Forest or the study area and was not located during field surveys conducted for this Project. Potential impacts to the study area resulting from Project implementation (Grant Lake level change, inundation, water level fluctuations, lake drawdown) could affect potential habitat for this species and thus potentially affect undetected populations. Direct effects could occur through inundation, fluctuations, and drawdown. Indirect effects are also possible, including the introduction and spread of invasive plant species, soil erosion, vegetation type changes due to changes in light or moisture levels, and shifts to earlier successional vegetation types. Because this species may grow in a variety of habitats, some of the potential impacts that would result from Project implementation have the potential to disturb potential Unalaska mist-maid habitat and undetected individuals.

3.4.3.9. Additional Findings – Yellowstone Draba and Western Fescue

A very small population of Yellowstone draba was located in the invasive plant study area on USFS lands on the north shore of Grant Lake, northwest of the island. This yellow-flowered mustard species is listed by the Alaska Natural Heritage Program as an S3 species. Implementation of the Project could cause potential impacts to the population, including light or moisture level changes and the introduction of invasive species.

A small population of western fescue was located in the study area on State of Alaska land along the access route west of the detention pond. This grass species is listed by the Alaska Natural Heritage Program as an S1 species. Construction and operation of the Project access road and transmission line could cause possible impacts to this population, including light or moisture level changes and the introduction of invasive species.

3.5. Variances from FERC-Approved Study Plan and Proposed Modifications

3.5.1. General Vegetation

There were no variances to the FERC-approved general vegetation study plan.

3.5.2. Invasive Plant Survey

There were no variances to the FERC-approved invasive plants study plan.

3.5.3. Sensitive Plant Survey

There were no variances to the FERC-approved sensitive plants study plan.

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4 BOTANTICAL RESOURCES: WETLANDS & OTHER WATERS OF THE U.S.

This section describes the existing wetlands and other "Waters of the U.S." that are associated with the Project based on the 2013 study effort and relevant data from previous Project studies (Ebasco 1984 and HDR 2011). Under Section 404 of the Clean Water Act (CWA [Section 404]), activities that adversely affect wetlands and aquatic resources must be authorized through a Section 404 permit issued by the U.S. Army Corps of Engineers (USACE), and adverse impacts must be mitigated to the extent practicable. Wetlands are defined for regulatory purposes under the CWA as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Waters are defined as any non-vegetated area with a bed and bank, including intermittent, ephemeral, or perennial streams, rivers, or standing water (lakes and ponds).

Various wetland communities are located throughout the Project area and include herbaceous dominated, scrub-shrub dominated, and forested dominated wetlands associated with Grant Lake, Upper Trail Lake, Lower Trail Lake, Grant Creek, Inlet Creek, various tributaries and drainages, and steep slopes. As noted in Table 3.3-1, wetlands comprise a relatively small portion of the overall Terrestrial Resources Study area, but remain important to identify for the purpose of future Project planning and permitting.

In addition to mapping and describing wetland communities, wetland functional assessments are required as per general policies associated with USACE Section 404 permits (33 Code of Federal Regulations [CFR] 320), and the U.S. Environmental Protection Agency's (EPA) 404(b)(1) guidelines for specification of disposal sites for dredged or fill material (40 CFR 230). Further, the USACE Alaska District Regulatory Guidance Letter (RGL) 09-01 states that a wetland functional assessment is important to the wetland evaluation process because the "Alaska District will determine what level of mitigation is appropriate based upon the functions lost or adversely affected by permitted activities" (USACE 2009).

Wetlands provide numerous functions, which are defined as the natural chemical, physical, and biological processes occurring within a wetland and between a wetland and adjacent non-wetland areas that support overall ecosystem processes. Commonly-assessed wetland functions include the ability to moderate or convey floods or provide habitat for sensitive wildlife or plant species. Due to variables such as geomorphology, water source, and plant and animal communities, not all wetlands perform these functions equally.

The 2013 Wetland and Waters Study was conducted in accordance with the approved Study Plan (KHL 2013). The objectives of this study were to 1) delineate Project area wetlands and other potential "Waters of the U.S." in areas not previously mapped in 2010 that could potentially be impacted by the Project and 2) to assess the functions of the wetlands within the Project area and assign each wetland habitat to a USACE-defined functional category. The purpose of the wetlands and waters mapping and functional assessment component is to provide information to prepare a wetland report sufficient to apply for a Section 404 permit. The wetlands and waters report will describe locations near the Project that are potentially subject to the authority of Section 404 of the CWA and/or Executive Order 11990 (42 FR 26961, 3 CFR, 121).

The subsections that follow provide a summary of the 2013 wetland delineation and functional assessment methods, results, and conclusions, as well as a summary of any variances from the 2013 Study Plan.

4.1. Study Area

The wetland and waters assessment area (referred to as the wetlands assessment area) mapped in 2013 is nested within the broader terrestrial resource assessment area that includes wetland and waters mapping conducted in 2010. Figure 4.1-1 provides an illustration of the wetland assessment area in relation to the collective terrestrial resource assessment area and the Project boundary.

The 2013 wetland assessment area focused on those areas where the Project has potential to have direct or indirect primary and/or secondary impacts on wetlands or waters, including surface water features such as lakes, ponds, creeks, and drainages. More specifically, the 2013 wetland assessment area includes the wetlands and waters that have the potential to be influenced by the following:

- The estimated operational minimum and maximum lake level fluctuations (692 feet NAVD 88 to 705 feet NAVD 88) around Grant Lake. Wetlands and waters were delineated in the field to the estimated 705 feet NAVD 88 contour line to capture possible hydrological influences from the operational maximum lake level.
- Project infrastructure (i.e. powerhouse, detention pond, access road, etc.). A 100-foot buffer was applied to all Project features to capture wetlands and waters that could be potentially affected by the construction and operation of these features.
- Secondary hydrological impacts associated with an altered flow regime in Grant Creek. A 100-foot buffer was applied to the north and south side of Grant Creek to capture any wetlands or waters that may be affected by a future operational flow regime in Grant Creek.



Internal Review

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DESCRIPTION

2013 Wetland

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4.2. Methods

In order to achieve the Wetland Study objectives noted in Section 4 above, the following tasks were conducted in 2013:

- Prepared a preliminary wetland delineation map prior to field work using existing U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) mapping (NWI 2013) and interpretation of the most current aerial photography or satellite imagery, previous Project mapping (HDR 2011), and other available vegetation mapping and regional habitat associations (NatureServe 2008).
- Created a wetland assessment area using conservative buffers around Project facilities and potential maximum/minimum surface water fluctuations in Grant Lake and Grant Creek such that wetland and waters with the potential to be influenced by these factors were captured in the field-based and desktop analysis.
- Conducted a field survey of wetlands and waters in the road/transmission corridor, facility locations, at the inlet of Grant Lake, and at the dam site. The field delineation also included an assessment of potential secondary impacts to the wetlands and waters along the Grant Lake shoreline and Grant Creek corridor per recommendations from the USACE following the approval of the Study Plan (McCafferty 2013).
- Collected detailed information on soil conditions, hydrology, and plant community composition in representative upland and wetland sites using guidelines from the 1987 wetland delineation manual (USACE 1987) and 2007 Alaska Regional Supplement (USACE 2007), using standard 2007 Alaska Regional Supplement data sheets.
- Conducted a wetland functional assessment for all wetland and waters areas that have the potential to be directly or indirectly affected by the Project using a functional assessment methodology that was approved by the USACE on May 29, 2013 (McCafferty 2013).
- Collected coordinates of wetland data points and boundary points with a GPS unit in the field.
- Prepared a final wetlands and waters map for areas potentially disturbed by Project activities using field delineation and previous Project study results. Prepared corresponding tables summarizing wetland and waters types and acreages within the assessment area.
- Prepared a summary report (provided here) that includes a detailed map of the areas potentially disturbed by Project activities, a general map of the entire study area, methods and findings, a wetland functional assessment, and copies of the field data forms.

The methodologies discussed below were followed to conduct the 2013 wetland and waters delineation and functional assessment.

4.2.1. Wetland Delineation Methods

Wetlands and waters within the entire assessment area were mapped by experienced wetland scientists using a combination of desktop and field techniques. Wetland determinations were performed according to the 1987 Corps of Engineers Wetland Delineation Manual (Corps Manual) (USACE 1987) and the Alaska Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Alaska Region (Regional Supplement; USACE 2007). Waters

were mapped using GPS points in the field, with subsequent editing in GIS using aerial photography and data collected by the Project aquatic habitat mapping study team (KHL 2014a) for Grant Creek side channel areas. The primary tasks for wetlands and waters mapping included the development of a preliminary wetland and waters map based on a review of existing maps and ecological information; a field-based wetland delineation and waters mapping to determine the presence or absence of wetlands and waters including characterization and delineation of the boundaries separating non-wetlands and waters map within the wetland assessment area and the broader terrestrial resource assessment area.

The 2013 field effort focused on the wetland assessment area illustrated in Figure 4.1-1. Wetlands located outside of the 2013 wetland assessment area that are captured within the broader Terrestrial Resources Study area were mapped using 2010 wetland delineation data, NWI data, and aerial photo interpretation.

Wetlands and waters throughout the wetland assessment area and the broader terrestrial resource assessment area were mapped to the NWI (Cowardin et al 1979) subclass level and Brinson (1993) hydrogeomorphic position level, which describes communities based on site moisture regime, dominant plant growth form, and physiognomic descriptor. This level of mapping relies on aerial photo interpretation with extensive ground reference data. Prior to conducting the field-based delineation effort, a preliminary wetland map was developed in ArcGIS using the following data sources:

- 2010 Project area wetland delineation maps and data (HDR 2011)
- Aerial photography
- Elevation contours (4-foot vertical resolution)
- USFWS NWI mapping (NWI 2013)
- Field Indicators of Hydric Soils in Alaska (USDA-NRCS 2005)
- Alaska 2013 Regional Wetland Plant List (Lichvar 2013)
- Other supporting literature, reference materials, and data are listed in the References Section.

The preliminary map was then groundtruthed during the 2013 field-based delineation effort, which focused on collecting data within the wetland assessment area identified in Figure 4.1-1. Data was collected in accordance with the currently accepted methods for wetland determination in Alaska, described in the Regional Supplement. This "three parameter approach" employed in wetland determination requires the three essential characteristics of wetlands (hydrophytic vegetation, hydric soils, and wetland hydrology) be present to have a positive wetland determination. A total of 41 field determination points (DP) (24 wetland DPs and 17 upland DPs) and 82 observation points (OP) were collected within the wetland assessment area in 2013. At each field determination point, wetland scientists completed a USACE wetland determination form, took representative site photographs, documented the hydrogeomorphic position of the wetland location, and documented general field observations. In addition, the location of wetland DPs representative wetland/upland boundary points, and other notable features were recorded with a Trimble GeoXH 2005 series GPS unit. Similar information was collected at OPs; however, formal delineation datasheets were not filled out for these locations.

Following the field-based wetland delineation, a desktop analysis was then used to refine and complete the vegetation mapping effort. This evaluation included an analysis of DP data, OPs, existing vegetation mapping, NWI mapping, aerial photographs, and surface hydrology data. Wetland boundaries were refined using GPS boundary points and corresponding vegetation cover signatures in aerial photographs. NWI class codes (Cowardin et al. 1979), hydrologic modifiers, and hydrogeomorphic classes were assigned to each wetland polygon through this process.

For the purposes of mapping within the terrestrial resource assessment, wetland or vegetation types were based on the predominant ecosystem and vegetation of the wetland as a whole and not necessarily on narrow bands or inclusions of other wetland/vegetation types or uplands. Many habitats in the Project area consisted of mosaics of wetland/vegetation types. Dominant vegetation types were typically used to characterize habitats, but sometimes a combination of vegetation types was used to describe habitat within the Project area, with multiple vegetation communities comprising a single wetland type.

4.2.2. Functional Assessment Methods

This portion of the report presents the process of assessing wetland and waters functions, and categorizing vegetated wetlands into USACE functional classification categories, per the USACE Alaska District RGL 09-01 (USACE 2009). A preliminary version of the functional assessment method for vegetated wetlands was presented to and approved by USACE representative Katie McCafferty in May 2013 to ensure that all of the USACE-required elements would be included. The functional assessment of the non-vegetated wetlands (waters) was specifically discussed with Katie McCafferty as part of the March 18, 2014 agency meeting in Anchorage, Alaska as well as in subsequent discussions.

4.2.2.1. Waters Functional Assessment Methods

Waters (non-vegetated wetlands) were divided into the following four functional classes for the purpose of the functional assessment: small streams (tributary streams), rivers (Grant Creek and Inlet Creek), the Trail Lake Narrows, and Grant Lake. The moving water functional classes (small streams, Grant and Inlet creeks, and Trail Lake Narrows) were assessed using the guidance provided in the streams functional assessment framework presented in the USACE's Functional Objectives for Stream Restoration (Fischenich 2006), which was further expanded upon in the U.S. EPA's A Function-Based Framework for Stream Assessment and Restoration Projects (Harman et al. 2012). Fifteen functions were assessed, within five areas, as presented in Table 4.2-1. A detailed description and indicators of each function are provided in Fischenich (2006). Grant Lake was assessed using a similar framework and functions as presented in Fischenich (2006) and Table 4.2-1, with adaptations made to better assess lake functions (e.g., an assessment of natural lake level fluctuations and natural shoreline erosion, as part of the hydrodynamics function).

For each moving water functional class, functions were assessed as being present or absent using a tabular format, based on the presence of certain hydrogeomorphic (i.e., water source or landscape position) or hydrologic characteristics, using field observations and data available in a GIS. For all of the functional classes (including Grant Lake), a description and rational for the presence/absence determination were presented in the narrative text, including discussion of whether a functional class might function at the lower or higher end for that function. While intermittent and perennial small streams were assessed collectively as a single functional class, a description of how these streams might function differently is also provided. No data form was completed for the waters assessment, and waters functional classes were not categorized for compensatory mitigation purposes.

	Stream evolution processes
System Dynamics	Energy management
	Riparian succession
Hudualaata	Surface water storage processes
Hydrologic Balanca	Surface/ subsurface water exchange
Darance	Hydrodynamic character
Sediment Sediment continuity	
Processes and	Substrate and structural processes
Character	Quality and quantity of sediments
Dislogical	Biological communities and processes
Biological	Necessary aquatic and riparian habitats
Support	Trophic structures and processes
Chemical	Water and soil quality
Processes and	Chemical processes and nutrient cycles
Pathways	Landscape pathways

Table 4.2-1. Functions assessed for moving waters, from Fischenich (2006).

4.2.2.2. Wetlands Functional Assessment Methods

Vegetated wetlands were grouped into functional classes based on vegetation and hydrogeomorphic characteristics; each functional class was then evaluated for its ability to perform 11 pre-defined functions. The following 11 hydrologic, biogeochemical, ecological, and social functions were assessed using the recommendations provided in RGL 09-01 (USACE 2009) (these functions are defined later in this section):

- 1. Flood flow alteration
- 2. Sediment removal
- 3. Nutrient and toxicant removal
- 4. Erosion control and stabilization
- 5. Production and export of organic matter
- 6. General wildlife habitat suitability
- 7. Fish habitat
- 8. Native plant richness
- 9. Educational, scientific, recreational, or subsistence use
- 10. Groundwater interchange
- 11. Uniqueness and heritage

Based on their functional rating (low, moderate, high) for each of the above functions, the wetland functional classes were assigned to one of the USACE Categories I-IV presented in RGL 09-01 (USACE 2009), which are intended to describe the ecological service provided by wetlands to the overall landscape or ecosystem. The categorization system used by USACE contains four categories, I-IV, with Category I being the highest functioning wetlands and Category IV being degraded and low functioning wetlands (USACE 2009).

Because wetland functions are difficult and time-consuming to measure directly, ecosystem characteristics (e.g., vegetation, hydrologic regime, soil, and landscape variables) are used as a surrogate to determine wetland function. Therefore, during the 2013 wetland delineation, the characteristics of the wetlands associated with the 24 wetland DPs were assessed using the *Wetland Functions Data Form- Alaska Regulatory Best Professional Judgment Characterization* (USACE 2009) (referred to as the functional assessment data form). Wetlands were rated as having a low, moderate, or high capacity to perform each function, based on the presence of certain hydrogeomorphic (i.e. water source or landscape position) or vegetation characteristics. The characteristics that were assessed at each DP are presented on the functional assessment data forms, located in Appendix 2a. In addition to the data collected on the functional assessment data form, information gathered by the Project's fisheries (KHL 2014b), wildlife (Section 5 of the Terrestrial Resources Report), cultural (KHL 2014c), recreation (KHL 2014d), water quality (KHL 2014e) and geomorphology (KHL 2014f) teams was also used to evaluate wetland functions.

The 24 wetland DPs were grouped into representative wetland functional classes based on an integration of the vegetation, hydrogeomorphology, and the sub-set of the Project area where the functional class was located, resulting in 15 wetland functional classes which are presented in Section 4.3, Results section below. The 124 wetland polygons mapped within the 2013 wetland assessment area were then assigned to one of the wetland functional classes, which provided the framework within which each wetland function was evaluated. The 24 polygons where DPs were located were assigned to the functional class associated with their DP; the remaining 100 polygons that were not directly assessed using a wetland DP were assigned to the most applicable wetland functional class. Many of the remaining 100 mapped polygons were assessed in the field using the OPs described in the wetland delineation section above; although functional assessment data forms were not completed at OPs, the detailed OP descriptions were used to assign these polygons to a functional class. Polygons with neither a DP nor an OP were assigned to functional class assessment described in the wetland delineation section above (e.g., with 2010 delineation data, NWI mapping, elevation contours, and aerial imagery).

The 15 wetland functional classes were stratified across three sub-areas within the wetland assessment area, referred to as functional assessment areas: 1) the transmission corridor / facilities area which includes the road/transmission line corridor, as well as associated Project facilities; 2) the Grant Creek corridor which includes the area along Grant Creek, including floodplain areas, between Grant Lake and Trail Lake; and 3) the Grant Lake area which includes the area along the edge of Grant Lake. The Grant Lake area was further divided into three sub-areas, the lake inlet (the flat area surrounding the lake inlet at the eastern end of Grant Lake including along Inlet Creek), lake shore (the lake fringe where the steep shoreline meets the lake,

outside of the inlet and outlet areas), and lake outlet (where Grant Creek exits Grant Lake). Wetland functions were assessed collectively by wetland functional class (e.g., for all of the herbaceous depressional wetlands within the assessment area) rather than for each individually mapped wetland.

The RGL 09-01 (USACE 2009) lists the functions that the Alaska District of the USACE recommends evaluating for Alaska wetlands, the characteristics associated with wetlands that perform each function (on their wetlands assessment data form, see Appendix 2a), as well as the number of characteristics required for a wetland to perform at a low, moderate, or high capacity for a given function. Based on the RGL 09-01 method if a function is evaluated for a given wetland, unless the evaluator is certain that the wetland did not perform the function, the wetland is at a minimum rated as "low" for that function, even if it does not provide any of the listed characteristics. Further, the provision of (i.e. answering "yes" to) a single characteristic automatically ranks the wetland as "moderate" rather than "low". For example, a wetland might only have one of the characteristics listed (e.g. dense woody vegetation, for the "flood flow alteration" function), yet the RGL 09-01 method would still rank this wetland as having a moderate capacity to perform that function. Therefore, wetlands were only ranked as "low" for a function if they did not provide any of the listed characteristics.

Wetlands that were not evaluated for a function because they did not meet certain criteria (e.g. adjacency to a fish-bearing stream for the "fish habitat" function) were listed as "not applicable" (NA). Note that wetlands were assessed based on their current condition, and not on their potential future condition if the proposed Project were constructed.

While the RGL 09-01 provides characteristics associated with each wetland function, it does not provide a specific definition for each function. Therefore, based on the characteristics listed in the RGL 09-01 data form (see Appendix 2a), as well as best professional judgment by wetland scientists, the 11 functions are defined as follows:

- 1. *Flood Flow Alteration*. This function is defined as a wetland's capacity to reduce flood flows (e.g. channelized or sheet flow) through storage and desynchronization in any area of a watershed, including streams or floodplains, by temporarily storing or slowing water passage. Most wetlands have topographic, soil, and vegetation attributes that contribute to their ability to retain and detain storm flows and snowmelt runoff. Precipitation and flood water is stored or used in wetlands via percolation into the soil, transpiration by plants, evaporation from surface waters, and detention in depressions, micro-topography, or low-lying landforms. Wetlands with no outlets, or constricted outlets, perform this function best.
- 2. Sediment Removal. Sediment removal refers to a wetland's capacity to remove suspended sediment from surface water and stabilize it within the wetland. This can occur, for example, when the energy associated with moving water is dissipated by dense wetland vegetation or allowed to spread out and pool in wetland micro-topography or depressions. None of the wetlands within the Project area are subject to an anthropogenic sediment source; however, the Grant Lake inlet wetlands receive suspended glacial till from Inlet Creek.
- 3. *Nutrient and Toxicant Removal*. This function is defined as the capacity of a wetland to remove suspended or dissolved nutrients and/or toxicants from groundwater and/or

surface water through the conversion to other forms (e.g. detention in vegetation or transformation to a gas). Wetland soils, plants, and organisms provide complex physical, chemical, and biological mechanisms for improving water quality. Nutrients, metals, and contaminants are retained by vegetation and the physical structure of the wetland; nutrients are incorporated into the vegetation biomass, absorbed by soils, or transformed by chemical and microbial pathways. Wetlands that have restricted outlets, ponding, a low slope angle, pronounced micro-topography, or are located in depressions provide a high level of this function because they can detain or retain water for longer periods of time.

- 4. *Erosion Control and Shoreline Stabilization*. This function is defined as the capacity of a wetland to dissipate the erosive forces of waves and streamflow, due to the ability of wetland vegetation to bind and stabilize soil within the root zone. This function was only evaluated for wetlands that are associated with shorelines of ponds, lakes, or stream banks.
- 5. *Production and Export of Organic Matter*. This function is defined as the capacity of a wetland to produce organic matter (e.g. dissolved or particulate carbon or detritus), and to export this organic matter to downstream or downflow environments. The exported organic matter is important for the support of primary and secondary productivity. Wetlands with dense deciduous vegetation, with a surface water (or inundated) connection to downstream environments perform this function best.
- 6. *General Wildlife Habitat Suitability*. This function is defined as the capacity of a wetland to provide general wildlife habitat support to birds and terrestrial mammals, including denning, forage, or breeding/nesting habitat. This includes habitat support for species that spend part or all of their life cycle in wetlands individually, or as part of a mosaic of wetlands in a local landscape. Sensitive plant or animal species (e.g., threatened or endangered species) were not evaluated as part of this function; they were instead evaluated as part of the "uniqueness and heritage" function. In addition to the data collected as part of the wetland delineation, this function was also evaluated using data collected for the Wildlife Study associated with the Project.
- 7. Fish Habitat. Fish habitat includes those biological, physical, and chemical attributes that support all life stages of fish. This function is defined as the capacity of a wetland to *directly* provide habitat to anadromous or resident salmonids. This function was only evaluated for wetlands that are associated with fish-bearing streams or lakes, such as riparian fringe wetlands that might be inundated during periods of high water and provide slower water refuge for salmonids. It was not assessed for wetlands providing indirect fish habitat (e.g., hydrologic or water quality related functions); these indirect fish habitat support functions were assessed as part of separate functions listed here. The fish habitat function was not assessed for Grant Lake or tributaries because no salmonids are present in the Grant Lake system upstream of Grant Creek. In addition to the data collected as part of the wetland delineation, this function was also evaluated using data collected for the Fish and Geomorphology Study associated with the Project.
- 8. *Native Plant Richness*. This function evaluates the capacity of a wetland to produce an abundance and diversity of hydrophytic plant species. Wetland plant communities contribute to many of the other functions (e.g., wildlife habitat). The production and support of abundant wetland vegetation is vital to the maintenance of energy and nutrient

cycling as well as other fundamental processes that are unique to wetlands and are a significant part of overall ecosystem functioning at the landscape level.

- 9. *Educational or Scientific Value*. This function is defined as the capacity of a wetland to provide educational or scientific opportunities to the public. These opportunities are limited to those that are water dependent and are directly related to wetlands. This function does not include general recreational activities. The entire Project area is located on State or USFS public lands.
- 10. Uniqueness and Heritage. The Uniqueness and Heritage function is defined as the capacity of a wetland to provide unique habitat due to biological, geological, cultural, or other features that are considered to be rare. Regarding rare biological characteristics, this function is provided by the following wetlands: 1) wetlands that are USFWS-designated critical habitat for threatened or endangered species; 2) wetlands with documented presence of threatened, endangered, or "priority" species designated by the USFWS, with "priority" species defined as those listed as candidates for Endangered Species Act (ESA) listing by the USFWS. This function is also provided by wetland types that are considered highly valuable and/or vulnerable by the State, as discussed in the Alaska Department of Fish & Game (ADF&G) Wildlife Action Plan (ADF&G 2006). In addition to the data collected as part of the wetland delineation, this function was also evaluated using data collected by the vegetation and wildlife teams associated with the Project (Sections 3 and 5 of this Terrestrial Resources Report respectively).
- 11. *Groundwater Interchange*. Groundwater interchange is defined as the capacity of a wetland to recharge and/or discharge to groundwater. Groundwater recharge is the infiltration of groundwater from a wetland into the underlying aquifer. Recharge replenishes the local or regional groundwater supply. Groundwater discharge is the net upward movement of water from an aquifer source to the wetland. Discharge creates and maintains wetlands and stream flows, supports plant and animal populations, and provides water for other uses. In addition to the data collected as part of the wetland delineation, this function was also evaluated using input by the water resources teams associated with the Project (KHL 2014e, KHL 2014f).

4.2.2.3. Categorization

The functional assessment method for the vegetated wetlands described above ultimately describes the capacity (low, moderate, high) of a functional class to perform a particular function. The results of the functional assessment were then converted into the functional Categories I, II, III, or IV as defined by RGL 09-01 (USACE 2009), with Category I being the highest functioning wetlands and Category IV being degraded and low functioning wetlands. These categories are used during the Section 404 permitting process to determine mitigation ratios for unavoidable impacts to jurisdictional wetlands, as part of compensatory mitigation planning and sequencing (avoidance, minimization, etc.). For example, unavoidable impacts to Category I wetlands may require a mitigation ratio of 2:1 to 3:1, meaning for every 1 acre of Project-related Category I wetland impacts the applicant would be required to restore, enhance and/or preserve 2 to 3 acres of similar wetland habitat or function to offset the loss (USACE 2009). Waters (non-vegetated wetlands) were not categorized as part of this report.

USACE (2009) RGL 09-01 defines the four categories as follows:

- Category I High Functioning Wetlands. These wetlands are the "cream of the crop." Generally, these wetlands are less common. These are wetlands that 1) provide a life support function for threatened or endangered species that has been documented; 2) represent a high-quality example of a rare wetland type; 3) are rare within a given region; or 4) are undisturbed and contain ecological attributes that are impossible or difficult to replace within a human lifetime, if at all.
- Category II High to Moderate Functioning Wetlands. These wetlands are those that 1) provide habitat for very sensitive or important wildlife or plants; 2) are difficult to replace; or 3) provide very high functions, particularly to fish or wildlife habitat.
- Category III Moderate to Low Functioning Wetlands. These wetlands can provide important functions and values. They can be important for a variety of wildlife species and can provide watershed protection functions depending on where they are located. Generally, these wetlands will be smaller and/or less diverse on the landscape than Category II wetlands. [Note that, for this assessment, Category III wetlands were functioning at a moderate level, as none of the Category III wetlands assessed were low functioning.]
- Category IV Degraded and Low Functioning Wetlands. These wetlands are typically the smallest, often isolated with very little vegetation diversity, and generally already degraded by human activities. Regional differences allow for a more narrow definition of this category.

Categories were assigned to functional classes using the Category definitions provided above (USACE 2009), as well as being based on the percent functional capacity at which each functional class was performing. Percent functional capacity was calculated as follows: Functional ratings were assigned a value—1, 2, or 3—for a low, moderate or high rating, respectively. The rating values were then summed for each functional class and divided by the highest possible rating value for a given functional class if the class were performing at 100 percent capacity. For example, if a functional class were evaluated for 10 of the 11 functions (e.g., for all functions except "fish habitat"), then the sum of the rating values would be divided by 30, the total rating if the functional class were performing at its highest capacity. Wetlands were then ranked as Category I, II, III, or IV based on their percent function capacity score. In addition, due to the importance of threatened, endangered, or priority species habitat, as well as salmonid habitat, if a functional class was rated as high for either the "uniqueness and heritage" or "fish habitat" function it was automatically categorized at a minimum as Category I or II, respectively.

4.3. Results

The following subsections present the results of the field-based and desktop wetland delineation and functional assessment. Data from the 2010 and 2013 field efforts provided a total of 41 field-based DPs and 82 OPs that were used to refine the wetland determination and functional assessment results presented in this report. In addition, this section provides a brief synopsis of the potential regulatory status of Project area wetlands with respect to USACE jurisdiction (USACE 2010) and Executive Order 11990 (42 FR 26961, 3 CFR, 121).

4.3.1. Wetlands Delineation and Waters Mapping

The field-based wetland delineation and waters mapping was conducted by qualified wetland scientists between July 16 and July 26, 2013, within the wetland assessment area defined in Figure 4.1-1. Weather conditions during the delineation were warm and dry; therefore, when appropriate, the delineators erred on the conservative side and assumed wetland hydrology could be present during cooler/wetter conditions.

A description of the wetland and waters types delineated within the wetland assessment area and terrestrial resource assessment area is provided below. Figure 4.3-1 through Figure 4.3-6 is an illustrative map set of the wetlands and waters. Table 4.3-1, Wetland and Waters – detailed, summarizes the various wetland and waters types by dominant vegetative cover (for vegetated wetlands), hydrogeomorphic positions (Brinson 1993), and NWI classification (vegetation and water regime, Cowardin et al. 1979), as well as cumulative areas within the terrestrial resource assessment area and 2013 wetland assessment area. Table 4.3-2, Wetland and Waters – summary, provides a summary of acreage and percent cover for each primary vegetation and surface water community within the terrestrial resource assessment area and the 2013 wetland assessment area is polygons are reported in linear feet.

Vegetated wetland communities mapped within the Grant Lake wetland assessment area include herbaceous dominated, scrub-shrub dominated, forested dominated wetlands associated with lacustrine, slope, and riparian areas. Waters mapped within the wetland assessment area include small tributary streams, Grant Creek, Inlet Creek, Grant Lake, and the Trail Lake Narrows. Ponds were also identified within the broader terrestrial resources assessment area, but not within the wetlands assessment area.

4.3.1.1. Herbaceous Wetland Communities

Herbaceous dominated wetlands within the terrestrial resources assessment area are associated with *depressional*, *lacustrine*, and *riverine* areas.

Depressional wetlands are those wetlands occurring within discrete topographic depressions primarily located on the south side of Grant Creek in the vicinity of the access road and transmission corridor. The largest individual wetland within the Project area is a depressional wetland located in the proposed tailrace detention pond area. Vegetation composition and hydrological conditions vary from strongly herbaceous to mixed herbaceous and scrub-shrub communities with saturated to seasonally flooded hydrologic conditions.

Lacustrine wetlands include persistent and non-persistent emergent wetlands, aquatic beds, and vegetated shoreline communities that are directly attached to or border Grant Lake or Upper Trail and Lower Trail lakes. The majority of these lakeshore communities are purely herbaceous, although some are mixed herbaceous and scrub-shrub types. Hydrological conditions range from saturated, seasonally flooded, semi-permanently flooded, to permanently flooded or inundated.

Riverine wetlands are those wetlands that are adjacent to and hydrologically influenced by Inlet Creek, Grant Creek, and their tributaries, as well as drainages associated with Grant Lake. These wetlands include both herbaceous only and herbaceous / scrub-shrub communities with hydrological conditions ranging from saturated to seasonally flooded. Riverine wetlands also include those wetlands found within an intricate wetland-upland mosaic associated with the Grant Creek side-channel complex immediately downstream of the proposed powerhouse location and along the Grant Creek side channel at its confluence with Upper Trail and Lower Trail lakes. Wetlands within the riparian mosaic are found in small topographic depressions or as intermittent wetland fringe along the side channels, typically occurring as saturated and seasonally flooded herbaceous stands and/or herbaceous and scrub-shrub mixed communities.

Table 4.3-1 and Table 4.3-2 include details and a summary of the acreages, data points, and dominant species associated for each herbaceous wetland type. Wetland datasheets, field notes, and representative photos of herbaceous dominated wetlands are included in Appendix 2a.

4.3.1.2. Scrub-Shrub Wetland Communities

Scrub-shrub dominated wetlands within the terrestrial resource assessment area are associated with *depressional*, *lacustrine*, and *riverine* areas.

Depressional scrub-shrub wetlands occur throughout or within portions of topographic depressions (usually as concentric rings) primarily on the south side of Grant Creek in the vicinity of the proposed access road and transmission corridor. Vegetation composition and hydrological conditions vary from predominantly broadleaf and/or needle leaf scrub-shrub to mixed scrub-shrub and herbaceous communities with saturated to seasonally flooded hydrologic conditions.

Lacustrine scrub-shrub wetlands include persistent shoreline communities that are directly attached to or border Grant Lake or Upper Trail and Lower Trail lakes. The majority of these lakeshore communities are broadleaf shrub-shrub with some mixed scrub-shrub and herbaceous types. Hydrological conditions range from saturated to seasonally flooded.

Scrub-shrub dominated *riverine wetlands* are broadleaf scrub-shrub and broadleaf scrub-shrub / herbaceous mixed wetlands that are adjacent to and hydrologically influenced by Inlet Creek, Grant Creek, and their tributaries, as well as drainages associated with Grant Lake. Seasonally flooded hydrologic conditions are typical of the riverine scrub-shrub wetlands within the Project area. Riverine wetlands also include scrub-shrub dominated wetlands found within an intricate wetland-upland mosaic associated with the Grant Creek side-channel complex approximately 300 feet downstream of the proposed powerhouse location. There are also two small riverine wetland-upland mosaics located on the north bank of Grant Creek immediately below the falls. Scrub-shrub wetlands within the riparian wetland/upland mosaic are found in small topographic lows or as intermittent wetland fringe along the side channels, typically occurring as temporarily flooded, saturated to seasonally flooded scrub-shrub stands and/or scrub-shrub and herbaceous mixed communities.

Table 4.3-1 and Table 4.3-2 include details and a summary of the acreages, data points, and dominant species associated for each scrub-shrub wetland type. Wetland datasheets, field notes, and representative photos of scrub-shrub dominated wetlands are included in Appendix 2a.

4.3.1.3. Forested Wetland Communities

There are two forest-dominated wetlands present within the Project area, occurring along a seasonal drainage on a north-facing slope and as a narrow fringe on the east side of the proposed tailrace detention pond area. In both cases, the wetland hydrology is more strongly influenced by the surrounding sloped topography that presumably contributes to the saturated hydrologic conditions found in both locations.

Tables 4.3-1 and 4.3-2 include details and a summary of the acreages, data points, and dominant species associated with the forested wetland type. The wetland datasheets, field notes, and representative photos of this wetland are included in Appendix 2a.

4.3.1.4. Waters

Waters within the Project area include the non-vegetated portions of Grant Lake (deep and shallow lake margins) and Trail Lake Narrows, Grant Creek, Inlet Creek, Project area tributaries and drainages (collectively referred to as small streams), and ponds. Waters assessed totaled 1,659.9 acres, with 1,650.1 assessed within Grant Lake and Trail Lake Narrows (99 percent), and 9.8 acres (9.8 percent) assessed within Grant and Inlet Creek channels. Small streams that were too narrow to map as polygons (e.g. less than 20 feet wide) were mapped as lines and reported in linear feet. A total of 13,582 linear feet of small streams were mapped within Project area (Table 4.3-2). All waters documented as part of the study had an ordinary high water mark, determined by a distinct vegetation line (e.g. a transition from unvegetated to vegetated, or from wetland to mesic or non-wetland vegetation), and/or geomorphic indicators (e.g., erosion line from wave action or stream flow).

Surface water is persistent and perennial for the lakes, ponds, and main channels of Grant Creek and Inlet Creek as well as for some of the primary tributary stream segments to these waterbodies. In addition, there are intermittent non-vegetated floodplains and outwash fans associated with Inlet Creek that were dry during the time of the delineation but are very likely inundated during higher flow events. Table 4.3-1 and Table 4.3-2 include details and a summary of the acreages for lakes, ponds, and rivers, and acreage or linear feet of small streams (depending on width), as well as data points associated with each open water type. Field notes and representative photos of open water features are included in Appendix 2a.

4.3.1.4.1. Small streams

The small streams included all of the tributary streams to Grant Creek, Grant Lake, and Trail Lake, identified within the Project area. Perennial small streams were classified as Cowardin R3UB, perennial unconsolidated bottom; intermittent streams were classified as R4SB, intermittent stream bottom (Appendix 2a). All of the small streams were moderate to high gradient, single channel streams.

Stream type and water regime are denoted by NWI type and water regime modifier in tables and figures (i.e., R3UBH or R4SBC). All of these streams were moderate to high gradient, single channel streams. Of the 17 streams within the transmission corridor and Grant Creek corridor, only four were perennial (Figure 4.3-2). In contrast, most small streams at the Grant Lake inlet were perennial. Tributaries to Grant Lake were both perennial and intermittent.

4.3.1.4.2. Grant and Inlet Creeks

Grant and Inlet creeks are the two primary large perennial streams within the Project area, with Inlet Creek entering at the mouth of Grant Lake, and Grant Creek flowing out of Grant Lake, and into the Trail Lake Narrows (Figure 4.3-1). Grant Creek is classified as Cowardin R2UB, perennial unconsolidated bottom (Appendix 2a), with the entire length located within the wetlands assessment area (approximately 1 mile long). Inlet creek while only the confluence area (~200-300 feet) of Inlet Creek was located within the wetlands assessment area. Grant Creek has a mean annual flow of 200 cfs. Grant Creek geomorphology, water quality, and aquatic habitats and resources are described extensively in the resource reports completed for the Project (KHL 2014f, KHL 2014e, KHL 2014a, KHL 2014b, respectively). Studies of Inlet creek were limited to geomorphology studies associated with Grant Lake (KHL 2014f), and the wetlands and waters study described in this report.

The Project divided Grant Creek into six reaches for study purposes; reaches are described in detail in the geomorphology (KHL 2014f) report, but are summarized here. Reach 1 is the lower gradient, alluvial fan section at the confluence with Trail Lake; Reaches 2 and 3 are also low to moderate gradient, with extensive riparian side channel areas on the south side of the creek; Reach 4 is slightly higher gradient with no side channel habitat; Reach 5 is a high gradient (>6 percent), high velocity bedrock channel, referred to as the canyon section; Reach 6 is the high gradient section just below the outlet of Grant Lake.

4.3.1.4.3. Trail Lake Narrows

The Trail Lake Narrows area is located between Upper Trail and Lower Trail lakes (Figure 4.3-1 It is considered Cowardin lacustrine habitat (L1UB, lacustrine unconsolidated bottom) for the purposes of the wetland and waters mapping.

4.3.1.4.4. Grant Lake

Grant Lake is an approximately 6-mile long, 1,649 acre¹ oligotrophic lake classified primarily as Cowardin lacustrine limnetic (deepwater) unconsolidated bottom, L1UB; a very small area was lacustrine littoral (L2UB or L2US) at the lake outlet. Inlet Creek is the primary inlet stream entering at the far eastern end; Grant Creek is the only surface water outlet flowing out of the western end of the lake. It is separated into two portions by a shallow submerged bedrock ridge, with the lower half trending north-south and 262 feet at its deepest point, and the upper half trending east-west and 283 feet at its deepest point. Most of the lake shore is characterized by steep slopes, with flatter shoreline areas limited to the inlet and outlet areas, and small areas of wetland fringe. The shoreline is primarily bedrock, with more erodible areas where small

¹ As calculated based on 2013 study data.

tributary drainages enter the lake forming alluvial fans. Grant Lake geomorphology and water quality are described extensively by the respective Project teams (KHL 2014f, KHL 2014e, respectively).

4.3.1.5. Regulatory Status of Project Area Wetlands

Regarding the potential jurisdictional status of Project area wetlands and waters, it is expected that Grant Lake, Upper Trail and Lower Trail lakes, Inlet Creek, Grant Creek, and all of the drainages and tributaries associated with those waterbodies will fall under the jurisdiction of the USACE under Section 404 of the CWA (USACE 2010). In addition, all of the wetlands associated with these waterbodies will also likely fall under the auspice of Section 404 (riverine, lacustrine, and depressional wetlands affected by the Project and how the Project would be required to compensate for unavoidable losses (if any) will ultimately be determined by the USACE during the Section 404 permitting process.

Federal agencies involved in the Project's FERC application review and approval process are required to consider impacts to wetlands under the directives of Executive Order 11990 (42 FR 26961, 3 CFR, 121). The purpose of Executive Order 11990 is "to avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative." Presumably, many of the potential wetland impacts described in Section 4.4, Conclusions, will be avoided or minimized through the development of site-specific, engineered controls and best management practices (BMP) during the Project's upcoming detailed engineering design phase.



Line Stream	Wetlan Wetlan	ds d Type	Scrub-Shrub Wetland / Floodplain Forest & Scrub	AND A DOWN
ream nd I Area		Herbaceous Wetland Herbaceous Wetland / Floodplain Forest & Scrub	Forested Wetland Pond Open Water Other Nonvegetated	
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Table 4.3-1. Wetlands and waters—detailed.

				Area Mapped (Acres)		
Wetland Cover Type	Hydrogeomorphic Position	NWI Class/ Subclass ¹	NWI Hydro Modifier ¹	Terrestrial Resource Assessment Area	Wetland Assessment Area	Vegetation Description ²
				Acres	Acres	
		PEM1	B, E, F, H	1.83	0.05	Palustrine emergent wetlands with saturated hydrologic conditions occurring throughout or within portions of Project area depressional features. Dominated by Drosera rotundifolia, Carex pauciflora, Rubus chamaemorus, Calamagrostis canadensis, Equisetum arvense. Wetland Points: OP55, (HDR 113, 116, 118,123); similar to DP14 but fewer scrub shrub.
Herbaceous Wetland	Depressional	PEM1/SS1	Е	0.24	0.08	Palustrine emergent and deciduous scrub-shrub mixed wetlands with saturated and seasonally flooded conditions occurring in a single depressional area within the transmission corridor west of Trail Lk. Dominated by Equisetum fluviatile, Comarum palustre, Sanguisorba canadensis, Calamagrostis canadensis, Salix barclayi, Betula glandulosa, Picea glauca. <i>Wetland</i> <i>Points: DP14</i>
	Lacustrine	PEM1	B, E, F, H	4.28	4.26	Palustrine emergent wetlands with hydrologic conditions ranging from saturated, seasonally flooded, semipermanently flooded, to permanently flooded typically occurring as a narrow fringe along portions of the Grant Lake shoreline. Dominated by Podagrostis aequivalvis, Poa palustris, Carex lenticularis, Carex utriculata, Calamagrostis canadensis, Equisetum arvense, Equisetum fluviatile, Carex aquatilis, Deschampsia caespitosa, Sanguisorba canadensis. <i>Wetland Points: DP10, DP27, DP33, OP59, OP61, OP62, OP65, OP67, OP82</i>
		PEM1/SS1	B, C, E	1.21	1.20	Palustrine emergent and deciduous scrub-shrub mixed wetlands with hydrologic conditions ranging from saturated to seasonally flooded occurring typically as a narrow fringe along portions of the Grant Lake and Trail Lake shoreline. Dominated by Chamerion latifolium, Calamagrostis canadensis, Comarum palustre, Equisetum arvense, Sanguisorba canadensis, Alnus viridis, Betula glandulosa, Populus balsamifera, Salix alaxensis, Salix barclayi, Salix sitchensis. <i>Wetland</i> <i>Points: DP01, DP35 (HDR107), OP60, OP68, OP69</i>
	I	Herbaceous Wetl	and Subtotal:	7.56	5.60	
Herbaceous Wetland / Floodplain Forest & Scrub	Riverine	PEM1	B, C, E	0.61	0.61	Palustrine emergent wetlands with hydrologic conditions ranging from saturated to seasonally flooded occurring as narrow fringe along stream channels or as part of a complex wetland-upland mosaic complex associated with Grant Creek side channels. Dominated by Calamagrostis canadensis, Carex sitchensis, Equisetum arvense, Sanguisorba canadensis. <i>Wetland</i> <i>Points: DP25, OP43, OP51, OP74</i>
		PEM1/SS1	С	2.50	2.50	Palustrine emergent and deciduous scrub-shrub mixed wetlands with seasonally flooded hydrologic conditions occurring in micro-topo lows within the complex riparian wetland-upland mosaic associated with the Grant Creek side channels. Dominated by Calamagrostis canadensis, Equisetum arvense, Athyrium felix-femina, Alnus viridis, Salix commutata. NOTE: Wetlands account for only 20% of the acreage associated with this mosaic community, the remaining 80% is upland. <i>Wetland Points: DP23</i> .
He	erbaceous Wetland / Floodp	olain Forest & Sc	rub Subtotal:	3.12	3.11	

Table 4.3-1, continued...

				Area Map	ped (Acres)	
Wetland Cover Type	Hydrogeomorphic Position	NWI Class/ Subclass ¹	NWI Hydro Modifier ¹	Terrestrial Resource Assessment Area Acres	Wetland Assessment Area Acres	Vegetation Description ²
Scrub-Shrub Wetland	Depressional	PSS1	B, E	5.97	0.21	Palustrine deciduous scrub-shrub wetlands with saturated to seasonally flooded hydrologic conditions occurring throughout or within portions of Project area depressional features Dominated by Ledum decumbens, Betula glandulosa, Vaccinium uliginosum. <i>Wetland</i> <i>Points: (HDR 129); similar to DP22</i>
		PSS1/3	B, E	3.35	0.14	Palustrine deciduous and broadleaved evergreen scrub-shrub wetlands with saturated conditions occurring throughout or within portions of Project area depressional features. Typically dominated by Rubus chamaemorus, Cronus canadensis, Emporium unigram, Betula glandulosa, Andromeda polifolia, Ledum decumbens. <i>Wetland Points: None, similar</i> <i>vegetation to DP17</i>
		PSS1/EM1	B, E	5.64	2.95	Palustrine deciduous scrub-shrub and emergent mixed wetlands with saturated to seasonally flooded hydrologic conditions occurring throughout or within portions of Project area depressional features, including the proposed detention pond area south of Grant Creek. Dominated by Picea glauca, Salix barclayi, Equisetum fluviatile, and Calamagrostis canadensis. <i>Wetland Points: DP22</i>
		PSS3/EM1	В	3.56	0.60	Palustrine broadleaved evergreen scrub-shrub and emergent mixed wetlands with saturated hydrologic conditions typically occurring within portions of Project area depressional features. Dominated by Andromeda polifolia, Betula glandulosa, Emporium unigram, Carex pauciflora, Rubus chamaemorus, Equisetum arvense. Wetland Points: DP17, DP20; (HDR 127)
		PSS4	В	0.11	0.00	Palustrine needle leaved evergreen scrub-shrub wetland with saturated hydrologic conditions occurring in a single depressional feature south of the transmission corridor on the west side of Trail Lake. Outside of 2013 wetland assessment area, plant species not documented. <i>Wetland</i> <i>Points: None, located outside of 2013 wetland</i> <i>assessment area</i>
		PSS4/3/EM1	В	1.25	0.40	Palustrine needle leaved and broadleaved evergreen scrub-shrub and emergent mixed wetland with saturated hydrologic conditions occurring in a depressional feature within the transmission corridor. Dominated by Picea glauca, Rubus chamaemorus, Andromeda polifolia, Betula glandulosa, and Ledum decumbens. <i>Wetland Points: DP19 (HDR 125)</i>
	Lacustrine	PSS1	С, Е	19.36	8.21	Palustrine deciduous scrub-shrub wetlands with saturated or seasonally flooded hydrologic conditions occurring as a narrow fringe along portions of the Grant Lake shoreline. Dominated by Salix alaxensis, Salix pulchra, Salix barclayi, Alnus viridis. <i>Wetland Points: OP12, OP15,</i> <i>OP80; (HDR106)</i>
		PSS1/EM1	B, C, E	7.25	7.24	Palustrine deciduous scrub-shrub and emergent mixed wetlands with saturated and seasonally flooded hydrologic conditions occurring typically as a narrow fringe along portions of the Grant Lake shoreline, or as larger wetlands at the Grant Lake inlet or outlet. Dominant plant species include Salix sitchensis, Salix alaxensis, Salix barclayi, Alnus viridis, Betula glandulosa, Carex hyemale, Carex canescens, Carex lenticularis, Equisetum arvense, Equisetum fluviatile, Calamagrostis canadensis, Chamerion latifolium, Sanguisorba canadensis, Wetland Points: DP03.

			DP04, DP06, DP08, DP29, DP31, OP81

Table 4.3-1, continued...

				Area Mapj	ped (Acres)		
Wetland Cover Type	Hydrogeomorphic Position	NWI Class/ Subclass ¹	NWI Hydro Modifier ¹	Terrestrial Resource Assessment Area Acres	Wetland Assessment Area Acres	Vegetation Description ²	
		PSS1	С	0.07	0.03	Palustrine deciduous scrub-shrub wetlands with seasonally flooded hydrologic conditions associated with small drainages within the Project area. Dominated by Salix sitchensis, Salix alaxensis, Alnus viridis, Sanguisorba canadensis, Rubus chamaemorus, Calamagrostis canadensis, Cronus canadensis. <i>Wetland Points:</i> <i>OP58</i>	
	Riverine	PSS1/EM1	С, Е	1.35	0.97	Palustrine deciduous scrub-shrub and emergent mixed wetlands with saturated to seasonally flooded hydrologic conditions associated with small drainages within the Project area. Dominated by Salix pulchra, Salix barclayi, Alnus viridis, Tsuga mertensiana, Equisetum arvense, Equisetum fluviatile, Calamagrostis canadensis, Agrostis mertensii. <i>Wetland Points:</i> DP12, DP39	
		Scrub-Shrub W	etland Subtotal:	47.91	20.75		
		PSS1	A, B, C, E	15.36	5.67	Palustrine deciduous scrub-shrub wetlands with hydrologic conditions ranging from temporarily flooded, saturated, to seasonally flooded associated with Project area active floodplain and outwash fan features. Dominated by Salix sitchensis, Salix alaxensis, Alnus viridis, Populus balsamifera, Calamagrostis canadensis, Equisetum hyemale. <i>Wetland Points: DP02, DP09</i>	
Scrub-Shrub Wetland / Floodplain Forest and Scrub	Riverine	PSS1/EM1	С, Е	2.22	2.22	Palustrine deciduous scrub-shrub and emergent mixed wetlands with saturated to seasonally flooded hydrologic conditions occurring in micro-topo lows within the complex riparian wetland-upland mosaic associated with the Grant Creek side channels. Dominated by Alnus viridis, Salix commutata, Calamagrostis canadensis. NOTE: Wetlands account for only 10% of the acreage associated with this mosaic community, the remaining 90% is upland. <i>Wetland Points: DP24, OP73, OP74</i>	
		PSS1/FO1	С	0.04	0.04	Palustrine deciduous scrub-shrub and deciduous forested mixed wetlands with seasonally flooded hydrologic conditions associated riparian fringe along Grant Creek. Dominated by Salix sitchensis, Salix alaxensis, Alnus viridis, Betula papyrifera. <i>Wetland Points: Documented on field</i> <i>map only; similar to DP24 but with more mature</i> <i>deciduous trees</i>	
	Scrub-Shrub / Floodplain Fo	orest & Scrub W	etland Subtotal:	17.62	7.94		
Forested Wetland	Slope	PFO4	В	0.81	0.81	Palustrine needle leaved evergreen forested wetland with saturated hydrologic conditions; within the Project area this includes one wetland which is associated with the west-facing slope adjacent to the detention pond. Dominated by Picea glauca, Salix barclayi, Betula papyrifera, and Agrostis stolonifera. <i>Wetland Points: OP40</i> (<i>HDR121</i>)	
Forested Wethand	Stope	PFO4/EM1	В	0.08	0.08	Palustrine needle leaved evergreen forested and emergent mixed wetland with saturated hydrologic conditions associated with a seasonal drainage on a north-facing slope. Dominated by Salix sitchensis, Salix alaxensis, Alnus viridis, Tsuga mertensiana, Rubus chamaemorus, Cronus canadensis. <i>Wetland Points: DP37, (HDR 110)</i>	
		Forested W	etland Subtotal:	0.89	0.89		
		(Grant Lk.)	Н	1648.20	1648.20	Unvegetated deep water (greater than 6.6 ft deep) of Grant Lake. <i>Wetland Points: None</i> Unvegetated shallow water (less than 6.6 ft deep)	
Open Water		L2UB (Grant Lk.)	Н	0.82	0.82	associated with the outlet of Grant Lake. Wetland Points: None	
	Lacustrine	L2US (Grant Lk.)	С	0.09	0.09	Unvegetated shallow water (less than 6.6 ft deep) associated with the outlet of Grant Lake. <i>Wetland</i> <i>Points: None</i>	
			Total Grant Lk.	1649.11	1649.11		
		L1UB (Trail Lk. Narrows)	Н	1.54	1.02	Unvegetated deep water (greater than 6.6 ft deep) of Trail Lake Narrows. <i>Wetland Points: None</i>	
		Open	Water Subtotal:	1650.65	1650.12		

Table 4.3-1, continued...

				Area Map	ped (Acres)		
Wetland Cover Type	Hydrogeomorphic Position	NWI Class/ Subclass ¹	NWI Hydro Modifier ¹	Terrestrial Resource Assessment Area	Wetland Assessment Area	Vegetation Description ²	
				Acres	Acres		
Pond	Depressional	PUB	PUB H 0.06 0.00		0.00	Shallow ponds (less than 20 acres in size) associated with depressional features within the Project area. All were outside the 2013 wetland assessment area. <i>Wetland Points: None, located</i> <i>outside 2013 wetland assessment area</i>	
			Pond Subtotal:	0.06	0.00		
Non-Vegetated		R2UB (Grant Cr.)	Н	6.74	6.74	Active channel and unvegetated portion of the Grant Creek main channel and side channels. <i>Wetland Points: OP28, OP45, OP48, OP51</i>	
	Riverine	R3UB (Outwash fans and Inlet Cr.)	С	12.03	3.07	Unvegetated channel beds and outwash fan located at the inlet of Grant Lake, including areas of Inlet Creek channel that are flooded during high flow and likely during high precipitation events, but dry during low flows. <i>Wetland</i> <i>Points: OP14, OP56, OP79</i>	
		R3UB (Small streams, perennial)	Н	17,772 ft	8,303 ft	Unvegetated perennial permanently flooded (flowing) active stream channels mapped as stream lines throughout Project area. Includes small stream tributaries to Grant Creek, Grant Lake, and active channels of Inlet Creek. No acreages associated with these stream lines. <i>Wetland Points: DP12,(HDR112), DP14, DP31, DP39, OP01, OP02, OP03, OP07, OP08, OP09, OP16, OP18, OP56, OP58, OP59, OP68, OP76</i> (HDR109), OP79; (HDR126)	
		R4SB (Small streams, intermittent)	С	10,818 ft	5,279 ft	Unvegetated intermittent seasonally flooded (not flowing during survey) stream channels mapped as stream lines throughout Project area. Includes small stream tributaries to Grant Creek and Grant Lake. No acreages associated with these stream lines. <i>Wetland Points: DP17, OP11, OP25,</i> <i>(HDR117) OP32, OP33, OP43, OP64, OP80;</i> <i>(HDR111)</i>	
Non-Vegetated Riverine Subtotal:				18.77	9.82		
			TOTALS	1745.04	1697.22		

Notes:

1. NWI and hydro modifier codes are the Wetlands and Deepwater Habitats Classification table (Cowardin et al 1979) in Appendix 2b.

2. DP =wetland delineation point, ERM 2013 field; OP = observation point, ERM 2013 field; (HDR ##) = HDR data point, HDR 2010 field; Wetland types w/o specific data points were assessed as part of the ERM 2013 field study, the HDR 2010 field study, or through a desktop analysis. Community associations were determined based on field knowledge of the wetland communities.

	Terre	strial Resources sessment Area	2013 Wetland Assessment Area		
Vegetated Wetland Communities	Acres	% Coverage	Acres	% Coverage	
Herbaceous Wetlands	7.6	10%	5.6	15%	
Herbaceous Wetland / Floodplain Forest & Scrub	3.1	4%	3.1	8%	
Scrub-Shrub Wetlands	47.9	62%	20.8	54%	
Scrub-Shrub Wetland / Floodplain Forest & Scrub	17.6	23%	7.9	21%	
Forested Wetlands	0.9	1%	0.9	2%	
Vegetated Wetland Subtotals	77.1		38.3		
Non-Vegetated Waters- Lakes, Ponds, Rivers	Acres	% Coverage	Acres	% Coverage	
Open Water - Grant Lake	1,649.1	99%	1,649.1	99%	
Open Water - Trail Lake Narrows	1.5	0%	1.0	0%	
Open Water - Ponds	0.1	0%	0	0%	
Riverine- Grant Creek main and side channels	18.8	1%	9.8	1%	
Riverine- Outwash fans and areas of Inlet Creek channel	12.0	1%	3.1	0%	
Non-Vegetated Water Acres Subtotals	1,669.5		1,659.9		
ACREAGE TOTAL	1,746.6		1,698.2		
Non-Vegetated Waters ¹ - Streams	Feet		Feet		
Streams (perennial)	17,772	62%	8,303	61%	
Streams (intermittent)	10,818	38%	5,279	39%	
FEET TOTAL	28,590		13,583		

 Table 4.3-2.
 Wetlands and waters- summary.

Notes:

1. Streams that were mapped as lines rather than polygons due to width.

4.3.2. Functional Assessment Results

Due to the undisturbed nature of the Project area, most of the wetlands and waters within the wetland assessment area were functioning at their highest potential, thus this functional assessment is considered a rough measure of their undisturbed, "baseline" functional condition. However, this does not mean that all of the evaluated functions were present or performing equally for each of the functional classes, nor is the highest functional potential equal between functional classes (i.e., for many functions, maximum functional potential is inherently greater for certain functional classes as compared to others), due to differences in hydrology, geomorphology, and vegetation (for the vegetated wetlands). Potential existing disturbance sources within the Project area are limited to residences along the Trail Lake Narrows that could cause shoreline erosion and water quality degradation, and walk-in fishing on Grant Creek. Results of the functional assessment are presented for non-vegetated wetlands (referred to as waters) and vegetated wetlands below. Note that this section is a summary of potential functions, the characteristics of several of the functional classes are discussed in greater detail in their respective resource reports (wildlife, vegetation, geomorphology, water quality, and fisheries).

4.3.2.1. Waters Functional Assessment

Four functional classes were assessed as part of the waters functional assessment: small streams, Grant and Inlet Creeks, the Trail Lake Narrows, and Grant Lake. Table 4.3-3 presents the functional assessment ratings (present, absent, or not assessed) for each of the three moving water functional assessment classes. The small streams functional class included all of the tributary streams to Grant Creek, Grant Lake, and Trail Lake, identified within the wetland assessment area. Grant Creek included both the main and side channels.

Eight functions were present for small streams, all 15 functions were present for Grant Creek and Inlet Creek, and for the Trail Lake Narrows. As a deepwater habitat, Grant Lake was not evaluated as part of Table 4.3-3, but its assessment is presented in the narrative below.

		Functional Class				
	Waters Function	Small Streams	Grant and Inlet Creeks	Trail Lake Narrows		
	Stream evolution processes	Х	Х	Х		
System Dynamics	Energy management	Х	Х	Х		
	Riparian succession	0	Х	Х		
	Surface water storage processes	0	Х	Х		
Hydrologic Balance	Surface/ subsurface water exchange	0	Х	Х		
	Hydrodynamic character	Х	Х	Х		
G. P	Sediment continuity	Х	Х	Х		
and Character	Substrate and structural processes	X^1	Х	Х		
and Character	Quality and quantity of sediments	Х	Х	Х		
	Biological communities and processes	X^1	Х	Х		
Biological Support	Necessary aquatic and riparian habitats	X^1	Х	Х		
	Trophic structures and processes	Х	Х	Х		
	Water and soil quality	0	Х	Х		
Chemical Processes and Pathways	Chemical processes and nutrient cycles	0	Х	Х		
	Landscape pathways	Х	Х	Х		

 Table 4.3-3. Results of waters functional assessment for moving waters functional classes.

Notes:

1. Limited to the moderate gradient perennial small streams

X Function present O Function not present

4.3.2.1.1. Small Streams

A total of 13,582 linear feet of small streams were mapped within the wetlands assessment area (Table 4.3-2). Twenty-three of the small stream segments were perennial (8,303 feet); 36 stream segments (5,279 feet) were intermittent with no water flowing in the channel during the 2013 assessment. Small streams were evaluated as having eight of the 15 functions present (Table4.3-3). While perennial and intermittent streams were evaluated equally for this presence/absence assessment, overall, perennial streams would be expected to perform all of the functions at a
higher level than intermittent streams. The following is a summary of the results of the waters functional assessment presented in Table 4.3-3. Two of the System Dynamics functions were present; stream evolution was considered present but limited for this class due to their very young nature and moderate to high gradient. These streams do dissipate energy, as many of them had considerable alluvial fans at their mouths. Riparian succession was considered absent (or very limited) due to their moderate to high gradient, high velocity channels, which lacked significant movement required for riparian succession. Most of the vegetation succession along these channels was due to natural slope vegetation succession (e.g., along Grant Lake associated with alder monocultures in avalanche paths), or forest succession (e.g., along all other channels) and not due to the stream channel. Stream banks were naturally stable for the small streams, with minimal erosion.

Only one of the Hydrologic Balance functions was present for the small streams, maintenance of hydrodynamic character, as the small streams do exhibit a natural flow regime. Due to their steeper gradient, they do not contribute to surface water storage, and contribute only negligibly to surface/subsurface water exchange. Small streams provide varying degrees of Sediment Process and Character functions. These moderate to high gradient small streams maintain sediment continuity, as they provide for natural erosion, transport, and deposition processes, as well as maintenance of substrate sorting and armoring within their channel and downstream receiving waters. They also maintain the quality and quantity of sediments, contributing to the natural sediment regime within their channel and downstream waters. Although they have limited habitat complexity, the more moderate gradient perennial (and possibly intermittent) small streams entering Grant Creek likely contribute to the maintenance of the quality of substrate and structural processes by providing rearing habitat for young fish. However, it is unlikely that the steeper high gradient perennial or intermittent small streams provide this habitat.

All the Biological Support functions were present for small streams (although minor), with significantly greater support provided by the perennial streams as opposed to the intermittent streams. The moderate perennial (and potentially intermittent) small streams likely provide necessary aquatic habitats within their channel; however, with less habitat complexity and flow they were not considered as productive as Grant Creek and Inlet Creek. They also maintain trophic structure and processes at a minimal level by acting as pathways for riparian-derived detrital inputs (e.g., leaf and needle litter) to the adjacent and downstream channels, contributing nutrients to the system. Although minimal, the moderate gradient perennial tributaries to Grant Creek likely provided some direct support for biological communities, e.g. rearing habitat for young fish, although these small streams were not surveyed as part of the 2013 fisheries study. The Project fisheries report (KHL 2014b) noted that during the1981-1982 fish surveys, sculpin and three-spine stickleback were the only fish observed in Grant Lake, and no fish were observed in Grant Lake tributaries.

One Chemical Processes and Pathways function was present in the small streams class. Small streams, particularly perennial streams, act as landscape pathways, maintaining both longitudinal and lateral (detrital inputs) connectivity. With their limited water retention time, steeper gradient, and limited hydric riparian soils, the small streams do not likely function to improve water and soil quality, nor maintain chemical processes and nutrient cycles.

4.3.2.1.2. Grant and Inlet Creeks

Salmonid species are present and spawn in reaches 1-4 of Grant Creek; the upstream end of Reach 5 provides a barrier to upstream salmonid migration, and no salmonids are found in Grant Lake (KHL 2014b). Where lower gradient side slopes allow riparian communities to exist along Grant Creek they are primarily mid to later successional scrub shrub and non-wetland forested areas, with limited herbaceous and scrub shrub wetland fringes and side channel areas (as described in the vegetated wetland section above). The portion of Inlet Creek within the wetland assessment area is a low gradient, dynamic, braided system with extensive sediment and bedload deposition, forming an alluvial fan where it flows into Grant Lake. Due to a more active disturbance regime, riparian areas along Inlet Creek are primarily early to mid-successional herbaceous and scrub shrub communities, with some floodplain forest and scrub riparian areas and backwater areas associated with beaver damming.

All of the functions were present for Grant and Inlet creeks (Table 4.3-3) with most of the functions performing at a high level compared to small streams. Grant and Inlet creeks have significant System Dynamic functions, with active stream evolution processes, energy management, and riparian succession. The Grant Creek riparian area is in a later successional state than the Inlet Creek riparian area, with less armoring, greater channel movement and disturbance occurring along Inlet Creek. Both creeks have extensive side channel systems with associated vegetated riparian wetlands (evaluated in the vegetated wetlands section below). The exception to the extensive riparian is within the Grant Creek upper Canyon Reach. Hydrologic Balance functions are also present, although surface water storage processes are more limited than the lotic habitats (e.g., Grant Lake). Primary water storage areas include the side channel areas and microtopographic features on both creeks, and the beaver ponds along Inlet Creek. Surface/subsurface water exchange occurs within the hyporheic zones along both creeks, likely to a greater degree than small streams. The rivers maintain their hydrodynamic character with natural flow regimes, including the characteristic spring and fall peak flows resulting from snowmelt and fall rains respectively, as well as additional flashy storm events spring through fall (KHL 2014e). Banks are relatively stable for Grant Creek, which is well armored; Inlet Creek banks are naturally eroding to the extent typical of a braided gravel bed channel.

Sediment Process and Character functions are performing at a high level in Grant and Inlet creeks. They provide for sediment continuity (e.g., erosion, transport, and deposition processes), as well as maintain the natural quality and quantity of sediments. Inlet creek is a dynamic system, characterized by glacial sediment deposits, gravel, and cobble, which form a highly erodible alluvial fan as it enters Grant Lake, providing a source of suspended sediment to Grant Lake. Grant Creek is a steep bedrock canyon in the upper reach; the geomorphology report for the Project (KHL 2014f) identified the Canyon Reach as the sole source of bedload material for the downstream reaches. This material is thought to be carried downstream during episodic events (e.g., a landslide into Grant Lake that pushes a surge of water into Grant Creek with the Trail Lake Narrows (KHL 2014f). With the exception of the Canyon Reach of Grant Creek, Grant Creek and Inlet Creek have a high degree of structural complexity for maintenance of substrates and structural processes. Both creeks have large woody debris, side channel habitat, diversity of substrates, healthy overhanging riparian vegetation, and frequent disturbance events which are important for maintaining this structural diversity (KHL 2014 a). Grant Creek also has habitat

within undercut bank areas, and large boulders which create low velocity habitat. With the presence of salmonids, Grant Creek provides habitat for a greater diversity of species than Inlet Creek (KHL 2014b).

Grant Creek and Inlet Creek provide high quality Biological Support functions. Both streams provide for maintenance of biological communities and processes with diverse assemblages of native species and age classes, including fish and benthic macroinvertebrates (KHL 2014b, KHL 2014g, respectively), with Grant Creek providing greater aquatic species diversity than Inlet Creek due to the presence of salmonids in Grant Creek (KHL 2014b). These creeks also provide necessary aquatic and riparian habitats, with excellent in-channel and riparian habitat diversity, as described above related to the substrate and structural process function described in the paragraph above (e.g., large woody debris, side channel habitat, diversity of substrates, and healthy overhanging riparian vegetation) (KHL 2014a). The exception to this habitat diversity is the canyon section of Grant Creek (Reach 5), which provides minimal low velocity habitat within a steep bedrock channeled reach (KHL 2014a). Reaches 2 and 3 of Grant Creek are considered the most ecologically productive, due to the complex side channel habitat, and increased habitat complexity in the main channel. Both creeks provide for trophic structure and processes, with several trophic levels represented, including periphyton, benthic macroinvertebrates, small resident fish (e.g., sticklebacks), as well as salmonids in Grant Creek. Both creeks also provide habitat for stream-associated waterfowl, and a food source (fish) for raptor species. These creeks also provide nutrient levels capable of sustaining the native species.

Chemical Process and Pathways functions are provided by Grant and Inlet creeks through the maintenance of water and soil quality, chemical processes and nutrient cycles, and landscape pathways. With the exception of the Canyon Reach on Grant Creek (Reach 5) Grant and Inlet creeks likely provide moderate water and soil quality improvement, and chemical process and nutrient cycling functions. Most of the potential water quality and nutrient processing likely occurs in the lower velocity side channels, and in the hyporheic zones of the main and side channels (e.g. dissolved nutrient processing), and within riparian wetlands (nutrient processing) and adsorption, and sediment and particulate retention). In-channel functions are expected to be limited to nutrient cycling via the breakdown of detrital material, and sediment deposition in Inlet Creek (Grant Creek appears to flush most of its suspended sediment through the channel resulting in the alluvial fan at the confluence). It is important to recognize that although nutrient processing functions are occurring, they are likely limited due to the low productivity of the creeks which limits nutrient inputs (KHL 2014e). Grant and Inlets creeks do however have significant natural suspended sediment inputs associated with upstream glaciers (KHL 2014f). Both creeks maintain natural thermal regimes, with Grant Creek's temperatures driven primarily by the thermal regime of Grant Lake due to minimal groundwater or surface water inputs to the creek (KHL 2014e).

Both creeks act as landscape pathways, maintaining both longitudinal and lateral (detrital inputs) connectivity with downstream and riparian environments, as well as acting as habitat corridors for fish and birds. The high gradient, high velocity sections of the Grant Creek Canyon Reach also act as a barrier of longitudinal pathways for upstream salmonid passage (KHL 2014b), as there are no salmonids in Grant Lake.

4.3.2.1.3. Trail Lake Narrows

Because the Narrows area between the lakes functions more like a riverine system than a lacustrine habitat, it was assessed using the streams functional assessment method. All of the functions were present for the Trail Lakes Narrows (Table 4.3-3). The System Dynamics functions were present but were more limited than Grant and Inlet creeks. Due to its position between two large lakes, Trail Lakes Narrows exhibits a more stable hydrologic regime than the small streams, on Grant or Inlet creeks (KHL 2014e). As such, stream evolution processes, energy management, and the resulting riparian succession are more limited for the Narrows. Hydrologic Balance functions are also present, although as a larger "river" with limited side channels, surface water storage processes are limited, with greater water conveyance functions rather than storage functions (KHL 2014e). Surface/subsurface water exchange occurs within the hyporheic zone. The Narrows area maintains its hydrodynamic character with a natural flow regime, including the characteristic spring and fall peak flows resulting from snowmelt and fall rains respectively, with these peak events buffered by the storage capacity of Upper Trail Lake.

Sediment Process and Character functions are performing at a high level in the Trail Lake Narrows. It provides for sediment continuity (e.g., erosion, transport, and deposition processes), as well as maintaining the natural quality and quantity of sediments. The Narrows area is not as dynamic as Grant or Inlet creeks, but does carry suspended sediment from Upper to Lower Trail Lakes. The water quality report for the Project (KHL 2014e) found that the Trail Lake Narrows consistently had higher turbidity values than found in Grant Lake or Grant Creek, yet well below the Alaska Department of Environmental Conservation (ADEC) water quality standards. Trail Lakes Narrows has a low to moderate degree of structural complexity for maintenance of substrates and structural processes, with minimal large woody debris, and no off-channel habitat areas. It does have a diversity of substrates, and healthy overhanging riparian vegetation. Trail Lakes provides important salmonid habitat within the Kenai River watershed.

The Trail Lakes Narrows provides high quality Biological Support functions. The area provides for maintenance of biological communities and processes with diverse assemblages of native species and age classes, including fish and benthic macroinvertebrates (KHL 2014b, KHL 2014g, respectively). It also provides necessary aquatic and riparian habitats, with in-channel and riparian habitat diversity, as described above, related to the substrate and structural process function described in the paragraph above (e.g., large woody debris, and healthy overhanging riparian vegetation) (KHL 2014a). The Narrows also provides for trophic structure and processes, with several trophic levels represented, including periphyton, benthic macroinvertebrates, juvenile and adult fish, as well as habitat for stream-associated waterfowl, and a food source (fish) for raptor species. Trumpeter swans, a USFS Species of Special Concern, were observed just downstream of the Trail Lake Narrows during the spring 2013 wildlife studies associated with the Project. The Narrows also provides nutrient levels capable of sustaining the native species.

Chemical Process and Pathways functions are provided by the Trail Lake Narrows through the maintenance of water and soil quality, chemical processes and nutrient cycles, and landscape pathways. The Narrows likely provides moderate water and soil quality improvement, and chemical process and nutrient cycling functions. Most of the potential water quality and nutrient processing likely occurs in the hyporheic zone (e.g., dissolved nutrient processing); however, this

is expected to be more limited than in Grant and Inlet creeks due to the lack of extensive side channels and riparian wetlands where nutrient processing and adsorption, and sediment and particulate retention would typically occur. In-channel functions (nutrient cycling via the breakdown of detrital material, and sediment deposition) are expected to be rather limited, as most of the suspended sediment and materials would be expected to be flushed through the channel. The water quality report for the Project (KHL 2014e) found that levels of gas and diesel range organic chemicals were below detectible limits within the Narrows. It is important to recognize that although nutrient processing functions are occurring, they are likely limited due to the low productivity of the Narrows water, which limits nutrient inputs. Trail Lake Narrows also acts as a landscape pathway, maintaining both longitudinal and lateral (detrital inputs) connectivity with downstream and riparian environments, as well as acting as habitat corridors for fish and birds.

4.3.2.1.4. Grant Lake

The following is a summary of the functions potentially performed by Grant Lake. Although the Fischenich (2006) stream functions assessment was not formally used to assess Grant Lake, the applicable functions are described where applicable for consistency with the moving waters assessment described above.

Grant Lake performs several hydrologic, biogeochemical, and ecological functions. Hydrologic and hydraulic functions are functioning at a high level within the lake. The watershed is subject to a natural hydrologic regime, with natural vertical lake fluctuations estimated at 7 feet, fluctuating between approximately 696 and 703 feet in elevation (NAVD 88) due to snow melt, glacial melt, and precipitation, with the ordinary high water surface elevation estimated at 700 feet elevation. The highest water surface elevations typically occur during the summer months, the lowest occur during the winter months. Due to its steep shoreline, minimal riparian areas are present, with all lacustrine fringe wetlands described in the vegetated wetland assessment below. Grant Lake is important for surface water storage within the watershed.

Sediment functions are very important within the Grant Lake watershed. Grant Lake is subject to natural wind-generated erosive forces that erode shoreline areas, deposit, and transport sediments along the shoreline. However, the geomorphology report for the Project (KHL 2014f) indicated that erosion due to wind-generated waves was minimal, even in the highly erodible alluvial fan areas. They also reported that sediment loads in Grant Lake remain trapped in the lake, with very little suspended sediment or bedload being transported into Grant Creek. Overall substrate and structural habitat complexity is limited due to the steep bedrock shoreline in most areas, with habitat complexity limited to the less steep shoreline areas, where some large woody debris, and littoral zone vegetation is present.

Grant Lake provides high quality Biological Support Functions, providing for maintenance of biological communities and processes with diverse assemblages of native species and age classes, including fish (non-salmonids) and benthic macroinvertebrates. Grant Lake provides relatively moderate quality aquatic and riparian habitat, with limited littoral and riparian habitat diversity (e.g., large woody debris and diversity of substrates) due to the steep shoreline. Grant Lake provides for trophic structure and processes, with several trophic levels represented, including periphyton, benthic macroinvertebrates, small resident fish (sticklebacks and sculpins).

The Project fisheries report (KHL 2014b) noted that during the1981-1982 fish surveys, sculpin and three-spine stickleback were the only fish observed in Grant Lake; based on additional studies prior to 2013, no salmonids have been observed in Grant Lake. The littoral areas, as well as open water areas during winter, also provide waterfowl habitat; the 2013 Project wildlife study observed trumpeter swans, a USFS Species of Special Concern, in an open area within the ice on Grant Lake.

Chemical Process and Pathways functions are provided by the natural limnology of Grant Lake through the maintenance of natural water quality, chemical processes and nutrient cycles, and landscape pathways. Grant Lake itself acts as a sediment sink, trapping sediment in its deep basin, with almost no transport downstream into Grant Creek, thereby functioning to maintain the water quality of downstream receiving waters (KHL 2014f). Grant Lake is naturally a highly oligotrophic lake, with cold water and low nutrient inputs (KHL 2014e). Natural nutrient inputs include detritus entering from shore and the littoral zone, and from biological sources (e.g., fish and wildlife). Grant Lake also maintains a natural thermal regime, contributing to the natural thermal regime of Grant Creek (KHL 2014e). The 2013 Project water quality study (KHL 2014e) found that temperatures in Grant Creek best matched Grant Lake outlet water temperatures at a depth of 1.5 meters (during ice-free periods), rather than the lake surface temperature. The water quality studies also indicate that Grant Lake is only minimally thermally stratified, but does exhibit spring and fall turnover events where the lake mixes, important for redistribution of nutrients and the removal of temperature gradients within the water column. Although there are limited riparian areas where nutrient processing and adsorption, and sediment and particulate retention would typically occur, natural nutrient cycling occurs within the lake water column. Grant Lake also acts as a landscape pathway, maintaining both longitudinal and lateral (detrital inputs) connectivity with downstream and upstream environments, as well as acting as habitat corridors for fish and birds.

4.3.2.2. Wetlands Functional Assessment

A total of 38.29 acres of vegetated wetlands were assessed within the wetlands assessment area, with 6.34 acres (16.5 percent) assessed within the transmission corridor / facilities functional assessment area, 4.39 acres (11.5 percent) in the Grant Creek functional assessment area, and 27.57 acres (72 percent) in the Grant Lake functional assessment area (Table 4.3-4). Fifteen wetland functional classes were identified across the three functional assessment areas (Table 4.3-4). Table 4.3-3 also presents the DP (and functional assessment data form(s)) with which each functional class is associated, as well as the associated vegetation types (NWI Class/Subclass), as described in Table 4.3-1 and Table 4.3-2 in the wetland delineation results section, Section 4.3.1 above.

Table 4.3-5 presents the functional assessment ratings (low, moderate, or high) for each of the functional assessment classes. Each functional class was assessed for a minimum of nine functions; and up to ten or eleven functions for some of the functional classes, depending on whether the "erosion control and shoreline stabilization" or "fish habitat" functions were assessed for a given functional class. Most of the functional classes rated as moderate or high for the evaluated functions, with a few exceptions.

Several functional classes were not evaluated for the "erosion control and shoreline stabilization" function because the wetlands associated with these functional classes were not located adjacent to streams, ponds, or lakes. Similarly, only the two functional classes located within the Grant Creek corridor were evaluated for the "fish habitat" function, as none of the other functional classes were associated with fish-bearing (salmonid) waters. All of the functional classes were rated as moderate for the "educational or scientific" function, as all of the functional classes were located on public land, but none were noted for scientific/educational use and were not used for wetland-focused recreation. All but two of the functional classes (forested slope wetland and Grant Lake Inlet scrub shrub) were rated as high for the "nutrient and toxicant" removal function.

All of the functional classes were rated equally as low for the "uniqueness and heritage" function. Project area wetlands are not habitat for any USFWS-designated threatened or endangered plant or animal species, or State-listed endangered plant or animal species, and as such none were expected nor documented within the Project area wetlands. "Priority" species were those listed as candidates for ESA listing by the USFWS. Two USFWS-designated ESA candidate bird species were potentially present in the Project area, Kittlitz's murrelet and the yellow-billed loon, but neither was documented in the Project area during the 2010 or 2013 Wildlife surveys, nor during the 1981-1982 field surveys (see Section 5, Wildlife, for additional details on Wildlife surveys within the Project area). While USFS Sensitive Species or Species of Special Interest plant and bird species were detected by the Project sensitive plant and wildlife teams during the 2013 surveys (as reported in Sections 3 and 5 respectively of the Terrestrial Resources Report), the RGL 09-01 (USACE 2009) is focused exclusively on the documented occurrence of "priority" species designated by the USFWS, and, as noted above, no priority species were documented in wetlands (see the wetland functional assessment data forms presented in Appendix 2a).

Lastly, according to the Project cultural resources team (KHL 2014c), none of the wetlands were considered "culturally significant" (e.g., habitat for a culturally significant plant species). Note that the proposed Iditarod National Historic Trail (INHT), as currently planned, bisects the northwest corner of the wetland associated with the proposed tailrace detention pond, and continues across Grant Creek immediately downstream of the powerhouse location. While the proposed INHT is considered socially significant, it was not considered significant from a wetlands perspective because wetlands do not inherently contribute to the social or historical significance of the trail.

Characteristics and general rating of each functional class are discussed below by functional area, with greater discussion focused on the functions that showed more variation between functional classes (e.g., "erosion control and shoreline stabilization" and "fish habitat").

4.3.2.2.1. Transmission Corridor / Facilities Area

Six functional classes were identified within the transmission corridor / facilities area: four of the functional classes within this area were associated with depressional wetlands, grouped by dominant vegetation type: herbaceous depressional, deciduous scrub shrub depressional, broadleaved evergreen scrub shrub depressional, and needle leaved evergreen scrub shrub depressional. One riverine wetland functional class, small stream scrub shrub riparian riverine

wetland, and one slope wetland functional class, forested slope wetland, were also associated with the transmission corridor / facilities area. These functional classes were rated as having a moderate or high capacity to perform most of the functions. The exception was that the three depressional scrub shrub functional classes were not evaluated for the "erosion control and shoreline stabilization" function because they were not associated with a stream bank or shoreline, and none of the functional classes in this area were evaluated for the fish habitat function because they direct fish habitat.

4.3.2.2.2. Grant Creek Corridor Area

The Grant Creek corridor includes only vegetated wetlands along Grant Creek; the Grant Creek main and side channels are discussed in the waters functional assessment above. Within the Grant Creek corridor, two riverine functional classes were identified: herbaceous riparian wetlands and scrub shrub riparian wetlands. Both of these riparian functional classes were associated with floodplain and wetland fringe areas along Grant Creek, with one small area located along Upper Trail Lake. These functional classes were also rated as having a moderate or high capacity to perform most functions. Because these were riparian fringe or floodplain wetlands with dense vegetation, they ranked high for the "erosion control and shoreline stabilization" function. These functional classes rated high for the "fish habitat" function because they provide potential salmonid habitat within a narrow fringe along Grant Creek and its side channels during high water events.

4.3.2.2.3. Grant Lake Area

The Grant Lake area includes only vegetated wetlands along Grant Lake; Grant Lake itself is discussed in the waters functional assessment above. The bulk of the wetland acreage in the wetlands assessment area was associated with the Grant Lake functional area. Four of the lake functional classes were identified at the lake inlet area. Three were lacustrine classes: inlet herbaceous wetlands, inlet herbaceous inundated wetland, and inlet scrub shrub wetland. One was a riverine functional class, inlet scrub shrub riparian, located along the alluvial fan outwash channels adjacent to Inlet Creek. Two functional classes were identified along the lake shore outside of the inlet or outlet area; both were lacustrine fringe wetlands: herbaceous lake fringe wetland and scrub shrub lake fringe wetland. Lastly, one functional class was identified at the lake outlet area, outlet herbaceous wetland. These functional classes were also rated as having a moderate or high capacity to perform most functions. Due to their adjacency to Grant Lake or Inlet Creek, all of the lake wetlands were evaluated for the "erosion control and shoreline stabilization" function; all of the functional classes scored high for this function, except the inlet herbaceous wetland, and inlet herbaceous inundated wetland functional classes scored low due to their lack of dense vegetation. No salmonids are present in Grant Lake or its tributaries (KHL 2014b); therefore, the lake functional classes were not evaluated for the "fish habitat" function.

1 able 4.3-4 . Functional classes, acreages, and associated characterist

Function	al Area ¹	Functional Class ²	Wetland Cover Type	Hydrogeomorphic Position	Acres	Percent Wetland Assessment Area	Representative Data Point(s) ³	NWI Codes	Hydro
		Herbaceous depressional wetland	Herbaceous Wetland	Depressional	0.14	0.36	DP14	PEM1, PEM1/SS1	B, E, F, H
		Deciduous scrub shrub depressional wetland			3.16	8.25	DP22	PSS1, PSS1/3, PSS1/EM1	B, E
Transmissio Facil	n Corridor / lities	Broadleaved evergreen scrub shrub depressional wetland	Scrub Shrub Wetland	Depressional	0.74	1.93	DP17, DP20	PSS3/EM1	В
racinuts		Needle leaved evergreen scrub shrub depressional wetland			0.40	1.05	DP19	PSS4, PSS4/1, PSS4/3/EM1	В
		Small stream scrub shrub riparian		Riverine	1.01	2.63	DP12, DP39	PSS1, PSS1/EM1	E, C
		Forested slope wetland	Forested Wetland	Slope	0.89	2.32	DP37	PFO4/EM1	В
			Total Tra	nsmission Corridor / Facilities	6.34	16.5			
Grant Graak Carridar	Grant Creek herbaceous riparian	Herbaceous Wetland / Floodplain Forest & Scrub	Riverine	3.11	8.12	DP23, DP25	PEM1, PEM1/SS1	B, C, E	
		Grant Creek scrub shrub riparian	Scrub-Shrub Wetland / Floodplain Forest & Scrub		1.28	3.34	DP24	PSS1/EM1, PSS1/FO1	С
				Total Grant Creek Corridor	4.39	11.5			
		Grant Lake inlet herbaceous wetland	Herbaceous Wetland		0.70	1.84	DP01	PEM1/SS1	С
	Lake Inlet	Grant Lake inlet herbaceous inundated wetland		Lacustrine	1.23	3.22	DP10	PEM1	F
		Grant Lake inlet scrub shrub wetland	Scrub Shrub Wetland		13.99	36.54	DP03, DP04, DP06, DP08	PSS1, PSS1/EM1	B, C, E
Grant Lake		Grant Lake inlet scrub shrub riparian	Scrub-Shrub Wetland / Floodplain Forest & Scrub	Riverine	6.66	17.39	DP02, DP09	PSS1	B, E
	Lake	Grant Lake herbaceous lake fringe wetland	Herbaceous Wetland		3.03	7.91	DP27, DP33	PEM1, PEM/SS1	B, E, H
	Shore	Grant Lake scrub shrub lake fringe wetland	Scrub Shrub Wetland	Lacustrine	1.45	3.79	DP29, DP31	PSS1, PSS1/EM1	Е
	Lake Outlet	Grant Lake outlet herbaceous wetland	Herbaceous Wetland		0.50	1.29	DP35	PEM1/SS1	Е
				Total Grant Lake	27.56	72.0			
			TOTAL WET	FLAND ASSESSMENT AREA	38.29				

 Notes:

 1.
 Functional area where the functional class was found; some areas overlap, e.g. transmission corridor at Grant Lake shoreline. Transmission Corridor includes corridor and Project facilities.

 2.
 Functional class: developed based on integration of dominant vegetation type, hydrogeomorphic position, and primary area within Project.

 3.
 Wetland DP functional assessment data form with which the functional class is associated.

Table 4.3-5.	Functional	assessment	ratings	for eac	h func	ctional	class.
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Functional Area ¹	Functional Class ²	Representative Data Point(s) ³	Flood Flow Alteration	Sediment Removal	Nutrient, & Toxicant Removal	Erosion Control and Shoreline Stabilization	Production and Export of Organic Matter	General Wildlife Habitat Suitability	Fish Habitat	Native Plant Richness	Educational or Scientific	Groundwater Interchange	Uniqueness and Heritage
	Herbaceous depressional wetland	DP14	Moderate	High	High	High	High	High	NA	Moderate	Moderate	High	Low
	Deciduous scrub shrub depressional wetland	DP22	Moderate	Moderate	High	NA	High	High	NA	High	Moderate	High	Low
Transmission Corridor /	Broadleaved evergreen scrub shrub depressional wetland	DP17, DP20	Moderate	Moderate	High	NA	Moderate-High	High	NA	Moderate	Moderate	Moderate-High	Low
Facilities	Needle leaved evergreen scrub shrub depressional wetland	DP19	Moderate	Moderate	High	NA	High	High	NA	Moderate	Moderate	High	Low
	Small stream scrub shrub riparian	DP12, DP39	Moderate	Moderate- High	High	High	High	High	NA	Moderate- High	Moderate	Moderate-High	Low
	Forested slope wetland	DP37	Moderate	Moderate	Moderate	NA	Moderate	High	NA	High	Moderate	High	Low
Grant Creek	Grant Creek herbaceous riparian	DP23, DP25	Moderate	High	High	High	High	High	High	Moderate- High	Moderate	Moderate-High	Low
Corridor	Grant Creek scrub shrub riparian	DP24	Moderate	High	High	High	High	High	High	High	Moderate	High	Low
	Grant Lake inlet herbaceous wetland	DP01	Moderate	Moderate	High	Low	High	High	NA	Moderate	Moderate	Moderate	Low
Loko Inlot	Grant Lake inlet herbaceous inundated wetland	DP10	Moderate	High	High	Low	Moderate	Moderate	NA	Moderate	Moderate	Moderate	Low
Lake Inter	Grant Lake inlet scrub shrub wetland	DP03, DP04, DP06, DP08	Moderate- High	Moderate- High	High	High	High	High	NA	Moderate	Moderate	Moderate	Low
	Grant Lake inlet scrub shrub riparian	DP02, DP09	Moderate	Moderate- High	Moderate-High	High	Moderate-High	Moderate	NA	Moderate	Moderate	Moderate	Low
Laka Shara	Grant Lake herbaceous lake fringe wetland	DP27, DP33	Moderate	High	High	High	High	Moderate- High	NA	Moderate	Moderate	Moderate-High	Low
	Grant Lake scrub shrub lake fringe wetland	DP29, DP31	Moderate	Moderate- High	High	High	High	High	NA	Moderate	Moderate	Moderate-High	Low
Lake Outlet	Grant Lake outlet herbaceous wetland	DP35	Moderate	High	High	High	High	High	NA	Moderate	Moderate	High	Low

Notes:

1. Functional area where the functional class was found; some areas overlap, e.g. transmission corridor at Grant Lake shoreline. Transmission Corridor includes corridor and Project facilities.

Functional class: developed based on integration of dominant vegetation type, hydrogeomorphic position, and primary area within Project.
 Wetland DP functional assessment data form with which the functional class is associated.

4.3.2.3. Wetlands Categorization

Table 4.3-6 presents the results of the categorization of the 15 wetland functional classes into USACE categories (per USACE 2009) within the wetlands assessment area. A separate categorization was not performed for the waters within the Project area. The wetlands within each functional class were either moderate functioning Category III wetlands, or moderate to high functioning Category II wetlands, based on the category definitions presented in RGL 09-01 (USACE 2009), as well as on the percent functional classes were performing at 67 percent of their functional capacity, while the highest-ranking functional class was performing at 88 percent of its functional capacity. With this range of functional capacity ratings, a threshold between Category III and Category III wetlands was established at 75 percent functional capacity and were thus categorized as Category III wetlands (10.22 acres, or 27 percent of the wetlands within the wetland assessment area). The remaining functional classes were functioning at greater than 75 percent of their functional capacity and were categorized as Category III wetlands within the wetland assessment area).

				Α	cres per	Catego	ry
Functional Per Area Functional Class		Percent Functional Capacity	Ι	П	Ш	IV	
		Herbaceous depressional wetland	83	/	0.14	/	/
		Deciduous scrub shrub depressional wetland	81	/	3.16	/	/
Trans	mission ridor /	Broadleaved evergreen scrub shrub depressional wetland	74	/	/	0.74	/
Corridor / Facilities		Needle leaved evergreen scrub shrub depressional wetland	78	/	0.40	/	/
		Small stream scrub shrub riparian	82	/	1.01	/	/
	Forested slope wetland 74		74	/	/	0.89	/
Total Transmission Corridor / Facilities					4.71	1.63	0.00
Grant Creek		Grant Creek herbaceous riparian	85	/	3.11	/	/
Cor	Corridor Grant Creek scrub shrub riparian		88	/	1.28	/	/
		Total Grant Cre	ek Corridor	0.00	4.39	0.00	0.00
		Grant Lake inlet herbaceous wetland	67	/	/	0.70	/
	Lake	Grant Lake inlet herbaceous inundated wetland	67	/	/	1.23	/
a .	Inlet	Grant Lake inlet scrub shrub wetland	80	/	13.99	/	/
Grant Lake Lake		Grant Lake inlet scrub shrub riparian	72	/	/	6.66	/
		Grant Lake herbaceous lake fringe wetland	80	/	3.03	/	/
	Shore	Grant Lake scrub shrub lake fringe wetland	80	/	1.45	/	/
	Lake Outlet	Grant Lake outlet herbaceous wetland	83	/	0.50	/	/
		Total	Grant Lake	0.00	18.97	8.59	0.00

 Table 4.3-6.
 Wetland acres per category by functional class.

None of the wetland functional classes were considered rare and had no documented occurrence of a threatened, endangered, or priority species; therefore, none were categorized as high functioning Category I wetlands. Due to the undisturbed nature of the wetlands, none of the functional classes were categorized as low functioning Category IV wetlands.

4.4. Potential Impacts to Wetlands and Waters

Potential Project-related impacts to wetlands and waters have been qualitatively evaluated for direct and indirect impacts. The functional assessment described in Section 4.2, Methods and Section 4.3, Results, illustrates the various direct and indirect interdisciplinary linkages between wetlands and waters with other study disciplines evaluated for this Project. For example, direct or indirect effects to Project area soils, vegetation, groundwater hydrology, or surface water hydrology could result in localized impacts to wetland and water communities within the Project area. Likewise, impacts to wetlands could have localized effects on the integrity and function of Project area soils, vegetation, and water resources. Similarly, impacts or changes to wetland and water resources to the level of use or benefits gained by fish, wildlife, or humans that use wetlands and waters for habitat, food, protection, or recreation.

The following sections discuss the potential impacts to specific wetland or waters types (depressional, lacustrine, or riverine); impacts by Project infrastructure type are presented in Table 4.4-1. It is important to note that the potential impacts discussed in these sections are preliminary and based primarily on the Terrestrial Resources studies and the current amount of engineering feasibility work conducted prior to this report being developed. Many of the potential wetland impacts described below will be avoided or minimized through the development of site-specific engineered controls and best management practices (BMPs) during the Project's upcoming detailed engineering design phase. A full discussion of wetland impacts will be included in the DLA.

Table 4.4-1.	Potential	wetland in	pacts by	Project	infrastructure ty	pe.
						P • •

Project Component	Potential Qualitative S	Short Term Impacts ^{1,2}	Potential Qualitative Long Term/Permanent Impacts ¹			
1 Toject Component	Direct	Indirect	Direct	Indirect		
GRANT CREEK DIVERSION						
Natural Outlet Option	Vegetation clearing/grubbing; soil disturbance; shoreline/bank disturbance; short-term reduced capacity to perform certain wetland functions (i.e. water quality, wildlife habitat); temporary surface water turbidity	Weed infestation; soil erosion; sediment input to water column; poor native vegetation re-establishment; short-term redacted capacity to perform certain wetland functions (i.e. water quality, wildlife habitat)	Fills due to structure; altered bank, shoreline and lakebed; permanently reduced capacity to perform certain wetland functions (i.e. water quality, wildlife habitat, stormwater attenuation)	Effects of new max lake level elevation on wetland vegetation (i.e. inundation); change in lakeshore erosion/deposition; effect of new Grant Creek in-stream flow regime on hydrologically connected riparian wetlands; change in capacity to perform certain wetland functions (i.e. shoreline stabilization, wildlife habitat)		
Concrete Dam Option	Vegetation clearing/grubbing; soil disturbance; shoreline/bank disturbance; short-term reduced capacity to perform certain wetland functions (i.e. water quality, wildlife habitat); temporary surface water turbidity	Weed infestation; soil erosion; sediment input to water column; poor native vegetation re-establishment; short-term reduced capacity to perform certain wetland functions (i.e. water quality, wildlife habitat)	Fills due to structure; altered bank, shoreline and lakebed; permanently reduced capacity to perform certain wetland functions (i.e. water quality, wildlife habitat, stormwater attenuation)	Effects of new max lake level elevation on wetland vegetation (i.e. inundation); change in lakeshore erosion/deposition; effect of new Grant Creek in-stream flow regime on hydrologically connected riparian wetlands; change in capacity to perform certain wetland functions (i.e. shoreline stabilization, wildlife habitat)		
WATER CONVEYANCE						
Intake Structure	Vegetation clearing/grubbing; soil disturbance; shoreline/bank disturbance; short-term reduced capacity to perform certain wetland functions (i.e. water quality, wildlife habitat); temporary surface water turbidity	Weed infestation; soil erosion; sediment input to water column; poor native vegetation re-establishment; short-term reduced capacity to perform certain wetland functions (i.e. water quality, wildlife habitat)	Fills due to structure; altered bank, shoreline and lakebed; permanently reduced capacity to perform certain wetland functions (i.e. water quality, wildlife habitat, stormwater attenuation)	Effects of new max lake level drop on wetland vegetation (i.e. wetland to upland conversion); down cutting in creeks may drain wetlands and add suspended sediments to water column; change in lakeshore erosion/deposition; effect of new in-stream flow regime on hydrologically connected riparian wetlands; change in capacity to perform certain wetland functions (i.e. shoreline stabilization, wildlife habitat)		
Tunnel	At surficial entrance and exit of tunnel: vegetation clearing/grubbing; soil disturbance; shoreline/bank disturbance; short-term reduced capacity to perform certain wetland functions (i.e. water quality, wildlife habitat); temporary surface water turbidity	At surficial entrance and exit of tunnel: weed infestation; soil erosion; sediment input to water column; poor native vegetation re-establishment; short-term reduced capacity to perform certain wetland functions (i.e. water quality, wildlife habitat)	Fills due to structure; permanently reduced capacity to perform certain wetland functions (i.e. water quality, wildlife habitat, stormwater attenuation)	At surficial entrance and exit of tunnel: weed infestation; soil erosion, sediment input to water column; poor native vegetation re-establishment; change in capacity to perform certain wetland functions (i.e. water quality, wildlife habitat)		
Penstock	Vegetation clearing/grubbing; soil disturbance; short-term reduced capacity to perform certain wetland functions (i.e. water quality, wildlife habitat)	Weed infestation; soil erosion; poor native vegetation re-establishment; short-term reduced capacity to perform certain wetland functions (i.e. water quality, wildlife habitat)	Fills due to structure; permanently reduced capacity to perform certain wetland functions (i.e. water quality, wildlife habitat, stormwater attenuation)	Weed infestation; soil erosion; poor native vegetation re-establishment; change in capacity to perform certain wetland functions (i.e. water quality, wildlife habitat).		
Tailrace	Vegetation clearing/grubbing; soil disturbance; short-term reduced capacity to perform certain wetland functions (i.e. water quality, wildlife habitat); temporary surface water turbidity	Weed infestation; soil erosion; sediment input to water column; poor native vegetation re-establishment; short-term reduced capacity to perform certain wetland functions (i.e. water quality, wildlife habitat)	Wetland excavation and fills; permanently reduced capacity to perform certain wetland functions (i.e. water quality, wildlife habitat, stormwater attenuation)	Drainage of adjacent wetlands; weed infestation; soil erosion; sediment input to water column; poor native vegetation re-establishment; change in capacity to perform certain wetland functions (i.e. water quality, wildlife habitat)		
Tailrace Detention Pond	Vegetation clearing/grubbing; soil disturbance; bank disturbance; short-term reduced capacity to perform certain wetland functions (i.e. water quality, wildlife habitat); temporary surface water turbidity	Weed infestation; soil erosion; sediment input to water column; poor native vegetation re-establishment; short-term reduced capacity to perform certain wetland functions (i.e. water quality, wildlife habitat)	Fills due to structures associated with detention pond and conveyance pipeline; inundation of wetland areas; sedimentation; loss of certain wetland functions and gain of others (i.e. loss of wildlife habitat functions tied to existing vegetation, and gain of open water habitat resulting from inundation)	Possible expansion of wetland fringe around water edge; weed infestation; soil erosion; sedimentation/burial of existing wetland vegetation; sediment input to water column (if pipeline conveys sediment laden water); poor native vegetation re-establishment; change in capacity to perform certain wetland functions (i.e. water quality, wildlife habitat)		

Table 4.4-1, continued...

Ducient Component	Potential Qualitative	Potential Qualitative Short Term Impacts ^{1,2}		Term/Permanent Impacts ¹
Project Component	Direct	Indirect	Direct	Indirect
POWERHOUSE				
Powerhouse Structure	Vegetation clearing/grubbing; soil disturbance; short-term reduced capacity to perform certain wetland functions (i.e. water quality, wildlife habitat)	Weed infestation; soil erosion; sediment input to water column; poor native vegetation re-establishment; short-term reduced capacity to perform certain wetland functions (i.e. water quality, wildlife habitat)	Fills due to structure; permanently reduced capacity to perform certain wetland functions (i.e. water quality, wildlife habitat, stormwater attenuation)	Weed infestation; soil erosion; poor native vegetation re-establishment; change in capacity to perform certain wetland functions (i.e. water quality, wildlife habitat)
TRANSMISSION LINE/SWITCHYARD				
Above Ground Option	Vegetation clearing/grubbing; soil disturbance; bank disturbance; short-term reduced capacity to perform certain wetland functions (i.e. water quality, wildlife habitat); temporary surface water turbidity	Weed infestation; soil erosion; sediment input to water column; poor native vegetation re-establishment; short-term reduced capacity to perform certain wetland functions (i.e. water quality, wildlife habitat)	Fills where poles are installed in wetlands or surface water bodies; loss of certain wetland functions (i.e. water quality, wildlife habitat, stormwater attenuation)	Weed infestation; soil erosion; poor native vegetation re-establishment; change in capacity to perform certain wetland functions (i.e. water quality, wildlife habitat). Change in wetland vegetation community if ROW is maintained clear of woody vegetation.
Below Ground Option	Vegetation clearing/grubbing; soil disturbance; bank disturbance; short-term reduced capacity to perform certain wetland functions (i.e. water quality, wildlife habitat); temporary surface water turbidity	Weed infestation; soil erosion; sediment input to water column; poor native vegetation re-establishment; short-term reduced capacity to perform certain wetland functions (i.e. water quality, wildlife habitat)	Wetland excavation and fills for buried utility line; permanently reduced capacity to perform certain wetland functions (i.e. water quality, wildlife habitat, stormwater attenuation)	Drainage of adjacent wetlands; weed infestation; soil erosion; sediment input to water column from erosion; poor native vegetation re-establishment; change in capacity to perform certain wetland functions (i.e. water quality, wildlife habitat). Change in wetland vegetation community if ROW is maintained clear of woody vegetation.
ACCESS ROADS				
Access Roads	Vegetation clearing/grubbing; soil disturbance; bank disturbance; short-term reduced capacity to perform certain wetland functions (i.e. water quality, wildlife habitat); temporary surface water turbidity	Weed infestation; soil erosion; sediment input to water column; poor native vegetation re-establishment; short-term reduced capacity to perform certain wetland functions (i.e. water quality, wildlife habitat)	Fills due to structure; permanently reduced capacity to perform certain wetland functions (i.e. water quality, wildlife habitat, stormwater attenuation)	Weed infestation; soil erosion; sediment input to water column; poor native vegetation re-establishment; change in capacity to perform certain wetland functions (i.e. water quality, wildlife habitat)

Notes:

1. The potential impacts discussed in this table are qualitative based primarily on the terrestrial studies and the limited amount of engineering design work conducted prior to this report being developed. This table and the associated impacts will be refined as engineered designs are finalized for the Project. A discussion of wetland impacts will be included in the DLA.Short term impacts would occur primarily during construction; Project would be constructed over a 30-36 month time period.

4.4.1. Depressional Wetlands

Depressional wetlands within the Project area include those wetlands occurring within discrete topographic depressions primarily located on the south side of Grant Creek in the vicinity of the access road and transmission corridor (Figure 4.3-2). Due to their geographic position, these wetlands experience little to no hydrologic influence from Grant Lake or Grant Creek. Therefore, there are no anticipated impacts to depressional wetlands associated with changes to lake level elevations and fluctuations, nor are there any anticipated impacts to depressional wetlands associated with the proposed changes to Grant Creek Project flows.

Potential indirect and direct impacts to depressional wetlands will primarily result from the construction, operation, and maintenance of the following Project features noted in Table 4.4-1: detention pond and small segments of the access road and transmission line corridor. While the water conveyance tunnel would pass under several depressional wetlands, it is assumed the underground tunnel would be constructed in a manner that would not alter wetland hydrology and, therefore, would not result in any impacts to depressional wetlands.

4.4.2. Lacustrine Wetlands and Waters

Vegetated Lacustrine Wetlands – Lacustrine wetlands include persistent and non-persistent emergent wetlands, aquatic beds, and vegetated shoreline communities that are directly attached to or border Grant Lake (Figure 4.3-1). Note that there were no vegetated lacustrine fringe wetlands associated with Upper Trail and Lower Trail lakes; therefore, this section refers to potential impacts to Grant lake lacustrine wetlands only (Figure 4.3-4 through Figure 4.3-6).

Grant Lake lacustrine wetlands could be affected by proposed changes to the lake's surface water elevations and fluctuations, as well as impacts associated with the construction and operation of Project features on the lake. As noted in Section 1.1, there are two concepts currently being considered for water control at the outlet of Grant Lake: the natural outlet option and the concrete diversion dam option. The new outlet control structure and low level intake structure will result in a new minimum pool elevation of approximately 692 feet NAVD 88, which is 4 feet lower than the current estimated minimum pool elevation of 696 feet NAVD 88. The maximum pool elevation, if the diversion structure option is implemented, is estimated to increase to 705 feet NAVD 88, up 2 vertical feet from the current estimated maximum pool elevation of 703 feet NAVD 88. Lake level and associated fluctuations will be further assessed with engineering studies. If it is determined that lake level changes would constitute a measurable gain or loss of jurisdictional wetlands it will be discussed with stakeholders and documented in the draft license application along with potential options for mitigation. In general, if minimum pool elevations occur during the growing season for prolonged periods of time (e.g., weeks), lacustrine wetlands, particularly herbaceous wetlands, may dry out and convert to uplands. Alternatively, if maximum pool elevations occur during the growing season for prolonged periods of time (e.g., weeks), lacustrine wetlands, especially herbaceous wetlands along the current wetted shoreline may drown. There is also the potential for areas of new wetland fringe to become established along the wetted shoreline if a new consistent pool elevation is maintained during the Project's normal operational conditions.

Other potential impacts associated with Grant Lake lacustrine wetlands include those resulting from the construction, operation, and maintenance of the following Project features noted in Table 4.4-1: outlet control structure, low level intake structure, surficial entrance to the tunnel, and a small portion of the access road that approaches the low level intake structure.

Non-Vegetated Lacustrine Waters – Lacustrine waters, also referred to as 'open water' in this report, includes the non-vegetated portions of Grant Lake and Upper Trail and Lower Trail lakes (deep and shallow lake margins). Depending on the timing, frequency, and duration of the new Grant Lake level fluctuations, the open water component of the lake may increase or decrease. Lake level and associated fluctuations will be further assessed with engineering studies. If it is determined that lake level changes would constitute a measurable gain or loss of jurisdictional waters it will be discussed with stakeholders and documented in the draft license application along with potential options for mitigation. Lake level fluctuations are not expected to change significantly for Upper Trail and Lower Trail lakes as a result of the Project; therefore, there are no anticipated gains or losses to the open water component of the Trail Lake system.

Potential impacts to the open water portion of Grant Lake and the Upper Trail and Lower Trail lakes include those resulting from the construction, operation, and maintenance of the following Project features noted in Table 4.4-1 that could potentially affect the bed, bank and surface water of the lakes: outlet control structure (Grant Lake), low level intake structure (Grant Lake), the initial segment of the conveyance tunnel (Grant Lake), and the access road, bridge, and transmission line that crosses the Trail Lake Narrows.

4.4.3. Riverine Wetlands and Waters

Vegetated Riverine Wetlands - Riverine wetlands are those wetlands that are adjacent to and hydrologically influenced by Inlet Creek, Grant Creek, and their tributaries, as well as drainages associated with Grant Lake.

Riverine wetlands associated with Inlet Creek and Grant Lake drainages have the potential to be affected by the new lake level elevations that would result from the outlet control structure and low level intake structure on Grant Lake. The Project is not expected to alter the current instream flows for Inlet Creek or surrounding lake tributaries/drainages. HEA's current operation plan is to draw the lake down no further than 4 ft below the current natural low and. under the concrete dam option, raise the lake level no further than 2 ft above its current natural maximum. However, the new minimum and maximum lake levels could cause erosion or depositional changes to stream channels and their associated floodplains and outwash fans at the Grant Lake interface. Changes to channel bed and form could, in turn, affect the hydrology of adjacent wetlands. Depending on the timing, duration and frequency, a drop in the lake level elevation commissariat with operations could cause the Inlet Creek and lake drainage channels to downcut or become incised, and possibly drain the adjacent riverine wetlands at the Grant Lake shoreline. Fortunately, the majority of the Grant Lake shoreline is well-armored with angular rocks which would likely minimize the potential for channels to become incised. Alternatively, an increase in the lake level elevation could create a backwater effect at the stream channel/Grant Lake interface, which could cause some low lying riverine wetlands to drown from excessive inundation, or be buried by increased sedimentation or deposition, while other wetland areas may expand and/or become enhanced by the additional hydrology.

There are no additional anticipated impacts associated with Project construction, operational, or maintenance for Inlet Creek or the tributaries/drainages that terminate at Grant Lake.

Instream flows associated with the various steep drainages and tributaries to Grant Creek are not expected to be affected by the changes in surface water elevations in Grant Lake or by the changes to instream flows in Grant Creek. Several seasonal drainages could be affected, however, by the construction, operations, and maintenance of several Project features described in Table 4.4-1, including: tailrace detention pond and outlet, access road, and transmission line. The water conveyance tunnel would pass under several seasonal drainages; however, it is assumed the underground tunnel would be constructed in a manner that would not alter stream hydrology and, therefore, would not result in any impacts to those drainages or their associated wetlands.

One of the most significant changes associated with the Project will be changes to instream flows in the main channel and primary side channels of Grant Creek (refer to Section 5.2 and Section 6.2 of the Water Resources Report for a detailed description). Instream flows will be reduced in the upper portion of Grant Creek, also referred to as the 'Canyon Reach,' between the Grant Lake outlet and the powerhouse tailrace (Reach 4/5 break). The majority of the water that naturally flows down this reach would be diverted to the powerhouse via the low elevation intake structure and tunnel to produce power. A limited amount of water would continue to flow down Grant Creek's Canyon Reach to provide a consistent baseflow throughout the year. This drop in flow would expose more channel bed and bank, reduce sediment transport, and most likely cause the four small wetland fringe communities mapped within the Canyon Reach to be drained and convert to uplands (a total wetland loss of approximately 0.2 acres) (Figure 4.3-2). Steep seasonal drainages that contribute to instream flows are not expected to be affected.

Annual average instream base flows from the powerhouse tailrace downstream to the Grant Creek outlet are expected to increase with Project operations; however, peak flows will be reduced, allowing for quality main stem habitats to be maintained for longer periods. Note that during annual periods of high water when lake inflows exceed the Project's maximum capacity of 350 cfs, the excess water will bypass the diversion structure and flow naturally through the Grant Creek channel, and continue to access the adjacent floodplain. It is fully anticipated that Grant Creek will continue to see peak flows well above what the Project can accommodate. The new instream flow pattern is expected to keep side channels wetted spring through fall. As noted in Section 4.3.1, wetlands located along the lower portion of Grant Creek are predominantly associated with complex wetland/upland floodplain mosaics that are supported by flood and baseflow hydrology. The anticipated instream flow changes to lower Grant Creek could affect associated riverine wetlands in a variety of ways. Wetland areas located in the distal fringes of the existing Grant Creek floodplain that are supported by current natural peak flows may be negatively affected by reduced peak flow hydrology (although it is unknown at this time what proportion of the wetland hydrology is supported by groundwater baseflows vs. surface water contributions). Alternatively, wetland areas supported by an increase in baseflows would experience a longer hydroperiod that could have beneficial results like expanded and enhanced wetland areas.

Non-Vegetated Riverine Waters - The riverine waters include the nonvegetated bed and bank of Inlet Creek channel, Grant Lake tributaries/drainages, Grant Creek tributaries/drainages, the Grant Creek channel, and numerous unvegetated floodplain and outwash fans that are likely inundated with surface water during spring breakup and flood events. Potential impacts to riverine waterbodies associated with Grant Lake and Grant Creek tributaries are noted in riverine wetland discussion above. Refer to Section 5.2 and Section 6.2 of the Water Resources Report for further discussion of anticipated impacts or changes to Grant Creek channel geomorphology resulting from changes to instream flow.

In addition, there are several construction, operational, and maintenance-related impacts noted in Table 4.4-1 that could affect the riparian wetlands associated with Grant Creek and the Grant Creek bed and bank including: the outlet control structure, the tailrace outlet, the detention pond outlet, the bridge, and small segments of the access road and transmission line corridor that cross small seasonal side channels and drainages. All other Project features have been intentionally configured to avoid unnecessary impacts to Grant Creek and other Project area stream channels.

4.4.4. Potential Impacts by Project Infrastructure Type

Table 4.4-1 summarizes the types of potential direct and indirect impacts associated with Project construction and operations, summarized by short term versus long term/permanent impacts. This table and the associated impacts will be fully refined, vetted, and incorporated into the DLA once the engineering designs are finalized. Table 4.4-1 combined with wetland maps will help guide Project engineering designs for Project infrastructure components as well as for the development of mitigation plans for the construction and operation phases.

4.5. Conclusions

This report provides the technical summary of the assessment methods, results, and conclusions of the 2013 Wetlands and Waters Study. The objective of the 2013 Wetlands and Waters Study was to delineate and describe wetlands and other potential "waters of the U.S." potentially impacted by the Project. The 2013 field effort delineated wetlands and other potential waters in the Project study area. Specifically, preliminary wetland maps were prepared; a field survey of wetlands and waters was conducted throughout the areas needing further study described in the Study Plan; a wetland functional assessment was conducted; and final wetland and waters maps were prepared using wetland data collect for the Project in 2010 and 2013. In addition, the potential impacts associated with Project construction and operational activities were evaluated.

As Project designs are further refined, the data provided in this report will be applied to conduct a quantitative analysis of potential impacts to wetlands and waters. This analysis will be included in the DLA. Additionally, all of the wetland and waters information associated with this report (including appendices and GIS data) can be used in support of future Section 404 application packages and other Project-related technical environmental reports.

4.6. Variances from FERC-Approved Study Plan and Proposed Modifications

The 2013 Wetland and Waters Mapping effort followed the March 2013 Study Plan objectives and methodologies. There were no variances to report.

5 WILDLIFE RESOURCES

This section describes the existing wildlife resources associated within the Grant Lake Hydroelectric Project based on the 2013 study effort and relevant data from previous Project studies. Under 18 CFR Ch. 1§5.6 (4-1-12 Edition), wildlife studies are required to obtain information requested by resource agencies as part of the informed decision process regarding the merits of the application. The ESA of 1973 (16 U.S.C. 1531 et seq.); the Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703 et seq.) and the Bald and Golden Eagle Protection Act (BGEPA) of 1940 (16 U.S.C. 668 et seq.) are also regulatory drivers for the permitting process.

The 2013 Terrestrial Resources Study incorporates field work on wildlife resources associated with three distinct study efforts: 1) wildlife studies completed in the 1980s as part of a hydro licensing effort referred to as Ebasco (1984); 2) wildlife studies conducted in 2010, referred to as the 2010 wildlife studies (HDR 2011); and 3) the 2013 wildlife studies. The Ebasco 1984 report and the 2010 wildlife studies as well as other readily available sources of information have been assimilated for a better understanding of Grant Lake wildlife resources. Data sources used in the wildlife resources results section are referenced.

The 1984 Ebasco wildlife investigation conducted for the Project included various literature reviews and field investigations on amphibians, birds (waterfowl, loons, grebes, gulls, terns, shorebirds, raptors, grouse and ptarmigan), and mammals (rodents, bats, hares, marmots, squirrels, beaver [*Castor canadensis*], porcupine [*Erethizon dorsatum*], wolf [*Canis lupus*], coyote [*Canis latrans*], red fox [*Vulpes vulpes*], black bear [*Ursus americanus*], brown bear [*Ursus arctos*], mink [*Neovison vison*], wolverine [*Gulo gulo*], lynx [*Lynx lynx*], moose [*Alces alces*], mountain goat [*Oreannos americanus*], and Dall sheep [*Ovis dalli*]). The Ebasco (1984) report served as the initial comprehensive assessment of wildlife resources within the Project area. The wildlife studies conducted in 2010 and 2013 build upon this study and serve to provide additional data for wildlife resources that required more research.

The 2010 wildlife studies collected information on breeding landbirds and shorebirds, Northern goshawks (*Accipiter gentilis*), waterbirds, and little brown bats (*Myotis lucifugus*), as well as various incidental mammal observations that included moose, bear, and goats. In addition, USFS 2010 observations of bear and wolverine dens and raptor nests within the wildlife study area were provided to KHL and are referred to in this report.

The 2013 wildlife studies conducted by the Project encompassed breeding landbird and shorebird studies, Northern Goshawk surveys, Winter Moose surveys, and Winter Waterbird surveys on Grant Lake. The Breeding Landbird, Shorebird, and Northern Goshawk surveys were conducted in the spring and summer of 2013. The 2013 Winter Moose and Winter Waterbird surveys were performed in December 2013. Field studies to be undertaken in 2014 include a second Winter Moose and Winter Waterbird survey to be conducted in February/March 2014 and two additional Northern Goshawk surveys to be completed in the summer of 2014. These data, once collected and analyzed, will be provided to stakeholders for review and collaboration and incorporated into the DLA.

The 2013 Wildlife Study was conducted in accordance with the approved Study Plan (KHL 2013). The objectives of this wildlife study were to:

- Document presence and distribution information to allow the Project to minimize or avoid impacts to protected species, including bald eagles and other raptors, shorebirds, waterbirds, and landbirds of special interest;
- Quantify the distribution and abundance of target wildlife species during key seasons of activity in the study area;
- Document the species composition of avian communities, particularly landbirds, shorebirds, and waterbirds; and
- Classify and map wildlife habitat in the study area in conjunction with the Botanical Resources Study.

The subsections that follow provide a summary of the primary components of the 2013 wildlife studies: Raptor Nesting survey, Breeding Landbirds and Shorebirds, Waterbirds, and Terrestrial Mammals. The methods, results, and conclusions, as well as a summary of any variances from the 2013 Study Plan are provided for each study component. Relevant data from the previous Project wildlife studies are also incorporated within the relevant section.

5.1. Study Area

The Grant Lake area is a characteristic component of the diverse vegetation mosaic found in the mountainous interior of the Kenai Peninsula. The plant communities in the study area are described in Section 3 and Section 4 and include coniferous forests, mixed conifer/deciduous forest, forested shrub communities, grass communities, riparian areas, stream banks, lake margins, and small meadows.

The variety of habitats in this region of Alaska sustains an array of large game as well as other non-game wildlife species. Early seral stands found in conifer and / or mixed conifer / deciduous forests (Oliver 1996), provide feeding habitat for moose, wolves, snowshoe hare, and lynx, and nesting habitat for birds. Old growth forests provide potential nesting habitat for Northern goshawks, neotropical migrants, and other raptors, while also providing thermal cover, concealment from predators, denning and bedding areas for large mammals, travel corridors for moose, bear, wolverine, and wolves, and winter foraging areas for mountain goats. Canopy gaps and steep slope areas with blueberry provide good foraging areas for bears. Paper birch snags, found in successional stages between mixed and conifer forest types provide good habitat for cavity nesting birds (songbirds, raptors, and waterfowl).

Wildlife habitat within the Project area has been, and continues to be, influenced by tree mortality due to spruce bark beetle (*Dendroctonus rufipennis*) and windthrow events. Spruce trees in Southcentral Alaska have experienced extensive mortality in response to the spruce bark beetle in the last 20 years, resulting in significant vegetation compositional and structural changes (Holsten et al. 1995). Some of the impacts to wildlife species associated with spruce beetle infestations outlined in USFS (2006) include long term stand conversion. For example, on some sites in Southcentral Alaska, blue-joint grass (*Calamagrostis canadensis*) and other competing vegetation quickly invade stands where spruce beetles have "opened up" the canopy, delaying reestablishment of tree species. Wildlife species dependent on live, mature spruce

stands may decline due to long term stand conversion (e.g., red squirrels [*Sciurus vulgaris*], spruce grouse [*Falcipennis canadensis*], Townsend's warblers [*Dendroica townsendi*], and rubycrowned kinglets [*Regulus calendula*]). Species that benefit from early successional vegetation (willow and aspen) like moose may increase in number as stand composition changes. Increases in large mammals may also result in an increase in predators including wolf and bear.

This area of the Kenai Peninsula is subject to windthrow; a cataclysmic abiotic factor that can generate an entire new chain of seral plant succession in a given area. Trees already stressed by infestation may be more susceptible to windthrow events. This was evident during the 2013 field season along the proposed Project access route. Many areas were difficult to traverse due to high concentrations of downed trees.

The 2013 Wildlife Study area represents the combined area that was assessed for each wildlife study component. It is also the same area previously defined as the collective terrestrial resources assessment area in Figure 1.2-1 and the general vegetation study area shown in Figure 3.1-1. Changes in the access route, Project design, and field efforts necessitated a revision of both the Breeding Bird and Northern Goshawk surveys; resulting in a revised definition of the 2013 'Wildlife Study area.' Figure 5.1-1 illustrates the revised 2013 Wildlife Study area in relation to the proposed FERC Project boundary. The delineated study areas specific to each component of the Study Plan are defined by their geographic nexus to the Project and are described below for the four 2013 field studies.

5.1.1. Raptor Nesting Survey

The Raptor Survey area is defined by the 2013 Study Plan as follows:

- The proposed development footprint of the Project (access roads, transmission line, Grant Creek, Grant Lake, powerhouse, and tunnel) and a buffer of 660 feet around Project development features. The 2013 field efforts occurred within the 2013 wildlife assessment area (see Figure 5.1-1) and focused exclusively on Northern Goshawk Broadcast Surveys along the newly defined Project route, as all other Raptor surveys were deemed complete.
- The 2010 study area encompassed the entire shore area of Grant Lake, including several rocky cliff faces and outcroppings above Grant Lake and potential nesting habitat for raptors, Grant Creek, and the access route (as defined at the time).

5.1.2. Breeding Landbirds and Shorebirds

The 2013 study area for breeding landbirds and shorebirds is defined by the Study Plan as follows:

- Grant Lake outlet delta area near the proposed tower intake (includes 500 feet on either side of Tower Intake);
- Trail Lake narrows access road alignment (100 feet on either side of the centerline of new road), as access allows;
- Powerhouse, detention pond, tailrace, and penstock (100 feet on either side of the centerline); and

• Transmission line corridor (includes up to 100 feet on both sides of centerline of transmission line), as access allows.

The 2010 study area for breeding landbirds and shorebirds incorporated the above; however, the access route (as defined at the time) paralleled Falls Creek extending from the highway south of Lower Trail Lake, north to Grant Creek, and then to Grant Lake. Appendix 3a contains further information on breeding landbirds and shorebirds.

5.1.3. Waterbirds

The study area for nesting and wintering waterbirds is defined by the 2013 Study Plan as follows:

- The survey area for wintering waterbirds is located within the 2013 wildlife assessment area (see Figure 5.1-1) at the southern-most portion of Grant Lake at the source of Grant Creek. Two surveys are planned for the winter of 2013 and 2014, one of which was performed in December 2013 and the other is slated for February/March 2014.
- The 2010 field effort included surveys of Grant Lake and the lower reaches of Grant Creek below the Canyon Reach for nesting harlequin ducks (*Histrionicus histrionicus*) (see Figure 5.1-2). Waterbird surveys to determine the distribution and abundance of waterbirds nesting in the study area were considered complete at the conclusion of the 2010 summer field season.



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5.1.4. Terrestrial Mammals

A study area was not defined specifically for mammals in the 2013 Study Plan. Two winter surveys of the study area will be conducted to determine the presence and travel paths of moose during the winter 2013 and 2014, one of which was performed in December 2013 and the other to be conducted in February/March 2014. Incidental records of 2013 and 2014 wildlife observations will continue to be collected as other studies are performed.

The 2013 Moose Study area will occur within the 2013 wildlife assessment area (see Figure 5.1-1) and includes the area east of the Seward Highway and Alaska Railroad adjacent to the community of Moose Pass, extending past the eastern shoreline of Grant Lake. The Moose Study area extends south between the highway and Grant Lake to Grant Creek, and includes all Project facilities along Grant Lake, Grant Creek, and access road and transmission line routes (see Figure 5.1-1).

Mammal Survey tasks for the 2010 studies focused on brown and black bears, moose, mountain goats, Dall sheep, and bats. Incidental observations of other species were also recorded during all 2010 surveys. All components of the Mammal Study plan were considered complete in 2010, except winter moose presence and use of the Project area.

5.2. Methods

Field investigations for the Terrestrial Wildlife studies were undertaken in 2010. Field data collection methods during the 2010 field season were specific to breeding birds, Northern goshawks, waterbirds, and little brown bats. Data were also collected from other sources to fulfill Raptor and Large Mammal Survey requirements as stipulated by the Study Plan. As noted, a number of the Terrestrial Wildlife studies were considered complete at the conclusion of the 2010 field season.

Changes in the access route, Project design, and field efforts necessitated a reiteration of both the Breeding Bird and Northern Goshawk surveys. The Moose surveys and Winter Waterbird surveys not completed in 2010 were incorporated into the 2013 Study Plan. The study method specific to each component of the 2010 and 2013 Terrestrial Study plans, respectively, are described below.

5.2.1. Raptor Nesting Survey

2010 Raptor Nesting Surveys - Based on discussions with Mary Ann Benoit, USFS Seward Ranger District Wildlife Biologist (May 2009), the Study Plan methods were modified to include ground-based surveys for Northern goshawk nests and territories instead of an aerial survey for raptor nests. The survey methods are based on the Broadcast Acoustical Survey Method as detailed in the USFS Survey Methodology for Northern Goshawks in the Pacific Southwest Region (2000) and in Woodbridge and Hargis (2006). The USFS conducted an aerial survey for bald eagle nests that included the Grant Lake study area on May 7, 2010. Therefore, the USFS did not feel it was necessary for the 2010 biologists to conduct an aerial Raptor Nest Survey as indicated in the Study Plan. 2013 Northern Goshawk Broadcast Surveys - A ground-based survey for Northern goshawk territories was conducted along all linear Project facilities (access road, transmission line, powerhouse, detention pond, tailrace, intake, and penstock). The 2013 survey methods utilize the same methods used for the 2010 study effort; the USFS Survey Methodology for Northern Goshawks in the Pacific Southwest Region (2000) and Woodbridge et al. (2006). Appendix 3b contains further information about the Northern Goshawk Survey.

ArcMap was used to identify 15 sample points for calling stations prior to going in the field. The calling stations were positioned roughly 200 meters (~219 yards) apart along the revised Project access route and facilities. Pre-selected calling stations were located in the field using a GPS receiver; each point was physically marked with flagging for ease of relocation. At each calling station, the surveyors utilized a broadcast speaker amplifier to broadcast 10 second recordings of an adult Northern goshawk wail call (3-call sequence) and a fledgling goshawk begging call (separate 3-call sequence). After each broadcast, the surveyors watched and listened for 30 seconds before continuing with the next broadcast. At each calling station, the calls were broadcast at 60 degrees, 120 degrees, and 300 degrees (the 3-call sequence). This 3-call sequence was completed twice at each call station. After the last sequence, the surveyors progressed to the next station, listening and watching carefully for Northern goshawk signs and presence along the way. The food-delivery call was not used as indicated in the USFS methodology for Northern goshawks.

At each survey calling station, the following information was recorded on the data form:

- Dates, start and stop times
- Station number
- Description (type) of the detection, if any
- Age of birds detected, if any
- Location of detection, if any, relative to survey station and transect, including details about habitat, and
- Incidental birds

5.2.2. Breeding Landbirds and Shorebirds

2010 Breeding Landbird and Shorebird Surveys – The 2010 Breeding Landbirds and Shorebirds Survey used a modified point count approach based on the Alaska Landbird Monitoring System (ALMS) protocol. Point count locations were selected along the route corridor based on representative habitat types from aerial photography. The survey area included the Grant Lake outlet area, the Project access road and transmission line alignment, and the powerhouse and penstock. Sample points were mapped in the office and when possible were located at least 400 meters (~437 yards) apart. Point counts were conducted between 0500 (5:00am) and 1000 (10:00am). Point-count locations were accessed on foot using a GPS receiver to locate preselected point-count locations. Some of the office-based point count locations were modified in the field due to rough terrain or inaccessibility. If the location was modified, a new GPS point was taken.

The point-counts were conducted in standard 10-minute intervals at each point-count location. All species observed visually or aurally were recorded during each count. Observations were categorized into distance-estimated categories of <50 meters (~55 yards) or >50 meters (~55 yards) as measured horizontally from the observers. In addition, species were documented based on the time interval at which they were detected (0-3 minutes; 3-5 minutes; and 5-10 minutes). Birds that were flying over during the count were also recorded. General vegetation types were recorded for eight points. ALMS-associated habitat information was not collected at any point. Data were recorded on a modified point count data sheet, and photos of the general vegetation at 19 point locations were taken. Incidental sightings of shorebirds, birds of conservation concern, or nest sites that were observed in transit between survey points were also documented.

2013 Breeding Landbird and Shorebird Surveys–ArcMap was used to identify 14 sample points for survey points prior to going in the field. The sample points were positioned roughly 250 meters (~273 yards) apart along the revised Project access route and facilities. Pre-selected survey points were located in the field using a GPS receiver; each point was physically marked with flagging for ease of relocation and then removed after the last survey.

Resident breeding birds begin nesting earlier than migrants on the Kenai. The different breeding timelines between residents and migrants manifests in distinct peak singing periods in May and June. To capture the peak singing periods for both groups of breeders, the 14 points were surveyed twice in 2013. The first time period (May 21st and 22nd) was surveyed for early nesting resident birds; the second time period (June 15th and 16th) was surveyed to capture later breeding migrants. Vegetation and habitat documentation were conducted within a 50 meter (~55 yards) radius for each point. Photo documentation at each cardinal direction (4 pictures per point), as specified by ALMS protocol, was also obtained. Habitat types were categorized in the field to at least Level III of the Alaska Vegetation Classification, and further classified to Level IV when possible (Viereck et al. 1992). All data were recorded on standard ALMS datasheets.

Surveys were initiated one half hour after sunrise and were completed by 0900 (9:00am). Each point was sampled for 10-minutes; all species observed visually or aurally were recorded during each count. Observations were categorized into standard ALMS distance-estimated categories in the field as measured horizontally from the observers; distances were later grouped as either <50 meters (~55 yards) or >50 meters (~55 yards) for analysis and compilation with 2010 data. Birds that were detected while flying over the point during the count were also recorded as well as their estimated horizontal distance from the observer. All point count data were recorded on standard ALMS datasheets.

Incidental observations of wildlife encountered while in transit between surveys points or while conducting surveys for other wildlife were also documented. Only the birds recorded within the 50 meter (55 yard) radius during each count were qualitatively analyzed for habitat association.

2013 Vegetation Classification and Correlation – In order to place the 2010 and 2013 breeding landbird and shorebird data in context with the vegetation community types located throughout the Project area, a vegetation community correlation was developed for this report. The correlation described below provides a linkage between the various habitat and vegetation cover types described for breeding landbirds and shorebirds from previous Project reports and literature sources, with the 2013 vegetation community classification types presented in Section 3 and Section 4 of this report.

The USFS (2007) cover types provided for this study originated from much older timber type coverages that were developed by the Alaska Regional Office in 1978 using 1:15,840 aerial photography flown in the 1950s-1970s. Part of the 2013 effort was to update and re-classify the cover types within the delineated study area, as described in Section 3 and Section 4. The breeding bird survey points (14), originally categorized by USFS (2007) vegetation types, were given new designations after the 2013 classification and then correlated to Ebasco (1984) for understory species comparisons and loose habitat associations (see Table 5.2-1). The only exceptions are the southern-most portion surrounding the Lower Trail Lake classified as birch, and the area immediately to the east classified as white spruce. These areas were outside of the designated 2013 study area. The 2010 breeding bird data were utilized for the overall qualitative assessment and all birds detected in the vegetation classifications either retained the old USFS (2007) designation of birch, or were re-named and incorporated into the 2013 Coniferous Forest classification. The bird species detected during the 2010 and 2013 field efforts were collectively summarized by the 2013 vegetation type classification.

	Vegetation Type					
2013 Mapped Point	USFS Cover Code (2007)	2013 Vegetation Types	EBASCO 1984 Crosswalk Classification	EBASCO 1984 Common Associated Understory Plants	Additional Associated Understory Plants	
1	Other-Non Forested	Coniferous Deciduous Forest	Mixed Broadleaf / Needleleaf Forest	MENFER, VIBEDU, VACOVA, RIBTRI, ROSACI, OPLHOR, ALNVIR, CORCAN, VACVIT, MOSS	LINBOR, SPIBEA, CHAANG, EMPNIG, GYMDRY, CALCAN.	
2	Mixed Hardwood- softwood	Coniferous Deciduous Forest	Mixed Broadleaf / Needleleaf Forest	MENFER, VIBEDU, VACOVA, RIBTRI, ROSACI, OPLHOR, ALNVIR, CORCAN, VACVIT, MOSS	LINBOR, SPIBEA, CHAANG, EMPNIG, GYMDRY, CALCAN.	
3	Cottonwood	Coniferous Forest	Conifer Forest	MENFER,VACOVA, SPIBEA, OPLHOR, ALNVIR, RIBTRI, VACVIT, LEDSPP, RUBPED, MOSS	VACALA, CORCAN, CHAANG, EMPNIG, LINBOR, CALCAN, EQUARV, DRYEXP, GYMDRY	
4	White Spruce	Coniferous Deciduous Forest	Mixed Broadleaf / Needleleaf Forest	MENFER, VIBEDU, VACOVA, RIBTRI, ROSACI, OPLHOR, ALNVIR, CORCAN, VACVIT, MOSS	LINBOR, SPIBEA, CHAANG, EMPNIG, GYMDRY, CALCAN.	
5	Mixed Hardwood- softwood	Coniferous Deciduous Forest	Mixed Broadleaf / Needleleaf Forest	MENFER, VIBEDU, VACOVA, RIBTRI, ROSACI, OPLHOR, ALNVIR, CORCAN, VACVIT, MOSS	LINBOR, SPIBEA, CHAANG, EMPNIG, GYMDRY, CALCAN.	

Table 5.2-1. 201	3 Breeding birds	survey point vegetation	classifications and correlation.
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0010	Vegetation Type					
2013 Mapped Point	USFS Cover Code (2007)	2013 Vegetation Types	EBASCO 1984 Crosswalk Classification	EBASCO 1984 Common Associated Understory Plants	Additional Associated Understory Plants	
6	Mixed Hardwood- Softwood	Scrub Shrub Wetland	Bog (Wet Meadow)	LEDSPP, VACVIT, EMPNIG, RUBCHA	BETNAN, VACOVA	
7	White Spruce	Herbaceous Wetland / Floodplain Forest & Scrub	Riparian Scrub	SALSPP, CHALAT, CHAANG, EQUSPP, CALCAN	EQIARV,ALNVIR	
8&9	Birch	Coniferous Deciduous Forest	Mixed Broadleaf / Needleleaf Forest	MENFER, VIBEDU, VACOVA, RIBTRI, ROSACI, OPLHOR, ALNVIR, CORCAN, VACVIT, MOSS	LINBOR, SPIBEA, CHAANG, EMPNIG, GYMDRY, CALCAN.	
10, 11, 12 & 14	Hemlock- Spruce	Coniferous Forest	Conifer Forest	MENFER,VACOVA, SPIBEA, OPLHOR, ALNVIR, RIBTRI, VACVIT, LEDSPP, RUBPED, MOSS	VACALA, CORCAN, CHAANG, EMPNIG, LINBOR, CALCAN, EQUARV, DRYEXP, GYMDRY	
13	Hemlock- Spruce	Scrub Shrub Wetland	Riparian Scrub	SALSPP, CHALAT, CHAANG, EQUSPP, CALCAN	SALALA, ALNVIR	

Table 5.2-1, Continued...

5.2.3. Waterbirds

2010 Waterbird Breeding and Brood-Rearing Surveys –Boat-based, intense area surveys were conducted along the entire nearshore habitat of Grant Lake in late June and mid- July 2010 to search for waterbird nests and broods. The survey was conducted by two observers motoring slowly along the lakeshore, documenting waterbirds and other wildlife observed. No effort was made to search for nest sites (except potential loon nesting habitat) since broods were already on the lake during the June 23, 2010 survey (the first 2010 survey). Additionally, the nesting waterbirds documented on Grant Lake were mainly cavity-nesting species that utilize standing dead trees. Therefore, nest searches along the entire shoreline were not conducted. However, areas with potential for loon nesting habitat (marshy habitat, emergent vegetation, and islands), which was limited to a few isolated areas on Grant Lake, were searched. Potential waterbird nesting habitat and broods were documented along the shoreline. The following information was recorded for each brood observed: species, descriptive location (no coordinates), number of ducklings and adults, approximate age of brood, behavior, and distance from shoreline.

2010 Harlequin Duck Survey –A foot survey of Grant Creek (below the falls to the outlet) was conducted on July 12, 2010, to identify harlequin duck broods and other waterbirds using Grant Creek. For each harlequin duck observation, the following data were recorded: GPS location, total number of birds in the group; numbers of pairs, males, and females; number of young; physical description of location (i.e., in the water, creek banks, flying); and a brief description of the creek habitat where the bird or birds were documented. Other notable species such as common merganser (*Mergus merganser*) and red-breasted merganser (*Mergus serrator*) were counted, but locations were not recorded.

2013 Winter Waterbird Surveys–In order to determine if this area is still being utilized by waterbirds in the winter, wildlife biologists conducted a survey of the Grant Lake outlet area in December 2013 and will conduct a second survey of the same area in February/March 2014 to document waterbird use and the amount of open water habitat available. Biologists will document species, number of individuals, and percent open water during a daylight survey period of 4-6 hours. The biologists will also document any wildlife species or tracks observed in the study area while en route to and from Grant Lake. These data, once collected and analyzed, will be provided to stakeholders for review and collaboration and incorporated into the DLA.

5.2.4. Terrestrial Mammals

2010 Terrestrial Mammal Surveys –A Bat Survey was conducted to document roosting of little brown bats (*Myotis lucifugus*) in an abandoned historic cabin on the west side of Grant Lake. While no other specific surveys were conducted, all wildlife observed during other field studies in 2010 were documented and reported as incidental information.

Bear - The Study Plan stated that a bear den emergence aerial survey would be conducted in early to mid-May 2010 to capture bear activities as they were leaving their dens in the spring. Based on discussions with Mary Ann Benoit, USFS Seward Ranger District Wildlife Biologist, the USFS assumed responsibility for Bear Denning surveys in concert with their annual survey for bald eagle nests and trumpeter swans on May 6, 2010. Ms. Benoit provided the ArcGIS shapefiles and findings to use in determining Project effects on bears. The survey effort included habitat along Grant Creek (covering the area of Trail Lake narrows access route) and around Grant Lake.

Mountain Goat and Dall Sheep - Observations of suitable habitat around Grant Lake were made in 2010 using binoculars and spotting scopes from a boat during the Waterbird surveys.

Bats - Biologists conducted a bat survey of the historic cabin on July 23, 2010, based on standard USFS Bat Survey protocols for abandoned buildings and mine sites (Reynolds and Leffler 1994). A high powered flashlight was used to search the cracks and crevices of the cabin, and crews searched for bat signs (guano and carcasses). Photos were taken inside and outside of the cabin.

Observations of all species including moose were recorded incidentally during all 2010 Wildlife surveys.

2013-2014 Winter Moose Surveys– Managers suspect that many moose depart the area in the late fall and winter in the Trail river drainage as well as the northeast portion of Grant lake through

the low pass into Moose Creek (Selinger 2013.). Two winter surveys of the study area will be conducted to determine the presence and travel paths of moose during the winter 2013- 2014. The first of the two Winter Moose surveys was conducted in December 2013, the second is planned for February/March 2014. Surveys will use methods for full coverage of the study area as described in detail in Gasaway et al. (1986). USFS flight regulations and requirements will be followed during the surveys. These data, once collected and analyzed, will be provided to stakeholders for review and collaboration and incorporated into the DLA.

5.3. Results

The following subsections present the results of the 2013 Wildlife Study as well as relevant data from the Ebasco (1984) and the 2010 Wildlife studies.

Field investigations for the Terrestrial Wildlife studies were undertaken in 2010 and then again in 2013. Figure 5.3-1 illustrates the Wildlife Survey locations from both of these field efforts. The 2010 field data are included in this results section for Waterbird Breeding and Brood Rearing, Harlequin Duck, and Little Brown Bat surveys as well as incidental observations. Data were also collected from the USFS to fulfill Raptor and Large Mammal Survey requirements as stipulated by the Study Plan. Changes in the access route, project design, and field efforts necessitated a reiteration of both the Breeding Bird and Northern Goshawk surveys included in the 2013 results section.

The terrestrial wildlife results section reports on studies that are complete as well as several studies that are in progress. These latter studies require either two years of data collection and/or seasonally-specific sampling methods. As a result of the ongoing field efforts, results are not yet complete for this report. The Breeding Land Bird surveys were completed in 2013. The first year of the two-year Northern Goshawk Survey was also completed along the new Project route. In addition, the first of the two Winter Moose and Winter Waterbird surveys were completed in December 2013. The 2014 Northern Goshawk (second year) Survey, Winter Waterbird, and Winter Moose surveys are not complete as of the drafting of this report. However, all other components as stipulated in the Study Plan are deemed complete. The results are organized by the four primary components of the Terrestrial Wildlife Study Plan.

5.3.1. Raptor Nesting Survey

Tree-nesting raptor habitats in the Project vicinity include mixed broadleaf/coniferous forests, broadleaf forest, and coniferous forests (see Table 5.3-1). Suitable habitats for cliff-nesting raptors are not abundant near the Project but include several rocky cliff faces and outcroppings above Grant Lake. Potential nesting habitat for raptors, at that time, was delineated during the AEIDC field studies conducted in the Project vicinity in 1981-1982 (Ebasco 1984).

Hawks and other owls commonly use woodlands, forests, and forested wetland areas for nesting and hunting. Prime foraging areas for many raptors include wetlands containing waterfowl, seabirds, shorebirds, and shallow or clear waterbodies that carry appropriate fish prey.

Table 5.3-1.	Raptor	breeding habitats.	
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Raptor	Breeding Habitat		
Golden Eagle (Aquila chrysaetos)	Coastal or inland cliffs, bluffs, or other steep terrain		
Peregrine Falcon (Falco peregrinus)			
Rough-legged Hawk (Buteo lagopus)			
Osprey (Pandion haliaetus)			
Bald Eagle (Haliaeetus leucocephalus)	Large trees for stick nest placement		
Red-tailed Hawk (Buteo jamaicensis)			
Sharp-shinned Hawk (Accipiter striatus)	Forest		
Northern Goshawks (Accipiter gentilis)			
Great Horned Owl (Bubo virginianus)			
Northern Hawk Owl (Surnia ulula)			
Boreal Owl (Aegolius funereus)			
Northern Saw-whet Owl (Aegolius acadicus)			
Northern Harrier (Circus cyaneus)	Open meadows, marshes or tundra		
Short-eared Owl (Asio flammeus)			
Great Gray Owl (Strix nebulosa)	Sami and a sustained a landing and a sife same and the d		
Merlin (Falco columbarius)	Senii-open country including open connerous woodland		
	Rivers and coastal areas, and possibly near alpine meadows; edges of forest habitat adjoining open areas,		
Black Merlin (Falco columbarius suckleyi)			
	such as muskegs, ponds, and lakes		
	Cavity nesters, utilizing natural holes in trees,		
	abandoned woodpecker holes, holes in buildings or		
American Kestrel (Falco snarvarius)	cliffs, abandoned magpie nests, and similar sites. This		
American Resuct (Faico sparvertas)	species is also found in alpine and tundra areas not far		
	from treeline and in open spruce and mixed		
	spruce/aspen forests (Alexander et al. 2003)		

2010 Raptor Nesting Surveys - Bald Eagle Nest surveys were conducted by the USFS in 2010. The surveys provided two nest locations (see Figure 5.3-2). Three sightings of bald eagles were noted as incidental during the 2010 season. There were no indications that these individuals were near or in nests.

2010 Northern Goshawk Broadcast Surveys –One survey was completed in 2010. No Northern goshawk responses (vocal or non-vocal) were detected and no Northern goshawk nests or territories were identified. There were no confirmed sightings of Northern goshawks in the study area during the 2010 effort.

2013 Northern Goshawk Broadcast Surveys - Two separate survey events were conducted in 2013: the first on June 16th and 17th and the second on July 8th and 9th. One adult female Northern goshawk response was detected both audibly and visually during the first survey on June 16, 2013 (see Figure 5.3-2). The individual responded to an adult wail call during the first 3-call sequence. The female was detected in a coniferous hardwood forest with False Azalea (*Menziesia ferruginea*), Dwarf Dogwood (*Cornus canadensis*), Devil's Club (*Oplopanax horridus*) and Nagoonberry (*Rubus arcticus*) dominant woody plant understory. Other non woody species included Pink Wintergreen (*Pyrola asarifolia*), Fireweed (*Chamerion angustifolium*), Oak Fern (*Gymnocarpium dryopteris*), Wood Fern (*Dryopteris expansa*), and moss species. No other individuals were detected during the surveys.



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2013 Incidental Raptor Sightings – A bald eagle nest in a large cottonwood along Grant Creek was recorded with a pair of adults in attendance; they appeared to be incubating eggs as assessed by behavior on May 22, 2013 (see Figure 5.3-2). This nest sight has been documented in previous years (2010 and 2012). The pair was re-sighted on June 14th -17th and again appeared to be incubating eggs. During the last field visit (July 8th -9th), the pair was once again sighted in the nest and appeared to have at least one hatched young as assessed from observed feeding behavior. An immature bald eagle was observed on July 19, 2013, attempting to capture a duckling (see Figure 5.3-2).

A pair of merlin was detected on May 21, 2013, during the first field visit on the small island just south of the Trail Lake narrows (see Figure 5.3-2). The Trail Lake Narrows area is defined as the section of water between the Upper Trail and Lower Trail lakes. The merlin did not appear to be incubating at that time; however, they did appear to have established a breeding territory based on assessed behavior. The pair was detected again during the second and final field visits at the same location; however, no effort was made to locate a nest due to high water near the suspected location of the nest.

An adult male osprey (based on plumage) was detected flying over the Trail Lake Narrows during the June $14^{th} - 17^{th}$ field visit.

Compilation of 2010 and 2013 Results - There are eleven diurnal raptor species that potentially occur in the delineated Project area: osprey, Northern harrier, golden eagle, bald eagle, sharp-shinned hawk, Northern goshawk, red-tailed hawk, rough-legged hawk, American kestrel, merlin, and peregrine falcon. There are also and six owls species that potentially occur in the delineated Project area: short-eared, great horned, great gray, Northern saw-whet, Northern hawk, and boreal. Occurrence includes migration and/or residence. All species listed are protected by the MBTA 1972 (16 U.S.C. 1361 et seq.). The bald eagle is protected under the BGEPA (16 U.S.C. 668 et seq.) and is considered a species of special interest for the USFS (2008). Northern goshawks are also considered a species of special interest for the USFS (2008).

Table 5.3-2 provides a summary of the various raptors that have been detected during site-specific studies in the Grant Lake Project area:

Raptor Species Detected in Project Area	Study Year
Bald Eagle	Ebasco 1984, 2010 and 2013
Northern Goshawk	2013
Sharp-shinned Hawk	Ebasco 1984
Osprey	2013
American Kestrel	Ebasco 1984
Golden Eagle	Ebasco 1984
Merlin	2013

Table 5.3-2. Raptors detected during site specific studies and year of study.

Based on vegetation classification, nesting habitat is available for all the listed diurnal raptors in the area. No owls were detected during any field studies; however, based on vegetation classification, suitable habitat exists throughout the Grant Lake area.

5.3.2. USFS Sensitive Species and Species of Special Interest

Osprey: The osprey is a Region 10 sensitive species. Ospreys were not documented using the Grant Lake area during the Trail River Watershed landscape assessment (USFS 2008), but potential nesting and foraging habitat was observed in the study area during the 2013 field efforts. An adult male Osprey was documented in 2013; however, its breeding status was unknown. Ospreys are very individualistic and type specific with regards to tolerance to human activities (Poole 1981).

Bald Eagle: Approximately 80 percent of all detected bald eagle nests on the Seward Ranger District are located in mature cottonwood trees with an average diameter of 31 inches and within 0.25 mile of an anadromous fish-bearing stream (USFS 2008). The breeding pair documented on Grant Creek in 2013 did not appear to be impacted by human activity and presence.

Northern Goshawks: This species is a year-round resident of the Chugach National Forest (USFS 1984). The majority of Northern goshawk nests discovered on the Seward Ranger District have been documented in old growth hemlock-spruce stands characterized by a closed canopy, large average diameter, gap regeneration, and an open understory (USFS 2008). A small stand of old growth hemlock and spruce at the east end of Grant Lake may provide additional nesting habitat (USFS 2008). The spruce bark beetle has affected approximately 95 percent of large conifer trees on the Kenai; a portion of these stands may yet provide nesting or foraging habitat, but the bark beetle is likely reducing the value of these stands for Northern goshawk nesting habitat as the canopy becomes more open (USFS 2008).

5.3.3. Breeding Landbirds and Shorebirds

Bird species are diverse in their forms and lifestyles; therefore, their habitat also needs to vary. However, regardless of location, a habitat must fulfill basic needs of: 1) cover (shelter) from weather and predators; 2) food and water for nourishment; and 3) space to obtain food, water, and to attract a mate. A bird's need for cover may depend on the age and breeding status of the individual. Birds, nestlings in particular, need shelter from predators and the elements. Cover, including trees, grasses, and rocks, also harbors foods for birds and provides space or materials for nesting. The requirements for cover can be quite specific. Species often show a marked preference for nesting and foraging at certain heights and in certain structures of vegetation. Cavity nesters, such as woodpeckers, require trees of the age and size to support suitable holes. The type of food that a bird selects depends on availability, and during periods of abundance (for example, during a spring fish spawning or fall fruiting) its diet may become very repetitive. A bird's diet also depends on its nutritional requirements, which change with season and age. Breeding adults and developing chicks need additional protein, for example. Birds that eat plant matter much of the year will turn to insects to fulfill that need. Birds undertaking strenuous migrations will increase and alter their diets prior to their journeys in order to accumulate large amounts of energy in the form of fat. Water is also an essential as a medium for feeding and other activities. Most species of birds will space themselves out during breeding, with males or breeding pairs defending their territory. In contrast, some bird species nest in colonies. Space or territory needs also depend on food sources and availability.

2010 Breeding Landbird and Shorebird Surveys - Point-count surveys for breeding landbirds and shorebirds were conducted in the study area in June 19th and 20th, 2010. A total of 20 point-counts were conducted in the study area. A total of 232 birds (27 species) were detected during the surveys at 19 points (see Table 5.3-3). The 2010 efforts did not include the 50 meter (~55 yards) radius vegetation survey for habitat delineation at each survey point; therefore, these species can only be compiled and assessed for presence in the Project area and a very loose forest type association.

2	010 Species	Total Detected
Wilson's Snipe	Gallinago delicata	1
Hairy Woodpecker	Picoides villosus	1
Alder Flycatcher	Empidonax alnorum	1
Gray Jay	Perisoreus canadensis	2
Black-billed Magpie	Pica hudsonia	3
Black-capped Chickadee	Poecile atricapilla	1
Boreal Chickadee	Poecile hudsonicus	9
Brown Creeper	Certhia americana	3
Golden-crowned Kinglet	Regulus satrapa	3
Ruby-crowned Kinglet	Regulus calendula	16
Swainson's Thrush	Catharus ustulatus	7
Hermit Thrush	Catharus guttatus	32
American Robin	Turdus migratorius	9
Varied Thrush	Ixoreus naevius	33
Orange-crowned Warbler	Oreothlypis celata	17
Yellow Warbler	Setophaga petechia	4
Yellow-rumped Warbler	Setophaga coronata	23
Townsend's Warbler	Setophaga towsendi	12
Wilson's Warbler	Cardellina pusilla	13
Northern Waterthrush	Parkesia noveboracensis	3
American Tree Sparrow	Spizella arborea	2
Fox Sparrow	Passerella iliaca	3
Lincoln's Sparrow	Melospiza lincolnii	3
Dark-eyed Junco	Junco hyemalis	12
Pine Grosbeak	Pinicola enucleator	2
Pine Siskin	Spinus pinus	4
Redpoll Species	Acanthis sp.	13
	Total Detections	232
	Total Species	27

 Table 5.3-3.
 2010 breeding bird and shorebird surveys.

Additional 2010 Incidentals – The following species were recorded as incidental observations during the 2010 field effort: American dipper (*Cinclus mexicanus*), American three-toed woodpecker (*Picoides tridactylus*), violet-green swallow (*Tachycineta thalassina*), common raven (*Corvus corax*), Steller's jay (*Cyanocitta stelleri*), alder flycatcher (*Empidonax alnorum*), spotted sandpiper (*Actitis macularia*), gray-cheeked thrush (*Catharus minimus*), golden-crowned sparrow (*Zonotrichia atricapilla*), herring gull (*Larus argentatus*), Western wood-pewee (*Contopus sordidulus*), olive-sided flycatcher (*Contopus cooperi*), solitary sandpiper (*Tringa solitaria*), and belted kingfisher (*Ceryle alcyon*).

2013 Breeding Landbird and Shorebird Surveys - Point-count surveys for breeding landbirds and shorebirds were conducted in the study area in May $21^{st} - 22^{nd}$ and June $15^{th} - 16^{th}$, 2013. A total of 279 birds (31 species) were detected during the surveys at 14 points (see Table 5.3-4). The 2013 effort did include vegetation and habitat delineation at each point (see Table 5.3-5); however, due to the small sample size, only a qualitative assessment may be compiled for loose bird habitat associations in the Project area as a whole.

2013 S	pecies	Total Detected	< 50 m
Common Loon	Gavia immer	1	1
Barrow's Goldeneye	Bucephala islandica	2	
Red-breasted Merganser	Mergus serrator	2	
Merganser Species	Mergus sp.	1	
Bald Eagle	Haliaeetus leucocephalus	1	
Merlin	Falco columbarius	1	1
Sandhill Crane	Grus canadensis	5	
Greater Yellowlegs	Tringa melanoleuca	1	1
Wilson's Snipe	Gallinago delicata	4	2
Mew Gull	Larus canus	1	
Glaucous-winged Gull	Larus glaucescens	1	
Chestnut-backed Chickadee	Poecile rufescens	6	3
Pacific Wren	Troglodytes pacificus	1	
American Dipper	Cinclus mexicanus	5	1
Ruby-crowned Kinglet	Regulus calendula	34	12
Swainson's Thrush	Catharus ustulatus	8	3
Hermit Thrush	Catharus guttatus	15	4
American Robin	Turdus migratorius	6	4
Varied Thrush	Ixoreus naevius	53	18
Orange-crowned Warbler	Oreothlypis celata	20	12
Yellow Warbler	Setophaga petechia	1	
Yellow-rumped Warbler	Setophaga coronata	13	2
Townsend's Warbler	Setophaga townsendi	7	

Table 5.3-4. 2013 breeding bird and shorebird surveys.

Table 5.3-4, Continued...

2013 Sp	ecies	Total Detected	< 50 m
Wilson's Warbler	Cardellina pusilla	12	3
Fox Sparrow	Passerella iliaca	3	
Golden-crowned Sparrow	Zonotrichia atricapilla	2	2
Dark-eyed Junco	Junco hyemalis	6	3
White-winged Crossbill	Loxia leucoptera	6	6
Pine Grosbeak	Pinicola enucleator	3	3
Pine Siskin	Spinus pinus	47	41
Redpoll Species	Acanthis sp.	11	10
	Total Detections	279	132
	Total Species	31	20

 Table 5.3-5.
 2013 Breeding birds survey point vegetation survey.

		Poin	t Vegetation Type	
Point	% of 50m radius and Type of Upper Story Tree Species	Upper Story Trees (% Canopy Cover, % Coniferous)	Mid-story Shrub Species	Non-woody Plant Cover Species
1	[85%] * BETPAP, POPTRE, PICGLA (PICSIT / PICLUT) [15%] * Developed Railroad	75%, 10%	VACOVA, VIBEDU, VACVIT,EMPNIG, SPIBEA	Graminoids, GEOLIV,CHAANG, VIOLAN, GYMDRY, DRYEXP and Moss species
2	[55%] * PICGLA (PICSIT / PICLUT), BETPAP [45%] * Grant Creek	90%, 85%	SALSPP , EMPNIG, VACOVA, LINBOR, ALNSPP	Graminoids, GEOLIV,CHAANG, GERERI, GYMDRY, DRYEXP and Moss species
3	[60%] * BETPAP, PICGLA (PICSIT / PICLUT) [40%] * Grant Creek	85%, 50%	VIBEDU, ROSACI, OPLHOR, CORCAN	Graminoids, PYRASA,STRAMP, GERERI, GALTRI, GYMDRY, DRYEXP and Moss species
4	[100%] * PICGLA (PICSIT / PICLUT), BETPAP	10%, 90%	MENFER, LEDGRO, RIBTRI, OPLHOR, ALNSPP	Graminoids, TRIARC,CHAANG, GYMDRY, DRYEXP and Moss species
5	[70%] * PICGLA (PICSIT / PICLUT), BETPAP [30%] * PICGLA (PICSIT / PICLUT)	85%, 60% 7%, 100%	MENFER, LINBOR, VIBEDU, ROSACI, EMPNIG SALSPP, BETGLA, VIBEDU, ANDPOL	Graminoids, PYRASA, GERERI,CHAANG, GYMDRY and Moss species Graminoids, PYRASA, COMPAL, ANERIC, VIOLAN and Moss species
6	[60%] * PICMAR, BETPAP	10%, 100%	SALSPP, BETGLA, LEDDEC, VACOVA	Graminoids and Moss species

Table 5.3-5, Continued...

		Poin	t Vegetation Type	
Point	% of 50m radius and Type of Upper Story Tree Species	Upper Story Trees (% Canopy Cover, % Coniferous)	Mid-story Shrub Species	Non-woody Plant Cover Species
	[40%] * PICMAR, BETPAP	85%, 30%	MENFER, EMPNIG, VACVIT, RUBCHA	GEOLIV, CHAANG and Moss species
7	[50%] * BETPAP, PICGLA (PICSIT / PICLUT), POPBAL [50%] * Grant Creek	65%, 20%	VIBEDU, RIBTRI, OPLHOR, ROSACI	Graminoids, HERLAN, CHAANG, STRAMP, PYRASA, GERERI, GYMDRY, DRYEXP and Moss species
8	[55%] * TSUMER, PICMAR, BETPAP	90%, 90%	MENFER, SALSPP, RIBTRI, OPLHOR	Graminoids, CHAANG, STRAMP, GYMDRY, DRYEXP CLASPP and Moss species
	[45%] * PICMAR, BETPAP	65%, 70%	MENFER, RIBTRI, RUBARC, VACOVA	Graminoids, CHAANG, GYMDRY and Moss species
9	[100%] * BETPAP, PICGLA (PICSIT/PICLUT)	85%, 45%	MENFER, CORCAN, OPLHOR, RUBARC	Graminoids, PYRASA, CHAANG, GYMDRY, DRYEXP and Moss species
10	[100%] * TSUMER, PICGLA (PICSIT / PICLUT)	92%, 99%	MENFER, VACOVA, VACVIT, EMPNIG	GEOLIV, GYMDRY, PELBRI and Moss species
11	[100%] * TSUMER, PICGLA (PICSIT / PICLUT), BETPAP	92%, 99%	MENFER, OPLHOR, VACOVA, RUBARC, ALNSPP	GEOLIV, GYMDRY, PELBRI and Moss species
12	[100%] * TSUMER, PICGLA (PICSIT / PICLUT)	87%, 99%	MENFER, CORCAN, VACVIT, EMPNIG, ALNSPP	Graminoids and Moss species
13	[30%] * PICGLA (PICSIT / PICLUT)	50%, 5%	ROSACI, VACOVA, RIBTRI, VACVIT, ALNSPP	Graminoids, VIOLAN, GYMDRY and Moss species
	[20%] * PICGLA (PICSIT / PICLUT)	15%, 5%	VIBEDU, ROSACI, SALSPP, VACOVA, ALNSPP	Graminoids, VIOSPP, COMPAL and GYMDRY
14	[50%] * Grant Lake [50%] * TSUMER, PICGLA (PICSIT / PICLUT) [50%] * Grant Creek	85%, 100%	BETNAN, LEDDEC, EMPNIG, VACOVA	Graminoids and Moss species

Additional 2013 Incidentals – Species that were observed incidentally during the 2013 field season include: Black-capped chickadee, boreal chickadee, brown creeper, belted kingfisher, spruce grouse, spotted sandpiper, violet-green swallow, common raven, alder flycatcher, tree swallow (*Tachycineta bicolor*), gray jay, and Arctic tern (*Sterna paradisaea*).

Compilation of Results - Compilation of site specific data (Ebasco 1984, 2010 field work, and 2013 field work) and the documented species list from the Kenai Lake-Black Mountain Research Natural Area (RNA) (2007) (4 miles to the southwest of the Project area) provided sufficient

information for an assessment of presence / absence of breeding birds in the immediate surrounding area. Observed species in the Kenai Lake-Black Mountain RNA include all species detected during the site specific Grant Lake studies, except for the Northern harrier, ptarmigan (*Lagopus* sp.), green sandpiper (*Tringa ochropus*), Northern shrike (*Lanius excubitor*), and savannah sparrow (*Passerculus sandwichensis*) (USFWS 2008).

Breeding bird presence in the Project area is contingent on many variables including habitat. Habitat includes vegetation as well as landform characteristics important to specific species. Bird species utilize forested and non-forested vegetation communities differently depending on nesting, cover, and foraging requirements. Landform characteristics important to species include elevation, slope, aspect, and rock ledges. Avifauna habitat types were developed by Kessel (1979) and utilized by Ebasco (1984). Ebasco (1984) correlated the avian breeding habitat types developed by Kessel (1979) to the general vegetation classifications developed for their study (see Table 5.3-6).

Table 5.3-6. Comparison of avifauna breeding habitat types (Kessel 1979) to vegetation classification	ıs
(Ebasco 1984).	

					A	vifaur	a Ha	bitat '	Гурез	6			
EBASCO (1984) Vegetation Classifications	Lacustrine Waters and Shorelines	Riverine Waters and Shorelines	Cliffs, Cutbanks, and Block Fields	Wet Meadow	Dwarf Shrub Meadow	Dwarf Shrub Mat	Low Shrub Thicket	Medium Shrub Thicket	Tall Shrub Thicket	Deciduous Forest	Coniferous Forest	Mixed Deciduous-Coniferous Forest	Scattered Woodland and Dwarf Forest
Conifer Forest	Х	Х		Χ	Х						Χ	Х	Х
Broadleaf Forest	Х	Х							Х	Х			
Mixed Broadleaf / Needleleaf Forest	Х	X						X	Х			Х	X
Riparian Scrub	Х	Х					Х	Х	Х				
Upland Scrub		Х						Х	Х				
Grass / Forbe Meadow		Х		Х									
Bog (Wet meadow)	X	X		X	X						Χ		X
Alpine Tundra		Χ		X		Х	Х						
Barren			Х										

For this report, all site-specific bird data has been incorporated into the Ebasco (1984) table format to include species detected during each site-specific study and their primary breeding habitats as described by Kessel (1979) (see Table 5.3-7).

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Species Potentially Project	Occurring in the Area	Observed or Reported During 2013 Field Season	Observed During 2010 Field Season	Observed During 1981-82 AEIDC Field Season ²	Known Breeders	Inferred Breeders	Abundance ³	Lacustrine Waters and Shorelines	Riverine Waters and Shorelines	Cliffs, Cutbanks, and Block Fields	Wet Meadow	Dwarf Shrub Meadow	Dwarf Shrub Mat	Low Shrub Thicket	Medium Shrub Thicket	Tall Shrub Thicket	Deciduous Forest	Coniferous Forest	Mixed Deciduous-Coniferous Forest	Scattered Woodland and Dwarf Forest	Migratory Only
Red-throated Loon*	Gavia stellata						R	XX	X												
Pacific Loon	Gavia pacifica	37	X	X	X		U	XX	X												
Common Loon	Gavia immer	X		X	X		FC R	XX	Х												
Loon*								VV	V												X
Horned Grebe	Podiceps auritus						U		Х												
Red-necked Grebe	Podiceps grisegena						R	XX	Х												
Tundra Swan	Cygnus columbianus						R														X
Trumpeter Swan***	Cygnus	X					U	Х			XX	Х									
Greater White-	Anser albifrons						U														Х
fronted Goose* Canada Goose	Branta	X					U	Х			Х	XX								┢────┥	
	canadensis		v	v		v	C	VV	V		v	V									
Mallard	Anas platyrhynchos		X	X		X	C	XX	Х		X	X									
Gadwall	Anas strepera						R					3737									X
Green-winged Teal	Anas crecca			X	v	X	U	v				XX V									
Northern Pintail	Anas acuta				Λ		FC		X		XX	A X									
Northern Shoveler	Anas clypeata						C													┟────┦	x
Blue-wing Teal	Anas discors						R	X			vv	X								<u> </u>	
Canvasback	Aythya						R														X
Greater Scaup	valisineria Avthva marila						R	XX													
Lesser Scaup	Aythya affinis			X			U	X			XX										
Harlequin Duck	Histrionicus	X	Х	X		Х	R		XX								XX			XX	
Common	histrionicus Bucephala		x	x	x		FC	x	X											XX	
Goldeneye	clangula						10														
Barrows Goldeneye	Bucephala islandica	Х	X	X			FC	X	Х											XX	
Bufflehead	Bucephala albeola						U	Х	Х											XX	
Common	Mergus	X	Х	X			С	X	Х											XX	
Red-breasted	Mergus serrator	X	X	X			FC	X	Х		Х	Х									
Merganser Osprey***	Pandion	X					R										XX	X	X		
Northern Harrier	haliaetus Circus cyaneus						R				XX	x									
Golden Eagle	Aquila			X		X	C			XX									X	 	
Pold Engle***	chrysaetos Haliacetus	v	v	v			FC										vv	v	v		
	leucocephalus	Λ	Λ	Λ			re										ΛΛ	Λ	Λ		
Sharp-shinned Hawk	Accipiter striatus			Х			С										Х	XX	Х		
Northern	Accipiter	X	Х				U										Х	Х	XX		
Goshawk*** Red-tailed Hawk	gentilis Buteo						U			X						X	X	X	Х		
Rough-legged	jamaicensis Buteo lagopus						U			XX											
Hawk American Kestrel	Falco			x			R										x	x	XX		
	sparverius																				
Merlin	Falco columbarius	X					R			X					_		X	X	XX		
Peregrine Falcon	Falco						R			XX											
Spruce Grouse	Falcipennis canadensis	X		X	X		FC											Х	XX		

Species Potentially Project	Occurring in the Area	Observed or Reported During 2013 Field Season	Observed During 2010 Field Season	Observed During 1981-82 AEIDC Field Season ²	Known Breeders	Inferred Breeders	Abundance ³	Lacustrine Waters and Shorelines	Riverine Waters and Shorelines	Cliffs, Cutbanks, and Block Fields	Wet Meadow	Dwarf Shrub Meadow	Dwarf Shrub Mat	Low Shrub Thicket	Medium Shrub Thicket	Tall Shrub Thicket	Deciduous Forest	Coniferous Forest	Mixed Deciduous-Coniferous Forest	Scattered Woodland and Dwarf Forest	Migratory Only
Willow Ptarmigan	Lagopus lagopus			X		Х	С							Х	XX	Х					
Rock Ptarmigan	Lagopus muta			Х		Х	С						XX	Х							
White-tailed	Lagopus						U						XX	Х							
Sandhill Crane	Grus	X					R				XX	X									
Diash hallind	canadensis						T					v	vv								
Plover	squatarola						U					Λ	лл								
Semipalmated Ployer	Charadrius semipalmatus						U	XX	XX												
Greater Yellowlegs	Tringa	X		X		x	С				x	xx									
Lasser Vellowlegs*	melanoleuca Tringa flavines			x		X	C				Λ										
Wandering Tattler*	Tringa juurpes Tringa incana			X			U	X	XX												
Solitary Sandpiper*	Tringa solitaria		X			X	U				x	xx									
Spotted Sandpiper	Actitis	X	X	v		v	FC	vv	vv			X	Х								
Whimbrel	macularius			Λ		Λ	R	ΛΛ	лл		xx	x	x								
	phaeopus						Ň														
Western Sandpiper	Calidris mauri						U				3737	37									X
Least Sandpiper	Calidris minutilla						U				XX	X									
Short-billed	Limnodromus						U				XX	X								Х	
Wilson's Snipe	Gallinago	X	X	X		X	FC				X	XX									
Pod pockod	delicata Phalaropus						П				vv	v									
Phalarope	lobatus						0				ΛΛ	Λ									
Bonaparte's Gull	Chroicocephalu s philadelphia						R	Х												Х	
Mew Gull	Larus canus	X		X			U			Х	XX										
Herring Gull	Larus		Х				R	Х		XX	Х										
Glaucous-winged	argentatus Larus	X		-			U			XX											
Gull	glaucescens			v			EC				vv	v									
Arctic Tern	Sterna paradisaea			Λ			FC				лл	Λ									
Kittlitz's Murrelet*	Brachyramphus						R			Х											
Short-eared Owl	Asio flammeus		 				R				XX	X	X								
Great Horned Owl	Bubo						U			X							Х	X	X		
Great Gray Owl	virginianus Strix nebulosa		-				U										X	XX	X		
Northern Saw-whet	Aegolius						U										X	XX	X		
Owl Northern Howk Owl	acadicus Surnia ulula	<u> </u>					IT										x	X	XX		
Boreal Owl	Aegolius						U											XX	X		
	funereus	<u> </u>	<u> </u>				.											1/17			
Rutous Hummingbird	Selasphorus rufus						U											XХ			
Belted Kingfisher	Megaceryle	X	X	X		Х	C			XX											
Northern Flicker	Colaptes auratus			X			U										XX	Х	Х		
Downy Woodpecker	Picoides	1	1		İ 🗌	1	R				İ	İ					XX	Х	Х		
Hairy Woodpecker	pubescens Picoides villosus		X	X		X	U										XX	Х	Х		
American Three- toed Woodpecker	Picoides dorsalis		X	X		X	FC											XX	Х		
Olive-sided Flycatcher*	Contopus cooperi		X				U											XX	Х	Х	
Western Wood-	Contopus	1	X				U											XX	Х	Х	
Alder Flycatcher	sordidulus Empidonax alnorum	X	X			X	FC							X	XX	X				Х	

Г

Table 5.3-7, continued...

Table 5.3-7, continu	ed	T		r	1	T	1	1	r	n	T	n	T		1	1	1	T	r		r
Species Potentially Project Willow Flycatcher	Occurring in the Area Empidonax traillii	Observed or Reported During 2013 Field Season	Observed During 2010 Field Season	× Observed During 1981-82 AEIDC Field Season ²	Known Breeders	X Inferred Breeders	Hadance ³	Lacustrine Waters and Shorelines	Riverine Waters and Shorelines	Cliffs, Cutbanks, and Block Fields	Wet Meadow	Dwarf Shrub Meadow	Dwarf Shrub Mat	× Low Shrub Thicket	XX Medium Shrub Thicket	× Tall Shrub Thicket	Deciduous Forest	Coniferous Forest	Mixed Deciduous-Coniferous Forest	× Scattered Woodland and Dwarf Forest	Migratory Only
Say's phoebe	Sayornis saya						R													Х	
Northern Shrike	Lanius			X			U							Х	Х	X	Х	Х	Х	Х	
Steller's Jay	excubitor Cyanocitta stelleri		X			X	U									Λ		XX	Х		
Gray Jay	Perisoreus		Х	Х		X	C										Х	XX	Х	Х	
Black-billed Magpie	canadensis Pica hudsonia		X	X			C									X X	XX		X	X	
Northwestern Crow	Corvus caurinus						C														Х
Common Raven	Corvus corax	Х	Х	Х			C			Х							Х	Х	Х		
Tree Swallow	Tachycineta bicolor			Х		Х	Α										Х	Х	Х	Х	
Violet-green	Tachycineta thalassina	Х	Х	X		Х	A			Х							Х	Х	Х	Х	
Bank Swallow	Riparia riparia			X		X	C			XX											
Cliff Swallow	Petrochelidon pyrrhonota						U			XX											
Barn Swallow	Hirundo rustica						R	Х	Х		Х	Х								XX	
Black-capped Chickadee	Poecile atricapillus	Х	Х	X	Х		A									Х	XX	Х	Х		
Chestnut-backed Chickadee	Poecile rufescens	Х				Х	FC										Х	XX	Х		
Boreal Chickadee	Poecile hudsonicus	X	X				FC									Х	Х	XX	Х		
Red-breasted	Sitta canadensis						R										Х	XX	Х		
Brown Creeper	Certhia americana	X	X				U										Х	XX	Х		
Pacific Wren	Troglodytes pacificus	Х					U										Х	Х	Х		
American Dipper	Cinclus mexicanus	Х	Х	Х	Х		Α		XX												
Golden-crowned Kinglet	Regulus satrapa		Х				U											XX	Х		
Ruby-crowned Kinglet	Regulus calendula	Х	Х	Х		Х	Α											XX	Х		
Gray-cheeked	Catharus		Х	Х		Х	R								XX	Х				Х	
Swainson's Thrush	minimus Catharus	X	X	X		X	FC									X		XX	Х	X	
Hermit Thrush	ustulatus Catharus	X	X	X	X		C									X X	X	XX	X	X	
Varied Thrush*	guttatus Ixoreus naevius	X	X	X		X	C									X		XX	X	Х	
American Robin	Turdus migratorius	X	X	X		X	С									X	XX		X	Х	
American Pipit	Anthus rubescens			X		X	С					Х	XX								
Bohemian Waxwing	Bombycilla garrulus			X	X		U											XX	Х	Х	
Orange-crowned Warbler	Oreothlypis celata	Х	X	X		Х	С							Х	XX		Х				
Yellow-rumped Warbler	Setophaga coronata	Х	Х	Х		Х	Α											XX	Х		
Townsend's Warbler***	Setophaga townsendi	X	X	X	X		Α									X		XX	X		
Blackpoll Warbler*	Setophaga						U											XX	X		
Yellow Warbler	striata Setophaga	X	X	X		X	C							Х	Х	X					
Wilson's Warbler	petechia Cardellina	X	X	X	X		A							X	XX	X X					
Northern	Parkesia	X	X				FC	X	X		XX	X									
Waterthrush American Tree	noveboracensis Spizella arborea		X	X			FC								X	X				XX	
Sparrow Fox Sparrow	Dassarall	v	v	v		<u> </u>	TI								yv	v				v	
FUX SPATTOW	r usserella		Λ	Λ	1	1	U	1							лл	Λ				л	

Table 5.3-7, continued...

Species Potentially Project	Occurring in the Area	Observed or Reported During 2013 Field Season	Observed During 2010 Field Season	Observed During 1981-82 AEIDC Field Season ²	Known Breeders	Inferred Breeders	Abundance ³	Lacustrine Waters and Shorelines	Riverine Waters and Shorelines	Cliffs, Cutbanks, and Block Fields	Wet Meadow	Dwarf Shrub Meadow	Dwarf Shrub Mat	Low Shrub Thicket	Medium Shrub Thicket	Tall Shrub Thicket	Deciduous Forest	Coniferous Forest	Mixed Deciduous-Coniferous Forest	Scattered Woodland and Dwarf Forest	Migratory Only
	iliaca																				
Savannah Sparrow	Passerculus sandwichensis			X		Х	С					XX	Х	X	Х						
Lincoln's Sparrow	Melospiza lincolnii		Х	Х			U					Х		XX	Х						
Song Sparrow	Melospiza melodia			Х			U				XX	Х									
White-crowned Sparrow	Zonotrichia leucophrys		X	Х		Х	С							XX	Х	Х				Х	
Golden-crowned	Zonotrichia atricapilla	X	Х	Х		Х	А						Х	XX	Х	Х					
Dark-eyed Junco	Junco hyemalis	X	Х	Х		Х	FC												XX	Х	
Lapland Longspur	Calcarius Japponicus						U					Х	XX								
Snow Bunting	Plectrophenax nivalis						U														Х
Gray-crowned Rosy Finch	Leucosticte tephrocotis			Х			FC						XX								
White-winged Crossbill	Loxia leucoptera	X					U											XX	Х		
Pine Grosbeak	Pinicola enucleator	X	X	Х		Х	С											XX	Х		
Pine Siskin	Spinus pinus	X	Х				U											XX	Х		
Hoary Redpoll	Acanthis hornemanni						U						XX	Х	Х						
Common Redpoll	Acanthis flammea		X				С						XX	Х	Х	Х		Х		Х	
Redpoll Species	Acanthis sp.	X					С						XX	Х	Х	Х		Х		Х	

Notes:

A - Abundant

C - Common

FC - Fairly common

U - Uncommon

R - Rare

XX – Primary breeding habitat
X - Secondary breeding habitat
(I) - Habitat types follow Kessel 1979

(2) - As reported in Ebasco 1984

(3) - Abundance categories follow U.S. Forest Service unpublished. Applies to study area only

* - Alaska Audubon's Red-listed Species (2010)

*** - USFS Sensitive Species or Species of Special Interest (USFS 2008)

Sources: Ebasco 1984 Kessel 1979 Ehrlich et al. 1988 Gabrielson and Lincoln 1959 U.S. Forest Service unpublished. Tarres 1980 Bellrose 1980 Kortright 1967

The Project area previously described by the USFS cover class was updated in 2013. All reclassified vegetation is defined and discussed in Section 3 and Section 4 and summarized in Table 5.2-1. The assessment of the 2013 breeding bird point vegetation data indicates the following: Five breeding bird points sampled in 2013 matched closely to the 2013 vegetation classifications; three points did not, and the final six sites shared attributes with the 2013 vegetation classifications. Also, distinct differences existed between the reported shrub and understory communities. Reasons for differences are attributed to the sampling methods for ALMS points.

Table 5.3-8 provides the 2013 vegetation types, the number of points that fell into each class, and the bird species detected in each class. The reader should keep in mind that the birch category is retained from the USFS (2007) cover class and was not located within the 2013 study area. Utilizing the species and the general point vegetation information collated from the 33 points (2010 and 2013), qualitative extrapolation may suggest that the non-sampled identical vegetation classes in the study area will have similar species. Appendix 3c contains further information on vegetation classes.

2013 Vegetation Types	Grass- Forb Meadow	Coniferous Forest	Birch (Original USFS Classification)	Coniferous Deciduous Forest	Scrub Shrub Wetland	Herbaceous Wetland / Floodplain Forest & Scrub
Number of points in Vegetation Class	1	16	1	12	2	1
Species Detected						
Alder Flycatcher	Х					
American Dipper		Х		Х	Х	
American Robin		Х		Х		
American Tree Sparrow	Х					
Bald Eagle				Х		
Barrow's Goldeneye		Х			Х	
Black-billed Magpie				Х		
Black-capped Chickadee		Х				
Boreal Chickadee		Х		Х		
Brown Creeper		Х		Х		
Chestnut-backed Chickadee				Х	Х	
Common Loon		Х				
Dark-eyed Junco		Х	Х	Х	Х	
Fox Sparrow	Х	Х			Х	
Glaucous-winged Gull				Х		
Golden-crowned Kinglet		Х				
Golden-crowned Sparrow		Х				

Table 5.3-8. Qualitative assessment of avian species presence in sampled 2013 wildlife study area by vegetation type.

Table 5.3-8, continued...

2013 Vegetation Types	Grass- Forb Meadow	Coniferous Forest	Birch (Original USFS Classification)	Coniferous Deciduous Forest	Scrub Shrub Wetland	Herbaceous Wetland / Floodplain Forest & Scrub
Number of points in Vegetation Class	1	16	1	12	2	1
Species Detected						
Gray Jay				Х		
Greater Yellowlegs					Х	
Hairy Woodpecker		Х				
Hermit Thrush	Х	Х	Х	Х	Х	
Lincoln's Sparrow				Х		
Merganser Species		Х				
Merlin				Х		
Mew Gull				Х		
Northern Waterthrush				Х		
Orange-crowned Warbler	Х	Х	Х	Х	Х	
Pacific Wren		Х				
Pine Grosbeak			Х	Х		
Pine Siskin		Х		Х	Х	
Red-breasted Merganser		Х			Х	
Redpoll Species		Х		Х	Х	
Ruby-crowned Kinglet		Х	Х	Х	Х	Х
Sandhill Crane				Х		
Swainson's Thrush		Х	Х	Х	Х	
Townsend's Warbler		Х		Х	Х	
Varied Thrush	Х	Х	Х	Х	Х	Х
White-winged Crossbill		Х		Х	Х	
Wilson's Snipe				Х		
Wilson's Warbler	Х	Х		Х	Х	
Yellow Warbler	Х	Х		Х	Х	
Yellow-rumped Warbler		Х	Х	Х	Х	
	P	Additional Sp Present in 2013	ecies that may b 3 Vegetation Cla	e ss		
Alder Flycatcher		Х	Х	Х	Х	Х
American Dipper			Х		Х	Х
American Pipit		X			Х	
American Robin			Х		X	Х
American Three-toed Woodpecker		X		Х	Х	
American Tree Sparrow		X	X	Х	Х	Х

Table 5.3-8, continued...

2013 Vegetation Types	Grass- Forb Meadow	Coniferous Forest	Birch (Original USFS Classification)	Coniferous Deciduous Forest	Scrub Shrub Wetland	Herbaceous Wetland / Floodplain Forest & Scrub
Number of points in Vegetation Class	1	16	1	12	2	1
Species Detected						
Arctic Tern		Х			Х	
Black-billed Magpie		Х	X		Х	X
Black-capped Chickadee			X	Х	Х	Х
Bohemian Waxwing		Х		Х	Х	
Boreal Chickadee			Х		Х	Х
Brown Creeper			X		Х	
Chestnut-backed Chickadee		Х	Х			
Common Raven		Х	Х	Х	Х	
Common Redpoll			Х	Х	Х	Х
Fox Sparrow			Х	Х		Х
Golden-crowned Kinglet				Х	Х	
Golden-crowned Sparrow			Х	Х	Х	Х
Gray-cheeked Thrush		Х	Х	Х	Х	Х
Gray Jay		Х	Х		Х	
Greater Yellowlegs		Х				
Hairy Woodpecker			Х	Х	Х	
Hermit Thrush						Х
Herring Gull		Х	Х	Х	Х	Х
Lesser Yellowlegs		Х			Х	
Lincoln's Sparrow		Х			Х	Х
Mew Gull		Х			Х	
Northern Flicker		Х	Х	Х	Х	
Northern Shrike		Х	Х	Х	X	Х
Northern Waterthrush		Х	Х		X	Х
Olive-sided Flycatcher		Х		Х	Х	
Orange-crowned Warbler						Х
Pacific Wren			Х	Х	Х	
Pine Grosbeak		Х			Х	
Redpoll Species			Х			Х
Rock Ptarmigan					X	Х
Sandhill Crane		Х			X	
Savannah Sparrow		Х		Х	X	X

Table 5.3-8, continued...

2013 Vegetation Types	Grass- Forb Meadow	Coniferous Forest	Birch (Original USFS Classification)	Coniferous Deciduous Forest	Scrub Shrub Wetland	Herbaceous Wetland / Floodplain Forest & Scrub
Number of points in Vegetation Class	1	16	1	12	2	1
Species Detected						
Solitary Sandpiper		X			Х	
Song Sparrow		X			Х	
Spotted Sandpiper		X	X	Х	Х	Х
Spruce Grouse		X		Х	Х	
Steller's Jay		Х		Х	Х	
Swainson's Thrush						Х
Townsend's Warbler			Х			Х
Tree Swallow		Х	Х	Х	Х	
Violet-green Swallow		Х	Х	Х	Х	
Wandering Tattler		Х	Х	Х	Х	Х
Western Wood-pewee		Х		Х	Х	
White-crowned Sparrow		Х	Х	Х	Х	Х
White-winged Crossbill					Х	
Willow Flycatcher		Х	Х	Х	Х	Х
Willow Ptarmigan			Х	Х	Х	Х
Wilson's Snipe		X		Х		
Wilson's Warbler			X			Х
Yellow Warbler			X		Х	Х
Yellow-rumped Warbler		X				

Vegetation classes not sampled include: Alder Scrub, Forested Wetland, and Herbaceous Wetland. Table 5.3-9 qualitatively evaluates the species most likely found in these habitats based on Kessel (1979) and the descriptions for these habitats provided in Section 3 and Section 4.

Species that may be Present in 2013 Vegetation Types	Alder Scrub	Forested Wetland	Herbaceous Wetland
Alder Flycatcher	X	Х	X
American Dipper		Х	
American Pipit	X	Х	
American Robin		Х	
American Three-toed Woodpecker	X	Х	
American Tree Sparrow		Х	Х
Arctic Tern	X	Х	
Black-billed Magpie	X	Х	
Black-capped Chickadee		Х	
Bohemian Waxwing	X	Х	
Boreal Chickadee		Х	
Brown Creeper		Х	
Chestnut-backed Chickadee		Х	
Common Raven	X	Х	
Common Redpoll		Х	
Dark-eyed Junco	X	Х	
Fox Sparrow		Х	
Golden-crowned Kinglet	X		
Golden-crowned Sparrow		Х	
Gray Jay	X	Х	
Gray-cheeked Thrush		Х	X
Greater Yellowlegs		Х	
Hairy Woodpecker	Х	Х	
Hermit Thrush		Х	Х
Herring Gull		Х	
Lesser Yellowlegs	Х	Х	
Lincoln's Sparrow		Х	X
Mew Gull		Х	
Northern Flicker	X	Х	X
Northern Shrike	X	Х	
Northern Waterthrush		Х	
Olive-sided Flycatcher	X		
Orange-crowned Warbler		Х	
Pacific Wren		Х	
Pine Grosbeak		Х	
Pine Siskin	Х	Х	

Table 5.3-9. Qualitative assessment of avian species presence in non-sampled Project area by vegetation type.

Table 5.3-9, continued...

Species that may be Present in 2013 Vegetation Types	Alder Scrub	Forested Wetland	Herbaceous Wetland
Redpoll Species		Х	
Ruby-crowned Kinglet		Х	Х
Sandhill Crane	X	Х	
Savannah Sparrow		Х	X
Solitary Sandpiper		Х	X
Song Sparrow	X	Х	X
Spotted Sandpiper		Х	
Spruce Grouse		Х	
Steller's Jay	X	Х	
Swainson's Thrush	X	Х	
Townsend's Warbler		Х	
Tree Swallow	X	Х	
Varied Thrush		Х	
Violet-green Swallow	X	Х	X
Wandering Tattler		Х	
Western Wood-pewee	X	Х	
White-crowned Sparrow		Х	
White-winged Crossbill	X	Х	
Willow Flycatcher	X		
Willow Ptarmigan		Х	X
Wilson's Snipe	X		
Wilson's Warbler	X		
Yellow Warbler		X	
Yellow-rumped Warbler			

5.3.4. USFS Sensitive Species and Species of Special Interest

Marbled Murrelet (*Brachyramphus marmoratus*): A USFS species of special interest, this medium sized seabird is documented to inhabit inland freshwater lakes and nest in inland areas of old-growth conifer forest or on the ground (Carter and Sealy 1986; Marshall 1988). Marbled murrelets have not been observed in the Grant Lake area. Murrelets are known to select mature or old growth conifers for nesting, and this habitat is found within the area in mature hemlock and spruce-hemlock forests.

Townsend's Warbler: A USFS species of special interest, this species is found throughout forested locations on the Kenai and Seward Ranger District (USFS 2008). They are associated with older, mature spruce and hemlock forests and are not found as often in young coniferous or hardwood forests. Seward Ranger District Breeding Bird surveys indicate that Townsend's warblers are found in higher numbers in older spruce and hemlock forests, and that they have declined in numbers between 1994 and 2000 (Prosser 2002). Townsend's warblers were detected during the Ebasco (1984), 2010, and 2013 Grant Lake surveys and their habitat occurs throughout forested sections of this area, in mature hemlock and spruce-hemlock forests.

Audubon's Red-Listed Species - The Alaska WatchList is Audubon Alaska's science-based, early warning system to identify bird species at risk. It is a tool to focus attention and resources on vulnerable and declining bird populations across the state. Species and subspecies on the WatchList face some combination of population decline, small population size, or limited geographic range. The Red List has the highest level of concern: species are vulnerable and currently declining, or depressed from a prior decline. The species listed below are identified on the Alaska WatchList.

Varied Thrush: This species is found in spruce forests, deciduous (balsam poplar and dense alder stands), and mixed forests (Kessel 1989; Kessel 1998; George 2000). Shrub understory appears important to breeding; shady, mossy forests, deciduous shrub, dense alder thickets, and isolated cottonwood patches are all apparently preferred habitat (Kessel 1998). Varied thrushes were detected during the Ebasco (1984), 2010, and 2013 Grant Lake surveys and their habitat occurs throughout forested sections of this area.

Lesser Yellowlegs: Breeds in muskegs and freshwater marshes in open boreal forests and forest / tundra transition habitats. Nesting habitat is typically a combination of shallow wetlands, trees, shrubs, and open water. The species will forage in boreal forest wetlands (Tibbitts and Moskoff 1999). Lesser yellowlegs were only detected during the Ebasco (1984) surveys and their habitat occurs throughout sections of this area.

Wandering Tattler: Mostly restricted to the alpine zone, this species usually breeds along rocky or scrubby vegetated edges of mountain streams and lakes; frequents rapidly-flowing streams and tundra habitats, wet meadows, moraine deposits, scree slopes, braided rivers, and is sometimes found in forest clearings away from water. These birds often nest on the ground in a rocky or gravelly site (Weeden 1965; Johnsgard 1981; Weeden 1959). Nests have also been observed in dwarf shrub tundra near streams or lakes (Spindler et al. 1980; Gill et al. 2002). Wandering tattlers were detected during the Ebasco (1984) surveys; however, their habitat does not likely occur in the study area.

Solitary Sandpiper: This species nests in wooded wetlands in muskeg bogs, spruce forests, and deciduous riparian woodlands (Moskoff 1995) and, occasionally, riparian tall shrub thickets (Spindler and Kessel 1980; McCaffery and Harwood 2004). More specifically, on the Kenai Peninsula, this sandpiper is closely associated with wet forest gaps 10 to 20 meters (~11 to 22 yards) wide (Collins et al. 1999). Solitary sandpipers were only detected during the 2010 surveys and their habitat likely occurs in the study area.

Kittlitz's Murrelet: A ground nesting species with nests constructed on barren scree slopes, a short distance below a peak or ridge (Day et al. 1983; Day 1995; Piatt et al. 1999). Breeding generally occurs in high elevation alpine areas, with little or no vegetative cover. When present, vegetation is primarily comprised of lichens and mosses (Day et al. 1983). Kittlitz's murrelets have not been observed in the Grant Lake area and their habitat does not likely occur in the study area.

Olive-sided Flycatcher: The species shows a preference for forest edges, including harvested areas and open canopied forested habitats where forests are naturally open or semi-open. This species, although considered an indicator for coniferous forests, is also found in mixed deciduous / coniferous forests. Further, this species is associated with openings and water (e.g., bogs, wetlands) and dead standing trees, and is closely associated with recently burned areas (Wright 1997). Olive-sided flycatchers were detected during the 2010 surveys and their habitat likely occurs in the study area.

Blackpoll warbler: This species is found predominantly along rivers, streams, or bogs in mixed or coniferous forests and tall shrub thickets (especially *Salix alaxensis* and *Alnus incana*) with mixed spruce-paper birch overstory ([*Betula papyrifera*] Gabrielson and Lincoln 1959; Kessel 1989; McCaffery 1996; Kessel 1998; Cotter and Andres 2000). These species will also inhabit riparian areas and ecotones between treeline alpine tundra (Kessel 1998; Kessel and Gibson 1978). Blackpoll warblers have not been observed in the Grant Lake area; however, their habitat does occur in the study area.

5.3.5. Waterbirds

Ducks can be categorized as either "puddle ducks" or "diving ducks." Puddle ducks frequent shallow water areas such as marshes, ponds, and creeks and nest on adjacent dry uplands. Puddle ducks generally feed in shallow water on the seeds and tubers of aquatic plants, grass, and insects. Mallards, pintails, American widgeons, Northern shovelers, and green–winged teals are common Alaskan puddle ducks. Diving ducks, mergansers, and loons are primarily observed on the larger and deeper ponds, lakes, and rivers. Some species nest in tree cavities while others nest over water among aquatic emergent plants or along the shore lines. Goldeneyes, buffleheads, common loons, and red-breasted mergansers are common in Alaska and feed by diving for a variety of aquatic animals and plants.

2010 Waterbird Surveys - A total of four boat-based, intense area searches for waterbird broods and nesting habitat were conducted on Grant Lake (6/23/2010, 7/9/2010, 7/16/2010, and 7/23/2010). In addition, a foot survey of Grant Creek was conducted on 7/12/2010 to search for harlequin duck broods and other waterbirds.

2010 Waterbird Breeding and Brood-Rearing Surveys – Four Waterbird surveys were conducted in 2010. Identified species as well as brooding status is provided in Table 5.3-10. Incidental bird species identified during the surveys included herring gull, solitary sandpiper, and spotted sandpiper.

2010 Harlequin Duck Survey - No harlequin ducks were detected during the survey on Grant Creek. Three individual adult American dippers were documented during this survey

Date	Waterfowl		Adults	Pairs	Adult Females	Adult Females + Young
23-Jun-10	Barrow's Goldeneye	Bucephala islandica	3	0	4	(3 + 5)
	Common Goldeneye	Bucephala clangula	1	0	2	(1+7); (1+7)
	Goldeneye Species	Bucephala sp.	2			
	Common Loon	Gavia immer	2			
	Common Merganser	Mergus merganser	2			
	Red-breasted Merganser	Mergus serrator		1	5	
	Merganser Species	Mergus sp.	3			
	Harlequin Duck	Histrionicus histrionicus			1	
	+	-			,	r
9-Jul-10	Common Goldeneye	Bucephala clangula	1	1	2	(1 + 8)
	Goldeneye Species	Bucephala sp.	1			
	Common Loon	Gavia immer	1	1		
	Common Merganser	Mergus merganser	2			
16-Jul-10	Common Goldeneye	Bucephala clangula	4		9	(1+3); (1+6); (2+3)
	Common Loon	Gavia immer	1			
	Red-breasted Merganser	Mergus serrator	3			(1 + 1); (1 + 1); (1 + 8); (1 + 9)
	Harlequin Duck	Histrionicus histrionicus	1			
	+	_	- t		1	r
23-Jul-10	Barrow's Goldeneye	Bucephala islandica				(1+6)
	Common Goldeneye	Bucephala clangula	1			(1+3); (1+5)
	Goldeneye Species	Bucephala sp.	7			
	Common Loon	Gavia immer	4			

Table 5.3-10. 2010 breeding waterbird surveys.

Date	Waterfowl		Adults	Pairs	Adult Females	Adult Females + Young
	Pacific Loon	Gavia pacifica	1			
	Red-breasted Merganser	Mergus serrator	1			
	Merganser Species	Mergus sp.	6			
	Harlequin Duck	Histrionicus histrionicus	1			
	Mallard	Anas platyrhynchos			1	

Table 5.3-10, continued...

2013 Winter Waterbird Surveys - Winter Waterbird surveys are scheduled for December 2013 (completed) and February/March 2014 and will verify whether the outlet of Grant Lake, purportedly ice-free throughout the winter, affords winter habitat and is utilized by waterbirds. This area was documented as a winter feeding area for a flock of mallards during the 1981-1982 field studies (Ebasco 1984). Open water habitat that supports waterbirds in the Seward Ranger District is limited during the winter (Benoit 2009).

Additional 2013 Incidentals – A pair of common loons were observed daily by the wetland crew during field work in various locations on Grant Lake in July 2013. A female merganser and brood were also seen during this time on Grant Lake. A female red-breasted merganser and a brood of nine chicks were documented in June 2013 along the shoreline above the Trail Lake narrows (defined as the section of water between the Upper Trail and Lower Trail lakes). A harlequin duck female was also recorded in June on Grant Creek just above the Trail Lake narrows.

Trumpeter swans were detected on March 3, 2013, on the east side of Lower Trail Lake. It is purported that these birds over winter in this area. Apparently the location remains ice-free due to the high pressure of water flow through the Trail Lake narrows.

Compilation of Results - The 2010 data provided information on seven species of waterfowl on Grant Lake (see Table 5.3-10). Ebasco (1984) reported two additional species of waterfowl, American widgeon and green-winged teal. Barrow's and common goldeneye species as well as red-breasted mergansers were also observed with broods. All three species are considered diving ducks and feed primarily on aquatic invertebrates (goldeneyes) and crustaceans and fish (merganser). Ebasco (1984) documented the availability of the following aquatic food resources for diving ducks: *Diptera, Plecoptera, Tricoptera, Bivalvia, Gastropoda* and *Gammaridae*. Prey concentrations and availability appear to sustain reproduction and brood rearing on Grant Lake.

Both goldeneye species are cavity nesters. Presence and availability of nest sites are a natural limiting factor. Females will often return to the same nest if reproduction is successful in previous years. The red-breasted merganser is a ground nester, and habitat for nest selection may not be as limited for this waterbird species in the Grant Lake area.

There is suitable habitat available for ground-nesting ducks including the for-mentioned puddle ducks in certain areas of Grant Lake. Winter Waterbird surveys will delineate any use of the area by non-migratory waterfowl.

5.3.6. USFS Sensitive Species and Species of Special Interest

Trumpeter Swan: A USFS sensitive species prefers large ponds, lakes, and marshes; constructing massive nest mounds in areas of reeds, sedges, or similar emergent vegetation, primarily on stationary fresh waterbodies (Mitchell 1994). Swans are considered shy waterfowl easily disturbed during nesting; however, once cygnets are mobile, adults become very protective. Trumpeter swans were observed north of the Grant Lake study area during USFS surveys (2008); however, no nests or cygnets were observed during these USFS (2008) surveys. Trumpeters were also sighted during spring 2013 below the Trail Lake narrows; however, they were not resigned during summer field work. Suitable habitat likely occurs in the wildlife study area.

5.3.6.1. Audubon's Red-Listed Species

Red-throated Loon: This species will typically select marshy islands for nest sites or on dry shores. They will nest on small oligotrophic lakes in diverse habitats, such as forests or tundra up to 1,070 meters (~3,510 feet) in elevation. The availability of freshwater fish limits this species' distribution (Soper 1946; Palmer 1962; Davis 1972; Bundy 1976; Bergman and Derksen 1977; Cramp and Simmons 1977; Merrie 1978; Derksen et al. 1981; Furness 1983; Reimchen and Douglas 1984; Johnsgard 1987; Douglas and Reimchen 1988; Eberl and Picman 1993; Barr et al. 2000). Red-throated loons have not been observed in the Grant Lake area however their nesting habitat does occur in the study area.

Yellow-billed Loon and Greater White-fronted Goose: Both species are considered non-breeders in this area and warrant no further discussion as their primary breeding habitats also do not occur in this area.

5.3.7. Terrestrial Mammals

Terrestrial mammals in the Project area have specific habitat requirements including: 1) cover (shelter) from weather and predators; 2) food and water for nourishment; and 3) space to obtain food, water, and to attract a mate. Moose use cover for shelter against weather and predators. Thermal cover is used to help moose control their body temperature, especially during extreme weather and temperatures in the summer and winter. Wildlife diet selection is driven by the quantity and quality of available food in concert with the nutritional needs of the animal. Food availability to a predator equates to prey availability. Carnivores may expend a large amount of energy in searching for, chasing, capturing, and killing their food. Herbivores or plant eaters may become nutritionally stressed by a lack or shortage of food (quantity) or by a lack of highly nutritious food (quality). Although woods and meadows may look green and be covered with lush plants, this does not mean moose and other herbivores have adequate food.

Each wildlife species requires a certain amount of space to avoid or escape potential predators, locate a mate, obtain sufficient food and water for survival, and rest. Space requirements protect behavioral and social responses that ensure an animal's well-being. Wildlife space requirements

vary by species, but, generally, the amount of space required is determined by the quantity and quality of food, cover, and water (habitat) found in an area. Other factors affecting space needs of wildlife include how large the animal is (larger animals require more space); the animal's dietary preferences (carnivores generally require more space than herbivores); and how well the animal can withstand crowded conditions. Space requirements (as a function of habitat quantity and quality) essentially determine the carrying capacity of the site for wildlife.

2010 Terrestrial Mammal Surveys - The following species were included in the 2010 Terrestrial Mammal surveys:

Bear: The USFS provided one brown bear den location collected in 2008 (see Figure 5.3-2). Three sightings of black bears and one sighting of a brown bear were noted as incidentals during the 2010 field season. The coordinates were not provided. No other field work was conducted in 2010 to document bear den locations. Denning surveys are considered complete, as stipulated in the Study Plan.

Mountain Goat and Dall Sheep: Six mountain goats (5 adults, 1 kid) were noted during the Waterbird Nesting Survey on July 23, 2010. The coordinates were not provided. This survey is considered complete, as stipulated in the Study Plan.

Bats: The survey was conducted on July 23, 2010, at an abandoned historic cabin near the inlet of Grant Lake. No bats or any evidence of bats were detected. Bat surveys are considered complete, as stipulated in the Study Plan.

Additional 2010 Incidentals – A moose, three beaver, a coyote, and a porcupine were all recorded during the various survey activities in 2010. The coordinates were not provided.

Additional Information – The USFS provided one wolverine den location collected in 2008 and again in 2010 (see Figure 5.3-2).

2013 – 2014 Terrestrial Mammal Surveys – The following species are included in the 2013 and 2014 Terrestrial Mammal surveys:

Moose: Two Moose surveys are scheduled for the winter 2013-2014, the first was conducted in December 2013 and the second to be conducted in February/March 2014. Results from these surveys will be amended to this study report when completed.

Additional 2013 Incidentals – A moose / calf pair were sighted at the Trail Lake narrows area in June 2013. Various crews from other resource studies reported individual moose sightings along Grant Creek and Grant Lake. Beaver activity, an active dam, and at least two active lodges, were reported by crews doing surveys around Grant Lake. Two black bears were sighted in the study area, one on Grant Creek and the other on Grant Lake. A lynx was observed in the study area on July 21, 2013. The coordinates were not provided.

5.3.7.1. Compilation of Results

Bear: Ebasco (1984) surveyed for the presence of black bears in their defined study area and reported detecting nine bears during three field surveys. They did not discover activity in the upper Grant Lake valley.

Important black bear habitat in the study area includes the lower alpine zone near the shrubline, which is important in July and August for the young, succulent forbs and sedges it produces. During August and September, salmon present in Grant Creek are sought by black bears. Because salmon are unavailable in great numbers, bears intermittently forage in the subalpine zone and on lowland berries at this time. Elderberries, blueberries, rosehips, salmon berries and low and highbush cranberries are probably utilized heavily.

Likely denning habitat for those black bears residing locally year-round in the Grant Lake area includes the bench between Grant Lake and Upper Trail and Lower Trail lakes.

On the Kenai Peninsula, the primary limiting factor for brown bear is spring and summer feeding habitat. Spring and summer habitat includes south-facing hillsides and avalanche chutes, big game winter ranges, and salmon streams that provide the high quality foods that bears need to develop fat reserves before denning and to replenish fat stores depleted after denning. Carrion, berries, and fish sources in the watershed provide a diversity of food sources for bears (USFS 2008). Ebasco (1984) delineated denning habitat for brown bear based on sightings of individual bears and their sign at the time of den emergence, and on the basis of certain geomorphic and vegetation characteristics. Three units of potential denning habitat were delineated in this manner (see Figure 5.3-3).

The USFS (2008) also delineated high value brown bear denning habitat in the more general Trail River Landscape Assessment (2008) (see Figure 5.3-4). The model predicted the probability of denning across the landscape. Potential denning habitat is abundant and well distributed on steep slopes. The identified habitat is most likely to be used by females with cubs after den emergence, which is also important for foraging (USFS 2008).

Mountain Goat: The 2010 wildlife study field efforts reported sighting six mountain goats during Waterbird surveys. Ebasco (1984) delineated goat habitat based on assessment of ADF&G information (see Figure 5.3-5).

The principal area of goat use in the Grant Lake basin is the north side of the lake. These south-facing slopes are utilized in fall, winter, spring, and into early summer. Occupied areas reach from alpine benches downslope into stringers of mountain hemlock. This plant was present in 70 percent of all fecal samples collected from alpine winter ranges at Grant Lake (Hansen and Archer 1981). The primary area of interchange between Grant Lake and other subpopulations is into the Moose Creek drainage to the northeast and across the glacier to the east to the Kings River-Kings Bay area.

Based on Chugach National Forest GIS data, mountain goat winter range primarily occurs on south-facing alpine slopes within the Trail River Watershed (USFS 2008). Predictive modeling

delineated mountain goat winter habitat well outside the 2013 wildlife study area (see Figure 5.3-6).

Dall Sheep: The Grant Lake area is purportedly considered the outer boundary of sheep range on the Kenai Peninsula covering the entire Grant Lake drainage in several small bands. During the Ebasco (1984) field studies, sheep were only noted on the northern half of the Grant Lake drainage, which may be the most favored range (see Figure 5.3-7). Dall sheep habitat does not likely occur in the study area.

Bat: The little brown Myotis is the only bat found in Interior and South Central Alaska, and has only been documented in forested regions of Alaska (Parker 1996, Parker et al. 1997). This species favors old-growth forests and riparian habitats (Parker et al. 1996), and will roost in building, trees, under rocks and wood, and caves (MacDonald and Cook 1996). Currently, there is not enough information for this species in Alaska to assess the presence or absence of habitat in the Project area.

Moose: This species is primarily associated with early to mid-succession habitat and riparian areas and are dependent on early seral vegetation types including young hardwoods (willow, birch, aspen, and, to a smaller extent, cottonwoods). Ebasco (1984) delineated moose habitat based on assessment of ADF&G information (see Figure 5.3-8).

Primary limiting factors for moose in Alaska and the Kenai Peninsula are the availability of winter range, predation, collision mortality from vehicles and trains (Lottsfeldt-Frost 2000), and distance between feeding and hiding/ thermal cover (Renecker and Schwartz 1998).

Chugach National Forest GIS data indicated that high-quality habitat is primarily in riparian areas along the river valleys, but is distributed throughout the Trail River Watershed on all but the highest elevations (USFS 2008). The ADF&G considers the overall habitat on the Seward Ranger District to be of low quality and capable of supporting only 2 to 5 moose per square mile. Predictive modeling of moose winter range is displayed in Figure 5.3-6 (USFS 2008).

Results from the 2013 / 2014 Winter Moose surveys once collected and analyzed, will be provided to stakeholders for review and collaboration and incorporated into the DLA.



80 - 100% Probable Denning Habitat and Brown Bear Core Prescription in the Trial River Landscape Assessment Area Legend 80% Probable Denning Habitat 100% Probable Denning Habitat Brown Bear Core Area streams lakes roads 10 Miles 2.5 5 trails Glaciers GRANT LAKE HYDROELECTRI Ν Developed For MCMILLEN, LLC GRANT LAKE TERRES Homer Electric A Fig OFFICE: 208.342.4214 FAX: 208.342.4216 Association, Inc. 1401 SHORELINE DRIVE BOISE, ID 83702 **Major Brown Bea** Touchstone Energy' Cooperative Habitat DESCRIPTION

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5.4. Conclusions

This report provides the technical summary of the assessment methods, results, and conclusions of the 2010 and 2013 wildlife studies. The objectives of the 2010 and 2013 wildlife studies were to:

- Document presence and distribution information to allow the Project to minimize or avoid impacts to protected species, including bald eagles and other raptors, shorebirds, waterbirds, and landbirds of special interest;
- Quantify the distribution and abundance of target wildlife species during key seasons of activity in the study area;
- Document the species composition of avian communities, particularly landbirds, shorebirds, and waterbirds; and
- Classify and map wildlife habitat in the study area in conjunction with the Botanical Resources Study.

The 2010 field effort documented presence of breeding birds and shorebirds, breeding waterbirds, bear, beaver, moose, coyote, porcupine, and mountain goats in the 2010 wildlife study area. The 2013 field effort documented presence of breeding birds and shorebirds, breeding waterbirds, breeding raptors, bear, beaver, moose, and lynx in the 2013 wildlife study area. The Ebasco (1984) site-specific study is referred to extensively to provide additional species information. The Ebasco (1984) document supplements information regarding Dall sheep, mountain goats, moose, and bear. The 2013 non-field effort combined all the site-specific information regarding wildlife resources in the Project area. In addition, the potential impacts associated with Project construction and operational activities are qualitatively evaluated for direct and indirect impacts in the subsections to follow. As Project designs are further refined, the data provided in this report will be applied to conduct a quantitative analysis of potential impacts to wildlife species and their habitat.

Wildlife presence in the Project area is contingent on many variables including habitat. Habitat is comprised of resources (water, food, and shelter) and environmental requirements (temperature, predators, and competitors) that determine the presence, survival, and reproduction of a species. Wildlife exhibits a propensity to occupy those habitats that provide the resources to fulfill the requirements necessary for the continuance of that species. This section utilizes the factor of vegetation (food and cover) to qualitatively assess species presence and use of the 2013 wildlife study area.

Vegetation characteristics utilized for this qualitative assessment have been obtained from various sources, including the site-specific Ebasco (1984) report, the USFS (2007) cover-type ArcGIS layer, and 2013 field work reported in Section 3 and Section 4 of this report. The level of vegetation classification varies for each source; therefore, an amalgamation of all these resources was necessary to discern habitat specific to the components of the wildlife study. General vegetation characteristics (cover type), as defined or mapped by each source, were compared. More specific habitat characteristics (understory species) were then delineated by correlating all available sources (see Table 5.2-1). A qualitative assessment of species presence and use of the 2013 wildlife study area is presented in the following section components. Each section includes a qualitative evaluation of Project impacts.

Impacts are categorized as construction-related or operations-related, each having direct and indirect effects. In general, construction-related impacts are considered temporary or short-term whereas operational impacts are considered longer-term or permanent. Table 5.4-1 summarizes potential Project impacts on wildlife as related to habitat, disturbance of biological activities, and possible direct mortality. It is important to note that the potential impacts discussed in Table 5.4-1 are preliminary and based primarily on the terrestrial natural resource studies and the limited amount of engineering feasibility work conducted prior to this report being developed. This table and the associated impacts will be fully refined and vetted once the engineering designs are finalized. A full discussion of wildlife impacts will be included in the DLA. Best Management Practices (BMP's) associated with construction and development activities will be collaboratively developed with stakeholders and implemented during those activities.

Project Component	Potential Qualitative Construction Impacts		Potential Qualitative Operational Impacts	
Toject Component	Direct	Indirect	Direct	Indirect
GRANT CREEK DIVERSION				
Natural Outlet Option	Vegetation clearing and disturbance; shoreline/bank disturbance; short- term reduction of wildlife habitat (nesting, foraging, and cover). Auditory disturbance to wildlife and associated biological activities.	Species introduction and competition; soil erosion, sediment input to water column and reduced clarity; poor native veg re- establishment; short-term changes in prey availability.	Permanent changes in habitat due vegetation clearing, filled wetlands, and altered banks /shoreline/bed.	Changes to natural lake level elevation on wildlife habitat include permanent changes to nesting, foraging and cover, and changes to species dynamics including predator- prey interactions.
Concrete Dam Option	Vegetation clearing and disturbance; shoreline/bank disturbance; short- term reduction of wildlife habitat (nesting, foraging, and cover). Auditory disturbance to wildlife and associated biological activities.	Species introduction and competition; soil erosion, sediment input to water column and reduced clarity; poor native veg re- establishment; short-term changes in prey availability.	Permanent changes in habitat due vegetation clearing, filled wetlands, and altered banks /shoreline/bed.	Changes to natural lake level elevation on wildlife habitat include permanent changes to nesting, foraging and cover, and changes to species dynamics including predator- prey interactions.

Table 5.4-1.	Grant Lake	terrestrial resour	rces - wildlif	e study	impacts.
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Table 5.4-1, continued...

	Potential Qualita	ative Construction	Potential Qualita	ative Operational
Project Component		pacts	Imp	acts
	Direct	Indirect	Direct	Indirect
WATER				
Intake Structure	Vegetation clearing and disturbance; shoreline/bank disturbance; short- term reduction of wildlife habitat (nesting, foraging, and cover). Auditory disturbance to wildlife and associated biological activities.	Species introduction and competition; soil erosion, sediment input to water column and reduced clarity; poor native veg re- establishment; short-term changes in prey availability.	Permanent changes in habitat due vegetation clearing, filled wetlands, and altered banks /shoreline/bed.	Changes to natural lake level elevation on wildlife habitat include permanent changes to nesting, foraging and cover, and changes to species dynamics including predator- prey interactions.
Tunnel	At surficial entrance and exit of tunnel: Vegetation clearing and disturbance; short- term reduction of wildlife habitat (nesting, foraging, and cover). Auditory disturbance to wildlife and associated biological activities.	At surficial entrance and exit of tunnel: Species introduction and competition; soil erosion, sediment input to water column and reduced clarity; poor native veg re- establishment; short-term changes in prey availability.	At surficial entrance and exit of tunnel: Permanent changes in habitat due vegetation clearing and altered succession stage.	At surficial entrance and exit of tunnel: Permanent changes to nesting, foraging and cover, and changes to species dynamics including predator-prey interactions.
Penstock	Vegetation clearing and disturbance; shoreline/bank disturbance; short- term reduction of wildlife habitat (nesting, foraging, and cover). Auditory disturbance to wildlife and associated biological activities.	Species introduction and competition; soil erosion, sediment input to water column and reduced clarity; poor native veg re- establishment; short-term changes in prey availability.	Permanent changes in habitat due vegetation clearing and altered banks /shoreline/bed.	Permanent changes to nesting, foraging and cover, and changes to species dynamics including predator-prey interactions.

Table 5.4-1, continued...

Project Component	Potential Qualita	ative Construction	Potential Qualitative Operational Impacts		
Toject Component	Direct	Indirect	Direct	Indirect	
Tailrace	Vegetation clearing and disturbance; shoreline/bank disturbance; short- term reduction of wildlife habitat (nesting, foraging, and cover). Auditory disturbance to wildlife and associated biological activities.	Species introduction and competition; soil erosion, sediment input to water column and reduced clarity; poor native veg re- establishment; short-term changes in prey availability.	Permanent changes in habitat due vegetation clearing and altered banks /shoreline/bed.	Permanent changes to nesting, foraging and cover, and changes to species dynamics including predator-prey interactions.	
Tailrace Detention Pond	Vegetation inundation and disturbance; changes in wildlife habitat (nesting, foraging, and cover). Auditory disturbance to wildlife and associated biological activities.	Changes in species and dynamics; soil erosion, sediment input to water column and reduced clarity; poor native veg re- establishment; changes in prey availability.	Permanent changes in habitat due vegetation clearing and filled wetlands.	Permanent changes to nesting, foraging and cover, and changes to species dynamics including predator-prey interactions.	
POWERHOUSE					
Powerhouse Structure	Vegetation clearing and disturbance; short- term reduction of wildlife habitat (nesting, foraging, and cover). Auditory disturbance to wildlife and associated biological activities.	Species introduction and competition; soil erosion; poor native veg re- establishment; short-term changes in prey availability.	Permanent changes in habitat due vegetation clearing and altered succession stage. Auditory disturbance to wildlife and associated biological activities.	Permanent changes to nesting, foraging and cover, and changes to species dynamics including predator-prey interactions. Auditory disturbance to wildlife and associated biological activities.	

Table 5.4-1, continued...

Project Component	Potential Qualitative Construction Impacts		Potential Qualitative Operational Impacts	
J	Direct	Indirect	Direct	Indirect
TRANSMISSION LINE/SWITCHYARD				
Above Ground Option	Vegetation clearing and disturbance; short- term reduction of wildlife habitat (nesting, foraging, and cover). Auditory disturbance to wildlife and associated biological activities.	Species introduction and competition; soil erosion; poor native veg re- establishment; short-term changes in prey availability.	Permanent changes in habitat due vegetation clearing, filled wetlands and altered succession stage. Possible direct mortality to avifauna not accustomed to power lines.	Permanent changes to nesting, foraging and cover, and changes to species dynamics including predator-prey interactions.
Below Ground Option	Vegetation clearing and disturbance; short- term reduction of wildlife habitat (nesting, foraging, and cover). Auditory disturbance to wildlife and associated biological activities.	Species introduction and competition; soil erosion; poor native veg re- establishment; short-term changes in prey availability.	Permanent changes in habitat due vegetation clearing, filled wetlands and altered succession stage.	Permanent changes to nesting, foraging and cover, and changes to species dynamics including predator-prey interactions.
ACCESS ROADS & BRIDGE				
Access Roads & Bridge	Vegetation clearing and disturbance; short- term reduction of wildlife habitat (nesting, foraging, and cover). Auditory disturbance to wildlife and associated biological activities.	Species introduction and competition; soil erosion; poor native veg re- establishment; short-term changes in prey availability.	Permanent changes in habitat due vegetation clearing, filled wetlands and altered succession stage. Possible direct mortality to wildlife not accustomed to access vehicles. Permanent periodic auditory disturbance to wildlife and associated biological activities.	Permanent changes to nesting, foraging and cover, and changes to species dynamics including predator-prey interactions from road and bridge infrastructure, and backwater effects from bridge. Permanent periodic auditory disturbance to wildlife and associated biological activities.

The following sections discuss the potential species-specific impacts that are not covered in Table 5.4-1 and are based solely on the 2013 Terrestrial Resources Study investigations. Impact assessments will be refined based upon engineering feasibility work that will document infrastructural locations in relation to habitat for the species mentioned below, and will be included in the DLA.

5.4.1. Raptor Nesting Survey

Potential Impacts to Raptors - Removal or loss of vegetation affects raptors in several ways that include loss of old growth trees for nesting platforms (bald eagles, osprey, and red-tailed hawks) and perches. Project-related tree removal may be direct or indirect. Indirect removal includes tree species influenced by changes in creek levels, causing tree mortality and eventual structure loss. Tree platforms utilized for large raptor nests and perches are lost naturally every year. Raptors often construct multiple nests in a season (osprey) or build new structures every year. The loss of the tree or the nest from the previous season is not a detriment to successful breeding, and is not predicted to impact the overall raptor population on the Kenai Peninsula. The direct removal of any nest structure utilized by bald eagles, regardless of activity state, without a permit is prohibited; the USFWS (2007) has published recommendations to avoid disturbance to occupied bald eagle nests during development activities. The USFWS (2007) recommend the following:

(1) Keep a distance between the activity and the nest (distance buffers),

(2) Maintain preferably forested (or natural) areas between the activity and around nest trees (landscape buffers), and

(3) Avoid certain activities during the breeding season.

The buffer areas serve to minimize visual and auditory impacts associated with human activities near nest sites. Ideally, buffers would be large enough to protect existing nest trees and provide for alternative or replacement nest trees. The size and shape of effective buffers vary depending on the topography and other ecological characteristics surrounding the nest site.

The height of the nest above the ground may also ameliorate effects of human activities; eagles at higher nests may be less prone to disturbance.

In addition to the physical features of the landscape and nest site, the appropriate size for the distance buffer may vary according to the historical tolerances of eagles to human activities in particular localities, and may also depend on the location of the nest in relation to feeding and roosting areas used by the eagles. Increased competition for nest sites may lead bald eagles to nest closer to human activity (and other eagles).

Seasonal restrictions can prevent the potential impacts of many shorter-term, obtrusive activities that do not entail landscape alterations (e.g. fireworks, outdoor concerts). In proximity to the nest, these kinds of activities should be conducted only outside the breeding season. For activities that entail both short-term, obtrusive characteristics and more permanent impacts (e.g., building construction), we [USFWS] recommend a combination of both approaches: retaining a landscape buffer and observing seasonal restrictions.

USFWS (2007) provides information regarding specific buffer distances (660 feet $-\frac{1}{2}$ mile) depending on activities (Categories A - H) (Table 5.4-2). Category A (construction of roads, trails, canals, power lines, and other linear utilities) have the following buffer recommendations:

	If there is no similar activity within 1 mile of the nest	If there is similar activity closer than 1 mile from the nest
If the activity will be visible from the nest	660 feet. Landscape buffers are recommended.	660 feet, or as close as existing tolerated activity of similar scope. Landscape buffers are recommended.
If the activity will not be visible from the	330 feet. Clearing, external construction, and landscaping between 330 feet and 660 feet should	330 feet, or as close as existing tolerated activity of similar scope. Clearing, external construction and landscaping
nest	be done outside breeding season (~March – August).	within 660 feet should be done outside breeding season (~March – August).

Table 5.4-2. Recommended distances for Category A activities as defined by USFWS (2007)

The Federal eagle nest take permit (OMB Control No. 1018-0022) authorizes a 'take' (removal and/or relocation) of a bald or golden eagle nest to protect human safety or eagles, and under other limited circumstances. Title 50 Parts 10, 13, and 22.27 of the Code of Federal Regulations (CFR) will provide addition regulatory information. This permit may be used to authorize the removal of a bald or golden eagle nest where the removal is: (a) necessary to alleviate a safety emergency to people or eagles; (b) necessary to ensure public health and safety; (c) the nest prevents the use of a pre-existing human-engineered structure; or (d) the activity or mitigation for the activity will provide a net benefit to eagles. Only inactive nests may be taken, except in the case of safety emergencies. Inactive nests are defined by the continuous absence of any adult, egg, or dependent young at the nest for at least 10 consecutive days leading up to the time of take. Permittees may be required to monitor the area and report whether eagles attempt to build or occupy another nest at another site in the vicinity for the duration specified in the permit. Permittees must submit a report to the Regional Migratory Bird Permit Office within 30 days after the permitted nest removal (except for programmatic permittees who must report each nest removal within 10 days after the take and submit an annual report by January 31 of the calendar year). The report must include all the information required by Service Form 3-202-16. All permittees will be required to avoid and minimize the potential for take to the degree practicable, and for programmatic permits, to the point where take is unavoidable. Where feasible, if suitable conditions are present, the permittee may be required to relocate the nest, construct an alternate nest, or improve conditions at alternate nest sites in the territory. Compensatory mitigation may be appropriate depending on the biological value of the nest and the type of circumstances necessitating its removal. In general, little or no compensatory mitigation will be required for emergency nest-take if the permittee could not foresee or prevent the eagles from nesting. The time needed by the Service to process a permit application depends on the complexity and scope of the activity and associated take, whether tribal consultation is warranted, what additional environmental analyses may be required, and other factors.

In general, applicants may expect the following approximate permit processing times from the time we receive a complete application:

- Emergency nest-take permit: (2 to 5 days)
- Standard permit: (90 days)
- Standard or programmatic permit requiring an environmental assessment: (4 to 6 months)
- Standard or programmatic permit with EIS: (18 to 24 months)

Removal of vegetation will also impact forest nesting and foraging raptor species including Northern goshawks and sharp-shinned hawks. Impacts include loss of nesting and foraging habitat. Both species are considered shy and may be sensitive to disturbance. Activities related to forest removal and anthropogenic access may cause these two species to move to other less disturbed areas; however, the movement of these accipiters is not predicted to impact the overall population of the Kenai Peninsula. The USFWS (2005) has published recommendations for time periods to avoid vegetation clearing. These recommendations are provided to help avoid vegetation removal during the breeding season.

Direct mortality to forest raptors may increase with the placement of power lines along the access route. Birds, especially resident species, unaccustomed to these lines may be impacted by flying into the line or injury by electrocution. Collision and nesting deterrent methods will be considered during the Project design phase to avoid or minimize impacts if the overhead power line alternative is selected.

Disturbance associated with construction and operational phases of the Project may impact raptor presence and distributions in the area; however, the movement of these species is not predicted to impact the overall population of the Kenai Peninsula.

5.4.2. Breeding Landbirds and Shorebirds

Potential Impacts to Breeding Birds and Shorebirds - Removal or loss of vegetation affects breeding birds and shorebirds in several ways that include loss of old growth trees for nesting, foraging, and cover habitat. Project-related tree and vegetation removal may be direct or indirect. Indirect removal includes understory changes to plant species influenced by direct tree removal; causing mortality and eventual structure loss or alteration. Breeding birds and shorebirds often construct a new nest every season and habitat is often lost to natural events like flooding and fire. The loss of nesting habitat from the previous season is not a detriment to successful breeding and is not predicted to impact the overall breeding birds and shorebirds population on the Kenai Peninsula. The direct removal of any active nest structure is prohibited. The USFWS (2005) has published recommendations for time periods to avoid vegetation clearing. These recommendations are provided to help avoid vegetation removal during the breeding season.

Removal or loss of vegetation will impact songbirds by decreasing the availability of habitat for cover from predators and for foraging. Loss of cover may increase predation on both breeding adults as well as nests. Activities related to forest removal and anthropogenic access may also cause more shy or sensitive species to move to other less acoustically disturbed areas; however, these movements are not predicted to impact the overall songbird population of the Kenai Peninsula. The USFWS (2005) has published recommendations for time periods to avoid

vegetation clearing. These recommendations are provided to help avoid vegetation removal and disturbance during the breeding season.

Direct mortality to breeding birds and shorebirds may increase with the placement of power lines along the access route. Birds, especially resident species, unaccustomed to these lines may be impacted by flying into the line or injury by electrocution. Collision deterrent methods will be considered during the Project design phase to avoid or minimize impacts if the overhead power line alternative is selected.

5.4.3. Waterbirds

Potential Impacts to Waterfowl - Removal or loss of vegetation affects waterfowl directly by loss of old growth trees for nesting habitat. Nest and trees are lost naturally every year to natural events that include flooding and fire. Cavity-nesting ducks make efficient use of hard to find tree-cavity nest sites, and are capable of identifying new cavities as trees age. The loss of the tree from the previous season can be a limiting factor in successful breeding, but this is not predicted to impact the overall waterbird population on the Kenai. The direct removal of any active nest structure is prohibited; the USFWS (2005) has published recommendations for time periods to avoid vegetation clearing. These recommendations are provided to help avoid vegetation removal during the breeding season.

Changes in lake and creek levels may indirectly impact waterfowl and waterbirds like American dippers by decreasing or altering prey availability. Lake level changes will also directly impact shorebirds by limiting available nesting and foraging habitat. Spotted sandpipers are known breeders along the shoreline of Grant Lake (2010 field data) and will place nests along the perimeter of lakes and rivers. Typical breeding habitat includes the edge of an open or semi-open area adjacent to water, with low ground cover, such as shrub-dotted or lightly treed meadows or grassland. This species prefers shores with rocks, wood, or debris (NatureServe 2007). Changes in the predator-prey dynamics and nesting surface availability may be temporary or permanent depending on the species and extent of lake level change.

Construction and operational activities may cause more shy or sensitive species to move to other less acoustically disturbed areas; however, these movements are not predicted to impact the overall waterfowl population of the Kenai Peninsula.

Direct mortality to waterfowl may increase with the placement of power lines along the access route. Waterfowl unaccustomed to these lines may be impacted by flying into the line or injury by electrocution. Collision deterrent methods will be considered during the Project design phase to avoid or minimize impacts if the overhead power line alternative is selected.

5.4.4. Terrestrial Mammals

Potential Impacts to Terrestrial Mammals – Removal or loss of vegetation may impact mammals (moose, bear, mountain goats, lynx, and other small mammals) by decreasing the availability of forest cover from predators and foraging. Loss of cover may increase predation on both breeding adults as well as young. Activities related to forest removal and anthropogenic access may also cause more shy or sensitive species to move to other less acoustically disturbed areas; however,

these movements are not predicted to impact the overall mammal population of the Kenai Peninsula. Black bear are very adaptable to human disturbance. This is not necessarily the case with brown bear, as impacts of roads and trails resulting from new development in the watershed may reduce the quality of available habitat and increase the number of negative bear-human encounters. On the Kenai Peninsula, habitat modification and human activities have resulted in an increase in the number of brown bears killed in defense of life or property (Suring and Del Frate 2002). During the summer, bears concentrate along salmon streams in areas that are heavily used by people; several encounters have occurred at salmon streams resulting in injury to humans and injury or death to brown bears (USFS 2008).

5.5. Variances from FERC-Approved Study Plan and Proposed Modifications

The 2013 wildlife resources effort followed the March 2013 Study Plan objectives and methodologies. There are no variances to report.

6 REFERENCES

- ADF&G (Alaska Department of Fish and Game). 2006. Our Wealth Maintained: A Strategy for Conserving Alaska's Diverse Wildlife and Fish Resources. Juneau, Alaska. xviii+824p. Accessed March 28, 2013. Website: http://www.adfg.alaska.gov/ index.cfm?adfg=species.wapview
- AKNHP (Alaska Natural Heritage Program). 2013. Alaska Natural Heritage Program Rare Vascular Plant Tracking List. Website accessed October 2013. Website http://aknhp.uaa.alaska.edu/botany/rare-plants-species-lists/rare-vascular-hulten/#content
- Barr, J.R., C. Earl, and J.W. McIntyre. 2000. Red-throated loon (Gavia stellata). In: A. Poole and F. Gill (eds.). The Birds of North America, No. 513. The Academy of Natural Sciences, Philadelphia, and The American Ornithologists' Union, Washington, D.C.
- Beck, K.A. 2013. Pre-Field Review Worksheet for Sensitive Plants for the Grant Lake Project. Prepared for the Seward Ranger District, Chugach National Forest by Kathryn Beck, Beck Botanical Services. June 2013.
- Bellrose, F.C. 1980. Ducks, Geese and Swans of North America. Third ed., Stackpole Books, Harrisburg, PA. 540 p.
- Benoit, M.A. 2009. Personal communication with Sirena Brownlee discussing wildlife studies conducted by the USFS in the Grant Lake Project area. September 30.
- Benoit, M.A. 2010. Personal communication with Sirena Brownlee discussing wildlife studies conducted by the USFS in the Grant Lake Project area. June 4.
- Berg, E.E., J.D. Henry, C.L. Fastie, A.D. De Volder, S.M. Matsuoka. 2006. Spruce beetle outbreaks on the Kenai Peninsula, Alaska, and Kluane National Park and Preserve, Yukon Territory: relationship to summer temperatures and regional differences in disturbance regimes. Forest Ecology and Management 227 (2006) 219-232.
- Bergman, R. D. and D. V. Derksen. 1977. Observations on Arctic and Red-throated loons at Storkersen Point, Alaska, Arctic 30:41-51.
- Brinson, Mark M. 1993. A gydrogeomorphic Classification for Weltands. Prepared for U.S. Army Corps of Engineers. Technical Report WRP-DE-4. 101p. August 1993.
- Bundy, G. 1976. Breeding biology of the red-throated diver. Bird Study 23:149-256 Cramp, S. and K. E. L. Simmons, eds. 1977. The Birds of the Western Palearctic. Vol. 1. Oxford Univ. Press, Oxford, UK.
- Carter, H.R., and S.G. Sealy, 1986. Year-round use of coastal lakes by Marbled Murrelets. Condor 88: 473-477.
- Charnon, B. 2007. Conservation Assessment for the Pale Poppy (Papaver alboroseum). Unpublished Administrative Paper. USDA Forest Service Region 10, Glacier Ranger District, Chugach National Forest, Girdwood, Alaska.
- Collins, W.B., D. Williams, and T. Trapp. 1999. Spruce beetle effects on wildlife. Federal Aid in Wildlife Restoration Research Progress Report. ADF&G, Division of Wildlife Conservation. Grant W-27-1, Study 1.53.

- Cotter, P. A. and B. A. Andres. 2000. Breeding bird habitat associations on the Alaska Breeding Bird Survey: USGS, Biological Resources Division Information and Technology Report USGS/BRD/ITR-2000-0010, 53 p.
- Cowardin, L.M., V. Carter, F.C. Golet and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service, Office of Biological Services, Washington, D. C. FWS/OBS-79/31.
- Cramp, S. and K.E.L. Simmons (eds.). 1977. The birds of the western Palearctic. Vol.1. Oxford Univ. Press, Oxford, U.K.
- Davis, R.A. 1972. A comparative study of the use of habitat by arctic loons and red-throated loons. Ph.D. diss., Univ. of Western Ontario, London.
- Day, R.H. 1995. New information on Kittlitz's Murrelet nests. The Condor 97:271-273.
- Day, R.H., K.L. Oakley, and D.R. Barnard. 1983. Nest sites and eggs of Kittlitz's and Marbled Murrelets. Condor 85(3):265-273.
- Derksen, D.V., T.C. Rothe, and W.D. Eldridge. 1981. Use of wetland habitats by birds in the National Petroleum Reserve-Alaska. Resource Pub. 141. USFWS, Washington, D.C. 27 pp.
- DeVelice, R.L, C.J. Hubbard, K. Boggs, S. Boudreau, M. Potkin, T. Boucher and C. Wertheim. 1999. Plant Community Types of the Chugach National Forest: South-central Alaska. USFS, Chugach National Forest, Alaska Region Technical Publication R10-TP-76. Anchorage, Alaska. 375 p.
- Dillman, K.L., P.C. Krosse, and C. Sever. 2009. Tongass National Forest Guidance for Biological Evaluations: Sensitive Plants. USDA Forest Service, Tongass National Forest. March 2009. documents/2009_revised_r10_ss_report.pdf
- Douglas, S.D. and T.E. Reimchen. 1988. Habitat characteristics and population estimate of breeding red-throated loons, Gavia stellata, on the Queen Charlotte Islands, British Columbia. Canad. Field-Naturalist 102:679-684.
- Ebasco (Ebasco Services Incorporated). 1984. Grant Lake Hydroelectric Project Detailed Feasibility Analysis, Volume 2 Environmental Report. Prepared for the Alaska Power Authority. January 1984. 325pp.
- Eberl, C. and J. Picman. 1993. Effect of nest-site location on reproductive success of Redthroated loons (Gavia stellata). The Auk 110: 436-444.
- Ehrlich, P. R., D. S. Dobkin and D. Wheye.1988. The Birder's Handbook: A Field Guide to the Natural History of North American Birds. Simon and Schuster Inc., New York.
- Fischenich, J.C., 2006. Functional Objectives for Stream Restoration, EMRRP Technical Notes Collection (ERDC TN-EMRRP-SR-52), US Army Engineer Research and Development Center, Vicksburg, Mississippi. http://el.erdc.usace.army.mil/elpubs/pdf/sr52.pdf
- Furness, R. W. 1983. Pages 18-30 in Foula, Shetland, Volume 4. Birds of Foula. The Brathay Hall Trust, Amblesidae, Cumbria.
- Gabrielson, I. N. and F. C. Lincoln. 1959. The Birds of Alaska. The Stackpole Company, Harrisburg, PA and Wildl. Manage. Inst., Washington, D.C. 922 pp.

- Gasaway, W. C., S. D. DuBois, D. J. Reed, and S. J. Harbo. 1986. Estimating moose population parameters from aerial surveys. Biological Papers University of Alaska No. 22.
- George, T. L. 2000. Varied Thrush (Ixoreus naevius). In The Birds of North America, No. 541 (A. Poole and F. Gill, Eds.). Philadelphia: The Academy of Natural Sciences; Washington, D.C.: The American Ornithologists' Union.
- Gill, R. E., B. J. McCaffery and P. S. Tomkovich. 2002. Wandering tattler (Heteroscelus incanus). In The Birds of North America, No. 642, (A. Poole and F. Gill, Eds.).
 Philadelphia: The Academy of Natural Sciences; Washington, D.C.: The American Ornithologists' Union.
- Goldstein, Michael I., D. Martin, and M.C. Stensvold. 2009. 2009 Forest Service Alaska Region Sensitive Species List: Assessment and Proposed Revisions to the 2002 List. U.S. Forest Service, Tongass National Forest. Website: http://www.fs.fed.us/r10/ro/policy-reports/
- Hansen, R.M., and S.R. Archer. 1981. Range survey of mountain goat wintering areas. Unpublished. Final report for the U.S. Forest Service, Chugach National Forest. 24 pp.
- Harman, W., R. Starr, M. Carter, K. Tweedy, M. Clemmons, K. Suggs, C. Miller. 2012. A Function-Based Framework for Stream Assessment and Restoration Projects. US Environmental Protection Agency, Office of Wetlands, Oceans, and Watersheds, Washington, DC EPA 843-K-12-006.
- HDR Alaska, Inc. 2005. Sensitive Plant Survey Cooper Lake Project (FERC No. 2170) Final Report. Prepared for Chugach Electric Association. February 2005.
- HDR. 2011. Grant Lake Hydroelectric Project (FERC No. 13212) Summary of 2010 Field Investigation. Prepared for Kenai Hydro, LLC. April 11, 2011. 12pp.
- Holsten, E.H., R.A. Werner, and R.L. DeVelice. 1995. Effects of a spruce beetle (Coleoptera: Scolytidae) outbreak and fire on Lutz spruce in Alaska. Environmental Entomology 24:1539-1547.
- Johnsgard, P. A. 1981. The plovers, sandpipers, and snipes of the world. Univ. of Nebraska Press, Lincoln.
- Johnsgard, P.A. 1987. Diving birds of North America. Univ. Nebraska Press, Lincoln, NE. 292 pp.
- Kessel, B. 1979. Avian Habitat Classification for Alaska. The Murrelet. Vol. 60, No. 3, pp. 86-94.
- ---. 1989. Birds of the Seward Peninsula, Alaska: their biogeography, seasonality, and natural history. Univ. of Alaska Press, Fairbanks, AK. 330 pp.
- ---. 1998. Habitat characteristics of some passerine birds in western North American taiga. University of Alaska Press, Fairbanks, AK.
- Kessel, B., and D.D. Gibson. 1978. Status and distribution of Alaska birds. Studies Avian Biology. In: Studies in Avian Biology No. 1. R. J. Raitt, Ed. Cooper Ornithological Society. 1:1-100.
- KHL (Kenai Hydro, LLC). 2009. Pre-Application Document. Grant Lake/Grant Creek and Falls Creek Project (FERC No. 13211 and 13212). August 2009. 134 pp.

- ---. 2011. Second Preliminary Permit Application No. 2 for Kenai Hydro, LLC Grant Lake Project (FERC No. 13212). October 2011. 34pp.
- ---. 2013. Grant Lake Project (FERC No. 13212) Terrestrial Resources Study Plan. March 2013. 56pp.
- ---. 2014a. Grant Lake Hydroelectric Project (FERC No. 13212). Aquatic Resources Study Grant Creek Aquatic Habitat Mapping and Instream Flow Study, Final Report. Prepared by McMillen LLC for Kenai Hydro, LLC. June 2014.
- ---. 2014b. Grant Lake Hydroelectric Project (FERC No. 13212). Aquatic Resources Study Fisheries Assessment, Final Report. Prepared by BioAnalysts, Inc. for Kenai Hydro, LLC. June 2014.
- ---. 2014c. Grant Lake Hydroelectric Project (FERC No. 13212). Cultural Resources Study, Draft Report. Prepared by Cultural Resource Consultants, LLC for Kenai Hydro, LLC. March 2014.
- ---. 2014d. Grant Lake Hydroelectric Project (FERC No. 13212). Recreational and Visual Resources Study, Final Report. Prepared by USKH, Inc. for Kenai Hydro, LLC. June 2014.
- ---. 2014e. Grant Lake Hydroelectric Project (FERC No. 13212), Water Resources Study Water Quality, Temperature and Hydrology, Final Report. Prepared by McMillen, LLC for Kenai Hydro, LLC. June 2014.
- ---. 2014f. Grant Lake Hydroelectric Project (FERC No. 13212), Water Resources Geomorphology, Final Report. Prepared for Kenai Hydro, LLC. Prepared by Element Solutions for Kenai Hydro, LLC. June 2014.
- ---. 2014g. Grant Lake Hydroelectric Project (FERC No. 13212). Aquatic Resources Study Baseline Studies of Macroinvertebrates and Periphyton in Grant Creek, Final Report. Prepared by Northern Ecological Services for Kenai Hydro, LLC. June 2014.
- Kortwright, F.H. 1967. The Ducks, Geese and Swans of North America. Stackpole Co., Harrisburg, PA. and Wildlife Management Institute, Washington, D.C. 476 p.
- Lichvar, R.W. 2013. The national wetland plant list: 2013 wetland ratings. Phytoneuron 2013-49: 1-241.
- Lottsfeldt-Frost, J., 2000. Draft Specialist Report on Moose (Alces alces). USDA Forest Service, Chugach National Forest, Anchorage, Alaska. 19 pp.
- MacDonald, S.O. and J.A. Cook. 1996. The land mammal fauna of Southeast Alaska. The Canadian Field-Naturalist 110(4):571-598.
- Marshall, D.B., 1988. Status of the Marbled Murrelet in North America: with special emphasis on populations in California, Oregon, and Washington. U. S. Fish and Wildl. Serv. Biol. Rep.88.
- McCaffery, B.J. 1996. Distribution and relative abundance of gray-cheeked thrush (Catharus minimus) and blackpoll warbler (Dendroica striata) on Yukon Delta National Wildlife Refuge, Alaska. Unpub. Report USFWS. Bethel, Alaska.

- McCaffery, B. J. and C. H. Harwood. 2004. Species at risk: Solitary Sandpiper (Tringa solitaria), summary of ecology, abundance, and population trends in North America. Unpublished poster presented at the 10th Alaska Bird Conference, Anchorage, AK.
- McCafferty, K. 2013. Personal Communication with K. McCafferty, USACE-Alaska. May 29, 2013.
- Merrie, T.D.H. 1978. Relationship between spatial distribution of breeding divers and the availability of fishing waters. Bird Study 25: 119-122.
- Mitchell, C. D. 1994. Trumpeter Swan (Cygnus buccinator). In The Birds of North America, Vol. 3, No. 105 (A. Poole and F. Gill, Eds.). Philadelphia: The Academy of Natural Sciences; Washington, D.C.: The American Ornithologists' Union.
- Moskoff, W. 1995. Solitary Sandpiper (Tringa solitaria). In The Birds of North America, No.156 (A. Poole and F. Gill, Eds.). Philadelphia: The Academy of Natural Sciences; Washington, D.C.: The American Ornithologists' Union.
- NatureServe. 2007. NatureServe Explorer: An online encyclopedia of life [web application]. Version 6.2. NatureServe, Arlington, Virginia. Website: http://www.natureserve.org/explorer.
- NatureServe. 2008. International Ecological Classification Standard: Terrestrial Ecological Classifications. Ecological Systems of Alaska. NatureServe Central Databases, Arlington, VA. Data current as of 18 December 2008.
- NWI (National Wetlands Inventory). 2013. USFWS Wetlands Online Mapper. Accessed February 2013. Website: http://www.fws.gov/wetlands/data/mapper.html
- Oliver, C.D. and B.C. Larson, 1996. Forest Stand Dynamics. John Wiley & Sons, New York. 424 p.
- Palmer, R. S., ed. 1962. Handbook of North American birds. Vol. 1: loons through flamingoes. Yale University Press, New Haven, CT.
- Parker, D.I. 1996. Forest ecology and distribution of bats in Alaska. M. S. thesis. Univ. of Alaska, Fairbanks. 73 pp.
- Parker, D.I., B.E. Lawhead, and J.A. Cook. 1997. Distributional limits of bats in Alaska. Arctic 50(3):256-265.
- Piatt, J. F., N. L. Naslund and T. I. van Pelt. 1999. Discovery of a new Kittlitz's Murrelet nest: clues to habitat selection and nest-site fidelity. Northwest Nat. 80:8-13.
- Poole, A. 1981. The Effects of Human Disturbance on Osprey Reproductive Success. Colonial Waterbirds, Vol. 4. pp. 20-27.
- Prosser, S.M., 2002. The Effects of Boreal Forest Succession on Bird Abundance and Species Diversity on the Kenai Peninsula, Southcentral Alaska. Unpublished manuscript.
- Reimchen, T.E. and S. Douglas. 1984. Feeding schedule and daily food consumption in redthroated loons (Gavia stellata) over the prefledging period. Auk 101:593-599.
- Renecker, L.A. and C.C. Schwartz. 1998. Food habits and feeding behavior. Ecology and Management of the North American Moose. Smithsonian Institute Press, Washington.

- Reynolds R. and J. Leffler. 1994. Bat Survey of Prince William Forest Park, Final Report. 16 pp.
- Soper, J. D. 1946. Ornithological results of the Baffin Island expeditions of 1928-1929 and 1930-1931, together were more recent records. Auk 63:1-24, 223-239, 418-427.
- Spindler, M. A. and B. A. Kessel. 1980. Avian populations and habitat use in interior Alaska taiga. Syesis 13:61-104.
- Spindler, M. A., M. A. Mouton and S.O. MacDonald. 1980. Biological surveys in the Firth-Mancha Research Natural Area, Alaska, 1979-1980. Fairbanks, AK: William O. Douglas Arctic Wildlife Range, Arctic National Wildlife Refuge. 91 pp.
- Stensvold, M. 2002. Sensitive Plants, Chugach National Forest. July 2002.
- Suring, L.H., and G. Del Frate. 2002. Spatial Analysis of Locations of Brown Bears Killed in Defense of Life or Property on the Kenai Peninsula, Alaska, USA. Ursus 13:237–245.
- Tarres, J.K. 1980. The Audubon Society Encyclopedia of North American Birds. Alfred A. Knopf, New York, NY. 1109 p.
- Tibbitts, T. L., and W. Moskoff. 1999. Lesser Yellowlegs (Tringa flavipes). In The Birds of North America, No. 427 (A. Poole and F. Gill, Eds.). Philadelphia: The Academy of Natural Sciences; Washington, D.C.: The American Ornithologists' Union.
- USACE (U. S. Army Corps of Engineers). 1987. Corps of Engineers Wetland Delineation Manual. Environmental Laboratory Department of the Army Waterways Experiment Station, U. S. Corps of Engineers. January 1987.
- ---. 2007. Regional Supplement to the 1987 Wetland Delineation Manual: Alaska Region (Version 2.0). Engineer Research and Development Center. September 2007.
- ---. 2009. Alaska District Regulatory Guidance Letter, RGL No. 09-01. Guidance on Alaska District implementation of the Federal Rule on Compensatory Mitigation for Losses of Aquatic Resources; Final Rule (33 CFR Parts 325 and 332), dated April 10, 2008.
- ---. 2010. Special Public Notice (SPN) 2010-45. Corps of Engineers Regulatory Program Consultant-Supplied Jurisdictional Determination Reports. January 29, 2010. U.S. Army Corps of Engineers, Alaska District Regulatory Division.
- USDA-NRCS. 2005. Field Indicators of Hydric Soils in Alaska, A Users Guide. United States Department of Agriculture and Natural Resources Conservation Services. Major Land Resource Region 17. Issued 2005.
- USFS (U.S. Forest Service). 1984. Birds of the Chugach National Forest. Alaska Region Leaflet Number 69. Chugach National Forest, Anchorage, Alaska. 19 pp.
- ---. 2000. Survey methodology for northern goshawks in the Pacific Southwest Region. Vallejo, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Region. 148 p.
- ---. 2006. Forest Health Conditions in Alaska 2005. Compiled by Cyndi Snyder, written by Forest Health Protection staff (USDA Forest Service) with contributions from Forest Health Specialist as the State of Alaska Dept of Natural Resources, Div. of Forestry and the Univ. of Alaska Coop Ext. Service. USDA Forest Service, Alaska Region, R10-PR-5 92 pgs.

- ---. 2007. Establishment Record for the Kenai Lake-Black Mountain Research Natural Area within the Chugach National Forest, Alaska. 56pp.
- ---. 2008. Trail River Landscape Assessment. Prepared by the U.S. Department of Agriculture Chugach National Forest Seward Ranger District. 156 p.
- USFS NRIS (U.S. Forest Service NRIS). 2013. National Resource Information System. Data extracted June 27, 2013.
- USFWS (U.S. Fish and Wildlife Service). 2005. Recommended Time Periods for Avoiding Vegetation Clearing in Alaska in order to Protect Migratory Birds. 2p.
- ---. 2007. National Bald Eagle Management Guidelines. 25p
- ---. 2013. Aleutian shield fern. Website: http://www.fws.gov/alaska/fisheries/endangered/ species/aleutian_shield_fern.htm
- Viereck, L. A., C. T. Dyrness, A. R. Batten and K. J. Wenzlick. 1992. The Alaska vegetation classification. U.S. Dept. of Agriculture, Forest Service, General Technical Report PNW– GTR–286. 278 pp.
- Weeden, R.B. 1959. A New Breeding Record of the Wandering Tattler in Alaska. The Condor 76(2):230-232.
- Weeden, R.B. 1965. Further notes on Wandering Tattlers in central Alaska. Condor 67:87-89.
- Woodbridge, B. and C.D. Hargis. 2006. Northern goshawk inventory and monitoring technical guide. Gen. Tech. Rep. WO-71. Washington, DC: U.S. Department of Agriculture, Forest Service. 80 p.
- Wright, J.M. 1997. Preliminary study of olive-sided flycatchers. July 1994-April 1997. Alaska Department of Fish and Game. Final research Report. Endangered species conservation fund federal aid studies SE-3-3, 4 and 5. Juneau, Alaska. 34pp.

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Appendix 1: Terrestrial Vegetation

Appendix 1a: Terrestrial Vegetation Tables

Appendix 1b: Terrestrial Vegetation Related Materials

Appendix 1a. Terrestrial Vegetation Tables

Table A.1a-1. Alaska Region sensitive plants, February 2011

Table A.1a-2. Invasive plant populations in the vicinity of Grant Lake, June 2013.

Table A.1a-3. Plants observed during vegetation surveys of the Grant Lake Project, 2013

Scientific Name	Common Name	Known/Suspected on the Seward RD
Aphragmus eschscholtianus	Eschscholtz's little nightmare	Known
Botrychium spathulatum	Spatulate moonwort	
Botrychium tunux	Moosewort fern	Sensitive
Botyrychium yaaxudakeit	Moonwort fern	Sensitive
Cirsium edule var. macounii	Edible thistle	Sensitive
Cochlearia sessilifolia	Sessileleaf scurveygrass	
Cypripedium guttatum	Spotted lady's slipper	Sensitive
Cypripedium montanum	Mountain lady's slipper	
Cypripedium parviflorum var. pubescens	Large yellow lady's slipper	
Ligusticum calderi	Calder's lovage	Sensitive
Lobaria amplissima	Lichen, no common name	
Papaver alboroseum	Pale poppy	Known
Piperia unalascensis	Alaska rein orchid	Sensitive
Platanthera orbiculata	Lesser round-leaved orchid	
Polystichum kruckebergii	Kruckeberg's swordfern	
Romanzoffia unalaschcensis	Unalaska mist-maid	Sensitive
Sidalcea hendersonii	Henderson's checkermallow	
Tanacetum bipinnatum ssp. huronense	Dune tansy	Sensitive

Table A.1a-1 . Alaska Region sensitive plants, February 201	Table A.1a-1.	Alaska Region	sensitive plants,	February 20
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USDA Plant Code	Common Name	Comments
ACMIM2	common yarrow	
ALGE2	water foxtail	
ALPR3	meadow foxtail	
ARGL	tower rockcress	
BRRA	field mustard	
CABU2	shepherd's purse	
CEFO2	common mouse-ear	
CEGL2	sticky chickweed	
CHALA	lambsquarters	
CIAR	common thistle	Not present in vicinity. High invasive potential.
CRTE3	annual hawksbeard	
DAGL	orchardgrass	
ELRE4	quackgrass	
GABI3	splitlip hempnettle	
HIAU	orange hawkweed	Not present in vicinity. High invasive potential.
HIUM	narrowleaf hawkweed	
HOJU	foxtail barley	
LEDE	common peppergrass	
LEVU	oxeye daisy	
LIVU2	butter and eggs	High potential invasiveness.
LOPEP	perennial ryegrass	
LOCO	bird's foot trefoil	Not present in vicinity. High invasive potential.
LUPOP4	bigleaf lupine	
MADI6	disc mayweed	
MEAL12	yellow sweetclover	High potential invasiveness.
PANU3	Icelandic poppy	
PHAR3	reed canarygrass	Not present in vicinity. High invasive potential.
PHPR3	timothy	
PLMA2	common plantain	
POAN	annual bluegrass	
POAV	prostrate knotweed	
POPR	Kentucky bluegrass	
RUAC3	common sheep	
RUCR	curly dock	
SOAR2	field sowthistle	Not present in vicinity. High invasive potential.
SPRU	red sandspurry	
STME2	common chickweed	
TAOF	common dandelion	
TRHY	alsike clover	

Table A.1a-2.	Invasive pl	ant not	nulations	in the	vicinity o	f Grant]	Lake Ju	ne 2013
Table A.Ia-2.	m asive p	ant pop	Julations	in the	vienney 0	1 Orant	Lake, Ju	10 2015.

USDA Plant Code	Common Name	Comments
TRPE21	scentless false	
TRPR2	red clover	
TRRE3	white clover	
VESES	thymeleaf speedwell	
VICRC	bird vetch	High potential invasiveness.

Species	Grant Lake/State Lands	Grant Lake/ USFS Lands	Project Features / State Lands	Invasive Species
TREES				
Betula papyrifera var. kenaica	x	х	Х	
Picea glauca	х	Х	Х	
Picea mariana			Х	
Picea x lutzii	х	Х	Х	
Populus balsamifera		х	Х	
Populus tremuloides		х	Х	
Salix scouleriana		Х	Х	
Tsuga mertensiana	х	х	Х	
SHRUBS				
Alnus incana ssp. tenuifolia			Х	
Alnus viridis ssp. sinuata	x	Х	Х	
Amelanchier alnifolia		X		
Andromeda polifolia	X		Х	
Arctostaphylos uva–ursi		Х		
Betula glandulosa/nana	х	Х	Х	
Dasiphora fruticosa	X	Х	Х	
Empetrum nigrum	x	Х	Х	
Juniperus communis		Х	Х	
Ledum groenlandicum		Х	Х	
Ledum palustre ssp. decumbens	x	Х	Х	
Linnaea borealis	x	х	Х	
Menziesia ferruginea	х	Х	Х	
Oplopanax horridus	х	Х	Х	
Oxycoccus microcarpus	х	х	Х	
Ribes laxiflorum	x	Х	Х	
Ribes triste		Х	Х	
Rosa acicularis		Х	Х	
Rosa nutkana	x	Х	Х	
Rubus idaeus	х	Х	Х	
Salix alaxensis		Х		
Salix barclayi	х	Х	Х	
Salix communtata		Х	Х	
Salix sitchensis		х		
Salix sp.	х	х	Х	
Sambucus racemosa	X	X	Х	

T-LL A 1- 2 DL	1	1	X7			C	-1 D	2012
Ladie A.1a-3 . Plar	its observed	auring	vegetation	surveys of	the	Grant I	lake Pro	ject, 2013.

Species	Grant Lake/State Lands	Grant Lake/ USFS Lands	Project Features / State Lands	Invasive Species
Sibbaldia procumbens		Х		•
Sorbus sitchensis		Х	Х	
Spiraea stevenii	х	Х	Х	
Vaccinium alaskaense	X	х	Х	
Vaccinium caespitosum	х	х	Х	
Vaccinium ovalifolium	х	х	Х	
Vaccinium uliginosum		х	Х	
Vaccinium vitis–idaea	х	Х	Х	
Viburnum edule	х	х	Х	
FORBS				
Achillea millefolium var. borealis	х	Х	Х	
Aconitum delphiniifolium	х	Х	Х	
Actaea rubra		Х	Х	
Allium schoenoprasm		Х		
Anemone narcissiflora		Х		
Anemone parviflora		Х		
Anemone richardsonii		Х		
Angelica genuflexa	х	Х		
Antennaria monocephala	X	Х		
Aquilegia formosa	х	Х	Х	
Arabis lyrata	x	Х		
Arabis sp.		Х		
Arnica latifolia	x	X		
Artemisia arctica	х	х		
Artemisia tilesii	х	х		
Aruncus dioicus	х	Х	Х	
Aster sibiricus		х		
Astragalus alpinus		Х		
Barbarea orthoceras	х	х		
Boschniakia rossica		Х	Х	
Caltha sp.		Х		
Campanula rotundifolia	х	Х	Х	
Cardamine pratensis		Х		
Cardamine sp.		х		
Cardamine umbellata	x	Х	Х	
Castilleja unalaschcensis		Х		

Species	Grant Lake/State Lands	Grant Lake/ USFS Lands	Project Features / State Lands	Invasive Species
Cerastium arvense		х		1
Chamerion angustifolium	X	х	Х	
Chamerion latifolium	X	х		
Chrysosplenium tetandrum	X	х		
Circaea alpina	X	х	Х	
Comarum palustre	X	х	Х	
Cornus canadensis	X	х	Х	
Delphinium glaucum	X	х	Х	
Draba incerta		х		
Draba palanderiana		х		
Drosera anglica			Х	
Drosera rotundifolia	х		Х	
Epilobium anagallidifolium	Х	х		
Epilobium glandulosum	Х	х		
Epilobium leptocarpum		х		
Epilobium leptophyllum			Х	
Erigeron peregrinus	Х		Х	
Galium boreale		х		
Galium trifidum	х	х		
Galium triflorum	х	х	Х	
Geocaulon lividum	х	х	Х	
Geranium erianthum	х	х	Х	
Geum macrophyllum	X	х	Х	
Heracleum maximum	х	х	Х	
Heuchera glabra	X	х	Х	
Impatiens noli-tangeri			X	
Iris setosa			Х	
Leptarrhena pyrolifolia			Х	
Listera cordata			Х	
Lloydia serotina		х		
Lupinus nootkatensis		х	Х	
Menyanthes trifoliata			Х	
Mimulus guttatus		x	Х	
Moehringia lateriflora		x		
Moneses uniflora		х	Х	
Orthilia secunda	X	x	Х	
Oxytropis campestris		x		

Species	Grant Lake/State Lands	Grant Lake/ USFS Lands	Project Features / State Lands	Invasive Species
Packera pauciflora			Х	•
Papaver alboroseum		Х		
Parnassia kotzebuei		Х		
Parnassia palustris	х	Х	х	
Pedicularis labradorica			х	
Pedicularis verticillata		Х		
Petasites hyperboreus		Х		
Platanthera dilatata	х		Х	
Polemonium acutiflorum	Х	Х	Х	
Polemonium pulcherrimum		Х	Х	
Polygonum bistortum		Х		
Polygonum viviparum	Х	Х	Х	
Potentilla norvegica	х	Х		
Potentilla villosa		Х		
Potentilla virgulata		Х		
Prenanthes alata		Х	Х	
Prunella vulgaris ssp. lanceolata		Х		
Pyrola asarifolia	x	х	Х	
Ranunculus abortivus		х		
Ranunculus eschscholtzii		х		
Ranunculus lapponicus			Х	
Ranunculus uncinatus		х		
Rhinanthus minor		х	Х	
Rhodiola integrifolia	х	Х	Х	
Romanzoffia sitchensis		х		
Rubus arcticus	х	х		
Rubus chamaemorus	Х	Х	Х	
Rubus pedatus	х	Х	Х	
Rumex sp.			Х	
Sagina saginoides		Х		
Sanguisorba canadensis	X	Х	Х	
Saxifraga ferruginea		Х		
Saxifraga lyallii ssp hultenii			Х	
Saxifraga punctata	X	Х	х	
Saxifraga rivularis	X			
Saxifraga sp.		Х		
Saxifraga tricuspidata	х	х	x	

Species	Grant Lake/State Lands	Grant Lake/ USFS Lands	Project Features / State Lands	Invasive Species
Senecio triangularis	X			•
Solidago multiradiata	X	Х	Х	
Stellaria spp.	х	Х		
Streptopus amplexifolius	X	Х	Х	
Swertia perennis	Х	Х	Х	
Taraxacum ceratophorum		Х		
Taraxacum officinale	Х	Х	Х	Х
Tellima grandiflora	Х	Х		
Thalictrum sparsiflorum	Х	Х	Х	
Tiarella trifoliata	х	Х		
Trientalis europaea	х	Х	Х	
Trifolium repens			Х	Х
Triglochin palustre			Х	
Urtica dioica	х	Х	Х	
Valeriana sitchensis		х	Х	
Veronica americana		х		
Veronica wormskjoldii		х	Х	
Viola langsdorffii		х	Х	
Viola sp.	Х	Х	Х	
Zigadenus elegans		х		
GRAMINOIDS				
Agrostis aequivalvis			X	
Agrostis mertensii	X	Х	Х	
Agrostis scabra	X	Х	Х	
Alopecurus aequalis	X	Х		
Anthoxanthum monticola subsp. alpinum		х		
Arctagrostis latifolia		Х		
Calamagrostis canadensis	X	Х	Х	
Carex aquatilis var. aquatilis		Х	Х	
Carex atrosquama		Х		
Carex brunnescens		Х		
Carex canescens	X	Х	Х	
Carex crawfordii		Х		
Carex disperma		Х		
Carex echinata	X			

Species	Grant Lake/State Lands	Grant Lake/ USFS Lands	Project Features / State Lands	Invasive Species
Carex lenticularis	X	Х		•
Carex leptalea	X		Х	
Carex limosa			Х	
Carex livida			Х	
Carex loliacea		х		
Carex macrochaeta	х	х		
Carex magellanica			Х	
Carex media		х	Х	
Carex mertensii	х	х	Х	
Carex pachystachya		х		
Carex pauciflora	х		Х	
Carex saxatilis	х	х	Х	
Carex scirpoides		х		
Carex sitchensis var. dives			Х	
Carex sp.			Х	
Carex utriculata		х	Х	
Cinna latifolia			Х	
Deschampsia caespitosa	X	х	Х	
Elymus trachycaulus		Х		
Elymus violaceus	х	х	Х	
Eriophorum angustifolium	Х			
Eriophorum russeolum	X		Х	
Eriophorum scheuchzeri			Х	
Festuca brachyphylla		х		
Festuca occidentalis			Х	
Festuca saximontana		х		
Festuca sp.		Х		
Hordeum brachyantherum		Х	Х	
Juncus castaneus		X		
Juncus mertensianus	X	Х		
Juncus sp.			Х	
Luzula multiflora	X	X		
Luzula parviflora	х	Х		
Luzula spicata		Х		
Phleum alpinum	X	Х	Х	
Poa alpina	X	x		
Poa annua		х		х

Species	Grant Lake/State Lands	Grant Lake/ USFS Lands	Project Features / State Lands	Invasive Species
Poa arctica x stenantha	X			
Poa interior	X	х	Х	
Poa palustris		х		
Poa pratensis		х		Х
Poa spp.	X	х	Х	
Trichophorum alpinum			Х	
Trichophorum caespitosum			Х	
Trisetum spicatum	х	х	Х	
Vahlodea atropurpurea		X	X	
FERNS AND FERN ALLIES				
Athyrium americanum		Х		
Athyrium filix–femina	X	Х	Х	
Botrychium lunaria	X			
Botrychium minganense	X			
Cryptogramma acrostichoides		х		
Cystopteris fragilis	X	х	Х	
Dryopteris expansa	х	х	Х	
Equisetum arvense	X	х	Х	
Equisetum fluviatile	Х	х	Х	
Equisetum hyemale	х	х	Х	
Equisetum scirpoides		Х		
Equisetum sylvaticum	X	Х	Х	
Equisetum variegatum	X	Х	Х	
Gymnocarpium dryopteris	X	Х	Х	
Lycopodium annotinum	X	Х	X	
Lycopodium clavatum	X	Х		
Lycopodium complanatum			Х	
Lycopodium selago	Х			
Matteucia struthiopteris		х	Х	
Thelypteris phegopteris	Х	х	Х	
Woodsia ilvensis		X	Х	
- Appendix 1b. Terrestrial Vegetation Related Materials
- R10 TES Plant Element Occurrence Field Form, Grant Lake Project, 2013.
- AKEPIC Field Data Sheet, Grant Lake Project
- USFS Plant Survey Field Form, Grant Lake Project, 2013
- USFS Survey Intensity Levels for Plants
- Photo A.1b-1. Blooming pale poppy plant
- Photo A.1b-2. Pale poppy habitat.
- Photo A.1b-3. Pale poppy habitat from Grant Lake

R10 TES PLANT ELEMENT OCCURRENCE FIELD FORM -

USDA FOREST SERVICE 12/08

® = required field, ®* = conditionally required field, ® = required field Alaska Region

General Information

1) SITE ID: ®		2) DATE: ® 07/19/2013		3) SITE NAME	3) SITE NAME: GRANT LAKE 1	
4) NRCS PLANT CODE: ® PAAL5						
5) SCIENTIFIC NAME: ® P	APAVER AL	BOROSEUM	1			
6) RECORD SOURCE: ® FS 7) SURVEY ID: ®*			ID: ®*	8) Survey Name: Grant Lake		
9) EXAMINER(S)- LAST: ® BECK				FIRST: ® Kathryn		MIDDLE INITIAL: A
Last:				FIRST: MIDDLE I		MIDDLE INITIAL:
10) OWNERSHIP: ® USF	S	11) Loc.	Uncert: ®	ncert: ® 12) Uncert. Dist: ®*		st: ®*
13) E.O. #		14) STATE	E: ®* AK 15) COUNTY: ®* KEN		* Kenai	
16) REGION: ®* 10 17) FOREST: ®* CHUGACH			BACH	18) DISTRICT: ®* SEWARD		
19) Area (Est): 10' x 25'				20) Area	UOM: ®* FEET	
21) Canopy Cover Method ®* (circle one): Cover Percent; Dauben; Nrmcov Dauben						

Element Occurrence Data

22) EO Canopy Cover:	8%Cov: or	Cover Class	Code: T	23) Lifeform: FB
24) Number of subpop	oulations: 0		25) Plant Found (Re	visit): Yes or No
26)Plant Count:® 15	27)Count Type: (®Genets/Ra	mets/Undetermined	28)Count: ®Actual or Estimate
29) Revisit needed - Y	es X <i>or</i> No	30) Revisit	Date:	
31) Revisit Justificatio	on:			
32)Phenology by % ® (<i>Sum to 100%</i>): Vegetative 20_	33) Population Co Moderately vigorou	omments: (e us, small pop	.g., distribution, vigor, ulation. Flowering adu	density, phenology, dispersal) ults and juveniles present.
Fruit/Dispersed .				
36) Pollinator observed – Yes or No 37) Pollinator type(s):				
38) Pollinator comments:				

Site Morphometry

39) Percent Slope:	0		40) Slope position: ® TS
41) Aspect:	160° or	cardinal:	
42) Elev.: Ave: 703	Min: 702	Max: 705	43) Elev UOM: ®* FEET

Soli Characteristics and Light Conditions					
44) Substrate on which EO occurs: R					
45) Parent Material: ALLU 46) Soil Moisture: M 47) Soil Texture: S					
48) Soil Type: 49) Light Exposure: ® PSH					

. ..

Site Classifications SITE ID:

.........

Record taxonomic units of the given type(s) if published classifications exist for the area.						
CLASSIFICATION TYPE	CLASS CODE	CLASSIFICATION SHORT NAME	CLASSIFICATION SET			
50) Existing Veg®						
51) Potential Veg						
52) Ecotype						

Habitat Quality and Management Comments

53) Habitat Description: Plants growing on semi-stabilized, sparsely vegetated, south-facing creek outwash area near shore of Grant Lake, on cobble, sand, gravel substrate, in open early successional shrub-forb-graminoid community. Plants 12 feet from lake edge. Plants from 2 to 6 feet higher than the estimated water level of 700 feet.					
54) Dominant Process: 50, 70					
55) Process Comment: At base of steep avalanche slopes, with creek nearby. Area is likely prone to flood and avalanches which could affect the population.					
56) Community Quality (L, M, H): H	57) Landscape Integrity (L, M, H): H				
58) Disturbance/Threats (present or imminent): EX	(, RC, SU				
59) Disturbance/Threats Comment: There is an historic cabin on same gravel bar. There are also at least 2 fire rings, and an obvious campsite in the vicinity. It is possible that the trees and shrubs growing near the population might eventually shade it out. The population is small to begin with.					
60) Non-Native Comment: There were estimated to be > 100 Taraxacum plants in and around the poppy population. It is possible that some of them were the native dandelion species Taraxacum ceratophorum, which was collected elsewhere on the lake in similar habitats.					
61) Current Land Use Comment:					

Canopy Cover Record % canopy cover by actual percent, or by cover class (as indicated in General Information Block). Lifeform Canopy Cover 62) % Cov or Code Ground Cover 63) % Cov or Code Tree Bare

Shrub	Gravel	
Forb	Rock	
Graminoid	Bedrock	
Non-vascular	Moss	
Lichen	Litter/Duff	
Algae	Basal Veg	
	Water	
	Road surface	
	Lichen	

Associated Species SITE ID:

List species directly associated with the EO species on this site. Record the NRCS Plant Code, scientific name or both. If desired, indicate lifeform, dominant species, % cover for each species and flag non-native species.

64) Completeness of Species List: ®* C, R, or S®

65) Species List Comment: Complete

66) ® NRCS Plant Code	67) ® Scientific Name	68) Life Form	69) Dom. (Y/N)	70) % Cov or Class	71) Non- native
	Picea x lutzii	Т		2	
	Alnus viridis sinuata	S		2	
	Populus balsamifera	S		Т	
	Taraxacum officinale/ceratophorum	F		2	?
	Aquilegia formosa	F		1	
	Cerastium arvense	F		1	
	Heracleum maximum	F		t	
	Astragalus alpinus	F		t	
	Chamerion latifolium	F		1	
	Oxytropis splendans	F		t	
	Artemisia arctica	F		t	
	Carex pachystachya	G		t	
	Festuca brachyphylla	G		1	
	Elymus violaceus	G		t	
	Trisetum spicatum	G		1	
	Poa alpina	G		1	
	Sibbaldia procumbens	F		1	
	Arabis lyrata	F		t	

EO Specimen Documentation

72) Reference for ID: Hulten						
73) Primary Collector – ®Last Name:	Beck	First Name:	Kathryn	M.I. A		
Other Collectors – RLast Name:		First Name:		M.I.		
74) Collection #: ®* 201334		75) ID Confirmed: ®* Y:	X or N:	or Questionable:		
76) Verification: ® K. BECK						
77) Specimen Repository: ®* WTU (UNIVERSITY OF WASHINGTON)						

Image Information ® (IF IMAGES TAKEN) SITE ID:

78) Image ID	79) Image Description

Location Information						
(State, County, Region, Forest, District will be auto-populated by the database application when the spatial feature is entered)						
80) USGS Quad Number: 81) USGS Quad Name:						
82) Forest Quad Number:	83) Forest Quad Name:					

84) Legal Description: F	equired where p	ublic land survey i	is available.	
Meridian:	Township and	Range: T05N R01	E	
Section: 29	Q Sec:_SW	QQ Sec:NE	QQQ Sec:	QQQQ Sec:
85) Latitude and Longit degrees)	Ide ®FOR TONGAS	s (either in degree	s, minutes, secon	ds or in decimal
Geodetic Datum: Latitude: Degrees Longitude: Degrees GPS Datum: GPS Lat. Dec. Degrees:	N W 60.4914885 N lat	Minutes Minutes : GPS Lot	Seconds Seconds ng. Dec. Degrees:	 -149.3043653 W lon
86) UTM® FOR CHUGACH				
UTM Datum:		UTM Zone:		

Easting:	Northing:
87) GPS Equipment Used (Manufacturer and M	odel):
Garmin Trek	
88) Metes and Bounds	

89) Directions to Site SITE ID:

#

Use GPS to help located. Population located on the north shore of lake, at the base of large avalanche slopes, northwest of the island on cobble shore visible from water. It is just west of small historic cabin.

#

90) Sketch of Site or Area



91) General EO Comments

Survey Date: 07/22/203Observers:	Beck, Kathing A.	**Required Field
mm / dd / yyyy	Last Name, First Name Initial. (e.g.: Smith, J.; Williams, R.)	

Observers Affiliation (circle one):

AACD_IPC AKNHP ARS BLM CES CWMA DOD DOWL HDR NPS PMC SCS TECI UAF USFS USFWS USGS Other

A. Site Information

** Site Code: AK State Land, Grant Lake Pipied
Visit Type (circle one): Reconnaissance Monitoring Research Control
Is this a Revisit (circle one): Yes No
** Study Type (circle one) Exhaustive species Inventory Highest priority species Single species study
** Area Surveyed: <u>+ 200</u> (acres)
(Note: 1/10 acre = 37 ft radius, 1/2 acre = 83 ft radius, 1 acre = 118 ft radius)
Site Vegetation Community Description (level IV Viereck et al. 1992): 11. Gel
Disturbance Type (see instructions below): Fill Importation (Road) Railroad) Kiver Action

B. Location Information

** Latitude: (60, 458/63/	(Decimal Degrees, NAD83)	
** Longitude: -149. 368 34-7	(Decimal Degrees, NAD83)	
Elevation: <u>+ 440</u>	(ft)	
** Collection Method (circle one):	GPS Topographic Map Aerial Photo	
** GPS precision: 0-30	_ (ft; 0-5, 0-30, 0-100, 0-1000, 1000+)	
Topographic Map Source:	Scale:	Date:
Quad name:	Quad number:	(i.e. A-1, B-2, C-3, D-4)
Notes (location): THOF + -	TRDE3 located on Sewond	+ Huy ROW + AK RR ROW,
within Bart Lake Stre	ky Area.	5
	1	

C. Survey Information

** Plant Species Code (see below)	**Infested Area (acres) (see below)	**Canopy Cover (% cover) (see below)	Disturbance Age (yrs.)	Stem Count (see below)	**Herbarium (see below)	Control Action (see below)	Aggressiveness (see below)
TADE	0.1	2.1%	engoing	51-150	-	Muttiple	Metim
TRRE3	0.01	< 1010	orgains	.1-5*	-	multiple	medin

D. Notes (species): The TAOF + TRRE3 plants above Devend Huy + Alaska RR ROW

+ 1-5 the another sather	at the more	the the Example Capel	s whore it enters	Trail Lake Namons.	,
A DINGUTTAD DATE	* 1-5 Thi	zonatous patch	10.		

Survey Date: 07/ 19/2013Observers:	Beck Kathyn A.	**Required Field
mm / dd / yyyy	Last Name, First Name Initial. (e.g.: Smith, J.; Williams, R.)	

Observers Affiliation (circle one):

AACD_IPC AKNHP ARS BLM CES CWMA DOD DOWL HDR NPS PMC SCS TECI UAF USFS USFWS USGS Other

A. Site Information

** Site Code: CHNF 2013
Visit Type (circle one): Reconnaissance Monitoring Research Control
Is this a Revisit (circle one): Yes No
** Study Type (circle one): Exhaustive species Inventory Highest priority species Single species study
** Area Surveyed: <u>+200</u> (acres)
(Note: 1/10 acre = 37 ft radius, 1/2 acre = 83 ft radius, 1 acre = 118 ft radius)
Site Vegetation Community Description (level IV Viereck et al. 1992): 11. (7.]
Disturbance Type (see instructions below): Late Action Main Main Manche

B. Location Information

** Latitude: <u>60.492915</u> (C	Decimal Degrees, NAD83) Decimal Degrees, NAD83)	
Elevation: 700 +0 705 (f	t)	
** Collection Method (circle one): GP:	5 Topographic Map Aerial Photo	
** GPS precision: 0-30 (f	t; 0-5, 0-30, 0-100, 0-1000, 1000+)	
Topographic Map Source:	Scale:	Date:
Quad name:	Quad number:	(i.e. A-1, B-2, C-3, D-4)
Notes (location): The Poa annua	Poup atensis and Tarax	around were found at this
point. Taxaxacum othici	rale was located at stre	1 scattered locations
evented laterhove. The	sport is where the conant	Lalce Trail enters the study
aska my the weat and sh-	the worth share of Gran	FLake on USES land.

C. Survey Information

** Plant Species Code (see below)	**Infested Area (acres) (see below)	** Canopy Cover (% cover) (<i>see below</i>)	Disturbance Age (yrs.)	Stem Count (see below)	**Herbarium (see below)	Control Action (see below)	Aggressiveness (see below)
TAOF	0.1 lakeshore	1%	-	151-500	Notcollected	Muttiple	Low to med
POAN	0.01	5%		- 50-150	Not. Collected	Multipe.	Low
POPR	0,01	1%		26-50	Not Gilleted	Multiple	Low

D. Notes (species): I located Tanyacum ceratophonom peranco. an VAN ake hono. Othil i Ant to Taraxacum of Mixe with 00 montations. Tararacum along the Grant AVO ARR 110 heations 21 distur offer Natura Scouring execte Wave action and 100 shore

USDA FOREST SERVICE 2008

PLANT SURVEY FIELD FORM

(® = Required Fields ® = Alaska Required) DECEMBER 2008

General Information								
1) SURVEY ID: ® 2) SURVEY NAME: GRANT LAKE PROJECT								
3) SURVEY STATUS: ® COMPLETED 4) TARGET: ® TESP; INPA; 5) SOURCE OF WORK: CONTRACT BOTH								
6) Survey Type: B Focused Intuitive Controlled								
7) Survey Focus: ® FEATURES								
8) Estimate of Survey Area Size (acres): 9) No. of Traverses:								
10) Elevation: Min: 700 Max: 710 Average: 705 11) Elevation UOM: Feet								
12) State: 13) County: ® 14) Region: ® 15) Forest: ® 16) District: ®								
AK Kenai 10 Chugach NF Seward								
 17) Parameters of Survey (Describe any ecological parameters, survey criteria or combinations of these used to focus the survey. (I.e., north slopes, specific habitat types, certain soils within certain forest conditions, survey timing, etc.): Survey was done around USFS owned portions of Grant Lake between lake level (700 feet) and five feet above normal high lake level (est. 705 feet). Habitats similar to those of targeted Sensitive plant species were focused on. Survey was done by boat in steep areas and walking surveys were done where walking was possible. Intuitive controlled survey was performed at proper time of year to identify all targeted species. 								
18) Survey Comments (Directions, area description, specific comments by visit date, etc.):								

Survey Visits

Required. Enter a Date (MM/DD/YYYY) and Examiners for each visit made.

19) VISIT DATE ®	20) LAST NAME ® AND FIRST NAME ® OF EXAMINERS FOR EACH VISIT
7/18-7/23/2013	BECK, KATHRYN / BECK BOTANICAL SERVICES
	LOHR, ROB / MCMILLEN LLC

Target Species

Required. List all targeted plant species (TES, INPA, special forest products, or other species of concern) that are the focus of the survey. It may be helpful to separate TES from INPA species by page or block if survey is for both purposes. Enter all the species individually using the NRCS *PLANTS* code and/or scientific name. All columns are required.

21) ® NRCS Plant Code	22) ® Scientific name	23) ® Suitable habitat found	24) ® Plant found	25) ® FS Site ID(s) for EOs (If EO forms completed)
APES	Aphragmus eschscholtzianus	no	No	
BOTU3	Botrychium tunux	no	No	
BOYA	Botrychium yaaxudakeit	no	No	
CYGU	Cypripedium guttatum	yes	No	
LICA15	Ligusticum calderi	no	No	
PAAL5	Papaver alboroseum	yes	Yes	Grant Lake 1
PIUN3	Piperia unalascensis	yes	No	
ROUN	Romanzoffia unalaschensis	yes	No	

Species List of Surveyed Area

Optional. List other species found during the survey. Record the NRCS *PLANTS* Code, scientific name or both. Indicate habitat (locally defined), lifeform and cover abundance (all optional). Indicate non-native plants with "X"

COMPLETE	

28) Comments (e.g. details about species list approach, habitat focus, vegetation types or structure, etc.):
(R)

An attempt was made to compile a complete species list.

29) NRCS Plant Code	30) Scientific Name	31) Life Form	32) Habitat	33) % Cover or Class	34) Non- native
	See Appendix A.8-1 of Grant Lake Project Terrestrial Resources Report for complete species list				

Optional Location Information

Location information to represent the survey area may be recorded, in addition to entering the spatial feature in the application

35) USGS Quad Number:	36) U	36) USGS Quad Name:					
37) Forest Quad Number:	38) Fe	38) Forest Quad Name:					
39) Legal Description: Required where public land survey is available.							
Meridian: Township a	and Range:						
Section: Q Sec:	QQ Sec:	QQQ Sec:	QQQQ Sec:				
40) Latitude and Longitude (either in Tongass	degrees, minutes	, seconds or in decim	al degrees) ® FOR				
Geodetic Datum:							
Latitude: Degrees N	Minutes	Seconds	•				
Longitude: Degrees W	Minutes	Seconds	•				
GPS Datum:							
GPS Lat. Dec. Degrees:	GPS	Long. Dec. Degrees:					
41) UTM® FOR CHUGACH							
UTM Datum:	UTM Zo	ne:					
Easting:	Northin	g:					
42) GPS Equipment: Manufacturer:		Model:					
43) Metes and Bounds							

44) Directions to Survey Area

Hike or fly into Grant Lake near Moose Pass, Alaska.

45) Sketch of Survey Area

USFS Survey Intensity Levels for Plants

The surveyor gives the area a quick "once-over" but does not walk completely through the project area. The entire project area has not been examined.

Level 2 – "Cursory" The surveyor gives the area an "once-over" by walking through the project area. The entire project has not been examined.

Level 3 – "Limited Focus"

The surveyor closely examines one or more habitat-specific locations within the project area, but does not look at the rest of the area.

Level 4 – "General"

The surveyor gives the area a closer look by walking through the project area and walking around the perimeter of the area or by walking more than once through the area. Most of the project area is examined.

Level 5 – "Intuitive Controlled" The surveyor has a closer look by conducting a complete examination of specific areas of the project after walking through the project area an perimeter or by walking more than once through the area.

Level 6 - "Complete"

The surveyor has walked throughout the area being examined until nearly all of the area has been examined.



Photo A.1b-1. Blooming pale poppy plant



Photo A.1b-2. Pale poppy habitat.



Photo A.1b-3. Pale poppy habitat from Grant Lake

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Appendix 2: Wetlands

Appendix 2a: Wetlands Related Materials

Appendix 2a. Wetlands Related Materials

Wetlands and Deepwater Habitat Classification Chart

Wetland Determination Datasheets

Wetland Functional Assessment Datasheets

Fieldnotes

Photo A.2a-1. Representative photo of an herbaceous dominated depressional wetland.

Photo A.2a-2. Representative photo of an herbaceous dominated lacustrine fringe wetland.

Photo A.2a-3. Representative photo of an herbaceous floodplain forest & scrub dominated riverine wetland on Grant Creek.

Photo A.2a-4. Representative photo of an herbaceous floodplain forest & scrub dominated riverine wetland in the complex wetland/upland mosaic associated with the Grant Creek side channels.

Photo A.2a-5. Representative photo of scrub-shrub dominated depressional wetland.

Photo A.2a-6. Representative photo of scrub-shrub dominated lacustrine wetland

Photo A.2a-7. Representative photo of scrub-shrub dominated riverine wetland.

Photo A.2a-8. Representative photo of a scrub-shrub floodplain forest & scrub dominated riverine wetland.

Photo A.2a-9. Representative photo of a scrub-shrub floodplain forest & scrub dominated riverine wetland in the complex wetland/upland mosaic associated with the Grant Creek side channels.

Photo A.2a-10. Representative photo of a forest dominated slope wetland

Photo A.2a-11. Representative photo of an open water lacustrine water body. Aerial photo of Grant Lake looking west towards narrows.

Photo A.2a-12. Representative photo of an active riverine water body.

Photo A.2a-13. Representative photo of non-vegetated and intermittent/ephemeral (dry) channel areas associated with Inlet Creek on west end of Grant Lake.

Photo A.2a-14. Representative photo of an intermittent/ephemeral (inactive) riverine water body.



WETLANDS AND DEEPWATER HABITATS CLASSIFICATION

Evergreen 5 Dead 6 Deciduous 7 Evergreen

MODIFIERS In order to more adequately describe the wetland and deepwater habitats one or more of the water regime, water chemistry. soil, or special modifiers may be applied at the class or lower level in the hierarchy. The farmed modifier may also be applied to the ecological system. WATER CHEMISTRY SOIL SPECIAL MODIFIERS							
Non-Tidal A Temporarily Flooded H Permanently Flooded B Saturated J Intermittently Flooded C Seasonally Flooded K Artificially Flooded D Seasonally Flooded W Intermittently Well Droined Flooded/Temporary E Seasonally Flooded Y Saturated/Semipermanent/ Saturated/Semipermanent/ Saturated/Semipermanent G Intermittently Exposed Z Intermittently G Intermittently Exposed Unknown	Tidal K Anificially Flooded K Anificially Flooded K Anificially Flooded K S Temporar S Sessional- T Semigern F Irregularly Exposed V Permater P Irregularly Flooded U Unknown *These water regimes are tidally influenced, freshwa	ry-Tidal Coastal Halinlty I Hyperhaline Euthaline anacent-Tidal J Hyperhaline ant-Tidal S Mixohaline (Brackish) 4 Polyhaline 6 Oligohaline 0 Fresh e only used in water systems.	Inland Sallnity 7 Hypersaline 8 Eusaline 9 Micosaline 0 Fresh	pH Modiffers for all Fresh Water a Acid t Circumneutral i Alkaline	g Organic n Mineral	b Beaver d Partially Drained/Ditched f Farmed	h <i>Diked/Impounded</i> r Artificial Substrate s Spoil x Excavated

NOTE: Italicized terms were added for mapping by the National Wetlands Inventory program.

Source: Cowardin, L.M., V. Carter, F.C. Golet and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service, Office of Biological Services, Washington, D. C. FWS/ OBS-79/31.

C - al Lake	Barough/City: Mouse Pass Sampling Date: 7-16-13
Project/Site: (gravit Care	Sampling Point: Sampling Point:
Applicant/Owner: <u>Perfect Filowo</u>	Landform (hillside, terrace, hummocks, etc.): Lake edge
Investigator(s): <u>C. SCACARA</u> S. IMARA	Slope (%): //
Local relief (concave, convex, none)	4671663 Long: -149.2171368 Datum:
Subregion: Alle well De Hour Deposit	NWI classification: <u>PEMI/SSIC</u>
Soil Map Unit Name:	of year? Yes X No (If no, explain in Remarks.)
Are climatic / hydrologic conditions on the site typical for this time is	anthy disturbed? Ne No
Are Vegetation, Soit, or Hydrology signification	http://www.analysical.com/ana
Are Vegetation, Solt, or Hydrology Induction	providence relations transacts important features etc.
SUMMARY OF FINDINGS – Attach site map showin	
Linder-hutin Vegetation Present? Yes X No	Is the Sampled Area
Hydrophylic Vegetation Present?	within a Wetland? Yes X No
Wetland Hydrology Present? Yes X No	
Remarks: 12, mar to the Scampally	12 1) DELISS arminity on lake shore
perpetution intersection	p. g. PDM (22 Controller () is an of the
VEGETATION - Use scientific names of plants. List	all species in the plot.
Abs	solute Dominant Indicator Dominance Test worksheet:
Tree Stratum % C	<u>Sover Species?</u> Status Number of Dominant Species 7 3 (A)
1. None	
2	Total Number of Dominant 29 4 (B)
3	
4Total Cover:	That Are OBL, FACW, or FAC: 106 75 (A/B)
50% of total cover:	20% of total cover: Prevalence Index worksheet:
Sapling/Shrub Stratum	Total % Cover of: Multiply by:
1. Populus balsamitera II	$\frac{1}{\sqrt{1-\frac{1}{1-\frac{1}{\sqrt{1-\frac{1}{\sqrt{1-\frac{1}{\sqrt{1-\frac{1}{\sqrt{1-\frac{1}{\sqrt{1-\frac{1}{\sqrt{1-\frac{1}{\sqrt{1-\frac{1}{\sqrt{1-\frac{1}{\sqrt{1-\frac{1}{\sqrt{1-\frac{1}{\sqrt{1-\frac{1}{\sqrt{1-\frac{1}{\sqrt{1-\frac{1}}{1-\frac{1}{\sqrt{1-\frac{1}{\sqrt{1-\frac{1}{\sqrt{1-\frac{1}{\sqrt{1-\frac{1}{1-\frac{1}{\sqrt{1-\frac{1}{\sqrt{1-\frac{1}{\sqrt{1-\frac{1}{\sqrt{1-\frac{1}{\sqrt{1-\frac{1}{1-\frac{1}{\sqrt{1-\frac{1}{1-\frac{1}{1-\frac{1}{1-\frac{1}{1-\frac{1}{1-\frac{1}{1-\frac{1}{1-\frac{1}{1-\frac{1}{1-\frac{1}{1-\frac{1}{1-\frac{1}{1-\frac{1}}{1-\frac{1}{1-\frac{1}}}}}}}}}}$
2. Alnus VIridis	$\frac{1}{1} = \frac{1}{1} $
3. <u>Salix SitchPrisis</u>	FAC species $58 \times 3 = 174$
4. <u>Pilea mariana</u> -	FACU species 10 $x4 = 40$
5	UPL species $(7 \times 35 = 0)$
6 Total Cover:	
50% of total cover: 14,5	20% of total cover: 5.8 Prevalence Index = B/A = 3.05
Herb Stratum	Hydrophytic Vegetation Indicators:
1. Chamerion latitolium 3	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ Dominance Test is >50%
2. Equisetum hypmale	$\frac{2}{FA(r)} = \frac{1}{FA(r)}$ Prevalence index is ≤ 3.0
3. Potentionium acutitiorum	Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet)
4. Harberts, anadritta	3 FAC Problematic Hydrophytic Vegetation ¹ (Explain)
6 5. HATUSTIS STOLUTION	T
2 Automan anders annadensis	10 4 FAC Indicators of hydric soil and wetland hydrology must
1. Containing route territer -	
9	
10.	
Total Cover:	<u>45</u>
50% of total cover: 22.5	20% of total cover:/ Hydrophytic
Plot size (radius, or length x width) 50' radius	6 Bare Ground Vegetation Present? Yes X No
% Cover of Wetland Bryophytes Total Cover	of Bryophytes
(Where applicable)	
TOTATION .	
photos: C's 619-623	

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SOIL

Sampling	Point:	_DP	0	

Depth <u>Matrix</u> (inches) Color (moint)	Redo	x Features			
		<u>% Typə'</u>	<u>Loc²</u>	<u>Texture</u>	Remarks
0-10 _ 2.5 7 2.5	11 100 %				Sandy silt
					warnuely
		*		•	- graner
			<u></u>	• m= · · ····	CODOLE
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					n. 1936 1986 1986 1996 1997 1996 1996 1996 1996 1996
Type: C=Concentration, D=Depleti	ion, RM=Reduced Matrix, CS	=Covered or Coate	Sand Gra	ins. ² Loca	ation: PL=Pore Lining, M=Matrix.
Histosol or Histol (A4)	Indicators for Pi	roblematic Hydric	Soils ³ :		
Histic Eninedon (A2)	Alaska Color	Change (TA4) ⁴		Alaska	Gleyed Without Hue 5Y or Redder
Hydrogen Sulfide (A4)	Alaska Alpini	e Swales (TA5)		Under	lying Layer
Thick Dark Surface (A12)	Alaska Redo	x With 2.5Y Hue		<u>, X</u> Other (E	Explain in Remarks)
Alaska Gleved (A12)	30 1 11 1				
Alaska Dedox (A13)	"One indicator of	hydrophylic vegeta	ion, one pr	imary indicator	r of wetland hydrology,
Alaska Cloved Deres (A45)	and an appropr	riate landscape pos	ition must b	present unie	ess disturbed or problematic.
Postrictive Laws (If	Give details of co	olor change in Rem	arks.		
Turse by a contract of the sentence of the sen					
Type: None Tound					
Depth (Inches):				Hydric Soil P	resent? Yes X No
Remarks:	··			.,	
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lake edge, grave Wetland area glacial melt u	l + sand sedu in an ont y stram.	ment no wash th	organ at is	ncs regne	arly flooded for
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[a.Ke edge, grave Wettams area glacial melt v YDROLOGY Wetland Hydrology Indicators: Primary Indicators (any one Indicator 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) ield Observations: wrface Water Present? Yes aturation Present? Yes aturation Present? Yes escribe Recorded Data (stream gauge	I + SAND Seduction I in an onto P Strain. Is sufficient) Inundation Visible of Sparsely Vegetated Mari Deposits (B15 Hydrogen Suffide Of Dry-Season Water Other (Explain in Rest Other (Explain in Rest No X Depth (inche No X Depth (inche	went no want no want n wash th wash th concave Surface) dor (C1) Table (C2) emarks) s): s): s): s):	Braan	ICS VEGNL econdary Indic Water-stain Drainage Pa Oxidized Rł Presence of Salt Deposit Stunted or S Geomorphic Shallow Aqu Microtopogra FAC-Neutral Hydrotogy Pa	ary Flowded from rators (2 or more required) ed Leaves (B9) atterns (B10) nizospheres along Living Roots (C3) resent Plants (D1) Position (D2) nitard (D3) aphic Relief (D4) I Test (D5) resent? Yes X No
[a.Ke edge, grave. Wetland area 91 acial melt v YDROLOGY Wetland Hydrology Indicators: Primary Indicators (any one Indicator 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) ield Observations: urface Water Present? Yes dater Table Present? Yes caturation Present? Yes escribe Recorded Data (stream gauge	<pre>(+ sand seduce</pre>	mant no want no on Aerial Imagery (I d Concave Surface) Odor (C1) Table (C2) emarks) s): s): s): tos, previous inspec	organ at is <u>s</u> (B8) (B8) (B8) wetfand	IC.S VEGNL econdary Indic Water-stain Water-stain Drainage Pa Oxidized Rł Presence of Salt Deposit Stunted or S Geomorphic Shallow Aqu Microtopogra FAC-Neutral Hydrotogy Pa	ary Flowded from rators (2 or more required) ed Leaves (B9) atterns (B10) nizospheres along Living Roots (C3) i Reduced Iron (C4) is (C5) Stressed Plants (D1) Position (D2) nilard (D3) aphic Relief (D4) I Test (D5) resent? Yes X No
[a.Ke edge, grave. Wethand area glacial melt v YDROLOGY Wetland Hydrology Indicators: Primary Indicators (any one Indicator 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) feld Observations: urface Water Present? Yes Mater Table Present? Yes aturation Present? Yes cludes capillary fringe) escribe Recorded Data (stream gauge	<pre>(+ sand seduce</pre>	mant no want no on Aerial Imagery (f d Concave Surface) Odor (C1) Table (C2) emarks) s): s): tos, previous inspec	organ at is <u>s</u> (B8) <u>x</u> (B8) <u>x</u> (B8)	<pre>K.S VEgwL econdary Indic Water-stain Drainage Pa Oxidized Rł Presence of Salt Deposit Stunted or S Geomorphic Shallow Aqu Microtopogra FAC-Neutral Hydrotogy Pa railable;</pre>	arborn Flooded from attors (2 or more required) ed Leaves (B9) atterns (B10) nizospheres along Living Roots (C3) i Reduced Iron (C4) is (C5) Stressed Plants (D1) Position (D2) nitard (D3) aphic Relief (D4) I Test (D5) resent? Yes X No
[a] (e edge, grave. Wettand area g] acial melt v YDROLOGY Wetland Hydrology Indicators: Primary Indicators (any one Indicator Saturation (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) ield Observations: water Table Present? Yes aturation Present? Yes aturation Present? Yes marks: # Selveral drainage	I + SAND Seduction in an onto y spram. Is sufficient) inundation Visible Sparsely Vegetated Mari Deposits (B15 Mari Depth (inche No Depth (inche No Depth (inche No Depth (inche No Depth (inche No Depth (inche No Depth (inche No Depth (inche No Depth (inche No Depth (inche No Depth (inche No Depth (inche No Depth (inche No Depth (inche No Depth (inche No Depth (inche No Depth (inche No Depth (inche 	mant no wash th wash th on Aerial Imagery (H d Concave Surface) Odor (C1) Table (C2) emarks) s): s): tos, previous inspec	ergan at is <u>s</u> <u>s</u> s s s s s s s s	K.S VEgwL econdary Indic Water-stain Caldized Rł Presence of Salt Deposit Stunted or S Geomorphic Shallow Aqu Microtopogra FAC-Neutral Hydrology Pr vallable:	arty Flooded fro ators (2 or more required) ed Leaves (B9) atterns (B10) hizospheres along Living Roots (C3) Reduced Iron (C4) is (C5) Stressed Plants (D1) Position (D2) hilard (D3) aphic Relief (D4) Test (D5) resent? Yes X No
[a.Ke edge, grave. Wettand area glacial melt v YDROLOGY Netland Hydrology Indicators: Primary Indicators (any one Indicator 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) feld Observations: wrface Water Present? Yes Auter Table Present? Yes Autor Table Present? Yes aturation Present? Yes cicludes capillary fringe) escribe Recorded Data (stream gaug emarks: # Several drawag	I + SAND Seduction in an onto Sparsen is sufficient) Inundation Visible Sparsely Vegetated Mari Deposits (B15 Hydrogen Suffde C Dry-Season Water Other (Explain in Russian No X Depth (Inche No X Depth (Inche) No X D	Mant NO Wash th Don Aerial Imagery (I d Concave Surface) Odor (C1) Table (C2) emarks) s): s): s): tos, previous inspect	ergan at is <u>s</u> <u>s</u> <u>s</u> s s s s s s s s	ICS VEGIL econdary Indic Water-stain Drainage Pa Oxidized Rt Presence of Salt Deposit Stunted or S Geomorphic Shallow Aqu Microtopogra FAC-Neutral Hydrology Ph Vailable:	ary Flooded free ators (2 or more required) ed Leaves (B9) atterns (B10) nizospheres along Living Roots (C3) i Reduced Iron (C4) is (C5) Stressed Plants (D1) Position (D2) nitard (D3) aphic Relief (D4) I Test (D5) resent? Yes X No
[a.Ke edge, grave Wettand area glacial melt v YDROLOGY Netland Hydrology Indicators: Primary Indicators (any one Indicator 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) Teld Observations: urface Water Present? Yes Alter Table Present? Yes aturation Present? Yes cludes capillary fringe) escribe Recorded Data (stream gaug emarks: # Several drawag	I + SAND Seduction I in an onto P Stram. Is sufficient) Inundation Visible Sparsely Vegetated Mari Deposits (B15 Hydrogen Suffide C Dry-Season Water Other (Explain in Resonance) No X Depth (Inche No X Depth (Inche No X Depth (Inche e, monitoring well, aerial pho Page NLAT P10+	Mant no Want no Wash th Wash th Don Aerial Imagery (I d Concave Surface) Don (C1) Table (C2) emarks) (C2) emarks) (C2) emarks) (C3) (C3) (C3) (C3) (C3) (C3) (C3) (C3	ergan at is <u>s</u> <u>s</u> (B8) <u>x</u> Wetland tions), if av	ICS VEGNL econdary Indic Water-stain Drainage Pa Oxidized Rt Presence of Salt Deposit Stunted or S Geomorphic Shallow Aqu Microtopogra FAC-Neutral Hydrology Pu vallable:	ary Flooded fro attors (2 or more required) ed Leaves (B9) atterns (B10) hizospheres along Living Roots (C3 i Reduced Iron (C4) is (C5) Stressed Plants (D1) i Position (D2) hitard (D3) aphic Relief (D4) I Test (D5) resent? Yes X No

Project/Site: Grant Lake	Boro	ugh/City: M	obse Pass	Sampling Date:	7-16-13
Applicant/Owner: Kenal Hydro		· , <u> </u>		Sampling Point	50 PG
Investigator(s): C. Schudel J. Blank	Land	dform (hillside,	terrace, hummocks, e	ic.): lake edge	wl
Local relief (concave, convex, none): None	Slop	e (%):		"Sk	rans
Subregion: Lat:	60.467	105	Long: ~149.2	-11038 Datum:	
Soil Map Unit Name: Alluvial Deltaic Depo	sits		NWI	classification: PSS1	E
Are climatic / hydrologic conditions on the site typical for this t	ime of year?	Yes X N	lo (If no, expl	ain in Remarks.)	
Are Vegetation, Soil, or Hydrology sig	nificantly distu	irbed? N・ /	Are "Normal Circumsta	ances" present? Yes 之	K No
Are Vegetation, Soll, or Hydrology nat	turally problen	natic? N • ((if needed, explain any	answers in Remarks.)	
SUMMARY OF FINDINGS – Attach site map sho	wing samp	ling point lo	cations, transects	, important features	s, etc.
Hydrophylic Vegetation Present? Yes V No				``	
Hydric Soil Present? Yes Yes		is the Sam	pied Area	Vez V	
Wetland Hydrology Present? Yes X No			etianor ,		
Remarks: Representative acturly	Thom &	sls cm	munity b	etween 200	tflow
chappels is portions of us	Mann	elined &	sheet flow.		
VEGETATION - Use scientific names of plants.	List all spec	cies in the p	lot.		
	Absolute Do	minant Indica	tor Dominance Te	st worksheet:	
Tree Stratum	<u>% Cover St</u>	<u>becles?</u> Statu	Number of Dom	inant Species 4	
1. Salix alaxensis	<u> </u>	<u> </u>	L That Are OBL, F	FACW, or FAC:	(A)
2	·	·	- Total Number o	f Dominant <	
			Species Across	Ali Strata; <u> </u>	(B)
Total Cover:	5		Percent of Dom	inant Species	(4(0)
50% of total cover; 2.5	 20% of tot	al cover: \	Prevalence ind	lev workeheet:	
Sapling/Shrub Stratum		,	Total % Co	verof Multia	oly by:
1. Alhus vindus	30	FAC	- OBL species	$0 \qquad x = 0$	2
2Setix-			FACW species) x2= 2	
3. Picea glavea		<u>FITC</u>	FAC species	<u>75</u> x3= <u>7</u>	25
4. JAJIX MAXETISIS	70 1	CAT	FACU species	<u>25</u> x4= <u>10</u>	<u>00</u>
B Proutus balsamifera	12 \		UPL species	x5=	>
Total Cover:	90	<u> </u>	Column Totals:	<u> 0 </u> (A) <u>3</u>	<u>27</u> (B)
50% of total cover: 45	20% of tota	al cover: 1%	Prevalenc	= index $= B/A = -3.2$.4
Herb Stratum			Hydrophytic V	egetation Indicators:	
1. Agrostis gizantea	<u> </u>	Y FAR	X Dominance	Test is >50%	
B-Equiserm Ryemale	_ <u>_</u>	FAC	W Prevalence	Index is ≤3.0	
3. Catamagrospis Unhadensis.	<u> </u>	<u>4 1-AR</u>	- Morphologi	cal Adaptations ¹ (Provid	e supporting
4			data in f	Remarks or on a separat	e sheet)
6			Problematic	: Hydrophytic Vegetatior	i' (Explain)
7			¹ Indicators of h	ydric soil and wetland hy	/drology must
8.	_		be present unle	ss disturbed or problema	atic.
9.					
10					
Total Cover:	6				
50% of total cover: <u>3</u>	_ 20% of tota	al cover: 1.2	Hydrophytic		
Plot size (radius, or length x width) 20 ' rad.	% Bare Grou	und <u>D</u>	Vegetation	5	
% Cover of Wetland Bryophytes Total Cove (Where applicable)	er of Bryophyt	es	Present?	Yes X No	
Remarks:					

SOIL

ling Doint:	DP	Ø	Z
	~ 1		

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SOIL								Sampling Point: UP 02	
Profile Des	cription: (Describe to	the depth ne	eded to docun	nent the i	ndicator	or confirm	the absence o	f Indicators.)	
Depth	Matrix		Redo	x Features					
(inches)	<u>Color (moist)</u>	<u>%</u> <u>C</u>	olor (moist)	%	Type'	Loc	<u>Texture</u>	Remarks	
								NTTE: 1	
	ALL ALL								
	-100 ber		···· UED/1428					rroman	
	abit	-nc 1.7	7-130	Ni					
TO SERVICE		03 02	7 12 30				<u> </u>	, www.i.e.	
					<u> </u>		<u> </u>		
	·	,		·					
								11. 19. 19. 19. 19. 19. 19. 19. 19. 19.	
ype: C=C	oncentration, D=Deplet	ion, RM=Red	uced Matrix, CS	-Covered	or Coate	d Sand Gra	ains. ² Local	tion: PL=Pore Lining, M=Matrix.	
ydric Soil	Indicators:	l	ndicators for P	roblemati	c Hydrlc	Solls ³ :			
Histosol	or Histel (A1)	_	Alaska Colo	r Change ((TA4) ⁴		Alaska G	Bleyed Without Hue 5Y or Redder	
Histic E	pipedon (A2)		Alaska Alpin	ie Swales	(TA5)		Underlying Layer		
_ Hydroge	n Sulfide (A4)	_	Alaska Redox With 2.5Y Hue				📈 Other (É	xplain in Remarks)	
_ Thick Da	ark Surface (A12)								
_ Alaska (Gleyed (A13)	3	One indicator of	f hydrophy	tic vegeta	ition, one p	rimary indicator	of wetland hydrology,	
_ Alaska F	Redox (A14)		and an approp	oriate land:	scape po:	sition must	be present unle	ss disturbed or problematic.	
_ Alaska (Gleyed Pores (A15)	4(Give details of c	olor chang	je in Ren	larks,			
estrictive	_ayer (if present):								
Туре:	None found						ł		
Depth (in	ches):						Hydric Soil P	resent? Yes <u>X</u> No	
emarks:							01.4.4	1 5	
We	land area	Inan	outwash	that	is re	guarti	1 Hovacea	(pom	
914	acial melt u	pstream	1						
U									

HYDROLOGY

Wetland Hydrology Indicators:	Secondary Indicators (2 or more required)
Delmana Indiantera (any ana indiantera la aufficienti)	
	Water-stained Leaves (B9)
Surface Water (A1) Inundation	on Visible on Aerial Imagery (B7) Drainage Patterns (B10)
X High Water Table (A2) Sparsely	Vegetated Concave Surface (88) Oxidized Rhizospheres along Living Roots (C3)
Saturation (A3) Mari Dep	posits (B15) Presence of Reduced Iron (C4)
Water Marks (B1) Hydroge	n Sulfide Odor (C1) Sait Deposits (C5)
Sediment Deposits (B2) Dry-Sea	son Water Table (C2) Stunted or Stressed Plants (D1)
Drift Deposits (B3) Other (E	xplain in Remarks) Geomorphic Position (D2)
Algal Mat or Crust (B4)	Shallow Aquitard (D3)
Iron Deposits (B5)	Microtopographic Relief (D4)
Surface Soil Cracks (B6)	FAC-Neutral Test (D5)
Field Observations:	
Surface Water Present? Yes 🗶 No _ D	epth (inches):
Water Table Present? Yes 🔀 No _ D	epth (inches):
Saturation Present? Yes X No D (includes capillary fringe)	epth (inches): Wetland Hydrology Present? Yes X No
Describe Recorded Data (stream gauge, monitoring well	, aerial photos, previous inspections), if available:
Remarks:	
	photos: C's
	(j2+-0))

Protocilistic Caraca L La ka		the star	a Dass 7 1/ 12					
Applicapt/Ourport Varager (1, d.g.)	Во	rough/City: <u>M 00</u>	SC [4] SS Sampling Date: 7-16-13					
hypricalization of Standard T Plank	Sampling Point: DP 0_3							
Investigator(s): <u>C. Schuzel</u> J. BIGNE	race, hummocks, etc.): <u>(ake edge</u>							
Local feller (concave, convex, none): <u>Y (by</u>	-							
Subregion: La	ng: Datum:							
Soli Map Unit Name: <u>ATTUVIAL DEITALC LEPT</u>	NWI classification: PGAHSSHE							
Are climatic / hydrologic conditions on the site typical for this time of year? Yes <u>X</u> No (if no, explain in Remarks.)								
Are Vegetation, Soil, or Hydrology Significantly disturbed? NV Are "Normal Circumstances" present? Yes X No								
SUMMARY OF FINDINGS – Attach site map si	naturally proble	ematic? No (If no pling point locat	eeded, explain any answers in Remarks.) tions transects important features etc.					
		1						
Hydrophytic Vegetation Present? Yes X N	lo	Is the Sampled	d Area					
Wetland Hydrology Present? Yes X N	lo	within a Wetia	nd? Yes <u>X</u> No					
Remarks: 7	<u> </u>							
Lake edge	- herba	cions s	15 withind adjacent to					
VEGETATION - Use scientific names of plants.	. List all spe	ecies in the plot.						
Tree Stratum	Absolute D	ominant Indicator	Dominance Test worksheet:					
	<u>% Cover</u> S	Species? <u>Status</u>	Number of Dominant Species					
2		······ ,	That Are OBL, FACW, or FAC: (A)					
3.			Total Number of Dominant					
4.	-i	····· ··· ··· ··· ··· ··· ··· ··· ···	Species Across All Strata: (B)					
Total Cover	;		Percent of Dominant Species					
50% of total cover:	20% of to	tal cover:	Provolonce Index workshoet					
Sapling/Shrub Stratum			Total % Course of Multiply by					
1. Alous Viriolis	10	Y FAC	OBL species 35 v1 - 35					
2. Salix alexensis		FAC	FACW species $2.5 \qquad x^2 = 50$					
3. <u>Sallx Sitchensis</u>	20	Y FAC	FAC species $40 \times 3 = 120$					
4			FACU species Q $x 4 = Q$					
6	·		UPL species $\boxed{0}$ x 5 = 0					
0Total Cover	- 25		Column Totals: 100 (A) 205 (B)					
50% of total cover: 17.5	20% of tot	F revoriet	2.45					
Herb Stratum	207001101		Prevalence Index = B/A =					
1. Equisation hypernale	5	Y FACW	A Deminence Test is > 50%					
2. Larex lenticularis	10	OBL	Prevalence Index is <3.0					
3. Carex ranescens	10	FACW	Mombological Adaptations ¹ (Provide supporting					
4. Errophorum chamissonis		<u> </u>	data in Remarks or on a separate sheet)					
5. Carex 14Ngbye1		Y OBL	Problematic Hydrophytic Vegetation ¹ (Explain)					
6 Agrostis grgantea		<u>+16</u>						
n <u> laramargrostiz aanadensis</u>	_5	4 FAC	Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic					
٥	······································							
۰ ۱۵								
1V	<u></u>	,,						
iotal Cover: 50% of total cover: 32.5	200/ 201-1	al covor 13						
Plot size (radius, or length y width) 30 Wash.	20% of (00		Hydrophytic					
% Cover of Wetland Bryophytes Total Cov (Where applicable)	er of Bryophyt	les <u>75</u>	Vegetation Present? Yes <u> </u>					
Remarks:								
		pha	otos 636-641					

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SOIL								Sampling Point: DP 03	
Profile Desc	ription: (Describe to	the depth ne	eded to docu	iment the ir	ndicator o	or confirm	the absence	of indicators.)	
Depth	Matrix		Red	ox Features				. .	
(inches)	Color (moist)	<u>%</u> C	olor (moist)	%	_Type'	Loc	<u> Texture </u>	Remarks	
3-0	Verydarkar	ettblack	savad.	Foravel				live vootlayer	
				- 9				w/ sandy silt	
						<u></u>	•		
0-11	very dark gr	ey /black	r Sand	+ grav	el			Sand + gravel	
			van.					0	
					<u> </u>				
	174 Millioner						<u> </u>		
								- <u></u>	
					·	. <u> </u>			
Type: C=C	oncentration, D=Deple	tion, RM=Red	uced Matrix, C	S=Covered	or Coate	d Sand Gr	ains. ² Lo	cation: PL=Pore Lining, M=Matrix.	
Hydric Soll	Indicators:		indicators for	Problemat	ic Hydric	Soils ³ :			
Histoso	or Histel (A1)		Alaska Co	lor Change	(TA4) ⁴		Alaska	a Gleyed Without Hue 5Y or Redder	
Histic E	pipedon (A2)		Alaska Alp	oine Swales	(TA5)		Underlying Layer		
Hydroge	en Sulfide (A4)		Alaska Redox With 2.5Y Hue				X Other (Explain in Remarks)		
Thick D	ark Surface (A12)								
Alaska	Gleyed (A13)	:	³ One indicator	of hydrophy	tic veget	ation, one j	primary indica	tor of wetland hydrology,	
Alaska I	Redox (A14)		and an appr	opriate lanc	iscape po	sition must	t be present u	nless disturbed or problematic.	
Alaska	Gleyed Pores (A15)		Give details o	f color chan	ge in Rer	narks.			
Restrictive	Layer (if present):								
Type:	none found	<u> </u>							
Depth (in	ches):		<u> </u>				Hydric Soi	i Present? Yes <u>X</u> No	
Remarks:		,							
lak	edge seas	maily	Floode	el .					
		Jash.							
	giaciar out	~~~~~							
								`	
							· · · · · · · · · · · · · · · · · · ·		
HYDROLC)GY								
Wetland Hy	drology indicators:		-				Secondary h	ndicators (2 or more required)	
Primary Indi	cators (any one indica	tor is sufficien	t)				Water-s	tained Leaves (B9)	
Surface Water (A1) Inundation Visible on Aerial Ima			al Imagery	y (B7)	Drainag	e Patterns (B10)			
High Water Table (A2) Sparsely Vegetated Concave Surface (B8)			ce (B8)	Oxidized	d Rhizospheres along Living Roots (C3)				
X Saturat	ion (A3)		Marl Deposits	(B15)			Presence	e of Reduced Iron (C4)	
Water M	/larks (B1)		Hydrogen Sulf	ide Odor (C	1)		Salt Dep	posits (C5)	
Sedime	nt Deposits (B2)		Dry-Season Ŵ	later Table (C2)		Stunted	or Stressed Plants (D1)	
Drift De	posits (B3)	⁽	Other (Explain	in Remarks	»)		K Geomo	rphic Position (D2)	
Algal M	at or Crust (B4)						Shallow	Aquitard (D3)	
Iron De	posits (B5)						Microtor	bographic Relief (D4)	
Surface	Soil Cracks (B6)						K_FAC-Ne	utral lest (D5)	

Algal Mat or Crust (B4) Iron Deposits (B5)		Shallow Aquitard (D3) Microtopographic Relief (D4) FAC-Neutral Test (D5)		
Field Observations: Surface Water Present? Water Table Present? Saturation Present?	Yes X No Depth (inches): Yes X No Yes X No Depth (inches): Yes X No Yes X	D ["] (war pit) <u>3"</u> O" Wetland Hydrology Present?	Yes X No	
(includes capiliary tringe) Describe Recorded Data (stre	eam gauge, monitoring well, aerial photos,	previous inspections), if available:		
Nomente.				

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Project/Site: Grant Laka			Lung Jaco
Applicant/Owner: KRIANA HINDR	E	sorough/City: _P	1003e PASS Sampling Date:
Investigatories: C. Schudel T. Blanck			Sampling Point: <u>DP 04</u>
	L	androrm (hilliside	e, terrace, hummocks, etc.): <u>[ake ealga</u>
Subregion:		siope (%): <u>1</u> (→Ωα(α+)	
Soil Man Linit Name: All Lustra L. De Litera Datas	at: <u>2014</u>	68824	Long: -1441, 211, 193 Datum:
Solimptio (budielesis and litera a line in the internet	5175		NWI classification: PSSIB EM []
Are Vegetetien	his time of yea	r7 Yes	No (If no, explain in Remarks.)
Are Vegetation, Soli, or Hydrology	significantly d	isturbed?	Are "Normal Circumstances" present? Yes No
SUMMARY OF FINDINGS – Attach site map	haturally prob	npling point lo	(If needed, explain any answers in Remarks.)
Hydrophytic Vegetation Present? Yes X	No		
Hydric Soll Present? Yes	No	within a M	Vetland?
Wetland Hydrology Present? Yes X	No	within a vi	
Remarks: Rypresentative of t	ne will	ional aide	r crommunity
VEGETATION - Use scientific names of plants	s. List all sp	pecies in the p	piot.
Trop Stratum	Absolute	Dominant Indica	ator Dominance Test worksheet:
	% Cover	<u>Species7</u> Stat	Number of Dominant Species
2.			That Are OBL, FACW, or FAC: (A)
3			Total Number of Dominant
4		MIL	B)
Total Cove	 er:		Percent of Dominant Species
50% of total cover:	20% of	total cover;	Prevalence Index workshoot: (A/B)
Sapling/Shrub Stratum	0.4		Total % Cover of Multiply by:
2 Salv situris			$\frac{1}{OBL \text{ species } 22} \times 1 = 22$
3 Solix alexansis	- 4 0 -	<u> </u>	FACW species 25 $x_2 = 50$
4. Picea slavca	<u></u>	<u> </u>	FAC species $\frac{71}{x3} = \frac{213}{x3}$
5		<u>FAO</u>	FACU species x 4 =
6			UPL species x 5 =
Total Cove	r: 100		Column Totals: 19 (A) 289 (B)
50% of total cover: <u>33</u>	20% of to	otal cover. <u>13.2</u>	= Prevalence index = $B/A = -2.43$
Herb Stratum	10	J	Hydrophytic Vegetation Indicators:
2 EBUIER DWG PULLYIG THE	- <u>- 15</u> -	<u>Y+AFCI</u>	<u>W</u> <u>X</u> Dominance Test is >50%
3 Coner Danescens		<u> </u>	Yerevalence Index is ≤3.0
4 Carex lenticularis		Y PEL	Morphological Adaptations ¹ (Provide supporting
5. Carex lunabuel	10.	<u> </u>	data in Remarks or on a separate sheet)
6. Chamenon latifolia	- <u> </u>		Problematic Hydrophytic Vegetation' (Explain)
2 Agrostis graanka	<u> </u>	FAC	C 1 Indicators of hydric soil and wetland hydrology must
D. Calamagrostis canadensis		FAC	be present unless disturbed or problematic.
9			
10			
. Total Cove	53		
50% of total cover: 26.	20% of to	tal cover: 10.6	, Hydrophytic
Plot size (radius, or length x width) 20 pad.	_ % Bare Gro	ound <u>O</u>	- Vegetation
% Cover of Wetland Bryophytes Total Cc (Where applicable)	ver of Bryophy	/tes_50	Present? Yes <u>X</u> No
Remarks;		Ć	3PS pt SO
			photos 642-646

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		Sampling Point: DIS 0 7
Profile Description: (Describe to the depth needed to de	ocument the indicator or conf	firm the absence of Indicators.)
Depth <u>Matrix</u>	Redox Features	Touture Remarks
(inches) Color (moist) % Color (moist) <u> % 1ype Loc</u>	
3-0	······································	live layer
1-2 INR311 95% 7,54R	416 5% C D.L	silt
		Sandy Argund
2-11 dark grey/ black sandy of	javer	Sallary graver
· · · · · · · · · · · · · · · · · · ·		
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matri	x, CS=Covered or Coated Sand	d Grains. ² Location: PL=Pore Lining, M=Matrix.
Hydric Soil Indicators: Indicators	for Problematic Hydric Solls ³	
Histosol or Histel (A1) Alaska	Color Change (TA4) ⁴	Alaska Gleyed Without Hue 5Y or Redder
Histic Epipedon (A2) Alaska	Alpine Swales (TA5)	Underlying Layer
Hydrogen Sulfide (A4) Alaska	Redox With 2.5Y Hue	
Thick Dark Surface (A12)	tor of hydrophytic venetation of	one primary indicator of wetland hydrology.
Alaska Gleyed (A13) One Indica	noropriate landscape position r	nust be present unless disturbed or problematic.
Alaska Redox (A14) and di e	is of color change in Remarks.	
Postrictive aver (if present):		
Type: NANE FUNC		
Depth (inches):		Hydric Soil Present? Yes 📉 No
Remarks:		
lake edge seasonally flo	sded	
adaqual situash		
entre contra		
Wetland Hydrology Indicators:		Secondary Indicators (2 or more required)
Wetland Hydrology Indicators:		Secondary Indicators (2 or more required) — Water-stained Leaves (B9)
Wetland Hydrology Indicators: <u>Primary Indicators (any one indicator is sufficient)</u> Surface Water (A1) Inundation	Visible on Aerial Imagery (B7)	<u>Secondary Indicators (2 or more required)</u> Water-stained Leaves (B9) Drainage Patterns (B10)
Wetland Hydrology Indicators: Primary Indicators (any one indicator is sufficient)	Visible on Aerial Imagery (B7) egetated Concave Surface (B8)	<u>Secondary Indicators (2 or more required)</u> Water-stained Leaves (B9) Drainage Patterns (B10)) Oxidized Rhizospheres along Living Roots (C
Wetland Hydrology Indicators: Primary Indicators (any one indicator is sufficient)	Visible on Aerial Imagery (B7) egetated Concave Surface (B8) sits (B15)	<u>Secondary Indicators (2 or more required)</u> Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots (C Presence of Reduced Iron (C4)
Wetland Hydrology Indicators: Primary Indicators (any one indicator is sufficient)	Visible on Aerial Imagery (B7) egetated Concave Surface (B8) sits (B15) Sulfide Odor (C1)	<u>Secondary Indicators (2 or more required)</u> Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots (C Presence of Reduced Iron (C4) Salt Deposits (C5)
Wetland Hydrology Indicators: Primary Indicators (any one indicator is sufficient)	Visible on Aerial Imagery (B7) egetated Concave Surface (B8) sits (B15) Sulfide Odor (C1) n Water Table (C2)	Secondary Indicators (2 or more required) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots (C Presence of Reduced Iron (C4) Salt Deposits (C5) Stunted or Stressed Plants (D1) Conservable Recilion (D2)
Wetland Hydrology Indicators: Primary Indicators (any one indicator is sufficient)	Visible on Aerial Imagery (B7) egetated Concave Surface (B8) sits (B15) Sulfide Odor (C1) n Water Table (C2) fain in Remarks)	Secondary Indicators (2 or more required) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots (C Presence of Reduced Iron (C4) Salt Deposits (C5) Stunted or Stressed Plants (D1) Second particular (D3)
Wetland Hydrology Indicators: Primary Indicators (any one indicator is sufficient)	Visible on Aerial Imagery (B7) egetated Concave Surface (B8) sits (B15) Sulfide Odor (C1) n Water Table (C2) Ialn in Remarks)	Secondary Indicators (2 or more required) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots (C Presence of Reduced Iron (C4) Salt Deposits (C5) Stunted or Stressed Plants (D1) Saltoenorphic Position (D2) Shallow Aquitard (D3) Microtopographic Relief (D4)
Wetland Hydrology Indicators: Primary Indicators (any one indicator is sufficient)	Visible on Aerial Imagery (B7) egetated Concave Surface (B8) sits (B15) Sulfide Odor (C1) n Water Table (C2) Ialn in Remarks)	Secondary Indicators (2 or more required) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots (C Presence of Reduced Iron (C4) Salt Deposits (C5) Stunted or Stressed Plants (D1) Salt Geomorphic Position (D2) Shallow Aquitard (D3) Microtopographic Relief (D4) K FAC-Neutral Test (D5)
Wetland Hydrology Indicators: Primary Indicators (any one indicator is sufficient)	Visible on Aerial Imagery (B7) egetated Concave Surface (B8) sits (B15) Sulfide Odor (C1) n Water Table (C2) Ialn in Remarks)	Secondary Indicators (2 or more required) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots (C) Presence of Reduced Iron (C4) Salt Deposits (C5) Stunted or Stressed Plants (D1) Salt Opposition (D2) Shallow Aquitard (D3) Microtopographic Relief (D4) K FAC-Neutral Test (D5)
Wetland Hydrology Indicators: Primary Indicators (any one indicator is sufficient)	Visible on Aerial Imagery (B7) egetated Concave Surface (B8) sits (B15) Sulfide Odor (C1) n Water Table (C2) Ialn in Remarks)	Secondary Indicators (2 or more required) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots (C Presence of Reduced Iron (C4) Salt Deposits (C5) Stunted or Stressed Plants (D1) Geomorphic Position (D2) Shallow Aquitard (D3) Microtopographic Relief (D4) K FAC-Neutral Test (D5)
Wetland Hydrology Indicators: Primary Indicators (any one indicator is sufficient)	Visible on Aerial Imagery (B7) egetated Concave Surface (B8) sits (B15) Sulfide Odor (C1) n Water Table (C2) Iain in Remarks) oth (Inches):	Secondary Indicators (2 or more required) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots (C Presence of Reduced Iron (C4) Salt Deposits (C5) Stunted or Stressed Plants (D1) Salt Geomorphic Position (D2) Shallow Aquitard (D3) Microtopographic Relief (D4) K FAC-Neutral Test (D5)
Wetiand Hydrology Indicators: Primary Indicators (any one indicator is sufficient)	Visible on Aerial Imagery (B7) egetated Concave Surface (B8) sits (B15) Sulfide Odor (C1) n Water Table (C2) fain in Remarks) oth (Inches):3 '' oth (Inches):0 ''	Secondary Indicators (2 or more required) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots (C Presence of Reduced Iron (C4) Salt Deposits (C5) Stunted or Stressed Plants (D1) K, Geomorphic Position (D2) Shallow Aquitard (D3) Microtopographic Relief (D4) K, FAC-Neutral Test (D5) Wetland Hydrology Present? Yes X No
Wetland Hydrology Indicators: Primary Indicators (any one indicator is sufficient)	Visible on Aerial Imagery (B7) egetated Concave Surface (B8) sits (B15) Sulfide Odor (C1) n Water Table (C2) Iain in Remarks) oth (Inches): oth (Inches): oth (Inches):	Secondary Indicators (2 or more required) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots (C Presence of Reduced Iron (C4) Salt Deposits (C5) Stunted or Stressed Plants (D1) K. Geomorphic Position (D2) Shallow Aquitard (D3) Microtopographic Relief (D4) K. FAC-Neutral Test (D5) Wetland Hydrology Present? Yes <u>No</u>
Wetland Hydrology Indicators: Primary Indicators (any one indicator is sufficient)	Visible on Aerial Imagery (B7) egetated Concave Surface (B8) sits (B15) Sulfide Odor (C1) in Water Table (C2) fain in Remarks) oth (Inches): oth (Inches): ^{1'} oth (Inches): ^{1'} terial photos, previous Inspection	Secondary Indicators (2 or more required) Utater-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots (C Presence of Reduced Iron (C4) Salt Deposits (C5) Stunted or Stressed Plants (D1) Salt Deposits (C5) Shallow Aquitard (D3) Microtopographic Relief (D4) K FAC-Neutral Test (D5) Wetland Hydrology Present? Yes No
Wetland Hydrology Indicators: Primary Indicators (any one indicator is sufficient)	Visible on Aerial Imagery (B7) egetated Concave Surface (B8) sits (B15) Sulfide Odor (C1) in Water Table (C2) fain in Remarks) oth (Inches): oth (Inches): ¹ oth (Inches): ¹	Secondary Indicators (2 or more required) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots (C) Salt Deposits (C5) Stunted or Stressed Plants (D1) Salt Deposits (C5) Stunted or Stressed Plants (D1) Shallow Aquitard (D3) Microtopographic Relief (D4) K FAC-Neutral Test (D5) Wetland Hydrology Present? Yes No
Wetland Hydrology Indicators: Primary Indicators (any one indicator is sufficient)	Visible on Aerial Imagery (B7) egetated Concave Surface (B8) sits (B15) Sulfide Odor (C1) in Water Table (C2) lain in Remarks) oth (Inches): th (Inches): ^{1'}	Secondary Indicators (2 or more required)
Wetland Hydrology Indicators: Primary Indicators (any one indicator is sufficient)	Visible on Aerial Imagery (B7) egetated Concave Surface (B8) sits (B15) Sulfide Odor (C1) in Water Table (C2) fain in Remarks) with (Inches): oth (Inches): in (Inches): oth (Inches):	Secondary Indicators (2 or more required) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots (C Presence of Reduced Iron (C4) Salt Deposits (C5) Stunted or Stressed Plants (D1) Salt Deposition (D2) Shallow Aquitard (D3) Microtopographic Relief (D4) K FAC-Neutral Test (D5) Wetland Hydrology Present? Yes No
Wetland Hydrology Indicators: Primary Indicators (any one indicator is sufficient)	Visible on Aerial Imagery (B7) egetated Concave Surface (B8) sits (B15) Sulfide Odor (C1) in Water Table (C2) fain in Remarks) oth (Inches): oth (Inches): ¹ th (Inches): ¹	Secondary Indicators (2 or more required) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots (C Salt Deposits (C5) Salt Deposits (C5) Stunted or Stressed Plants (D1) Salt Or Stressed Plants (D1) Shallow Aquitard (D3) Microtopographic Relief (D4) K FAC-Neutral Test (D5) Wetland Hydrology Present? Yes No

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Sampling Point: DP 04

Project/Site: brant lale Borough/City:	LODSE PALL Sampling Date: 7-110-13
Applicant/Owner: Icenan Hydro	Sampling Point: DP0 5
Investigator(s): Co. Shudl_ J. Bleunh_ Landform (hillside, te	errace, hummocks, etc.): <u>Slight terraces</u>
Local relief (concave, convex, noлe): Slope (%);	
Subregion: Lat: <u>60. 469000</u> L	ong: -149.210881 Datum:
Soll Map Unit Name: Alwyial Deltair Deposits	NWI classification: _ WPL
Are climatic / hydrologic conditions on the site typical for this time of year? Yes \underline{X} No	(If no, explain in Remarks.)
Are Vegetation, Soil, or Hydrology significantly disturbed? Are	e "Normal Circumstances" present? Yes _X No
Are Vegetation, Soil, or Hydrology naturally problematic? (If	needed, explain any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site map showing sampling point loca	ations, transects, important features, etc.
Hydrophytic Vegetation Present? Yes V No	ad Area
Hydric Soil Present? Yes No Vet	and Area
Wetland Hydrology Present? Yes No	
Remarks: Representative up1. pt. Marginal	veg, dony soils a no hydro.
VEGETATION - Use scientific names of plants. List all species in the plo	t.
Tree Stratum	Dominance Test worksheet:
1. DODNLUS balsamilera, 205A4115 V FAM	- Number of Dominant Species
2. Salix alexensis 30 y car	(A)
3	Total Number of Dominant
4	
Total Cover: <u>50</u>	That Are OBL FACW or FAC:
50% of total cover. 25 20% of total cover/D	Prevalence Index worksheet:
Sapundyshrup stratum	Total % Cover of: Multiply by
$\frac{1}{2} \sum_{i=1}^{n} \frac{1}{2} \sum_{i=1}^{n} \frac{1}$	OBL species 0 x1 = 0
3 Scoliv adorasis 5 N Each	FACW species 0 x2 = 0
4. 1	FAC species $120 \cdot x_3 = 360$
5	FACU species 25 x 4 = 100
6	UPL species x 5 =
Total Cover: 105	Column Totals: <u>145</u> (A) <u>460</u> (B)
50% of total cover: <u>32, 5</u> 20% of total cover: <u>13</u>	Prevalence index = $B/A = 3/7$
Herb Stratum	Hydrophytic Vegetation Indicators:
1. Jorghulia Decunda _ b yN FACU	× Dominance Test is >50%
2 ASPOSAS giganten FAC.	Prevalence Index is ≤3.0
A Calcumate alles and lange 2 and the	Morphological Adaptations ¹ (Provide supporting
5	data in Remarks or on a separate sheet)
6.	Problematic Hydrophytic Vegetation ¹ (Explain)
7	¹ Indicators of hydric soil and wetland hydrology must
8	be present unless disturbed or problematic.
9	
10	
Total Cover:	
50% of total cover: 15 20% of total cover: 16	Hydrophytic
Plot size (radius, or length x width) <u>70 Yael</u> % Bare Ground <u>20</u>	Vegetation
Where applicable)	Present? Yes <u>4</u> No
Remarks: photos 647-650 Representative	62 upland - marginal
Veg ammunita	
JS Army Corps of Engineers	

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Alaska Version 2.0

SOIL	Sampling Point: <u>)) P.O.S.</u>
Profile Description: (Describe to the depth needed to document the indicator or confirm	n the absence of indicators.)
Depth Matrix Redox Features	Remedia
(inches) Color (moist) % Color (moist) % Type* Loc*	<u>Texture</u> Remarks
	livelayer
11-3 7.51 2.5/1 100	Silt
	E a a d a la a musici
5-17 gravelly sand vory dark grey 1 black	_ Sana + gravy
Tune: C=Concentration D=Depletion RM=Reduced Matrix CS=Covered or Coated Sand G	rains. ² Location: PL=Pore Lining, M=Matrix.
Hydric Soil Indicators: Indicators for Problematic Hydric Soils ³ :	
Histosof or Histel (A1) Alaska Color Change (TA4) ⁴	Alaska Gleyed Without Hue 5Y or Redder
Histic Epipedon (A2) Alaska Alpine Swales (TA5)	Underlying Layer
Hydrogen Sulfide (A4) Alaska Redox With 2.5Y Hue	Other (Explain in Remarks)
Thick Dark Surface (A12)	·
Alaska Gleyed (A13) ³ One indicator of hydrophytic vegetation, one	primary indicator of wetland hydrology,
Alaska Redox (A14) and an appropriate landscape position mu	st be present unless disturbed or problematic.
Alaska Gleyed Pores (A15) ⁴ Give details of color change in Remarks.	
Restrictive Layer (if present):	
Type: Mare find	
Depth (inches):	Hydric Soll Present? Yes No _X
Remarks:	
HYDROLOGY	Cocondocy (adjoctors (2 or more required)
Wetland Hydrology Indicators:	Secondary Indicators (2 of More required)
Primary Indicators (any one indicator is sufficient)	Water-stained Leaves (05)
Surface Water (A1) Inundation Visible on Aerial Imagery (B7)	Drainage Patterns (B10)
High Water Table (A2) Sparsely Vegetated Concave Surface (B8)	Dividized Rhizosphere's along Living Roots (C3)
Saturation (A3) Mart Deposits (B15)	Solt Denosite (C5)
Water Marks (B1) Hydrogen Sutilde Odor (U1)	Stunted or Stressed Plants (D1)
Sediment Deposits (B2) Ury-Season water Table (C2)	Geomorphic Position (D2)
Drift Deposits (83) Other (Explain in Remains)	Shallow Aquitard (D3)
Algal Mat or Crust (84)	Microtopographic Relief (D4)
Iron Deposits (85)	FAC-Neutral Test (D5)
I SURACE SOIL CLACKS USD I	

____ Surface Soil Cracks (B6) Field Observations:

Surface Water Present?

Water Table Present?

Remarks:

Yes _____ No ____ Depth (inches): _

 Saturation Present?
 Yes
 No
 ✓
 Depth (inches):
 Wetland Hydrold

 (Includes capillary fringe)
 Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Yes _____ No ____ Depth (inches): ______

Wetland Hydrology Present? Yes _____ No ____

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Project/Site: Crant Lake		Borough/C	ilv: Mou	SP. Pass Sampling Date: 7-17-13
Applicant/Owner: Keney, Hydro		0	• • • • • • • •	Sampling Point: DP 06
Investigator(s): C. Schudel J. Blank		Landform (hillside, ter	race, hummocks, etc.): Lake edge
Local relief (concave, convex, none): りゃんと		Slope (%):	30	<u> </u>
Subregion: Lat:	with	10 10 35	Loi	- ng: ~149,240,251 Datum:
Soil Map Unit Name: Aleuvial Dettaic	Die			NWI classification: PSSI & / EMIC
Are climatic / hydrologic conditions on the site typical for this	time of ve	ar? Yes	X No	(If no, explain in Remarks)
Are Vegetation Soil or Hydrology sid	nificantly	disturbed?	No Are	"Normal Circumstances" present? Yes V No
Are Vegetation, Soll, or Hydrology na	turally pro	blematic?	Nº (If ne	eeded, explain any answers in Remarks.)
SUMMARY OF FINDINGS - Attach site map sho	wing sa	mpling p	oint locat	ions, transects, important features, etc.
Hydrophytic Vegetation Present? Yes X No		1- 41		
Hydric Soil Present? Yes X No		IS tr	ie Sampled	nd? Van X
Wetland Hydrology Present? Yes X No		Will		
Remarks: Representative of S/S & adjacent to lakeshore in	old o	unite	In for	GPS 16
VEGETATION - Use scientific names of plants.	List all s	pecies in	the plot.	
	Absolute	Dominant	Indicator	Dominance Test worksheet:
	% Cover	Species?	Status	Number of Dominant Species
2				That Are OBL, FACW, or FAC: $\frac{7}{2}$ (A)
3		, <u> </u>		Total Number of Dominant
4.			·	Species Across All Strata: <u>1</u> (B)
Total Cover:		.		Percent of Dominant Species
50% of total cover;	_ 20% o	f total cove	r:	Prevalence Index worksheet:
Sapling/Shrub Stratum	n .	N	<u></u>	Total % Cover of Multinu by:
1. San alaxerisis	30		<u>+AC</u>	$\begin{array}{c c c c c c c c c c c c c c c c c c c $
2. SALLA SITURIAL	20	<u> </u>	FAR	FACW species (40)30 x2= (50)60
s. ATTROS VILLOUS	<u> </u>			FAC species 400190 x3= 300210
5		<u> </u>	•	FACU species x 4 =
6.				UPL species $\sqrt{2}$ x 5 = $\frac{2}{2}$
Total Cover;	70			Column Totals: (140) (A) (B) (B)
50% of total cover: <u>35</u>	_ 20% of	total cover	. 14	Prevalence Index = $B/A = (2.71) 2.75$
Herb Stratum	1 20	N	Fand	Hydrophytic Vegetation Indicators;
1. Equiserum niemare	<u>44 50</u>		FACW	Dominance Test is >50%
2. Chaman a latifalia	10		FAC	X Prevalence Index is ≤3.0
up Acoustic a country			FAC.	Morphological Adaptations ¹ (Provide supporting
5 Calamarato S canadensis	$\frac{10}{10}$	<u> </u>	EAC.	data in Remarks or on a separate sheet)
6.			170	Problematic Hydrophytic Vegetation' (Explain)
7		-	·	¹ Indicators of hydric soil and wetland hydrology must
8.			•	be present unless disturbed or problematic.
9				
10				
Total Cover: _	TO			
50% of total cover: <u>35</u>	20% of	total cover:	14	Hydrophytic
Plot size (radius, or length x width) 70 rad	% Bare G	round	<u> </u>	Vegetation
% Cover of Wetland Bryophytes Total Cover (Where applicable)	r of Bryopi	hytes	<u> </u>	Present? Yes <u>X</u> No
remarks:			ай	10ths 1:10 (-5.1
		•	r''	670 - 601

SOIL		Sampling Point: DPOL
Profile Description: (Describe to the dep	th needed to document the indicator or confir	m the absence of Indicators.)
Depth Matrix	Redox Features	
(inches) Color (moist) %	<u>Color (moist)</u> % <u>Type¹</u> Loc ²	Texture Remarks
1-0		livelayer
¢-3		sandy silt
3-10		Sand + gravel, small cobble
		- <u>.</u>
· ·	· · · · · · · · · · · · · · · · · · ·	
Type: C=Concentration, D=Depletion, RM	=Reduced Matrix, CS=Covered or Coated Sand C	Grains. ² Location: PL=Pore Lining, M=Matrix.
Hydric Soil Indicators:	Indicators for Problematic Hydric Solls ³ :	
Histosol or Histel (A1)	Alaska Color Change (TA4) ⁴	Alaska Gleyed Wilhout Hue 5Y or Redder
Histic Epipedon (A2)	Alaska Alpina Swales (TA5)	Underlying Layer
Hvdrogen Sulfide (A4)	Alaska Redox With 2.5Y Hue	🔀 Other (Explain in Remarks)
Thick Dark Surface (A12)		
Alaska Gleved (A13)	³ One indicator of hydrophytic vegetation, one	primary indicator of wetland hydrology,
Alaska Bedox (A14)	and an appropriate landscape position mu	st be present unless disturbed or problematic.
Alaska Gleved Pores (A15)	⁴ Give details of color change in Remarks.	· · · · · · · · · · · · · · · · · · ·
Restrictive Laver (if present):		
Type none found		
Depth (inches):		Hydric Soil Present? Yes X No
Remarks:	· · · · · · · · · · · · · · · · · · ·	
lake edge	4	
seasonally floode	d	
glacial outrash	sand t graved	
HYDROLOGY		
Wetland Hydrology Indicators:		Secondary Indicators (2 or more required)
Primary Indicators (any one indicator is suf	ficient)	Water-stained Leaves (B9)
Surface Water (A1)	Inundation Visible on Aerial Imagery (B7)	🔀 Drainage Patterns (B10)
High Water Table (A2)	Sparsely Vegetated Concave Surface (B8)	Oxidized Rhizospheres along Living Roots (C3)
Saturation (A3)	Marl Deposits (B15)	Presence of Reduced Iron (C4)
Water Marks (B1)	Hydrogen Sulfide Odor (C1)	Salt Deposits (C5)
Sediment Deposits (B2)	Dry-Season Water Table (C2)	Stunted or Stressed Plants (D1)
Drift Deposits (B3)	Other (Explain in Remarks)	X Geomorphic Position (D2)
Algal Mat or Crust (B4)		Shallow Aguitard (D3)
Iron Deposite (B5)		Microtopographic Relief (D4)
Surface Soil Cracks (B6)		FAC-Neutral Test (D5)
Surface Water Present? Yes	No X Depth (inches):	

 Saturation Present?
 Yes
 No
 Depth (inches):
 Wetland Hydrold

 (includes capillary fringe)
 Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Yes ____ No _

🔀 Depth (inches): ___

K Depth (inches): _

Remarks:

Water Table Present?

Wetland Hydrology Present? Yes <u>X</u> No

Project/Site: Grount Lake Borough/City: Mo	USE PALL Sampling Date: 7-17-13
Applicant/Owner: Kenci Hydro	Sampling Point: DP07
Investigator(s):Blande_C_Schudel Landform (hillside, terr	ace, hummocks, etc.): Old ontrough fun
Local relief (concave, convex, none): Slope (%):	- · · · · · · · · · · · · · · · · · · ·
Subregion: Lat: 120, 170198 Lor	ig: <u>~149,209443</u> Datum:
Soil Map Unit Name: Aleuvial Delitair. Fun	NWI classification:NOUMA
Are climatic / hydrologic conditions on the site typical for this time of year? Yes $__X_$ No $_$	(If no, explain in Remarks.)
Are Vegetation, Soil, or Hydrology significantly disturbed? N v Are *	'Normal Circumstances" present? Yes 🔀 No
Are Vegetation, Soil, or Hydrology naturally problematic? N 😺 (If ne	eeded, explain any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site map showing sampling point location	ions, transects, important features, etc.
Hydrophytic Vegetation Present? Yes Von No	4.440
Hydric Soil Present? Yes No	ada Van No
Wetland Hydrology Present? Yes No	
Remarks: Representative of upl. communisty in	old ontroash fan. New) recent
VECETATION los esignifica nomes of planta List all appaises in the plat	Nets_
VEGETATION - Ose scientific names of plants. List all species in the plot.	Deminent Technologia
Tree Stretum <u>% Cover</u> Species? Status	Dominance Test worksneet:
1. Salit Alexensis 5 Y FAC	That Are OBL, FACW, or FAC: (A)
2	Total Number of Dominant
3	Species Across All Strata: (B)
4	Percent of Dominant Species
Total Cover: 5	That Are OBL, FACW, or FAC: (A/B)
50% of total cover: 2/5 20% of total cover; 1	Prevalence index worksheet:
1. Dopulius Balsamisfern 50 Y FACU	Total % Cover of: Multiply by:
2. Salix Sitchensons 20 Y FAC	OBL species O $x = 0$
3. Salix alexentiniz 10 FAC	FACW species 0 $x_2 = 0$
4	FAC species 40 x 3 = 100
5	FACU species SU X4 = ACU X5 = A
6	Column Totals: 90 (A) 320 (B)
Total Cover: <u>XO</u>	
50% of total cover: <u>40</u> 20% of total cover: <u>10</u>	Prevalence Index = $B/A = \underline{S} \cdot \underline{S} \cdot \underline{S}$
1. A hermerian Latifilium 3 Y FAC	Hydrophytic Vegetation Indicators:
2 Acrustis signation & Y EAC	Dominance Test Is >50%
3. Calamaranstis canadensis 2 4 FAC	Prevalence Index is ≤3.0
4	data in Remarks or on a separate sheet)
o	Problematic Hydrophytic Vegetation' (Explain)
7	¹ Indicators of hydric soil and welland hydrology must
8	be present unless disturbed or problematic.
9.	
10	
Total Cover: <u>5</u>	
50% of total cover: 2,5 20% of total cover: 1	Hydrophytic
Plot size (radius, or length x width) 70' rad % Bare Ground 30	Vegetation
% Cover of Wetland Bryophytes Total Cover of Bryophytes (Where applicable)	Present? Yes <u>v</u> No
Remarks: Well establish ectonwood Baplin	ngs, at reast 5 mars
old (?)estimated?) photos 485-58	
1	

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Alaska Version 2.0

SOIL								Sampling Point: <u>DP07</u>		
Profile Desc	cription: (Describe	to the depth	needed to docun	nent the i	ndicator o	or confirm	the absence	of indicators.)		
Depth	Matrix		Redox	x Features	<u>s</u> 	. 2	-			
(inches)	Color (moist)		Color (moist)	%	<u>lype'</u>	Loc	lexture	Remarks		
0-5		·					Coloble	y gravel		
	-							0		
·	·		.	<u> </u>	B	. <u></u>		P , ,		
·	·	• ••••••••••••••••••••••••••••••••••••	, ,,		·	•		2		
							<u></u>	·		
·								· · · · · · · · · · · · · · · · · · ·		
		·								
Type: C=C	oncentration. D=Dep	letion, RM=R	educed Matrix, CS	-Covered	or Coate	d Sand Gra	ains. ² Loo	cation: PL=Pore Lining, M=Matrix.		
Hydric Soil	Indicators:		Indicators for P	roblemat	ic Hydric	Solls ³ :				
Histosol or Histel (A1) Alaska Color Change (TA4) ⁴			(TA4) ⁴		Alaska Gleyed Without Hue 5Y or Redder					
Histic Epipedon (A2)			Alaska Alpine Swales (TA5)					Underlying Layer		
Hydrogen Sulfide (A4)			Alaska Redox With 2.5Y Hue				Other (Explain in Remarks)			
Thick Dark Surface (A12)										
Alaska (Gleyed (A13)		³ One indicator of	fhydroph	ytic vegeta	ition, one p	primary indicat	or of welland hydrology,		
Alaska F	Redox (A14)		and an approp	priate land	Iscape po:	sition must	be present ur	less disturbed or problematic.		
Alaska C	Gleyed Pores (A15)		⁴ Give details of a	color chan	ge in Ren	narks.		,		
Restrictive I	Layer (If present):							•		
Type:	-									
Depth (in	ches):						Hydric Soil	Present? Yes <u>No X</u>		
Remarks:	Nuc.	P-11-1		1	÷Υ ,					
	DNJA	9 au	ep pit	- n	~T 1	2915	ance	at TISNTLY packe		
9	rairle	VI.			0	310	- 11	J V		
		v. er	7 200	uce/	Jan	$\circ \mid \Sigma$	ר <i>ר</i> ו ר			
			0			•				
HYDROLO	GY									
Wetland Hy	drology Indicators:						Secondary In	dicators (2 or more required)		
Primary Indicators (any one indicator is sufficient)							Water-stained Leaves (B9)			
Surface Water (A1) Inundation Visible on Aerial Imagery (B7)					(B7)	<u> </u>				
High Water Table (A2) Sparsely Vegetated Concave Surface (BB)				e (88)	Oxidized Rhizospheres along Living Roots (C3)					

<u> X.</u> Drainage Patterns (810)
Oxidized Rhizospheres along Living Roots (C3

- Presence of Reduced Iron (C4)
 - ____ Salt Deposits (C5)
 - Stunted or Stressed Plants (D1)
 - Geomorphic Position (D2) too elevated
 - _ Shallow Aquitard (D3)
 - ____ Microtopographic Relief (D4)
 - _ FAC-Neutral Test (D5)

Depth (inches):				
Depth (inches):				
Depth (inches):	Wetiand Hydrology Present?	Yes	No_	V

(includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

~

Yes _____ No ____ Yes ____ No

Yes

__ No _

Marl Deposits (B15)

Hydrogen Sulfide Odor (C1)

Other (Explain In Remarks)

Dry-Season Water Table (C2)

Bld outwash fan. Dry & well drained

US Army Corps of Engineers

____ Saturation (A3)

___ Water Marks (B1)

___ Drift Deposits (B3)

Field Observations: Surface Water Present?

Water Table Present?

Saturation Present?

Remarks:

____ Sediment Deposits (B2)

____ Algal Mat or Crust (B4) ___ Iron Deposits (85)

Surface Soil Cracks (B6)

Project/Site: Grant Lale Borough/City: Mo	DUSE PASS Sampling Date: DPD8							
Applicant/Owner: Kencis Hypero	Sampling Point: DPUS							
Investigator(s):Blanch T. Schudel Landform (hillside, te	errace, hummocks, etc.): 15 kDuD from 19 ke edge							
Local relief (concave, convex, none): Slope (%):								
Subregion: Lat: 60.471896 L								
Soil Map Unit Name: Aleyvial Deltaire Dun	NWI classification: 17551/ENILB							
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? No Are	"Normal Circumstances" present? Yes							
Are Vegetation, Soil, or Hydrology naturally problematic? No (If	needed, explain any answers in Remarks.)							
SUMMARY OF FINDINGS – Attach site map showing sampling point loca	ations, transects, important features, etc.							
Hydrophylic Vegetation Present? Yes No No								
Hydric Soil Present? Yes No No Is the Sample	ed Area							
Wetland Hydrology Present? Yes <u>No</u> Wetland Wetland	and r Yes <u>V</u> No							
Remarks: Representative of sist herbaccous community on North side.								
VEGETATION - Use scientific names of plants. List all species in the plot	t.							
Absolute Dominant Indicator	Dominance Test worksheet:							
Tree Stratum <u>% Cover</u> Species? Status	Number of Dominant Species							
	That Are OBL, FACW, or FAC:(A)							
2	Total Number of Dominant							
4	. Species Across All Strata: <u>3</u> (B)							
Total Cover:	That Are OBL FACW or FAC: 1007 (AP)							
50% of total cover: 20% of total cover:	Prevalence Index worksheet:							
1 Minut Vi addis	Total % Cover of: Multiply by:							
2 Sal, Sitchansis , AD Y FAC	OBL species 10 $x_1 = 10$							
3 Cal alexensis	FACW species $5 x 2 = 10$							
4.	FAC species $\overline{50}$ $\times 3 = 240$							
5	FACU species <u>O</u> x 4 = 0							
6	UPL species x 5 =							
Total Cover: 50	Column Totals: 95 (A) 260 (B)							
50% of total cover: 50% of total cover: 20% of total cover: 10	Provalence index = $B/A = 2.74$							
1. Acordination lea	Hydrophytic Vegetation Indicators:							
2. Eguisetum hiemale. 5 FATW	Dominance Test is >50%							
3. Briophorum Chamissonis 5 ORL	_X Prevalence Index is ≤3.0							
B Agrostis statuniferra 15 Y-FAR	Morphological Adaptations ¹ (Provide supporting							
5. Paujactum Fluviatie 5 OBL	Brobiometic Hydron by the Verseter to 1 (5 - 1 + 1)							
6. Culumagrosts cundensis 30 V FAG								
7	¹ Indicators of hydric soil and wetland hydrology must							
8	be present unless disturbed or problematic.							
9								
10								
50% of total cover: 22.5 20% of total cover: 9	Hydrophytic							
Cover of Monthand Deventuring So Service (radius, or length x width) 30 So Service (radius, or length x width) 30	Vegetation							
(Where applicable) Total Cover of Bryophytes	Present? Yes V No							
Remarks: photos 705710	1							
SOIL								Sampling Point: <u>DP08</u>
------------------------	----------------------	-----------------	--	------------	--------------	---------------	---------------------------	--------------------------------------
Profile Desc	cription: (Describ	e to the dept	h needed to docur	nent the l	ndicator	or confir	m the absence o	f Indicators.)
Depth	Matrix		Redo	x Feature:	s	x		·
(inches)	Color (moist)	%	Color (moist)	%	<u>Type'</u>	Loc	<u> </u>	Remarks
62								Brzanies
	<u> </u>	·	الدميم			01	0.10	U U
3-15	Gentin	jpy 90.	5910-916	, 10_	<u> </u>	Ļ./∽		
	• 7					·····		
	0718340728.1-1	· ·	SER.07					
					·			
					<u> </u>	- 102		
·	····	·		_		. <u> </u>		
¹ Type: C=C	oncentration, D=De	eptetion, RM=	Reduced Matrix, C	S=Covere	d or Coate	ed Sand C	Grains. ² Loca	tion: PL=Pore Lining, M=Matrix.
Hydric Soll	Indicators:		Indicators for I	Problema	tic Hydric	: Soils':		
Histosol	l or Histel (A1)		Alaska Colo	or Change	e (TA4)⁴		Alaska	Gleyed Without Hue 5Y or Redder
Histic E	pipedon (A2)		Alaska Alpi	ne Swales	s (TA5)		Under Other (I	riying Layer Evoleta in Romarka)
Hydroge	en Sulfide (A4)		Alaska Red	lox With 2	.5Ү Ние			zxplain in Remarks)
Thick D	ark Surface (A12)		30 i- diastan	.f. L		olion one	- namanu indicato	r of wetland hydrology
Alaske	Gleved (A13)			or nyaropr	decane no	seition mu	s primary indicato	ess disturbed or problematic.
Alaska	Redox (A14)	1	⁴ Give details of	color cha	nae in Rei	marks.	lat be present an	
Alaska	Gleyed Poles (ATS)	Give dotaits of		ige in ite		1	
Restrictive	Layer (if present)	•						
Type:							Hydric Soil I	Present? Yes / No
Depth (in	nches):		······································				ityano oon	
Remarks:	Similar	1 - 5	oil indiz	abor	AII	Dept	lated be	Low dark Surtace
			-			,		
			· .					
							····	
HYDROLO)GY							
Wetland Hy	vdrology Indicator	's:					Secondary Inc	licators (2 or more required)
Primary Ind	icators (any one inc	dicator is suff	icient)				Water-sta	ined Leaves (B9)
Surface	- Water (A1)		Inundation Visit	ole on Aer	ial Imager	y (B7)	Drainage	Patterns (B10)
Aligh W	ater Table (A2)	-	Sparsely Veget	ated Cond	ave Surfa	ice (B8)	Oxidized	Rhizospheres along Living Roots (C3)
-V-Saturat	lion (A3)	•	Marl Deposits (B15)			Presence	of Reduced Iron (C4)
Water	Marks (B1)	-	Hydrogen Sulfic	de Odor ((C1)		Salt Depo	osits (C5)
Sedime	ent Deposits (B2)		Dry-Season Wa	ater Table	(C2)		Stunted o	r Stressed Plants (D1)
Drift De	eposits (B3)	· ·	Other (Explain i	in Remark	(s)		Geomorp	hic Position (D2)
Aigai M	lat or Crust (B4)						Shallow A	quitard (D3)
Iron De	eposits (B5)						Microtopo	ographic Relief (D4)
Surface	e Soil Cracks (B6)						FAC-Neu	tral Test (D5)
Field Obse	rvations:							
Surface Wa	iter Present?	Yes	No V Depth (i	nches):				
Water Table	e Present?	Yes 📝	No Depth (i	nches):	lbgs	<u> </u>		
Saturation I	Present?	Yes _ 🗸	No Depth (i	nches):	1 bgg	<u>s </u> We	etland Hydrolog	/ Present? Yes 📉 No

Remarks:

Project/Site: Grant Lake	Borough/City:	Mouse	Pass	_ Sampling Date:	<u>1-17-13</u>
Applicant/Owner: Kenai Hydro	1000	and the second	·	_ Sampling Point:	DPO9
Investigator(s):Blimh C.Schudell	Landform (hillside	e, terrace, humi	mocks, etc.):	Lake shore	
Local relief (concave, convex, none):	Slope (%):		360.		
Subregion: Lat: _ Lot	171479	_ Long: <u>t-</u>	49.200	Datum:	
Soil Map Unit Name: Deltanz Aluenial Delta	ic Dep.		NWI classifi	cation: PS51B	
Are climatic / hydrologic conditions on the site typical for this time of ye	ear? Yes <u>×</u>	No (If	no, explain in F	Remarks.)	
Are Vegetation, Soil, or Hydrology significantly	disturbed? Nv	Are "Normal C	ircumstances"	present? Yes X	No
Are Vegetation, Soil, or Hydrology naturally pr	oblematic? No	(If needed, exp	olain any answe	ers in Remarks.)	
SUMMARY OF FINDINGS – Attach site map showing sa	ampling point l	ocations, tra	nsects, impo	ortant features, e	łc.
Hydrophytic Vegetation Present? Yes No	is the Son				
Hydric Soil Present? Yes No	within a W	lofland?	Van		
Wetland Hydrology Present? Yes V No			res	<u> </u>	
Remarks: Pt. 15 representative of the Observed thrught area	· typica	l sps	willow-	alder com	munity
VEGETATION - Use scientific names of plants. List all	species in the j	plot.			
Absolute	Dominant Indica	ator Domina	ince Test work	sheet:	<u>`</u>]
<u>Tree Stratum</u> <u>% Cover</u>	Species? Stat	us Number	of Dominant S	pecies /	
	· ·	That Are	∍ OBL, FACW, i	or FAC: 6	(A)
3		Total Nu	Imber of Domin	ant /	
4.		Species	Across All Stra	ta: <u>0</u>	(B)
Total Cover:		Percent	of Dominant Sp	pecies	
50% of total cover: 20% of	- of total cover:	That Are	: OBL, FACW, a	or FAC: <u>100</u>	(A/B)
Sapling/Shrub Stratum		Prevaler	nce Index worl	ksheet:	
1. Alnus viriais 30	Y FA		<u>il % Cover of:</u>	Multiply by	<u>v:</u>
2 Sali sitehensis	Y FAT	e OBL spe	icles <u>S</u>	x1= <u>``</u>	
3. Sul, alovensis 25	_YFA		pecies <u>~</u>	x2= <u></u>	<u> </u>
4	· · · · · · · · · · · · · · · · · · ·	FAC Spe	$\frac{100}{100}$	$x_3 = \frac{10}{200}$	
5	<u> </u>		cies 0	X4 = <u></u>	
0,	<u> </u>	Column	Totals: $1/00$	X0	(D)
Total Cover: <u><u>y</u>U</u>			10(0)0. <u></u>	(N <u></u>	(D)
Herb Stratum	total cover:	2_ Pre	valence Index	= B/A = <u>2,85</u>	<u> </u>
1. Agros aigantea 10	-Y	Hydroph	iytic Vegetatio	n Indicators:	
2. P.G. humale 5.	Y FAC	W Som	inance Test is :	>50%	
3. Eq. Fluviatile 5	Y OBL	— 入 Prev	alence Index is	≤3.0	
A Calamagrostis canadensis 10			phological Adap	tations ¹ (Provide sup	porting
5		Prob	lematic Hydron	bytic Venetation ¹ /Ev	
6			ioniatio riyarop	infile vegetation (Ex	piani)
7		Indicato	rs of hydric soil	and wetland hydrolo	gy must
8		be preser	nt unless distur	bed or problematic.	
9	·	_			
10					
Total Cover; 20	.1				
50% of total cover: <u>40</u> 20% of	total cover:	Hydroph	vfic ·		
Processee (radius, or length x width) % Bare G	iround	Vegetatio	5n		
Where applicable)	hyles	Present?	Yes	No	-
Remarks:			•		
GPS 2	,	•		,	

SOIL		Sampling Point: <u>)}}09</u>
Profile Description: (Describe to the d	epth needed to document the Indicator or confin	m the absence of indicators.)
Depth Matrix	Redox Features	
(inches) Color (moist) %	Color (moist) % Type ¹ Loc ²	<u>Texture</u> <u>Remarks</u>
カ・フィ		Gra.
		C.S. Turburg Place with
2-16 (rey 65/1-1	Q. SME He IV - PE	Shor Tak here unanged
·		(@ 10 bgs to Sala
······································		
		2
¹ Type: C=Concentration, D=Depletion, F	M=Reduced Matrix, CS=Covered or Coated Sand C	Grains, "Location: PL=Pore Lining, M=Matrix,
Hydric Soil Indicators:	Indicators for Problematic Hydric Solis :	Alaska Glaved Mithout Hue 5V or Redder
Histosof or Histel (A1)	Alaska Golor Change (TA4)	Alaska Gleyeu Williou nue 51 of Reduct
Histic Epipedon (A2)	Alaska Alpine Swales (1A5) Alaska Rodov Milb 2 5Y Hue	Other (Explain In Remarks)
Hydrogen Suffice (A4)		A const (animation in containe)
Alaska Gleved (A13)	³ One indicator of hydrophytic yegetation, one	e primary indicator of wetland hydrology,
Alaska Redox (A14)	and an appropriate landscape position mu	ist be present unless disturbed or problematic.
Alaska Gleved Pores (A15)	⁴ Give details of color change in Remarks.	
Restrictive Layer (if present):		
Type:		/
Depth (inches):		Hydric Soli Present? Yes 📈 No
Remarks:		1 Pres Divid Confirm
Store to To	Similar to peplete	& Gerow carrie surface
	(AN).	
HYDROLOGY	•	
Wetland Hydrology Indicators:		Secondary Indicators (2 or more required)
Primary Indicators (any one indicator is s	sufficient)	Water-stained Leaves (89)
Surface Water (A1)	Inundation Visible on Aerial Imagery (B7)	Drainage Patterns (B10)
High Water Table (A2)	Sparsely Vegetated Concave Surface (B8)	Oxidized Rhizospheres along Living Roots (C3)
Saturation (A3)	Marl Deposits (B15)	Presence of Reduced Iron (C4)

-	Marl Deposits (B15)
_	Hydrogen Sulfide Odor (C1)

____ Salt Deposits (C5)

____ Stunted or Stressed Plants (D1)

____ Geomorphic Position (D2)

____ Shallow Aquitard (D3)

- ____ Dry-Season Water Table (C2)
- ____ Other (Explain In Remarks)
- ___ Drift Deposits (B3) Algal Mat or Crust (B4)

Sediment Deposits (B2)

Water Marks (B1)

Iron Deposits (B5)		Microtopographic Relief (D4)
Surface Soil Cracks (86)		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): 1 D	Wetland Hydrology Present? Yes
Describe Recorded Data (stre	am gauge, monitoring well, aerial photos, previous inspec	clions), if available:
Remarks:		

_ No_

Project/Site: <u>Grant Lake</u> Borough/City: Moli	USE Pass Sampling Date: 7-17-13
Applicant/Owner: Kenau Hydro	Sampling Point: DD 10
Investigator(s): C. Schudel J. Blank Landform (hillside, ter	race, hummocks, etc.): gravel (sland
Local relief (concave, convex, none): Slope (%): Slope (%):	, <u> </u>
Subregion: Lat: 120, 4720(00 Lo	ng:~149.204078 Datum:
Soll Map Unit Name: Aleminal Detaic Dep.	NWI classification: PIZM IE
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No	(If no, explain in Remarks)
Are Vegetation, Soil , or Hydrology significantly disturbed? NV Are	"Normal Circumstances" present? Yes V No
Are Vegetation Soil or Hydrology naturally problematic? At a (If n	eeded explain any answers in Remarks)
SUMMARY OF FINDINGS – Attach site map showing sampling point local	tions transects important features etc
Hydrophytic Vegetation Present? Yes Vegetation Present? Yes Vegetation Present?	d Area
Hydric Soil Present? Yes <u>Vo</u> No within a Wetia	nd? Yes X No
Remarks: No	
Menans. grasses colonizing in shallow lake Hoc	
VEGETATION - Use scientific names of plants. List all species in the plot	
Absolute Dominant Indicator	Dominance Test worksheet:
1. Nove	Number of Dominant Species 3
2.	That Are OBL, FACTO, of FAC: (A)
3.	Total Number of Dominant
4	Species Across All Strata: (B)
Total Cover:	Percent of Dominant Species That Are OBL_FACW_or FAC: 100 (A/B)
50% of total cover: 20% of total cover:	Prevalence Index worksheet:
Sapling/Shrub Stratum	Total % Cover of: Multiply by:
	OBL species $3D$ $x1 = 3D$
	FACW species x 2 =
4	FAC species
	FACU species x 4 =
6,	UPL species x 5 =
Total Cover:	Column Totals: <u>4550</u> (A) <u>7590</u> (B)
50% of total cover; 20% of total cover;	Prevalence index = $B/A = 1/kT + 1/8$
Herb Stratum	Hydronbytic Vegetation Indicators
1. podagnostisi to acquivalvis 4220 4 OBI	X Dominance Test is >50%
2. NOAS PANISTIS TOP 2015 4 FAC	X Prevalence Index is ≤3.0
3. <u>Carea lenticularis</u> <u>BIU y GBL</u>	Morphological Adaptations ¹ (Provide supporting
4. <u>Gruppionium mamissons</u> <u>45</u> <u>BL</u>	data in Remarks or on a separate sheet)
	Problematic Hydrophytic Vegetation ¹ (Explain)
7	Indicators of hydric call and wallend hydroleny wast
8	be present unless disturbed or problematic.
Q	
10	
Total Cover: ED	
50% of total cover: 25 20% of total cover: 10	
Plot size (radius, or length x width) $\int Y \Delta A$.	Hydrophytic
% Cover of Wetland Bryophytes Total Cover of Bryophytes	Present? Yes No
(Where applicable)	
Remarks: Arca may be governmenting here to the	

L

N. ...-

S	0	I	L
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Profile Description: (Description:	to the dept				
Depth <u>Matrix</u>	0/.	Redo:	<u>x Features</u> % Tupe ¹	oc ² Tevlure	Remarks
	//0				
			· ·		
101	nt		photo 719		
	<u>→ </u>		· · · · · · · · · · · · · · · · · · ·	······································	1775- 1175-
gravel is	<u>and in</u>	are e	age		4
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<u></u>					• · · · · · · · · · · · · · · · · · · ·
	anialian OM	Dadwood Matrix CS	-Covered or Costed	Sand Grains ² Lo	cation: PL=Pore Lining M=Matrix
Type: C=Concentration, D=L	epietion, RM-	Indicators for P	Problematic Hydric Sc	nile ³ '	callon. T L-1 ore Ellinig, M-Mank.
		Alanka Cala	Change (TAA)4	Δiaeb/	a Gleved Without Hue 5Y or Redder
					edving Laver
Histic Epipedon (A2)		Alaska Alpii		Othor	(Evolution in Demarks)
Hydrogen Sulfide (A4)		Alaska Red	OX VVIDI 2.51 HUE		
Thick Dark Surface (A12)		30-a to the to -to-	f hudranhulla va at-lla		tor of welland hydrology
Alaska Gleyed (A13)		One indicator o	r nyoropnytic vegetatio	an, one primary more	niero disturbad or problematic
Alaska Redox (A14)		and an approp	priate lanoscape positi	on must be present u. Va	ntess disturbed of problematic.
Alaska Gleyed Pores (A1)) 	Give details of	color change in Remar	KS.	
	1				
Restrictive Layer (If present)	•				
Restrictive Layer (if present) Type:					,
Restrictive Layer (If present) Type: Depth (inches): Remarks: Arca In	undat		o Soils gr	Hydric Soi avel (Sand	l Present? Yes <u>×</u> No
Restrictive Layer (If present) Type: Depth (inches): Remarks: Arca In	undat		o Soils gra	Hydric Soi avel (Sand	I Present? Yes <u>×</u> No
Restrictive Layer (If present) Type: Depth (inches): Remarks: Arca In	un dat	ed w/ Hp	o Soils gn	Hydric Soi avel (Sand	I Present? Yes <u>×</u> No
Restrictive Layer (If present) Type: Depth (inches): Remarks: Arca In HYDROLOGY Wetland Hydrology Indicato	undat		o Soils gn	Hydric Soi avel (Sand Secondary Ir	I Present? Yes <u> </u>
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Restrictive Layer (If present) Type: Depth (inches): Remarks: Arca In HYDROLOGY Wetland Hydrology Indicato <u>Primary Indicators (any one in</u> X Surface Water (A1)	nn dat rs: dicator is suffi	sient)	O Soils gra le on Aerial Imagery (B	Hydric Soi avel (Sand <u>Secondary Ir</u> Water-si 37) Drainag	I Present? Yes <u>No</u> ndicators (2 or more required) tained Leaves (B9) e Patterns (B10)
Restrictive Layer (If present) Type: Depth (inches): Remarks: Arca In HYDROLOGY Wetland Hydrology Indicato Primary Indicators (any one in X Surface Water (A1) X High Water Table (A2)	rs: dicator is suffi	sient)	O Soils gm le on Aerial Imagery (B	Hydric Soi avel (Sand <u>Secondary Ir</u> Waterst 17) _ Drainag (B8) Qxidizec	I Present? Yes <u>No</u> <u>ndicators (2 or more required)</u> tained Leaves (B9) e Patterns (B10) d Rhizospheres along Living Roots (C3)
Restrictive Layer (If present) Type: Depth (inches): Remarks: Arca In HYDROLOGY Wetland Hydrology Indicato Primary Indicators (any one in X Surface Water (A1) Y High Water Table (A2) X Saturation (A3)	nn dent rs: dicator is suffin -	sient) Inundation Visib Sparsely Vegeta Mail Deposits (F	O Soils gra le on Aerial Imagery (E ated Concave Surface (115)	Hydric Soi avel / Sand <u>Secondary Ir</u> Waterski 17) Drainagu (B8) Oxidizec Presenc	I Present? Yes <u>No</u> <u>ndicators (2 or more required)</u> tained Leaves (B9) e Patterns (B10) d Rhizospheres along Living Roots (C3) se of Reduced Iron (C4)
Restrictive Layer (If present) Type: Depth (inches): Remarks: Arca In HYDROLOGY Wetland Hydrology Indicato Primary Indicators (any one in X Surface Water (A1) Y High Water Table (A2) X Saturation (A3) Wetar Marks (B1)	rs: dicator is suffir -	cient) Inundation Visibi Sparsely Vegeta Mari Deposits (E Hydrogen Sulfid	O Soils gra le on Aerial Imagery (E ated Concave Surface (315) e Odor (C1)	Hydric Soi avel / Sand <u>Secondary Ir</u> Watersl 7) Drainagu (B8) Oxidized Presenc Salt Der	I Present? Yes <u>No</u> <u>ndicators (2 or more required)</u> tained Leaves (B9) e Patterns (B10) d Rhizospheres along Living Roots (C3) ta of Reduced Iron (C4) posits (C5)
Restrictive Layer (If present) Type: Depth (inches): Remarks: Arca In HYDROLOGY Wetland Hydrology Indicato Primary Indicators (any one in X Surface Water (A1) Y High Water Table (A2) X Saturation (A3) Water Marks (B1) Sediment Denselis (B2)	rs: dicator is suffi - -	cient) Inundation Visibi Sparsely Vegeta Mari Deposits (E Hydrogen Sulfid Dry-Spason Wal	O Soils gra le on Aerial Imagery (E ated Concave Surface (315) e Odor (C1) ter Table (C2)	Hydric Soi avel (Sand <u>Secondary Ir</u> Water-si 7) Drainagu (B8) Oxidized Presenc Salt Dep Stunted	I Present? Yes <u>No</u> ndicators (2 or more required) tained Leaves (B9) e Patterns (B10) d Rhizospheres along Living Roots (C3) to of Reduced Iron (C4) posits (C5) or Stressed Plants (D1)
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Restrictive Layer (If present) Type: Depth (inches): Remarks: Arca In Arca In HYDROLOGY Wetland Hydrology Indicato Primary Indicators (any one in X Surface Water (A1) Y High Water Table (A2) X Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Alact Mat ar Crust (B4)	rs: dicator is suffi - - -	cient) Inundation Visibi Inundation Visibi Sparsely Vegeta Mari Deposits (E Hydrogen Sulfid Dry-Season Wal Other (Explain in	O Soils gra le on Aerial Imagery (E ated Concave Surface (B15) e Odor (C1) ter Table (C2) n Remarks)	Hydric Soi avel (Sand Secondary Ir Water-si B7) Drainage (B8) Oxidized Presenc Salt Dep Stunted Geomor Shallow	I Present? Yes <u>No</u> <u>No</u> <u>ndicators (2 or more required)</u> tained Leaves (B9) e Patterns (B10) d Rhizospheres along Living Roots (C3) æ of Reduced Iron (C4) posits (C5) or Stressed Plants (D1) phic Position (D2) Aquifard (D3)
Restrictive Layer (If present) Type: Depth (inches): Remarks: Arco In Arco In HYDROLOGY Wetland Hydrology Indicato Primary Indicators (any one in X Surface Water (A1) X High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) I on Deposite (B5)	rs: dicator is suffir - - - -	cient) Inundation Visibi Inundation Visibi Sparsely Vegeta Mari Deposits (E Hydrogen Sulfid Dry-Season Wat Other (Explain in	O Soils gra le on Aerial Imagery (E ated Concave Surface (315) e Odor (C1) ter Table (C2) n Remarks)	Hydric Soi avel (Sand Secondary Ir Waterst Waterst Waterst Waterst Drainag (B8) Oxidized Salt Dep Stunted Geomor Shallow Microtor	I Present? Yes <u>No</u> <u>No</u> <u>ndicators (2 or more required)</u> tained Leaves (B9) e Patterns (B10) d Rhizospheres along Living Roots (C3) æ of Reduced Iron (C4) posits (C5) or Stressed Plants (D1) phic Position (D2) Aquitard (D3) pographic Relief (D4)
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Restrictive Layer (If present) Type: Depth (inches): Remarks: Arca In Arca	$\frac{1}{2}$	Leak and the second sec	O Spills g_{M} le on Aerial Imagery (E ated Concave Surface (315) e Odor (C1) ter Table (C2) n Remarks) iches): \underline{O} ches): \underline{O} ches): \underline{O}	Hydric Sol avel (Sand Secondary Ir Water-st Dr) Drainage (B8) Oxidized Presenc Salt Dep Stunted Geomor Shallow Microtop FAC-Ne Wetland Hydrolog ctions), if available:	I Present? Yes <u>No</u> <u>ndicators (2 or more required)</u> tained Leaves (B9) e Patterns (B10) d Rhizospheres along Living Roots (C3) to of Reduced Iron (C4) posits (C5) or Stressed Plants (D1) phic Position (D2) Aquitard (D3) pographic Relief (D4) utral Test (D5) gy Present? Yes <u>No</u> <u>Solonizing Wig</u> Stant

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Project/Site: Grant Lake	Boro	ough/City:	MUSH PAAL Sampling Date: 7-17-13
Applicant/Owner: Cenai Hydro			Sampling Point: DP-11
Investigator(s): SRIGUE Cosche	idel Lan	dform (hillside, ter	race, hummocks etc.): Do to sis fin
Local relief (concave, convex, none): 12m Vex	Sloc	e(%): 5	
Subregion: ALEUNIAL/COLINNIAL Fan La	t. 60.472	895 10	
Soil Map Unit Name:	·· <u></u>	<u></u>	
Are climatic / bydrologic conditions on the site typical for the	is time of year?	Vec v Ne	NW classification: <u>CC ρ curvito</u>
Are Vegetation Soil or Hydrology	na unie oryearr		(if no, explain in Remarks.)
Are Vegetation Solt or Hydrology	significantiy dist	inded in Are	Normal Circumstances" present? Yes <u>Y</u> No
SUMMARY OF EINDINGS	haturally problem	naucrNio (nr,n.	eeded, explain any answers in Remarks.)
Schmart of Findings – Attach site hap s	nowing samp	ing point locat	ions, transects, important features, etc.
Hydrophytic Vegetation Present? Yes <u>X</u> N	lo_ <u>&</u>	Is the Sample	1 Area
Hydric Soil Present? Yes N	lo <u>X</u>	within a Wetla	nd? Yor No Y
Wetland Hydrology Present? Yes N	lo <u> </u>		
Remarks: upland avea on No	orth er	-2 2 in	be thet area
VEGETATION – Use scientific names of plants.	. List all spec	ies in the plot	
	Absolute Do	minant Indicator	Dominance Test worksheet:
Tree Stratum	<u>% Cover</u> Sp	ecies? Status	Number of Dominant Species 7
1. <u>None</u>			That Are OBL, FACW, or FAC: (A)
2	· · · · · · · · · · · · · · · · · · ·		Total Number of Dominant
3			Species Across All Strata: <u>5</u> (B)
4	•		Percent of Dominant Species
Total Cover			That Are OBL, FACW, or FAC: 80 (A/B)
50% of total cover:	20% of tota	il cover:	Prevalence Index worksheet:
1. Salax barclay!	In N	FAC	Total % Cover of: Multiply by:
2,			OBL species O x1 = O
3			FACW species <u>10</u> x 2 = <u>20</u>
4.	·	· <u> </u>	FAC species <u>40</u> x 3 = <u>120</u>
5	· · · · · · · · · · · · · · · · · · ·	·····	FACU species <u>50</u> x 4 = <u>200</u>
6			UPL species x 5 =
Total Cover	: 10		Column Totals: <u>10</u> (A) <u>4 (の 34</u>) (B)
50% of total cover:	20% of total	cover:_2	Prevalence Index = B/A = 3.4
1 Class and us to take	7.0 \		Hydrophytic Vegetation Indicators:
2 Service and Line		- rach	X Dominance Test is >50%
3 Rangensor Da Canadensis	<u> </u>	- HACW	Prevalence Index is ≤3.0
1 - O	<u> </u>	MACIA	Morphological Adaptations ¹ (Provide supporting
We there a law and a start and			data in Remarks or on a separate sheet)
6 Poplaisation ary durch		- PITCU	Problematic Hydrophylic Vegetation ¹ (Explain)
7 Artennesia tilesii	-12	- INIU	¹ Indicators of hydrin coll and walland hydrological
8 Caluman wosts Ranadancis			be present unless disturbed or problematic.
9.	<u> 13 - </u>		
10.			
Total Cover:	10		
50% of total cover: 45	 20% of totat	cover: 18	
Plot size (radius, or length x width)_ 20' rad.	% Bare Groun		Hydrophytic
% Cover of Wetland Bryophytes Total Cov (Where applicable)	er of Bryophytes	<u> </u>	Present? Yes X No
Remarks:			
pm148-753			

SOIL	
OOL	

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(inches) Color (moist) % Color (moist) % Type1 Loc 0 -	Texture Remarks NONS, SMell Ylarge Cok Market Cok d Grains. ² Location: PL=Pore Lining, M=Matrix. ³ : Alaska Gleyed Without Hue 5Y or Redder . Underlying Layer Other (Explain In Remarks) one primary indicator of wetland hydrology, must be present unless disturbed or problematic. Hydric Soil Present? Yes No
0 -	<u>d Grains.</u> <u>Location: PL=Pore Lining, M=Matrix.</u> <u>Alaska Gleyed Without Hue 5Y or Redder</u> <u>Underlying Layer</u> <u>Other (Explain In Remarks)</u> one primary indicator of wetland hydrology, must be present unless disturbed or problematic. <u>Hydric Soil Present?</u> Yes <u>No </u>
Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Same Hydric Soll Indicators: Indicators for Problematic Hydric Soils ³ Histosol or Histel (A1) Histosol or Histel (A1) Histosol or Histel (A1) Histosol or Histel (A1) Histosol or Histel (A1) Histosol or Histel (A1) Histosol or Histel (A1) Alaska Color Change (TA4) ⁴ Histosol or Histel (A1) Alaska Gleyed (A13) Alaska Gleyed (A13) Alaska Gleyed (A13) Alaska Gleyed Pores (A15) Yope: Depth (inches): Depth (inches): Remarks: Soil pit to 11" bgs. Clearly	d Grains. ² Location: PL=Pore Lining, M=Matrix. ³ : Alaska Gleyed Without Hue 5Y or Redder Underlying Layer Other (Explain In Remarks) one primary indicator of wetland hydrology, must be present unless disturbed or problematic. Hydric Soil Present? Yes No
Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coaled Same Hydric Soil Indicators: Indicators for Problematic Hydric Soils ³	d Grains. ² Location: PL=Pore Lining, M=Matrix. ³ : Alaska Gleyed Without Hue 5Y or Reddet Underlying Layer Other (Explain In Remarks) one primary indicator of wetland hydrology, must be present unless disturbed or problematic. Hydric Soil Present? Yes No
Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Hydric Soil Indicators: Indicators for Problematic Hydric Soils ³	d Grains. ² Location: PL=Pore Lining, M=Matrix. ³ : Alaska Gleyed Without Hue 5Y or Redder Underlying Layer Other (Explain In Remarks) one primary indicator of wetland hydrology, must be present unless disturbed or problematic. Hydric Soil Present? Yes No
Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Hydric Soil Indicators: Indicators for Problematic Hydric Soils ³	d Grains. ² Location: PL=Pore Lining, M=Matrix. ³ : Alaska Gleyed Without Hue 5Y or Redder Underlying Layer Other (Explain in Remarks) one primary indicator of wetland hydrology, must be present unless disturbed or problematic. Hydric Soil Present? Yes No
Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Same Hydric Soil Indicators: Indicators for Problematic Hydric Soils* Histosol or Histel (A1) Alaska Color Change (TA4)* Histic Epipedon (A2) Alaska Alpine Swales (TA5) Hydrogen Sulfide (A4) Alaska Redox With 2.5Y Hue Thick Dark Surface (A12) 3One indicator of hydrophytic vegetation, or Alaska Gleyed (A13) *Give details of color change in Remarks. Restrictive Layer (If present): Type: Depth (inches): Depth (inches): Remarks: Soil pit to 11" bgs. Clearly	d Grains. ² Location: PL=Pore Lining, M=Matrix. ³ : Alaska Gleyed Without Hue 5Y or Redder Underlying Layer Other (Explain in Remarks) one primary indicator of wetland hydrology, must be present unless disturbed or problematic. Hydric Soil Present? Yes No
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Hydric Soil Indicators: Indicators for Problematic Hydric Soils ² Histosol or Histel (A1) Alaska Color Change (TA4) ⁴ Histic Epipedon (A2) Alaska Alpine Swales (TA5) Hydrogen Sulfide (A4) Alaska Redox With 2.5Y Hue Thick Dark Surface (A12) Alaska Redox With 2.5Y Hue Alaska Gleyed (A13) ³ One indicator of hydrophytic vegetation, or Alaska Gleyed Pores (A15) ⁴ Give details of color change in Remarks. Restrictive Layer (if present): Type: Depth (inches): Depth fib 11" bgs. Clearly	d Grains. ² Location: PL=Pore Lining, M=Matrix. ³ : Alaska Gleyed Without Hue 5Y or Redder Underlying Layer Other (Explain In Remarks) one primary indicator of wetland hydrology, must be present unless disturbed or problematic. Hydric Soil Present? Yes No
Image: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Same Hydric Soil Indicators: Indicators for Problematic Hydric Soils ² Histosol or Histel (A1) Alaska Color Change (TA4) ⁴ Histic Epipedon (A2) Alaska Alpine Swales (TA5) Hydrogen Sulfide (A4) Alaska Redox With 2.5Y Hue Thick Dark Surface (A12) Alaska Redox With 2.5Y Hue Alaska Gleyed (A13) ³ One indicator of hydrophytic vegetation, or Alaska Gleyed Pores (A15) ⁴ Give details of color change in Remarks. Restrictive Layer (if present): Type: Type: Depth (inches): Remarks: Soil Dit to Dit Dit to Dit Dit to Dit Dit to Dit to Dit to Dit to Dit to Dit to	d Grains. ² Location: PL=Pore Lining, M=Matrix. ³ : Alaska Gleyed Without Hue 5Y or Redder Underlying Layer Other (Explain In Remarks) one primary indicator of wetland hydrology, must be present unless disturbed or problematic. Hydric Soil Present? Yes No
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Samily Hydric Soil Indicators: Hydric Soil Indicators: Indicators for Problematic Hydric Soils	d Grains. ² Location: PL=Pore Lining, M=Matrix. ³ : Alaska Gleyed Without Hue 5Y or Redder Underlying Layer Other (Explain In Remarks) one primary indicator of wetland hydrology, must be present unless disturbed or problematic. Hydric Soil Present? Yes No
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Same Hydric Soil Indicators: Indicators for Problematic Hydric Soils	d Grains. ² Location: PL=Pore Lining, M=Matrix. ³ : Alaska Gleyed Without Hue 5Y or Redder Underlying Layer Other (Explain in Remarks) one primary indicator of wetland hydrology, must be present unless disturbed or problematic. Hydric Soil Present? Yes No
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Same Hydric Soil Indicators: Indicators for Problematic Hydric Soils'	d Grains. ² Location: PL=Pore Lining, M=Matrix. ³ : — Alaska Gleyed Without Hue 5Y or Redder . Underlying Layer — Other (Explain in Remarks) one primary indicator of wetland hydrology, must be present unless disturbed or problematic. Hydric Soil Present? Yes No
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sample of Coate	d Grains. ² Location: PL=Pore Lining, M=Matrix.
Type: C=Concentration, D=Depletion, RW-Reduced triating, C3-covered of coded data of the dat	Alaska Gleyed Without Hue 5Y or Redder . Underlying Layer Other (Explain In Remarks) one primary indicator of wetland hydrology, must be present unless disturbed or problematic.
Histosol or Histel (A1)	Alaska Gleyed Without Hue 5Y or Redder Underlying Layer Other (Explain In Remarks) one primary indicator of wetland hydrology, must be present unless disturbed or problematic.
	Underlying Layer Other (Explain in Remarks) one primary indicator of wetland hydrology, must be present unless disturbed or problematic. Hydric Soil Present? Yes No
	Other (Explain in Remarks) one primary indicator of wetland hydrology, must be present unless disturbed or problematic.
	one primary indicator of wetland hydrology, must be present unless disturbed or problematic. Hydric Soil Present? Yes No
	one primary indicator of wetland hydrology, must be present unless disturbed or problematic. Hydric Soil Present? Yes No
	must be present unless disturbed or problematic.
	Hydric Soil Present? Yes No
Restrictive Layer (if present): Type: Depth (inches): Remarks: Soil pit to 11" bgs. Clearly	Hydric Soil Present? Yes No
Type: Depth (inches): Remarks: Soil pit to 11" bgs. Clearly	Hydric Soil Present? Yes No
Depth (inches): Remarks: Soil pit to 11" bgs. Clearly	Hydric Soil Present? Yes No
Remarks: Soil pit to 11" bgs. Clearly	Hydro Contresente Tes Ho
Remarks: Soil pit to 11" bgs. Clearly	
HYDROLOGY	•
Wetland Hydrology Indicators:	Secondary Indicators (2 or more required)
Primary Indicators (any one indicator is sufficient)	Water-stained Leaves (B9)
Surface Water (A1) Inundation Visible on Aerial Imagery (B7)	Drainage Patterns (B10)
High Water Table (A2) Sparsely Vegetated Concave Surface (B8)) Oxidized Rhizospheres along Living Roots (
Saturation (A3) Marl Deposits (B15)	Presence of Reduced Iron (C4)
Water Marks (B1) Hydrogen Sulfide Odor (C1)	Salt Deposits (C5)
Sediment Deposits (B2) Dry-Season Water Table (C2)	Stunted or Stressed Plants (D1)
Drift Deposits (B3) Other (Explain in Remarks)	Geomorphic Position (D2)
Algal Mat or Crust (B4)	Shallow Aquitard (D3)
Iron Deposits (B5)	Microtopographic Relief (D4)
Surface Soil Cracks (B6)	FAC-Neutral Test (D5)
Field Observations:	
Surface Water Present? Yes No Depth (inches):	
Water Table Present? Yes No X Depth (inches):	
Saturation Present? Yes No × Depth (inches):	Wetland Hydrology Present? Yes No
(includes capillary fringe)	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspection	ons), ir avaliable:
Remarks:	
Remarks: No Hyd. indicators	

Mr. a. Break A. I	
Project/Site: CITAYIT SHEEF Corndor Borough/City: NO	SE Vass Sampling Date: <u>1-18-13</u>
Applicant/Owner: <u>fener Hydro</u>	Sampling Point:
Investigator(s): C. SCHVAU T. Blank Landform (hillside, ter	race, hummocks, etc.):
Local relief (concave, convex, none):CONCAVE Slope (%):	
Subregion: Lat: 1,0,458302 Lo	ng: -144.341426 Datum
Soil Map Unit Name:	NWI classification: R3VB
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No	(If no evoluin in Remarks) POST GAA (12)
Are Vegetation Soil or Hydrology significantly disturbed 2 N.D. Are	"Normal Circumstances" necessitic Ves
Are Vegetation . Soil or Hydrology naturally problematic? N3 (If a	anded explain any ensurer is Results)
SUMMARY OF FINDINGS – Attach site map showing sampling point local	tions, transects, important features, etc.
Hydrophytic Vegetation Present? Yes X No	
Hydric Soil Present? Yes 7 No	l Area
Wetland Hydrology Present? Yes X No within a Wetla	nd? Yes <u>No</u>
Remarks: Dag	and high hard a start
R3 UB3H running down the middles	En with and with small
VEGETATION - Use scientific names of plants. List all species in the plot	
Absolute Dominant Indicator	Dominance Test worksheet:
Tree Stratum <u>% Cover Species? Status</u>	Number of Dominant Species
1. Iolga Merterisiana FAT.	That Are OBL, FACW, or FAC: (A)
2	Total Number of Dominant
	Species Across All Strata: (B)
7, 1)	Percent of Dominant Species
	That Are OBL, FACW, or FAC: /OD (A/B)
Solve of total cover: 20% of total cover:	Prevalence Index worksheet:
1. Ahus viridis 30 Y FAT,	Total % Cover of: Multiply by:
2. Cornus Canadinsis 3 FACU	OBL species x 1 =O
3. Arctostaphylus UVa-Ursl 3 UPL	FACW species <u>5</u> x 2 = <u>10</u>
4. NUNZIESIA FERRUGINEA S FACU	FAC species $100 \times 3 = 300$
5. Tsuga mertensiana 20 y FAC	FACU species 3 $x 4 = 32$
6	UPL species 3 $x_5 = 15$
Total Cover: 11.6	Column Totais: <u>110</u> (A) <u>357</u> (B)
50% of total cover: 30.5 20% of total cover: 12.7	Prevalence Index = $B/A = -\frac{3}{2}$ (28)
Herb Stratum	Hydrophytic Vegetation Indicators:
1. Caroliscium arveroe 30 1 FAC	X Dominance Test is >50%
2. Sanavision bar canadansis 5 FACW	 Prevalence Index is ≤3.0
A CHIQUE COURS COURSES 7	Morphological Adaptations ¹ (Provide supporting
An LOTTIUS CAPTURALITIES S FACO	data In Remarks or on a separate sheet)
- caramagrosps canadensis 10 _ y_ He.	Problematic Hydrophytic Vegetation ¹ (Explain)
7	
8	be present unless disturbad or problematic.
q	
10	
50% of total cover: $7275 = 20\%$ of total access of 9.10	
Plot size (radius, or length x width) 10^{1} (Gd , 24^{24} % Bare Ground ≤ 0	Hydrophytic
% Cover of Welland Bryophytes Total Cover of Bryophytes	Vegetation Present? Yes X No.
(Where applicable)	NO
Remarks:	
pics III-ITI	

1

DIL			(f	f tu elle stars)
rofile Description: (Describe to the de	epth needed to document the Indi	cator or confirm	the absence o	r indicators.)
epth <u>Matrix</u>	Redox Features		Texture	Remarks
iches), Color (moist) %		<u>ypc</u>	·	
NU pit				
Aluna	+ standing water	in plot		
				awaa
			·	dukon , uzotulun , uzot
				ANY WARE ADDON'NY AMERICANY
				-
ype: C=Concentration, D=Depletion, R	M=Reduced Matrix, CS=Covered or	Coated Sand G	ains. ² Loca	tion: PL=Pore Lining, M=Matrix.
ydric Soil Indicators:	Indicators for Problematic	Hydric Solls*:		our - Luzza - A Luzz SV or Doddor
Histosol or Histel (A1)	Alaska Color Change (17	A4)*	Alaska	
_ Histic Epipedon (A2)	Alaska Alpine Swales (1/	A5) Huo	Olber (I	lying Layer
_ Hydrogen Sulfide (A4)	Alaska Redox With 2.51	nue		-Abient in Liveniana)
_ Thick Dark Surface (A12)	³ Opp indicator of hydrophytic	vegetation one	primary indicato	r of wetland hydrology.
_ Alaska Gleyed (A13)	and an appropriate landso	ane position mus	t he present uni	ess disturbed or problematic.
_ Alaska Redox (A14)	⁴ Give details of color change	in Remarks.	• • • • • • • • • • • •	·
Times				
Type				
Depth (inches): emarks:			Hydric Soil	Present? Yes <u>X</u> No
Depth (inches): Remarks:	· · ·		Hydric Soll	Present? Yes <u>X</u> No
Depth (Inches):	· .		Hydric Soll	Present? Yes <u>X</u> No
Depth (Inches): eemarks:	· · ·		Hydric Soll	Present? Yes <u>X</u> No
Depth (inches):	· · ·		Hydric Soll	Present? Yes X No
Depth (inches):	ufficient)		Hydric Soll	Present? Yes X No
Depth (inches): temarks: YDROLOGY Vetland Hydrology Indicators: Primary Indicators (any one indicator is s Surface Water (A1)	ufficient) Inundation Visible on Aerial I	magery (B7)	Hydric Soll Secondary Inc Water-sta Drainage	Present? Yes <u>X</u> No licators (2 or more required) ined Leaves (B9) Patterns (B10)
Depth (inches): remarks: YDROLOGY Vettand Hydrology Indicators: rimary Indicators (any one indicator is s Surface Water (A1) High Water Table (A2)	ufficient) Inundation Visible on Aerial In Sparsely Vegetated Concave	magery (B7) e Surface (B8)	Hydric Soll Secondary Inc Water-sta X Drainage Oxidized	Present? Yes X No
Depth (Inches): remarks: YDROLOGY Vetland Hydrology Indicators: Inimary Indicators (any one indicator is s Surface Water (A1) High Water Table (A2) Saturation (A3)	ufficient) Inundation Visible on Aerial In Sparsely Vegetated Concave Marl Deposits (B15)	magery (B7) Ə Surface (B8)	Hydric Soll Secondary Inc Water-sta X Drainage Oxidized Presence	Present? Yes X No
Depth (inches): temarks: YDROLOGY Vetland Hydrology Indicators: Primary Indicators (any one Indicator is s Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1)	ufficient) Inundation Visible on Aerial II Sparsely Vegetated Concave Marl Deposits (B15) Hydrogen Sulfide Odor (C1)	magery (B7) e Surface (B8)	Hydric Soll Secondary Ind Water-sta X Drainage Oxidized Presence Salt Depo	Present? Yes X No
Depth (Inches): temarks: YDROLOGY Vetland Hydrology Indicators: Primary Indicators (any one indicator is s Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2)	ufficient) inundation Visible on Aerial II Sparsely Vegetated Concave Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Teble (C2 Others (Enclairs in Bernarko)	magery (B7) 9 Surface (B8) 2)	Hydric Soll Secondary Ing Water-sta X Drainage Oxidized Presence Salt Depo Stunted of X Geomore	Present? Yes <u>X</u> No <u></u> licators (2 or more required) ined Leaves (B9) Patterns (B10) Rhizosphere's along Living Roots (C of Reduced Iron (C4) sits (C5) r Stressed Plants (D1) bic Position (D2)
Depth (Inches): temarks: YDROLOGY Vettand Hydrotogy Indicators: Primary Indicators (any one indicator is s Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) High Water (A1)	ufficient) Inundation Visible on Aerial II Sparsely Vegetated Concave Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Teble (C2 Other (Explain in Remarks)	magery (B7) a Surface (B8) 2)	Hydric Soll Secondary Ing Water-sta X Drainage Oxidized Presence Salt Depo Stunted of X Geomorp Shallow A	Present? Yes X No licators (2 or more required) ined Leaves (B9) Patterns (B10) Rhizospheres along Living Roots (C of Reduced Iron (C4) sits (C5) r Stressed Plants (D1) hic Position (D2) ouitard (D3)
Depth (inches): temarks: YDROLOGY Yettand Hydrology Indicators: Primary Indicators (any one indicator is s 	ufficient) Inundation Visible on Aerial In Sparsely Vegetated Concave Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Teble (C2 Other (Explain in Remarks)	magery (B7) e Surface (B8) 2)	Hydric Soll	Present? Yes X No
Depth (Inches): Temarks: YDROLOGY Vetland Hydrology Indicators: Primary Indicators (any one indicator is s 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 (B5)	ufficient) Inundation Visible on Aerial II Sparsely Vegetated Concave Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Teble (C2 Other (Explain in Remarks)	magery (B7) e Surface (B8) 2)	Hydric Soll Secondary Ing Water-sta X Drainage Oxidized Presence Salt Depo Stunted of X Geomorp Shallow A X Microtopo FAC-Neu	Present? Yes X No licators (2 or more required) ined Leaves (B9) Patterns (B10) Rhizosphere's along Living Roots (C of Reduced Iron (C4) sits (C5) r Stressed Plants (D1) hic Position (D2) iquitard (D3) igraphic Relief (D4) tral Test (D5)
Depth (Inches): Remarks: YDROLOGY Vetland Hydrology Indicators: Primary Indicators (any one indicator is s 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) Etald Observations:	ufficient) Inundation Visible on Aerial II Sparsely Vegetated Concave Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Teble (C2 Other (Explain in Remarks)	magery (B7) e Surface (B8) 2)	Hydric Soll Secondary Ing Water-sta X Drainage Oxidized Presence Salt Depo Stunted of X Geomorp Shallow A X Microtopo FAC-Neuronal	Present? Yes X No licators (2 or more required) ined Leaves (B9) Patterns (B10) Rhizosphere's along Living Roots (C of Reduced Iron (C4) sits (C5) r Stressed Plants (D1) hic Position (D2) equitard (D3) Igraphic Relief (D4) tral Test (D5)
Depth (Inches): Remarks: YDROLOGY Wettand Hydrotogy Indicators: Primary Indicators (any one indicator is s 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) Field Observations: Surface Water Present?	ufficient) inundation Visible on Aerial II Sparsely Vegetated Concave Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Teble (C2 Other (Explain in Remarks) Other (Explain in Remarks)	magery (B7) 9 Surface (B8) 2)	Hydric Soll Secondary Ing Water-sta Drainage Oxidized Oxidized Sait Depo Stunted of Shatlow A Shatlow A FAC-Neu	Present? Yes X No licators (2 or more required) ined Leaves (B9) Patterns (B10) Rhizosphere's along Living Roots (C of Reduced Iron (C4) sits (C5) r Stressed Plants (D1) hic Position (D2) quitard (D3) Igraphic Relief (D4) tral Test (D5)
Depth (Inches): Remarks: YDROLOGY Wetland Hydrology Indicators: Primary Indicators (any one indicator is s 	ufficient) Inundation Visible on Aerial In Sparsely Vegetated Concave Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Teble (C2 Other (Explain in Remarks) Other (Explain in Remarks)	magery (B7) e Surface (B8) 2)	Hydric Soll A Secondary Ind Water-sta X Drainage Oxidized Presence Salt Depo Stunted of X Geomorp Shatlow A X Microtopo FAC-Neu	Present? Yes X No licators (2 or more required) ined Leaves (B9) Patterns (B10) Rhizospheres along Living Roots (C of Reduced Irori (C4) sits (C5) r Stressed Plants (D1) hic Position (D2) equitard (D3) Igraphic Relief (D4) tral Test (D5)
Depth (Inches):	ufficient)	magery (B7) e Surface (B8) 2)	Hydric Soll Secondary Ind Water-sta X Drainage Oxidized Presence Salt Depo Stunted of X Geomorp Shallow A X Microtopo FAC-Neu Hand Hydrolog	Present? Yes X No licators (2 or more required) ined Leaves (B9) Patterns (B10) Rhizosphere's along Living Roots (C of Reduced Iron (C4) sits (C5) r Stressed Plants (D1) hic Position (D2) equitard (D3) orgraphic Relief (D4) tral Test (D5) r Present? Yes X No
Depth (Inches):	ufficient)	magery (B7) e Surface (B8) 2) 5 5 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Hydric Soll Secondary Ing Water-sta X Drainage Oxidized Presence Salt Depo Stunted of X Geomorp Shallow A X Microtopo FAC-Neu Hand Hydrolog	Present? Yes X No licators (2 or more required) ined Leaves (B9) Patterns (B10) Rhizosphere's along Living Roots (C of Reduced Iron (C4) sits (C5) r Stressed Plants (D1) hic Position (D2) iquitard (D3) igraphic Relief (D4) tral Test (D5) r Present? Yes X No
Depth (Inches):	ufficient)	magery (B7) e Surface (B8) 2)	Hydric Soll I Secondary Ing Water-sta X Drainage Oxidized Presence Salt Depo Stunted of X Geomorp Shallow A X Microtopo FAC-Neu Hand Hydrolog	Present? Yes X No licators (2 or more required) ined Leaves (B9) Patterns (B10) Rhizospherés along Living Roots (C of Reduced Irori (C4) sits (C5) r Stressed Plants (D1) hic Position (D2) equitard (D3) Igraphic Relief (D4) tral Test (D5) r Present? Yes X No
Depth (Inches):	ufficient)	magery (B7) e Surface (B8) 2) 2) 2) 2) 2) 2) 2) 2) 2) 2) 2) 2) 2)	Hydric Soll Secondary Ind Water-sta V Drainage Oxidized Oxidized Oxidized Salt Depo Salt Depo Shallow A	Present? Yes X No licators (2 or more required) ined Leaves (B9) Patterns (B10) Rhizosphere's along Living Roots (C of Reduced Iron (C4) sits (C5) r Stressed Plants (D1) hic Position (D2) iquitard (D3) igraphic Relief (D4) tral Test (D5) r Present? Yes X No
Depth (Inches):	ufficient)	magery (B7) a Surface (B8) 2) 5 5 2 Verious Inspections)	Hydric Soll Secondary Ing Water-sta Drainage Oxidized Oxidized Sait Depo Stati Depo Stati Depo Stati Depo Stati Depo Stati Depo Stati Depo Stati Depo Stati Depo Stati Depo Stati Depo Stati Depo Stati Depo Stati Depo Stati Depo Stati Depo Stati Depo Stati Depo Stati Depo	Present? Yes X No licators (2 or more required) ined Leaves (B9) Patterns (B10) Rhizosphere's along Living Roots (C of Reduced Iron (C4) sits (C5) r Stressed Plants (D1) hic Position (D2) uquitard (D3) Igraphic Relief (D4) tral Test (D5) r Present? Yes X No
Depth (Inches):	ufficient)	magery (B7) a Surface (B8) 2) 5 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Hydric Soll I Secondary Ing Water-sta X Drainage Oxidized Presence Salt Depo Stunted of X Geomorp Shallow A X Microtopo FAC-Neu Iland Hydrolog	Present? Yes X No licators (2 or more required) ined Leaves (B9) Patterns (B10) Rhizospherés along Living Roots (C of Reduced Iron (C4) sits (C5) r Stressed Plants (D1) hic Position (D2) equitard (D3) Igraphic Relief (D4) tral Test (D5) r Present? Yes X No

Project/Site: Grant Creek Orndor Borough/City Mi	18- Pass - 7-18-18
Applicant/Owner: Kener Hydro	
Investigator(s): C. Schudel J. Blank I andform (hilloide h	Sampling Point: OP 13
Local relief (concave, convex, none): $(A \lor A)/\ell X$ Since (ℓ)	shace, nummocks, etc.): <u>11115 loc a bove UP12</u>
Subregion:	
Soli Mao Unit Name:	ong: 197, 5971639 Datum:
Are elimetic / but deleste conditions and the line is the standard s	NWI classification: UPIARA
Are Variated involving conditions on the site typical for this time of year? Yes X. No	(If no, explain in Remarks.)
Are Vegetation, Soll, or Hydrology significantly disturbed? No Are	e "Normal Circumstances" present? YesX No
Are vegetation, Soit, or Hydrology naturally problematic? No (If naturally problematic?	needed, explain any answers in Remarks.)
SUMMARY OF FINDINGS - Attach site map showing sampling point loca	tions, transects, important features, etc.
Hydrophytic Vegetation Present? Yes K No	
Hydric Soil Present? Yes No Y	ed Area
Welland Hydrology Present? Yes No X Within a Wetle	and? Yes No <u>X</u>
Remarks: uptond community plips typical of upl	and Hembork Commun, ty,
VEGETATION - Use scientific names of plants. List all species in the plot	
Absolute Dominant Indicator	Dominance Test worksheet:
<u>Iree Stratum</u> <u>% Cover Species?</u> <u>Status</u>	Number of Dominant Species
1. Isuga mertensigna 40 FAC	That Are OBL, FACW, or FAC: (A)
3	Total Number of Dominant
4	Species Across All Strata: (B)
Total Course: 40	Percent of Dominant Species
50% of total cover: 20 20% of total cover.	That Are OBL, FACW, or FAC: (A/B)
Sapling/Shrub Stratum	Prevalence Index worksheet:
1. Empetrum nigrum #7 Y FAC	Total % Cover of:Multiply by:
2. Arctostaphylus uva-ursi 5 UPL	OBL species $0 x 1 = 0$
3. Menziesia ferruginea 5 FACU	FACW species 0 $x^2 = 0$
4. Vacrinium Ulizandsum 2 FAC	FAC species 00 $x_3 = 170$
5. Tsuga mertensiana 10 Y FAC	FACU species \underline{S} $x4 = \underline{W}$
6. Ledun groundandicum 7 FAC	UPL species $3 \times 5 = 23$
groenlandieum Total Cover: 30	Column Totals: $\underline{10}$ (A) $\underline{-243}$ (B)
Herb Stratum 50% of total cover: 18 20% of total cover: 7.2	Prevalence index = $B/A = 3.2$
1. None	Hydrophytic Vegetation Indicators:
2	X Dominance Test is >50%
3	Prevalence Index is ≤3.0
4.	Morphological Adaptations ¹ (Provide supporting
5.	data in Remarks or on a separate sheet)
6.	Problematic Hydrophytic Vegetation' (Explain)
7	¹ Indicators of hydric soil and wetland hydrology must
8	be present unless disturbed or problematic.
9	
10	
Total Cover:	
50% of total cover: 20% of total cover:	
Plot size (radius, or length x width) 20' radl. % Bare Ground 0	Hydrophytic Vegetation
% Cover of Wetland Bryophytes Total Cover of Bryophytes (Where applicable)	Present? Yes X No
Kemarks:	· · · · · · · · · · · · · · · · · · ·
photos	778-782 GPS 9

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SOIL

Sampling Point: DP13

Profile Desc	ription: (Describe	e to the depl	h needed to document	the indicator o	r confirm	the absence	of indicators.)		
Depth	Matrix		Redox Fe	atures			-		
(inches)	<u>Color (moist)</u>	%	Color (moist)	<u>% Type'</u>	LOC	l exture	<u>F</u>	emarks	
4-0	۰ 				- 1.00 - 1 .00	TOOR	Ive laye	<u>۲</u>	
0-5	7.SYP 3	14				organi	<u>cs</u>		
5-12						cobble			
0 6							•···		
<u></u>			· · · · · · · · · · · · · · · · · · ·						
									
	.			······					<u></u>
					Cand Ca	21.00	ation: DI-Dore	tining M=	Matrix
Type: C=C	oncentration, D=De	pletion, RM=	Reduced Matrix, CS=Co	iematic Hydric	Soils ³ :	ans. Loc		Clining, Wr~	
Historal	noicators,	,	Alaska Color Ch	ange (TA4) ⁴		Alaska	Gleyed Withou	Hue 5Y or	Redder
Histic Fi	pipedon (A2)		Alaska Alpine S	wales (TA5)		Unde	rlying Layer		
Hydroae	en Sulfide (A4)		Alaska Redox V	With 2.5Y Hue		Other (Explain in Rem	arks)	
Thick D	ark Surface (A12)								
Alaska (Gleyed (A13)		³ One indicator of hy-	drophytic vegeta	tion, one p	rimary indicat	or of wetland hy	drology,	
Alaska I	Redox (A14)		and an appropriat	e landscape pos	ition must	be present un	less disturbed o	r problema	NC,
Alaska	Gleyed Pores (A15))	'Give details of colo	r change in Rem	arks.				
Restrictive	Layer (if present):	Loolald							
Туре;	bedrock.	1 00001	L			Undete Call	Dranant? V		$X \to X$
Depth (in	iches):i L	0. 4040777 -= 		-		Hydric 301	Flesent it		
Remarks:									
ĺ									
HYDROLC	DGY					<u> </u>			-1.
Wetland Hy	drology Indicator	s;				Secondary In	dicators (2 or m	ore required	<u>a)</u>
Primary Indi	icators (any one inc	licator is suff	icient)		(0.2)	water-st	ained Leaves (E	9)	
Surface	Water (A1)		Inundation Visible of Operation Visible of Comparison (Comparison)	n Aeriał Imagery	(B7) a (B9)	Drainage	Patterns (BTU)	alona Livina	Roots (C3)
High W	ater Table (A2)		Sparsely Vegetated Mod Doposite (P15)	Concave Sunac	e (60)	Oxidized	of Reduced in	n (C4)	10013 (00)
Saturat	ion (A3)		Matt Deposits (B15)	dor (C1)		Salt Den	osits (C5)	,,,,(0,1)	
Godime	via(KS (D1)		Drv-Season Water 1	able (C2)		Stunted	or Stressed Pla	nts (D1)	
Drift De	an deposits (B2)		Other (Explain in Re	emarks)		Geomor	hic Position (D	2)	
Algal M	lat or Crust (B4)			,		Shallow	Aquitard (D3)		
Iron De	posits (B5)					<u> </u>	ographic Relief	(D4)	
Surface	Soil Cracks (B6)					FAC-Net	utral Test (D5)		
Field Obse	rvations:		-						
Surface Wa	iter Present?	Yes	No Depth (inche	s):					
Water Table	e Present?	Yes	No Depth (inche	s):	-1		_		X
Saturation F	Present?	Yes	No Depth (inche	s):	_ Wetl	and Hydrolog	y Present? Y	'es	No <u>^_</u>
(includes ca	apiliary fringe) ecorded Data (strea	m qaude, m	onitoring well, aerial pho	tos, previous ins	pections).	if available:			
Describe R	Condou Data Janea	gaugu, m	annaring mont source buo						
Remarks'									
1101101105									
i									

Project/Site: Carant Criek Corndor	F	arough/Cit	"Ma	Se Pass Sampling Data: 7.19.13
Applicant/Owner: King Hydre	L	Jorougni Oit	y	Sampling Polet: NP 14
Investigator(s): C. Schudel J. Blank	1	andform //	illeide torr	ace hummacks ato : diameter ato :
Local relief (concave, convey, none); COO CAVE	'		10306, (611	ace, noninfocks, alc.). <u>Det pre so Tore</u>
Subregion:		ັ¥່າໄປ ເຮັ	1 100	
Sold Mari Unit Name:	1001 43	0140	LUI	
Are dimetia (bydrelagie conditions on the site typical for this	time of upo		X' No.	
Are climatic / hydrologic conditions on the site typical for this	une of yea	irr res	<u>/·</u> NO_	(if fio, explain in Remarks.)
Are Vegetation, Soli, or Hydrology si	grinicanuy c			Normal Circumstancas present? Yes <u>No</u> No
SUMMARY OF FINDINGS - Attach site map sho	owing sat	mpling po	oint locati	ons, transects, important features, etc.
		:		
Hydrophytic Vegetation Present? Yes No	·	is th	e Sampied	Area
Wetland Hydrology Present? Yes X No		with	in a Wetlar	1d? Yes <u>X</u> No
Remarks: Wart	<u> </u>	Smal	01.59-6	-2 F4 AV4 W 41 4 7 1835415 021 1
Harris M	. w/10	·		the strong way prove pours hunning
VEGETATION - Use scientific names of plants	Listalle	ncolos in	the plot	
	Abaaluta	Deminant	Indiantar	, Deminence Test underhandt
Tree Stratum	<u>% Cover</u>	<u>Species?</u>	Status	Dominance Test worksneet:
1. Noine				That Are OBL, FACW, or FAC:(A)
2				Total Number of Dominant
3				Species Across All Strata: <u>\mathcal{H} 5</u> (B)
4				Percent of Dominant Species
Total Cover:				That Are OBL, FACW, or FAC: 100 (A/B)
50% of total cover: Sapling/Shrub Stratum	20% of	total cover	*	Prevalence Index worksheet:
1. Picea glasca	S		FACU	Total % Cover of: Multiply by:
2. Salix bardan	74/0	У	TAC	OBL species 49 $x_1 = 45$
3. Betula glandulosa	<u>\$7</u>	· Y	FAC	FACW species 20 $x^2 = 40$
4. ledim dicumbins	3		FAC	FACtion 500 $x_3 = 10$
5. Empetrum highm	3		EAC	$\frac{1100 \text{ species } 0}{1100 \text{ species } 0} \times 5 = 0$
6. Vaccinium uliganosum	<u> </u>	. <u> </u>	FAC	Column Totals: 96 (A) 183 (B)
Total Cover:	<u></u>			
50% of total cover: <u>1 > ></u> Herb Stratum	_ 20% of	total cover:	612	Prevalence index = $B/A = 1.91$
1. Equisetim are fluviatile	30	Y	OBL	Hydrophytic Vegetation Indicators:
2. Schausurbe canadinas	10	Y	FALW	X Dominance Test is >50%
3. Carex leptalea	<u> </u>		OBL	Prevalence index is \$3,0
4. Comaruns padustre	_10	<u> Y </u>	OBL	data in Remarks or on a separate sheet)
5. Carex canescens	<u> </u>	<u> </u>	FACW	Problematic Hydrophytic Vegetation ¹ (Explain)
6. Carex Media	<u> </u>		FACW	
7	· ·			Indicators of hydric soil and wetland hydrology must
8		·		
9,				
	1.5			
50% of total cover: 32,5	20% of t	total cover	13	
Plot size (radius, or length x width) 20' Yad	20 % 01 \ % Bare G	round S	open Hr	Hydrophytic
% Cover of Wetland Bryophytes Total Cover (Where applicable)	er of Bryopi	hytes9	ò	Present? Yes <u>No</u>
Remarks: Photos		005 0	ntai	it of east fork channel
7416 - 803	<i>.</i>	गा प अन्छ 3		" west " "
		M 4	1 date	apt 14 (merge of exw furks)
		N	، ما م	and Q adar of annalar where it

·US Army Corps of Engineers

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winds of play. Mappen Alaska Version 2.0

Profile Desc	cription: (Descri	oe to the de	pth needed to docur	nent the li	ndicator	or confirm	n the absence	of indicators.)
Depth	Matrix Calas (malati	<u>(</u>	Redo	x Features	3 Ture1		Tautura	Demode
(Inches)	Color (moist)			70	<u> </u>	LOC		Remarks
			•					
	NID 2	+						
	<u></u>	1	"	1	·			
	Stand	ting w	later in pl	04				· · · · · · · · · · · · · · · · · · ·
		Ū.	•					
<u>_</u>			······································	KANNING TRADE				
								•
		<u> </u>	•			·		
Type: C=C	oncentration D=F	enletion Rt	A=Reduced Matrix CS	S=Covered	or Coate	d Sand G	rains ² l.or	ation: PI =Pore Lining M=Matrix
Hydric Soil	Indicators:	-optotion _t i si	Indicators for F	Problemat	ic Hydric	Solls ³ :	101113. <u>200</u>	
Histosol	or Histel (A1)		Alaska Colr	r Change	(TA4) ⁴		Alaska	Gleved Without Hue 5Y or Redder
Histic E	nipedon (A2)		Alaska Obic	ne Swales	(TA5)			whying Laver
Historic	n Sulfide (A4)		Alaska Red	ov Weth 2	57 Hua		Other /	(Evolain in Remarks)
Thick D	ark Surface (A12)			OA 1101 2.				
finck D	Seved (A13)		³ One indicator o	fhydrophy	tic venet	ation one	nriment indicate	or of wetland bydrology
Alaska (and an annro	nriate land	lecano no	sition mus	t he present up	less disturbed or problematic
Alaska (Gloved Pores (A1)	51	⁴ Give details of	color chan	ne in Ren	arks'	it be present an	iess distanced of problematic.
Claska	lover (if propert)	·)			go in rion		1	
Restrictive	Layer (ii present,	/•						
Type:								
Depth (in	ches):						Hydric Soil	Present? Yes <u>No</u>
Remarks:								
,								
	,							
				•				
	2		······································					
HIDROLO	GY							
Wetland Hy	drology Indicato	rs:					Secondary In	dicators (2 or more required)
Primary Indi	<u>cators (any one in</u>	dicator is su	fficient)				Water-sta	ained Leaves (B9)
X Surface	Water (A1)		Inundation Visib	ie on Aeria	il Imagery	' (B7)	Drainage	Patterns (B10)
_X High Wa	ater Table (A2)		Sparsely Vegeta	ted Conca	ve Surfac	æ (B8)	Oxidized	Rhizospheres along Living Roots (C3)
🔀 Saturati	on (A3)		Marl Deposits (B	15)			Presence	e of Reduced Iron (C4)
Water N	larks (B1)		Hydrogen Sulfid	e Odor (C1	i)		Salt Depo	osits (C5)
Sedime	nt Deposits (B2)		Dry-Season Wal	er Table (C2)		Stunted c	or Stressed Plants (D1)
Drift De	posits (B3)		Other (Explain in	n Remarks)		Geomorp	hic Position (D2)
Algal Ma	at or Crust (84)						Shallow A	Aquitard (D3)
Iron Dep	oosits (B5)						Microtopo	ographic Relief (D4)
Surface	Soil Cracks (B6)						FAC-Neu	itral Test (D5)
Field Obser	vations:							
Surface Wat	er Present?	Yes 🔨	No Depth (in	ches):	U			
Water Table	Present?	Yes X	No Depth (in	ches):	0	-		
Saturation P	resent?	Yes X	No Depth (in	ches);	Ó	- Wetl	and Hydrology	
(includes ca	pillary fringe)	100				-		
Describe Re	corded Data (stre	am gauge, n	nonitoring well, aerial	ohotos, pre	evious ins	pections),	if available;	
Remarks:			<u> </u>					
		•						
	. '							•

WETLAND DETERMINATION DATA F	FORM – Alaska Region
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Project/Site: Grant Greek Corridor	+ Borough/C#	iv Mai	KEParks Sampling Parks 7-19-13
Applicant/Owner: Keneu Hydro	Doroughron	<u></u>	Sampling Date:
Investigator(s): C. Schudel J. Blank	Landform (I	hillside ter	race hummocks ato :
Local relief (concave, convex, none): Convex	Slope (%):	3	
Subregion:	at: 60.4585.4	Lo.	
Soil Map Unit Name:			
Are climatic / hydrologic conditions on the site typical for the	his time of year? Yes	X No	// no. ovplain in Remarks)
Are Vegetation . Soil . or Hydrology	significantly disturbed?	NJ Are	"Normal Circumstancos" presenta Vez X
Are Vegetation Soil or Hydrology	naturally problematic?	Als //fm	eeded evolution and answere in Remarke)
SUMMARY OF FINDINGS – Attach site map s	showing sampling po	pint locat	ions, transects, important features, etc.
Hydrophytic Vegetation Present? Yes X	No		
Hydric Soil Present? Yes	No X is th	e Sampleo	d Area
Wetland Hydrology Present? Yes	No <u>X</u> with	in a Wetla	nd? YesNoX
Remarks: Kepsintative of write	Sprice Popl	und	forest
VEGETATION - Use scientific names of plants	s. List all species in	the plot.	
Tree Stratum	Absolute Dominant	Indicator	Dominance Test worksheet:
1. Picka alaysa	<u>% Cover</u> <u>Species</u> ?	Status	Number of Dominant Species
2.	_ <u></u>	THUV	That Are OBL, FACW, or FAC: (A)
3			Total Number of Dominant
4			(B)
Total Cove	ar. 20		Percent of Dominant Species
50% of total cover: 10	20% of total cover	:_4	Prevalence Index worksheet:
1 Sabila alandulosa	2.0 \	- A C	Total % Cover of: Multiniv by
2 lodyna dicumpteros grentandicum	<u>20</u> - <u>y</u>	FAC	OBL species
3. EMPETRUM MANN	10	FAr	FACW species x 2 =
4. Arctostaphylus uva-ursi	- <u>- ,,, ,</u> ,	UPL	FAC species <u>52</u> x 3 = <u>156</u>
5. Spirea steveni	10	FACU	FACU species 3 x 4 = 124
6			UPL species $5 \times 5 = 23$
Total Cove	r: <u>68</u>		Column Totals: $\underline{58}$ (A) $\underline{305}$ (B)
50% of total cover: <u>34</u>	20% of total cover:	13.6	Prevalence index = $B/A = 3.47$
1 Chamara a closest falla	1 I	EMU	Hydrophytic Vegetation Indicators:
2. Asperts a contra	<u> </u>	FAC	X Dominance Test is >50%
P Caluman a rush & a madament		FAC GAL	Prevalence Index is ≲3.0
4. (totals included of shi	\sim		Morphological Adaptations ¹ (Provide supporting
5 < 5 %	· •·• J		data in Remarks or on a separate sheet)
6	· ·		Problematic Hydrophytic Vegetation' (Explain)
7	·		¹ Indicators of hydric soil and wetland hydrology must
8			be present unless disturbed or problematic.
9			
10			
Total Cover			
50% of total cover;	20% of total cover:	[Hydronhytic
Plot size (radius, or length x width) 20' (Pa.	_ % Bare Ground(2	Vegetation
% Cover of Wetland Bryophytes Total Co (Where applicable)	ver of Bryophytes10	1.	Present? Yes <u>No</u>
photos 804	1-807		
1			(main and a second seco
an have a second second second second second second second second second second second second second sec			13-0

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SOIL						·	Sampling Point	<u> . DP15</u>
Profile Description: (Describ	e to the depth nee	eded to docum	ent the in	dicator o	r confirm	the absence of in	dicators.)	
Depih Matrix		Redox	Features					
(inches) Color (moist)	<u>%</u> Co	olor (molst)		Type ¹	Loc ²	<u>Texture</u>	Remarks	
6-0	<u> </u>					live mos	stoon 4 20	
0-4			<u> </u>			Diganics		-
4-10 2.51 4	1) 100%				• • • • • • •	Silt loan	۱	
······								
							Addabricki, and a solution	
. Herrier					<u></u>		- 100 M	
¹ Type: C=Concentration, D=D	epletion, RM=Redu	ced Matrix, CS	Covered	or Coate	d Sand Gr	rains. 'Location	: PL=Pore Lining,	M=Matrix.
Hydric Soll Indicators:	Ir	dicators for Pi	roblemati	c Hydric	Solis":	Aleska Olev	and Mithewith Lives EV	ar Daddar
Histosol or Histel (A1)		_ Alaska Color	Change ((IA4)' (TA6)		Alaska Gley	ed wanout Hue or	or Redder
Histic Epipedon (A2)	_	_ Alaska Alpine	e Swales I	(TA5) (X11/ma		Olber (Evel	g Layer	
Hydrogen Sulfide (A4)		_ Alaska Redo	ix vviin 2.5	or nue			ain in Remarks)	
Thick Dark Surface (A12)	3,	Dealedicator of	hudronhu	tic veneta	tion one	nrimany indicator of	welland hydrology	
	,	and an annion	riste land	scane no	sition must	t he present unless	disturbed or probler	matic.
Alaska Reuox (A14)	s) ⁴ 0	Sive details of c	olor chan	ne in Rem	arks.	too processi assee		
Destrictive Lever (If present)	·/·					1	<u></u>	iii
Tuno: bydvOck	•							
Depth (inches):	jl	••••				Hydric Soil Pres	sent? Yes	No X
Deptil (inches). <u>19</u>								
Remarks.								
			.7			-AND-T		
						Secondary Indicat	ors (2 or more requ	ired)
Wettand Hydrology Indicator	diantar in cufficiant)					Water-stained	Leaves (B9)	<u></u>
Primary indicators (any one ind		undation Visible	on Aerio	i Imagenr	(87)	Drainage Patt	erns (810)	
Surface Water (A1)	!! e	parcely Venetat		ve Surfar	(B7) (B8)	Ovidized Rhiz	rospheres along Liv	ing Roots (C3)
High Water Fable (A2)	0	paracity vegetat ari Denosits /8:	15)	ic ound		Presence of F	Reduced Iron (C4)	
Mater Marks (B1)	'' H	vdrogen Sulfide	odor (C1)		Salt Deposits	(C5)	
Sediment Deposits (B2)	D	ry-Season Wate	er Table (() C2)		Stunted or St	ressed Plants (D1)	
Drift Deposits (B3)	0	ther (Explain in	Remarks)		Geomorphic I	Position (D2)	
Algal Mat or Crust (B4)						Shallow Aquil	ard (D3)	
Iron Deposits (85)						Microtopogra	phic Relief (D4)	
Surface Soil Cracks (B6)						FAC-Neutral	Test (D5)	
Field Observations:	<u>.</u>							
Surface Water Present?	Yes No	⊥ Depth (inc	:hes):					
Water Table Present?	Yes No	K Depth (ind	hes):			· ·		
Saturation Present?	Yes No	L Depth (ind	ches):		_ Wet	land Hydrology Pr	esent? Yes	_ No <u>X_</u> _
(Includes capillary fringe)		, _ · ·				if availables		
Describe Recorded Data (stree	am gauge, monitori	ng well, aerial p	niolos, pre	evious ins	pecuons),	, n avanable:		
								•
Remarks:								

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Projectisite: Grant Greek Cornelor		Borough/C	city: Moi	SCPASS Sampling Data: 7-19-13
Applicant/Owner: Kenal Hydro		č	· · · · · · ·	Sampling Date
Investigator(s): C. Schudel J. Blank		Landform	(hillside ter	Tace hummocke etc.): Patie form. 18
Local relief (concave, convex, none):Convex		Slope (%)		Hatura outwash ta
Subregion:Lat	60.4	68 U 5	2645 In	
Soll Map Unit Name:			<u></u>	$\frac{1}{1} \frac{1}{1} \frac{1}$
Are climatic / hydrologic conditions on the site typical for this	time of ve	ar? 'Yes	X No	
Are Vegetation, Soil, or Hydrology s	ionificantly	disturbed?	<u>, 10</u>	
Are Vegetation, Soil, or Hydrology	aturaliv oro	blematic?	איך קיין אי (ונח	eeded explain any assure in Deceder)
SUMMARY OF FINDINGS – Attach site map sh	owing sa	mpling p	point local	tions, transects, important features, etc.
Hydrophytic Vegetation Present?				······································
Hydric Soil Present? Yes		ls t	he Sample	d Area
Wetland Hydrology Present? Yes No) <u>/ </u>	wit	hin a Wetla	nd? Yes No <u>×</u>
Remarks: [Lopland] have done at min a		4	144.1	
areading the use in T	mun	mary	winte	à la numerores low-looking
VEGETATION - Use scientific names of planta			. 41 1. 1	
- Ose scientific names of plants.	List all s	pecies II	n the plot.	·
Tree Stratum	% Cover	Dominan Species'	t Indicator ? Status	Dominance Test worksheet:
1. None				Number of Dominant Species That Are OBL_FACW or FAC: 2 (A)
2,	·			
3,				Species Across All Strata: 43
4	<u> </u>		·	
Total Cover:	•			That Are OBL. FACW, or FAC: 50 46 (AIR)
50% of total cover:	20% of	total cove	or:	Prevalence Index worksheet:
1. Vibir num edul	20	V	FACU	Total % Cover of: Multiply by
2- CARAVE CAMPULAGES	10		TACU.	$\frac{1}{OBL \text{ species } O} \frac{1}{x_1 = 0}$
3. Basa accularis	5		FACU	FACW species x 2 =
4		•	<u> EACO</u>	FAC species $\frac{90}{x3} = \frac{240}{x3}$
5	······································			FACU species 60 x4 = 240
6			· · · · · · · · · · · · · · · · · · ·	UPL species O x 5 = O
Tolal Cover;	45 3	5		Column Totals: <u>140</u> (A) <u>480</u> (B)
50% of total cover: 22.5	20% of 1	total cover	977	Provalence Index - P/A - 343
Herb Stratum 17. S	0.5	. 1		Hydrenbytic Veretation Indicators
1. Equisetum orvense	30	<u> </u>	FAC	Dominance Test is >50%
2. Allarana Chuc Crana		·····	FA-CU-	Prevalence Index is <3.0
A GUMPDERKOWA dry sofering	<u> </u>		<u>FAC</u>	Morphological Adaptations ¹ (Provide supporting
5 Aarostic algoate		- >1	FAC	data in Remarks or on a separate sheet)
Currys canadrosis	10		THU.	Problematic Hydrophytic Vegetation ¹ (Explain)
7. Calavora waster acuratores	<u> </u>		<u>Frico</u>	¹ Indicators of budyin political workboard to but
8.	<u> </u>	<u> </u>	THE	be present unless disturbed or problematic.
9		<u> </u>		
10.				
Total Cover	25 10	5.		
50% of total cover; 47.5	;0 20% of to	otal cover	1921	
Plot size (radius, or length x width) 20 (rad 52.5	% Bare Gr	ound	0	Hydrophytic
% Cover of Wetland Bryophytes Total Cove (Where applicable)	r of Bryoph	yles	50	Present? Yes X No X
Remarks:	````			
ruo 105 0 005 - 850	,			

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0012	with weaters to do	firm the absence of indicators.)
Profile Description: (Describe to the de	pin needed to document the indicator of cor	mut un assence or indicators?
Depth <u>Matrix</u>	Color (molst) % Type Loc	³ Texture Remarks
		live noots + arganics
0-0		
6-7 104R 314 100		SILFLOAM & rOUTS
• •		
· · · · · · · · · · · · · · · ·		
		·
· · · · · · · · · · · · · · · · · · ·		
¹ Type: C=Concentration, D=Depletion, R	M=Reduced Matrix, CS=Covered or Coated Sar	nd Grains. ² Location: PL=Pore Lining, M=Matrix.
Hydric Soil Indicators:	Indicators for Problematic Hydric Soils	S"; Alexile Oleved Mithewill has EV or Doddor
Histosol or Histel (A1)	Alaska Color Change (TA4)*	Alaska Greyed Without Hue of or Redder
Histic Epipedon (A2)	Alaska Alpine Swales (TA5)	Undenying Layer Other (Evolais in Remarks)
Hydrogen Sulfide (A4)	Alaska Redox With 2.5Y Hue	
Thick Dark Surface (A12)	³ One indicator of budrephylic vegetation	one primary indicator of wetland hydrology.
Alaska Gleyed (A13)	and an annronriate landscape position,	must be present unless disturbed or problematic.
Alaska Redox (A14)	⁴ Give details of color change in Remarks	
Alaska Gibyeu Poles (A10)		
Tune: Write I land me	<u>k</u>	
Depth (inches): 7"		Hydric Soil Present? Yes No _X
remarks:		
2	· · · · · ·	
HYDROLOGY		
Wetland Hydrology Indicators:		Secondary Indicators (2 or more required)
Primary Indicators (any one indicator is s	ufficient)	Water-stained Leaves (B9)
Surface Water (A1)	Inundation Visible on Aerial Imagery (B7)) Drainage Patterns (B10)
High Water Table (A2)	Sparsely Vegetated Concave Surface (B	Brosonce of Reduced iron (C4)
Saturation (A3)	Marl Deposits (B15)	Presence of Reduced from (C4) Salt Denosits (C5)
Water Marks (B1)	Hydrogen Suitide Odor (C1)	Stunted or Stressed Plants (D1)
Sediment Deposits (B2)	Dry-Season water rable (62)	Geomorphic Position (D2)
Drift Deposits (B3)		Shallow Aguitard (D3)
Algal Mat or Grust (B4)		Microtopographic Relief (D4)
Iron Deposits (B5)		FAC-Neutral Test (D5)
Eleid Observations:		
Curring Water Present? Yes	No : X Depth (inches):	
Maler Toble Present? Yes	No X Depth (inches):	
Valer Table Present? Tes	No X Depth (inches):	Wetland Hydrology Present? Yes No
(includes capillary fringe)		

Remarks:

WETLAND DETERMINATION DATA FORM - Alaska Regio	on
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nvesugator(s): <u>Lixhuaen</u> J.BANK		Landform	(hillside, ter	race, hummocks, etc.): <u>depression</u>
Local relief (concave, convex, none): <u>('ancave</u>		Slope (%)	:_0	 ·
Subregion: La	at: <u>40, 4</u> ,	54684	Lo	ng: <u>-149,357179</u> Datum:
Soil Map Unit Name:				NWI classification: Perci 35 13
Are climatic / hydrologic conditions on the site typical for the	nis time of ye	ar? Yes_	<u> </u>	(If no, explain in Remarks.) P55-3/
Are Vegetation, Soil, or Hydrology	significantly	disturbed?	Are No	"Normal Circumstances" present? Yes <u>K</u> No
Are Vegetation, Soil, or Hydrology	naturally pro	blematic?	N> (lfn	eeded, explain any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site map s	howing sa	ampling p	ooint locat	ions, transects, important features, etc.
Hydrophytic Vegetation Present? Yes X	No	In t	ha Samula	4 4
Hydric Soil Present? Yes Yes	No	151	hin a Motia	
Wetland Hydrology Present? Yes X	No	WIL	ann a vveua	
Remarks: Typical penlos com	munit	ч.		· · ·
/EGETATION – Use scientific names of plants	. List all s	species i	n the plot	
	Absolute	Dominan	it Indicator	Dominance Test worksheet:
1 PLANA	% Cover	<u>Species</u>	? <u>Status</u>	Number of Dominant Species
2				That Are OBL, FACW, or FAC: 3 (A)
3		·	•	Total Number of Dominant
4.				Species Across All Strata; (B)
Total Cove			-	Percent of Dominant Species
50% of total cover:	20% o	f total cove	er:	That Are OBL, FACW, or FAC: <u>700</u> (A/B)
Sapling/Shrub Stratum				Prevalence Index worksheet:
1. Empetrum Nigrum		_ Y	FAC	OPI seasting 10 Multiply by:
2. <u>Pirea mariana</u>	- 5	<u></u>	FACW	EACW species 10 $x_1 = 10$
3. Flaa glaveg			FACU	FAC species 81 $x_2 = 242$
4. DEMIA GIANACIOSA	- 10	_ <u> </u>	<u>FAC</u>	FACU species IO $x = 4D$
6 Vaccinium illisacism			FAR	UPL species $2 \times 5 = 10$
Ledum drumbers 3 factor	<u> </u>		-r/C	Column Totals: 121 (A) 389 (B)
Arctostaphylus UVA-Ursi 2 1001 Cove	ে <u>১</u> ২ বিজ্ঞা	total		
Herb Stratum	<u></u> 20% 01	total cover	r <u>. 1016</u>	Prevalence index = $B/A = 2 \cdot 3$
1. Cornus canadensis	5_		FACU	Hydrophytic Vegetation Indicators:
2. Pubus chamaemorus	10		FACW	A Dominance Test is >50%
B. Equisetum arvensie	40	<u> </u>	FAC	_X Prevalence Index Is ≤3.0
1. Carex pausitiona	0		OBL	data in Remarks or on a separate sheet)
tgnist 15 grantee	<u> </u>		FAC	Problematic Hydrophytic Vegetation ¹ (Explain)
* Talamagnes canadensis	3		FAC	
		<u> </u>		Indicators of hydric soil and welland hydrology must
),			<u> </u>	
0	•		<u> </u>	
T.(1)	. 1.0			
Lotal Cover	: <u> (0 3 </u>		12.1	
ou % or total cover: <u>.54</u> Plot size (radius, or length y width) کمک کھ	20% of I	total cover	$\frac{1}{0}$	Hydrophytic
6 Cover of Wetland Bright width)	_ 70 Bare G	round	$\frac{3}{40}$	Vegetation Present?
(Where applicable)	vei ui втуорі	nytes	<u> </u>	
			-	

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Danil Kini Kini	1.	Reday Features				
Uepth <u>Matri</u> (inches) Color (moist)	<u>) %</u>	Color (moist) % Type ¹	Loc ²	Texture	Remarks	
3-0				live moss		
0-16		·		organic_	peat	*
				0		
			<u> </u>			
		, 			<u> </u>	
	··_					
Type: C=Concentration, D=	Depletion, RM=R	educed Matrix, CS=Covered or Coa	ed Sand Grain	ns. ² Locatio	n: PL=Pore Lining, N	I=Matrix.
Hydric Soil Indicators:		Indicators for Problematic Hydri	c Solis ³ :			
✓ Histosol or Histel (A1)		Alaska Color Change (TA4) ⁴		Alaska Glo	eyed Without Hue 5Y	or Redder
Histic Epipedon (A2)		Alaska Alpine Swales (TA5)		Underlyi	ng Layer	
Hydrogen Sulfide (A4)		Alaska Redox With 2.5Y Hue		Other (Ex	olain in Remarks)	
Thick Dark Surface (A12	2)	3	1		fundered budreters	
Alaska Gleyed (A13)		*One indicator of hydrophytic vege	tation, one prin	mary indicator d	r wettand nyurology, a distushed or problem	atic
Alaska Redox (A14)	4.51	and an appropriate landscape p	osition must bi	e present unies	s distance of problem	(atic.
Alaska Gleyed Pores (A	15)	Give details of color change in Re				
Restrictive Layer (if presen	it): 					
Type: <u>Nore tour</u>	<u>10</u>			Hudric Soil Dr	sent? Yes X	No
Depth (inches):						
Remarks:						
Remarks:						
Remarks: HYDROLOGY Wefland Hydrology Indicat			I	Secondary Indic	ators (2 or more requi	red)
Remarks: IYDROLOGY Wetland Hydrology Indicat Primary Indicators (any one	tors: Indicator is suffici	ent)	S	Secondary Indic Water-staine	ators (2 or more reguli ad Leaves (B9)	red)
Remarks: HYDROLOGY Wetland Hydrology Indicat <u>Primary Indicators (any one </u> Surface Water (A1)	tors: Indicator is suffici	ent) _ Inundation Visible on Aerial Image	<u>S</u> 	Secondary Indic Water-staind Drainage Pa	ators (2 or more requined Leaves (B9)	red)
Remarks: HYDROLOGY Wetland Hydrology Indicat <u>Primary Indicators (any one I</u> Surface Water (A1) X High Water Table (A2)	tors: Indicator is suffici	ent) _ Inundation Visible on Aerial Image _ Sparsely Vegetated Concave Surf	<u></u>	Secondary Indic Water-stain Drainage Pa Oxidized Rh	ators (2 or more requined Leaves (B9) atterns (B10) izospheres along Livin	r <u>ed)</u> ng Roots (C3)
Remarks: HYDROLOGY Wetland Hydrology Indicat Primary Indicators (any one I Surface Water (A1) High Water Table (A2) Saturation (A3)	tors: Indicator is suffici	ent) _ Inundation Visible on Aerial Image _ Sparsely Vegetated Concave Surf _ Marl Deposits (B15)		Secondary Indic Water-staind Drainage Pa Oxidized Rh Presence of	ators (2 or more requin ed Leaves (B9) atterns (B10) izospheres along Livin Reduced iron (C4)	red) ng Roots (C3)
Remarks: HYDROLOGY Wetland Hydrology Indicat Primary Indicators (any one I Surface Water (A1) X High Water Table (A2) X Saturation (A3) Water Marks (B1)	tors: Indicator is suffici	ent) _ Inundation Visible on Aerial Image _ Sparsely Vegetated Concave Surf _ Marl Deposits (B15) _ Hydrogen Sulfide Odor (C1)	лу (B7) асе (B8)	Secondary Indic Water-staine Drainage Pa Oxidized Rh Presence of Salt Deposi	ators (2 or more required Leaves (B9) atterns (B10) izospheres along Livin Reduced iron (C4) s (C5)	red) ng Roots (C3)
Remarks: HYDROLOGY Wetland Hydrology Indicat Primary Indicators (any one for a surface Water (A1) Surface Water Table (A2) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2)	tors: Indicator is suffici 	ent) Inundation Visible on Aerial Image Sparsely Vegetated Concave Surf Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2)		Secondary Indic Water-staine Drainage Pa Oxidized Rh Presence of Sait Deposi Sait Deposi	ators (2 or more required ad Leaves (B9) Itterns (B10) izospheres along Livin Reduced Iron (C4) s (C5) Stressed Plants (D1) Desility (20)	r <u>ed)</u> ng Roots (C3)
Remarks: HYDROLOGY Wetland Hydrology Indicat Primary Indicators (any one I Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3)	tors: Indicator is suffici	ent) Inundation Visible on Aerial Image Sparsely Vegetated Concave Surf Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Other (Explain in Remarks)	лу (В7) асе (В8) 	Secondary Indic Water-staine Drainage Pa Oxidized Rh Presence of Salt Deposi Stunted or S Geomorphic	ators (2 or more required teaves (B9) itterns (B10) izospheres along Livin Reduced Iron (C4) s (C5) Stressed Plants (D1) : Position (D2)	red) ng Roots (C3)
Remarks: HYDROLOGY Wetland Hydrology Indicat Primary Indicators (any one f Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4)	tors: indicator is suffici	ent) Inundation Visible on Aerial Image Sparsely Vegetated Concave Surf Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Other (Explain in Remarks)	лу (В7) асе (В8) 	Secondary Indic Water-staine Drainage Pa Oxidized Rh Presence of Sait Deposi Stunted or S Geomorphic Shallow Aqu	ators (2 or more requinated Leaves (B9) atterns (B10) izospheres along Livin Reduced Iron (C4) s (C5) Stressed Plants (D1) : Position (D2) attard (D3) applic Bolief (D4)	red) ng Roots (C3)
Remarks: HYDROLOGY Wetland Hydrology Indicat Primary Indicators (any one f 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)	tors: indicator is suffici 	ent) Inundation Visible on Aerial Image Sparsely Vegetated Concave Surf Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Other (Explain in Remarks)	sy (B7) ace (B8) 	Secondary Indic Water-staine Drainage Pa Oxidized Rh Presence of Salt Deposi Stunted or S Geomorphic Shallow Aqu Microtopoge FAC-Neutra	ators (2 or more required Leaves (B9) atterns (B10) izospheres along Livin Reduced Iron (C4) s (C5) Stressed Plants (D1) Position (D2) attard (D3) aphic Relief (D4) t Test (D5)	red) ng Roots (C3)
Remarks: HYDROLOGY Wetland Hydrology Indicat Primary Indicators (any one f Surface Water (A1) X 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)	tors: Indicator is suffici 	ent) Inundation Visible on Aerial Image Sparsely Vegetated Concave Surf Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Other (Explain in Remarks)		Decondary Indic Water-staine Drainage Pa Oxidized Rh Presence of Salt Deposi Stunted or S Geomorphic Shallow Aqu Microtopogr FAC-Neutra	ators (2 or more required bed Leaves (B9) itterns (B10) izospheres along Livin Reduced Iron (C4) s (C5) Stressed Plants (D1) c Position (D2) ittard (D3) aphic Relief (D4) 1 Test (D5)	r <u>ed)</u> ng Roots (C3)
Remarks: HYDROLOGY Wetland Hydrology Indicat Primary Indicators (any one I	tors: indicator is suffici 	ent) Inundation Visible on Aerial Image Sparsely Vegetated Concave Surf Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Other (Explain in Remarks)		Secondary Indic Water-staine Drainage Pa Oxidized Rh Presence of Salt Deposi Stunted or S Geomorphic Shallow Aqu Microtopogr FAC-Neutra	ators (2 or more requined ed Leaves (B9) literns (B10) izospheres along Livin Reduced iron (C4) s (C5) Stressed Plants (D1) e Position (D2) uitard (D3) aphic Relief (D4) 1 Test (D5)	red) ng Roots (C3)
Remarks: HYDROLOGY Wetland Hydrology Indicat Primary Indicators (any one I 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) Field Observations: Surface Water Present?	tors: indicator is suffici 	ent) Inundation Visible on Aerial Image Sparsely Vegetated Concave Surf Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Other (Explain in Remarks) o Depth (inches);	лу (В7) асе (В8) 	Secondary Indic Water-staine Drainage Pa Oxidized Rh Presence of Salt Deposi Stunted or S Geomorphic Shallow Aqu Microtopogr FAC-Neutra	ators (2 or more required ed Leaves (B9) itterns (B10) izospheres along Livin Reduced Iron (C4) s (C5) Stressed Plants (D1) Position (D2) ittard (D3) aphic Relief (D4) t Test (D5)	red) ng Roots (C3)
Remarks: HYDROLOGY Wetland Hydrology Indicat Primary Indicators (any one I 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) Field Observations: Surface Water Present? Water Table Present?	tors: indicator is suffici 	ent) Inundation Visible on Aerial Image Sparsely Vegetated Concave Surf Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Other (Explain In Remarks) o Depth (inches): o Depth (inches):	Iry (B7) ace (B8) 	Secondary Indic Water-staine Drainage Pa Oxidized Rh Presence of Salt Deposi Stunted or S Geomorphic Shallow Aqu Microtopogr FAC-Neutra	etors (2 or more required Leaves (B9) atterns (B10) izospheres along Livin Reduced Iron (C4) s (C5) Stressed Plants (D1) Position (D2) aphic Relief (D4) t Test (D5)	red) ng Roots (C3)
Remarks: HYDROLOGY Wetland Hydrology Indicat Primary Indicators (any one I 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) Field Observations: Surface Water Present? Water Table Present? Saturation Present? (includes capillary fringe) Describe Percent Data (stri	tors: indicator is suffici 	ent) Inundation Visible on Aerial Image Sparsely Vegetated Concave Surf Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Other (Explain in Remarks) o Depth (inches): o Depth (inches): Jepth (inches): o Depth (inches):	S Iry (B7) ace (B8) Wetlar nspections). if	Secondary Indic Water-staine Drainage Pa Oxidized Rh Presence of Salt Deposi Stunted or S Geomorphic Shallow Aqu Microtopogr FAC-Neutra	ators (2 or more required Leaves (B9) atterns (B10) izospheres along Livin Reduced Iron (C4) s (C5) Stressed Plants (D1) Position (D2) aphic Relief (D4) t Test (D5) Present? Yes	red) ng Roots (C3)
Remarks: HYDROLOGY Wetłand Hydrology Indicat Primary Indicators (any one I 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) Field Observations: Surface Water Present? Water Table Present? Saturation Present? Saturation Present? Saturation Present? Saturation Present?	tors: indicator is suffici 	ent) Inundation Visible on Aerial Image Sparsely Vegetated Concave Surf Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Other (Explain in Remarks) o Depth (inches):	S Py (B7) ace (B8) Wetlar nspections), if	Secondary Indic Water-staine Drainage Pa Oxidized Rh Presence of Sait Deposi Stunted or S Geomorphic Shallow Aqu Microtopogr FAC-Neutra	ators (2 or more required ad Leaves (B9) Interns (B10) Izospheres along Livin Reduced Iron (C4) s (C5) Stressed Plants (D1) Position (D2) Intard (D3) aphic Relief (D4) 1 Test (D5)	red) ng Roots (C3)
Remarks: HYDROLOGY Wetland Hydrology Indicat Primary Indicators (any one I 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) Field Observations: Surface Water Present? Water Table Present? Saturation Present? Satur	tors: indicator is suffici 	ent) Inundation Visible on Aerial Image Sparsely Vegetated Concave Surf Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Other (Explain in Remarks) o Depth (inches): o Depth (inches): o Depth (inches): iltoring well, aerial photos, previous 1	Iny (B7) ace (B8) Wetlar nspections), if	Secondary Indic Water-staine Drainage Pa Oxidized Rh Presence of Salt Deposil Stunted or S Geomorphic Shallow Aqu Microtopogr FAC-Neutra	ators (2 or more required ed Leaves (B9) itterns (B10) izospheres along Livin Reduced Iron (C4) s (C5) itressed Plants (D1) e Position (D2) ittard (D3) aphic Relief (D4) t Test (D5) Present? Yes	red) ng Roots (C3)

Project/Site: Grant Creek Corridor	E	Borough/City:	Moos	e Pass s	Sampling Date:	7-20-13
Applicant/Owner: KINAL Hydro					Sampling Point: 1)PIX
Investigatorie): C. Schudel J. Blank		andform (hill	sido torra	to hummerke ate)		
Local relief (concave, convex, none);	'		2 2	ice, nunținocks, etc.). <u>P</u>		7732
Subragion:	<u> </u>		3			
Subregion; Lat: _	<u>160. 45</u>	4248	Long	<u>=199,356514</u>	Datum:	
Soil Map Unit Name:				NWI classifical	ion: or	nc
Are climatic / hydrologic conditions on the site typical for this t	time of yea	ar?Yes <u>×</u>	No	(If no, explain in Rer	narks.)	1
Are Vegetation, Soil, or Hydrologysig	nificantly o	disturbed? N	Are "I	Normal Circumstances" pre	sent? Yes <u>×</u>	_ No
Are Vegetation, Soil, or Hydrology nat	turally prol	blematic? N) (If ne	eded, explain any answers	In Remarks.)	
SUMMARY OF FINDINGS - Attach site map sho	wing sa	mpling poir	nt locatio	ons, transects, import	ant features, et	C.
Hydrophytic Vegetation Present? Yes No	<u> </u>	Is the	Sampled	Area		
Hydric Soil Present? Yes No	<u>×</u>	within	a Wetlan	d? Ves	No X	
Wetland Hydrology Present? Yes No	<u> </u>		a monan	un (ca_		<u> </u>
Remarks: Typical white sprice !	hem	Lucke 1 r	super	birch upland	foreste	ommit
VEGETATION – Use scientific names of plants.	List all s	pecies in ti	he plot.			
Tree Stratum	Absolute % Cover	Dominant In	ndicator Status	Dominance Test works	eet:	
1 Betila DEDVICTERA	20	J	EAT 11	Number of Dominant Spe	cies	
2 TSUER MURTHASIGAR	7.0		FAC		I'AC	(A)
3 PICCA GLANCA	40		FACU	Total Number of Dominar	t 4	
				Species Across All Strata	······	(B)
Total Cover:	510			Percent of Dominant Spe	cies oc	
50% of total cover: 40	20% d	f total cover	16	That Are OBL, FACW, or	FAC: <u></u>	(A/B)
Sapling/Shrub Stratum	_ 20700	r total cover		Prevalence Index works	heet:	
1. Arctostaphylus UVA-UTSI	5		UPL	Total % Cover of:	Multiply b	<u>v:</u>
2. Hisande Vacunum uliganosin	10		FAC	OBL species	$- x_1 = -0$	
3. Menzesia forruginea	40	<u> </u>	FACU	FACW species U	$x^2 = 0$	
4. Empetrum nigrum	10		FAC	FAC species <u>75</u>	$x_3 = 100$	
5. Ts-ga mertensiana	_5		FAC	PACU species <u><u>IIU</u></u>	X4= <u></u>	<u> </u>
6. Picea glauca	10	<u>F</u>	ACU	OPL species	$\frac{1}{2} \times \frac{1}{2} = \frac{1}{2} \times \frac{1}$	(p)
Total Cover:	50			Column Totals: <u>TVU</u>	(A) <u></u>	(B)
50% of total cover: <u>40</u>	_ 20% of	total cover:	16	Prevalence Index =	B/A = 3.75	
Herb Stratum			ŀ	Hydrophytic Vegetation	Indicators:	
1. 100102.			<u> </u>	Dominance Test is >8	50%	
2				Prevalence Index is ≤	3.0	
3		······································		Morphological Adapta	itions ¹ (Provide su	oporting
4,			İ	data in Remarks o	r on a separate sh	eet)
5				Problematic Hydroph	ytic Vegetation ¹ (E;	xplain)
б	, .			¹ Indicators of hudrin anil a	nd wollond budget	
				be present unless disturbe	and wettand hydroid ad or problematic.	igy must
ð		······································	-			
9,						
Total Cover: _	2084 -6	4 - 4 - 1				
Diat size (radius as length y with) DATE & d	20% 01"	iotal cover:		Hydrophytic		
	r of Bryop	hytes 75	5	Vegetation Present? Yes_	NoX	-
(vinele applicable)						
		ph	otos	3163 - 3169		

SOI	L
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Sampling Point: DP 18	

Profile Description: (Desci	ibe to the dep	th needed to docun	ient the ir	ndicator or o	onfirm	the absence of indicators.)
Depth <u>Matr</u>	ix	Redo	k Features			
(inches) Color (mois) %	Color (moist)	%	<u> Type¹ </u>	<u>.0C² .</u>	Texture Remarks
3.0				<u> </u>	·	We moss & rook
0-3 2.544	12					silt logm
3-9	a					peart / arganics
			·	······		······································
					·	
Type: C=Concentration D=	Depletion, RM-	Reduced Matrix, CS	=Covered	or Coated S	and Gra	ins. ² Location: PL=Pore Lining, M=Matrix.
Hydric Soll Indicators:	Poplotion 1 m	Indicators for P	roblemati	c Hydric So	ils ³ :	
Histosol or Histel (A1)		Alaska Colo	r Change ((TA4) ⁴		Alaska Gleyed Without Hue 5Y or Redder
Histic Epipedon (A2)		Alaska Alpir	ie Swales	(TA5)		Underlying Layer
Hydrogen Sulfide (A4)		Alaska Red	ox With 2,8	5Y Hue		Other (Explain in Remarks)
Thick Dark Surface (A12)					
Alaska Gieyed (A13)		³ One indicator of	f hydrophy	tic vegetatio	n, one pi	rimary indicator of wetland hydrology,
Alaska Redox (A14)		and an approp	priate land	scape positio	on must l	be present unless disturbed or problemalic.
Alaska Gleyed Pores (A	15)	⁴ Give details of o	color chang	je in Remarl	(8.	
Restrictive Layer (if presen	t):					
Type: healrock						
Depth (inches):9"		<u>.</u>				Hydric Soll Present? Yes No 🗶
Remarks:					l	
HYDROLOGY						
Wetland Hydrology Indicate	are					Secondary Indicators (2 or more required)
Drimany indicators (any one i	ndicator is suffi	cient)			,	Water-stained Leaves (B9)
Finitely molectors (any one i	itulestor is sum	Inundation Vieibl	o on Aoria	Imagon /P	·	Water-standed Eeuves (Bo)
		munoaduli visibi Sporcolu Vogeta	e un Aena	ue Surface //	() RB)	Drainage Fatterns (BTO) Ovidized Bhizospheres along Living Poots (C2)
Fight Water Table (A2)	-	Mad Donoeite /R	(60 CONCA 46)	ve ounace (i	50)	Oxidized Knizospheres along Living Roots (C3)
Mater Marks (P1)	-	Man Deposits (D	iu) Odar (C1	`		
Water Watks (D1)	-		er Table //	<i>}</i>		Sunted or Stressed Plants (D1)
Segiment Deposits (B2)	. –	Offer (Evaluin in	Domarko	,2)		Stolled of Silessed Plants (D1)
	-	Other (Explain in	Remarks			Geomorphic Position (D2)
Algal Mat of Crust (B4)						Shallow Aquitaro (D3)
Iron Deposits (B5)						Microtopographic Relief (D4)
Surface Soll Cracks (B6)	: 				r — ·	
Field Observations:		N				
Surface Water Present?	Yes	No Depth (ind	ches):	······································		
Water Table Present?	Yes	No/` Depth (ind	nes):			
Saturation Present? (includes capillary fringe)	Yes	No <u> </u>	ches):		Wetla	nd Hydrology Present? Yes No <u>X</u>
Describe Recorded Data (str	eam gauge, mo	initoring well, aerial p	hotos, pre	vious Inspec	tions), if	f available:
Remarks'					,	
nonano.						

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Projecusite: <u>firant lake Corndor</u> Boro	ugh/City: Mose Pass Sampling Date: 7.20.13
Applicant/Owner: Keney Hydro	Sampling Point: DP 据 19
Investigator(s): <u>C. Schudel J. Blank</u> Lanc	lform (hillside, terrace, hummocks, etc.): depression
Local relief (concave, convex, none): Concave Slop	e (%):
Subregion: Lat: Lat:	029 Long:149.354706 Datum: PSS\$13 PEMI
Soil Map Unit Name;	NWI classification: PERHITSSTER B
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 distu	rbed? $\mathcal{N}v$ Are "Normal Circumstances" present? Yes X No
Are Vegetation, Soil, or Hydrology naturally problem	natic? N • (If needed, explain any answers in Remarks.)
SUMMARY OF FINDINGS - Attach site map showing sample	ing point locations, transects, important features, etc.
Hydrophytic Vegetation Present? Yes X No Hydric Soil Present? Yes X No Wetland Hydrology Present? Yes X No	Is the Sampled Area within a Wetland? Yes <u>K</u> No

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

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	Absolute	Dominant	Indicator	Dominance Test worksheet:					
Iree Stratum	<u>% Cover</u>	<u>Species?</u>	<u>Stetus</u>	Number of Dominant Species					
		· · · · · · · · · · · · · · · · · · ·		That Are OBL, FACW, or FAC: (A)					
2			······	Total Number of Dominant					
3				Species Across All Strata: (B)					
4				Porcent of Demission Creation					
Total Cover:	P			That Are OBL, FACW, or FAC: 80 (A/B)					
50% of total cover:	20% o	f total cover	·	Prevalence Index worksheet:					
Sapingronub Stratom	E		CAR	Total % Cover of: Multiply by:					
1. Cally by clays	-7		<u></u>	OBL species 12 $x_1 = 12$					
2. Cours ale combens			FACW	FACW species 5^2 $x_2 = 104$					
3. Enpetrin nigran :	<u> </u>		FAC	FAC species 19 var 57					
4. Benja glandulusum		<u> </u>	FAC	EACH species $\frac{7}{2}$ $\frac{7}{2}$ $\frac{1}{2}$ $\frac{1}{2}$					
5. ficea glavca		<u> </u>	FACU	$\frac{1}{100} \text{ species } \frac{1}{100} \text{ x} 4 = \frac{1}{100}$					
6. Andronuola politolia		<u> </u>	FACW	$\frac{1}{2} \frac{1}{2}	Total Cover:	51			Column lotals; 103 (A) 233 (B)
50% of total cover: <u>25,5</u>	20% of	total cover:	10.2	Prevalence index = $B/A = 2.46$					
Herb Stratum	20			Hydrophytic Veretation Indicators:					
1. <u>Rubus chamae mins</u>	50	<u> </u>	FACW	X Dominance Test is >50%					
2. (arex disperma	3	-	FACW	X Browsteneo Indovio <3.0					
3. Swerha pertinis	2		FACW	Masshaltated and talk and report					
4. Plastantheria dilatata	_3		FACW	data in Remarks or on a separate sheet)					
5. Equisetum fluviatile	<u> </u>		OBL	Problematic Hydronhylic Venetation ¹ (Explain)					
6. Erlophorum chamissons	5.		OBL						
7. Agroshis grantea	-2		FAG	¹ Indicators of hydric soil and wetland hydrology must					
all Carex pausi Flora	2		OBL	be present unless disturbed or problematic.					
J. Calamaarostis canadensis	5 2		FAC						
10				1					
Total Cover:	52								
50% of total cover: 26	20% of	total cover:	10.4						
Plot size (radius, or length x width) 201 rad	% Bare G	round	0	Hydropnytic Vegetation					
% Cover of Wetland Bryophytes Total Cove (Where applicable)	er of Bryopi	hytes	92	Present? Yes <u>No</u>					
Remarks:		ohotos	217	He - 317 COPS 15					
		ľ	וו						

SO	I	L
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nches) Color (moist) %	Color (moist)	%Type ¹	Loc ²		Remarks
				live moss	
· · · · · · · · · · · · · · · · · · ·				111-4-	
<u> </u>		· · · · · · · · · · · · · · · · · · ·		pear	2000
······································			-	<u> </u>	·
				·	<u></u>
				<u></u>	
424.0259mg299407		<u> </u>			
Contraction DeDopiction P	M-Doducod Motrix CS-	Covered or Cos	led Sand G	rains ² Location:	PL=Pore Lining M=Matrix
ype: C=Concentration, D=Depletion, K vdric Soil Indicators:	Indicators for Pr	oblematic Hydr	ic Solls ³ :		E-t bic ching; in-maax;
Kistosol or Histel (A1)	Alaska Color	Change (TA4)4		Alaska Gleye	d Without Hue 5Y or Redder
Histic Epipedon (A2)	Alaska Alpine	e Swales (TA5)		Underlying	Layer
_ Hydrogen Sulfide (A4)	Alaska Redo	x With 2.5Y Hue		Other (Explain	n in Remarks)
_ Thick Dark Surface (A12)					· · · · · · · · · · · · · · · · · · ·
_ Alaska Gleyed (A13)	³ One indicator of i	hydrophytic veg	etation, one	primary indicator of we	etland hydrology,
_ Alaska Redox (A14)	and an appropr	riate landscape	osition mus	t be present unless al	sturbed of problematic.
_ Alaska Gieyed Pores (A15)	Give details of co				
estrictive Layer (if present):					
Type: <u>Yove</u> Dorter				Hydric Soil Prese	nt? Yes X No
Type: <u>Y WC WORR</u> Depth (inches): Remarks:				Hydric Soil Prese	nt? Yes <u>X</u> No
Type: <u>Yove tooriot</u> Depth (inches): Remarks:				Hydric Soil Prese	nt? Yes <u>X</u> No
YDROLOGY				Hydric Soil Prese	nt? Yes <u>X</u> No <u></u>
Type: Yorce Depth (inches):	ufficient)			Hydric Soil Preset	nt? Yes <u>X</u> No s (2 or more required) eaves (B9)
Type: Yorce Depth (inches):	ufficient)	on Aerial Image		Hydric Soil Preset	nt? Yes <u>X</u> No <u></u> s (2 or more required) eaves (B9) ns (B10)
Type: Depth (inches): Remarks: YDROLOGY Vetland Hydrology Indicators: Primary Indicators (any one Indicator Is s Surface Water (A1) High Water Table (A2)	ufficient) Inundation Visible Sparsely Vegetate	on Aerial Image	ry (B7) face (B8)	Hydric Soil Preset	nt? Yes <u>X</u> No <u></u> s (2 or more required) eaves (B9) ns (B10) spheres along Living Roots (C3)
Type:	ufficient) Inundation Visible Sparsely Vegetate Mari Deposits (B1	on Aerial Image ed Concave Sur 5)	ery (B7) face (B8)	Hydric Soil Preset	nt? Yes <u>X</u> No <u></u> s (2 or more required) eaves (B9) ns (B10) spheres along Living Roots (C3) duced Iron (C4)
Type:	ufficient) Inundation Visible Sparsely Vegetate Mari Deposits (B1 Hydrogen Sulfide	on Aerial Image ed Concave Sur 5) Odor (C1)	ery (B7) face (B8)	Hydric Soil Preser	nt? Yes <u>No</u> <u>nore required</u> eaves (B9) ns (B10) spheres along Living Roots (C3) duced Iron (C4) (5)
Type:	ufficient) Inundation Visible Sparsely Vegetate Mari Deposits (B1 Hydrogen Sulfide Dry-Season Wate	on Aerial Image ed Concave Sur 5) Odor (C1) er Table (C2)	ery (B7) face (B8)	Hydric Soil Preset	nt? Yes X No s (2 or more required) eaves (B9) ns (B10) spheres along Living Roots (C3) duced Iron (C4) :5) essed Plants (D1)
Type:	ufficient) Inundation Visible Sparsely Vegetate Mari Deposits (B1 Hydrogen Sulfide Dry-Season Wate Other (Explain in	o on Aerial Image ed Concave Sur 5) Odor (C1) er Table (C2) Remarks)	ery (B7) face (B8)	Hydric Soil Preset	nt? Yes X No s (2 or more required) eaves (B9) ns (B10) spheres along Living Roots (C3) duced Iron (C4) (5) sed Plants (D1) sition (D2) d (C2)
Type: YINC YUNC Depth (inches):	ufficient) Inundation Visible Sparsely Vegetate Mari Deposits (B1 Hydrogen Sulfide Dry-Season Wate Other (Explain in	o on Aeriai Image ed Concave Sur 5) Odor (C1) er Table (C2) Remarks)	ery (B7) face (B8)	Hydric Soil Preset	nt? Yes X No s (2 or more required) eaves (B9) ns (B10) spheres along Living Roots (C3) duced Iron (C4) (5) ased Plants (D1) sition (D2) d (D3) is Relief (D4)
Type:	ufficient) Inundation Visible Sparsely Vegetate Mari Deposits (B1 Hydrogen Sulfide Dry-Season Wate Other (Explain in	o on Aerial Image ed Concave Sur 5) Odor (C1) er Table (C2) Remarks)	ery (B7) face (B8)	Hydric Soil Preser	nt? Yes X No s (2 or more required) eaves (B9) ns (B10) spheres along Living Roots (C3) duced Iron (C4) :5) ased Plants (D1) sition (D2) d (D3) ic Relief (D4) st (D5)
Type:	ufficient) Inundation Visible Sparsely Vegetate Mari Deposits (B1 Hydrogen Sulfide Dry-Season Wate Other (Explain in	o on Aerial Image ed Concave Sur 5) Odor (C1) er Table (C2) Remarks)	ery (B7) face (B8)	Hydric Soil Preset	nt? Yes X No s (2 or more required) eaves (B9) ns (B10) spheres along Living Roots (C3) duced Iron (C4) (5) ased Plants (D1) sition (D2) d (D3) lc Relief (D4) st (D5)
Type:	ufficient) Inundation Visible Sparsely Vegetate Mari Deposits (B1 Hydrogen Sulfide Dry-Season Wate Other (Explain in No X Depth (incl	o on Aeriai Image ed Concave Sur 5) Odor (C1) er Table (C2) Remarks)	ery (B7) Face (B8)	Hydric Soil Preser	nt? Yes X No s (2 or more required) eaves (B9) ns (B10) spheres along Living Roots (C3) duced Iron (C4) :5) sed Plants (D1) sition (D2) d (D3) ic Relief (D4) st (D5)
Type:	ufficient) Inundation Visible Sparsely Vegetate Mari Deposits (B1 Hydrogen Sulfide Dry-Season Wate Other (Explain in No Depth (incl No Depth (incl No Depth (incl No Depth (incl No Depth (incl No Depth (incl No Depth (incl No Depth (incl No Depth (incl No Depth (incl No Depth (incl No Depth (incl No Depth (incl No Depth (incl No No Depth (incl Depth (incl	e on Aerial Image ed Concave Sur 5) Odor (C1) rr Table (C2) Remarks) hes):	ery (B7) face (B8)	Hydric Soil Preset Secondary Indicator Water-stained L Drainage Patter Oxidized Rhizos Presence of Rei Salt Deposits (C Stunted or Strest Geomorphic Po Shallow Aquitar X Microtopograph FAC-Neutral Te	nt? Yes X No s (2 or more required) eaves (B9) ns (B10) spheres along Living Roots (C3) duced Iron (C4) :5) seed Plants (D1) sition (D2) d (D3) ic Relief (D4) st (D5)
Type:	ufficient)Inundation VisibleSparsely VegetateMari Deposits (B1Hydrogen SulfideDry-Season WateOther (Explain inNoDepth (inclNoDepth (inclNoDepth (inclNoDepth (inclNoDepth (incl)	e on Aerial Image ed Concave Sur 5) Odor (C1) er Table (C2) Remarks) hes): hes):	ery (B7) Face (B8)	Hydric Soil Preset Secondary Indicator Water-stained L Drainage Patter Oxidized Rhizos Presence of Re Salt Deposits (C Salt Deposits (C Stunted or Strest Geomorphic Po Shallow Aquitar Microtopograph FAC-Neutral Te Iand Hydrology Pres	nt? Yes X No s (2 or more required) eaves (B9) ns (B10) spheres along Living Roots (C3) duced Iron (C4) 55) ased Plants (D1) sition (D2) d (D3) ic Relief (D4) st (D5) ent? Yes X No
Type:	ufficient)Inundation VisibleSparsely VegetateMari Deposits (B1Hydrogen SulfideDry-Season WateOther (Explain inNoDepth (inclNoDepth (inclNo)Depth (incl)Depth (inclNO)Depth (incl)Depth (incl	e on Aerial Image ed Concave Sur 5) Odor (C1) rr Table (C2) Remarks) hes): hes): hes):	ry (B7) face (B8)	Hydric Soil Preset	nt? Yes X No s (2 or more required) eaves (B9) ns (B10) spheres along Living Roots (C3) duced Iron (C4) (5) sed Plants (D1) sition (D2) d (D3) ic Relief (D4) st (D5) ent? Yes X No
Type: YINC YOROLOGY Netland Hydrology Indicators: Primary Indicators (any one Indicator Is s Primary Indicators (any one Indicator Is s 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 Weter Present? Yes Saturation Present? Yes Saturation Present? Yes Diration Present? Yes Describe Recorded Data (stream gauge,	ufficient)Inundation VisibleSparsely VegetateMarl Deposits (B1Hydrogen SulfideDry-Season WateOther (Explain inNoDepth (inclNoDepth (inclNo)Depth (inclNo)Depth (inclNo)Depth (inclNo)Depth (inclNo)Depth (incl)Depth (incl	e on Aerial Image ed Concave Sur 5) Odor (C1) rr Table (C2) Remarks) hes): hes): hes): hotos, previous	ery (B7) face (B8)	Hydric Soil Preset Secondary Indicator Water-stained L Drainage Patter Oxidized Rhizos Presence of Rei Salt Deposits (C Stunted or Strest Geomorphic Po Shallow Aquitar X Microtopograph FAC-Neutral Te Iand Hydrology Pres if available:	nt? Yes X No s (2 or more required) eaves (B9) ns (B10) spheres along Living Roots (C3) duced Iron (C4) :5) ased Plants (D1) sition (D2) d (D3) ic Relief (D4) st (D5) ent? Yes X No
Type:	ufficient)Inundation VisibleSparsely VegetateMari Deposits (B1Hydrogen SulfideDry-Season WateOther (Explain inNoDepth (inclNoDepth (inclNo)Depth (inclNo)Depth (inclNo)Depth (inclNo)Depth (inclNo)Depth (inclNo)Depth (inclNo)Depth (inclNo)Depth (incl)Depth (incl _	e on Aerial Image ed Concave Sur 5) Odor (C1) er Table (C2) Remarks) hes):	ery (B7) face (B8)	Hydric Soil Preset Secondary Indicator Water-stained L Drainage Patter Oxidized Rhizos Presence of Rei Salt Deposits (C Stunted or Strest Geomorphic Po Shallow Aquitar Microtopograph FAC-Neutral Te Iand Hydrology Pres if available:	nt? Yes X No s (2 or more required) eaves (B9) ns (B10) spheres along Living Roots (C3) duced Iron (C4) (5) ased Plants (D1) sition (D2) d (D3) ic Relief (D4) st (D5) ent? Yes X No
Type:	ufficient)Inundation VisibleSparsely VegetateMari Deposits (B1Hydrogen SulfideDry-Season WateOther (Explain inNoDepth (inclNoDepth (incl	e on Aerial Image ed Concave Sur 5) Odor (C1) er Table (C2) Remarks) hes): hes): hes): hotos, previous	ery (B7) face (B8) face (B8) wet	Hydric Soil Preset Secondary Indicator Water-stained L Drainage Patter Oxidized Rhizos Presence of Re Salt Deposits (C Stunted or Stress Geomorphic Po Shallow Aquitar Microtopograph FAC-Neutral Te Iand Hydrology Press if available:	nt? Yes X No s (2 or more required) eaves (B9) ns (B10) spheres along Living Roots (C3) duced Iron (C4) (5) ssed Plants (D1) sition (D2) d (D3) Ic Relief (D4) st (D5) ent? Yes X No

Project/Site: <u>Givant Creek Corndor</u>	Boroug	h/City: Mø	ose Pass	- Samplino Date:	7.20.13
Applicant/Owner. Kenou Hydro				Sampling Point:	PZD
Investigator(s): <u>C.Schudel</u> J. Blank	Landfo	rm (hillside, terra	ace, hummocks, etc.);	de pression	
Local relief (concave, convex, none): Concave	Slope (%): <i>O</i>			
Subregion: Lat: 60	0. 4540	10 Lon	a:~149.352.74	7 Datum	
Soil Map Unit Name:			NWI classi	ication PSS414	PEMIB
Are climatic / hydrologic conditions on the site typical for this time	of year? Ye	s X No	(if no, explain in	Remarks)	(04421EM/B)
Are Vegetation, Soil, or Hydrology signification	cantly disturbe	ed? K/v Are "	Normal Circumstances"		No
Are Vegetation, Soil, or Hydrology natural	liy problemati	ic?, A,⊨) (lfne	eded, explain any answ	ers in Remarks.)	
SUMMARY OF FINDINGS - Attach site map showin	ng sampling	g point locati	ons, transects, imp	ortant features, e	tc.
Hydrophytic Vegetation Present? Yes No Hydric Soll Present? Yes No Wetland Hydrology Present? Yes No		ls the Sampled within a Wetlan	Area d? Ye	s_X_ No	
Remarks:	<u> </u>				
VEGETATION - Use scientific names of plants. List	t all specie	s in the plot.	· · · · · · · · · · · · · · · · · · ·	•	
Abso Abso	olute Domir	ant Indicator	Dominance Test wor	ksheet;	·
1. Nove	<u>Speci</u>	<u>ies?</u> <u>Status</u>	Number of Dominant & That Are OBL, FACW,	Species or FAC: 2	(A)
2			Total Number of Domi	nant	
3			Species Across All Str	ala; Z	(B)
4 Total Cover:		u	Percent of Dominant S That Are OBL, FACW,	or FAC: 100	(A/B)
50% of total cover: 20	20% of total c	over:	Prevalence Index wo	rksheet:	
1. Betula alandulosa 5	•	FAC.	Total % Cover of:	Multiply b	<u>v:</u>
2. ledum depumbens 5		FAC	OBL species 25	x1= <u>25</u>	

1. DETUTA CHUMOLONDSA			THU	
2. ledun depundens	_5		FAC	OBL species $\frac{25}{15}$ x 1 = $\frac{25}{15}$
3. Empetrum nigrum	5		FAC	FACW species 25 x 2 = 50
4. Andromeda polifolia	20	V	FACW	FAC species 1% x 3 = 54
5. Naccinium Visanosam	3	· · · · ·	FAL	FACU species _ O x 4 = _ O
6.		· · · · · · · · · · · · · · · · · · ·		UPL species x 5 =
Total Cover:	38	<u> </u>		Column Totals: 68 (A) 129 (B)
50% of total cover; <u>19</u>	20% of	total cover	7.6	Prevalence index = $B/A = 1,90$
1 Drosera votudifilia	5		DBL .	Hydrophytic Vegetation Indicators:
2 Carty sauciflace	70		NRI	X Dominance Test Is >50%
3 Rubus classocialis	<u> </u>			X Prevalence Index is ≤3.0
4			<u>+/10</u> W	Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
5			<u></u>	Problematic Hydrophytic Vegetation ¹ (Explain)
6				
7				¹ Indicators of hydric soil and wetland hydrology must
8				be present unless disturbed or problematic.
9				
10.				
Total Cover:	30			
50% of total cover: 15	20% of	total cover:	6	
Plot size (radius, or length x width) $2i$ (rad).	% Bare G	round	0	Hydrophytic
% Cover of Wetland Bryophyles Total Cove (Where applicable)	er of Bryop	hytes <u>1</u>	20	Present? Yes <u>X</u> No
Remarks:			I	106 (182 - 2161 (1)84
			en	0702 SIRS - 5120 - 5130
			•	

								518 ¹⁴¹¹¹	
OIL							Sar	npling Point:	DP20
rofile Description: (Describ	e to the depth n	eeded to docum	ent the in	dicator o	or confirm	n the absence	of Indicator	s.)	
Depth <u>Matrix</u>		Redox	Features	Tunal		Toyturo		Pemarke	
inches) Color (moist)	%	Color (moist)		Type	LUC			Itemarks	
2-0		•		<u> </u>	<u> </u>	live mos	5		
0-16						peat	L		
						•			
						,			
			·						
			·			<u></u>	. <u></u>		
						····			
			<u> </u>		<u></u>		<u></u>	· · · ·	
		durad Matrix CS	Covered	or Coale	d Sand G	rains ² 1 a	cation: PL=P	ore Lining, M	=Matrix
Type: C=Concentration, D=De	epielion, rivi-re	Indicators for P	roblematic	c Hydric	Soils ³ :	<u>rumo. 20</u>		010 20031	
X Histosol or Histel (A1)		Alaska Colo	r Change ((TA4) ⁴		Alaska	a Gleyed With	nout Hue 5Y o	or Redder
Histic Epipedon (A2)		Alaska Alpin	ne Swales ((TA5)		Und	erlying Layer		
Hydrogen Sulfide (A4)		Alaska Rede	ox With 2.5	6Y Hue		Other	(Explain in R	emarks)	
Thick Dark Surface (A12)		³ O	f Ludenshui	Na va och	Non and	nrimony indica	for of welland	hydrology	
Alaska Gleyed (A13)		one indicator of	r nyaropnyi priate lands	lic vegela scane no	sition mus	t be present u	nless disturbe	d or problem	atic.
		4Cius dataile of c	olor chanc	in Ren	narks.				
Alaska Gleved Pores (A15)	6	Give details of u							
Alaska Gleyed Pores (A15 Alaska Laver (If present)	5) :	Give details of t		<u>, , , , , , , , , , , , , , , , , , , </u>					
Alaska Gleyed Pores (A15 Restrictive Layer (If present) Type: Norl Finn	i) : nd								
Alaska Gleyed Pores (A15 Restrictive Layer (If present) Type: را ماسل الماسي Depth (inches): Remarks:	i) : nd			, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		Hydric Soi	l Present?	Yes <u>X</u>	No
Alaska Gleyed Pores (A15 Restrictive Layer (If present) Type: Depth (inches): Remarks: YDROLOGY Wetland Hydrology Indicator Primary Indicators (any one ind Surface Water (A1) High Water Table (A2) X Saturation (A3) Water Marks (B1) SedIment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5)	i) 	nt) Inundation Visibl Sparsely Vegeta Marl Deposits (E Hydrogen Sulfid Dry-Season Wal Other (Explain in	le on Aeria ited Conca 115) e Odor (C1 ter Table (C h Remarks)	I Imagery ve Surfac () (22))	/ (87) ce (88)	Hydric Soi Secondary II Water-s Drainag Oxidized Presence Salt Dep Stunted Geomon Shallow Microto	I Present? I Present? I ained Leave Patterns (B Rhizosphere of Reduced bosits (C5) or Stressed I phic Position Aquitard (D3 bographic Re	Yes r more requir s (B9) 10) es along Livir f iron (C4) Plants (D1) (D2)) lief (D4)	No ed) ig Roots (C
Alaska Gleyed Pores (A15 Restrictive Layer (If present) Type:	i)	nt) Inundation Visibl Sparsely Vegeta Marl Deposits (E Hydrogen Sulfid Dry-Season Wał Other (Explain in Depth (in Depth (in Depth (in Depth (in Depth (in	le on Aeria ted Conca ted Conca ted Conca ter Table (C n Remarks) ches): ches): ches): ches):	I Imageny ve Surfac () C2))	/ (87) ce (88) 	Hydric Sol Secondary II Water-s Drainag Oxidized Presenc Salt Dep Stunted Geomot Shallow Microtop FAC-Ne tland Hydrolog	I Present? Indicators (2 of tained Leave e Patterns (B d Rhizospher cosits (C5) or Stressed I phic Position Aquitard (D3 pographic Re- putral Test (D- gy Present?	Yes r more requir s (B9) 10) es along Livir d iron (C4) Plants (D1) (D2)) lief (D4) 5) Yes X	No
Alaska Gleyed Pores (A15 Restrictive Layer (If present) Type:	i)	ant) Inundation Visibl Sparsely Vegeta Marl Deposits (E Hydrogen Sulfide Dry-Season Wal Other (Explain in	le on Aería Ited Conca Ited Conca Iter Table (C n Remarks) ches): ches): ches): pholos, pre	I Imagery ve Surfat () C2))	/ (B7) ce (B8) 	Hydric Soi Secondary II Water-s Drainag Oxidized Presence Salt Dep Stunted Geomor Shallow Microtop FAC-Net	I Present? I Present? I Present? Addicators (2 of tained Leaves Patterns (B Addicators (C5) or Stressed Phic Position Aquitard (D3 pographic Re- putral Test (D gy Present?	Yes r more requir s (B9) 10) es along Livir d iron (C4) Plants (D1) (D2)) lief (D4) 5) Yes	No

Project/Site: Grant (reek Coundar	Dev	Mar Mar		0 -1
Applicant/Owner: Kengs Hydro	Bord	ough/City: <u>19101</u>	Be Pass Sampling Date:	<u></u>
Investigator(s): C.Schudel J. Blank	Lan	dform (hilloido, tor	Sampling Point: UY 2	<u> </u>
Local relief (concave, convex, none); NUNL	Slor			<u> </u>
Subregion:	at: 60.434	189 La	- no: k -149 20-1521/ power	
Soil Map Unit Name:			NUM classification: (12/4/4 of	
Are climatic / hydrologic conditions on the site typical for th	is time of year?	Yes X No	(If no, evolution in Remarks)	
Are Vegetation, Soil, or Hydrology	significantly distu	Irbed? NV Are	"Normal Circumstances" present2 Yes Y	
Are Vegetation, Soil, or Hydrology	naturally problem	natic? N (If n	eeded explain any answers in Remarks)	
SUMMARY OF FINDINGS - Attach site map s	howing samp	ling point locat	tions, transects, important features, etc.	
Hydrophylic Vegetelien Dresseria				
Hydric Soil Present? Yes		Is the Sampled	d Area	
Wetland Hydrology Present? Yes N	10	within a Wetla	nd? Yes No	
Remarks: point representation	e 0 1		}	
Sprice aprenad fore	st. D "	(pscal H	functively paperbirch wh	Ļ
VEGETATION - Use scientific names of plants	List all spec	ies in the nlot		
	Absolute Do	minant Indicator	Dominance Test workshoot	<u> </u>
Tree Stratum	% Cover Sp	ecles? Status	Number of Dominant Species	
1. Betvia papintera	$-\frac{-10}{10}$	FACU FACU	That Are OBL, FACW, or FAC:	(A)
2. Fleh glasca		<u> FAPEU</u>	Total Number of Dominant	i
4			Species Across All Strata: 5	(B)
Total Cover	r	······································	Percent of Dominant Species	ľ
50% of total cover: 30) 20% of tota	l cover 12	That Are OBL, FACW, or FAC: 20 00	(A/B)
Sapling/Shrub Stratum			Prevalence Index worksheet:	
1. Arctostaphylus uva. ursi	2	UPL.	Lotal % Cover of: Multiply by:	
2. Menzicia furriginea	<u>20</u>	FAEU	$\frac{1}{1} OBL species \qquad 0 \qquad x_1 = 0$	
3. Competition Internet		FAC	FAC species $3 \times 3 = 9$	
4. CINNALL DOILALIS		FACU	FACU species 93 $x4 = 372$	
6			UPL species $6 \times 5 = 25$	[
Total Cover	. 7.8		Column Totals: 111 (A) 426	(B)
50% of total cover: 14	20% of total	cover 516		
Herb Stratum				
1. KUBUS Chamaemons	<u>@ 10</u>	Y FACW	Hydrophytic vegetation indicators:	
2. <u>Chamerian angustitolium</u>		EACU	Prevalence Index is <3.0	
3. INFROTATIS enoped		FACU	Morphological Adaptations ¹ (Provide supportin	_
5 Chones coundings	-3		data in Remarks or on a separate sheet)	а
6. (permot in perior) - cs	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	T. FACU	Problematic Hydrophytic Vegetation ¹ (Explain)	
7. Geocarlon lividum		<u></u>	¹ Indicators of hydric soil and wetland hydrology mu	
8		· · · · · · · · · · · · · · · · · · ·	be present unless disturbed or problematic.	si
9		[
10				
Total Cover:	23			•
50% of total cover:50%	20% of total	cover: 4.6	Hudronbutte	
Plot size (radius, or length x width) 10 rad,	% Bare Ground		Vegetation Vegetation	
% Cover of Wetland Bryophytes Total Cov (Where applicable)	er of Bryophytes	<u></u>	Present? Yes No	
Remarks:	· · · · · · · · · · · · · · · · · · ·			
2 and 2		÷		
photos	3191-93			

				r or confir-	the absence of indicators)	
Profile Desc	ription: (Describe to	the depth	needed to document the Indicato	r or contirn	n the absence of indicators.)	
Depth (inchor)	<u>Matrix</u>	06	<u>Redox Features</u>	Loc ²	Texture Remarks	
		<u></u>			Ind gozenic	
θ^{-5}		-			1100 dispance s2"cob	ble
3-13	7.5YR-4/6	100	<u> </u>		Sanay loam + gravel	
13-110	10YR 411	100			cobble / bedrockes	
<u></u>					sandy day	
		w.				
					·	
	<u></u>					
	22-02					
			Jaduard Mattiv, CS-Covered or Cos	ted Sand G	rains ² Location: PI =Pore Lining, M=Matrix,	
Type: C=C	oncentration, D=Deplet Indicators:	ion, RMI=	Indicators for Problematic Hydr	ic Soils ³ :		
Historia	or Histel (A1)		Alaska Color Change (TA4)4		Alaska Gleyed Without Hue 5Y or Redde	er.
Histic E	ninedon (A2)		Alaska Alpine Swales (TA5)		Underlying Layer	
– Hvdroa	an Sulfide (A4)		Alaska Redox With 2.5Y Hue		Other (Explain in Remarks)	
Thick D	ark Surface (A12)					
Alaska	Gleved (A13)		³ One indicator of hydrophytic veg	etation, one	primary indicator of wetland hydrology,	
Alaska	Redox (A14)		and an appropriate landscape	position mus	st be present unless disturbed or problematic.	
Alaska	Gleyed Pores (A15)		⁴ Give details of color change in R	emarks.		
	-					
Restrictive	Layer (if present):					
Restrictive Type:	Layer (if present): bed vock					,
Restrictive Type: Depth (ir	Layer (if present): bed vock iches): [b"				Hydric Soil Present? Yes No	<u><</u>
Restrictive Type: Depth (ir Remarks:	Layer (if present): bed yock inches): b ⁿ				Hydric Soil Present? Yes No _>	<u><</u>
Restrictive Type: Depth (ir Remarks:	Layer (if present): bedrock iches): 6 ^H				Hydric Soil Present? Yes No _>	<u><</u>
Restrictive Type: Depth (ir Remarks: ()	Layer (if present): bedrock iches): <u>b"</u> .har(oal in	Pit			Hydric Soil Present? Yes No _>	<u><</u>
Restrictive Type: Depth (ir Remarks: 	Layer (if present): bedrock iches): <u>b"</u> .harcoal in	pit			Hydric Soil Present? Yes No _>	<u><</u>
Restrictive Type: Depth (ir Remarks: () O	Layer (if present): bedrock inches): <u>bedrock</u> har (dal 1n	pit			Hydric Soil Present? Yes No _>	<
Restrictive Type: Depth (ir Remarks: 	Layer (if present): bedrock iches): <u>b"</u> har (dal in ish	pit .			Hydric Soil Present? Yes No _>	
Restrictive Type: Depth (ir Remarks: YDROLC	Layer (if present): bedrock inches): <u> b"</u> harcoal in ish	pit			Hydric Soil Present? Yes No	<
Restrictive Type: Depth (ir Remarks: () () () () () () () () () () () () ()	Layer (if present): bedrock iches): <u> b"</u> harcoal in ish OGY rdrology Indicators:	pit			Hydric Soil Present? Yes No <u>Secondary Indicators (2 or more required)</u> Water-stained Leaves (B9)	<
Restrictive Type: Depth (ir Remarks: () () () () () () () () () () () () ()	Layer (if present): bedrock inches): <u> b"</u> .har(dal in .sh .sh .sh DGY /drology Indicators: icators (any one indicat	Pit.	sient)		Hydric Soil Present? Yes No <u>Secondary Indicators (2 or more required)</u> Water-stained Leaves (B9) Drainage Patterns (B10)	<u><</u>
Restrictive Type: Depth (ir Remarks: () () () () () () () () () () () () ()	Layer (if present): bed vock inches): 6" . War (dal 10 . War (dal 10 . Water (A1) . Water (A1)	Pit-	cient)	ery (B7)	Hydric Soil Present? Yes No Secondary Indicators (2 or more required) Water-stained Leaves (B9) Drainage Patterns (B10) Ovidized Phizeenbergs along Living Roots	(03
Restrictive Type: Depth (ir Remarks: C V VDROLC Wetland Hy Primary Ind Surface High W	Layer (if present): bed vock iches):	pit or is suffic	cient) Inundation Visible on Aerial Image Sparsely Vegetated Concave Sur	ery (B7) face (B8)	Hydric Soil Present? Yes No Secondary Indicators (2 or more required) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots Breence of Reduced Iron (C4)	(C3)
Restrictive Type: Depth (ir Remarks: C C YDROLC Vetland Hy Primary Ind Surface High W Saturat	Layer (if present): bed vock iches): <u>b</u> (hav (dal in ish DGY vdrology Indicators: icators (any one indicat b Water (A1) vater Table (A2) ion (A3)	pit or is suffic	cient) Inundation Visible on Aerial Image Sparsely Vegetated Concave Sur Marl Deposits (B15)	ery (B7) face (B8)	Hydric Soil Present? Yes No Secondary Indicators (2 or more required)	(C3
Restrictive Type: Depth (ir Remarks: () () () () () () () () () () () () ()	Layer (if present): bed vock iches): <u>b</u> (i have (dal in ish oGY vorology Indicators: icators (any one indicat b) Water (A1) vater Table (A2) ion (A3) Warks (B1)	pit or is suffic	sient) Inundation Visible on Aerial Image Sparsely Vegetated Concave Sur Marl Deposits (B15) Hydrogen Sulfide Odor (C1)	ery (B7) face (B8)	Hydric Soil Present? Yes No Secondary Indicators (2 or more required)	(C3
Restrictive Type: Depth (ir Remarks: YDROLC Wetland Hy Primary Ind Surface High W Saturat Saturat Sedime	Layer (if present): bed yock inches):	pit or is suffic	cient) Inundation Visible on Aerial Image Sparsely Vegetated Concave Sur Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2)	ery (B7) face (B8)	Hydric Soil Present? Yes No Secondary Indicators (2 or more required)	(C3
Restrictive Type: Depth (ir Remarks: () () () () () () () () () () () () ()	Layer (if present): bed yock inches):	pit or is suffic	cient) Inundation Visible on Aerial Image Sparsely Vegetated Concave Sur Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Other (Explain in Remarks)	ery (B7) face (B8)	Hydric Soil Present? Yes No Secondary Indicators (2 or more required)	(C3
Restrictive Type: Depth (ir Remarks: () () () () () () () () () () () () ()	Layer (if present): bed yock inches):	or is suffic	cient) Inundation Visible on Aerial Image Sparsely Vegetated Concave Sur Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Other (Explain in Remarks)	ery (B7) face (B8)	Hydric Soil Present? Yes No Secondary Indicators (2 or more required)	(C3
Restrictive Type: Depth (ir Remarks: C C Ventland Hy Primary Ind Surface High W Saturat Water I Sedime Sedime Algal M Iron De	Layer (if present): bed yock inches):	or is suffic	cient) Inundation Visible on Aerial Image Sparsely Vegetated Concave Sur Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Other (Explain in Remarks)	ery (B7) face (B8)	Hydric Soil Present? Yes No Secondary Indicators (2 or more required)	(C3
Restrictive Type: Depth (ir Remarks: C C VDROLC Wetland Hy Primary Ind Saturat High W Saturat Sedime Drift De Algal M Iron De Surface	Layer (if present): bed yock inches):	pit or is suffic	sient) Inundation Visible on Aerial Image Sparsely Vegetated Concave Sur Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Other (Explain in Remarks)	ery (B7) face (B8)	Hydric Soil Present? Yes No Secondary Indicators (2 or more required)	(C3
Restrictive Type: Depth (ir Remarks: C O YDROLC Wetland Hy Primary Ind Wetland Hy Primary Ind Saturat High W Saturat Water I Sedime Drift De Algal M Iron De Surface	Layer (if present): bed rock inches):	pit or is suffic	sient) Inundation Visible on Aerial Image Sparsely Vegetated Concave Sur Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Other (Explain in Remarks)	ery (B7) face (B8)	Hydric Soil Present? Yes No Secondary Indicators (2 or more required)	(C3
Restrictive Type: Depth (ir Remarks: () () () () () () () () () () () () ()	Layer (if present): bed yock inches): bed yock inches): bed yock inches): bed yock inches): bed yock inches): bed wary (dal 10 inches): bed off off off off off off off of	pit or is suffic	sient) inundation Visible on Aerial Image Sparsely Vegetated Concave Sur Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Other (Explain in Remarks) No Depth (inches):	ery (B7) face (B8)	Hydric Soil Present? Yes No Secondary Indicators (2 or more required) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots 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)	(C3
Restrictive Type: Depth (ir Remarks: () () () () () () () () () () () () ()	Layer (if present): bed yock inches): bed yock i	pit <u>or is suffic</u> <u>s 1</u>	Sient) Inundation Visible on Aerial Image Sparsely Vegetated Concave Sur Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Other (Explain in Remarks)	ery (B7) face (B8)	Hydric Soil Present? Yes No Secondary Indicators (2 or more required) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots 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)	(C3
Restrictive Type: Depth (ir Remarks: () () () () () () () () () () () () ()	Layer (if present): bd yock inches): bd yock	or is suffic s 1 s 1	Sient) Inundation Visible on Aerial Image Sparsely Vegetated Concave Sur Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Other (Explain in Remarks) No X No X Depth (inches):	ery (B7) face (B8)	Hydric Soil Present? Yes No Secondary Indicators (2 or more required)	(c3
Restrictive Type: Depth (ir Remarks: () () () () () () () () () () () () ()	Layer (if present): bd yock inches): bd yock	pit <u>or is suffic</u> <u>s 1</u> <u>s 1</u>	cient)	ery (B7) face (B8)	Hydric Soil Present? Yes No Secondary Indicators (2 or more required)	(c3

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Subregion:	 Lat: <u>144</u>	360721 Lo	
Soil Map Unit Name:			NWI classification: PSHILLSCHE
re climatic / hydrologic conditions on the site typical fo	or this time of yea	r? Yes X No	(If no explain in Remarks)
re Vegetation, Soil, or Hydrology	significantly d	listurbed? No Are	"Normal Circumstances" present? Ver X
re Vegetation, Soll, or Hydrology	naturally prot	lematic? No (If n	leeded, explain any answers in Remarks)
UMMARY OF FINDINGS – Attach site ma	o showino sar	nolina point loca	tions transects important footures ate
	N-		
Hydric Soil Present? Yes 🔨		is the Sample	d Area
Wetland Hydrology Present? Yes X	No	within a Wetla	and? Yes <u>X</u> No
Remarks: Haulog (1940 SIA			
The start of the s	Alma	w opur	stunted sprice freeze
EGETATION - Use scientific names of pla	nts. List all sp	pecies in the plot	
<u> Iree Stratum</u>	Absolute % Cover	Dominant Indicator Species? Status	Dominance Test worksheet:
1. Picea glawca	<u> </u>	Y FACU	That Are OBL FACW or FAC:
3			Species Across All Strata: 4 (B)
·			Percent of Deminant Creation
Total C	over: <u>15</u>		That Are OBL, FACW, or FAC: 75 (A/B)
50% of total cover: <u>7</u> Sapling/Shrub Stratum	َ 20% of	total cover: <u>3</u>	Prevalence Index worksheet:
. Betla glandulusa	5	FAL	Total % Cover of:Multiply by:
. Salix Barday	30	Y FAC	OBL species 35 $x_1 = 35$
·			FACW species 13 $x_2 = 26$
•			FAC species $\underline{55}$ $x_3 = \underline{145}$
•		······································	10 species 0 species 0
·			Column Totals: III (A) 2.90 (b)
I otal Co	over: <u>05</u>	–	
erb Stratum	<u>715</u> _20% of to	otal cover: <u>7</u>	Prevalence Index = $B/A = 2.94$
Equisely Elviable	30	<u>.Y. OBL</u>	Hydrophytic Vegetation Indicators:
Chamerion angustifica	<u>}</u>	FALU	Dominance Test is >50%
Janguisosba Canadensis	<u> </u>	FACW	Morphological Adoptotions ¹ (Drovide surged by
Aubis chamacmonus	<u> </u>	FACW	data in Remarks or on a separate sheet)
Const converse		FAC	Problematic Hydrophytic Vegetation ¹ (Explain)
Caret A Intescerts		FATW	
A la la so a grostis a so a da s			be present unless disturbed or problematic.
u ~ com a y o o ha a canance	<u> </u>	4 FAC	
),`	· ·		
Total Co	ver: <u>69</u>		
50% of total cover: 3	4.5 20% of to	tal cover:_ 13,8	
	V Bara Ora	und A	Hydrophytic
ot size (radius, or length x width) <u>60'rad</u> .	70 Date Gro		VEGERATION

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SOIL

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rotile Description: (Descri									
Depth <u>Matrix</u>	%	Color (m	oist)	%	Type ¹	Loc ²	<u>Texture</u>	Re	emarks
		<u> </u>							
					<u></u>				
No a	1+						, <u></u>		
dan		aler 1	o olixt	۲					
<u> </u>	m & w	MACT II		·			V-17-44092		
				=	u				
			<u>_</u>				-		
									- H Almonyana Ha
				E					
	Janlation Ph	A-Raduced M	latrix CS=	Covered	or Coate	ed Sand (Grains. ² L	ocation: PL=Pore	Lining, M=Matrix.
ype: C=Concentration, D=I	pepietion, ru	Indicat	ors for Pro	oblematic	: Hydric	Soils ³ :			
Historol or Histol (A4)		Als	ska Color	Change (- TA4) ⁴		Alas	ka Gleyed Without	Hue 5Y or Redder
Listosol of hister (A1)		Als	ska Alpine	Swales (TA5)		Un	derlying Layer	
_ matter = μρουνίη (ΔΔ) Hydrogen Sulfide (ΔΔ)		Ala	ska Redox	x With 2.5	Y Hue	•	Othe	er (Explain in Rema	arks)
Thick Dark Surface (A12	1								
Alaska Gleved (A13)		³ One ir	dicator of I	hydrophyt	lic veget	ation, one	e primary indic	ator of wetland hyd	drology,
Alaska Redox (A14)		and	an appropr	riate lands	scape po	sition mu	ist be present	unless disturbed o	r problematic.
Alaska Gleyed Pores (A1	5)	⁴ Give o	letails of co	olor chang	je in Rei	marks.			
estrictive Laver (if presen	i):								
	•								
Type:									- X No
Type:		10.00000000000000000000000000000000000					Hydric S	oil Present? Ye	
Type: Depth (inches):							Hydric S	oil Present? Ye	
Type: Depth (inches): Remarks:			· 				Hydric S	oil Present7- Ye	<u>s no</u>
Type: Depth (inches): Remarks:							Hydric S	oil Present? Ye	<u> </u>
Type: Depth (inches): Remarks:							Hydric S	oil Present? Ye	<u> </u>
Type: Depth (inches): Remarks:							Hydric S	oil Present?* Ye	<u><u> </u></u>
Type: Depth (inches): Remarks:							Hydric S	oil Present ⁷ Ye	<u><u>s</u></u>
Type: Depth (inches): Remarks: YDROLOGY	·						Hydric S	oil Present ²⁴ Ye	<u><u>s</u></u>
Type: Depth (inches): Remarks: YDROLOGY Wetland Hydrology Indicat	ors:						Hydric S	Indicators (2 or m	ore regulred)
Type: Depth (inches): Remarks: YDROLOGY Wetland Hydrology Indicat Primary Indicators (any one	ors: ndicator is st	ufficient)					Hydric S Secondary Water	Indicators (2 or m stained Leaves (B	ore regulred) 19)
Type: Depth (inches): Remarks: YDROLOGY Wetland Hydrology Indicat Primary Indicators (any one X Surface Water (A1)	ors: ndicator is st	ufficient)	tion Visible	e on Aeria	l Imager	y (87)	Hydric S Secondary Water Draina	Indicators (2 or m -stained Leaves (B uge Patterns (B10)	ore required) 19)
Type: Depth (inches): Remarks: YDROLOGY Wetland Hydrology Indicat Primary Indicators (any one X Surface Water (A1) X High Water Table (A2)	ors: ndicator is st	ufficient) Inunda Sparse	tion Visible	e on Aeria ed Conca	I Imager	y (87) ace (88)	Secondary Water Draina Oxidiz	Indicators (2 or m stained Leaves (8 ge Patterns (810) ed Rhizospheres a	ore regulred) (9) along Living Roots (C3
Type: Depth (inches): Remarks: YDROLOGY Wetland Hydrology Indicat Primary Indicators (any one X Surface Water (A1) X High Water Table (A2) X Saturation (A3)	ors: ndicator is st	ufficient) Inunda Sparse Marl D	tion Visible Iy Vegetate eposits (B1	e on Aeria ed Conca 15)	l Imager ve Surfa	y (B7) ace (B8)	Secondary Water Draina Oxidiz Prese	Indicators (2 or m Indicators (2 or m Indicators (8	ore regulred) 9) along Living Roots (C3
Type: Depth (inches): Remarks: YDROLOGY Wetland Hydrology Indicat Primary Indicators (any one Surface Water (A1) Kigh Water Table (A2) Saturation (A3) Water Marks (B1)	ors: ndicator is st	ufficient) Inunda Sparse Mari D Hydrog	tion Visible Iy Vegetat eposits (B1 gen Sulfide	e on Aeria ed Conca 15) e Odor (C'	I Imager ve Surfa	y (B7) ace (B8)	Secondary Water Draina Oxidiz Prese Satt D	Indicators (2 or m stained Leaves (B ge Patterns (B10) ed Rhizospheres a nce of Reduced inc eposits (C5)	ore regulred) 9) along Living Roots (C3 on (C4)
Type: Depth (inches): Remarks: YDROLOGY Wetland Hydrology Indicat Primary Indicators (any one Surface Water (A1) K High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2)	ors: ndicator is st	ufficient) Inunda Sparse Mari D Hydrog Dry-Se	tion Visible by Vegetata eposits (B1 gen Sulfide eason Wate	e on Aeria ed Conca 15) e Odor (C´ er Table (I Imager ve Surfa 1) C2)	y (87) ace (88)	Secondary Water Draina Oxidiz Prese Satt D Stunte	Indicators (2 or m -stained Leaves (B age Patterns (B10) ed Rhizospheres a nce of Reduced Irc eposits (C5) ed or Stressed Plan	ore required) 19) along Living Roots (C3 on (C4) nts (D1)
Type: Depth (inches): Remarks: YDROLOGY Wetland Hydrology Indicat Primary Indicators (any one Surface Water (A1) Surface Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3)	ors: ndicator is st	ufficient) Inunda Sparse Mari D Hydrog Dry-Se Other	tion Visible ly Vegetate eposits (B1 gen Sulfide eason Wate (Explain in	e on Aeria ed Conca 15) e Odor (C' er Table (Remarks	I Imager ve Surfa I) C2)	y (87) ace (88)	Hydric S Secondary Water Draina Oxidiz Prese Satt D Stunte Geom	Indicators (2 or m -stained Leaves (B age Patterns (B10) ed Rhizospheres a nce of Reduced Irc eposits (C5) ed or Stressed Plan orphic Position (D2)	ore regulred) 19) along Living Roots (C3 on (C4) nts (D1) 2)
Type: Depth (inches): Remarks: YDROLOGY Wetland Hydrology Indicat Primary Indicators (any one Surface Water (A1) Kigh Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4)	ors: ndicator is SI	ufficient) Inunda Sparse Marl D Hydrog Dry-Se Other f	tion Visible ely Vegetata eposits (B1 gen Sulfide eason Wate (Explain in	e on Aeria ed Conca 15) e Odor (C r Table (Remarks	I Imager ve Surfa I) C2)	y (B7) ace (B8)	Secondary Water Draina Oxidiz Prese Salt D Stunte Geom Shalk	Indicators (2 or m -stained Leaves (B nge Patterns (B10) ed Rhizospheres a nce of Reduced Irc eposits (C5) ed or Stressed Plan orphic Position (D2) w Aquitard (D3)	ore regulred) 19) along Living Roots (CS on (C4) hts (D1) 2)
Type: Depth (inches): Remarks: YDROLOGY Wetland Hydrology Indicat Primary Indicators (any one 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)	ors: ndicator is st	ufficient) Inunda Sparse Marl D Hydrog Dry-Se Other i	tion Visible ely Vegetate eposits (B1 gen Sulfide eason Wate (Explain in	e on Aeria ed Conca 15) e Odor (C' er Table (I Remarks	I Imager ve Surfa 1) C2))	y (87) ace (88)	Secondary Water Draina Oxidiz Prese Salt D Stunte Geom Shalk Micro	Indicators (2 or m Indicators (2 or m Indicators (2 or m Indicators (8 of m Indicators (8	ore regulred) (9) along Living Roots (C3 on (C4) nts (D1) 2) (D4)
Type: Depth (inches): Remarks: YDROLOGY Wetland Hydrology Indicat Primary Indicators (any one 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)	ors: ndicator is st	ufficient) Inunda Sparse Marl D Hydrog Dry-Se Other f	tion Visible ly Vegetate eposits (B1 gen Sulfide eason Wate (Explain in	e on Aeria ed Conca 15) e Odor (C´ er Table (Remarks	l Imager ve Surfa I) G2))	y (B7) ace (B8)	Hydric S Secondary Water Draina Oxidiz Oxidiz Oxidiz Oxidiz Oxidiz Salt D Stunte Stunte Stunte Stunte Stunte Stunte Stunte Stunte Stunte Stunte Stunte Stunte Stunte Stunte Stunte Stunte Stunte	Indicators (2 or m Indicators (2 or m Indicators (2 or m Indicators (810) Indicators (810)	ore reguired) (C4) (D4)
Type: Depth (inches): Remarks: YDROLOGY Wetland Hydrology Indicat Primary Indicators (any one Surface Water (A1) High Water Table (A2) Surface 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) Field Observations:	ors: ndicator is st	ufficient) Inunda Sparse Mari D Hydrog Dry-Se Other f	tion Visible Iy Vegetate eposits (B1 gen Sulfide eason Wate (Explain in	e on Aeria ed Conca 15) e Odor (C' er Table (Remarks	I Imager ve Surfa I) C2))	y (B7) ace (B8)	Hydric S Secondary Water Draina Oxidiz Prese Salt D Salt D Stunte Geom Shalko Micro FAC-I	Indicators (2 or m -stained Leaves (B age Patterns (B10) ed Rhizospheres a nce of Reduced Irc eposits (C5) ed or Stressed Plan orphic Position (D w Aquitard (D3) topographic Relief Neutral Test (D5)	ore regulred) (P) along Living Roots (C3 on (C4) nts (D1) (D4)
Type: Depth (inches): Remarks: YDROLOGY Wetland Hydrology Indicat Primary Indicators (any one 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) Field Observations: Surface Water Present?	ors: ndicator is sr) Yes	ufficient) Inunda Sparse Mari D Hydrog Dry-Se Other m	tion Visible ly Vegetate eposits (B1 gen Sulfide eason Wate (Explain in Depth (inc	e on Aeria ed Conca 15) e Odor (C´ Remarks	I Imager ve Surfa I) C2))	y (B7) ace (B8)	Hydric S Secondary Water Draina Oxidiz Prese Salt D Stunte Geom Shalk Micro FAC-I	Indicators (2 or m -stained Leaves (B -stained Leaves (B age Patterns (B10) ed Rhizospheres a nce of Reduced Irc eposits (C5) ed or Stressed Plan orphic Position (D) topographic Relief Veutral Test (D5)	ore required) 9) along Living Roots (C3 on (C4) nts (D1) 2) (D4)
Type: Depth (inches): Remarks: YDROLOGY Wetland Hydrology Indicat Primary Indicators (any one 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 Field Observations: Surface Water Present?	ors: ndicator is si) Yes _X Yes _X	ufficient) Inunda Sparse Marl D Hydrog Dry-Se Other f	tion Visible ely Vegetate eposits (B1 gen Sulfide eason Wate (Explain in Depth (inc Depth (inc	e on Aeria ed Conca 15) e Odor (C' Remarks ches): ches):	I Imagel ve Surfa I) C2))	y (87) ace (88)	Hydric S Secondary Water Draina Oxidiz Prese Salt D Stunte Geom Shalle Micro FAC-I	Indicators (2 or m Indicators (2 or m Indicators (2 or m Indicators (8 of m Indicators (8	ore required) 19) along Living Roots (C3 on (C4) nts (D1) 2) (D4)
Type: Depth (inches): Remarks: PYDROLOGY Wetland Hydrology Indicat Primary Indicators (any one 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 (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Surface Soil Cracks (B6) Field Observations: Surface Water Present? Water Table Present? Saturation Present?	ors: ndicator is st Yes X Yes X	ufficient) Inunda Sparse Marl D Hydrog Dry-Se Other Other Other No No	tion Visible ely Vegetate eposits (B1 gen Sulfide eason Wate (Explain in Depth (inc Depth (inc Depth (inc	e on Aeria ed Conca 15) o Odor (C' Remarks ches): ches):	I Imager ve Surfa I) C2))	y (B7) ace (B8)	Hydric S Secondary Water Draina Oxidiz Prese Salt D Stunte Geom Shalk Microi FAC-I	Indicators (2 or m Indicators (2 or m Indicators (2 or m Indicators (8 of m Indicators (8	$\frac{\text{ore required}}{\text{ig}}$ $\frac{\text{along Living Roots}}{\text{ig}}$ $\frac{\text{ord}}{\text{ig}}$ $\frac{\text{ord}}{\text{ig}}$ $\frac{\text{ord}}{\text{ig}}$ $\frac{\text{ord}}{\text{ig}}$ $\frac{\text{ord}}{\text{ig}}$ $\frac{\text{ord}}{\text{ig}}$
Type: Depth (inches): Remarks: YDROLOGY Wetland Hydrology Indicat Primary Indicators (any one 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 (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Surface Soil Cracks (B6) Field Observations: Surface Water Present? Water Table Present? Saturation Present? Saturation Present?	ors: ndicator is st dicator is st yes Yes Yes	ufficient) Inunda Sparse Marl D Hydrog Dry-Se Other for No No No	tion Visible ely Vegetate eposits (B1 gen Sulfide eason Wate (Explain in Depth (inc Depth (inc Depth (inc	e on Aeria ed Conca 15) o Odor (C ² er Table (Remarks ches): ches): ches):	I Imager ve Surfa I) C2)) () () () () () ()	y (B7) ace (B8)	Hydric S Secondary Water Draina Oxidiz Prese Salt D Stunte Geom Shalk Micro FAC-1 fetland Hydro s), if available	Indicators (2 or m Indicators (2 or m Indicators (2 or m Indicators (8 Inder Pattern	$\frac{\text{ore required}}{\text{19}}$ $\frac{\text{along Living Roots}}{\text{10}}$ $\frac{\text{C4}}{\text{11}}$ $\frac{\text{C4}}{\text{C4}}$ $\frac{\text{C4}}{\text{C4}}$
Type: Depth (inches): Remarks: YDROLOGY Wetland Hydrology Indicat Primary Indicators (any one Sufface 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) Surface Soil Cracks (B6) Field Observations: Surface Water Present? Water Table Present? Water Table Present? Saturation Present? Includes capillary fringe) Describe Recorded Data (st	ors: ndicator is st ndicator is st Yes Yes Yes ream gauge,	ufficient) Inunda Sparse Mari D Hydrog Dry-Se Other f Other f No No No No Mo	tion Visible ly Vegetate eposits (B1 gen Sulfide eason Wate (Explain in Depth (inc Depth (inc Depth (inc rell, aerial p	e on Aeria ed Conca 15) o Odor (C' er Table (Remarks ches): ches): ches): ches):	I Imager ve Surfa I) C2)) () () evious in	y (B7) ace (B8)	Hydric S Secondary Water Draina Prese Salt D Stunte Geom Shalk Micro FAC-1 Vetland Hydro Is), if available	Indicators (2 or m Indicators (2 or m Indicators (2 or m Indicators (8	<u>ore regulred)</u> 9) along Living Roots (C3 on (C4) nts (D1) 2) (D4) 'es <u>()</u> No
Type:	ors: ndicator is su yes Yes Yes ream gauge,	ufficient) Inunda Sparse Mari D Hydrog Dry-Se Other r No No No No No	tion Visible ly Vegetate eposits (B1 gen Sulfide eason Wate (Explain in Depth (inc Depth (inc Depth (inc rell, aerial p	e on Aeria ed Conca 15) e Odor (C' er Table (Remarks ches): ches): ches): ches):	I Imager ve Surfa I) C2)) () () evious in	y (B7) ace (B8)	Hydric S Secondary Water Draina Oxidiz Prese Salt D Stunte Stunte Geom Shalk Micro FAC-I Vetland Hydro is), if available	Indicators (2 or m Indicators (2 or m Indicators (2 or m Indicators (810) Inder Rhizospheres a Ince of Reduced Irc Ince of Reduce	$\frac{\text{ore regulred}}{\text{(P)}}$ $\frac{\text{along Living Roots (C3)}}{\text{along Living Roots (C4)}}$ $\frac{\text{(C4)}}{\text{(D4)}}$ $\frac{\text{(C4)}}{\text{(cs } 4 \text{(C4)})}$
Type: Depth (inches): Remarks: YDROLOGY Wetland Hydrology Indicat Primary Indicators (any one 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 Field Observations: Surface Water Present? Saturation Present? Saturation Present? Saturation Present? (includes capillary fringe) Describe Recorded Data (st Remarks:	ors: ndicator is sr ndicator is sr Yes Yes Yes Yes	ufficient) Inunda Sparse Mart D Hydrog Dry-Se Other m No No No No No	tion Visible ly Vegetate eposits (B1 gen Sulfide eason Wate (Explain in Depth (inc Depth (inc Depth (inc rell, aerial p	e on Aeria ed Conca 15) e Odor (C' er Table (Remarks ches): ches): ches): ches):	I Imager ve Surfa I) C2)) () evious in	y (B7) ace (B8)	Hydric S Secondary Water Draina Oxidiz Prese Stunta Stunta Stunta Shalla Shalla FAC-I Micro FAC-I	Indicators (2 or m Indicators (2 or m Indicators (2 or m Indicators (2 or m Indicators (8 of m Indicators (8	ore required) 19) along Living Roots (C3 on (C4) nts (D1) 2) (D4) Yes X No
Type: Depth (inches): Remarks: YDROLOGY Wetland Hydrology Indicat Primary Indicators (any one 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 (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Surface Soil Cracks (B6) Field Observations: Surface Water Present? Water Table Present? Saturation Present? Saturation Present? (includes capillary fringe) Describe Recorded Data (st Remarks:	ors: ndicator is si yes Yes Yes ream gauge,	ufficient) Inunda Sparse Marl D Hydrog Dry-Se Other of Other of No No No monitoring w	tion Visible ely Vegetate eposits (B1 gen Sulfide eason Wate (Explain in Depth (inc Depth (inc Depth (inc Depth (inc rell, aerial p	e on Aeria ed Conca 15) e Odor (C' rable (Remarks ches): ches): ches): ches):	I Imagel ve Surfa I) C2)) () () evious in	y (B7) ace (B8)	Hydric S Secondary Water Draina Oxidiz Prese Salt D Stunte Geom Shalle Micro FAC-1 Vetland Hydro Is), if available	Indicators (2 or m Indicators (2	ore regulred) (19) along Living Roots (C3) (C4) (C4) (C4) (C4) (C4) (C4) (C4) (C4) (C4)

		- ·
	Project/Site: Carant Greek_Corndor Borough/City: MOD	se Pass Sampling Date: 7-21-13
	Applicant/Owner: Kenau Hudw	Sampling Point:
	Investigatoric): C. Schuldel T Black K Handler Withit to	Gamping Point, The paint PP23
•		ace, nummocks, etc.): <u>Night point</u> between the
	Local relief (concave, convex, none): Slope (%): Slope (%):	- BIYEAM CARINARD
	Subregion: Lat: 60, 457146 Lot	ng: <u>-149,352 846</u> Datum:
	Soil Map Unit Name:	NWI classification: PEMI/SSIC 4
	Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No	(If no explain in Remarks) [10] and WUSA
	Are Vegetation Soll or Hydrology significantly disturbed? NP Are	"Normal Circumstances" propert? Yes X
	Are Vegetation, coll, of Hydrology againteenally disturbed 11 Are	Norman Checking and the second state in the second state in the second state in the second state is the se
		eeded, explain any answers in Rémarks.)
	SUMMARY OF FINDINGS - Attach site map showing sampling point locat	ions, transects, important features, etc.
	y	
	Hydrophytic Vegetation Present? Yes X No	i Area
	Hydric Soil Present? Yes <u>No</u> within a Wetla	nd? Vee X No
	Wetland Hydrology Present? Yes X No	
	Remarks: Dutys: 2125-3228 This 13 a pt to hel	p depine the topo high
	to the local aread in a company with	and the more
	VEGETATION Liss scientific names of planta List all appairs in the relation	
	VECETATION - Ose scientific names of plants. List all species in the plot.	• • • • • • • • • • • • • • • • • • •
	Tree Stratum % Cover Species 2 Status	Dominance Test worksheet:
1	1 Dabile Dapikifere #520 V TATU	Number of Dominant Species 2
(- Brind paper Free Free	Inat Are OBL, FACW, or FAC; (A)
		Total Number of Dominant
		Species Across All Strata: (B)
	4	Percent of Dominant Species
	Total Cover: <u>20</u>	That Are OBL, FACW, or FAC:(A/B)
	50% of total cover: <u>10</u> 20% of total cover: <u>4</u>	Prevalence Index worksheet:
	Sapling/Shrub Stratum	Total % Cover of: Multiply by:
	1. tilla silauca 5 <u>14(U</u>	$\frac{1}{\text{OBL species}} \qquad \qquad \frac{1}{\text{vis}} \frac{1}$
	2. Vibirnum edule <u>S</u> <u>FACU</u>	
	3. Rosa ancularis <u>310 Y</u> FACU	FACW species U $\chi_2 = U$
	4. Rubus Ideneus \$10 Y wet	FAC species $13 \times 3 = 73$
1	5 FACU	FACU species $\underline{\gamma}U$ $x4 = \underline{3}(\partial D)$
~3	6,	UPL species U $x5 = U$
ð	Total Cover: 30	Column Totals: <u>105</u> (A) <u>405</u> (B)
Ē	50% of total cover: 15 20% of total cover: 10	Brovalance Index = BIA = 3.870
5	Herb Stratum	
2	1. Heradeum maiximum 20 Y FACU	Rydrophytic vegetation indicators:
Ę	2. Mamerian granshfillia 5 FACU	- Dominance lest is >50% yes for topo how
ب	3. Cornus canadensis 3 EALU	- Prevalence index is ≤3.0 No for togo in
5	4 Equisitivity arvense 7 V FAR	Morphological Adaptations' (Provide supporting
Ņ	5 Geranium eriginthum 3 FAIN	data in Remarks or on a separate sheet)
	5 Gumporaroum durations 3 EAU	Problematic Hydrophytic Vegetation' (Explain)
	8. <u>Cidentificant and plans</u> <u>FACO</u>	1 Indicators of hudrin and and under a hudra hum
	1. DYUDPHYIS EXPANSE	be present unless disturbed or problematic.
	Stranosts anarmed Cali Lanacensist FAC	
	9. OTVEDTODUS amprexitivations 3 FACU	* No for topo highs, but
	10. Aconitism delphinii follom FAC_	wes for toop lawls
Ч	Total Cover:56	Les in tobe less
	50% of total cover: <u>21,6</u> 20% of total cover: 11	The two set off
	Plot size (radius, or length x width) 15 rad, % Bare Ground 0	Nydrophytic Vegetation
	% Cover of Wetland Bryophytes Total Cover of Bryophytes	Present? Yes No
	(Where applicable)	- terrerenantiational
[Remarks: In topo areas Equ. arv. + Afr. Arg. dr.	minate, other species are sim. to
l	typo high areas ispecies list above his	for 11 1 2770
		(10W) · 5000
Ľ	Estimate 20% wetland Sol, woland and	tos (10204): 3225-28
l	US Army Corps of Engineers	Alaska Version 2.0
	IT- MUDML	

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SOIL		Sampling Point: <u>UP23</u>
Profile Description: (Describe to the depti	n needed to document the indicator or confirm	the absence of indicators.)
Depth <u>Matrix</u>	Redox Features	· · ·
(inches) Color (moist) %	Color (moist) % Type' Loc	Texture Remarks
0-14		organics: bark, roots, obligs
[][[]][[]][[]][[]][[]][[]][[]][[]][[]]	·	(very little sitt mixed in)
14+	· · · · · · · · · · · · · · · · · · ·	small cobble + gravel
		V
Type: C=Concentration, D=Depletion, RM=	Reduced Matrix, CS=Covered or Coated Sand G	rains. ² Location: PL=Pore Lining, M=Matrix.
Hydric Soll Indicators:	Indicators for Problematic Hydric Solls ³ :	· · · · · · · · · · · · · · · · · · ·
Histosol or Histel (A1)	Alaska Color Change (TA4) ⁴	Alaska Gleyed Without Hue 5Y or Redder
Histic Epipedon (A2)	Alaska Alpine Swales (TA5)	Underlying Layer
Hydrogen Sulfide (A4)	Alaska Redox With 2.5Y Hue	\underline{X} Other (Explain in Remarks)
Thick Dark Surface (A12)		
Alaska Gleyed (A13)	³ One indicator of hydrophytic vegetation, one	primary indicator of wetland hydrology,
Alaska Redox (A14)	and an appropriate landscape position mus	t be present unless disturbed or problematic.
Alaska Gleyed Pores (A15)	⁴ Give details of color change in Remarks.	
Restrictive Layer (if present):		
Type:	·	Hydric Soil Present? Yes 📐 No
Pemarke'		
suls are problematic	, · · · · · · · · · · · · · · · · · · ·	
	as between two channels	
active flood pigine an		
some areas w/ little	to no organic above gr	avel, this pit had more (14")
HYDROLOGY		······································
Wetland Hydrology Indicators:		Secondary Indicators (2 or more required)
Drimont Indicators (any one indicator is suffic	vient)	Water-stained Leaves (B9)
Plimary indicators (any one indicator is sum	Investion Visible on Aerial Imagen/ (B7)	Drainage Patterns (B10)
		Ovidized Bhizospheres along Living Boots (C3)
High Water Table (A2)	Sparsely vegetated Colleave Surface (DD)	Presence of Reduced Irop (C4)
	Wall Deposits (B10)	Salt Denosits (C5)
Water Marks (B1)		Sait Depusits (03)
Sediment Deposits (B2)	Dry-Season Water Table (C2)	Y Common bio Resistion (D2)
Drift Deposits (B3)	_ Other (Explain in Remarks)	Shellow Aquited (D3)
Algal Mat or Crust (B4)	·	Shakow Aquitard (D3) Misseten equaphic Poliof (D4)
Iron Deposits (B5)		Microtopographic Relief (D4)
Surface Soil Cracks (B6)	· · · · · · · · · · · · · · · · · · ·	
Field Observations:		
Surface Water Present? Yes N	lo <u>/_</u> Depth (inches):	· ·
Water Table Present? Yes X	lo Depth (inches):	· · · · · · · · · · · · · · · · · · ·
Saturation Present? Yes X. N	اه Depth (inches): ۲۰۰۰ Wet	iand Hydrology Present? Yes <u>X</u> No
Describe Recorded Data (stream gauge, mo	nitoring well, aerial photos, previous inspections)	, if available:
Remarks:		
1 yes - mpho pres	ent tor topo how an	1 With grow
No- hydro not	present tor topo l	nigh areas
1		

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Investigator(s): <u>ССССОСАСС</u> Local relief (concave, convex, поле):	J. Blank Concave	Lai	ndform (hillsio ope (%): <u>3</u>	, terrace, hummocks, etc.):	<u>-1parian</u>
Subregion:	Lat: _	60,451	0083	Long: -144,358997	Datum:
Soll Map Unit Name: <u>N</u>		//*****		NWI classific	ation:PS
Are climatic / hydrologic conditions on the	e site typical for this I	ime of year?	Yes X	No (if no, explain in R	emarks.) Wrand Ma
Are Vegetation, Soil, or H	lydrology sig	nificantly disi	lurbed? No	Are "Normal Circumstances" p	present? Yes <u>X</u> No
Are Vegetation, Soil, or H	lydrology nat	urally proble	matic?	(If needed, explain any answe	rs in Remarks.)
SUMMARY OF FINDINGS - Atta	ach site map sho	wing sam	pling point	ocations, transects, impo	rtant features, etc.
Hudrophylia Magalalian Drasonia	New V Ne				· · · · · · · · · · · · · · · · · · ·
Hydric Soil Present?	Yes X No		Is the Sa	ipled Area	
Wetland Hydroiogy Present?	Yes X No		within a	fetland? Yes	<u> </u>
Remarks: Pt tulas, at 1	Dark wate	e ida	$\frac{1}{10}$	unmunt cont	inned in franci
in port in the second	up mansai		alder	Photos 113-11.	+ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~
VEGETATION – Use scientific na	ames of plants	list all snc	cies in the	int <u>(a tioninings - 2</u> ů	JYINCe.
		Absolute D	ominant Indi	Not.	abaati
Tree Stratum		<u>% Cover S</u>	pecies? St	US Number of Dominant Si	sneet:
1. None				That Are OBL, FACW, o	or FAC: (A)
2			·		ant o
3			•	Species Across All Stra	ta: <u>5</u> (B)
4				Percent of Dominant Sc	ecles ,
CO9/ - 5	Total Cover: _			That Are OBL, FACW, o	or FAC: 100 (A/B)
Sapling/Shrub Stratum	total cover:	_ 20% of to	tal cover:	Prevalence Index worl	ksheet:
1. Alnus Virialis		20	Y FA	<u></u>	Multiply by:
2. Salix commutata		50	Y FA	OBL species	x1= <u>0</u>
3	······································			FACW species 0	$x^2 = 0$
4				EACUlanation	X3= <u>.578</u>
5				UPL shecies	$- x^{4} = - 1$
				Column Totals: 127	(A) <u>38</u> 2- (B)
6		·			
6	Total Cover: _	<u>-10</u>			
6	Total Cover: _ otal cover: _ <u>35</u>	20% of tota	al cover: <u>14</u>	Prevalence index	= B/A = 3.01
6	Total Cover: _ lotal cover: <u>35</u> <u>1. cunadensis</u>	20% of tot:	ai cover: <u>14</u>	Prevalence index	= B/A = 3.01 n Indicators:
6	Total Cover: _ lotal cover: <u>35</u> <u>1. canadensis</u> 16 lium	20% of tot:	al cover: 14	Prevalence Index Hydrophytic Vegetatio	$= B/A = \underline{3.01}$ n Indicators: $>50\%$
6. <u>50% of the stratum</u> 18 Agrostis Jigantea Cu 2. Aconitum delphinin 3. Athyrium falix-ferr	Total Cover: _ lotal cover: <u>35</u> <u>1. canadensis</u> <u>1.fo lium</u> <u>1102</u>	$\frac{10}{20\% \text{ of tot}}$	al cover: <u>14</u> <u>FA</u> <u>FA</u> <u>FA</u>		$= B/A = \underline{3.D1}$ n Indicators: $>50\%$ ≤ 3.0 tations ¹ (Provide our perting)
6	Total Cover: _ total cover: _35 <u>1. canadensis</u> <u>1. fo lium</u> <u>1. na</u> (columbine)	$\frac{50}{5}$	al cover: <u>14</u> <u>FA</u> <u>FA</u> <u>FA</u>	Prevalence index Prevalence index Hydrophytic Vegetatio X Dominance Test is Prevalence index is Prevalence index is Morphological Adap data in Remarks	= B/A = <u>3.01</u> n Indicators: >50% ≤3.0 tations ¹ (Provide supporting or on a separate sheet)
6. <u>Herb Stratum</u> <u>B Agrostis Jigantea Ca</u> 2. <u>Aconitum delphini</u> 3. <u>Athyrium falix-ferr</u> 4. <u>Aguilegia formosa</u> 5.	Total Cover: _ lotal cover: <u>35</u> <u>1. Canadensis</u> <u>1. Follum</u> <u>1. Ina</u> (columbine)	$\frac{10}{20\% \text{ of tot.}}$	al cover: <u>14</u> <u>FA</u> FA FA FA FA	Prevalence Index Hydrophytic Vegetatio X Dominance Test Is Prevalence Index is Prevalence Index is Orphological Adap data in Remarks Problematic Hydrop	= B/A = <u>3.01</u> n Indicators: >50% ≤3.0 trations ¹ (Provide supporting or on a separate sheet) hytic Vegetation ¹ (Explain)
6	Total Cover: _ total cover: _35 <u>1. canadensis</u> <u>1. follum</u> <u>1. ma</u> (columbine)		al cover: <u>14</u> <u>FA</u> <u>FA</u> <u>FA</u> <u>FA</u>	Prevalence index Hydrophytic Vegetatio X Dominance Test is Prevalence index is Prevalence index is Morphological Adap data in Remarks Problematic Hydrop	= B/A = <u>3.D1</u> n Indicators: >50% ≤3.0 tations ¹ (Provide supporting or on a separate sheet) hytic Vegetation ¹ (Explain)
6	Total Cover: _ total cover: _35 <u>1. Canadensiz</u> <u>1. Folium</u> <u>1. Ina</u> (columbine)	<u>50</u> <u>1</u> <u>5</u> <u>1</u>	al cover: <u>14</u> <u>FA</u> <u>FA</u> <u>FA</u>	Prevalence Index Hydrophytic Vegetatio X Dominance Test is Prevalence Index is Prevalence Index is Orphological Adap data in Remarks Problematic Hydrop 'Indicators of hydric soil be present unless distur	= B/A = <u>3.01</u> n Indicators: >50% ≤3.0 tations ¹ (Provide supporting or on a separate sheet) hytic Vegetation ¹ (Explain) and wetland hydrology must bed or problematic.
6	Total Cover: _ total cover: _35 <u>1. canadensis</u> <u>1. fo lium</u> <u>1. na</u> (columbine)	$\frac{1}{20\% \text{ of tot}}$	al cover:14 FA FA FA	Prevalence Index Hydrophytic Vegetatio X Dominance Test is Prevalence Index is Prevalence Index is Morphological Adap data in Remarks Problematic Hydrop ¹ Indicators of hydric soil be present unless disture	= B/A = <u>3.01</u> n Indicators: >50% <3.0 tations ¹ (Provide supporting or on a separate sheet) hytic Vegetation ¹ (Explain) and wetland hydrology must bed or problematic.
50% of the <u>Herb Stratum</u> <u>B Agrostis Jigantea Cu</u> 2. <u>ACONITUM delphinit</u> 3. <u>Athyrium falix-fer</u> 4. <u>Aguilegia formosa</u> 5 6 8 9 10.	Total Cover: _ total cover: _35 <u>1. canadensis</u> <u>1. fo lium</u> <u>1. na</u> (columbine)	$\frac{1}{20\% \text{ of tot}}$	al cover:14 FA F7 F7 F7	Prevalence Index Hydrophytic Vegetatio X Dominance Test is Prevalence Index is Prevalence Index is Morphological Adap data in Remarks Problematic Hydrop ¹ Indicators of hydric soil be present unless distur	= B/A = <u>3.D</u> n Indicators: >50% ≤3.0 stations ¹ (Provide supporting or on a separate sheet) hytic Vegetation ¹ (Explain) and wetland hydrology must bed or problematic.
50% of the stratum 50% of the stratum 50% of the stratum 3. Adverted to the stratum former fo	Total Cover: _ total cover: _35 <u>1. Canadensiz</u> <u>1. Canadensiz</u>	50 50 5 1 5 5 5 5 7	al cover:14 FA FA FA	Prevalence Index Hydrophytic Vegetatio X Dominance Test is Prevalence Index is Prevalence Index is Morphological Adap data in Remarks Problematic Hydrop ¹ Indicators of hydric soil be present unless distur	= B/A = <u>3.01</u> n Indicators: >50% ≤3.0 otations ¹ (Provide supporting or on a separate sheet) hytic Vegetation ¹ (Explain) and wetland hydrology must bed or problematic.
50% of the <u>Herb Stratum</u> <u>B Agrostis grgantea Ca</u> 2. <u>Aconitum delphinit</u> 3. <u>Athyrium falix ferr</u> 4. <u>Aguilegia formosa</u> 5 6 8 9 10 50% of to	Total Cover: total cover:35 <u>16 lum</u> <u>100 lum</u> (columbine) (columbine) Total Cover: 	$\frac{50}{5}$	al cover: 14 FA FA FA FA FA FA I I Cover: 11.	Prevalence Index Hydrophytic Vegetatio Hydrophytic Vegetatio Dominance Test is Prevalence Index is Morphological Adap data in Remarks Problematic Hydrop I Indicators of hydric soil be present unless distur	= B/A = <u>3.D1</u> n Indicators: >50% <3.0 tations ¹ (Provide supporting or on a separate sheet) hytic Vegetation ¹ (Explain) and wetland hydrology must bed or problematic.
50% of the stratum 50% of	Total Cover: total cover: <u>16 lium</u> <u>16 lium</u> (columbine) (columbine) (columbine) (columbine) (columbine) (columbine) (columbine) (columbine)	$\frac{1}{20\% \text{ of tot}}$ $\frac{50}{5}$ $\frac{1}{5}$	al cover: 14 FA FA FA FA A A A A A A A A A A A A A	Prevalence Index Hydrophytic Vegetatio X Dominance Test is Prevalence Index is Morphological Adap data in Remarks Problematic Hydrop ¹ Indicators of hydric soll be present unless distur	= B/A = <u>3.D</u> n Indicators: >50% ≤3.0 tations ¹ (Provide supporting or on a separate sheet) thytic Vegetation ¹ (Explain) and wetland hydrology must bed or problematic.
50% of the stratum 50% of the stratum 50% of the stratum 3. <u>Adverte Canon delphining</u> 3. <u>Adverte Canon delphining</u> 3. <u>Adverte Canon delphining</u> 3. <u>Adverte Canon delphining</u> 3. <u>Adverte Canon delphining</u> 4. <u>Adverte Canon delphining</u> 4. <u>Adverte Canon delphining</u> 50% of the strategy	Total Cover: total cover:35 <u>1. Canadensis</u> <u>1. Constructure</u> <u>1. Constructure</u> <u>1. Constructure</u> <u>1. Constructure</u> <u>1. Constructure</u> <u>1. Constructure</u> <u>1. Constructure</u>	<u>50</u> <u>50</u> <u>1</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>20% of tota</u> % Bare Grou of Bryophyte	al cover: <u>14</u> FA FA FA FA 	Prevalence Index Hydrophytic Vegetatio X Dominance Test Is Prevalence Index is Prevalence Index is Morphological Adap data in Remarks Problematic Hydrop ¹ Indicators of hydric soil be present unless distur Hydrophytic Vegetation Present? Yes	= B/A = <u>3.01</u> n Indicators: >50% ≤3.0 stations ¹ (Provide supporting or on a separate sheet) shytic Vegetation ¹ (Explain) and wetland hydrology must bed or problematic.
6	Total Cover: total cover:35 <u>16 lum</u> <u>10 lum</u> <u>(columbine)</u> <u>(columbine)</u> <u>Total Cover:</u> <u>tat cover: _28.5</u> <u>(racl.</u> <u></u> <u>Total Cover</u>	20% of tot <u>50</u> <u>1</u> <u>5</u> <u>1</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>6</u> <u>7</u> 20% of tota % Bare Grou of Bryophyte	al cover: <u>14</u> FA FA FA FA Il cover: <u>11</u> 	Prevalence Index Hydrophytic Vegetatio Hydrophytic Vegetatio Dominance Test is Prevalence Index is Morphological Adap data in Remarks Problematic Hydrop Indicators of hydric soil be present unless distur Hydrophytic Vegetation Present? Yes	= B/A = <u>3.01</u> In Indicators: >50% ≤3.0 Intations ¹ (Provide supporting or on a separate sheet) Inytic Vegetation ¹ (Explain) and wetland hydrology must bed or problematic.

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Alaska Version 2.0

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SOIL	Sampling Point: DP-24
Profile Description: (Describe to the depth needed to document the indicator or confirm	the absence of indicators.)
Depth Matrix Redox Features (inches) Color (moist) % Color (moist) % Type1 Loc2	Texture Remarks
No pit	1st - in topo tomanant
	boulders in creek bod
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Gi	rains. ² Location: PL=Pore Lining, M=Matrix.
Hydric Soll indicators: Indicators for Problematic Hydric Solls*:	 Alaska Gleyed Without Hue 5Y or Redder Underlying Layer Other (Explain in Remarks) primary indicator of welland hydrology, the present unless disturbed or problematic.
Alaska Gleyed Pores (A15) "Give details of color change in Remarks. Restrictive Layer (if present):	
Type: Depth (inches):	Hydric Soil Present? Yes X No
Remarks:	
HYDROLOGY	
Wetland Hydrology Indicators:	Secondary indicators (2 or more required)
Primary Indicators (any one indicator is sufficient)	Dreinege Patterns (B10)
Surface Water (A1) Inundation Visible on Aerial Imagery (B7) High Water Table (A2) Sparsely Vegetated Concave Surface (B8) Saturation (A3) Mart Deposits (B15) Water Marks (B1) Hydrogen Sulfide Odor (C1)	Oxidized Rhizospheres along Living Roots (C3) Presence of Reduced Iron (C4) Salt Deposits (C5)

- Dry-Season Water Table (C2)
 - Other (Explain in Remarks)
- Sediment Deposits (B2) ___ Drift Deposits (B3) ____ Algal Mat or Crust (B4)

Surface Water Present?

- ____ Iron Deposits (B5)
- Surface Soil Cracks (B6)
- Field Observations:
- Water Table Present? Yes Saturation Present?
- Yes <u>X</u> No _____ Yes <u>X</u> No _____ д Depth (inches): _ υ Depth (inches): Wetland Hydrology Present? Yes X No _ Ð <u>X_</u> №. Depth (inches):
- (includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

narks: plot is on edge of stream/side channel of standing water. Plot is NZ' edge of low topo area w/ grass & willow dominated comm. Remarks: high areas above 2'edge alder & gottonwood dominated-topo high areas do not have hydro.

Stunted or Stressed Plants (D1)

Geomorphic Position (D2)

Microtopographic Relief (D4)

Shallow Aquitard (D3)

FAC-Neutral Test (D5)

Applicationmer CSCH udf 1 Flank Landform (hilskie, lensee, hummoks, etc.): CTP24/LAL Locat relief (concive, convex, none): CALVEX Stepe (%): O Accentral (%): CTP24/LAL Locat relief (concive, convex, none): CALVEX Stepe (%): O Accentral (%): CALVEX Stepe (%): O Accentral (%): CALVEX Stepe (%): O Accentral (%): Accentral (%): CALVEX Stepe (%): O Accentral (%): CALVEX No Accentral (%): Milling (%): Accentral (%): CALVEX No Accentral (%): Accentral (%): No Accentral (%):	Project/Site: Crant (veek Condox	Boroi	Jgh/City:	use Pass sampling Date: 7.22.	
Investigato(s): <u>CSCU vdf CT</u> <u>Blank</u> Landom (hilstée, larrace, hummocks, etc.): <u>C1(20 vict vc</u> Stope (%): <u>O</u> Subregion: <u>Las 400.45514/10</u> Long: <u>149.462/167</u> Dominants): Soli Moy Unit Name: <u>NWI destification: <u>P64455444</u> Soli Moy Unit Name: <u>NWI destification: <u>P64455444</u> Re limitel/Windogic conditions on the site typical for this time of year? Yes <u>X</u> No <u>(If no, equilan in Remarks.)</u> <u>P644155</u> Are Vegetation <u>Soli</u> <u>or Hydrology</u> significantly disturbed? <u>N</u>⁰ Are Normal Circumsinnes⁶ present? <u>Yes <u>X</u> No <u>(If no equilan in Remarks.)</u> SUMMARY OF FINDINGS - Attach site map showing sampting point locations, transects, important features, etc. Hydrolypit Vegetation Present? <u>Yes <u>X</u> No <u>Is the Sampted Area</u> Wight Soli Present? <u>Yes <u>X</u> No <u>Is the Sampted Area</u> Wight Soli Present? <u>Yes <u>X</u> No <u>Is the Sampted Area</u> Wight Soli Present? <u>Yes <u>X</u> No <u>Is the Sampted Area</u> Wolf and Hydrolypit Vegetation Present? <u>Yes <u>X</u> No <u>Is the Sampted Area</u> Hydrolypit Vegetation Present? <u>Yes <u>X</u> No <u>Is the Sampted Area</u> Wolf and Hydrolypit Vegetation Present? <u>Yes <u>X</u> No <u>Is the Sampted Area</u> Hydrol Soli Present? <u>Yes <u>X</u> No <u>Is the Sampted Area</u> Hydrol Soli Present? <u>Yes <u>X</u> No <u>Is the Sampted Area</u> Hydrol Soli Present? <u>Yes <u>X</u> No <u>Is the Sampted Area</u> Hydrol Soli Present? <u>Yes <u>X</u> No <u>Is the Sampted Area</u> Hydrol Soli Present? <u>Yes <u>X</u> No <u>Is the Sampted Area</u> Hydrol Soli Present? <u>Yes <u>X</u> No <u>Is the Sampted Area</u> Hydrol Soli Present? <u>Yes <u>X</u> No <u>Is the Sampted Area</u> Hydrol Soli Present? <u>Yes <u>X</u> No <u>Is the Sampted Area</u> Hydrol Soli Present? <u>Sampted Area</u> Hydrol Soli Present? <u>Sampted Area</u> <u>Sampted Area</u> Hydrol Soli Present? <u>Sampted Area</u> <u>Sampted Area</u> <u>Sampted Area</u> <u>Sampted Area</u> <u>Sampted Area</u> <u>Sampted Area</u> <u>Sampted Area</u> <u>Sampted Area</u> <u>Sampted Area</u> <u>Sampted Area</u> <u>Sampted Area</u> <u>Sampted Area</u> <u>Sampted Area</u> <u>Sampted Area</u> <u>Sampted Area</u> <u>Sampted Area</u> <u>Sampted Area</u> <u>Sampted Area</u> <u>Sampted Area</u> <u>Sampted Area</u> <u>Sampted Area</u> <u>Sampted Area</u> <u>Sampted Area</u> <u>Sampted Area</u> <u>Sampted Area</u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u>	Applicant/Owner: Kenal Hydro			Sampling Point: DP25	
Local field (conceve, convex, none): Carve X Slope (%): O Ac pression Subregion: Lat: Lat:<	Investigator(s): <u>C.Schudel</u> J. Blan	<u>K</u> Land	form (hillside, te	rrace, hummocks, etc.): rivarian	
Subregion Lat: <u>UD. UST Let U</u> Long: -149. <u>Alo2162</u> Datum: Soil Map Unit Name: NWU idensification: <u>PCHAISS LC.</u> Net dimited (hydrologic conditions on the site typical for this time of year? Yes No (If ne optical in the marks.) PCHAISS LC. Are Vegetation Soil or Hydrology significantly disturbed? No Are "Normal Circumstances" present? Yes No PCHAISS LC. SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc. Hydrolytic Vegetation Present? Yes No Is the Sampled Area Hydrolytic Vegetation Present? Yes No Is the Sampled Area No Ves Hydrolytic Vegetation Present? Yes No Is the Sampled Area No Vest Area No Hydrolytic Vegetation Present? Yes No Is the Sampled Area No Vest Area No Vest Area No Vest Area No Vest Area No Vest Area No Vest Area No Vest Area No Vest Area No Vest Area No Vest Area No Vest Area No Vest Area No Vest Area No Vest Area No	Local relief (concave, convex, none):Coヘvモメ	Slope	e (%): O	depression	
Soil May Unit Nume:	Subregion: L	at: 60, 457	640 LC		
Are climatic / hydrologic conditions on the sile typical for this time of year? Yes	Soil Map Unit Name:	•••••		NWI classification: PEAL SS 14	
Are Vegetation Soil or Hydroby significanily disturbed? No No Are Vegetation Soil or Hydroby significanily disturbed? No No Are Vegetation Soil or Hydroby meturity problematic? No (if needed, explain any answers in Remarks.) SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc. Is the Sampled Area Hydrobytic Vegetation Present? Yes No Is the Sampled Area Welland Hydrology Present? Yes No Is the Sampled Area Welland Hydrology Present? Yes No Is the Sampled Area Welland Hydrology Present? Yes No Is the Sampled Area Welland Hydrology Present? Yes No Is the Sampled Area Welland Hydrology Present? Yes No Is the Sampled Area VEGETATION - Use scientific names of plants. List all species in the plot. Interface Bolt, FACW, or FAC: Interface 1 No Soft of total cover: 20% of total cover: Soft for Interface<	Are climatic / hydrologic conditions on the site typical for t	his time of year? Y	es X No	(If no ovnicin in Demodul) (If no ovnicin in Demodul)	
Are Vegetation Soil or hydrology naturally problemation Y Y No SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc. Hydrophytic Vegetation Present? Yes X No Hydrophytic Vegetation Present? Yes X No Hydrophytic Vegetation Present? Yes No within a Wetland? Yes No Hydrophytic Vegetation Present? Yes No within a Wetland? Yes No Wetland Hydrology Present? Yes No within a Wetland? Yes No Wetland Hydrology Present? Yes No within a Wetland? Yes No VEGETATION - Use scientific names of plants. List all species in the plot. Number of Dominant Species Number of Dominant Species (A) 1. No Sold total cover: 20% of total cover: 10 All Number of Dominant Species (A) 1. Sold Common Hydroby Cover of total cover: 20% of total cover: 2 (A) (A) 2. Sold X Communication Indicatore: 2 (A) (A) (A) 2. <td< td=""><td>Are Vegetation, Soil, or Hydrology</td><td>significantly distur</td><td></td><td>"Normal Circumstances" (IP Marks.)</td></td<>	Are Vegetation, Soil, or Hydrology	significantly distur		"Normal Circumstances" (IP Marks.)	
SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc. Hydrophytic Vegetation Present? Yes X No Is the Sampled Area Weltand Hydrology Present? Yes X No Is the Sampled Area Weltand Hydrology Present? Yes X No Is the Sampled Area Weltand Hydrology Present? Yes X No Is the Sampled Area Remarks: pt pc/public Market Marke	Are Vegetation , Soil , or Hydrology	naturally problem:	aticz Na //fr	No No	
Hydrophytic Vegetation Present? Yes No is the Sampled Area Hydrophytic Vegetation Present? Yes No within a Wettand? Yes No Remarks: pt pt No within a Wettand? Yes No Remarks: pt pt pc No within a Wettand? Yes No Remarks: pt pt pc pc </td <td>SUMMARY OF FINDINGS – Attach site map</td> <td>showing sampli</td> <td>ng point loca</td> <td>tions, transects, important features, etc.</td>	SUMMARY OF FINDINGS – Attach site map	showing sampli	ng point loca	tions, transects, important features, etc.	
Hydro Soll Present? Yes No Is the Sallpide Area Wetland Hydrology Present? Yes No Within a Wetland? Yes No Momental: $proposed Present? Yes No Within a Wetland? Yes No Amondation of the second th$	Hydrophytic Vegetation Present? Yes X	No	le the Sampla	d Area	
Wettand Hydrology Present? Yes No Its No Romarks: pt provide filled and fil	Hydric Soil Present? Yes X	No	within a Wetla	and? Yes of No.	
Internation pt representation formula Bernand Grand Gra	Wetland Hydrology Present? Yes X	No	WIGHT & WELL	And 7 Yes No	
Under the trans N. Side of the Grant of the plot. VEGETATION - Use scientific names of plants. List all species in the plot. The Statum Absolute Dominant indicator Status Number of Dominant Species. 1. None	Remarks: Pt represents was in	ing and	is @ cr	n finence of Grant Car &	
VEGETATION – Use scientific names of plants. List all species in the plot. Interstation Absolute Dominant Indicator Nome Dominant Indicator Nome Dominant Indicator Nome Dominant Indicator Nome Dominant Indicator Nome Total Cover: Solve of total cover: Solve of total cover: Solve of total cover: Solve of total cover: Solve of total cover: Solve of total cover: Solve of total cover: Total Cover: Total Cover: Total Cover: Total Cover: Total Cover: Total Cover: Total Cover: Total Cover: Total Cover: Total Cover: Total Cover: Total Cover: <td col<="" td=""><td>truiterk on N. side D.</td><td>Dros Gran</td><td>art carles</td><td>- Phannels 0</td></td>	<td>truiterk on N. side D.</td> <td>Dros Gran</td> <td>art carles</td> <td>- Phannels 0</td>	truiterk on N. side D.	Dros Gran	art carles	- Phannels 0
Tree Stratum Absolute Dominant Indicator Dominance Test worksheet: 1. Nore % Gover Species? Status 2.	VEGETATION - Use scientific names of plant	s. List all speci	es in the plot		
Tree Statum % Cover Species 2 Status 1. Nomber of Dominant Species 3 (A) 2. Total Cover: (B) 3. (A) 4. (B) 4. (B) 5.		Absolute Dom	inant Indicator	Dominance Test worksheet	
1. JWK That Are OBL, FACW, or FAC: 3 (A) 2.	Tree Stratum	<u>% Cover Spe</u>	cles? Status	Number of Dominant Species	
2.	1. 10000			That Are OBL, FACW, or FAC: (A)	
3. Total Cover: Species Across All Strata: Species Acros Spice Across All Strat	2	***		Total Number of Dominant 7	
4. Total Cover: Percent of Dominant Species 100 (A/B) Sabling/Shrub Stratum 50% of total cover: 20% of total cover: Total Cover: Total Cover: Total Cover: Total Cover: 100 (A/B) Sabling/Shrub Stratum S Y FAC Total Cover of: Multiply by: (A/B) 2. Sal ix barc family S Y FAC OBL species 100 x1 = 100 3. S Y FAC OBL species 100 x1 = 100 FAC species 1000 x1 = 100 4. S Y FAC OBL species 1000 x1 = 10000 FAC species $1000000000000000000000000000000000000$	- 3			Species Across All Strata: (B)	
Total Cover:	4		······	Percent of Dominant Species	
SeptimorShrub Stratum 20% of total cover: 20% of total cover: Prevalence Index worksheet: 1. Salix barclari S Y FAC 2. Salix Commutate S Y FAC 3. S Y FAC 4. S Y FAC 5. S Y FAC 6. S Y FAC 50% of total cover: 10 FAC species 10 50% of total cover: 20% of total cover: 2 X4 = 2 6. Total Cover: 10 FAC species 2 X4 = 2 1. Sanguisorba canadunsis S FAC species 2 X4 = 2 1. Sanguisorba canadunsis S FAC species 2 X4 = 2 2. Equite tum Arguistic tum and rownesse S FAC species 2 X4 = 2 3. Carex sitchensis S FAC species S Y FAC species 2 Y 4. Arguistic tum and rownesse S FAC species S Y FAC species S Y FAC species S	Total Cove	er:		That Are OBL, FACW, or FAC: /00 (A/B)	
1. Salix barclay S Y FAC 2. Salix Commutata S Y FAC 3. S Y FAC 4. S Y FAC 5. S Y FAC 6. S Y FAC 6. Total Cover: 10 FAC species 10 x1 = 10 7. FAC species 2 x4 = \$ 10 FAC species 2 x4 = \$ 10 6. Total Cover: 10 Total Cover: 10 Column Totals: 7.5 0 Column Totals: 7.5 0 Column Totals: 7.5 0 Column Totals: 7.7 1. Sanguisoria 6. Total Cover: 5 7.4 Hydrophytic Vegetation Indicators: X Prevalence Index is \$3.0 X Prevalence Index i	Sapling/Shrub Stratum	20% of total	cover:	Prevalence Index worksheet:	
2. Salix commutate 3	1. Salix barclay	5 V	FAC	Total % Cover of:Multiply by:	
3.	2. Salix commutata	- <u> </u>		OBL species 10 $\times 1 = 10$	
4.	3,			FACW species $3 \times 2 = 6$	
5	4			FAC species (a) x3 = 180	
6	5			FACU species <u>2</u> x 4 = <u>8</u>	
Total Cover: 10 Column Totals: \underline{TS} (A) $\underline{2024}$ (B) 50% of total cover: $\underline{5}$ 20% of total cover: $\underline{2}$ Prevalence Index = $B/A = \underline{2.72}$ Hydrophytic Vegetation Indicators: 2. Equite turn $\underline{Arvensters}$ \underline{S} [D \underline{FACW} $\underline{XDominance Test is >50%}$ 3. Care x sitchensis $\underline{arvense}$ \underline{S} [D \underline{FACW} $\underline{XDominance Test is >50%}$ 4. Agrostis stologuiders $\underline{arvense}$ \underline{S} [D \underline{FACW} $\underline{XDominance Test is >50%}$ 5. Stologuiders $\underline{arvense}$ \underline{S} [D \underline{FACW} $\underline{Aerostars or on a separate sheet}$) 6. Calamagrosts Canadunsis \underline{S} [D \underline{FACW} $\underline{Problematic Hydrophytic Vegetations' (Provide supporting data in Remarks or on a separate sheet)$ $\underline{Problematic Hydrophytic Vegetation' (Explain)$ 7. \underline{S} $\underline{Arrowstrs}$ \underline{S} $\underline{Arrowstrs}$ \underline{S} 9. \underline{S} \underline{S} \underline{S} \underline{S} \underline{S} \underline{S} 9. \underline{S} \underline{S} \underline{S} \underline{S} \underline{S} \underline{S} \underline{S} 10. \underline{S} \underline{S}	6			UPL species x 5 =	
50% of total cover: 5 20% of total cover: 7 Prevalence Index = $B/A = 2.72$ Herb Stratum 1. Sangvisorba canadumsis 3 FACW 2. Equile turn arvense 810 FACW 3. Carex sitchensis (a buch his sppt) 10 $08L$ 4. Agrostis stolonitors (a buch his sppt) 10 $08L$ 5. Streptopus amplexiform 2 FACU 6. Calamagroshs Canadumsis $80 + 0$ 7 7. Problematic Hydrophytic Vegetation' (Explain) 7. Problematic Hydrophytic Vegetation' (Explain) 10. 9. 10. 10. 10. 10. 10. Yegetation <td>Total Cove</td> <td>r:</td> <td></td> <td>Column Totals: 75 (A) 201 (B)</td>	Total Cove	r:		Column Totals: 75 (A) 201 (B)	
1. Sanguisorba canadunsis 3 FACW 2. Equile hum arvense \$10 FACW 3. Carex sitchensis (a huch his spp) 10 0BL 4. Agrostis sitchensis (a huch his spp) 10 0BL 5. Streptopus ample xifolius Z FACU 6. Calamagroshs Canadunsis Solutions (Provide supporting data in Remarks or on a separate sheet) 7.	50% of total cover: <u>5</u>	20% of total c	cover: 2	Prevalence Index = $B/A = 2.72$	
2. Equite turn arvense 310 7100 X Dominance Test is >50% 3. Carex sitchensis (a puch his spp) 10 081 X Prevalence Index is 3.0 X Prevalence Index is 3.0 $Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet) 10 081 Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet) 10 081 Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet) R Streptopus ample x ifold Us 2 FACU Problematic Hydrophytic Vegetation' (Explain) 10 Streptopus ample x ifold Streptopus = 10 Streptop$	1. Sanguisorba canadensis	3	FACIN	Hydrophytic Vegetation Indicators:	
3. <u>Care × sitchensis</u> <u>(arboth hs spp)</u> 10 <u>OBL</u> 4. <u>Arrostis stoloritera</u> 5. <u>Streptopus amplexifolius</u> <u>Z</u> <u>FACU</u> 6. <u>Calamagrostis canadunsis</u> <u>Stoto Yo</u> <u>Y</u> <u>FAC</u> 7. <u></u> 7. <u></u> 8. <u></u> 9. <u></u> 10. <u></u> Total Cover: <u></u> 50% of total cover of Broophytes <u></u> 50% of total cover of Broophytes <u></u> 50% of total cover of Broophytes <u></u> 50% of total cover of Broophytes <u></u> 50% of cover of Broophytes <u></u> 50% of cover of Broophytes <u></u> 50% of cover of Broophytes <u></u> 50% of cover of Broophytes <u></u> 50% of cover of B	2. Egivise tum arvense.	- <u>ŝ</u> lo	EAC	_X Dominance Test is >50%	
4. <u>Argrostis stolonitera</u> 5. <u>Shreptopus amplexifolius</u> <u>Z</u> 6. <u>Calamagroshs canadunsis</u> <u>BD 40 Y</u> 7. <u>FAC</u> 7. <u>Indicators of hydric soil and wetland hydrology must</u> 8. <u>Indicators of hydric soil and wetland hydrology must</u> 9. <u>Indicators of hydric soil and wetland hydrology must</u> 10. <u>Total Cover: <u>105</u> 50% of total cover: <u>32.5</u> 20% of total cover: <u>13</u> Plot size (radius, or length x width) <u>20' rad</u>. <u>% Bare Ground <u>25 optr</u> Wegetation % Cover of Wetland Bryophytes <u>Total Cover of Bryophytes</u> <u>10</u></u></u>	3. Carex sitchensis Caguatilis spe	·) 10		_X Prevalence Index is ≤3.0	
5. <u>Streptopus amplexificitus</u> <u>Z</u> <u>FACU</u> 6. <u>Calamagroshs</u> <u>Canadunsis</u> <u>Z</u> <u>FACU</u> 7 8 9 10 Total Cover: <u>13</u> Plot size (radius, or length x width) <u>20' rad.</u> <u>Store</u> <u>Kacu</u> 50% of total cover: <u>32.5</u> 20% of total cover: <u>13</u> Ware Ground <u>Z5 open</u> We getation <u>Kacu</u> <u>Hydrophytic</u> Vegetation <u>Kacu</u> <u>Store</u> <u>Kacu</u> <u>Store</u> <u>Kacu</u> <u>Kacu</u> <u>Store</u> <u>Kacu</u> <u>Store</u> <u>Kacu</u> <u>Store</u> <u>Kacu</u> <u>Store</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>Kacu</u> <u>K</u>	4. Agrostis stologifera	······································		Morphological Adaptations ¹ (Provide supporting	
6. <u>Calamagroshs</u> <u>Canadunsis</u> <u>Boyo</u> <u>Y</u> <u>FAC</u> 7 8 9 10 Total Cover: <u>165</u> 50% of total cover: <u>32.5</u> 20% of total cover: <u>13</u> Problematic Hydrophytic Vegetation' (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic. Hydrophytic Vegetation Hydrophytic Vegetation Vegetation Present 2 Ves X No	5. Streptopus amplexificius	2	FACU	data in Remarks or on a separate sheet)	
7 Indicators of hydric soil and wetland hydrology must 8 9 10 Total Cover: Flot size (radius, or length x width)' rad% Bare GroundS copen % Cover of Wetland Bryophytes Total Cover of Bryophytes (0)	6. Falamagnostis canadinsis	第140 V	FAC	Problematic Hydrophytic Vegetation1 (Explain)	
8 be present unless disturbed or problematic	7			¹ Indicators of hydric soil and wetland hydrology must	
9 10 10 50% of total cover: <u>13</u> 50% of total cover: <u>32.5</u> 20% of total cover: <u>13</u> Plot size (radius, or length x width) <u>20' rad.</u> % Bare Ground <u>25' op(n</u> % Cover of Wetland Bryophytes <u>10</u> % Cover <u>10</u> % Cover <u>10</u> % Cover <u>10</u> % Cover <u>10</u> % Cover <u>10</u> % Cover <u>10</u> % Cover <u>10</u> % Cover <u>10</u> % Cover <u>10</u> % Cover <u>10</u> % Cover <u>10</u> % Cover <u>10</u> % Cover <u>10</u> % Cover <u>10</u> % Cover <u>10</u> % Cover <u>10</u> % Cover <u>10</u> % Cover <u>10</u> % Cover <u>10</u> % Cover <u>10</u> % Cover <u>10</u> % Cover <u>10</u> % Cover <u>10</u> % Cover <u>10</u> % Cover <u>10</u> % Cover <u>10</u> % Cover <u>10</u> % Cover <u>10</u> % Cover <u>10</u> % Cover <u>10</u> % Cover <u>10</u> % Cover <u>10</u> % Cover <u>10</u> % Cover <u>10</u> % Cover <u>10</u>	8			be present unless disturbed or problematic.	
10	9				
Total Cover: <u>65</u> 50% of total cover: <u>32.5</u> 20% of total cover. <u>13</u> Plot size (radius, or length x width) <u>20' rad.</u> % Bare Ground <u>25' open</u> % Cover of Wetland Bryophytes <u>10</u> Yes X No	10				
50% of total cover: 32.5 20% of total cover: 13 Plot size (radius, or length x width) 20' rad. % Bare Ground 25 op(n Vegetation % Cover of Wetland Bryophytes Total Cover of Bryophytes Present? Yes X No	Total Cover	: 105			
Plot size (radius, or length x width) 20' rad. % Bare Ground 25 open Hydrophytic % Cover of Wetland Bryophytes Total Cover of Bryophytes 10 Present? Yes X No	50% of total cover: 32 .	5 20% of total o	over: 13		
% Cover of Wetland Bryophytes Total Cover of Bryophytes Present? Yes X No	Plot size (radius, or length x width) 20' rad.	% Bare Ground	25 open	Hydrophytic	
(Where applicable)	% Cover of Wetland Bryophytes Total Co (Where applicable)	Present? Yes <u>No</u>			
Remarks:	Remarks:				
up to tos 129-131 132	uhotos 129-131 132				

US Army Corps of Engineers

SOIL							Sampling Po	oint: <u>DPZS</u>
Brofile Doser	intion: (Describe	e to the den	th needed to docu	ment the indicato	r or confi	rm the absence of	f Indicators.)	
Profile Desci	intion: (nescina		Pod	ny Fostures			,	
Depth (inches)	Color (moist)	%	Color (moist)		Loc ²		Remar	ks
(mones)								
	<u> </u>							
	NOC	DIT						
<u> </u>			ulater in	218+				
.		<u>iaircy</u>	WHILI		_			
		v						······
-					-			
<u> </u>							Million Million Million	
	<u> </u>							
Type: C=Co	ncentration, D=De	epletion, RM	=Reduced Matrix, C	S=Covered or Coa	ted Sand	Grains. ² Loca	ition: PL=Pore Linin	ig, M=Matrix.
Hydric Soil I	ndicators:		Indicators for	Problematic Hydr	ic Solls':	1		
Histosol	or Histel (A1)		Alaska Co	lor Change (TA4) ⁴		Alaska (Sleyed Without Hue	5Y or Redder
Hislic Ep	ipedon (A2)		Ataska Afp	oine Swales (TA5)		Under	lying Layer	
Hydroge	n Sullide (A4)		Alaska Re	dox With 2.5Y Hue		Other (E	Explain in Remarks)	
Thick Da	rk Surface (A12)							
Alaska G	Bleyed (A13)		³ One indicator	of hydrophylic veg	etation, or	ne primary indicato	r of wetland hydrolo	9y,
Alaska R	tedox (A14)		and an appr	opriate landscape p	position m	nust be present unle	ess disturbed or pro	blematic.
Alaska G	Bleyed Pores (A15	i)	⁴ Give details o	f color change in R	emarks.			
Restrictive L	ayer (if present)	:		~~~~				
Type:			. <u></u>					,
Depth (ind	ches):					Hydric Soll I	Present? Yes 🗋	<u>×No</u>
Romarke'			· · · · · · · · · · · · · · · · · · ·		···-	H	<i>*</i> *	
i tomano.								
HYDROLO	GY							
Wetland Hv	drology indicato	rs:		<i></i>		Secondary Ind	licators (2 or more re	equired)
Brimany India	cators (any one in	dicator is sul	fficient)			Water-sta	ined Leaves (B9)	
	Motor (A1)	<u>utoutor 15 011</u>	Inundation Vis	ible on Aerial Imag	erv (B7)	Drainage	Patterns (B10)	
	vvater (AT)		Snarsely Vege	tated Concave Sur	face (B8)	Oxidized	Rhizospheres along	Living Roots (C3)
			Mari Denosits	(B15)		Presence	of Reduced Iron (C	4)
	on (A3) Latia (D4)		Hydrogen Sulf	ide Odor (C1)		Salt Depo	sits (C5)	
Water N	arks (Bi)		Tryatogen out	later Table (C2)		Stunted o	r Stressed Plants (C	01)
Sedimer			Other (Explain	in Remarks)		Geomoro	hic Position (D2)	•
	posits (B3)			in Nerhankoy		Shallow A	ouitard (D3)	
	at of Crust (B4)					Microtopo	oranhic Relief (D4)	
fron Dep	DOSILS (B5)					EAC-Neu	tral Test (D5)	
Surface	Soll Gracks (B6)		·					<u></u>
Field Obser	vations:			0				
Surface Wat	er Present?	Yes	NO Depth ((incries): 0	— I		,	
Water Table	Present?	Yes <u>}-</u>	No Depth ((inches):			D	X No
Saturation P	resent?	Yes 🗡	No Depth	(inches):	V	Vetland Hydrology	/ Present? Yes 🗹	<u> </u>

 Saturation Present?
 Yes
 Yes
 Depth (inches):
 D
 Wetland Hydrold

 (includes capillary fringe)
 Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Projecusite: Grant Creek Corridor		Borough	/City: Moi	Sepass Sampling Date: 7-22-13	
Applicant/Owner. Kener Hydro				Sampling Point: DP7.6	
Investigator(s): <u>C.Schudel</u> J. Blank		Landforn	n (hillside, ter	race, hummocks, etc.):	
Local relief (concave, convex, none):		Slope (%):()		
Subregion: Lat		60.4	57646 Loi	ng: -149.361931 Datum:	
Soil Map Unit Name;				NWI classification: Upland	
Are climatic / hydrologic conditions on the site typical for this	time of ya	əar? Yes	<u> </u>	(If no, explain in Remarks.)	
Are Vegetation, Soil, or Hydrologys	ignificantly	disturbed	I? N 0 Are	"Normal Circumstances" present? Yes V	
Are Vegetation, Soil, or Hydrology n	aturaliy pr	oblematic	' ?N∛ (lfn	eeded, explain any answers in Remarks.)	
SUMMARY OF FINDINGS - Attach site map sh	owing sa	ampling	point locat	ions, transects, important features, etc.	
Hydrophytic Vegetation Present? Yes No	5 K				
Hydric Soil Present? Yes No	<u>×</u>	IS	the Sampled	l Area	
Wetland Hydrology Present? Yes No	, <u>人</u>	WI	unin a wettai	nd? Yes No_//	
Remarks: Representative of a	10 Ho	nuro	nd 15r	once shotos 1211-128	
I upland in the pi	DAIN	TRAKS	Civen.		
VEGETATION - Use scientific names of plants.	List all :	species	in the plot.		
Trac Charles	Absolute	Domina	nt Indicator	Dominance Test worksheet:	
Tree Stratum	<u>% Cover</u>	Species	s? Status	Number of Dominant Species	
2 Babile Dearware	- 51-	<u> </u>	- FACV	That Are OBL, FACW, or FAC: (A)	
2. DETUT- polygriftera	<u> </u>	<u> </u>	<u> FACU</u>	Total Number of Dominant	
4	·	<u> </u>		Species Across All Strata: (B)	
Total Cover:			<u> </u>	Percent of Dominant Species	
50% of total cover: 2.5	20%	If total cov	or 10	That Are OBL, FACW, or FAC: (A/B)	
Sapling/Shrub Stratum	20/00	n lotai cov	el. <u>10</u>	Prevalence Index worksheet:	
1. Vibirnum edule	20		FACU	Total % Cover of: Multiply by:	
2. Hosa acicularis	_30_	<u> </u>	FACU	OBL species $0 \times 1 = 0$	
3. Picea glanca	<u>+05</u>		FACU	FACW species 3 $x_2 = 6$	
4. MINS MARIAIS	\$15	<u> </u>	FAC	FAC species 20 $x^3 = 60$	
5		<u>. </u>		$\frac{110}{100} \times 4 = 524$	
b,		<u> </u>		Column Totale: 154 (A) 500 (D)	
Total Cover:	60		.7.	$(B) = \frac{10}{10} (A) - \frac{10}{10} (B)$	
Herb Stratum	_ 20% of	total cove	r:	Prevalence Index = B/A = 3.83	
1. Chamerion a newstitulium	10	У	FACU	Hydrophytic Vegetation Indicators:	
2. Pymnocarpium dryopteris	10	-	FACU	Dominance Test is >50%	
3. Equisition arvense	is	1-	FAC	Prevalénce Index is ≤3.0	
4. Cornus canadensis	S		FACU	Morphological Adaptations ¹ (Provide supporting	
5. Gallium trifitung dum	_3		FACW	Problematic Hydrophytic Venetation ((Turket)	
6. <u>Streptopus amplexitulium</u>			TACU	romentatio rydrophytic vegetation (Explain)	
7				¹ Indicators of hydric soil and wetland hydrology must	
8			[be present unless disturbed or problematic.	
9			[
10	<u> </u>		·		
Total Cover: _	44_	-			
50% of total cover: <u>22</u>	20% of	total cover	" <u>X.X</u>	Hydronhytic	
Protisize (radius, or length x width) <u>20' Y cucl</u>	% Bare G	round	<u>v</u>	Vegetation	
(Where applicable) Total Cove	r of Bryopl	nytes	10	Present? Yes No'	
nonjuno.		+ <u>1</u>			
photos: 133-138		.:d.			
THE REPORT OF TH	e to the depth ne	eeded to docur	ment the indicator	or confirn	n the absence of indicators.)
--	---	--	--	----------------------	--
enth Matrix		Redo	x Features		
iches) Color (moist)	%0	Color (moist)	% Type ¹	Loc ²	Remarks
5-10					siltloam w/ organics
/ //		NAN			- in the second
					_very ary
			<u>.</u>		
			•		
27.1.1.8					
LANDON LILL OF MANY MANY	<u> </u>				
······································	<u> </u>				
pe: C=Concentration, D=De	epletion, RM=Red	duced Matrix, C	S=Covered or Coat	ed Sand G	Grains. ² Location: PL=Pore Lining, M=Matrix.
dric Soil Indicators:		Indicators for	Problematic Hydri	c Solls':	
Histosol or Histel (A1)		Alaska Col	lor Change (TA4) ⁴		Alaska Gleyed Wilhout Hue 5Y or Redder
Histic Epipedon (A2)		Alaska Alp	ine Swales (TA5)		Underlying Layer
Hydrogen Sulfide (A4)		Alaska Red	dox With 2.5Y Hue		Other (Explain in Remarks)
Thick Dark Surface (A12)					
Alaska Gleyed (A13)		°One indicator	of hydrophytic vege	tation, one	at he present unless disturbed or problematic
_ Alaska Redox (A14)	•	and an appro	opriate landscape p	osition mu	st be present unless disturbed of problematic.
Alaska Gleyed Pores (A15) 	Give details of	r color change in Re	marks.	
strictive Layer (if present)	10.10				
Type: <u>(000) () / 100</u>	ance_				
Depth (inches):/O'					Hydric Son Presence Tes No
emarks:					1
emarks:	•				
emarks: /DROLOGY	•				
DROLOGY etland Hydrology Indicator	rs;				Secondary Indicators (2 or more required)
marks: DROLOGY etland Hydrology Indicator imary Indicators (any one ind	rs: dicator is sufficie	n()			Secondary Indicators (2 or more required) Water-stained Leaves (B9)
emarks: /DROLOGY /etland Hydrology Indicator rimary Indicators (any one indicator Surface Water (A1)	rs: dicator is sufficie	nt) Inundation Visi	ible on Aeriai Image	ту (В7)	<u>Secondary Indicators (2 or more required)</u> Water-stained Leaves (B9) Drainage Patterns (B10)
emarks: DROLOGY letland Hydrology Indicator imary Indicators (any one Indicators) _ Surface Water (A1) High Water Table (A2)	rs: dicator is sufficie	nt) Inundation Visi Sparsely Vege	ible on Aerial Image tated Concave Surf	ry (B7) ace (B8)	<u>Secondary Indicators (2 or more required)</u> Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots (C
emarks: DROLOGY /etland Hydrology Indicator <u>imary Indicators (any one Indicator</u> _ Surface Water (A1) _ High Water Table (A2) Saturation (A3)	rs: dicator is sufficie 	nt) Inundation Visi Sparsely Vege Mari Deposits (ible on Aerial Image tated Concave Surf (B15)	ry (B7) ace (B8)	<u>Secondary Indicators (2 or more required)</u> <u>Water-stained Leaves (B9)</u> Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots (C Presence of Reduced Iron (C4)
emarks: DROLOGY retland Hydrology Indicator rimary Indicators (any one indicator _ Surface Water (A1) _ High Water Table (A2) _ Saturation (A3) Water Marks (B1)	rs: dicator is sufficien 	nt) Inundation Visi Sparsely Vege Mari Deposits Hydrogen Sulfi	ible on Aerial Image tated Concave Surf (B15) ide Odor (C1)	ry (B7) ace (B8)	Secondary Indicators (2 or more required) — Water-stained Leaves (B9) — Drainage Patterns (B10) — Oxidized Rhizospheres along Living Roots (C — Presence of Reduced Iron (C4) — Salt Deposits (C5)
Pmarks: DROLOGY etland Hydrology Indicator imary Indicators (any one indicator Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2)	rs: dicator is sufficier 	nt) Inundation Visi Sparsely Vege Mari Deposits Hydrogen Sulfi Dry-Season W	ible on Aerial Image tated Concave Surf (B15) ide Odor (C1) /ater Table (C2) '	ry (B7) ace (B8)	Secondary Indicators (2 or more required) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots (C Presence of Reduced Iron (C4) Salt Deposits (C5) Stunted or Stressed Plants (D1)
emarks: DROLOGY etland Hydrology Indicator imary Indicators (any one Ind Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3)	rs: dicator is sufficier 	nt) Inundation Visi Sparsely Vege Mari Deposits Hydrogen Sulfi Dry-Season W Other (Explain	ible on Aerial Image tated Concave Surf (B15) ide Odor (C1) Vater Table (C2) ' in Remarks)	rry (B7) ace (B8)	Secondary Indicators (2 or more required) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots (C Presence of Reduced Iron (C4) Salt Deposits (C5) Stunted or Stressed Plants (D1) Geomorphic Position (D2)
Emarks: DROLOGY etland Hydrology Indicator imary Indicators (any one Inv Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4)	rs: dicator is sufficie 	nt) Inundation Visi Sparsely Vege Mari Deposits Hydrogen Sulfi Dry-Season W Other (Explain	ible on Aerial Image tated Concave Surf (B15) ide Odor (C1) rater Table (C2) ' in Remarks)	ту (В7) асе (В8)	Secondary Indicators (2 or more required) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots (C Presence of Reduced Iron (C4) Sait Deposits (C5) Stunted or Stressed Plants (D1) Geomorphic Position (D2) Shallow Aquitard (D3)
marks: DROLOGY etland Hydrology Indicator imary Indicators (any one Ind Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Aigal Mat or Crust (B4) Iron Deposits (B5)	rs: dicator is sufficie 	nt) Inundation Visi Sparsely Vege Mari Deposits Hydrogen Sulfi Dry-Season W Other (Explain	ible on Aeriai Image tated Concave Surf (B15) ide Odor (C1) /ater Table (C2) ' in Remarks)	ry (B7) ace (B8)	Secondary Indicators (2 or more required) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots (C Presence of Reduced Iron (C4) Sait Deposits (C5) Stunted or Stressed Plants (D1) Geomorphic Position (D2) Shallow Aquitard (D3) Microtopographic Relief (D4)
marks: DROLOGY etland Hydrology Indicator imary Indicators (any one ind 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)	rs: dicator is sufficier 	nt) Inundation Visi Sparsely Vege Mari Deposits Hydrogen Sulfi Dry-Season W Other (Explain	ible on Aerial Image tated Concave Surf (B15) ide Odor (C1) Vater Table (C2) ' in Remarks)	ry (B7) ace (B8)	Secondary Indicators (2 or more required) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots (C Presence of Reduced Iron (C4) Sait Deposits (C5) Stunted or Stressed Plants (D1) Geomorphic Position (D2) Shallow Aquitard (D3) Microtopographic Relief (D4) FAC-Neutral Test (D5)
marks: DROLOGY etland Hydrology Indicator imary Indicators (any one in- 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) eld Observations:	rs: dicator is sufficien 	nt) Inundation Visi Sparsely Vege Mari Deposits Hydrogen Sulfi Dry-Season W Other (Explain	ible on Aerial Image tated Concave Surf (B15) ide Odor (C1) /ater Table (C2) in Remarks)	ry (B7) ace (B8)	Secondary Indicators (2 or more required) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots (C Presence of Reduced Iron (C4) Sait Deposits (C5) Stunted or Stressed Plants (D1) Geomorphic Position (D2) Shallow Aquitard (D3) Microtopographic Relief (D4) FAC-Neutral Test (D5)
Pemarks: DROLOGY etland Hydrology Indicator imary Indicators (any one in- 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) leid Observations: urface Water Present?	rs: dicator is sufficier 	nt) Inundation Visi Sparsely Vege Mari Deposits (Hydrogen Sulfi Dry-Season W Other (Explain	ible on Aerial Image tated Concave Surf (B15) ide Odor (C1) /ater Table (C2) ' in Remarks)	ry (B7) ace (B8)	Secondary Indicators (2 or more required) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots (C 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)
Pemarks: DROLOGY Tetland Hydrology Indicator <u>imary Indicators (any one Inv</u> 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) Teld Observations: urface Water Present? Vater Table Present?	rs: dicator is sufficie 	nt) Inundation Visi Sparsely Vege Mari Deposits Hydrogen Sulfi Dry-Season W Other (Explain Other (Explain	ible on Aerial Image tated Concave Surf (B15) ide Odor (C1) /ater Table (C2) in Remarks) in Remarks)	ary (B7) ace (B8)	Secondary Indicators (2 or more required) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots (C Presence of Reduced iron (C4) Sait Deposits (C5) Stunted or Stressed Plants (D1) Geomorphic Position (D2) Shallow Aquitard (D3) Microtopographic Relief (D4) FAC-Neutral Test (D5)
emarks: 'DROLOGY /etiand Hydrology Indicator rimary Indicators (any one Indicators) 	rs: dicator is sufficie 	nt) Inundation Visi Sparsely Vege Mari Deposits Hydrogen Sulfi Dry-Season W Other (Explain Other (Explain	ible on Aerial Image tated Concave Surf (B15) ide Odor (C1) /ater Table (C2) ' in Remarks) (inches): (inches):	ry (B7) ace (B8)	Secondary Indicators (2 or more required) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots (C Presence of Reduced Iron (C4) Sait Deposits (C5) Stunted or Stressed Plants (D1) Geomorphic Position (D2) Shallow Aquitard (D3) Microtopographic Relief (D4) FAC-Neutral Test (D5) Molecular Content of the second state of
Pemarks: Processing and the processing of the p	rs: dicator is sufficien 	nt) Inundation Visi Sparsely Vege Mari Deposits (Hydrogen Sulfi Dry-Season W Other (Explain Depth (Depth (ible on Aerial Image tated Concave Surf (B15) ide Odor (C1) Vater Table (C2) ' in Remarks) (inches): (inches):	ry (B7) ace (B8)	Secondary Indicators (2 or more required) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots (C Presence of Reduced Iron (C4) Sait Deposits (C5) Stunted or Stressed Plants (D1) Geomorphic Position (D2) Shallow Aquitard (D3) Microtopographic Relief (D4) FAC-Neutral Test (D5) Billand Hydrology Present? Yes No _X
Pemarks: Pemarks: Petiand Hydrology Indicator rimary Indicators (any one in- 	rs: dicator is sufficien 	nt) Inundation Visi Sparsely Vege Mari Deposits Hydrogen Sulfi Dry-Season W Other (Explain Depth (Depth (Depth (Depth (ible on Aerial Image tated Concave Surf (B15) ide Odor (C1) fater Table (C2)' in Remarks) (inches): (inches): (inches): al photos, previous	ry (B7) ace (B8)	Secondary Indicators (2 or more required) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots (C Presence of Reduced Iron (C4) Sait Deposits (C5) Stunted or Stressed Plants (D1) Geomorphic Position (D2) Shallow Aquitard (D3) Microtopographic Relief (D4) FAC-Neutral Test (D5) ettland Hydrology Present? Yes NoX
emarks: /DROLOGY /etland Hydrology Indicator rimary Indicators (any one in- 	rs: dicator is sufficien 	nt) Inundation Visi Sparsely Vege Mari Deposits (Hydrogen Sulfi Dry-Season W Other (Explain Other (Explain Depth (Depth (Depth (Depth (ible on Aerial Image tated Concave Surf (B15) ide Odor (C1) /ater Table (C2) in Remarks) (inches): (inches): (inches): al photos, previous	ry (B7) ace (B8)	Secondary Indicators (2 or more required)

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WETLAND DETERMINATION DATA FORM - Alaska Region

Projecusite: <u>Grant Freets Co</u> Lak	と Boro	ugh/City:M	ouse Pass Sampling Date: 7-23-1
Applicant/Owner: Kenas Hydro		· · · · ·	Sampling Point: DP77
Investigator(s): C.Schudil J. Blank	Land	lform (hillside, ter	race hummocks etc): Lake edge
Local relief (concave, convex, none):	Slop	e(%): Z	,,
Subregion: L	at: 10, 474-	199 Lo	no: -149,205 81.4 Datum
Soil Map Unit Name:		· · · · · · · · · · · · · · · · · · ·	NMI classification: DISTA 115
Are climatic / hydrologic conditions on the site typical for	his time of year?	Yes X No	(If no evolution in Remarks)
Are Vegetation Soil or Hydrology	significantly distu	$\frac{1}{100} \frac{1}{100} \frac{1}{100}$	
Are Vegetation , Soil , or Hydrology	naturally problem	atic? Any fifm	eeded explain any answers in Bomarka)
SUMMARY OF FINDINGS – Attach site map	showing sampl	ing point locat	tions, transects, important features, etc.
Hydrophytic Vegetation Present? Yes	No		
Hydric Soil Present? Yes 🗡	No	is the sampled	a Area
Wetland Hydrology Present? Yes X	No	within a wetta	nd? Yes <u>X.</u> No
Remarks: Herbaccore wetland	fringe	- on la	lee
VEGETATION - Use scientific names of plant	s. List all spec	ies in the plot.	
Tree Stratum	Absolute Dor	ninant Indicator	Dominance Test worksheet:
	<u>% Cover</u> Sp	ecies? Status	Number of Dominant Species
2			Inat Are OBL, FACW, or FAC: (A)
3.		<u></u>	Total Number of Dominant
4			Species Across All Strata: (B)
Total Cov	er;		Percent of Dominant Species
50% of total cover:	20% of tota	l cover:	That Are OBL, FACW, or FAC: (A/B)
Sapling/Shrub Stratum			Total % Cover of Multi-het up
1. Alnus viridis	5	Y_FAC	OBL spacing SQ with SQ
2. Salix barclayi		I FAC	FACW species 15 $y_2 = 30$
3	·	<u> </u>	FAC species 57 $x_3 = 171$
4			FACU species $9 \times 4 = 36$
6	······ ·······························		UPL species O x 5 = O
U	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~		Column Totals: 131 (A) 287 (B)
50% of lotal cover: 2	5 2004 of total		
Herb Stratum	<u></u> 20% 01 totat	COVOI:	Prevalence Index = $B/A = 2, 19$
1. Equisetum fluviatice	<u>30</u>	Y_OBL	Hydrophytic Vegetation Indicators:
2. Equisetim arvinse		Y FAC	X Dominance Test is >50%
3. Carex aquatilus		Y OBL	Arrevalence index is \$3.0
4. Deschempsia caespitusa	<u> </u>	EAC	data in Remarks or on a separate sheet)
5. Sanguisorba anadinsis	_ <u>_ 15</u>	FACW	Problematic Hydrophytic Vegetation ¹ (Explain)
6. <u>Aquilegia tomosa</u>	- Ŧ	FACU	
7. Chamenon angustitolia		<u>FACU</u>	¹ Indicators of hydric soil and welland hydrology must
8	÷		be present unless disturbed of problematic.
9			
10			
• Total Cove	n: <u>124</u>	2110	
	20% of total	cover: <u>~~</u>	Hydrophylic
Plot size (radius, or length x width) $\mathcal{W} \times \mathcal{S}$	% Bare Groun		Vegetation
% Gover of Wetland Bryophytes Total Co (Where applicable)	over of Bryophytes		Present? Yes X No
Remarks:			
11/1/1051 735-731			
printing. 1.0.0 Mag			

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SOIL

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Profile Description: (Desc	ribe to the depth needed to document	the Indicator or confirm	the absence of indicators.)
Depth <u>Mat</u>	rix Redox Fea		
(inches) Color (mols	t) % Color (moist) 9	1 IVDE LOC	
······			gravel + Cobble
			U
·	<u>pit</u>		
in	aht on lake edge	<u> </u>	
	1		
		•	
Type: C=Concentration D	Depletion RM=Reduced Matrix CS=Co	vered or Coaled Sand Gr	ains, ² Location: PL=Pore Lining, M=Matrix.
Hydric Soil Indicators:	Indicators for Probl	ematic Hydric Solls ³ :	
Histosol or Histel (A1)	Alaska Color Ch	ange (TA4) ⁴	Alaska Gleyed Without Hue 5Y or Redder
Histic Epipedon (A2)	Alaska Alpine Sv	wales (TA5)	Underlying Layer
Hydrogen Sulfide (A4)	Alaska Redox W	/ith 2.5Y Hue	KOther (Explain in Remarks)
Thick Dark Surface (A1:	2)	•	
Alaska Gleyed (A13)	³ One Indicator of hyd	Irophytic vegetation, one p	primary indicator of wetland hydrology,
Alaska Redox (A14)	and an appropriate	e landscape position must	t be present unless disturbed or problematic.
Alaska Gleyed Pores (A	15) ⁴ Give details of color	change in Remarks.	
Restrictive Layer (if prese	nt):	_	
Туре:			
Depth (inches):			Hydric Soll Present? Yes No
Remarks:		3	
plot	~1 above lake 1	ever	
· · ·			
· · ·		•	
1			
HYDROLOGY			
Wetland Hydrology Indica	tors:		Secondary Indicators (2 or more required)
Primary Indicators (any one	indicator is sufficient)		Water-stained Leaves (B9)
X Surface Water (A1)	Inundation Visible on	Aerial Imagery (B7)	Drainage Patterns (B10)
High Water Table (A2)	Sparsely Vegetated	Concave Surface (BB)	Oxidized Rhizospheres along Living Roots (C3)
Saturation (A3)	Marl Deposits (B15)		Presence of Reduced Iron (C4)
Water Marks (B1)	Hydrogen Sulfide Od	lor (C1)	Salt Deposits (C5)
Sediment Deposits (B2) Dry-Season Water T	able (C2)	Stunted or Stressed Plants (D1)
Drift Deposits (B3)	Other (Explain in Rei	marks)	<u>A</u> Geomorphic Position (D2)
Algal Mat or Crust (B4)			Shallow Aquitard (U3)
Iron Deposits (B5)			Microtopographic Relief (04)
Surface Soil Cracks (B	5)		
Field Observations:			
Surface Water Present?	res X No Depth (inches	ッ. <u></u>	
Water Table Present?	Yes <u>No</u> Depth (inches	³⁷ - <u>~</u>	land Hudrology Bracont? Vac. X No.
Saturation Present?	Yes <u>/ No</u> Depth (inches	s); Wetl	iana nyarology Present 7 185 🔼 No
Describe Recorded Data (si	ream gauge, monitoring well, aerial phot	os, previous inspections),	, if available:
	•		
Remarks:			
%			

•

WETLAND DETERMINATION DATA FORM -- Alaska Region

Project/Site: <u>Grant Lake</u>	Borough/City	Mouse Pails	7·73-1
Applicant/Owner: Vener Hydro)	·	
Investigator(s): C. Schudel J.	Blank Landform (b)		- Sampling Point: <u>DFCS</u>
Local relief (concave, convex, none); // by		<pre>iside, terrace, nummocks, etc.): ;</pre>	lake edge
Subregion:			have stoppe
Soil Man Lloit Name	Lat. <u>00:019815</u>	Long: <u>~149, 20566</u>	b Datum:
Are climatic / bydrologic conditions as the site to		NWI class	ification: Upland
Are Vegetation	pical for this time of year? Yes	No (if no, explain in	i Remarks.)
Are Vegetation, Soli, or Hydrolo	3y significantly disturbed? /	کر Are "Normal Circumstances	" present? YesX No
Are vegetation, Soll, of Hydrolog	ay naturally problematic? ↑	J 🐖 (If needed, explain any ansi	wers in Remarks.)
SUMMARY OF FINDINGS – Attach si	e map showing sampling poi	nt locations, transects, imp	portant features, etc.
Hydrophytic Vegetation Present? Yes	X No		· · · · · · · · · · · · · · · · · · ·
Hydric Soil Present? Yes	No X is the	Sampled Area	
Wetland Hydrology Present? Yes		a Wetland? Ye	es No
Remarks: Elevated alder hu	At in the last the second		
too how upone lake to	have hydrolien.	phietos 237-23	ן רי
VEGETATION - Use scientific names	of plants. List all species in t	ne plot	
	Absolute Dominant II	dicator Dominance Testure	
Tree Stratum	<u>% Cover</u> Species?	Status Number of Deminance	rksheet:
1. None		That Are OBL, FACW	Species 2 (Δ)
2	······································		(**
3		Species Across All St	rata: 3 (B)
4	······································		
•	lotal Cover:	That Are OBL, FACW	Species
50% of total co	ver: 20% of total cover:_	Prevalence Index wo	prksheet:
1. Alaric VIV		Total % Cover of:	Multinly by:
2 Pables Planas (40	salarny E 1	THE OBL species O	$x_1 = \varphi$
3.		FACW species	x2= 0
4.		FAC species 108	2 x3= 300
5		FACU species 5	5 x4= 220
6,		UPL species	x5=_0
T	otal Cover: 75	Column Totals: <u>/</u> S	5 (A) <u>520</u> (B)
50% of total cov	er: 37.5 20% of total cover:	15 Brevelence Index	- P/A - 3:35
Herb Stratum		Hydronbytic Venetati	
1. Char divensitivita	<u> </u>	<u>ACU</u> X Dominance Test in	
2. Hera. maximum	£	ACU Prevalence Index	is <3.0
A EQUIL DICUE IDSE		Morphological Ada	aptations ¹ (Provide supporting
AB A consistentian O Law		data in Remark	(s or on a separate sheet)
6	$\underline{\text{Leensis}}_{10} = 1 - 1$	Problematic Hydro	phytic Vegetation ¹ (Explain)
7			
8		be present unless distu	oil and wetland hydrology must
9.	· · · · · · · · · · · · · · · · · · ·		
10.			
. Tr	tal Cover: Sh	· · ·	
50% of total cow	ar: 40 20% of total cover 1	6	
Plot size (radius, or length x width) $10' < 1$	() % Bare Ground 1	Hydrophytic	
% Cover of Wetland Bryophytes	Total Cover of Bryonhytes 10	Vegetation Present? Vo	s X No
(Where applicable)			<u> </u>
Remarks:			
phons 257-23	1		

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epth <u>aches)</u>	Matrix Color (moist)		Redox Features Color (moist) % Type ¹	Loc ²	<u>Texture</u>	Remarks	
	Nu	ort	· · · · · · · · · · · · · · · · · · ·	v.			
	all	- cub	ble				
				· · ·			- WILLIAM IN
				·			
	<u> </u>	• ••		·	·		
	, <u> </u>						
pe: C=C	oncentration, D=Dep	oletion, RM-	Reduced Matrix, CS=Covered or Coate	d Sand Gra	ains. ² Loca	alion: PL=Pore Lining, M	l=Matrix.
dric Soli	indicators:		Indicators for Problematic Hydric	Solls":	A1 - +1+ - +	Claured Mithout Hug EV	or Dedder
Histosol	or Histel (A1)		Alaska Color Change (TA4)		Alaska	Gieyeu vyimout nue or i dvina Lavor	
Histic Ep	pipedon (A2)		Alaska Alpine Swales (TA5)		Undel Other (1	nying Layer Evolain in Romerke\	
Hydroge	en Sulfide (A4)		Alaska Redox With 2.5Y Hue			-Aptain of inclusion	
Thick Da	ark Surface (A12)		³ One indicator of hydrophylic vocati	ation one o	rimary indicato	r of wetland hydrology.	•
Alaska (Gleyed (A13)		and an appropriate landscape po	sition must	be oresent un!	ess disturbed or problem	iatic,
Alaska i	Redox (A14)		⁴ Give details of color chance in Rer	narks.		•	
Alaska (Sieyeu Fores (A15)				T		
	Laver of present).				1		
sincave	Edici (ii procent).						
Type: Depth (in marks:	ches):		<u> </u>		Hydric Soil	Present? Yes	No X
Type: Depth (in emarks:	ches):				Hydric Soil	Present? Yes	NO X
Depth (in permarks:	ches):				Hydric Soil	Present? Yes	No <u>X</u>
Depth (in emarks: DROLC	ches):)GY /drology indicators				Hydric Soll	Present? Yes	
Type: Depth (in emarks: DROLC	ches):)GY /drology indicators	:: cator is suf	ficient)		Hydric Soil Secondary Inc	Present? Yes dicators (2 or more requi	No X
Depth (in marks: DROLC etland Hy imary Ind	Ches): OGY rdrology Indicators icators (any one ind w Water (A1)	: cator is suf	ficient)	у (В7)	Hydric Soil i Secondary Ind Water-sta Drainage	Present? Yes dicators (2 or more requi nined Leaves (B9) Patterns (B10)	No X
Depth (in Depth (in marks: DROLC etland Hy imary Ind Surface High W	Ches): OGY /drology Indicators icators (any one ind water (A1) /ater Table (A2)	:: icator is suf	ficient) Inundation Visible on Aerial Imager Sparsely Vegetated Concave Surfa	y (B7) ce (B8)	Hydric Soll Secondary Ing Water-sta Drainage Oxidized	Present? Yes dicators (2 or more requi nined Leaves (B9) Patterns (B10) Rhizospheres along Livi	No X
Depth (in marks: DROLC etland Hy imary Ind 	ches): oGY /drology Indicators icators (any one ind e Water (A1) ater Table (A2) ion (A3)	:: icator is suf	ficient) Inundation Visible on Aerial Imager Sparsely Vegetated Concave Surfa Marl Deposits (B15)	y (B7) .ce (B8)	Hydric Soil I Secondary Ind Water-sta Drainage Oxidized Presence	Present? Yes ticators (2 or more requi ined Leaves (B9) Patterns (B10) Rhizospheres along Livi o of Reduced Iron (C4)	No X
Depth (in marks: DROLC etland Hy imary Ind Surface High W Saturat Water N	DGY ches): DGY rdrology Indicators icators (any one ind water (A1) later Table (A2) ion (A3) Marks (B1)	:: ;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;	ficient) Inundation Visible on Aerial Imager Sparsely Vegetated Concave Surfa Marl Deposits (B15) Hydrogen Sulfide Odor (C1)	y (B7) ce (B8)	Hydric Soil I Secondary Ind Water-sta Drainage Oxidized Presence Salt Depo	Present? Yes dicators (2 or more requi inned Leaves (B9) Patterns (B10) Rhizospheres along Livi o of Reduced Iron (C4) osits (C5)	No X
Depth (in Depth (in marks: DROLC etland Hy imary Ind Surface High W Saturat Water N Sedime	Ches): Ches): PGY rdrology Indicators icators (any one ind water (A1) later Table (A2) ion (A3) Marks (B1) ont Deposits (B2)	:: cator is suf	ficient) Inundation Visible on Aerial Imager Sparsely Vegetated Concave Surfa Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2)	y (B7) .ce (B8)	Hydric Soil I Secondary Ing Water-sta Drainage Oxidized Presence Salt Depo	Present? Yes dicators (2 or more requi ined Leaves (B9) Patterns (B10) Rhizospheres along Livi o of Reduced Iron (C4) osits (C5) or Stressed Plants (D1) bis Resilien (D2)	No X
Depth (in Depth (in emarks: DROLC Tetland Hy imary Ind Surface High W Saturat Saturat Sedime Drift De	Ches): Ches):	;; ; <u>cator is suf</u>	ficient) Inundation Visible on Aerial Imager Sparsely Vegetated Concave Surfa Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Other (Explain in Remarks)	y (B7) ce (B8)	Hydric Soll i Secondary Ing Water-sta Drainage Oxidized Presence Salt Depo Stunted o Stunted o	Present? Yes dicators (2 or more requi- nined Leaves (B9) Patterns (B10) Rhizospheres along Livi of Reduced Iron (C4) osits (C5) or Stressed Plants (D1) whic Position (D2)	No red) ng Roots (C
Depth (in Depth (in emarks: /DROLC /etland Hy /mary Ind 	ches): oGY rdrology Indicators icators (any one ind water (A1) later Table (A2) ion (A3) Marks (B1) ont Deposits (B2) eposits (B3) lat or Crust (B4)	: cator is suf	ficient) inundation Visible on Aerial Imager Sparsely Vegetated Concave Surfa Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Other (Explain in Remarks)	y (B7) .ce (B8)	Hydric Soll I Secondary Ing Water-sta Drainage Oxidized Presence Salt Depo Stunted o Geomorp Shallow /	Present? Yes dicators (2 or more requi- nined Leaves (B9) Patterns (B10) Rhizospheres along Livi o of Reduced Iron (C4) osits (C5) or Stressed Plants (D1) whic Position (D2) Aquitard (D3)	No X
Depth (in Depth (in emarks: Depth (in emarks: Depth (in emarks: Depth (in emarks: Comparison etaland Hy imary Ind Saturat Saturat Sedime Drift De Algal M Iron De	ches): ches): drology indicators icators (any one ind e Water (A1) later Table (A2) ion (A3) Marks (B1) ent Deposits (B2) eposits (B3) lat or Crust (B4) eposits (B5)	i: icator is suf	ficient) inundation Visible on Aerial Imager Sparsely Vegetated Concave Surfa Mari Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Other (Explain in Remarks)	y (B7) .ce (B8)	Hydric Soll I Secondary Ind Water-sta Drainage Oxidized Presence Salt Depo Stunted c Geomorp Shallow / Microtop	Present? Yes ticators (2 or more requi ined Leaves (B9) Patterns (B10) Rhizospheres along Livi o of Reduced Iron (C4) osits (C5) or Stressed Plants (D1) whic Position (D2) Aquitard (D3) ographic Relief (D4) trat Test (D5)	No X
Depth (in Depth (in emarks: DROLC etland Hy imary Ind Surface High W Saturat Water N Sedime Drift De Algal M Iron De Surface	ches): ches): drology indicators icators (any one ind e Water (A1) later Table (A2) ion (A3) Marks (B1) ent Deposits (B2) eposits (B3) lat or Crust (B4) eposits (B5) e Soil Cracks (B6)	icator is suf	ficient) Inundation Visible on Aerial Imager Sparsely Vegetated Concave Surfa Mari Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Other (Explain in Remarks)	y (B7) ce (B8)	Hydric Soil I Secondary Ing Water-sta Drainage Oxidized Presence Salt Depo Stunted of Geomorp Shallow / Microtop FAC-Neu	Present? Yes dicators (2 or more requi- bined Leaves (B9) Patterns (B10) Rhizospheres along Livi o of Reduced Iron (C4) osits (C5) or Stressed Plants (D1) whic Position (D2) Aquitard (D3) ographic Relief (D4) trai Test (D5)	No X
Depth (in Depth (in emarks: Depth (in emarks: DROLC etland Hy imary Ind Surface High W Saturat Water N Sedime Drift De Algal M Iron De Surface	ches): ches): rdrology Indicators icators (any one ind water (A1) later Table (A2) ion (A3) Marks (B1) ont Deposits (B2) eposits (B3) hat or Crust (B4) eposits (B5) e Soil Cracks (B6) rvations:	icator is suf	ficient) Inundation Visible on Aerial Imager Sparsely Vegetated Concave Surfa Mari Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Other (Explain in Remarks)	y (B7) .ce (B8)	Hydric Soil I Secondary Ind Water-sta Drainage Oxidized Presence Salt Depo Stunted o Geomorp Shallow / Microtopo FAC-Neu	Present? Yes dicators (2 or more requi nined Leaves (B9) Patterns (B10) Rhizospheres along Livi of Reduced Iron (C4) osits (C5) or Stressed Plants (D1) whic Position (D2) Aquitard (D3) ographic Relief (D4) ttral Test (D5)	No X
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Type: Depth (in emarks: TOROLC Toronal High Control High W Saturat Water N Sedime Drift De Algal M Iron De Surface ield Obse Vater Table	ches): ches): drology Indicators icators (any one ind e Water (A1) later Table (A2) ion (A3) Marks (B1) ent Deposits (B2) eposits (B3) lat or Crust (B4) eposits (B5) e Soil Cracks (B6) rvations: iter Present? e Present?	:: cator is suf Yes Yes	ficient)	y (B7) .ce (B8)	Hydric Soll I Secondary Ind Water-sta Drainage Oxidized Presence Salt Depo Stunted c Geomorp Shallow A Microtopa FAC-Neu	Present? Yes ticators (2 or more requi ined Leaves (B9) Patterns (B10) Rhizospheres along Livi o of Reduced Iron (C4) osits (C5) or Stressed Plants (D1) whic Position (D2) Aquitard (D3) ographic Relief (D4) titral Test (D5) w Present? Yes	No X
Type: Depth (in emarks: //DROLCC /etland Hy rimary Indi Surface High W Saturat Saturat Sedime Sedime Sedime Sedime Sedime Saturat Saturat Surface 	ches): ches): drology indicators icators (any one ind e Water (A1) ater Table (A2) ion (A3) Marks (B1) ent Deposits (B2) eposits (B3) lat or Crust (B4) eposits (B5) e Soil Cracks (B6) rvations: ater Present? e Present? Present? apillary fringe) ecorded Data (circo	Yes Yes	ficient)	y (B7) .ce (B8) WetI	Hydric Soll Secondary Ing Water-sta Drainage Oxidized Presence Salt Depo Stunted o Geomorp Shallow / Microtop FAC-Neu land Hydrolog if available:	Present? Yes dicators (2 or more requi bined Leaves (B9) Patterns (B10) Rhizospheres along Livi o of Reduced Iron (C4) osits (C5) or Stressed Plants (D1) whic Position (D2) Aquitard (D3) ographic Relief (D4) ttral Test (D5) y Present? Yes	No <u>(</u> (ed) ng Roots (C
Type: Depth (in lemarks: YDROLC Vetland Hy Primary Indi Surface High W Saturat Sedime Nater N Sedime Drift De Algal M Iron De Surface Surface Wa Nater Table Saturation 1 includes ci Describe R	ches): ches): drology indicators icators (any one ind atter Table (A2) ion (A3) Marks (B1) att Deposits (B2) aposits (B3) lat or Crust (B4) aposits (B5) a Soil Cracks (B6) rvations: atter Present? Present? Present? Present? apillary fringe) ecorded Data (streat	Yes Yes Yes Yes	ficient)	y (B7) .ce (B8) 	Hydric Soll Secondary Ind Water-sta Drainage Oxidized Presence Salt Depo Stunted c Geomorp Shallow / Microtope FAC-Neu land Hydrolog if available:	Present? Yes ticators (2 or more requi ined Leaves (B9) Patterns (B10) Rhizospheres along Livi o of Reduced Iron (C4) osits (C5) or Stressed Plants (D1) whic Position (D2) Aquitard (D3) ographic Relief (D4) ttral Test (D5) y Present? Yes	No X

WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: Grant Lake Borough/City: M	0050 Pass Sampling Date:7-24-13
Applicant/Owner: <u>Kenal Hydro</u>	Sampling Point:
Investigator(s): <u>C.Schudel J. Blank</u> Landform (hillside, ter	rrace, hummocks, etc.): ake edge
Local relief (concave, convex, none): <u>Nove</u> Slope (%): <u>2</u>	
Subregion: Let: 40, 489630 Lo	ng: -149, 293042 Datum:
Soil Map Unit Name:	NWI classification: PEM (SSIE
Are climatic / hydrologic conditions on the site typical for this time of year? Yes No	(If no, explain in Remarks) f 551/15m/15
Are Vegetation, Soil, or Hydrology significantly disturbed? Are	"Normal Circumstances" present? Yes X No
Are Vegetation, Soil, or Hydrology naturally problematic? (If n	eeded, explain any answers in Remarks)
SUMMARY OF FINDINGS - Attach site map showing sampling point loca	tions, transects, important features, etc.
Hydrophylic Vegetation Present? Yes X No	· · · · · · · · · · · · · · · · · · ·
Hydric Soil Present? Yes X No Is the Sample	d Area
Wetland Hydrology Present? Yes Ko	and? Yes <u>/ No</u> No
Remarks: Wetland fringe commandy on late	eshare Photos 258-259
VEGETATION - Use scientific names of plants. List all species in the plot	
Absolute Dominant Indicator	Dominance Test worksheet:
<u>Tree Stratum</u> <u>% Cover Species? Status</u>	Number of Dominant Species
	That Are OBL, FACW, or FAC: (A)
3	Total Number of Dominant
4	Species Across All Strata: Q (B)
Total Cover:	Percent of Dominant Species
50% of total cover: 20% of total cover:	That Are OBL, FACW, or FAC: 03/3 (A/B)
Sapling/Shrub Stratum	Prevalence index worksheet:
1. Home Alnus viridis 30 Y FAC	I otaf % Cover of: Multiply by:
2 John 30	OBL species 13 $x_1 = 13$
3 Hero Stratur 30% 17 20% 3	FACTOR species 12 $x_2 = 24$ EAC species 12 $x_2 = 701$
	FACIL species 12 , $\sqrt{4} = 49$
5. Agrostis scabra 5 FAC	$\frac{11}{11} \text{ Mod species } \frac{1}{12} \text{ and } \frac$
Station A Mastic Annactensis FAC	Column Totals: 111 (A) 313 (B)
Total Cover:	
Herb Stratum	Prevalence index = $B/A = \frac{2.82}{2}$
1. Utrica diocia (nutle) 2 FACIL	Hydrophytic Vegetation Indicators:
2. Epilobium ciliatum 10 Y FAC	_X Dominance Test is >50%
3. Equisetum arvense 15 Y. FAC	Prevalence Index is ≤3.0
4. Sanguisorba canadinais 10 Y. FACW	Morphological Adaptations' (Provide supporting data in Remarks or on a separate speet)
5. MIMOLUS guttatus (minilugs) 10 Y OBL	Problematic Hydrophytic Vegetation ¹ (Explain)
6. Carex aquatilis 5 OBL	
7. Angelica genuflexa FACW	¹ indicators of hydric soil and wetland hydrology must
8. Arencus Glolcus (quatsbeard) 5 UPL	be present unless disturbed or problematic.
9. Tellima grandition (Frangeup) 10. Y. FACU	
10-theto Aconitum dulphinifolium 2' FAC	
Total Cover: <u>61</u>	
50% of total cover: 40.5 20% of total cover: 16.4	Hydrophytic
Plot size (radius, or length x width) 10 X 10 % Bare Ground 5	Vegetation
" " Cover of Wetland Bryophytes Total Cover of Bryophytes (Where applicable)	Present? Yes <u>X</u> No
Normanno. Overhanging of nos variatis vit Inatales	-
photos! 258-259	

SOIL

	paon: (nescun	e to the dep	in needed to docur		nuicator	ui coanna	n the absence of	mulcators.	
Depth	Matrix		Redo	x Features					
(inches)	Color (moist)	%	Color (moist)	%	Түре'	<u>Loç</u> ⁴	<u> </u>	Remarks	
	A to				<u> </u>				·
	<u> </u>	17		·				ELECTRON ADMONTAN	
	lavo	Odco.	, w/ star	dina	R ING	ter			
	- ane	cage	- vi oni	<u>v</u>	$-\underline{\nabla}$	<u></u>	L		
						<u> </u>	. <u> </u>		
-									
					·			viin.	,
<u></u>							·		
Type: C=Con	centration, D=De	epletion. RM=	Reduced Matrix, CS	S=Covered	or Coate	d Sand G	rains. ² Locati	on: PL=Pore Lining, M	-Matrix.
Hydric Soil Inc	dicators:		Indicators for F	roblemat	ic Hydric	Solls ³ :		<u>.</u>	
Histosol or	Histel (A1)		Alaska Colo	r Change	(TA4) ⁴		Alaska Gl	eved Without Hue 5Y o	r Redder
Histic Enin	edon (A2)		Alaska Alol	ne Swales	(TA5)		Underly	ing Laver	
	Sulfida (AA)		Alaska Rod	ov Mith 2	57 Hue			nlain in Remarks)	
Thick Dark				OA WARTE.				plantin (contanto)	
	Conace (ATZ)		³ On a ladianter a	f hudroph	diovogoł	tion one	arimon, indicator -	Eucliand budtalagu	
Alaska Gle	yed (A13)			r nyaropny	Allo vegeta	ation, one	phinary indicator of	n wettand hydrology, a dialushad ar problems	dia :
Alaska Re	dox (A14)		and an appro	phate land	iscape po	sidon mus	st be present unles	s disturbed of problems	uc.
Alaska Gle	yed Pores (A15)	Give details of	color chan	ge in Ren	narks.			
Restrictive La	yer (if present):	1							
Туре:									
Depth (inch	es):	· · · · · · · · · · · · · · · · · · ·					Hydric Soll Pr	esent? Yes 🔼	No
Remarks:			1		0.0	~ ~ 19			
((ake eag	je, 10	ing cons	UL Y	- m				
	dr. Ch	amod d	about the	ald	er d	otr.t	215		
	OPPERIO	/000000		10.00		\ \			
HYDROLOG	Y								
Wetland Hydro									
	ology Indicator	s:					Secondary Indic	ators (2 or more require	<u>d)</u>
Primary Indicat	ology Indicator	s: licator is suffi	cient)				Secondary Indic Water-stain	ators (2 or more require ed Leaves (B9)	<u>d)</u>
Primary Indical	ology Indicator tors (any one ind	s: Ilcator is suffi	cient)	e on Aeria	al imagery	(87)	Secondary Indic Water-staine Drainage Pa	ators (2 or more require ed Leaves (B9) itterns (B10)	<u>d)</u>
Primary Indicat	ology Indicator tors (any one inc tater (A1)	s: Ilcator is suiffi -	cient) Inundation Visib	e on Aeria	l Imagery	(B7)	Secondary Indic Water-stain Drainage Pa Oxidized Bt	ators (2 or more require ed Leaves (B9) htterns (B10)	<u>d)</u> I Roots (C3)
Primary Indical X Surface W High Wate	ology Indicator tors (any one inc ater (A1) r Table (A2)	s: licator is suiffi - -	cient) Inundation Visib Sparsely Vegeta	e on Aeria	al Imagery ave Surfac	r (B7) æ (B8)	Secondary Indic Water-stain Drainage Pa Oxidized Rh Presence of	ators (2 or more require ed Leaves (B9) atterns (B10) Izospheres along Living Reduced (con (C4)	<u>d)</u> 9 Roots (C3)
Primary Indicat	ology Indicator tors (any one inc 'ater (A1) r Table (A2) (A3)	s: <u>Ilcator is su</u> iffi - -	cient) Inundation Visib Sparsely Vegeta Mart Deposits (E	le on Aeria Ited Conca 115)	al Imagery ave Surfac	(B7) ce (B8)	Secondary Indic Water-stain Drainage Pa Oxidized Rh Presence of Salt Dancel	ators (2 or more require ed Leaves (B9) Itterns (B10) Izospheres along Living Reduced Iron (C4)	<u>d)</u> 9 Roots (C3)
Primary Indicat X Surface W High Wate Saturation Water Mar	ology Indicator tors (any one inc tater (A1) r Table (A2) (A3) ks (B1)	s: <u>Ilcator is suiff</u> - - -	cient) Inundation Visib Sparsely Vegeta Marl Deposits (E Hydrogen Sulfid	e on Aeria Ited Conca 115) e Odor (C	al Imagery ave Surfac 1)	(B7) æ (B8)	Secondary Indic Water-stain Drainage Pa Oxidized Rh Presence of Salt Deposit	ators (2 or more require ed Leaves (B9) htterns (B10) izospheres along Living Reduced Iron (C4) s (C5)	<u>d)</u>) Roots (C3)
Primary Indicat X Surface W High Wate Saturation Water Mar Sediment	ology Indicator tors (any one inc tater (A1) r Table (A2) (A3) ks (B1) Deposits (B2)	s: licator is suiffi - - - -	cient) Inundation Visib Sparsely Vegeta Marl Deposits (E Hydrogen Sulfid Dry-Season Wa	le on Aeria Ited Conca 115) e Odor (C ler Table (al Imagery ave Surfac 1) C2)	y (B7) ce (B8)	Secondary Indic Water-stain Drainage Pa Oxidized Rh Presence of Salt Deposit Stunted or S	ators (2 or more require ed Leaves (B9) htterns (B10) izospheres along Living Reduced Iron (C4) s (C5) Stressed Plants (D1)	<u>d)</u>] Roots (C3)
Primary Indicat X Surface W High Wate Saturation Water Mar Sediment I Drift Depos	ology Indicator tors (any one inc tater (A1) ir Table (A2) (A3) ks (B1) Deposits (B2) sits (B3)	s: licator is suiffi - - - - -	cient) Inundation Visib Sparsely Vegeta Marl Deposits (E Hydrogen Sulfid Dry-Season Wa Other (Explain In	le on Aeria Ited Conca 115) e Odor (C ter Table (n Remarks	al Imagery ave Surfac 1) C2)	(B7) ce (B8)	Secondary Indic Water-stain Drainage Pa Oxidized Rf Presence of Salt Deposit Stunted or S Geomorphic	ators (2 or more require ed Leaves (B9) htterns (B10) izospheres along Living Reduced Iron (C4) s (C5) Stressed Plants (D1) e Position (D2)	<u>d)</u> 9 Roots (C3)
Primary Indicat X Surface W X High Wate Saturation Water Mar Sediment I Drift Depos	ology Indicator tors (any one inc tater (A1) r Table (A2) (A3) ks (B1) Deposits (B2) sits (B3) or Crust (B4)	s: <u>Ilcator is suffi</u> - - - - -	cient) Inundation Visib Sparsely Vegeta Mart Deposits (E Hydrogen Sulfid Dry-Season Wa Other (Explain In	le on Aeria Ited Conca 115) e Odor (C ter Table (n Remarks	al Imagery ave Surfac 1) C2)	(B7) 22 (B8)	Secondary Indic Water-Stain Drainage Pa Oxidized Rf Presence of Salt Deposit Stunted or S Geomorphic Shallow Aqu	ators (2 or more require ed Leaves (B9) atterns (B10) izospheres along Living Reduced Iron (C4) s (C5) Stressed Plants (D1) e Position (D2) uitard (D3)	<u>d)</u>) Roots (C3)
Primary Indicat X Surface W X High Wate Saturation Water Mar Sediment I Drift Depos Algal Mat o Iron Depos	ology Indicator tors (any one inc later (A1) r Table (A2) (A3) ks (B1) Deposits (B2) sits (B3) or Crust (B4) sits (B5)	s: licator is suffi - - - - -	cient) Inundation Visib Sparsely Vegeta Mart Deposits (E Hydrogen Sulfid Dry-Season Wa Other (Explain in	le on Aeria Ited Conca 115) e Odor (C ler Table (n Remarks	al Imagery ave Surfac 1) C2)	7 (B7) 22 (B8)	Secondary Indic Water-Stain Drainage Pa Oxidized Rf Presence of Salt Deposit Stunted or S Geomorphic Shallow Aqu Microtopogr	ators (2 or more require ed Leaves (B9) atterns (B10) izospheres along Living Reduced Iron (C4) s (C5) Stressed Plants (D1) e Position (D2) uitard (D3) aphic Relief (D4)	<u>d)</u> 9 Roots (C3)
Primary Indicat X Surface W X High Wate Z Saturation Water Mar Drift Depos Algal Mat c Iron Depos Surface So	ology Indicator tors (any one inc later (A1) r Table (A2) (A3) ks (B1) Deposits (B2) sits (B3) or Crust (B4) sits (B5) oil Cracks (B6)	s: licator is suffi - - - - - -	cient) Inundation Visib Sparsely Vegeta Marl Deposits (E Hydrogen Sulfid Dry-Season Wa Other (Explain in	le on Aeria Ited Conca I15) e Odor (C ter Table (n Remarks	al Imagery ave Surfac 1) C2)	7 (B7) 52 (B8)	Secondary Indic Water-stain Drainage Pa Oxidized Rf Presence of Salt Deposit Stunted or S Geomorphic Shallow Aqu Microtopogr FAC-Neutra	ators (2 or more require ed Leaves (B9) atterns (B10) izospheres along Living Reduced Iron (C4) s (C5) Stressed Plants (D1) e Position (D2) ritard (D3) aphic Relief (D4) I Test (D5)	<u>d)</u> 9 Roots (C3)
Primary Indicat X Surface W X High Wate Saturation Water Mar Bediment I Drift Depos Algal Mat o Iron Depos Surface So Field Observa	ology Indicator tors (any one inc later (A1) r Table (A2) (A3) ks (B1) Deposits (B2) sits (B3) or Crust (B4) sits (B5) oil Cracks (B6) tions:	s: licator is suffi - - - - -	cient) Inundation Visib Sparsely Vegeta Marl Deposits (E Hydrogen Sulfid Dry-Season Wa Other (Explain in	le on Aeria Ited Conca I15) e Odor (C er Table (n Remarks	al Imagery ave Surfac 1) C2))	7 (B7) 22 (B8)	Secondary Indic Water-stainu Drainage Pa Oxidized Rh Presence of Salt Deposit Stunted or S Geomorphic Shallow Aqu Microtopogr FAC-Neutra	ators (2 or more require ed Leaves (B9) atterns (B10) izospheres along Living Reduced Iron (C4) s (C5) Stessed Plants (D1) c Position (D2) vitard (D3) aphic Relief (D4) t Test (D5)	<u>d)</u> 9 Roots (C3)
Primary Indical X Surface W X High Wate Saturation Water Mar Bediment I Drift Depos Algal Mat o Iron Depos Surface So Field Observa	ology Indicator tors (any one inc later (A1) ir Table (A2) (A3) ks (B1) Deposits (B2) sits (B3) or Crust (B4) sits (B5) oil Cracks (B6) ttons: Present?	s: <u>licator is suffi</u> - - - - - - - -	cient) Inundation Visib Sparsely Vegeta Mart Deposits (E Hydrogen Sulfid Dry-Season Wa Other (Explain Ir Other (Explain Ir	le on Aeria Ited Conca 115) e Odor (C ler Table (n Remarks	al Imagery ave Surfac 1) C2))	7 (B7) 22 (B8)	Secondary Indic Water-stainu Drainage Pa Oxidized Rh Presence of Salt Deposit Stunted or S Geomorphic Shallow Aqu Microtopogr FAC-Neutra	ators (2 or more require ed Leaves (B9) atterns (B10) izospheres along Living Reduced Iron (C4) s (C5) Stressed Plants (D1) position (D2) position (D2) aphic Relief (D4) t Test (D5)	<u>d)</u>) Roots (C3)
Primary Indical X Surface W X High Wate Saturation Water Mar Bediment I Drift Depos Algal Mat o Iron Depos Surface So Field Observa Surface Water Water Table Pr	ology Indicator tors (any one inc later (A1) ir Table (A2) (A3) ks (B1) Deposits (B2) sits (B3) or Crust (B4) sits (B5) oil Cracks (B6) tions: Present?	s: <u>licator is suffi</u> - - - - - - - - - - - - -	cient) Inundation Visib Sparsely Vegeta Mart Deposits (E Hydrogen Sulfid Dry-Season Wa Other (Explain In No Depth (in No Depth (in	e on Aeria Ited Conca 115) e Odor (C er Table (n Remarks ches): ches):	al Imagery ave Surfac 1) C2)) <u>()</u>	- (B7) 22 (B8)	Secondary Indic Water-stainu Drainage Pa Oxidized Rh Presence of Salt Deposit Stunted or S Geomorphic Shallow Aqu Microtopogr FAC-Neutra	ators (2 or more require ed Leaves (B9) atterns (B10) izospheres along Living Reduced Iron (C4) s (C5) Stressed Plants (D1) e Position (D2) uitard (D3) aphic Relief (D4) I Test (D5)	<u>d)</u>) Roots (C3)
Primary Indical X Surface W X High Wate Saturation Water Mar Sediment I Drift Depos Algal Mat o Iron Depos Surface So Field Observa Surface Water Water Table Pro- Saturation Pro-	ology Indicator tors (any one inc later (A1) ir Table (A2) (A3) ks (B1) Deposits (B2) sits (B3) or Crust (B4) sits (B5) oil Cracks (B6) tions: Present?	s: <u>licator is suffi</u> - - - - - - - - - - - - - - - - - - -	cient) Inundation Visib Sparsely Vegeta Marl Deposits (E Hydrogen Sulfid Dry-Season Wa Other (Explain In No Depth (in No Depth (in	e on Aeria Ited Conca (15) e Odor (C er Table (Remarks ches): ches):	al Imagery ave Surfac 1) C2)) O	(B7) æ (B8)	Secondary Indic Water-stainu Drainage Pa Oxidized Ri Presence of Salt Deposit Stunted or S Geomorphic Shallow Aqu Microtopogr FAC-Neutra	ators (2 or more require ed Leaves (B9) htterns (B10) izospheres along Living Reduced Iron (C4) s (C5) Bressed Plants (D1) c Position (D2) htard (D3) aphic Relief (D4) I Test (D5)	<u>d)</u> 9 Roots (C3)
Primary Indicat Primary Indicat Surface W High Water Water Mar Sediment I Drift Depos Algal Mat of Iron Depos Surface So Field Observa Surface Water Water Table Pro Saturation Press (includes capill	ology Indicator tors (any one inc tater (A1) ir Table (A2) (A3) ks (B1) Deposits (B2) sits (B3) or Crust (B4) sits (B5) oil Cracks (B6) tions: Present? resent? sent? ary fringe)	s: <u>licator is suffi</u> - - - - - - - - - - - - -	cient) Inundation Visib Sparsely Vegeta Marl Deposits (E Hydrogen Sulfid Dry-Season Wa Other (Explain in Other (Explain in No Depth (in No Depth (in	e on Aeria Ited Conca (15) e Odor (C er Table (Remarks ches): ches): ches):	al Imagery ave Surfac 1) C2)) <u>()</u> ()	(B7) (B8) (B8) (B8) (B8) (Wet	Secondary Indic Water-stainu Drainage Pa Oxidized Rf Presence of Salt Deposit Stunted or S Geomorphic Shallow Aqu Microtopogr FAC-Neutra	ators (2 or more require ed Leaves (B9) htterns (B10) izospheres along Living Reduced Iron (C4) s (C5) Stressed Plants (D1) e Position (D2) htard (D3) aphic Relief (D4) t Test (D5) resent? Yes <u>×</u>	<u>d)</u>) Roots (C3)
Primary Indical Primary Indical Surface W High Wate Saturation Water Mar Sediment I Drift Depos Algal Mat o Iron Depos Surface So Field Observa Surface Water Water Table Pr Saturation Pres (includes capill Describe Reco	ology Indicator tors (any one inc tater (A1) ir Table (A2) (A3) ks (B1) Deposits (B2) sits (B3) or Crust (B4) sits (B5) oil Cracks (B6) tions: Present? resent? sent? ary fringe) rded Data (streat	s: <u>licator is suffi</u> - - - - - - - - - - - - - - - - - - -	cient) Inundation Visib Sparsely Vegeta Marl Deposits (E Hydrogen Sulfid Dry-Season Wa Other (Explain In Other (Explain In No Depth (in No Depth (in onitoring well, aerial	e on Aeria Ited Conca (15) e Odor (C er Table (Remarks ches): ches): ches):	al Imagery ave Surfac 1) C2)) <u>()</u> () () () () () () () () () () () () ()	(B7) æ (B8) — Wet	Secondary Indic Water-stainu Drainage Pa Oxidized Rf Presence of Salt Deposit Stunted or S Geomorphic Shallow Aqu Microtopogr FAC-Neutra	ators (2 or more require ed Leaves (B9) htterns (B10) izospheres along Living Reduced Iron (C4) s (C5) Stressed Plants (D1) e Position (D2) htard (D3) aphic Relief (D4) I Test (D5)	<u>d)</u>) Roots (C3)
Primary Indicat X Surface W X High Wate X Saturation Water Mar Sediment I Drift Depos Algal Mat of Iron Depos Surface So Field Observa Surface Water Water Table Pro Saturation Pres (includes capill Describe Reco	ology Indicator tors (any one inc /ater (A1) ir Table (A2) (A3) ks (B1) Deposits (B2) sits (B3) or Crust (B4) sits (B5) oil Cracks (B6) tions: Present? resent? sent? ary fringe) rded Data (streat	s: <u>ilcator is suffi</u> - - - - - - - - - - - - - - - - - - -	cient) Inundation Visib Sparsely Vegeta Marl Deposits (E Hydrogen Sulfid Dry-Season Wa Other (Explain in No Depth (in No Depth (in No Depth (in ponitoring well, aerial	e on Aeria Ited Conce (15) e Odor (C er Table (Remarks ches): ches): ches): photos, pr	al Imagery ave Surfac 1) C2)) O O O O	(B7) æ (B8) — Wet — Wet	Secondary Indic Water-stainu Drainage Pa Oxidized Rh Presence of Sait Deposit Stunted or S Geomorphic Shallow Aqu Microtopogr FAC-Neutra	ators (2 or more require ed Leaves (B9) htterns (B10) izospheres along Living Reduced Iron (C4) s (C5) Stressed Plants (D1) e Position (D2) htard (D3) aphic Relief (D4) I Test (D5) resent? Yes X	<u>d)</u> 9 Roots (C3)
Primary Indicat Primary Indicat Surface W High Wate Saturation Water Mar Sediment I Drift Depos Algal Mate Iron Depos Surface So Field Observa Surface Water Water Table Pr Saturation Pres (includes capill Describe Reco	ology Indicator tors (any one inc /ater (A1) ir Table (A2) (A3) ks (B1) Deposits (B2) sits (B3) or Crust (B4) sits (B5) oil Cracks (B6) tions: Present? resent? sent? ary fringe) rded Data (strea	s: <u>ilcator is suffi</u> - - - - - - - - - - - - - - - - - - -	cient) Inundation Visib Sparsely Vegeta Marl Deposits (E Hydrogen Sulfid Dry-Season Wa Other (Explain in No Depth (in No Depth (in No Depth (in onitoring well, aerial	e on Aeria Ited Conce (15) e Odor (C er Table (Remarks ches): ches): ches): photos, pr	al Imagery ave Surfac 1) C2)) O O O O	(B7) æ (B8) — — — wet pections),	Secondary Indic Water-stainu Drainage Pa Oxidized Rh Presence of Sait Deposit Stunted or S Geomorphic Shallow Aqu Microtopogr FAC-Neutra	ators (2 or more require ed Leaves (B9) htterns (B10) izospheres along Living Reduced Iron (C4) s (C5) Stressed Plants (D1) e Position (D2) fitard (D3) aphic Relief (D4) I Test (D5) resent? Yes X	<u>d)</u> 1 Roots (C3)
Primary Indicat _X Surface W _X High Wate _ Saturation _ Water Mar _ Sediment I _ Drift Depos _ Algal Mat o _ Iron Depos _ Surface So Field Observa Surface Water Water Table Pro Saturation Press (includes capill Describe Recoon Remarks:	ology Indicator tors (any one inc fater (A1) in Table (A2) (A3) ks (B1) Deposits (B2) sits (B3) or Crust (B4) sits (B5) oil Cracks (B6) tions: Present? resent? sent? ary fringe) rded Data (streat	s: <u>ilcator is suffi</u> - - - - - - - - - - - - - - - - - - -	cient) Inundation Visib Sparsely Vegeta Mart Deposits (E Hydrogen Sulfid Dry-Season Wa Other (Explain in No Depth (in No Depth (in No Depth (in no Depth (in	e on Aeria Ited Conce (15) e Odor (C er Table (Remarks ches): ches): ches): photos, pro	al Imagery ave Surfac 1) C2)) O O O O O O	(B7) (B8) (B8) (B8) (B8) (B8) (B1) (B1) (B1) (B1) (B1) (B1) (B1) (B1) (B1) (B1) (B2) (B2) (B3) (Secondary Indic Water-stain Drainage Pa Oxidized Rf Presence of Salt Deposit Stunted or S Geomorphic Shallow Aqu Microtopogr FAC-Neutra	ators (2 or more require ed Leaves (B9) itterns (B10) izospheres along Living Reduced Iron (C4) s (C5) Stressed Plants (D1) e Position (D2) ritard (D3) aphic Relief (D4) I Test (D5)	<u>d)</u> Roots (C3)
Primary Indicat _X Surface W _X High Wate _ Saturation _ Water Mar _ Sediment I _ Drift Depos _ Algal Mat o _ Iron Depos _ Surface So Field Observa Surface Water Water Table Present Saturation Prese (includes capilit Describe Recoon Remarks:	ology Indicator tors (any one inc fater (A1) in Table (A2) (A3) ks (B1) Deposits (B2) sits (B3) or Crust (B4) sits (B5) oil Cracks (B6) tions: Present? resent? sent? ary fringe) rded Data (streat	s: <u>ilcator is suffi</u> - - - - - - - - - - - - -	cient) Inundation Visib Sparsely Vegeta Mart Deposits (E Hydrogen Sulfid Dry-Season Wa Other (Explain in No Depth (in No Depth (in No Depth (in no Depth (in	e on Aeria Ited Conce (15) e Odor (C er Table (Remarks ches): ches): photos, pro	al Imagery ave Surfac 1) C2)) O O O O O O	(B7) (B8) (B8) (B8) (B8) (B8) (B1) (B1) (B1) (B1) (B1) (B1) (B1) (B1) (B1) (B2) (B2) (B3) (Secondary Indic Water-stain Drainage Pa Oxidized Rf Presence of Salt Deposit Stunted or S Geomorphic Shallow Aqu Microtopogr FAC-Neutra	ators (2 or more require ed Leaves (B9) atterns (B10) izospheres along Living Reduced Iron (C4) s (C5) Stressed Plants (D1) e Position (D2) oitard (D3) aphic Relief (D4) I Test (D5) resent? Yes <u>×</u>	<u>d)</u> Roots (C3)

WETLAND DETERMINATION DATA FORM – Alaska Region

Projecusite: <u>Grant Lake</u>	Borough/City:	Muse Pass	Sampling Data: 7-24-1
Applicant/Owner: Kenal Hydro		1.00-	Sampling Date,
Investigator(s): C. Schudel J. Blank	Landform (hillsid	e terrace hummocks etc.);	lebrus -brace
Local relief (concave, convex, none):COAVEX	Slope (%);		hprio kiloue
Subregion: Lat: L(). 489488	Long: -149,292.538	/ Datum:
Soil Map Unit Name: <u>colluvial</u> soil diposit	· · · · · · · · · · ·	NWI classific	ation: upland
Are climatic / hydrologic conditions on the site typical for this time	of year? Yes X	No (If no explain in R	emarke)
Are Vegetation, Soil, or Hydrology signific	cantly disturbed? No	Are "Normal Circumstances" r	uresent? Ves X' No
Are Vegetation, Soil, or Hydrology natura	lly problematic? N.	(If needed, explain any answe	rs in Remarks)
SUMMARY OF FINDINGS - Attach site map showin	ng sampling point l	ocations, transects, impo	rtant features, etc.
Hydrophytic Vegetation Present? Yes No	X	Not 1	
Hydric Soil Present? Yes No	メ Is the Sar	npled Area	\checkmark
Wetland Hydrology Present? Yes No	within a V	Vetland? Yes	No_ <u>^_</u>
Remarks: Pf tuben adjucant to DP:	a wetland	upland, a	1. 716
pt tulem in moister parton ture un	stand ada	photos 2	60-000
VEGETATION – Use scientific names of plants List	all species in the	plot	U U
Abs	olute Dominant Indic	alor Dominance Test work	shoot
Tree Stratum	Cover Species? Sta	tus Number of Dominant Sr	iecies a
1. DICEA ALAOCA	<u>S Y FAU</u>	U That Are OBL, FACW, o	r FAC: (A)
2. Baisainer Populus baisamitina 3	0 <u>FA</u>	Total Number of Domina	ant 4-
3		Species Across All Strai	a; (B)
Total Cover	<u> </u>		ecies
50% of total cover: 22:5		That Are OBL, FACW, o	r FAC: <u>35</u> (A/B)
Sapling/Shrub Stratum	to w bi total cover:i	Prevalence Index work	sheet;
1. Athus vividis	<u>5 Y FA</u>	C Total % Cover of:	Multiply by:
2. Populus balsamifera 3	D	<u>CU</u> OBL species <u>U</u>	$x_1 = 0$
3		EAC species	$x^{2} = 0$
4	······································	FACIL species 98	$x_{1} = \frac{x_{2}}{392}$
5	·····	UPL species	$\frac{1}{x5=0}$
0	~	Column Totals: 176	(A) (a2(a (B)))
50% of total cover: 222 S	9		
Herb Stratum	0% of total cover: 1	Prevalence Index	= B/A = <u>3, 36</u>
1. Oplopanax horadus no	<u> </u>	Hydrophytic Vegetation	n Indicators:
2. Aconitum duppiniifolium 3	<u>FA</u>	C Dominance Test is >	•50%
3. <u>Equischmarvense</u> 4	OFA	e Marphalagiaal Adam	≤3.0 f=th==1 (D==+1)
4. Athonium falle-femina _10) <u>FA</u>	data in Remarks	or on a separate sheet)
10 Agrostis Spionitica 10	<u> </u>	🗲 📔 🔄 Problematic Hydropi	nytic Vegetation ¹ (Explain)
6. <u>Aymnocar. dryoptens</u>	<u>ک</u> F4(
" Calamagnishs canadensis 11	<u> </u>	Indicators of hydric soil be present unless disturb	and wetland hydrology must
o, /	······		
10			
Total Cover 1	ò		
50% of total cover: 43 20	% of total cover: 17,5	2	
Plot size (radius, or length x width) $20'$ YaA · % B	are Ground 5	Hydrophytic	
% Cover of Wetland Bryophytes Total Cover of to (Where applicable)	Bryophytes 20	Present? Yes	No <u></u>
Remarks:			ده
photos: 260.	265		

		. .					
SOIL							Sampling Point: <u>N²30</u>
Profile Desci	ription: (Describe t	o the depth	needed to docu	ment the ir	ndicator	or confirm	the absence of indicators.)
Depth	Matrix		Red	ox Features			
(inches)	<u>Color (moist)</u>		Color (moist)	%	_Түра'_	Loc ⁴	<u> </u>
0-402	·		····· ··· ···				Organics
2-10	115 10 2.11						silt loam
	10 110 011		· · · · ·	0.1		·	all light a grad
11-15	10 YC 41	070	<u></u>	-1010			SIF WITH & Graver
15+			v				gravels
,							0
	- mc	L					
TTIMO: C=Co	ncentration D=Dent	ation RM=F	Reduced Matrix, C	S=Covered	or Coate	ed Sand Gr	ains. ² Location: PL=Pore Lining, M=Matrix.
Hydric Soli I	ndicators:	51011, 1 111 1	Indicators for	Problemat	ic Hydric	Soils ³ :	
Histosol	or Histel (A1)		Alaska Co	lor Change	(TA4) ⁴		Alaska Gleyed Without Hue 5Y or Redder
Histic Ep	ipedon (A2)		Alaska Alp	ine Swales	(TA5)		Underlying Layer
Hydroge	n Sulfide (A4)		Alaska Re	dox With 2.	5Y Hue		Other (Explain in Remarks)
Thick Da	rk Surface (A12)						
📔 🔄 Alaska G	Heyed (A13)		³ One indicator	of hydrophy	tic vegel/	ation, one p	primary indicator of wetland hydrology,
Alaska F	edox (A14)		and an appr	opriate land	lscape po	osition must	t be present unless disturbed or problematic.
Alaska G	leyed Pores (A15)		*Give details o	f color chan	ge in Rei	marks.	
Restrictive L	ayer (if present):	1					
Type:	None tour	<u>× </u>	<u> </u>				
Depth (inc	:hes):						Hydric Soil Present? Yes No Y-
Remarks:							
HYDROLO	GY						
Wetland Hyd	drology Indicators:		-				Secondary Indicators (2 or more required)
Primary India	ators (any one indication	ator is suffic	ent)				Water-stained Leaves (B9)
Surface	Waler (A1)	_	_ inundation Visi	ble on Aeria	al Imager	y (B7)	Drainage Patterns (B10)
High Wa	ter Table (A2)		_ Sparsely Vege	tated Conca	ave Surfa	ice (B8)	Oxidized Rhizospheres along Living Roots (C3)
* Saturatio	on (A3)	_	_ Marl Deposits	(B15)			Presence of Reduced Iron (C4)

s (n 1	5)				
640	0444	101	`		

_ Salt Deposits (C5)

- _ Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2)

 Water Marks (D1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Surface Soil Cracks (B6) 	Dry-Season Water Table (C2) Other (Explain in Remarks)	 Stunted or Stressed Plants (D1) Geomorphic Position (D2) Shaltow Aquitard (D3) Microtopographic Relief (D4) FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Water Table Present? Saturation Present? (includes capillary fringe)	Yes No Depth (inches): Yes No Depth (inches): Yes No Depth (inches):	Wetland Hydrology Present? Yes No _X
Remarks: * Saturation	eam gauge, monitoring well, aerial photos, previous insp n deeper than 12", small dr IN this plot thein surrounding	ainage ~4' away from plot, z oplands

Water Marks (B1)

...

roject/site: Grant Erec	K Lake	E	Borough/City	: Mo	osc Pass	Sampling Date: 7	-24-
pplicant/Owner: Kenal H	ydro		- ,			Sampling Point: D	P31
vestigator(s): C. Schude	L' J. Blan	k I	Landform (h	illside, terri	ace, hummocks, etc.):	lake edge	
ocal relief (concave, convex, none): _	none		Slope (%): _	D	1	historic Lelhe	out
ubregion:	Lat:	40.47	7632	Lon	g: -149.33473	Datum:	
oil Map Unit Name:				1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-	NWI classif	lication: PSSEMI	E
e climatic / hydrologic conditions on	the site typical for this	time of yea	ar?Yes 📝	<u>K_</u> No_	(If no, explain in	Remarks	•
e Vegetation, Soil, o	Hydrologys	ignificantly d	disturbed?	,)v Are"	Normal Circumstances*	present? Yes	No
e Vegetation, Soil, o	Hydrology n	aturally prol	blematic?	Nु∂ (lf пе	eded, explain any answ	vers in Remarks.)	
UMMARY OF FINDINGS - A	ttach site map sh	owing sa	mpling po	int locati	ons, transects, imp	ortant features, etc	i.
Hydrophytic Vegetation Present?							······
Hydrophytic vegetation / resent?	Yes X N	s	Is the	Sampled	Area		
Wetland Hydrology Present?	Yes X N	s	withi	n a Wetlan	id? Ye	s <u> </u>	
Romarks: Salix/ Marcix	- agrostic 1	wetta	nd all	hist	mic de la	202. 7 50/	
lute onthet	0				- photos	200 - 234	
EGETATION – Use scientific	names of plants.	List all s	pecies in	the plot.	······································		
		Absolute	Dominant	Indicator	Dominance Test wor	rksheet:	·
Liee Stratum		<u>% Cover</u>	<u>Species?</u>	Status	Number of Dominant	Species 6	
		·			That Are OBL, FACW	, or FAC:	(A)
···					Total Number of Dom	inant 7	(D)
·	<u></u>				openes Autoss All Ol	iata, <u>i</u>	(¤)
	Total Cover:				Percent of Dominant S	Species	
50%	of total cover:	20% of	f total cover:		Prevalence Index wo	prksheet:	
Sapling/Shrub Stratum		5		FAr		Multiply by	
Salix bardanli			·	FAT	OBL species 25	5x1=_25	
Bobla dandulusa		10	<u> </u>	FAC	FACW species <u>5</u>	x 2 = <u>/</u> ð	
Betula Opaninifera	•	5		FACU	FAC species 70	x3= <u>Z/0</u>	
. pier glavica		/D	<u> </u>	FACU	FACU species 13	×4 = <u>(00</u>	
, <u> </u>		·		·	Column Totology 11 C	$\frac{x_{5}}{2n} \frac{y_{5}}{2n}$	(E)
	Total Cover:	<u> </u>			Column rotats; <u>11 C</u>	, (A) <u></u>	(B)
50% terh≲tratum	of total cover: <u>20</u>	20% of	total cover:	8	Prevalence Inde	x = B/A = 2.65	
Sawanawha mana	veltasis	5		GAL IN	Hydrophytic Vegetat	ion Indicators:	
Equisetim arven	S.	15	<u> </u>	FAC.	<u>∧</u> Dominance Test i	s >50%	
Comanin "palist	re	10		OBL	X Prevalence Index	is ≤3.0	
Referitilla patusti	2 Disignara	15		FAC	data in Remar	aptations" (Provide sup ks of on a separate she	porting et)
Agrostis Stolonifer	and canaden	كلهر	<u> </u>	FAC:	Problematic Hydro	ophytic Vegetation ¹ (Exp	piain)
. (aver aquah lis		<u>_\S_</u>	_¥	ORF.	tion and a		
•			-		indicators of hydric s be present unless dist	on and wetland hydrolog urbed or problematic	gy must
•		<u> </u>	- 				
U	Total Cover	34	<u> </u>				
50%	of total cover: 37	20% of	total cover	15			
lot size (radius, or length x width) と	0' ×5'	% Bare G	iround 1) opin	Hydrophytic		
Cover of Wetland Bryophytes	Total Cov	er of Bryop	hytes \1) Hip	Present? Ye	es <u>×</u> No	_
		· / · F				· · · · · · · · · · · · · · · · · · ·	
(Where applicable)	· <u></u>						

US Army Corps of Engineers

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Sampling Point: DP2]

Protile Desc	ription: (Descrit	e to the depth	needed to docur	nent the indicator or	contirm	the absence	of Indicators.)	
Deptn (inches)	Color (moist)	%	Color (moist)	% Type ¹	Loc ²	Texture	Remarks	
	A 1	<u> </u>		· · · · · · · · · · · · · · · · · · ·	-		2.1.1.01.00/70005.01	
	N	3 pit						
			ula lar					
		<u>AMAING</u>	Mater	- M PIOT -	-			
		0	•					
					<u> </u>			
							New original to	,
Type: C=C	oncentration, D=D	epletion, RM=R	educed Matrix, CS	S=Covered or Coated	Sand Gra	ins. ² Loc	ation: PL=Pore Lining, M=Matrix.	
Hydric Soil	indicators:		Indicators for F	Problematic Hydric S	oils³:			
Histosof	or Histel (A1)		Alaska Colo	or Change (TA4) ⁴		Alaska	Gleyed Without Hue 5Y or Redder	
Histic Eg	pipedon (A2)		Alaska Alpi	ne Swales (TA5)		Unde	riying Layer	
Hydroge	n Sulfide (A4)		Alaska Red	ox With 2.5Y Hue		Other (Explain in Remarks)	
Thick Da	ark Surface (A12)						•	
Alaska (Sleyed (A13)		³ One indicator of	f hydrophytic vegetatio	on, one pr	imary indicate	r of wetland hydrology,	
Alaska F	Redox (A14)		and an appro	priate landscape positi	ion must b	be present unl	ess disturbed or problematic.	
Alaska (Sleved Pores (A15)	⁴ Give details of	color change in Remai	rks.	-		
Restrictive I	aver (if present)	 :						<u> </u>
Type:								
Denth (in	ches):	4				Hydric Soil I	Present? Yes X No	
Deptit (in						nyano oon		
Remarks.								
HYDROLO	GY							
Wetland Hy	drology Indicator	s:				Secondary Inc	licators (2 or more required)	
Primary Indic	ators (any one in	licator is sufficie	ent)			Water-sta	ined Leaves (B9)	
X Surface	Water (A1)		Inundation Visib	le on Aerial Imagery (P		 Drainage	Patterns (B10)	
	ler Table (A2)	- <u></u>	Snarsely Vegeta	ited Concave Surface	(B8)	Oxidized	Rhizospheres along Living Roots ((23)
X Saturatio	on (A3)		Marl Denosits (E	315)	() _	Presence	of Reduced Iron (C4)	,
Water M	arks (B1)		Hydrogen Sulfid	e Odor (C1)	-	Salt Depo	sits (C5)	
Sedimer	t Deposits (B2)		Drv-Season Wat	ter Table (C2)	-	Stunted o	r Stressed Plants (D1)	
Drift Der	nosits (B3)		Other (Explain Ir	Remarks)	-	Geomorni	alc Position (D2)	
Algai Ma	tor Crust (B4)			(internet internet)	-	Shallow A	quitard (D3)	
Iron Den	osite (85)				-	Microtopo	granhic Relief (D4)	
Nufface	Soil Cracks (B6)				-	EAC-Neul	ral Test (D5)	
Field Obser	vations'			•				
Surface Mak	r Brocont?		Donth /in	chool: (1)				
Surface Wate	Deservia		Depth (in	ches), <u>0</u>				
water Table	Presentr			()		4	с X	
Saturation Pi	resent?	Yes <u>/</u> No	Depth (In	ches):	vvetiai	na Hydrology	Present? Yes <u>//</u> No	
Describe Re	corded Data (strea	m gauge, moni	toring well, aerial	photos, previous inspe	ctions)/if	available:	· · · · · · · · · · · · · · · · · · ·	
	•				1.00			
Remarke'						·-···		
nomanto,								

WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: <u>Girant Lalce</u> Borough/City:	Mouse Pass Sampling Date: 7-14-13
Applicant/Owner: Kenal Hydro	Sampling Point: NP 37-
Investigator(s): <u>C. Schudel</u> J. Blank Landform (hillsin	le terrace hummocks etc.): [AIISICH abuse-
Local relief (concave, convex, none): Moye Sione (%): 5	later edge will
Subregion: 1at: (a), 417,210	
Soil Map Unit Name:	_ Long, Datum: Datum:
Are climatic / hydrologic conditions on the site typical for this time of year? You X	
Are Vegetation, Soil, or Hydrology significantly disturbed? Na	Are "Normal Circumstances"
Are Vegetation, Soil, or Hydrology naturally problematic? No	(If needed, explain any ensurers in Romarke)
SUMMARY OF FINDINGS - Attach site map showing sampling point	locations, transects, important features, etc.
Hydrophylic Vegetation Present? Yes X No	
Hydric Soil Present? Yes 🔨 No 🗙 Is the Sa	mpled Area
Wetland Hydrology Present? Yes 🕺 No 🗙 within a	Netland? Yes <u>No X</u>
Remarks: white sorriges / Head and he has a bot	e Armhunit
W a doubled that lot ab lot about a wetten	0 photos) 285 - 293
VEGETATION – Use scientific names of plants – List all sposios in the	all Drait this pt. + surmandered
Absolute Devices in the	plot. up umag
Tree Stratum <u>% Cover</u> Species? Sta	ator Dominance lest worksheet:
1. Tsuga mertensiana 30 Y FA	That Are OBL, FACW, or FAC: 2 (A)
2. Picen glaven 5 FA	
3	Species Across All Strata: 2 (B)
Total Cover; 35	Percent of Dominant Species
50% of total cover: 17.5 20% of total cover: 7	That Are OBL, FACW, or FAC: 100 (A/B)
Saplino/Shrub Stratum	Tatel % Coverent
1. Empetrum rignom 75 y FA	C Multiply by:
2. Leaven de combens 20 . Fr	
Behild alight	$\frac{C}{1} = \frac{1}{1000} + \frac{1}{1000} + \frac{1}{1000} + \frac{1}{10000} + \frac{1}{10000000000000000000000000000000000$
4. Dervice Hanaviosa 10 FA	FACU species $5 \times 4 = 20$
6 Arctoste Abrilius inconsusci 2- uc	UPL species $2 \times 5 = 10$
Total Course 17.2	L Column Totals: 157 (A) 480 (B)
50% of total cover: $\left \frac{1}{2} \right = 20\%$ of total cover: 2^{\pm}	4
Herb Stratum	Prevalence index = $B/A = 3,00$
1. None	A Deminance Test is 5 50%
2	Prevalence Index is <3.0
3	Mornhological Adaptations ¹ (Revide superstine
4	data in Remarks or on a separate sheet)
b,	Problematic Hydrophytic Vegetation ¹ (Explain)
7	
8	Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic
9	
10.	—
50% of total cover: 20% of total cover:	
Plot size (radius, or length x width) 20' radius % Bare Ground ()	Hydrophytic
% Cover of Wetland Bryophytes Total Cover of Bryophytes [Where applicable)	Present? Yes X No
Remarks:	
•	

DIL ¹		oumphing round
ofile Description: (Describe to the dep	oth needed to document the indicator or co	nfirm the absence of indicators.)
epth <u>Matrix</u>	Redox Features	2 Texture Remarks
iches) Color (moist) %		Inaxe lun programas
)-7		
6-82 7.572 7.512 JU	۷	
2-17 7.5 1P 413 11)	<u>silt loam</u>
		ang ang ang ang ang ang ang ang ang ang
		nd Grains ² Location: PL=Pore Lining M=Matrix
(pe: C=Concentration, D=Depletion, RM dric Soil Indicators;	Indicators for Problematic Hydric Soil	s ³ ;
Histosol or Histel (A1)	Alaska Color Change (TA4) ⁴	Alaska Gleyed Without Hue 5Y or Redder
Histic Epipedon (A2)	Alaska Alpine Swales (TA5)	Underlying Layer
Hydrogen Sulfide (A4)	Alaska Redox With 2.5Y Hue	Other (Explain in Remarks)
_ Thick Dark Surface (A12)	· · · · · · · · · · · · · · · · · · ·	the set of the set of
Alaska Gleyed (A13)	"One indicator of hydrophytic vegetation,	one primary indicator of wetland hydrology,
_ Alaska Redox (A14)	and an appropriate landscape position	I must be present unless distance of problematio.
_ Alaska Gieyeu Poles (A15)		
at fative Lover (it propert)		
strictive Layer (if present):		
estrictive Layer (if present): Type: <u>None for Mana</u> Depth (inches): emarks:		Hydric Soll Present? Yes No
estrictive Layer (if present): Type: <u>None formal</u> Depth (inches): emarks:		Hydric Soil Present? Yes No <u>X</u>
Depth (inches):		Hydric Soll Present? Yes <u>No X</u>
Strictive Layer (if present): Type: None formation Depth (inches):		Hydric Soll Present? Yes No _X Secondary Indicators (2 or more required)
Strictive Layer (if present): Type: None for the second	fficient)	Hydric Soll Present? Yes <u>No X</u> <u>Secondary Indicators (2 or more required)</u> Water-stained Leaves (B9)
Depth (inches): Depth (inches): emarks: 'DROLOGY retland Hydrology Indicators: rimary Indicators (any one indicator is su	fficient) Inundation Visible on Aerial Imagery (B7	Hydric Soll Present? Yes No X Secondary Indicators (2 or more required) Water-stained Leaves (B9) Drainage Patterns (B10)
Particitive Layer (if present): Type: None format Depth (inches):	fficient) Inundation Visible on Aerial Imagery (B7 Sparsely Vegetated Concave Surface (B	Hydric Soll Present? Yes No X <u>Secondary Indicators (2 or more required)</u> Water-stained Leaves (B9) Drainage Patterns (B10) B) Oxidized Rhizospheres along Living Roots (C
Particitive Layer (if present): Type: None for descent Depth (inches):	flicient) Inundation Visible on Aerial Imagery (B7 Sparsely Vegetated Concave Surface (B Marl Deposits (B15) Hard Deposits (B15)	Hydric Soll Present? Yes <u>No X</u> <u>Secondary Indicators (2 or more required)</u> <u>Water-stained Leaves (B9)</u> Drainage Patterns (B10) Drainage Patterns (B10) Drainage Context (C6) <u>No Xidized Rhizospheres along Living Roots (C6)</u>
Particitive Layer (if present): Type: None for the med Depth (inches):	flicient) Inundation Visible on Aerial Imagery (B7 Sparsely Vegetated Concave Surface (B Mari Deposits (B15) Hydrogen Sulfide Odor (C1) Dru-Spason Water Table (C2)	Hydric Soll Present? Yes No _X Secondary Indicators (2 or more required)
Destrictive Layer (if present): Type: Nore Depth (inches):	fficient) Inundation Visible on Aerial Imagery (B7 Sparsely Vegetated Concave Surface (B Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Other (Explain in Remarks)	Hydric Soll Present? Yes No Secondary Indicators (2 or more required) Water-stained Leaves (B9) Water-stained Leaves (B9) Orainage Patterns (B10) (8) Oxidized Rhizospheres along Living Roots (C0) Presence of Reduced Iron (C4) Salt Deposits (C5) Stunted or Stressed Plants (D1) Geomorphic Position (D2)
Strictive Layer (if present): Type: None for definition Depth (inches):	fficient) Inundation Visible on Aerial Imagery (B7 Sparsely Vegetated Concave Surface (B Mari Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Other (Explain in Remarks)	Hydric Soll Present? Yes No _X Secondary Indicators (2 or more required)
Strictive Layer (if present): Type: None for the med Depth (inches):	fficient) Inundation Visible on Aerial Imagery (B7 Sparsely Vegetated Concave Surface (B Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Other (Explain in Remarks)	Hydric Soll Present? Yes No Secondary Indicators (2 or more required)
Strictive Layer (if present): Type: Norse for Mark Depth (inches):	fficient) Inundation Visible on Aerial Imagery (B7 Sparsely Vegetated Concave Surface (B Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Other (Explain in Remarks)	Hydric Soll Present? Yes No _X Secondary Indicators (2 or more required) Water-stained Leaves (B9) Water-stained Leaves (B9) Orainage Patterns (B10) 8) Oxidized Rhizospheres along Living Roots (C0)
Strictive Layer (if present): Type: Nore Depth (inches):	fficient) Inundation Visible on Aerial Imagery (B7 Sparsely Vegetated Concave Surface (B Mari Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Other (Explain in Remarks) 	Hydric Soll Present? Yes No _X Secondary Indicators (2 or more required)
astrictive Layer (if present): Type: None for the med Depth (inches):	fficient) Inundation Visible on Aerial Imagery (B7 Sparsely Vegetated Concave Surface (B Mari Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Other (Explain in Remarks) No Depth (inches):	Hydric Soll Present? Yes No _X Secondary Indicators (2 or more required)
estrictive Layer (if present): Type: None for the model Depth (inches):	fficient) Inundation Visible on Aerial Imagery (B7 Sparsely Vegetated Concave Surface (B Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Other (Explain in Remarks) ight in Remarks) No X Depth (inches):	Hydric Soll Present? Yes No _X Secondary Indicators (2 or more required)
estrictive Layer (if present): Type: Nore Depth (inches):	flicient)	Hydric Soll Present? Yes No _X Secondary Indicators (2 or more required)
strictive Layer (if present): Type: Nore Depth (inches):	flicient) 	Hydric Soll Present? Yes No _X
strictive Layer (if present): Type: Nore Depth (inches):	fficient)	Hydric Soll Present? Yes No _X
strictive Layer (if present): Type: Nore Depth (inches):	fficient)	Hydric Soll Present? Yes No _X Secondary Indicators (2 or more required)

WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: Grant Lake.		Borough	Citing Adva	nee Poss	
Applicant/Owner: Kalaak Hydro		BOIDUGII	City. <u>IV (0</u>	U)C 15200	Sampling Date: 121
Investigator(s): C. Schuddl J. Bland	<i>i</i> .	1	/LIN-1-2- 4		Sampling Point: <u>D1 S</u>
Local relief (concerve convex none): 10/04 /			i (miisiae, tei	rrace, nummocks, etc.): _ //	<u>re crise</u>
Subrecion:	100	Slope (%)): <u> </u>	-	
Coll Mart Unit Manage	40.48	<u>15515</u>	Lo	ong: <u>-149,300783</u>	Datum:
	· · · · · · · · · · · · · · · · · · ·	n		NWI classific	ation: VEWALF
Are climatic / hydrologic conditions on the site typical for this	time of ye	ar? Yes_	<u> X </u>	(If no, explain in R	emarks.)
Are vegetation, Soil, or Hydrology si	gnificantly	disturbed	?No Are	"Normal Circumstances" p	resent? Yes X_ No
SUMMARY OF FINDINGS - Attach site map she	aturally pro owing sa	blematic? Impling	・N・V(Ifn point loca	leeded, explain any answe tions, transects, impo	rs in Remarks.) rtant features, etc.
Hydrophytic Vanstation Prosent? Van X Na					
Hydric Soil Present? Yes X No	·	ls	the Sample	d Area	
Wetland Hydrology Present? Yes X No	, <u> </u>	wi	thin a Wetla	ind? Yes	<u> X No </u>
Remarks: Anorex doorn in a sed wetter	nds 1			A 1 1 7.	
14,0	-3	יכן~	man	J photos SOL	1 - 508
VEGETATION - Use scientific names of plants.	List all s	pecies	in the plot	•	
	Absolute	Dominar	nt Indicator	Dominance Test works	sheet;
Tree Stratum	<u>% Cover</u>	Species	7 Status	Number of Dominant Sp	ecles o
	an	<u></u>		That Are OBL, FACW, c	or FAC: (A)
3	·			Total Number of Domina	ant 2
A.	·,	-		Species Across All Strat	a: <u> </u>
		•		Percent of Dominant Sp	ecies
50% of total cover:	20% a	ftatal any	~~	That Are OBL, FACW, o	r FAC:(μ (Α/Β)
Sapling/Shrub Stratum	20%0	i total cov	er	Prevalence Index work	sheet:
1. Betula papyrifina	5	<u> </u>	FACU	Total % Cover of:	Multiply by:
2. Salix pilchva	5	<u> </u>	FALW	OBL species <u>72</u>	$x_{1} = \frac{72}{2}$
3. Isuca mertinsiana	<u> </u>	-	FAL	FACW species	$x^2 = \frac{24}{14}$
4. Victor alanca		.	FALV	FAC species 10	X3=X
5/		. <u> </u>		LIPL species	X4=
6		-	•	Column Totolar 12/0	$\frac{x}{188} = 0$
Total Cover:	14				(A) <u>10 D</u> (B)
50% of total cover: $\underline{\phi}$	_ 20% of	total cove	r: <u>2.4</u>	Prevalence Index	= B/A = 149
1) BAGAETTS Stolon form ful aunader	nsúl O		TAN	Hydrophytic Vegetation	n Indicators;
2. Carex utriculata	70	- V	ABL	X Dominance Test is >	·50%
3. Comprisión palistre	10		084	Prevalence Index is	≤3.0
4. Fausetum arypice	5		FAC	Morphological Adapt	ations ¹ (Provide supporting
5. Sanavisilba canadensis	5		FACW	Droblemetic Hudren	or on a separate sheet)
6. Carell rawiscons	2		FACW		iytic vegetation (Explain)
7. Carey Iohacea	2-		OBL	¹ Indicators of hydric soil	and wetland hydrology must
8				be present unless disturb	ed or problematic.
9					
10				, :	
Total Cover: _	114				
50% of total cover: <u>57</u>	20% of t	otal cover	r: 22.8	1 hadren of the	
Plot size (radius, or length x width) 20 ' Y ad .	% Bare G	round 🛄	0	Hydrophylic Vegetation	
% Cover of Wetland Bryophytes Total Cove (Where applicable)	r of Bryoph	iytes	20	Present? Yes	<u>×</u> No
Remarks:			·····	·	······
					r

SOIL

Sampling Point: DP33

Profile Description: (Describe to the o	lepth needed to document the indicator o	or confirm the absence of Indicators.)
Depth <u>Matrix</u>	Redox Features	Turken Provide
(Inches) Color (moist) %	<u>Color (moist) % Type'</u>	Loc Texture Remarks
Alb a.F		
	6220-70 6200-70 700-70 700-70 700-70 700-70 700-70 700-70-70 700-70-70 700-70 700-70 700-70 700-70 700-70 700-70 700-70 700-70 700-70 700-70 700-70 700-70 700-70 700-70 700-70 700-70-70-70-70-70-70-70-70-70-70-70-70-	
standing	intater in plot	
<u> </u>	<u> </u>	
· · · · · · · · · · · · · · · · · · ·		
Trunci C=Concentration D=Daplation	PM-Reduced Matrix CS=Covered or Coater	d Sand Grains ² Location: PL=Pore Lining, M=Matrix.
Type: C=Concentration, D=Depletion, I Hydric Soil Indicators:	indicators for Problematic Hydric	Soils ³ :
Historol or Histol (A1)	Alaska Color Change (TA4) ⁴	Alaska Gleved Without Hue 5Y or Redder
Histic Enhedon (A2)	Alaska Alpine Swales (TA5)	Underlying Laver
	Alaska Redox With 2.5Y Hue	Other (Explain in Remarks)
Thick Dark Surface (A12)		
Alaska Gleved (A13)	³ One indicator of hydrophytic vegeta	tion, one primary indicator of wetland hydrology,
Alaska Redox (A14)	and an appropriate landscape pos	sition must be present unless disturbed or problematic.
Alaska Gleved Pores (A15)	⁴ Give details of color change in Rem	narks.
Bestrictive Laver (if present):		
Tunet		
	•	Hudric Soil Prosent? Ves X No
Depth (Inches):		
Remarks:		
		Secondary Indicators (2 or more required)
wetland Hydrology Indicators:		Motor stained Leaves (B9)
Primary Indicators (any one indicator is	sunicient)	
<u>X</u> Surface Water (A1)	Inundation Visible on Aerial Imagery	(B7) Drainage Patterns (B10)
X High Water Table (A2)	Sparsely Vegetated Concave Surfac	Discover and the second
X Saturation (A3)	Mari Deposits (B15)	Presence of Reduced Iron (C4)
Water Marks (B1)	Hydrogen Sullide Odor (C1)	Sait Deposits (US) Shunted as Streamed Dianta (D1)
Sediment Deposits (B2)	Dry-Season Water Table (C2)	Stunied or Stressed Plants (D1)
Drift Deposits (B3)	Other (Explain in Remarks)	Geomorphic Position (D2)
Algal Mat or Crust (B4)		Snallow Aquitard (US)
Iron Deposits (B5)		Microlopographic Relief (D4)
Surface Soil Cracks (B6)		
Field Observations:		
Surface Water Present? Yes <u>7</u>	No Depth (inches):	-
Water Table Present? Yes	≦ No Depth (inches):()	-
Saturation Present? Yes 📝	_ No Depth (inches):	Wetland Hydrology Present? Yes 🔀 No
(includes capillary fringe)	monitoring well series photos, previous ins	Inections) if available:
Describe Recorded Data (stream gauge	, monitoring wen, aenat protos, previous ma	
Remarks:		
	4 * 1.	
Found a dead of	duckling in this welle	and
ł	<u>`</u>	

WETLAND DETERMINATION DATA FORM - Alaska Region

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				,
Project/Site: <u>GVOINT CALLE</u>	Borougi	n/City: Man	re Pass	_ Sampling Date: _7-24-
Applicant/Owner: <u>Rehear Hydro</u>			0	_ Sampling Point: <u>5P34</u>
Investigator(s): <u>C.Schvall</u> J. Blank	Landfor	m (hillside, ter	race, hummocks, etc.):	toe of be-lock D
Local relief (concave, convex, none):	Slope (%	%): <u>D</u>		
Subregion: Lat:	100, 4857	<u>33</u> Lo	ng: -149,30036	L Datum;
Soil Map Unit Name:	······································		NWI classifi	cation: upland
Are climatic / hydrologic conditions on the site typical for this	time of year? Yes	_X_No_	(if no, explain in F	Remarks.)
Are Vegetation, Soli, or Hydrology si	inificantly disturbe	d? N ◊ Are	"Normal Circumstances"	nresent? Yes X No
Are Vegetation, Soil, or Hydrology na	turally problematic	⊳?No (∦fn	eeded, explain any answe	ers in Remarke)
SUMMARY OF FINDINGS – Attach site map sh	wing sampling	point locat	ions, transects, impo	ortant features, etc.
		· · · ·		
Hydric Sóil Present? Yes Nr		s the Sampleo	d Area	
Wetland Hydrology Present? Yes No	× W	ithin a Wetla	nd? Yes	No <u>X</u>
Remarks:				• •
white spinled from to	ch up la	nd the	AGPS II ph.	309-314
EGETATION - Use scientific names of plants.	List all species	in the plot.		Nya <u>n</u> (1997) - Angeland (1997
Tree Stratum	Absolute Domina	ant Indicator	Dominance Test work	sheet:
1. PI (Pa alguica	<u>secre</u> <u>specre</u>	TACH	Number of Dominant S	pecies 2
2, 0	<u> </u>	_ <u>F/ICV</u>	Inat Are OBL, FACW,	or FAC: (A)
3.			Total Number of Domin	ant
·			Species Across All Stra	ta: <u> (</u> B) (B)
Total Cover:	40		Percent of Dominant Sp	pecies (v.a.
50% of total cover: 2.0	 20% of total co	ver: K	That Are OBL, FACW, o	or FAC: _/00 (A/B)
Sapling/Shrub Stratum			Prevalence Index work	ksheet:
. Plesa alavia	<u>40 Y</u>	FACU	Total % Cover of;	<u>Multiply by:</u>
TSICA MERHINSIANA	10	_ FAC	OBL species	x1=
M. M. Elsia Firmanea	<u> </u>	<u>FAU</u>	FACW species _ 3	$x^2 = 10$
			FAC species	X3 = WO
·	•		HRU species 10	$x_4 = \frac{372}{272}$
·			Column Totale: US	$- x_{5} = \frac{1}{\sqrt{1}}$
Total Cover:	<u>53</u>			(A) <u>44</u> (B)
erb Stratum	20% of total cov	rer: <u>(</u> 0,()	Prevalence Index	= B/A =
Cornus caredonsis	S Y	FATU	Hydrophytic Vegetatio	n Indicators:
Rubus pharmannes	<u>s</u> <u>y</u>	FATAN	X Dominance Test is	>50%
EQUISETIM Sylvation	s Y	FAL	Prevalence Index is	≤3.0
Educetim arvense	5 4	FAC	Morphological Adap	tations ¹ (Provide supporting
MUMPOCARPINA deviaptoris	3	FATU	data in Remarks	or on a separate sheet)
Dripptens dutation expansa		FACU	Problematic Hydrop	nytic Vegetation' (Explain)
Lycopodium claintim		FACU	¹ Indicators of hydric soil	and welland hydrology must
			be present unless distur	bed or problematic.
			·····	
۰				
Total Cover: _	25			
50% of total cover: 12.5	20% of total cove	er: <u>5</u>	14 1 A S	
			Hydronhytia	
lot size (radius, or length x width) $20' \times 7.0'$	% Bare Ground	0	Veretation	
lot size (radius, or length x width) <u>70' X 7.0'</u> Cover of Wetland Bryophytes <u> </u>	% Bare Ground of Bryophytes	0 <u>7</u> <	Vegetation Present? Yes	<u> </u>

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and the state of the section of the stand have a state of the section of the indicator or confi	Sampling Point:PP 3-
Profile Description: (Describe to the depth needed to document the indicator of contra	rm the absence of Indicators.)
Depth Matrix Redox Features	- Tester Bergelo
inches) Color (moist) % Color (moist) % Type' Loc	
0-2	
7-8 INVR 712 100%	SIL
	ocouplly site
8-10 2:57 2:51 - 100%	
	·
	· · · · · · · · · · · · · · · · · · ·
Type: C=Concentration D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand	Grains. ² Location: PL=Pore Lining, M=Matrix.
lydric Soll Indicators: Indicators for Problematic Hydric Solls ³ :	
Histosol or Histel (A1) Alaska Color Change (TA4) ⁴	Alaska Gleyed Without Hue 5Y or Redder
Histic Epipedon (A2) Alaska Alpine Swales (TA5)	Underlying Layer
Hydrogen Sulfide (A4) Alaska Redox With 2.5Y Hue	Other (Explain in Remarks)
Thick Dark Surface (A12)	
Alaska Gleved (A13) *One indicator of hydrophytic vegetation, or	the primary indicator of wetland hydrology,
Alaska Redox (A14) and an appropriate landscape position in	lust be present unless distorbed of problemate.
Alaska Gleyed Pores (A15) Give details of color change in Remarks.	
Restrictive Layer (if present):	
Type:	Hudric Soil Present? Yes No
Depth (inches):	
•	
YDROLOGY	Secondary Indicators (2 or more regulated)
YDROLOGY Wetland Hydrology Indicators:	Secondary Indicators (2 or more required) Water-stained Leaves (B9)
YDROLOGY Wetłand Hydrology Indicators: Primary Indicators (any one indicator is sufficient)	<u>Secondary Indicators (2 or more required)</u> Water-stained Leaves (B9) Drainage Patterns (B10)
YDROLOGY Wetland Hydrology Indicators: Primary Indicators (any one indicator is sufficient)	<u>Secondary Indicators (2 or more required)</u> Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots (C3
YDROLOGY Wetland Hydrology Indicators: Primary Indicators (any one indicator is sufficient)	Secondary Indicators (2 or more regulred) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots (C3) Presence of Reduced Iron (C4)
YDROLOGY Wetiand Hydrology Indicators: Primary Indicators (any one indicator is sufficient)	<u>Secondary Indicators (2 or more required)</u> <u>Water-stained Leaves (B9)</u> Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots (C3) Presence of Reduced Iron (C4) Salt Deposits (C5)
YDROLOGY Wetland Hydrology Indicators: Primary Indicators (any one indicator is sufficient)	Secondary Indicators (2 or more regulred) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots (C3) Presence of Reduced Iron (C4) Salt Deposits (C5) Stunted or Stressed Plants (D1)
YDROLOGY Wetland Hydrology Indicators: Primary Indicators (any one indicator is sufficient)	Secondary Indicators (2 or more regulred) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots (C3) Presence of Reduced Iron (C4) Salt Deposits (C5) Stunted or Stressed Plants (D1) Geomorphic Position (D2)
YDROLOGY Wetland Hydrology Indicators: Primary Indicators (any one indicator is sufficient)	Secondary Indicators (2 or more regulred) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres along Living Roots (C3) Presence of Reduced Iron (C4) Salt Deposits (C5) Stunted or Stressed Plants (D1) Geomorphic Position (D2) Shallow Aquitard (D3)
YDROLOGY Wetland Hydrology Indicators: Primary Indicators (any one indicator is sufficient) Surface Water (A1) Inundation Visible on Aerial Imagery (B7) High Water Table (A2) Sparsely Vegetated Concave Surface (B8) Saturation (A3) Mari Deposits (B15) Water Marks (B1) Hydrogen Sulfide Odor (C1) Sediment Deposits (B2) Dry-Season Water Table (C2) Drift Deposits (B3) Other (Explain in Remarks) Algal Mat or Crust (B4) Iron Deposits (B5)	Secondary Indicators (2 or more regulred) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres 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)
YDROLOGY Wetland Hydrology Indicators: Primary Indicators (any one indicator is sufficient)	Secondary Indicators (2 or more regulred) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres 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)
YDROLOGY Wetland Hydrology Indicators: Primary Indicators (any one indicator is sufficient)	Secondary Indicators (2 or more regulred) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres 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)
YDROLOGY Wetland Hydrology Indicators: Primary Indicators (any one indicator is sufficient)	Secondary Indicators (2 or more regulred) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres 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)
YDROLOGY Wetland Hydrology Indicators: Primary Indicators (any one indicator is sufficient)	Secondary Indicators (2 or more regulred) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres 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)
YDROLOGY Wetland Hydrology Indicators: Primary Indicators (any one indicator is sufficient)	Secondary Indicators (2 or more regulred) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres 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)
YDROLOGY Wetland Hydrology Indicators: Primary Indicators (any one indicator is sufficient)	Secondary Indicators (2 or more required) Water-stained Leaves (B9) Drainage Patterns (B10) Oxidized Rhizospheres 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)
YDROLOGY Wetland Hydrology Indicators: Primary Indicators (any one indicator is sufficient)	Secondary Indicators (2 or more required)
WDROLOGY Wetland Hydrology Indicators: Primary Indicators (any one indicator is sufficient)	Secondary Indicators (2 or more required)
YDROLOGY Wetland Hydrology Indicators: Primary Indicators (any one indicator is sufficient)	Secondary Indicators (2 or more required)
YDROLOGY Wetiand Hydrology Indicators: Primary Indicators (any one indicator is sufficient)	Secondary Indicators (2 or more required)

WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: Givant Lake		Borouah/C	itv: Mda	SP. PASS Sempling Date: 7-25-13
Applicant/Owner: Keney Hydro			.,	Sampling Date: DP 35
Investigator(s): C. Schudel J. Blank		l andform (hilleldo tor	race hummooke eta): Jaka e-la.
Local relief (concave convex none): CONCAVE				lace, hummocks, etc.). <u>100 pc (Corp</u>
Subracion:	+ 12/2 /J			- pemilssi
Soil Man Unit Name:		0070	נייי נטו	ng: 141.651559 Detum:
Are dimetia / budrelegie conditions on the site lucical for the	- K		¥	NVVI classification:
Are contractor hydrologic conditions on the site typical for the	is time of yea	arr Yes		(If no, explain in Remarks)
Are Vegetation, Soll, or Hydrology	significantly	disturbed?	Are	"Normal Circumstances" present? Yes No
Are vegetation, Soil, or Hydrology i	naturally pro	blematic?	N.) (If ne	eeded, explain any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site map sl	howing sa	mpling p	oint locat	ions, transects, important features, etc.
Hydrophytic Vegetation Present? Yes X N	lo	le ti	a Samplor	d Aroa
Hydric Soil Present? Yes <u>7</u> N	lo	with	in a Wetla	
Welland Hydrology Present? Yes X N	lo			
Remarks: Outlet of lake			P)hotos 321 - 323
VEGETATION – Use scientific names of plants.	. List all s	pecies ir	hthe plot.	
	Absolute	Dominant	Indicator	Dominance Test worksheet:
Iree Stratum	<u>% Cover</u>	Species?	Status	Number of Dominant Species
	-			That Are OBL, FACW, or FAC:(A)
2.		·		Total Number of Dominant
A				Species Across All Strata: 7 (B)
Total Cause	_ <u>_</u>	1.3.		Percent of Dominant Species
50% of total cover	20% of	ficial acus	-	That Are OBL, FACW, or FAC: 100 (A/B)
Sapling/Shrub Stratum	20% 0	i totar cove	ſ. <u></u>	Prevalence Index worksheet:
1. Dasiphora Miticosa		<u> </u>	FAC	Total % Cover of: Multiply by:
2. <u>Picea glavea</u>	2		FACU	OBL species $\underline{9}$ $x_1 = \underline{9}$
3. Alnus Viridis	<u>b</u>	<u> </u>	FAC	FACW species $\underline{-7}$ $x_2 = \underline{-14}$
4. Vaccinium uliganosum	<u>3`</u>		FAC	FAC species $\frac{15}{15}$ $\times 3 = \frac{67}{15}$
5. Betla glandulosa	<u></u>		FALU	FACU species $4 = 28$
6. Andromeda politolia			FALW	UPL species \underline{D} $x5 = \underline{D}$
Total Cover	<u> 35 </u>			Column Totals: (A) (A) (B)
Horb Stratum	5 20% of	total cover	: 7	Prevalence Index = $B/A = 1.55$
1 Exighter (Mamissons	40	N.	18L	Hydrophytic Vegetation Indicators:
2 Carey agraphic	- <u>-</u>	- <u>-</u>	<u>- 010 - 1</u>	Dominance Test is >50%
2. Contraction Elimina here			<u></u>	Yerevalence Index is ≤3.0
· Canx' Pichington the	· _ Č _ ·		DPL	Morphological Adaptations ¹ (Provide supporting
5 Sanguisocha canadensis	· <u> </u>	. <u></u>	ED-11	data in Remarks or on a separate sheet)
6 Carex 1PPtalea is	·		NBL-	Problematic Hydrophytic Vegetation' (Explain)
7. Droserg mtndiplia	· <u> </u>		XBL	¹ Indicators of hydric soil and wetland hydrology must
8. Swertra personnis	· ·		FARM	be present unless disturbed or problematic.
9.	· · · · · ·			· · · · · · · · · · · · · · · · · · ·
10	· · · · ·			
Total Cover.	99			
50% of total cover: 49.5	20% of t	total cover:	19.8	
Plot size (radius, or length x width)_30' X 7.0'	_ % Bare G	round S	openthi	h Hydrophylic
% Cover of Wetland Bryophytes Total Cov (Where applicable)	ver of Bryop	hytes <u>S</u>)	Present? Yes X No
Remarks: World an PEnn Simminum	at Gr	- Huis	watur	and the sharks
opten shorter than	herbiace	uns;	portic	no of polygin are ss dominat

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Deptn Mate	11X 11		uux reatures	Tupot	1.002	Texture	Romarka
INCRES) Color (mois	<u>u %</u>	Color (moist)	%	<u>ı ype</u> .		Texture	
			<u> </u>				- <u> </u>
No	pit si	tandina	water	<u>_1</u> ~_	plot		1000 · · · · · · · · · · · · · · · · · ·
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	-Dardell -	A-Dadres 19175	<u></u>		. <u></u>	(aioc 2)	ation: Di -Dara i inine M-M-M-M-
ype: C=Concentration, D=	-Depletion, RM	w-reduced Matrix,	<u>ua=uovered</u> r Problemet	i or Coat Ic Hudet	eu sand G s Soile ^{3,}	ianis. ⁻ LOC	anon, r L-rold Lifling, M=Matrix.
History and Maicators:			olor Channel	пуать (ТАЛ ⁴	, JUNS (Aleal	Gleved Without Hue &V or Boddor
Histosol of Histel (A1)		Alaska C	inine Surela-	(TA6)		Alaska	riving Laver
_ msac ≿pipedon (A2)		Alaska A	edox Maies	(173) 5Y Hua		Office (Exolain in Remarks)
_ myorogen Suitide (A4)	2)	Alaska R	SOON WITH 2.1	⇒ı ⊓ue		Othet (- (containo)
Alaska Olavez (A12	-)	3Ono indiant	r of hudrons	He vor-	ation on-	primary indiant-)r of wetland hydrology
Alaska Bodov (A13)			, or nyuroph))ronriate local	scane n	one osition mus	t be present or	less disturbed or oroblematic
Alaska Glavod Deres (*	.15)	anu an app ⁴ Give detaite	of color chan	ge in PA	marks	proount un	vi provontauo.
maand Gieyeu Mores (A	107		-,,,,, [3[1]	un rte	،قدر بمبر	1	
Tunci							
туре:						Hudda o h	Present? Vac X N-
uepth (inches):						T Invutic Soll	reaenti les <u>\\</u> No
Remarks:						<u> </u>	
Remarks:	•					_1	
Remarks:						<u> </u>	
YDROLOGY							dicators (2 or more required)
Remarks: YDROLOGY Vetland Hydrology Indica	tors:					<u>Secondary Inc</u>	dicators (2 or more required)
Remarks: YDROLOGY Vetland Hydrology Indical Primary Indicators (any one	tors: indicator is su	(ficient)				Secondary Inc Water-sta	dicators (2 or more required) alned Leaves (B9)
Remarks: YDROLOGY Vetland Hydrology Indical Primary Indicators (any one X Surface Water (A1)	tors: indicator is su	ifficient)	sible on Aeria	al Imager	y (B7)	<u>Secondary Inc</u> Water-sta Drainage	<u>Jicators (2 or more required)</u> ained Leaves (B9) Patterns (B10)
Remarks: YDROLOGY Vetland Hydrology Indical Primary Indicators (any one Surface Water (A1) High Water Table (A2)	tors: indicator is su	ifficient) Inundation Viα Sparsely Veg	sible on Aeria	al Imager	-y (B7) ace (B8)	Secondary Inc Water-sta Drainage Oxidized	<u>dicators (2 or more required)</u> lined Leaves (B9) Patterns (B10) Rhizospheres along Living Roots (C
YDROLOGY Yetland Hydrology Indical Yrimary Indicators (any one Y Surface Water (A1) High Water Table (A2) Saturation (A3)	tors: indicator is su	ifficient) Inundation Vis Sparsely Veg Mari Deposits	sible on Aeria etated Conca (B15)	al Imager ave Surfa	y (B7) ace (B8)	Secondary Inc Water-sta Drainage Oxidized Presence	dicators (2 or more required) alned Leaves (B9) Patterns (B10) Rhizospheres along Living Roots (C of Reduced Iron (C4)
Permarks: YDROLOGY Vetland Hydrology Indical Primary Indicators (any one Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Water Marks (B1)	tors: indicator is su	Ifficient) Inundation Vis Sparsely Vegu Marl Deposits Hydrogen Sul	sible on Aeria etated Conce s (B15) Ifide Odor (C	al Imager ave Surfa 1)	у (В7) ісе (В8)	Secondary Ing Water-sta Drainage Oxidized Presence Salt Depo	dicators (2 or more required) alned Leaves (B9) Patterns (B10) Rhizospheres along Living Roots (C of Reduced Iron (C4) posits (C5) an Stressed Plants (D4)
YDROLOGY Yetland Hydrology Indicat Yrimary Indicators (any one Y Surface Water (A1) Y High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2)	tors: indicator is su	Ifficient) Inundation Vis Sparsely Vegu Marl Deposits Hydrogen Sul Dry-Season V	sible on Aeria etated Conce is (B15) Ifide Odor (C' Vater Table (vater Table (al Imager ave Surfa 1) C2)	у (В7) ісе (В8)	Secondary Ind Water-sta Drainage Oxidized Presence Salt Depo Stunted c	<u>dicators (2 or more required)</u> ilned Leaves (B9) Patterns (B10) Rhizospheres along Living Roots (C: e of Reduced Iron (C4) osits (C5) or Stressed Plants (D1)
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YDROLOGY Yetland Hydrology Indical Yrimary Indicators (any one Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4)	tors: indicator is su	Ifficient) inundation Vis Sparsely Vege Mari Deposits Mari Deposits Hydrogen Sul Dry-Season V Other (Explain	sible on Aeria etated Conca s (B15) Ifide Odor (C Vater Table (n in Remarks	al Imager ave Surfa 1) C2)	у (В7) ісе (В8)	Secondary Inc Water-sta Drainage Oxidized Presence Salt Depc Stunted c Geomorp Shallow A	<u>dicators (2 or more required)</u> Ined Leaves (B9) Patterns (B10) Rhizospheres along Living Roots (C of Reduced Iron (C4) osits (C5) or Stressed Plants (D1) hic Position (D2) Aquitard (D3)
YDROLOGY Yetland Hydrology Indical Primary Indicators (any one Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5)	tors: indicator is su	<u>,fficient)</u> Inundation Vis Sparsely Vegu Marl Deposits Hydrogen Sul Dry-Season V Other (Explain	sible on Aeria etated Conca i (B15) Ifide Odor (C Vater Table (n in Remarks	al Imager ave Surfa 1) C2)	у (В7) ісе (В8)	Secondary Inc Water-sta Drainage Oxidized Presence Salt Depo Stunted c Geomorp Shallow / Microtopo EAC Nov	dicators (2 or more required) alned Leaves (B9) Patterns (B10) Rhizospheres along Living Roots (Ca of Reduced Iron (C4) osits (C5) or Stressed Plants (D1) hic Position (D2) Aquitard (D3) ographic Relief (D4) trai Test (D5)
YDROLOGY Yetland Hydrology Indical Yrimary Indicators (any one Y 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)	tors: indicator is su	fficient) Inundation Vis Sparsely Vegu Marl Deposits Hydrogen Sul Dry-Season V Other (Explain	sible on Aeria etated Conca i (B15) líide Odor (C Vater Table (n in Remarks	al Imager ave Surfa 1) C2)	y (B7) ice (B8)	Secondary Inc Water-sta Drainage Oxidized Presence Salt Depo Stunted o Geomorp Shallow / Microtopo FAC-Neu	dicators (2 or more required) alned Leaves (B9) Patterns (B10) Rhizospheres along Living Roots (Ca of Reduced Iron (C4) posits (C5) or Stressed Plants (D1) hic Position (D2) Aquitard (D3) ographic Relief (D4) tral Test (D5)
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. WETLAND DETERMINATION DATA FORM – Alaska Region

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Project/Site:Grant Lake Borough/City:	MANSE POISS Sampling Data 7-25-13
Applicant/Owner: Kewey Hydro	Sampling Date: DD 2/2 AD 82
Investigator(s): C.Schwdul J. Blank Landform (hills)	the terrace hummonic eta is to its the its of a monor
Local relief (concave, convex, none): NoNe Slope (%):	law ease
Subregion:	449
Soil Map Unit Name: DP3X: 100. 4691.01	Datum; Datum;
Are climatic / hydrologic conditions on the site hydrologic for this time of year? Year	NWI classification: UPI9hec
Are Vegetation Soil or Hydrology closeling the detailed Att	_ No (If no, explain in Remarks.)
Are Vegetation, or Hydrology significantly disturbed 7 10	Are "Normal Circumstances" present? Yes XNo
SUMMARY OF FINDINGS - Attach site map showing sampling point	locations, transects, important features, etc.
Hydrophytic Vegetation Present? Yes X No	
Hydric Soil Present? Yes No X	ampled Area
Wetland Hydrology Present? Yes No X within a	Wetland? Yes No X
Remarks: The Armonald mith decline water have body	<u>photos 367-369 DP38</u>
photos 274 B is that same down the	PC PROPS 544 ~ 345 UP36
VEGETATION - Use scientific names of plants, List all apositor in the	or p1 38. 1415 data sheet is representative
Abaside Designation of plants. List all species in the	plot. For port charapoint weations.
<u>Tree Stratum</u>	cator Dominance lest worksheet:
1. Tsugar mertinsiana IS Y F	A That Are OBL, FACW, or FAC: 3 (A)
2. VICEA glauca 5 Y F	ACU Tatal Number of Devilent
3	Species Across All Strata: 4 (B)
4	Percent of Dominant Species
	That Are OBL, FACW, or FAC: 75 (A/B)
50% of total cover: <u>10</u> 20% of total cover: <u>10</u> 20% of total cover: <u>10</u>	Prevalence index worksheet:
1. TSUZA mertunsiana 30 y F	AC Total % Cover of: Multiply by:
2. Piced davice 10 FF	OBL species 1 x1 = -2
3. lodum duembers 10 FA	FACW species b $x_2 = 0$
4. Vaccinium Visanosm 13	AC FAC species $100 \times 3 = 300$
5. Empetrum rigum 30 Y FA	FACU species 1 x4 = 72
6. Arctostaphylos uran ursi 5	PV UPL species 5 $x_5 = 25$
Geocation Inidian 3 Fithal Cover: 103_	$\begin{array}{c} \text{Column Totals:} \underline{123} (A) \underline{397} (B) \end{array}$
50% of total cover: <u>51.5</u> 20% of total cover: <u>20</u>	$\frac{1}{2}$ Prevalence Index = B/A = 3.23
1 NAME	Hydrophytic Vegetation Indicators:
2.	── X Dominance Test is >50%
3.	Prevalence Index is ≤3.0
4	Morphological Adaptations' (Provide supporting
5	
6	Froblematic Hydrophytic Vegetation' (Explain)
7	¹ Indicators of hydric soil and wetland hydrology must
8	be present unless disturbed or problematic.
9	
10	
Total Cover:	
50% of total cover: 20% of total cover:	
Plot size (radius, or length x width) 20 Yael. % Bare Ground	– Vegetation 🗸
% Cover of Wetland Bryophytes Total Cover of Bryophytes (Where applicable)	Present? Yes No
Remarks:	

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		Redox Features			•	
ches) Color (moist)	%	Color (moist) % Type ¹	Loc ²	Texture	Remarks	1.11.00000000
)-6				MOSSY	roots organics	
0-7 2,54 8	12 50%	7,54R 2.5/3 50% C	M	silt	· · ·	<u>.</u>
7-110 1010 4				81/10	am	
	<u> </u>				· · · · · · · · · · · · · · · · · · ·	AUT
			B.	······································		
	<u> </u>	· · · · · · · · · · · · · · · · · · ·	<u></u>			
				noor		<u> </u>
a and a second sec	•					
pe: C=Concentration, D=D	epletion, RM=	Reduced Matrix, CS=Covered or Coated	Sand Gra	lns. ²Lo	cation: PL=Pore Lining, M=Mal	rix.
dric Soil Indicators:		Indicators for Problematic Hydric S	oils':			
Histosol or Histel (A1)		Alaska Color Change (TA4)*		Alaski	a Gleyed Without Hue of of Ke edving Laver	ader .
Histic Epipedon (A2)		Alaska Redox With 2.5Y Hue		Other	(Explain in Remarks)	
Thick Dark Surface (A12)					/	
Alaska Gleyed (A13)		³ One indicator of hydrophytic vegetation	on, one pi	rimary indica	tor of wetland hydrology,	
Alaska Redox (A14)		and an appropriate landscape posit	ion must l	be present u	nless disturbed or problematic.	
Alaska Gleyed Pores (A1	5)	"Give details of color change in Rema	rks.			
strictive Layer (if present): nd					
estrictive Layer (if present Type: <u>NUVL</u> DU Depth (inches): marks:	" nd			Hydric Sol	l Present? Yes No	<u>X.</u>
estrictive Layer (if present Type: <u>Y()YL</u> Depth (inches): marks:	nd			Hydric Sol	l Present? Yes No	<u>X_</u> .
bstrictive Layer (if present Type: <u>4071</u> Depth (inches): marks: DROLOGY	nd			Hydric Sol	l Present? Yes <u>No</u>	<u>× </u>
bstrictive Layer (if present Type: <u>YUYL</u> Depth (inches): marks: DROLOGY etiand Hydrology Indicato	nd nd rs:			Hydric Sol	I Present? Yes No	<u>X</u>
Depth (inches):	rs: dicator is suffi			Hydric Sol	Present? Yes <u>No</u> No ndicators (2 or more required) tained Leaves (B9)	<u>× </u>
bstrictive Layer (if present Type: <u>YI)YI</u> Depth (inches): marks: DROLOGY etland Hydrology Indicato imary Indicators (any one in Surface Water (A1)	rs: dicator is suffi	cient) Inundation Visible on Aerial Imagery (I	B7) (F8)	Hydric Sol Secondary I Water-s Drainag	I Present? Yes <u>No</u> ndicators (2 or more required) tained Leaves (B9) e Patterns (B10)	<u>×</u> .
Depth (inches): Depth (inches): marks: DROLOGY etland Hydrology Indicato imary Indicators (any one In	rs: dicator is suffi	cient) Inundation Visible on Aerial Imagery (I Sparsely Vegetated Concave Surface Marl Deposits (B15)	B7) (B8)	Hydric Sol Secondary I Water-s Drainag Oxidized Presend	I Present? Yes <u>No</u> ndicators (2 or more required) tained Leaves (B9) e Patterns (B10) d Rhizospheres along Living Ro e of Reduced Iron (C4)	 ots (C3)
Depth (inches): Depth (inches): marks: DROLOGY etland Hydrology Indicato imary Indicators (any one Ir Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1)	rs: dicator is suffi	cient) Inundation Visible on Aerial Imagery (I Sparsely Vegetated Concave Surface Mari Deposits (B15) Hydrogen Sulfide Odor (C1)	B7) (B8)	Hydric Sol Secondary I Water-s Drainag Oxidized Presenc Salt De	Present? Yes <u>No</u> ndicators (2 or more required) tained Leaves (B9) e Patterns (B10) d Rhizospheres along Living Ro œ of Reduced Iron (C4) posits (C5)	
bstrictive Layer (if present Type: Y(Y) Depth (inches): Dip pmarks: Dip bmarks: Dip	rs: dicator is suffi	cient) Inundation Visible on Aerial Imagery (I Sparsely Vegetated Concave Surface Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2)	B7) (B8)	Hydric Sol Secondary I Water-s Drainag Oxidized Salt Dej Salt Dej Stunted	I Present? Yes No ndicators (2 or more required) tained Leaves (B9) e Patterns (B10) d Rhizospheres along Living Ro æ of Reduced Iron (C4) posits (C5) or Stressed Plants (D1)	
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batrictive Layer (if present Type:	rs: dicator is suffi	cient) Inundation Visible on Aerial Imagery (I Sparsely Vegetated Concave Surface Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Other (Explain in Remarks)	B7) (B8)	Secondary II Water-s Drainag Oxidized Presence Salt Deg Stunted Geomor Shallow	A Present? Yes <u>No</u> <u>ndicators (2 or more required)</u> tained Leaves (B9) e Patterns (B10) d Rhizospheres along Living Ro e of Reduced Iron (C4) posits (C5) or Stressed Plants (D1) rphic Position (D2) Aquitard (D3) pographic Relief (D4)	
strictive Layer (if present Type: <u>N()/()</u> Depth (inches): <u>)</u> marks: DROLOGY etland Hydrology Indicato imary Indicators (any one In 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 Sail Cracks (B6)	rs: dicator is suffi	cient) Inundation Visible on Aerial Imagery (I Sparsely Vegetated Concave Surface Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Other (Explain in Remarks)	B7) (B8)	Secondary II Water-s Drainag Oxidized Salt Dej Salt Dej Stunted Geomor Shallow Microtoj FAC-Ne	A Present? Yes No hdicators (2 or more required) tained Leaves (B9) e Patterns (B10) d Rhizospheres along Living Ro æ of Reduced Iron (C4) posits (C5) or Stressed Plants (D1) rphic Position (D2) Aquitard (D3) pographic Relief (D4) putral Test (D5)	
berrictive Layer (if present Type:	rs: dicator is suffi	cient) Inundation Visible on Aerial Imagery (I Sparsely Vegetated Concave Surface Mari Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Other (Explain in Remarks)	B7) (B8)	Secondary I Water-s Drainag Oxidized Presence Salt Dep Stunted Geomor Shallow Microtop FAC-Nee	Present? Yes No ndicators (2 or more required) tained Leaves (B9) e Patterns (B10) d Rhizospheres along Living Ro æ of Reduced Iron (C4) posits (C5) or Stressed Plants (D1) phic Position (D2) Aquitard (D3) pographic Relief (D4) sutral Test (D5)	ots (C3)
batrictive Layer (if present Type: <u>Y()Y()</u> Depth (inches): marks:	rs: dicator is suffi	cient) Inundation Visible on Aerial Imagery (I Sparsely Vegetated Concave Surface Mari Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Other (Explain in Remarks) No X Depth (inches):	B7) (B8)	Hydric Sol Secondary II Water-s Drainag Oxidized Presenc Salt Deg Stunted Geomot Shallow Hicroto FAC-Ne	Present? Yes <u>No</u> <u>ndicators (2 or more required)</u> tained Leaves (B9) e Patterns (B10) d Rhizospheres along Living Ro e of Reduced Iron (C4) posits (C5) or Stressed Plants (D1) rphic Position (D2) Aquitard (D3) pographic Relief (D4) mutral Test (D5)	×
batrictive Layer (if present Type: <u>YIJYL</u> Depth (inches): marks: DROLOGY etland Hydrology Indicato imary Indicators (any one in 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) eld Observations: urface Water Present? ater Table Present?	Yes	<u>cient)</u> Inundation Visible on Aerial Imagery (I Sparsely Vegetated Concave Surface Marl Deposits (B15) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Other (Explain in Remarks) No X Depth (inches):	B7) (B8)	Hydric Sol Secondary I Water-s Drainag Oxidized Presence Salt Deg Salt Deg Salt Deg Shallow Microtog FAC-Ne	I Present? Yes <u>No</u> ndicators (2 or more required) tained Leaves (B9) e Patterns (B10) d Rhizospheres along Living Ro æ of Reduced Iron (C4) bosits (C5) or Stressed Plants (D1) phic Position (D2) Aquitard (D3) bographic Relief (D4) sutral Test (D5)	 ots (C3)
betrictive Layer (if present Type: <u>Y(Y)()</u> Depth (inches): marks: DROLOGY etiand Hydrology Indicato imary Indicators (any one in 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) eld Observations: arface Water Present? aturation Present?	Yes Yes	cient)	B7) (B8)	Hydric Sol Secondary II Water-s Drainag Oxidizer Presence Salt Dep Stunted Geomor Shallow Microtop FAC-Ne	Present? Yes No ndicators (2 or more required) tained Leaves (B9) e Patterns (B10) d Rhizospheres along Living Ro se of Reduced Iron (C4) bosits (C5) or Stressed Plants (D1) phic Position (D2) Aquitard (D3) bographic Relief (D4) sutral Test (D5) gy Present? Yes No	X
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Depth (inches): Depth (inches): marks: DROLOGY ettand Hydrology Indicato imary Indicators (any one In 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 Water Present? auration Present? <tr< td=""><td>Yes Yes Yes Yes Yes</td><td>Sient) </td><td>B7) (B8) Wetla ections),</td><td>Hydric Sol Secondary II Water-s Drainag Oxidized Presend Salt Deg Salt Deg Salt Deg Shallow Microto FAC-Ne and Hydroio</td><td>Present? Yes No hdicators (2 or more required) tained Leaves (B9) e Patterns (B10) d Rhizospheres along Living Ro the of Reduced Iron (C4) bosits (C5) or Stressed Plants (D1) phic Position (D2) Aquitard (D3) bographic Relief (D4) sutral Test (D5) gy Present? Yes No</td><td><u>×</u></td></tr<>	Yes Yes Yes Yes Yes	Sient)	B7) (B8) Wetla ections),	Hydric Sol Secondary II Water-s Drainag Oxidized Presend Salt Deg Salt Deg Salt Deg Shallow Microto FAC-Ne and Hydroio	Present? Yes No hdicators (2 or more required) tained Leaves (B9) e Patterns (B10) d Rhizospheres along Living Ro the of Reduced Iron (C4) bosits (C5) or Stressed Plants (D1) phic Position (D2) Aquitard (D3) bographic Relief (D4) sutral Test (D5) gy Present? Yes No	<u>×</u>

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WETLAND DETERMINATION DATA FORM - Alaska Region

Project/Site:Grant Lake	Borough/City: M	MSP. Pass Sampling Date: 7-25-13
Applicant/Owner: Keney Hydro		Sampling Point: DP37
Investigator(s): <u>C'Schudul</u> J. Blank	Landform (hillside, te	rrace, hummocks, etc.); SWale
Local relief (concave, convex, none):	Slope (%):	
Subregion: Lat:	159557 La	ong: -149.337486 Datum:
Soil Map Unit Name:		NWI classification: PI=04B/PEMIP
Are climatic / hydrologic conditions on the site typical for this time of ye	ear? Yes <u>X</u> No	. (If no, explain in Remarks.)
Are Vegetation, Soil, or Hydrology significantly	/ disturbed? 🙌 Are	"Normal Circumstances" present? Yes X No
Are Vegetation, Soil, or Hydrology naturally pr	oblematic? Nა (If r	needed, explain any answers in Remarks.)
SUMMARY OF FINDINGS - Attach site map showing s	ampling point loca	tions, transects, important features, etc.
Hydrophytic Vegetation Present? Yes 🗙 No		
Hydric Soll Present? Yes X No	Is the Sample	d Area
Wetland Hydrology Present? Yes X No	within a wetla	and? Yes <u>No</u>
Remarks: manginal Forested watund,	n moist dr	as made the this 362 - 366
Same weation as HDR'S 2010	12+ #10.	510103 302 300
VEGETATION - Use scientific names of plants. List all	species in the plot	· · · · · · · · · · · · · · · · · · ·
Absolute	Dominant Indicator	Dominance Test worksheet:
1 Tsim & haustansiscond 75	<u>C Species?</u> <u>Status</u>	Number of Dominant Species
2	- I FAC	That Are OBL, FACW, or FAC: (A)
3.		Total Number of Dominant
4		Species Across All Strata: (B)
، Total Cover: <u>مج</u> اح	e	Percent of Dominant Species
50% of total cover: 37.5 20%	of total cover: <u>IS</u>	Prevalence index worksheet
Sapling/Shrub Stratum		Total % Cover of Multiply by
2 Million adult 10	Y FAC	OBL species 0 $x_1 = 0$
3		FACW species 30 x 2 = 40
4.	· · · · · · · · · · · · · · · · · · ·	FAC species $\underline{95}$ $x_3 = \underline{285}$
5	- <u> </u>	FACU species <u>23</u> x 4 = <u>92</u>
6,		UPL species \underline{O} $x5 = \underline{O}$
Total Cover: 15		Column Totals: $\underline{143}$ (A) $\underline{43}$ (B)
50% of total cover: <u>7.5</u> 20% o	f total cover: <u>3</u>	Prevalence Index = $B/A = -2.95$
1 Bubus chamer mars 30	Y FARM	Hydrophytic Vegetation Indicators:
2 Streations analyzifiling 3		Dominance Test is ≻50%
3. Oplopanax horridus	FACU	Yervalence Index is ≤3.0
4. Jacom Vaceinium wigenwarts	FAU	Morphological Adaptations ¹ (Provide supporting
5. Cornus canadinsis 10	FACU	Problematic Hydrophytic Vegetation ¹ (Evolution)
6. Lycopodium clavatum 5	FACY	
7		¹ Indicators of hydric soil and wetland hydrology must
8		be present unless disturbed or problematic.
9	; 	
10		
Total Cover: <u>b</u> b		
Plot size (radius or length x width) 20' radi	ritotal cover: <u>II · W</u>	Hydrophytic
% Cover of Wetland Bryophytes Total Cover of Bryop (Where applicable)	phytes 90	Vegetation Present? Yes <u>X</u> No
Remarks:	t.	1
·		

SOIL								Sampling Point: <u>DP 37</u>
Profile Desc	ription: (Describe t	o the dept	h needed to docu	ment the li	ndicator	or confirm	n the absence of inc	licators.)
Depth	Matrix		Redo	ox Features				
(inches)	Color (moist)	<u>%</u> .	Color (moist)	%	<u>Type</u>	<u> </u>	Texture	Remarks
0-3							Mass-live	organics
3-9	2.54 413	50%,	10122/1	<u>50%</u>		M	silt +r	oo tš
9-16	104P2/1	100			<u>.</u>		(damp) <u>Sil</u>	t + noots
		. <u> </u>			<u></u>	. <u> </u>	·	
				<u> </u>		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
		· · · ·	·		<u> </u>			
		<u> </u>						
Type: C=Co	ncentration, D=Depl	etion, RM≓	Reduced Matrix, C	S=Covered	or Coate	d Sand G	rains. ² Location:	PL=Pore Lining, M=Matrix.
Hydric Soil I	ndicators:		Indicators for	Problemat	ic Hydric	Soils ³ :		
Histosol	or Histel (A1)		Alaska Col	or Change	(TA4) ⁴		Alaska Gley	ed Without Hue 5Y or Redder
Histic Ep	ipedon (A2)		Alaska Alp	ine Swates	(TA5)		Underlying	j Layer
Hydroge	n Sulfide (A4)		Alaska Red	dox With 2.	5Y Hue		Other (Expla	ain in Remarks)
Thick Da	rk Surface (A12)							
Alaska G	Sleyed (A13)		³ One indicator	of hydrophy	lic veget/	ation, one	primary Indicator of v	vetland hydrology,
Alaska F	Redox (A14)		and an appro	priate land	iscape po	sition mu	st be present unless d	listurbed or problematic.
Alaska G	lieyed Pores (A15)		⁴ Give details of	color chan	ge in Rer	narks.		
Restrictive L	ayer (if present):							way
Type:	None four	d						
Depth (inc	ches):						Hydric Soil Pres	ent? Yes <u>X</u> No
Remarks: ≯ HD	R'S Point	110	at this s	iame	locati	0N 8	howed we	Her soils.
we	are being	<i>୯୶</i> ୦୫୫	rvative 4	con sid	derin	3 th	is a wetla	and as well

HYDROLOGY

1.00

Wetland Hydrology Indicators:	Secondary Indicators (2 or more required)
Primary Indicators (any one indicator is sufficient)	Water-stained Leaves (B9)
	 Drainage Patterns (B10) Oxidized Rhizospheres 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)
Surface Soil Cracks (B6)	FAC-Neutral Test (D5)
Field Observations:	
Surface Water Present? Yes <u>No X</u> Depth (inches):	
Water Table Present? Yes <u>No X</u> Depth (inches):	¥.,
Saturation Present? Yes <u>No X</u> Depth (Inches): <u>Vo</u> (includes capillary fringe)	Netland Hydrology Present? Yes <u>X</u> No
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspectio	ns), if available:
Remarks: HDR documented saturated condition	mar 1 - 2010

WETLAND DETERMINATION DATA FORM - Alaska Region

Projectisite Mant Greek Condex	Br	rough/Gity:	Mar	se Pars sampling Date: 7-25-13
Applicant/Owner: Yener Hydro	0.			Sampling Point: DP39
Investigatoris): C.Schudy, J. Righ	KI	andform (hillsid	le terra	ce hummocks etc): Drugam classings
Local relief (concave convex none); NUNL	<u>si</u>	one (%):	10, 10,10	
Subregion:	- Lan . 44	ara-1	Long	335031 Datum
Soli Man Unit Name:	460	2495	LONG	
Are alimatic / hydrologic conditions on the site typical for this				/// croy
Are Venetation Soil or Hydrology	ianifiantiu di	r res <u>, r</u>	_ 190	(if no, explain in Remarks.)
Are Vegetation, Soli, or Hydrology si	eturallu probl		Ale r	
	aturany probi	emaucr ree	(ir nee	eded, explain any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site map sh	owing sam	npling point	locatio	ons, transects, important features, etc.
Hydrophytic Vegetation Present? Yes X No	0	ls the Sa	mnfed	Area
Hydric Soll Present? Yes X No	o	within a V	Wetlan	d? Yes K No
Wetland Hydrology Present? Yes X No	o 0			
Remarks: pt truben along a runn	ring tr	toutan	W1 R	35B) Photos: 374-377
VEGETATION – Use scientific names of plants	Listallsn	ecies in the	nlot	· · · ·
		Dominant India	icator	Dominance Test worksheet
Tree Stratum	<u>% Cover</u>	Species? Sta	atus	Number of Dominant Species
1. None				That Are OBL, FACW, or FAC: (A)
2			[Total Number of Dominant
3	· <u> </u>			Species Across All Strata: 6 (B)
4				Percent of Dominant Species
FOW of total cover:	:			That Are OBL, FACW, or FAC: <u>100</u> (A/B)
Sapling/Shrub Stratum	20%011	otal cover;		Prevalence Index worksheet:
1. Salix pilchra	20	Y FA	TOW	Total % Cover of:Multiply by:
2. AINUS MINULIS	30	Y FA	tc .	UBL species $15 \times 1 = 15$
3. Salix barclay1	25		AC	FACW species 33 $x^2 = 70$
4. Picea gravia		FA	KU	FACIL species $1/2$ $x_4 = 4/2$
5	. <u> </u>		[UPL species $0 \times 5 = 0$
6		······································		Column Totals: 149 (A) 393 (B)
Total Cover:	: <u>-10</u>		2-	
50% of total cover:	20% of to	otal cover: 13		Prevalence index = $B/A = -\frac{2.64}{2}$
1. Sanguisurba camerelensis	15	Y FA	w	Hydrophytic Vegetation Indicators:
2. Equisetion fluviatile	韵15	Y OB	j.	Dominance Test is >50%
3. Atherium Gelix-Gemina	_3	FA		Prevalence index is \$3.0
4. Egulsetim anense	30	Y FA	<u>+0 </u>	data in Remarks or on a separate sheet)
5. Adrostis mertensu	_10	FA	w	Problematic Hydrophytic Vegetation ¹ (Explain)
6				
7			[Indicators of hydric soil and wetland hydrology must
8			ļ	
9		·		
10			İ	
l otal Cover;	<u> 75</u>		,	
50% of total cover: <u>56, 5</u>	20% of to	ארו בערבי באריים אוריים אוריים אוריים אורים אורים אורים אורים אורים אורים אורים אורים אורים אורים אורים אורים א הערבים אורים אורים אורים אורים אורים אורים אורים אורים אורים אורים אורים אורים אורים אורים אורים אורים אורים אורי	ain	Hydrophytic
Cover of Welland Bright & Willing Total Cov	_ 70 Date Gr	vies 10	Hiv	Vegetation Present? Yes X No
(Where applicable)		,		
Remarks:	•			

Sampling Point: DP39

Profile Desc	ription: (Descri	be to the dept	h needed to docu	iment the in	idicator c	or confirm	n the absence	of indicators.)
Depth (inches)	Matrix	······································	Red	ox Features %	Type ¹	1 oc ²	Texture	Bemarks
					1100			
·	· · · · · · · · · · · · · · · · · · ·				· ·	<u></u>		
	NO PI	f						· · ·
	GIA. IN		. (L	· · · · · · · · · · · · · · · · · · ·
	TIOW	<u>noz ne</u>	Her in	PIOT.				
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	<u>k</u>		aa.					
								The Version of the Additional Addit
							······	
·				<u> </u>	·····	·		
¹ Type: C=C	oncentration, D=D	epletion, RM=	Reduced Matrix, C	S=Covered	or Coated	d Sand G	rains. ² Loc	alion: PL=Pore Lining, M=Matrix.
Hydric Soil	Indicators:		Indicators for	Problemati	c Hydric	Solls ³ :		
Histosol	or Histel (A1)		Alaska Co	lor Change ((TA4) ⁴		Alaska	Gleyed Without Hue 5Y or Redder
Histic Ep	pipedon (A2)		Alaska Alp	ine Swales	(TA5)		Unde	erlying Layer
Hydroge	n Sulfide (A4)		Alaska Re	dox With 2.5	Y Hue		Other ((Explain in Remarks)
Thick Da	ark Surface (A12)							
Alaska C	Sleyed (A13)		³ One indicator	of hydrophyl	tic vegeta	tion, one	primary indicate	or of wetland hydrology,
Alaska F	Redox (A14)		and an appr	opriate lands	scape pos	ition mus	st be present un	less disturbed or problematic.
Alaska C	Sleyed Pores (A1	5)	*Give details of	color chang	je in Rem	arks.		
Restrictive t	_ayer (if present)	:						
Туре:								
Depth (ind	ches):						Hydric Soll	Present? Yes X_ No
Remarks:								······································
L							•	
HYDROLO	GY							
Wetland Hye	trology Indicato	's:					Secondary Inc	dicators (2 or more required)
Primary Indic	ators (any one in	dicator is suffic	ient)	-			Water-sta	ained Leaves (B9)
Surface	Water (A1)		_ Inundation Visit	ole on Aerial	Imagery -	(B7)	Drainage	Patterns (B10)
High Wa	ter Table (A2)	_	_ Sparsely Veget	ated Concav	ve Surface	e (88)	Oxidized	Rhizospheres along Living Roots (C3)
🔀 Saturatio	on (A3)		_ Marl Deposits (B15)			Presence	of Reduced Iron (C4)
Water M	arks (B1)		_ Hydrogen Sulfic	le Odor (C1))		Salt Depo	osits (C5)
Sedimer	t Deposits (B2)		_ Dry-Season Wa	iter Table (C	;2)		Stunted o	r Stressed Plants (D1)
Drift Dep	osits (B3)		Other (Explain	n Remarks)			Geomorp	hic Position (D2)
Algal Ma	t or Crust (B4)						Shallow A	Aquitard (D3)
Iron Dep	osits (B5)						Microtopo	ographic Relief (D4)
Surface	Soil Cracks (B6)						FAC-Neu	tral Test (D5)
Field Observ	vations:							
Surface Wate	er Present?	Yes X N	lo Depth (ii	1ches):()	_		
Water Table	Present?	Yes_K_N	o Depth (ii	iches): C)			
Saturation Pr	esent?	Yes X N	lo · Depth (ir	nches):)	Wetl	and Hydrology	Present? Yes 🗡 No
(includes cap	illary fringe)					-		
Describe Red	corded Data (strea	im gauge, mor	nitoring well, aerial	photos, pre	vious insp	pections),	if available:	
,								•
Remarks:		· · · · · · · · · · · · · · · · · · ·						· ·
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WETLAND DETERMINATION DATA FORM - Alaska Region

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Project/Site: Grant Lake	Bor	ough/City	r: Moose	-PassSampling Date: 7-28-13
Applicant/Owner: Keney Hydro				Sampling Point: DP40
Investigator(s): CiSchudel J. Blank	Lar	ndform (hi	illside, terra	ce, hummocks, etc.): hullside
Local relief (concave, convex, none): Nove	Slo	pe (%):	3	
Subregion:	60.440	442	Long	:
Soil Map Unit Name:	,			NWI classification: Upland
Are climatic / hydrologic conditions on the site typical for this to	ime of year?	Yes 🚬	∠ No	(If no, explain in Remarks.)
Are Vegetation Soil, or Hydrology sig	nificantly dis	turbed?	N≎ Are "∖	Normal Circumstances" present? Yes X No
Are Vegetation, Soil, or Hydrology nat	urally proble	matic? N	J∂ (If nee	eded, explain any answers in Remarks.)
SUMMARY OF FINDINGS - Attach site map sho	wing sam	pling po	int locatio	ons, transects, important features, etc.
Hydrophytic Vegetation Present? Yes X No Hydric Soil Present? Yes No	×	is the	e Sampled n a Wetlan	Area d2 Yes No X
Wetland Hydrology Present? Yes No	<u>×</u>	main	n a wonan	
Remarks: (photos 378-379
VEGETATION – Use scientific names of plants.	List all spe	ecies in	the plot.	
Trace Charles	Absolute D	ominant	Indicator Status	Dominance Test worksheet:
1 TSUDA MIXTENSIANA	40	Y	FAC	Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A)
2	<u>`</u>			Total Number of Dominant
3		.		Species Across All Strata: <u>5</u> (6)
4 Total Cover;	40		~	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>40</u> (A/B)
50% of total cover: 20	_ 20% of to	otal cover	·· <u> </u>	Prevalence Index worksheet:
Sapling/Shrub Stratum	10	Y	FAL.	Total % Cover of: Multiply by:
2 Man Zesia Gerainan	30 -	Ý	FACU	OBL species x1 = _O
3 PICE AANCA	2		FACU	FACW species 5 $x_2 = 10$
4				FAC species $\frac{100}{12}$ x3 = $\frac{101}{2100}$
5.				FACU species $02 \times 4 = 243$
6				$\begin{array}{c c} UPL \text{ species} & \underline{V} & \chi \text{ 5} = \underline{V} \\ Optimer \text{ Tables} & \chi \text{ 3} \end{array} $
Total Cover:	42			Column rotals: 1.50 (A) $-\frac{74}{74}$ (B)
50% of total cover: 21	_ 20% of to	tal cover:	8,4	Prevalence Index = B/A = <u>3.44</u>
Herb Stratum	10	N.	EAC.	Hydrophytic Vegetation Indicators:
1. Egois Nove Structure	-15	+	FACIN	X Dominance Test is >50%
2. OFTO POUS CONTRACTIONS	70	N	FACU	Prevalence Index is ≤3.0
A CALOUS COMO ALIASIS	5		FACU	Morphological Adaptations ¹ (Provide supporting
5 Ribes trister (Auron t)	3	·	FAC	Problematic Hydrophytic Vegetation ¹ (Explain)
6 MODDIUM MANAL	<		FALV	
7.				¹ Indicators of hydric soil and wetland hydrology must
8.				be present unless disturbed or problematic.
9				•
10	·			
Total Cover:	48	•	<u>.</u>	
50% of total cover: <u>24</u>	_ 20% of to	otal cover	<u>: 9.4</u>	Hydrophytic
Plot size (radius, or length x width) 20' Y 0.0'.	% Bare Gr	ound		Vegetation
% Cover of Wetland Bryophytes Total Cov (Where applicable)	er of Bryoph	ytes	<u></u>	Present? Yes <u>A</u> No
Remarks:				

...

SOIL								Sampling Po	int:D/24と	
Profile Desci	ription: (Describe to	the depth	needed to docun	nent the	Indicator o	r confirm	n the absence of	indicators.)		
Depth	Matrix		Redo	x Feature	S					
(inches)	<u>Color (moist)</u>	%	Color (moist)	%	Type'	Loc ²	<u> </u>	Remark	(<u>s</u>	
B. B. M. M. M. B. L. M. M. M. M. M. M. M. M. M. M. M. M. M.										
	No pit								** <u>***********************************</u>	
	the much	- day	infall 4	10	1010 101	lan		to dia sa	Int	
	<u>NU 11/020</u>	200	ophene v		- part	<u>11</u>	<u>ge 10015</u>	- NOLIG ON		
				·	· •					
····			•		• •					
Aurolina and 1000				•	· · ·		h			
					·					
¹ Type: C=Co	ncentration, D=Deple	tion, RM=F	educed Matrix, CS	=Covere	d or Coated	Sand Gr	ains. ² Locatio	on: PL=Pore Lining	, M=Matrix.	
Hydric Soll II	ndicators:		Indicators for P	robiema	tic Hydric S	Soils ³ :		v		
Histosol d	or Histel (A1)		Alaska Colo	r Change	(TA4) ⁴		Alaska Gi	eyed Without Hue 5	Y or Redder	
Histic Epi	ipedon (A2)		Alaska Alpir	e Swales	s (TA5)		Underlying Layer			
Hydroger	n Sulfide (A4)		Alaska Redu	ox With 2	.5Y Hue		Other (Explain in Remarks)			
Thick Date	rk Surface (A12)									
Alaska G	leyed (A13)		³ One indicator of	f hydroph	ytic vegetat	ion, one p	primary indicator o	of wetland hydrology	4	
Alaska Ri	edox (A14)		and an approp	priate land	dscape posi	tion must	t be present unles	s disturbed or probl	ematic,	
Alaska G	leyed Pores (A15)		*Give details of c	olor char	nge in Rema	arks.				
Restrictive L	ayer (if present):									
Type:	n						*		· .	
Depth (incl	hes):						Hydric Soil Pre	esent? Yes	_ No <u>×</u>	
Remarks: D	ny uplane	1 con	nditions	511	nilar	10	previon.	shy down	mentril	
L	pland.	Saw	phe los	at	1.57/14	Arres		1 10 000 - 10.		
-	Soul Renad	Lit- n	ν Λ., <i>μ</i> λ			7753	SULVICIO		loric	

HYDROLOGY

Wetland Hydrology Indicators:	Secondary indicators (2 or more required)
Primary Indicators (any one Indicator is sufficient)	Water-stained Leaves (B9)
Surface Water (A1) Inundation Visible on A High Water Table (A2) Sparsely Vegetated Co Saturation (A3) Marl Deposits (B15) Water Marks (B1) Hydrogen Sulfide Odor Sediment Deposits (B2) Dry-Season Water Tab Drift Deposits (B3) Other (Explain in Remained Algat Mat or Crust (B4) Iron Deposits (B5) Surface Soil Cracks (B6) Surface Soil Cracks (B6)	
Field Observations:	
Surface Water Present? Yes NoX_ Depth (inches): Water Table Present? Yes NoX_ Depth (inches):	
Saturation Present? Yes <u>No X</u> Depth (inches): (includes capillary fringe)	Wetland Hydrology Present? Yes No
Describe Recorded Data (stream gauge, monitoring well, aerial photos	, previous inspections), if available:
Remarks:	

WETLAND DETERMINATION DATA FORM - Alaska Region

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Project/site: Grant Lake	Bo	prough/City: Moi	DSC Pass Sampling Date: 7-25-13
Applicant/Owner Kenai Hydro		· · ·	Sampling Point: <u>DP4</u>
Investigator(s): C. Schudel J. Blank	. La	andform (hillside, te	rrace, hummocks, etc.): lalle edge
local relief (concave, convex, none): N(ML	s	ope (%): Z	· (Douthe)
Subregion: Lat: Le	0.40	20590 L	ong:
Soll Man Unit Name			NWI classification: Upland
Are climatic / hydrologic conditions on the site typical for this time	of vear	?Yes 🗙 No	(If no, explain in Remarks.)
Are Vegetation Soll or Hydrology signific	cantiv di	sturbed? No Are	e "Normal Circumstances" present? Yes No
Are Vegetation, Coll, or Hydrology atural	llv orobi	lematic? N (If	needed, explain any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site map showir	ng san	npling point loca	ations, transects, important features, etc.
Hydrophytic Vegetation Present? Yes <u>X</u> No	<u></u>	is the Sample	ed Area
Hydric Soil Present? Yes No	<u>~</u>	within a Wetl	land? Yes No X
Wetland Hydrology Present? Yes No			
Remarks: Lahe edge on Sonth Sic	de i	of Lake	
VEGETATION – Use scientific names of plants. Lis	t all sp	pecies in the plo	ot.
Abs Trop Stratum	solute Cover	Dominant Indicato Species? Status	f Dominance Test Worksneet:
			That Are OBL, FACW, or FAC: (A)
2			Total Number of Dominant
3,			Species Across All Strata: (6) (B)
4			Percent of Dominant Species
Total Cover:			That Are OBL, FACW, or FAC: <u>SD</u> (AVB)
50% of total cover.	20% of	total cover:	- Prevalence Index worksheet:
Sapling/Shrub Stratum	<	V FACE	Total % Cover of: Multiply by:
1. EUDIS (dale)		Y FAL	OBL species x1 =
2 Disa, accularis	ζ	T FAU	\overline{J} FACW species $\underline{12}$ $x^2 = \underline{24}$
			FAC species \underline{SS} $x_3 = \underline{10S}$
			FACU species 46 × 4 = 184
6.			$= UPL species \underline{5} \times 5 = \underline{43}$
Total Cover:	3		Column Totals: $\underline{112}$ (A) $\underline{370}$ (D)
50% of total cover: <u>6.5</u>	20% of	total cover: <u>2.6</u>	Prevalence Index = $B/A = 3.87$
Herb Stratum	h	FAC	Hydrophytic Vegetation Indicators:
1. Chamerion angustions (2	<u></u>	$\frac{1}{1}$ \times Dominance Test is >50%
2. Achilla Harphana	215	Y KAL	Similar Prevalence Index is ≤3.0
3. Appanton prideritions 10	0	FACU	Morphological Adaptations' (Provide supporting
E Fange tum anavse	5	Y FAC	
5 Horaduum noo Ximum K	2	Fre	
2 Aconstra dilphiniliplium	5	FAC	¹ Indicators of hydric soil and wetland hydrology must
a Galum trifidum	2	TACU	be present unless disturbed or problematic.
9. Aquilegia Grmosa	\$5_	FAC	
10. Calamagnostis avadensis	30	_ Y FAC	<u>,</u>
U Total Cover:	105		
50% of total cover: <u>52.5</u>	20% of	total cover: 21	
Plot size (radius, or length x width) 20' rad %	b Bare G	Ground <u>D</u>	- Vegetation
% Cover of Wetland Bryophytes Total Cover of (Where applicable)	of Bryop	hytes <u>2-0</u>	_ Present? Yes <u>A</u> No
Remarks:	н .		
* KRISHNY conditions = upland	a, b	ut potent	W Public mation and of This
communtory to meet were	γιςι (unununs	The work of the second state

larly growing season when lake levels are hyper. The sample pit US Army Corps of Engineers is ~3 ft (vertical) above current H20 live, Wave Alaska Version 2.0 eire is ~2 vertical ft. above the live, Duy pit to 20" bys-moist but not wel. SOIL

nint:	DPU	I

SOIL					Sampling Point: <u>DP41</u>
Profile Description: (Descr	ibe to the depth ne	eded to docum	ent the Indicator or	confirm	n the absence of indicators.)
Depth <u>Matr</u>	ix	Redox	Features		
(inches) Color (moist	<u>) % C</u>	olor (moist)	<u>% Type1</u>	Loc ²	Texture Remarks
0=50-1					organics mass & nots
35-1-6	remensional (···		organics
6-20					fine lakeshore gravels
·		-		<u></u>	0
·					
		· · · · · · · · · · · · · · · · · · ·			· · · · · · · · · · · · · · · · · · ·
¹ Type: C=Concentration, D=	Depletion, RM=Red	uced Matrix, CS=	Covered or Coated	Sand Gr	rains. ² Location: PL=Pore Lining, M=Matrix.
Hydric Soll Indicators:	11	ndicators for Pr	oblematic Hydric S	oils":	• .
Histosol or Histel (A1)	-	_ Alaska Color	Change (TA4)⁴		Alaska Gleyed Without Hue 5Y or Redder
Histic Epipedon (A2)	-	_ Alaska Alpine	Swales (TA5)		Underlying Layer
Hydrogen Suilide (A4) Thick Dark Surface (A12)	ب	_ Alaska Redo	With 2.5Y Hue		Other (Explain in Remarks)
Alaska Gleyed (A13)	, a,	One indicator of I	nydrophytic vegetatio	on, one r	primary indicator of wetland hydrotogy
Alaska Redox (A14)		and an appropr	iate landscape posit	on must	t be present unless disturbed or problematic.
Alaska Gleyed Pores (A1	(5) ⁴ (Give details of co	lor change in Rema	ks.	
Restrictive Layer (if presen	i): ,				
Type: None to	nd	-			
Depth (inches):					Hydric Soil Present? Yes No X
Remarks:					
					•
HYDROLOGY					
Wetland Hydrology Indicate	ors:				Secondary Indicators (2 or more required)
Primary Indicators (any one in	idicator is sufficient)				Water-stained Leaves (B9)
Surface Water (A1)	· In	undation Visible	on Aerial Imagery (E	17)	Drainage Patterns (B10)
High Water Table (A2)	SI	parsely Vegetate	d Concave Surface	(B8)	Oxidized Rhizospheres along Living Roots (C3)
Antor Marka (R1)	M	ari Deposits (B1) Dia (04)		Presence of Reduced Iron (C4)
Sediment Deposite (B2)	T	yarogen Suillae i Natar	Joor (C1)		Salt Deposits (C5)
Drift Denosits (B3)		ther (Evolution in F	Table (Cz)	•	Geomorphic Resilies (D1)
Algal Mat or Crust (B4)	_ `		emarksj		Shallow Aquitard (D3)
iron Deposits (B5)					Microtopographic Belief (D4)
Surface Soll Cracks (B6)					FAC-Neutral Test (D5)
Field Observations:					
Surface Water Present?	Yes No	🖌 Depth (inch	es):		
Water Table Present?	 Yes No	L Depth (inch	es):		
Saturation Present?	Yes No	🔨 Depth (inch	es):	Wetla	and Hydrology Present? Yes No 🗶
Describe Recorded Data (stre	am gauge, monitorir	ng well, aerial ph	otos, previous inspe	tions), i	if available:
	· · ·	• · · · · · · · · · · · · · · · · · · ·	,	,	
Remarks:					
		•			

Kenia Hydro, LLC - Grant Lake Project

WETLAND FUNCTIONS DATA FORM

Alaska Regulatory Best Professional Judgement Characterization Adapted from Regulatory Guidance Letter 09-01

Wetland ID:	DPOL	
Trougha iba		

Date: 7-16-13

Wetland Type: PEMI/SSIC

Investigators: J. Blank + C. Schudel

A. Flood Flow Alteration	Likely or not likely to Provide
(Storage and Desynchronization)	(Y or N)
 Storage and Desynchronization) Wetland occurs in the upper portion of its watershed. Wetland is relatively flat area and is capable of retaining higher volumes of water during storm events, than under normal rainfall events. Wetland is a closed (depressional) system. If flowthrough, wetland has constructed outlet with signs of fluctuating water levels, algal mats, and/or lodged debris. Wetland has dense woody vegetation. Wetland receives floodwater from an adjacent water course. Floodwater come as sheet flow rather than channel flow. 	$ \begin{array}{c} 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 7 \\ 1 \\ 6 \\ 7 \\ 1 \\ 1 \\ 7 \\ N \\ 5 \\ 7 \\ N \\ S \\ S \\ S \\ S \\ S \\ S \\ S \\ S \\ S \\ S$
	None - Low of No Punction
 B. Sediment Removal 1 Sources of excess sediment (from tillage, mining or construction) are present upgradient of the wetland 	Likely or not likely to Provide (Y or N) 1 <u>Y</u> 2 N
 Slow-moving water and/or a deepwater habitat are present in the wetland. 	3 <u>N</u> 4 <u>Y (porth</u> ons)
3 Dense herbaceous vegetation is present. 4 Inerspersion of vegegetation and water is high in wetland.	$6 \frac{N}{1}$
5 Ponding of water is high in wetland.	4.6 (X) - High Eurotion
6 Sediment deposits are present in weiland.	1-3 (Y) - Moderate Function ✓ None - Low or No Function
C. Nutrient and Toxicant Removal	Likely or not likely to Provide (Y or N)
 Sources of excess nutrients (fertilizers) and toxicants (pesticides and heavy metals) are present upgradient of the wetland. 	$\begin{array}{c}1\\2\end{array}$
2 Wetland is inundated or has indicators that flooding is a seasonal event during the growing season.	$\begin{array}{c} 3 \\ 4 \\ \underline{\gamma} \\ \underline$
3 Wetland provides long duration for water detention.	5
4 Wetland has at least 30% aerial cover of live dense herbaceous vegetation.	3-5 (Y) - High Function
5 Fine grained mineral or organic materials are present for the wetland.	1-2 (Y) - Moderate Function None - Low or No Function

NOTE: Base wetland function assessment on existing conditions, not future conditions.

Example Ranking: If ranking the capacity for a wetland to perform a given wetland function into high, moderate, low or none categories, use the following example as guidance. For Flood Flow Alteration, answering yes to five to seven attributes would rate the wetland as high functioning; answering yes to one to four attributes would rate the wetland as moderate; and not answering yes to any attributes would rate the wetland does not perform this function, it can be rated as none.

D.		Erosion Control and Shoreline Stabilization	Likely or not likely to Provide
		(if associated with a watercourse or shoreline)	(Y or N)
			(,
	1	Wetland has dense, energy absorbing vegetation bordering the water	1 <u>N</u>
		course and no evidence of erosion.	2 N
1	2	A herbaceous layer is part of this dense vegetation.	3 N
1	2	Troes and shruhs able to withstand erosive flood events are also part	
	0	Tibes and sindus able to withstand crostyce hood events are also part	
		of this dense vegetation.	2-3 (Y) - High Function
			1 (Y) - Moderate Function
			None Low or No Function 🗸
F		Production of Organic Matter and its Export	Likely or not likely to Provide
<u>ا ب</u>		Froduction of organic matter and the Export	
			(Y OF N)
	1	Wetland has at least 30% aerial cover of dense herbaceous	1 <u> </u>
		vegetation.	2 1
	2	Woody plants in welland are mostly deciduous.	3 <u>N</u>
	3	High degree of plant community structure, vegetation density, and	4
	Ű	an electric victor are even at	
		species nonness present.	$\frac{5}{4}$
	4	Interspersion of vegetation and water is high in wetland.	6** <u>Y</u>
	5	Wetland is inundated or has indicators that flooding is a seasonal	
		event during the growing season.	4-6 (Y) - High Function
	6	Wetland has outlet from which organic matter is flushed.**	1-3 (Y) - Moderate Function
	0	**If #6 is No, then wetland automatically rated as low or No function	Nono - 1 our or No Eurotion
	• •	If #0 is No, then we land automatically fated as low of No function	
F.		General Wildlife Habitat Suitability	Likely or not likely to Provide
			(Y or N)
	1	Wetland is not fragmented by development.	1 V
	2	Unland surround wetland is undeveloped	
	5	Watland has connectivity with other habitat types	
	3	Weitand has connectivity with other nabital types.	
	4	Divserity of plant species is high.	4 <u>N v</u>
	5	Wetland has more than one Cowardin Class (e.g. PFO, PSS, PEM)	5 <u>y y y</u>
	6	Has high degree of Corwardin Class interspersion	6 <u>N</u>
	7	Evidence of wildlife use (e.g. tracks, scat, gnawed stumps) present.	7 1
	Ċ		·····
			5.7 (V) High Eurotion
			5-7 (r) - High runction V
			1-4 (Y) - Moderate Function
			None - Low or No Function
G.		General Fish Habitat	Likely or not likely to Provide
		(Must he associated with a fish-hearing stream or lake)	(Yor N) o
		Inder be debediated init a new bearing enealth of failey	NA
		n National de la companya de la contrata de la companya de la companya de la companya de la companya de la company	
	1	wetland has perennial or intermittent surface-water connection to a	
		fish-bearing water body.	2
	2	Wetland has sufficient size and depth of open water so as not to	3
		freeze completely during winter.	4
	3	Observation of fish	5
	4	Harbanaous and/or woody vagatation is present in watland and/or	6
	4	Helbaceous and/or woody vegetation is present in weitand and/or	· · · · · · · · · · · · · · · · · · ·
		butter to provide cover, shade, and/or detrital matter.	
	5	Spawning areas are present (aquatic vegetation and/or gravel beds).	4-6 (Y) - High Function
	6	Juvenile rearing areas.	1-3 (Y) - Moderate Function
		-	None - Low or No Function
	<u> </u>	Native Plant Bichness	Likely or not likely to Provide
\mathbf{L}			
1			
ľ	1	Dominant and codominant plants are native.	
I	2	Wetland contains two or more Cowardin Classes.	2 <u>y</u>
	3	Wetland has three or more strata of vegetation.	3 N
	۵	Wetland has mature trees.	4 N
1	7		3.4 (V) - High Function
I			1 9 (V) Mederate Eurotion
I			1-2 (r) - Moderate Function V
		-	INone - Low or No Function

Date: 7-16-13

		Likely er net likely te Broyide
Ï.	Educational or Scientific Value	Likely of not likely to Provide
		(Y or N)
	1 Site has documented scientific or educational use.	1 <u>N</u>
	0 Wetland is in public ownership	2 1
		3 N
	3 Accessible trails available.	
		2-3 (Y) - High Function
		1 (Y) - Moderate Function
		None Low or No Eunction
		None - Low of Norranskon
J.	Uniqueness and Heritage	Likely or not likely to Provide
		(Y or N)
	1 Wetland contains documented occurrences of a state or federally	1** N
	listed threatened or endanged species **	2** N
	Isted integration desumented aritical habitat high quality	3 4 N
	2 Weitand contains documented critical nabital, high quality	
	ecosystems, or priority species respectively designated by the	+
	USFWS.**	
	3 Wetland has biological, geological, or other features that are	
i i	determined to be rare.	3-4 (Y) - High Function
	4 Wotland type is a bighly valuable wetland type of the State.**	1-2 (Y) - Moderate Function
•	**/(#1 #2, or #4 is Yes, then wetland is automatically rated as high	None (Low)or No Fonction
<u> </u>		Likely or not likely to Provide
К.	Groundwater interchange	(Y or N)
		1 11
	1 Presence of seeps or springs	
	2 Microreleif of wetland surface	2 <u>N</u>
	3 Surficial geologic deposits under wetland are permeable	3 <u>Y</u>
1	(e.g. alluvium)	
ļ	\ <i>a</i> . /	2-3 (Y) - High Function
		1 (Y) - Moderate Function √
	•	None - Low or No Function
1		

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Kenia Hydro, LLC - Grant Lake Project

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WETLAND FUNCTIONS DATA FORM

Alaska Regulatory Best Professional Judgement Characterization Adapted from Regulartory Guidance Letter 09-01

Wetland ID:	DP02	Date:	7-10	0-1	3	
Wetland Type	: PSSIE	Investig	gators:	J.	Blank	C. Schudel

	Flood Flow Alteration	Likely or not likely to Provide
A.	(Clorage and Deputy heritation)	(Y or N)
	(Storage and Desynchronization)	(,
	 Wetland occurs in the upper portion of its watershed. Wetland is relatively flat area and is capable of retaining higher volumes of water during storm events, than under normal rainfall events. Wetland is a closed (depressional) system. If flowthrough, wetland has constructed outlet with signs of fluctuating water levels, atgal mats, and/or lodged debris. Wetland has dense woody vegetation. Wetland receives floodwater from an adjacent water course. 	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
- í	r Floodwater come as sheet now rather than channel now.	None - Wower No Function
<u> </u>		Likely or not likely to Provide
В.	Sediment Removal	
	 Sources of excess sediment (from tillage, mining or construction) are present upgradient of the wetland. (タレルント イル) Slow-moving water and/or a deepwater habitat are present in the wetland. Dense herbaceous vegetation is present. Inerspersion of vegegetation and water is high in wetland. Ponding of water is high in wetland. Sediment deposits are present in wetland. 	$(Y \text{ or } N)$ $1 \qquad Y$ $2 \qquad N$ $3 \qquad N$ $4 \qquad Y$ $5 \qquad N$ $6 \qquad Y$ $4-6 (Y) - High Function$ $1-3 (Y) - Moderate Function$ None - Low or No Function
C.	Nutrient and Toxicant Removal	Likely or not likely to Provide
	 Sources of excess nutrients (fertilizers) and toxicants (pesticides and heavy metals) are present upgradient of the wetland. Wetland is inundated or has indicators that flooding is a seasonal event during the growing season. Wetland provides long duration for water detention. Wetland has at least 30% aerial cover of live dense herbaceous vegetation. Fine grained mineral or organic materials are present for the wetland. 	$(Y \text{ or } N)$ $1 \qquad N$ $2 \qquad \checkmark$ $3 \qquad N$ $4 \qquad N$ $5 \qquad \checkmark$ $3-5 (Y) - \text{High Function}$ $1-2 (Y) - \text{Moderate Function} \checkmark$ None - Low or No Function

NOTE: Base wetland function assessment on existing conditions, not future conditions.

Example Ranking: If ranking the capacity for a wetland to perform a given wetland function into high, moderate, low or none categories, use the following example as guidance. For Flood Flow Alteration, answering yes to five to seven attributes would rate the wetland as high functioning; answering yes to one to four attributes would rate the wetland as moderate; and not answering yes to any attributes would rate the wetland as low, or if evaluator is certain the wetland does not perform this function, it can be rated as none.

Date: <u>7-16-13</u>

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Wetland ID: <u>DP02</u>

D. Erosion Control and Shoreline Stabilization	Lifenius en peri literie te Deserte
(if associated with a watercourse or shoreling)	Likely of not likely to Provide
(" dooolated min't materioodise of shoreline)	(Y or N)
1 Wotland has done an every share the second state to be the	
a weitand has dense, energy absorbing vegetation bordering the water	
course and no evidence of erosion.	2 <u>N</u>
2 A nerbaceous layer is part of this dense vegetation.	3 44
3 Trees and shrubs able to withstand erosive flood events are also part	
of this dense vegetation.	2-3 (Y) - High Function
	1 (Y) - Moderate Eurotion
	None - Low or No Function, //
E. Production of Organic Matter and its Export	Likely or not likely to Dravide
	Likely of hot likely to Provide
1 Wetland has at least 30% aerial cover of dense horbosours	(Y OF N)
Venetation	
2 Wordy plants in watland are maatly desiduous	2 4
2 High degree of plant community structure transfellow due it	3 <u>N</u>
o high degree of plant community structure, vegetation density, and	4
species richness present.	5
4 Interspersion of vegetation and water is high in welland.	6** <u>y</u>
o wettand is inundated or has indicators that flooding is a seasonal	
event during the growing season.	4-6 (Y) - High Function 🗸
6 Wetland has outlet from which organic matter is flushed.**	1-3 (Y) - Moderate Function
**If #6 is No, then wetland automatically rated as low or No function	None - Low or No Function
F. General Wildlife Habitat Suitability	Likely or not likely to Provide
	(V or N)
1 Wetland is not fragmented by development.	
2 Upland surround wetland is undeveloped.	
3 Wetland has connectivity with other habitat types	
4 Divsenity of plant species is high	
5 Wetland has more than one Cowordin Class (a.g. PEO, DEM,)	
6 Has high degree of Converdin Class interpretion	5 <u>N</u>
7 Evidence of wildlife use (a g tracks cost ground strume) amount	6 <u>N</u>
/ Evidence of vitalito use (e.g. fracks, scat, grawed stumps) present.	
	5-7 (Y) - High Function
	1-4 (Y) - Moderate Function ✓
	None - Low or No Function
G. General Fish Habitat	Likely or not likely to Provide
(Must be associated with a fish-bearing stream or lake)	(YorN) ALA
	NA
 Wetland has perennial or intermittent surface-water connection to a 	1
fish-bearing water body.	2
2 Wetland has sufficient size and depth of open water so as not to	3
freeze completely during winter.	4
3 Observation of fish.	5
4 Herbaceous and/or woody vegetation is present in wetland and/or	6
buffer to provide cover, shade, and/or detrital matter.	·
5 Spawning areas are present (aquatic vegetation and/or gravel bods)	(G (V) Wigh Euroption
6 Juvenile rearing areas	4-0 (T) - Fligh Function
	1-3 (1) - Moderate Function
H Native Plant Pichness	Norre - Low or No Function
ин нийистанцийнорб	Likely or not likely to Provide
1 Deminent and codeminant structures at	(Y or N)
2 Wetherd eachdring two are notive.	1 <u>Y</u>
vveuand contains two or more Cowardin Classes, 0.100 July 11 July 11 July 12 July 1	2 <u>N</u>
3 vveuand has three or more strata of vegetation.	3 <u>N</u>
4 Wetland has mature trees.	4 N
	3-4 (Y) - High Function
	1-2 (Y) - Moderate Function V
	None - Low or No Function

Date: 7-16-13

	. Educational or Scientific Value	Likely or not likely to Provide
		(Y or N)
	 Site has documented scientific or educational use. 	1 <u>N</u>
	2 Wetland is in public ownership	2 1
	3 Accessible trails available.	3 <u>N</u>
		2-3 (Y) - High Function
		1 (Y) - Moderate Function V
	and a second statement of the second second second second second second second second second second second second	None - Low or No Function
	J. Uniqueness and Heritage	Likely or not likely to Provide
		(Y or N)
	1 Wetland contains documented occurrences of a state or federally	
r.	listed threatened or endanged species.**	2*** <u>N</u>
	2 Weltand contains documented critical habitat, high quality	
	ecosystems, or priority species respectively designated by the USEWS **	4 <u>N</u>
	3 Wetland has biological, geological, or other features that are	
	determined to be rare.	3-4 (Y) - High Function
	4 Wetland type is a highly valuable wetland type of the State.**	1-2 (Y) - Moderate Function
	**If #1,#2, or #4 is Yes, then wetland is automatically rated as high	None - (ow or No Ainction)
	K. Groundwater Interchange	Likely or not likely to Provide
		(Y or N)
	1 Presence of seeps or springs	1 <u>N</u>
	2 Microreleif of wetland surface	2 <u>N</u>
	3 Surficial geologic deposits under wetland are permeable	3
	(e.g. alluvium)	
		2-3 (Y) - High Function
		1 (Y) - Moderate Function V
		None - Low or No Function
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WETLAND FUNCTIONS DATA FORM

Alaska Regulatory Best Professional Judgement Characterization

Adapted from Regulartory Guidance Letter 09-01

Adapted from negativity database Ecitor	00 01
Wetland ID: DP03 PSSI EMILE Date: 7-16-13	3
Wetland Type: PENTTSSIE Investigators: J. B	lank + C. Schude(
A. Flood Flow Alteration (Storage and Desynchronization)	Likely or not likely to Provide (Y or N)
 Wetland occurs in the upper portion of its watershed. Wetland is relatively flat area and is capable of retaining higher volumes of water during storm events, than under normal rainfall events. Wetland is a closed (depressional) system. If flowthrough, wetland has constructed outlet with signs of fluctuating water levels, algal mats, and/or lodged debris. Wetland has dense woody vegetation. Wetland receives floodwater from an adjacent water course. Floodwater come as sheet flow rather than channel flow. 	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$
 B. Sediment Removal 1 Sources of excess sediment (from tillage, mining or construction) are present upgradient of the wetland. (gladal till) 2 Slow-moving water and/or a deepwater habitat are present in the wetland. 3 Dense herbaceous vegetation is present. 4 Inerspersion of vegegetation and water is high in wetland. 5 Ponding of water is high in wetland. 6 Sediment deposits are present in wetland. 	Likely or not likely to Provide (Y or N) 1 $-\frac{1}{2}$ 3 $-\frac{1}{2}$ 4 $-\frac{1}{N}$ 5 $-\frac{N}{6}$ 6 $-\frac{2}{2}$ 4-6 (Y) - High Function $\sqrt{1-3}$ (Y) - Moderate Function None - Low or No Function
 C. Nutrient and Toxicant Removal 1 Sources of excess nutrients (fertilizers) and toxicants (pesticides and heavy metals) are present upgradient of the wetland. 2 Wetland is inundated or has indicators that flooding is a seasonal event during the growing season. 3 Wetland provides long duration for water detention. 4 Wetland has at least 30% aerial cover of live dense herbaceous vegetation. 5 Fine grained mineral or organic materials are present for the wetland. 	Likely or not likely to Provide (Y or N) 1 2 3 4 5 3-5 (Y) - High Function ✓ 1-2 (Y) - Moderate Function None - Low or No Function

NOTE: Base wetland function assessment on existing conditions, not future conditions.

Example Ranking: If ranking the capacity for a wetland to perform a given wetland function into high, moderate, low or none categories, use the following example as guidance. For Flood Flow Alteration, answering yes to five to seven attributes would rate the wetland as high functioning; answering yes to one to four attributes would rate the wetland as moderate; and not answering yes to any attributes would rate the wetland as low, or if evaluator is certain the wetland does not perform this function, it can be rated as none.

:

Date: _______

D. Erosion Control and Shoreline Stabilization	Likely or not likely to Provide
(if associated with a watercourse or shoreline)	(Y or N)
1 Wetland has dense, energy absorbing vegetation bordering the water	1 1
course and no evidence of erosion.	
2 A herbaceous laver is part of this dense vedetation	
3 Trees and shrubs able to withstand erosive flood events are also part	
of this dense vegetetion	
or this dense vegetation.	2-3 (Y) - High Function V
	1 (Y) - Moderate Function
	None - Low or No Function
E. Production of Organic Matter and its Export	Likely or not likely to Provide
	(Y or N)
1 Wetland has at least 30% aerial cover of dense herbaceous	
vegetation.	2
2 Woody plants in wetland are mostly deciduous.	
3 High degree of plant community structure, vegetation density, and	
species richness present	
4 Interspersion of vegetation and water is high in wetland	
5 Wetland is injudeted or has indicators that floading is a second	
o we transit is munuated of has multators that nooding is a seasonal	
event during the growing season.	4-6 (Y) - High Function V
6 Wetland has outlet from which organic matter is flushed,**	1-3 (Y) - Moderate Function
**If #6 is No, then wetland automatically rated as low or No function	None - Low or No Function
F. General Wildlife Habitat Suitability	Likely or not likely to Provide
·	(Y or N)
 Wetland is not fragmented by development. 	
2 Upland surround wetland is undeveloped.	2 1
3. Wetland has connectivity with other habitat types.	
4 Divserity of plant species is high.	4 44
5 Wetland has more than one Cowardin Class (e.g. PEO, PSS, PEM,)	
6 Has high degree of Converdin Class interspersion	
7 Evidence of wildlife use (e.g. tracks east growed stumps) present	
7 Endence of wilding use (e.g. tracks, seat, grawed stumps) present.	
	5-7 (Y) - High Function V
	1-4 (Y) - Moderate Function
	None - Low or No Function
G. General Fish Habitat	Likely or not likely to Provide
(Must be associated with a lish-bearing stream or lake)	(YorN) NIA-
1 Wetland has perennial or informittent surface-water connection to a	1
fish-bearing water body.	2
2 Wetland has sufficient size and depth of open water so as not to	3
freeze completely during winter	۰ ۸
3 Observation of fish	5
A Herbanague and/or woody vagatation is present in walland and/or woody vagatation is present in walland and/or	
+ Horbaceous and/or woody vegetation is present in wettand and/or	D
builer to provide cover, snade, and/or detrital matter.	
o spawning areas are present (aquatic vegetation and/or gravel beds).	4-6 (Y) - High Function
6 Juvenile rearing areas.	1-3 (Y) - Moderate Function
	None - Low or No Function
H. Native Plant Richness	Likely or not likely to Provide
	(Y or N)
1 Dominant and codominant plants are native.	1 1 N
2 Wetland contains two or more Cowardin Classes	
3 Wetland has three or more strate of vegetation	
4 Wetland has mature trees	
	1-2 (Y) - Moderate Function √
	None - Low or No Function

Date: <u>7-14-13</u>

Wetland ID: <u>DP. 03</u>

1.	Education	al or Scientific Value	Likely or not likely to Provide
			(V or N)
ľ	1 Site has do	ocumented scientific or educational use	
	2 Wetland is	in nublic ownership	
	3 Accessible	trails available	
	07000000000		3 <u>N</u>
			2-3 (Y) - High Function
			1 (Y) - Moderate Function √
L			None - Low or No Function
J.	Uniquenes	ss and Heritage	Likely or not likely to Provide
1			(Y or N)
	1 Wetland co	ontains documented occurrences of a state or federally	1** N
	listed threa	itened or endanged species.**	2** N
ľ	2 Weltand co	ontains documented critical habitat, high quality	3 <u>N</u>
	ecosystem USFWS.**	s, or priorily species respectively designated by the	4** <u>N</u>
	3 Wetland ha	as biological, geological, or other features that are	
	determined	I to be rare.	3-4 (Y) - High Function
	4 Wetland ty	pe is a highly valuable wetland type of the State.**	1-2 (Y) - Moderate Function
	**lf #1,#2, o	or #4 is Yes, then wetland is automatically rated as high	Nonec-Low or No Exection
к.	Groundwa	ter Interchange	Likely or not likely to Provide
1			(Y or N)
	1 Presence of	of seeps or springs	1 N
	2 Microreleif	of wetland surface	2 <u>N</u>
	3 Surficial ge	ologic deposits under wetland are permeable	3
	(e.g. alluviu	lm)	
			2-3 (Y) - High Function
			1 (Y) - Moderate Function √
L			None - Low or No Function

WETLAND FUNCTIONS DATA FORM

Alaska Regulatory Best Professional Judgement Characterization

Adapted from Regulartory Guidance Letter 09-01

Wetland ID: DP 04	Date: 7-16-13
Wetland Type: PSSIJEMIB	Investigators: C. Schudel J. Blank
A. Flood Flow Alteration (Storage and Desynchronization)	Likely or not likely to Provide (Y or N)
 Wetland occurs in the upper portion of its water Wetland is relatively flat area and is capable of volumes of water during storm events, than und events. Wetland is a closed (depressional) system. If flowthrough, wetland has constructed outlet w water levels, algal mats, and/or lodged debris. Wetland has dense woody vegetation. Wetland receives floodwater from an adjacent w 7 Floodwater come as sheet flow rather than char 	retaining higher 1 1 retaining higher 2 1 ler normal rainfall 3 1 vith signs of fluctuating 6 1 vater course. 5-7 (Y) - High Function nnel flow. 1-4 (Y) - Moderate Function
Channels thru wettan	None - Low or No Function
 Setument Hernoval Sources of excess sediment (from tillage, mining present upgradient of the wetland. (G lacial) Slow-moving water and/or a deepwater habitat a wetland. Dense herbaceous vegetation is present. Inerspersion of vegegetation and water is high in 5 Ponding of water is high in wetland. Sediment deposits are present in wetland. 	Likely or not likely to Provide (Y or N) 1 $\frac{1}{2}$ 2 $\frac{1}{2}$ are present in the n wetland. 4-6 (Y) - High Function 1-3 (Y) - Moderate Function V
C. Nutrient and Toxicant Removal	None - Low or No Function Likely or not likely to Provide
 Sources of excess nutrients (fertilizers) and toxic heavy metals) are present upgradient of the wet Wetland is inundated or has indicators that flood event during the growing season. Wetland provides long duration for water detenti Wetland has at least 30% aerial cover of live der vegetation. Fine grained mineral or organic materials are present 	cants (pesticides and land, ling is a seasonal on. nse herbaceous esent for the wetland. $\begin{pmatrix} Y \text{ or } N \end{pmatrix}$ $1 \qquad N$ $2 \qquad Y$ $4 \qquad Y$ $4 \qquad Y$ $5 \qquad Y$ $3-5 (Y) - \text{High Function}$ $1-2 (Y) - \text{Moderate Function}$ None - Low or No Function

NOTE: Base wetland function assessment on existing conditions, not future conditions.

Date: 7-16-13

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-		Likely or not likely to Provide
D,	Erosion Control and Shoreline Stabilization	
	(if associated with a watercourse or shoreline)	(* OF N)
	1 Wetland has dense, energy absorbing vegetation bordering the water	
	course and no evidence of erosion.	2
	2 A berbaceous layer is part of this derise verifiation.	3 1
	2 Troop and shrubs able to withstand erosive flood events are also part	
	3 (rees and shrubs able to winistand erosive nood events are use part	2-3 (V) - High Eunction
	of this dense vegetation.	1 (V) Madavata Eurotian
		(Y) - Moderate Function
		None - Low of No Function
Ē.	Production of Organic Matter and its Export	Likely or not likely to Provide
		(Y or N)
	1 Wetland has at least 30% aerial cover of dense herbaceous	1
	Vegetation	2 1
	vegetation.	3 41
	2 Woody plants in weitand are mostly decidedus.	
	3 High degree of plant community structure, vegetation density, and	
	species richness present.	
	4 Interspersion of vegetation and water is high in wetland.	6
1	5 Wetland is inundated or has indicators that flooding is a seasonal	
I	event during the growing season.	4-6 (Y) - Hìgh Function ¥
	6 Wetland has outlet from which organic matter is flushed.**	1-3 (Y) - Moderate Function
•	**If #6 is No, then wetland automatically rated as low or No function	None - Low or No Function
	Concerned Wildlife Habitet Sultability	Likely or not likely to Provide
г.	General Wildlife Habitat Sunability	(V or N)
	and the state of the day forwards	
	1 Wetland is not tragmented by development.	
	2 Upland surround wetland is undeveloped.	
	Wetland has connectivity with other habitat types.	3 10
	Divserity of plant species is high.	4 <u>NU</u>
	5 Wetland has more than one Cowardin Class (e.g. PFO, PSS, PEM)	5 <u>NM</u>
	6 Has high degree of Corwardin Class interspersion	6 N.V.
	7 Evidence of withlife use (e.g. tracks, scat, gnawed stumps) present.	7 N
	Taldonoo of Mildino doo (oldi fictional coordi ginante a champe) presenta	
		5-7 (Y) - High Function
		1.4 (V) - Moderate Function
		None Low or No Eurotion
		None - Low of No Function
G.	General Fish Habitat	Likely or not likely to Provide
	(Must be associated with a fish-bearing stream or lake)	(YorN)
	1	10.1
	1 Wetland has perennial or intermittent surface-water connection to a	1
	fich-bearing water body	2
	Non-bearing water body.	3
	2 Weitanu nas summent size and depin of open water so as not to	4
	Treeze completely during winter.	
	3 Observation of fish.	
	4 Herbaceous and/or woody vegetation is present in wetland and/or	σ
	buffer to provide cover, shade, and/or detrital matter.	
1	5 Spawning areas are present (aquatic vegetation and/or gravel beds).	4-6 (Y) - High Function
	6 Juvenile rearing areas.	1-3 (Y) - Moderate Function
		None - Low or No Function
	Native Plant Richness	Likely or not likely to Provide
F1.	1404499 ()0111 ()0111 ()03	(Y or N)
1	t Device and an deminant stants are notice	
	1 Dominant and codominant plants are native.	
	2 Wetland contains two or more Cowardin Classes.	
ł	3 Wetland has three or more strata of vegetation.	
1	4 Wetland has mature trees.	4 <u>N</u>
		3-4 (Y) - High Function
		1-2 (Y) - Moderate FunctionV
		None - Low or No Function

Wetland ID: DP 04

1.	Educational or Scientific Value	
		Likely or not likely to Provide
	1 Charles days of the training of the second	(Y or N)
	Site has documented scientific or educational use.	1 N
	2 Wetland is in public ownership	2 1
	3 Accessible trails available.	3 N
	,	· · · · · · · · · · · · · · · · · · ·
		2-3 (Y) - High Function
	.*	1 (Y) - Moderate Function
		None - Low or No Function
J.	Uniqueness and Herltage	Likely or not likely to Provide
	A Mathematican de la constant de la constant de la constant de la constant de la constant de la constant de la	(Y or N)
	we take or federally	1** N.
	listed threatened or endanged species.**	2** N
	2 Weltand contains documented critical habitat, high quality	3 N
	ecosystems, or priority species respectively designated by the	4** b)
	USFWS.**	
	3 Wetland has biological, geological, or other features that are	
	determined to be rare,	3-4 (Y) - High Eurotion
1	4 Wetland type is a highly valuable wetland type of the State **	1.2 (V) Modevote Eurolieu
	**If #1.#2, or #4 is Yes, then wetland is automatically rated as high	None (1) - Woderate Function
K.	Groundwater Interchange	None Lowor No Function
	aloundhatai interchange	Likely or not likely to Provide
	t Presence of scope or environment	(Y or N)
	A Microrotoli of wolland surface	1 <u>N</u>
	2 Microreleti ol wettand sufface	2 <u>N</u>
-	(e.g. alluvium)	3
		2-3 (Y) - High Function
		1 (Y) - Moderate Function
		None - Low or No Function

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WETLAND FUNCTIONS DATA FORM

Alaska Regulatory Best Professional Judgement Characterization Adapted from Regulartory Guidance Letter 09-01

Wetland ID: DP06 Date: 7-17-13	5
Wetland Type: P35 JEMIC Investigators: C.S	ichudel J. Blank
A. Flood Flow Alteration (Storage and Desynchronization)	Likely or not likely to Provide (Y or N)
 Wetland occurs in the upper portion of its watershed. Wetland is relatively flat area and is capable of retaining higher volumes of water during storm events, than under normal rainfall events. Wetland is a closed (depressional) system. If flowthrough, wetland has constructed outlet with signs of fluctuating water levels, algal mats, and/or lodged debris. Wetland has dense woody vegetation. Wetland receives floodwater from an adjacent water course. Floodwater come as sheet flow rather than channel flow. 	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
B. Sediment Removal	None - Low or No Function Likely or not likely to Provide
 Sources of excess sediment (from tillage, mining or construction) are present upgradient of the wetland. (glacial till) Slow-moving water and/or a deepwater habitat are present in the wetland. Dense herbaceous vegetation is present. Inerspersion of vegegetation and water is high in wetland. Ponding of water is high in wetland. Sediment deposits are present in wetland. 	$ \begin{array}{c} 1 \\ 2 \\ N \\ 3 \\ 4 \\ 4 \\ 5 \\ 6 \\ Y \\ 4 \\ 6 \\ Y \\ 4 \\ 6 \\ Y \\ 4 \\ 6 \\ Y \\ 4 \\ 6 \\ Y \\ 4 \\ 6 \\ Y \\ 1 \\ 3 \\ Y \\ 4 \\ 6 \\ Y \\ 1 \\ 3 \\ Y \\ 4 \\ 6 \\ Y \\ 1 \\ 3 \\ Y \\ 1 \\ 3 \\ Y \\ 1 \\ 3 \\ Y \\ 1 \\ 3 \\ Y \\ 1 \\ 3 \\ Y \\ 1 \\ 1 \\ 3 \\ Y \\ 1 \\ 1 \\ 3 \\ Y \\ 1 \\ 1 \\ 3 \\ Y \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1$
 C. Nutrient and Toxicant Removal 1 Sources of excess nutrients (fertilizers) and toxicants (pesticides and heavy metals) are present upgradient of the wetland. 2 Wetland is inundated or has indicators that flooding is a seasonal event during the growing season. 3 Wetland provides long duration for water detention. 4 Wetland has at least 30% aerial cover of live dense herbaceous vegetation. 5 Fine grained mineral or organic materials are present for the wetland. 	Likely or not likely to Provide (Y or N) 1 N 2 Y 3 N 4 Y 5 Y 3-5 (Y) - High Function 1-2 (Y) - Moderate Function
	None - Low or No Function

NOTE: Base wetland function assessment on existing conditions, not future conditions.

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Date: <u>1-17-13</u>

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D		Froston Control and Shoreline Stabilization	Likely or not likely to Provide
Γ.		(if associated with a watercourse or shoreline)	(Y or N)
		In appointed many matched and environment	
	4	Wotland has dense, energy absorbing vegetation hordering the water	1 Y
	ŧ	welland has dense, energy absorbing vegetation bordening the water	2 1
	~	Course and no evidence of erosion.	$\frac{1}{3}$ $\frac{1}{}$
	2	A neroaceous layer is part of this dense vegotation.	~ <u></u>
	3		2-3 (Y) - High Eunction
.		or this dense vegetation.	1 (V) - Moderate Eurotion
			None - Low or No Exection
L			Likely or not likely to Broyide
E.		Production of Organic Matter and its Export	Likely of not likely to Provide
	1	Wetland has at least 30% aerial cover of dense herbaceous	$\frac{1}{2}$ $\frac{\gamma}{\gamma}$
		vegetation.	
	2	Woody plants in wetland are mostly deciduous.	
	3	High degree of plant community structure, vegetation density, and	
1		species richness present.	
	4	Interspersion of vegetation and water is high in wetland.	<u> </u>
1	5	Wetland is inundated or has indicators that flooding is a seasonal	
1		event during the growing season.	4-6 (Y) - High Function V
1	6	Wetland has outlet from which organic matter is flushed.**	1-3 (Y) - Moderate Function
L		**If #6 is No, then wetland automatically rated as low or No function	None - Low or No Function
F.		General Wildlife Habitat Sultability	Likely or not likely to Provide
1			(Y or N)
	1	Wetland is not fragmented by development.	
	2	Upland surround wetland is undeveloped.	2 1
1	3	Wetland has connectivity with other habitat types.	3 1 1
	4	Divserity of plant species is high.	4 <u>N M</u>
	5	Wetland has more than one Cowardin Class (e.g. PFO, PSS, PEM)	5 <u>MY</u>
	6	Has high degree of Corwardin Class interspersion	6 <u>NY</u>
	7	Evidence of wildlife use (e.g. tracks, scat, gnawed stumps) present.	7 <u> </u>
		· · · · · · · · · · · · · · · · · · ·	5-7 (Y) - High Function V
			1-4 (Y) - Moderate Function
1			None - Low or No Function
G.		General Fish Habitat	Likely or not likely to Provide
[(Must be associated with a fish-bearing stream or lake)	(Y or N) NA
1	1	Wetland has perennial or intermittent surface-water connection to a	1
	'	fish-hearing water body.	2
L	2	Wetland has sufficient size and depth of open water so as not to	3
	-	freeze completely during winter.	4
1	2	B Observation of fish.	5 ~
		L Herbaceous and/or woody vegetation is present in wetland and/or	6 7
	4	buffer to provide cover, shade, and/or detrital matter.	
	c	S Showning areas are present (armatic venetation and/or gravel heds)	4-6 (Y) - High Function
	0	> opawning areas are present laquate vegetation and or grave beach.	1-3 (Y) - Moderate Function
	t) טעיפוווים וכמווויץ מוכמא.	None - Low or No Function
—		Netive Biont Dishness	Likely or not likely to Provide
HH.		Native Flatt Dictiliess	(Y or N)
		Deminent and adaminant plants are notive	
	1	Dominant and codominant plants are flative.	2
	2	2 Wettand contains two or more bowardin blasses.	
1	3	3 Wetland has three or more strata of vegetation.	
	4	t wetland has mature trees.	3.4 (Y) - High Function
1			1_{-2} (Y) - Moderate Function
			None - Low or No Function
			Profile - LOW OF NOT ULICBOIL

Date: <u>7-17-13</u>

	I. Educational or Scientific Value	Likely or not likely to Provide
		(Y or N)
	1 Site has documented scientific or educational use.	1 <u>N</u>
	2 Wetland is in public ownership	2 1
	3 Accessible trails available.	3 <u>N</u>
		2-3 (Y) - High Function
		1 (Y) - Moderate Function
		None - Low or No Function
	J. Uniqueness and Heritage	Likely or not likely to Provide
۱.	. 1 Wetland contains documented occurrences of a state or federally	(Y or N)
. der	listed threatened or endanged species.**	2" IN VATH. TOWA
	2 Weltand contains documented critical habitat, high quality	3 N (MACC)
	ecosystems, or priority species respectively designated by the	4** N
	USFWS. **, USPS, or Andubon	
	3 Wetland has biological, geological, or other features that are	
	determined to be rare.	3-4 (Y) - High Function
	4 Wetland type is a highly valuable wetland type of the State.**	1-2 (Y) - Moderate Function
	**If #1,#2, or #4 is Yes, then wetland is automatically rated as high	None - Cow or No Function
	K. Groundwater Interchange	Likely or not likely to Provide
		(Y or N)
	1 Presence of seeps or springs	1 N /
	2 Microreleif of wetland surface	2 <u>N</u>
	 Surficial geologic deposits under wetland are permeable (e.g. alluvium) 	3 7
		2-3 (Y) - High Function
		1 (Y) - Moderate Function
		None - Low or No Function

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WETLAND FUNCTIONS DATA FORM

Alaska Regulatory Best Professional Judgement Characterization Adapted from Regulartory Guidance Letter 09-01

Wetland ID:	DPUS	Date:	
Wetland Typ	DE: PSSI/PEMIB	Investigators: JP310	nk & Schudel
A. Flood (Storag	Flow Alteration ge and Desynchronization)		Likely or not likely to Provide (Y or N)
 Wetlan, Wetlan, Wetlan, volume events. Wetlan, Wetlan, If flowth water less Wetlan, Wetlan, Wetlan, Wetlan, Floodwa 	d occurs in the upper portion of its waters d is relatively flat area and is capable of re- s of water during storm events, than under d is a closed (depressional) system. nrough, wetland has constructed outlet with evels, algal mats, and/or lodged debris. d has dense woody vegetation. d receives floodwater from an adjacent wa ater come as sheet flow rather than chann	ned. Itaining higher In normal rainfall In signs of fluctuating Iter course. I flow.	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
 B. Sedime 1 Sources present 2 Slow-me wetland 3 Dense I 4 Inerspect 5 Ponding 6 Sedime 	ent Removal s of excess sediment (from tillage, mining upgradient of the wetland. (glacial oving water and/or a deepwater habitat and , herbaceous vegetation is present. rsion of vegegetation and water is high in g of water is high in wetland. nt deposits are present in wetland.	or construction) are ててし) e present in the wetland.	Likely or not likely to Provide (Y or N) 1 2 3 4 5 6 ++++ 4-6 (Y) - High Function 1-3 (Y) - Moderate Function None - Low or No Function
C. Nutrien 1 Sources heavy m 2 Wetland event du 3 Wetland 4 Wetland vegetation 5 Fine gra	t and Toxicant Removal s of excess nutrients (fertilizers) and toxica netals) are present upgradient of the wetla d is inundated or has indicators that floodir uring the growing season. I provides long duration for water detention has at least 30% aerial cover of live dens on. ined mineral or organic materials are pres	nts (pesticides and nd. Ig is a seasonal n. Ie herbaceous ent for the wetland.	Likely or not likely to Provide (Y or N) 1 2 3 4 5 4 3-5 (Y) - High Function None - Low or No Function

NOTE: Base wetland function assessment on existing conditions, not future conditions.

Date: <u>1-11-13</u>

		Litzbu za pot Malute Drovide
D.	Erosion Control and Shoreline Stabilization	
	(if associated with a watercourse or shoreline)	(FOLN)
	1 Wetland has dense, energy absorbing vegetation bordering the water	
	course and no evidence of erosion.	
	2 A herbaceous layer is part of this dense vegetation.	3
	3 Trees and shrubs able to withstand erosive flood events are also part	
	of this dense vegetation.	2-3 (Y) - High Function Y
		1 (Y) - Moderate Function
		None - Low or No Function
E.	Production of Organic Matter and its Export	Likely or not likely to Provide
		(Y or N)
	1 Wetland has at least 30% aerial cover of dense herbaceous	1 <u>Y</u>
	vegetation.	2
	2 Woody plants in wetland are mostly deciduous.	3 l portions
	3 High degree of plant community structure, vegetation density, and	4 N
	species richness present.	5 Liportorns
	4 Interspersion of vegetation and water is high in wetland.	6** <u>``</u>
	5 Wetland is inundated or has indicators that flooding is a seasonal	
1	event during the growing season.	4-6 (Y) - High Function ✔
	6 Wetland has outlet from which organic matter is flushed.**	1-3 (Y) - Moderate Function
	**If #6 is No, then wetland automatically rated as low or No function	None - Low or No Function
F.	General Wildlife Habitat Suitability	Likely or not likely to Provide
	· · · · · · · · · · · · · · · · · · ·	(Y or N)
	1 Wetland is not fragmented by development.	1 Y true
	2 Upland surround wetland is undeveloped.	2 4
	3 Wetland has connectivity with other habitat types.	3
	4 Divserity of plant species is high.	4
	5 Wetland has more than one Cowardin Class (e.g. PFO, PSS, PEM)	5 4
	6 Has high degree of Corwardin Class interspersion	6 <u>y</u>
	7 Evidence of wildlife use (e.g. tracks, scat, gnawed stumps) present.	7 11 nest tracks
		/ · · · /
		5-7 (Y) - High Function ✓
		1-4 (Y) - Moderate Function
		None - Low or No Function
G.	General Fish Habitat	Likely or not likely to Provide
	(Must be associated with a fish-bearing stream or lake)	(Y or N) $(1 A)$
	t Wetland has perennial or intermittent surface-water connection to a	
	fish-bearing water body.	2
	2 Wetland has sufficient size and depth of open water so as not to	3 VI 12 starkley arken
	freeze completely during winter.	4 y latesame
	3 Observation of fish.	5 Mak
	4 Herbaceous and/or woody vegetation is present in wetland and/or	6 UNK
	buffer to provide cover, shade, and/or detrital matter.	
	5 Spawning areas are present (aquatic vegetation and/or gravel beds).	4-6 (Y) - High Function
	6 Juvenile rearing areas	1-3 (Y) - Moderate Function
	o buvenile realing areas	None - Low or No Function
	Nativa Plant Pichness	Likely or not likely to Provide
Г ^{п.}	nauve riani nicilless	(Y or N)
	t Deminent and addeminant plants are notive	1 14
	1 Dominant and codominant plants are native.	
1	2 Weitand Contains two or more strate of vegetation	
	o yyenanu nas inree or more strata or vegetation.	
	4 Welland has majore liees.	3-4 (Y) - High Function
		1-2 (Y) - Moderate Function
		None - Low or No Function
ł		

μ.	Educational or Scientific Value	Likely or not likely to Provide
		(Y or N)
	1 Site has documented scientific or educational use.	
	2 Wetland is in public ownership	2 1
	3 Accessible trails available.	3
1		2-3 (Y) - High Function
		1 (Y) - Moderate Function
		None - Low or No Function
J.	Uniqueness and Heritage	Likely or not likely to Provide
		(Y or N)
	1 Wetland contains documented occurrences of a state or federally	1** <u>N</u>
	listed threatened or endanged species.**	2** <u>N</u>
Ł	2 Weltand contains documented critical habitat, high quality	3 N
Í	ecosystems, or priority species respectively designated by the USFWS.**	4** <u>N</u>
	3 Wetland has biological, geological, or other features that are	
	determined to be rare.	3-4 (Y) - High Function
	4 Wetland type is a highly valuable wetland type of the State.**	1-2 (Y) - Moderate Function
	**If #1,#2, or #4 is Yes, then wetland is automatically rated as high	None Cowor No Function
К.	Groundwater Interchange	Likely or not likely to Provide
		(Y or N)
	1 Presence of seeps or springs	1 NO
	2 Microreleif of wetland surface	$2 \sqrt{\nu}$
	3 Surficial geologic deposits under wetland are permeable (e.g. alluvium)	3
		2-3 (Y) - High Function
		1 (Y) - Moderate Function
		None - Low or No Function

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Tuprcal alder wills adj. to lake shore

WETLAND FUNCTIONS DATA FORM

Alaska Regulatory Best Professional Judgement Characterization

Adapted from Regulartory Guidance Letter 09-01

PSS IB

Wetland ID: DPC9

Date: 7-17-13

Wetland Type: PSS1 B

Investigators: JBlank + GSchudel

	Cland Claur Altaration	E a version of the second second second second second second second second second second second second second s
~ .		Likely or not likely to Provide
	(Storage and Desynchronization)	(Y or N)
	1 Wetland occurs in the upper portion of its watershed.	1 Y .
	2 Wetland is relatively flat area and is capable of retaining higher	2 4
	volumes of water during storm events, than under normal rainfall	3 N
	events.	4. 7 1
l	3 Wetland is a closed (depressional) system.	5 1
l	4 If flowthrough, wetland has constructed outlet with signs of fluctuating	6 1
	water levels, algal mats, and/or lodged debris.	
	5 Wetland has dense woody vegetation.	· · · · · · · · · · · · · · · · · · ·
1	6 Wetland receives floodwater from an adjacent water course.	5-7 (Y) - Hiah Function
	7 Floodwater come as sheet flow rather than channel flow.	1-4 (Y) - Moderate Function
L		None - Low or No Function
В.	Sediment Removal	Likely or not likely to Provide
	· · · · · · · · · · · · · · · · · · ·	(Y or N)
1	1 Sources of excess sediment (from tillage, mining or construction) are	
	present upgradient of the wetland. $(g[a i a l till)$	2 1
	2 Slow-moving water and/or a deepwater habitat are present in the	3 ¥N
l I	wetland.	4 <u>N</u>
	3 Dense herbaceous vegetation is present.	5 N
1	4 Inerspersion of vegegetation and water is high in wetland.	6 1
1	5 Ponding of water is high in wetland.	
1	6 Sediment deposits are present in wetland.	4-6 (Y) - High Function
1		1-3 (Y) - Moderate Function √
	,	None - Low or No Function
C.	Nutrient and Toxicant Removal	Likely or not likely to Provide
l	en en en en en en en en en en en en en e	(Y or N)
1	1 Sources of excess nutrients (fertilizers) and toxicants (pesticides and	1 <u>N</u>
l I	heavy metals) are present upgradient of the wetland.	2
I	2 Wetland is inundated or has indicators that flooding is a seasonal	3 XXY
I	event during the growing season.	4 <u>N</u>
i –	3 Welland provides long duration for water detention.	5 _ 1
I	4 Wetland has at least 30% aerial cover of live dense herbaceous	
ł	vegetation,	3-5 (Y) - High Function
I .	5 Fine grained mineral or organic materials are present for the wetland.	1-2 (Y) - Moderate Function 1
1		None - Low or No Function

NOTE: Base wetland function assessment on existing conditions, not future conditions.

In.	Frosion Control and Shoreline Stabilization	Likely or not likely to Provide
P	(if associated with a watercourse or shoreline)	(Y or N)
	1 Walland has dense, energy absorbing vegetation bordering the water	1 N
	ource and no evidence of erosion	
	Course and no evidence of elosion.	
	2 A nerbaceous layer is part of this dense vegetation.	
	3 Trees and shrubs able to withstand erosive hood events are also part	2.2 (V) High Eurotion
	or this dense vegetation.	1 (V) Medarate Eurotion
		I (Y) - Moderate Function
		None - Low of No Function
ε.	Production of Organic Matter and its Export	Likely or not likely to Provide
		(Y or N)
	1 Weiland has at least 30% aerial cover of dense herbaceous	
	vegetation.	2
	2 Woody plants in wetland are mostly deciduous.	3 <u>N</u>
	3 High degree of plant community structure, vegetation density, and	4 <u>N</u>
	species richness present.	5
	4 Interspersion of vegetation and water is high in wetland.	6**
1	5 Wetland is inundated or has indicators that flooding is a seasonal	
1	event during the growing season.	4-6 (Y) - High Function
	6 Wetland has outlet from which organic matter is flushed.**	1-3 (Y) - Moderate Function
	**If #6 is No, then wetland automatically rated as low or No function	None - Low or No Function
F.	General Wildlife Habitat Suitability	Likely or not likely to Provide
F		(Y or N)
	1 Wetland is not fragmented by development.	1 1
	 A Lipland surround wetland is undeveloped 	2 1
	2 Wotland has connectivity with other habitat types	
	A Divenity of plant species is high	4 <u>N</u>
	Motiond becamere then and Cowardin Class (e.g. PEO, PSS, PEM,)	5 N
	C Lies high degree of Converdin Close intercontrolon	6
	b Has high degree of conwardin class interspersion	7 10
	/ Evidence of wildlife use (e.g. tracks, scar, gnawed stumps) present.	′ <u> </u>
		E 7 (V) Uich Eurotion
		5-7 (T) - Flight Function
		None Low of No Eunction
G.	General Fish Habitat	Likely of not likely to Provide
	(Must be associated with a fish-bearing stream or lake)	(YorN) NA
	1 Wetland has perennial or intermittent surface-water connection to a	1
	fish-bearing water body.	2 <u>K</u>
	2 Wetland has sufficient size and depth of open water so as not to	3
1	freeze completely during winter.	4 <u>*</u>
1	3 Observation of fish.	5
1	4 Herbaceous and/or woody vegetation is present in wetland and/or	6 .
	buffer to provide cover, shade, and/or detrital matter.	
1	5 Spawning areas are present (aquatic vegetation and/or gravel beds).	4-6 (Y) - High Function
	6 Juvenile rearing areas.	1-3 (Y) - Moderate Function
		None - Low or No Function
H	Native Plant Bichness	Likely or not likely to Provide
1		(Y or N)
1	1 Dominant and codominant plants are native	1 1
	a Motiond contains two or more Cowardin Classes	
1	2 Wetland boo three or more strate of vegetation	3 N
	3 vyenano nas intee or more sirata or vegetalion.	
	4 vyetiand has mature trees.	2.4 (V) - High Eurotion
		1.2 (V) Moderate Eurotion
		Nono Low or No Eurotion
1		None - Low of No Function

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 Educational or Scientific Value 	Litraly on not litraly Dury 11
	Likely or not likely to Provide
1 Site has desumation activities and the st	(Y or N)
Tone has documented scientific of education	al use. 1 N
2 Wetland is in public ownership	2
3 Accessible trails available.	3
	······································
	2-3 (Y) - High Function
	1 (Y) - Moderate Function
	None - Low or No Function
J. Uniqueness and Heritage	Likely or not likely to Provide
t Wetland contains documented occurrences	of a ptota ar (adaptility
listed threatened as and an and	of a state of rederally
isted threatened or endanged species.**	2** <u>N</u>
2 Weitand contains documented critical habita	it, high quality 3 N
ecosystems, or priority species respectively	designated by the 4** N
USFWS,**	·
3 Wetland has biological, geological, or other:	features that are
determined to be rare.	3-4 (Y) - High Function
4 Wetland type is a highly valuable wetland type	De of the State ** 1-2 (Y). Modorate Eurotien
**If #1.#2. or #4 is Yes, then welland is auto	matically rated as high Nano California Function
K Groundwater Interchange	nationally rated as high prone - Low or No Function
in dioundwater interchange	Likely or not likely to Provide
1 Proposa of acons or antings	(Y or N)
Alignmentality of seeps of springs	1 <u>N</u>
2 Microreleir of wetland surface	2 N
3 Sufficial geologic deposits under wetland are	permeable 3
(e.g. alluvium)	
	2-3 (Y) - High Function
	1 (Y) - Moderate Function
	None - Low or No Function

WETLAND FUNCTIONS DATA FORM

Alaska Regulatory Best Professional Judgement Characterization Adapted from Regulartory Guidance Letter 09-01

Wetland ID:	DPID
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Α.

7-17-13 Date:

Wetland Type: PEMIF

Flood Flow Alteration

Investigators: (. Schudul J. Blank

Likely or not likely to Provide (Storage and Desynchronization) (Y or N) 1 Wetland occurs in the upper portion of its watershed. 1 2 Wetland is relatively flat area and is capable of retaining higher 2 volumes of water during storm events, than under normal rainfall з events. 4 3 Wetland is a closed (depressional) system. 5 4 If flowthrough, wetland has constructed outlet with signs of fluctuating 6 water levels, algal mats, and/or lodged debris. 7 5 Wetland has dense woody vegetation. 6 Wetland receives floodwater from an adjacent water course. 5-7 (Y) - High Function 7 Floodwater come as sheet flow rather than channel flow. 1-4 (Y) - Moderate Function√ None - Low or No Function В. Sediment Removal Likely or not likely to Provide (Y or N) 1 Sources of excess sediment (from tillage, mining or construction) are 1 present upgradient of the wetland. (g(acial tr))2 Slow-moving water and/or a deepwater habitat are present in the 2 З wetland. 4 3 Dense herbaceous vegetation is present. 5 4 Inerspersion of vegegetation and water is high in wetland. 6 5 Ponding of water is high in wetland. 6 Sediment deposits are present in wetland. 4-6 (Y) - High Function √ 1-3 (Y) - Moderate Function None - Low or No Function C. Nutrient and Toxicant Removal Likely or not likely to Provide (Y or N) 1 Sources of excess nutrients (fertilizers) and toxicants (pesticides and heavy metals) are present upgradient of the wetland. 2 2 Wetland is inundated or has indicators that flooding is a seasonal 3 event during the growing season. 4 3 Wetland provides long duration for water detention. 5 4 Wetland has at least 30% aerial cover of live dense herbaceous vegetation. 3-5 (Y) - High Function 🖌 5 Fine grained mineral or organic materials are present for the wetland. 1-2 (Y) - Moderate Function None - Low or No Function

NOTE: Base wetland function assessment on existing conditions, not future conditions.

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Wetland ID: <u>PPIO</u>

1 0	Fusion Control and Charoline Stabilization	Likely or not likely to Broyide
D.	Erosion Control and Shoreline Stabilization	
	(If associated with a watercourse of shoreline)	
	d M. H	1 N & Ymalas
	Wetland has dense, energy absorbing vegetation bordening the water	Nr Mandanie
	course and no evidence of erosion.	2 NON PORTIONS QUE
	2 A nerbaceous layer is part of this dense vegetation.	<u> </u>
	3 Trees and shrubs able to withstand erosive flood events are also part	0.0.(1) Llich Europhian
-	of this dense vegetation.	2-3 (T) - Fligh Function
	Becoming more of a stubilizion feature, but still	1 (Y) - Moderate Function
	furry new establishment of plants	None - Low of No Punction -
IE.	Production of Organic Matter and its Export	Likely or not likely to Provide
		(Y or N)
	1 Wetland has at least 30% aerial cover of dense herbaceous	<u>7N</u>
	vegetation.	2 <u>N</u>
	2 Woody plants in welland are mostly deciduous.	3 <u>N</u>
	3 High degree of plant community structure, vegetation density, and	$\frac{4}{-}$
	species richness present.	
	4 Interspersion of vegetation and water is high in welland.	6** <u> </u>
	5 Wetland is inundated or has indicators that flooding is a seasonal	
	event during the growing season.	4-6 (Y) - High Function
	6 Wetland has outlet from which organic matter is flushed.**	1-3 (Y) - Moderate FunctionY
	**If #6 is No, then wetland automatically rated as low or No function	None - Low or No Function
F.	General Wildlife Habitat Suitability	Likely or not likely to Provide
		(Y or N)
	1 Wetland is not fragmented by development.	
	2 Upland surround wetland is undeveloped.	
	3 Wetland has connectivity with other habitat types.	
	4 Divserity of plant species is high.	4 No Flocated to "high"
	5 Wetland has more than one Cowardin Class (e.g. PFO, PSS, PEM)	5 N Wighted
	6 Has high degree of Corwardin Class interspersion	
	7 Evidence of wildlife use (e.g. tracks, scat, gnawed stumps) present.	y water prea
		- white
		5-7 (Y) - High Function J
		1-4 (Y) - Moderate Function V
		None - Low or No Function
G.	General Fish Habitat	Likely or not likely to Provide
	(Must be associated with a fish-bearing stream or lake)	(Y or N) K A
	1 Wetland has perennial or intermittent surface-water connection to a	
	fish-bearing water body.	
1	2 Wetland has sufficient size and depth of open water so as not to	3 X - 1 small sculping rear
	freeze completely during winter.	4 X-adjacent wetland
	3 Observation of fish.	5 unde
	4 Herbaceous and/or woody vegetation is present in wetland and/or	6
	buffer to provide cover, shade, and/or detrital matter.	
	5 Spawning areas are present (aquatic vegetation and/or gravel beds).	4-6 (Y) - High Function
	6 Juvenile rearing areas.	1-3 (Y) - Moderate Function
	,	None - Low of No Function
H.	Native Plant Richness	Likely or not likely to Provide
1		(Y or N)
1	1 Dominant and codominant plants are native.	
1	2 Wetland contains two or more Cowardin Classes.	2 <u>N</u>
1	3 Wetland has three or more strata of vegetation.	3 <u>N</u>
1	4 Wetland has mature trees.	4 <u>N</u>
1		3-4 (Y) - High Function
	·	1-2 (Y) - Moderate Function
		None - Low or No Function

1.	Educational or Scientific Value	Likely or not likely to Provide
		(V or N)
	1 Site has documented scientific or educational use	
	2 Motland is in public our parchin	
	2 Approachte traite curtichte	2
		3 <u>N</u>
1		
		2-3 (Y) - High Function
		1 (Y) - Moderate Function 🗸
		None - Low or No Function
J.	Uniqueness and Heritage	Likely or not likely to Provide
		(Y or N)
	1 Wetland contains documented occurrences of a state or federally	1** <u>N</u>
	listed threatened or endanged species.**	2** N
	2 Weltand contains documented critical habitat, high quality	3 <u>N</u>
	ecosystems, or priority species respectively designated by the	4** N
	USFWS.**	
	3 Wetland has biological, geological, or other features that are	
	determined to be rare.	3-4 (Y) - High Function
	4 Wetland type is a highly valuable wetland type of the State.**	1-2 (Y) - Moderate Eurotion
I 1	**If #1,#2, or #4 is Yes, then wetland is automatically rated as high	None - Kow or No Function
ĸ.	Groundwater Interchange	Likely or not likely to Provide
	1 Presence of seens or springs	
	2 Microreleif of wetland surface	
Į	2 Surficial acalogia deposite updar wattand are normaphia	2 <u>N</u>
ĺ	(e.g. alluvium)	3
	•	2-3 (Y) - High Function
		1 (Y) - Moderate Function
		None - Low or No Function

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WETLAND FUNCTIONS DATA FORM

Alaska Regulatory Best Professional Judgement Characterization Adapted from Regulartory Guidance Letter 09-01

Wetland ID: DP 12		Date:	7-18-1	3
Wetland Type	: PSSI/EM IE	Investiga	tors: C.Sa	hudel J. Blank
A. Flood Fl (Storage	ow Alteration and Desynchronization)	•		Likely or not likely to Provide (Y or N)
 Wetland Wetland volumes events. Wetland If flowthrowater levents Wetland Wetland Wetland Floodwate 	occurs in the upper portion of its watersh is relatively flat area and is capable of rel of water during storm events, than under is a closed (depressional) system. bugh, wetland has constructed outlet with els, algal mats, and/or lodged debris. has dense woody vegetation. receives floodwater from an adjacent wat er come as sheet flow rather than channe	ed. aining highe normal rain signs of flue er course. el flow.	er fall ctuating	1 N 2 N 3 N 4 Y 5 Y 6 X 7 N 5-7 (Y) - High Function 1-4 (Y) - Moderate Function None - Low or No Function
 B. Sediment 1 Sources of present u 2 Slow-move wetland, 3 Dense het 4 Inerspers 5 Ponding of 6 Sediment 	It Removal of excess sediment (from tillage, mining o pgradient of the wetland. ving water and/or a deepwater habitat are erbaceous vegetation is present. ion of vegegetation and water is high in v of water is high in wetland. I deposits are present in wetland.	or construction present in t vetland.	on) are the	Likely or not likely to Provide (Y or N) 1 N 2 N 3 Y 4 N 5 Y 6 N 4-6 (Y) - High Function 1-3 (Y) - Moderate Function None - Low or No Function
C. Nutrient 1 Sources of heavy me 2 Wetland i event duri 3 Wetland p 4 Wetland b vegetation 5 Fine grain	and Toxicant Removal of excess nutrients (fertilizers) and toxican tals) are present upgradient of the wetlar s inundated or has indicators that floodin ing the growing season. provides long duration for water detention has at least 30% aerial cover of live dens n. ned mineral or organic materials are prese	nts (pesticid nd. g is a seaso e herbaceou ent for the w	es and nal Is retland.	Likely or not likely to Provide (Y or N) 1 N 2 Y 3 X 4 Y 5 Y 3-5 (Y) - High Function √ 1-2 (Y) - Moderate Function None - Low or No Function

NOTE: Base wetland function assessment on existing conditions, not future conditions.

Date: 7-18-13

D. Erosion Control and Shorell			
(if associated with a watercou	rse or snoreline)		
1 Wetland has dense, energy a	bsorbing vegetation bordening the water		
course and no evidence of ero	bio dense vegetation		
2 A nerbaceous layer is part of t	nis dense vegetation.		
3 Trees and shrubs able to with	stand erosive hood events are also part	0.0 MA Aligh Function	
of this dense vegetation.		2-3 (f) - High Function •	
		(Y) - Moderate Function	
		None - Low of No Function	
E. Production of Organic Matte	er and its Export	Likely or not likely to Provide	
	· · · · · · · · ·	(Y or N)	
1 Wetland has at least 30% aer	al cover of dense herbaceous		
vegetation.		2 <u> 7N</u>	
2 Woody plants in wetland are r	nostly deciduous.		
3 High degree of plant commun	ity structure, vegetation density, and		
species richness present.		$5 - \frac{\gamma}{\gamma}$	
4 Interspersion of vegetation an	d water is high in wetland.	6*** <u> </u>	
5 Wetland is inundated or has in	ndicators that flooding is a seasonal		
event during the growing seas	son,	4-6 (Y) - High Function V	
6 Wetland has outlet from which	organic matter is flushed.**	1-3 (Y) - Moderate Function	
**If #6 is No, then wetland aut	omatically rated as low or No function	None - Low or No Function	
F. General Wildlife Habitat Suit	tability	Likely or not likely to Provide	
		(Y or N)	
 Wetland is not fragmented by 	development.	1	
2 Upland surround wetland is ur	ndeveloped.	2	
3 Wetland has connectivity with	other habitat types.		
4 Divsenty of plant species is hi	gh.	$4 \rightarrow N$	
5 Wetland has more than one C	Cowardin Class (e.g. PFO, PSS, PEM)	5	
6 Has high degree of Corwardin	Class interspersion		
7 Evidence of wildlife use (e.g. t	racks, scat, gnawed stumps) present.	/ <u>N</u>	
		5 7 00 Ulist Foreston	
		5-7 (Y) - High Function •	
		1-4 (Y) - Moderate Function	
		None - Low of No Function	_
G. General Fish Habitat	·	Likely or not likely to Provide	1.6 1. 1.
(Must be associated with a fis	h-bearing stream or lake)		No direct
			helpit
f Wetland has perennial or inte	rmittent surface-water connection to a		Valerie
fish-bearing water body.			
2 Wetland has sufficient size an	id depth of open water so as not to		Wettand
freeze completely during winte	ər.	4	
3 Observation of fish.		5	(67)
4 Herbaceous and/or woody ve	getation is present in wetland and/or	6 <u></u>	-
buffer to provide cover, shade	, and/or detrital matter.		
5 Spawning areas are present (aquatic vegetation and/or gravel beds).	4-6 (Y) - High Function	
6 Juvenile rearing areas.		Non- I was No Eurotion	
		None - Low of No Function	_
H. Native Plant Richness		Likely or not likely to Provide	
		(Y or N)	
1 Dominant and codominant pla	ints are native.		
2 Wetland contains two or more	Cowardin Classes.		1
3 Wetland has three or more st	rata of vegetation.		
4 Wetland has mature trees.			
		3-4 (Y) - High Function N	
		1-2 (Y) - Moderate Function	
1		UNONE - LOW OF NO FUNCTION	1

Date: 7-18-13

Likely or not likely to Dreside
Likely of not likely to Provide
(Y or N)
2 7
3 N
· 2-3 (Y) - High Function
1 (Y) - Moderate Function 🗹
None - Low or No Function
Likely or not likely to Provide
(Y or N)
1** N
2** N
3 41
4** N
·
•
3-4 (Y) - High Function
1-2 (Y) - Moderate Function
None - Low or No Function
Likely or not likely to Provide
(Y or N)
1 N
2 1
3
2-3 (Y) - High Function √
1 (Y) - Moderate Function
None - Low or No Function

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WETLAND FUNCTIONS DATA FORM

Alaska Regulatory Best Professional Judgement Characterization

Adapted from Regulartory Guidance Letter 09-01

Wetland ID: DP14

7-19-13 Date:

Wetland Type: PEMIISSIE

Investigators: C. Schudel J. Biank

Α.	Flood Flow Alteration	Likely or not likely to Provide
	(Storage and Desynchronization)	(Y or N)
	· · · · · · · · · · · · · · · · · · ·	(1
	1 Wetland occurs in the upper portion of its watershed.	1 N
	2 Wetland is relatively flat area and is capable of retaining higher	2 1
	volumes of water during storm events, than under normal rainfall	
	events.	4 1
	3 Wetland is a closed (depressional) system.	5
İ	4 If flowthrough, wetland has constructed outlet with signs of fluctuating	6 AV
	water levels, algal mats, and/or lodged debris.	
	5 Wetland has dense woody vegetation.	
	6 Wetland receives floodwater from an adjacent water course.	5-7 (Y) - High Function
	7 Floodwater come as sheet flow rather than channel flow,	1-4 (Y) - Moderate Function ✓
		None - Low or No Function
В.	Sediment Removal	Likely or not likely to Provide
		(Y or N)
	1 Sources of excess sediment (from tillage, mining or construction) are	
	present upgradient of the wetland.	2 1
	2 Slow-moving water and/or a deepwater habitat are present in the	3 1
	wetland.	4
	3 Dense herbaceous vegetation is present.	5
	4 Inerspersion of vegegetation and water is high in wetland.	$6 \frac{1}{N}$
	5 Ponding of water is high in wetland.	
	6 Sediment deposits are present in wetland.	4-6 (Y) - High Function
		1-3 (Y) - Moderate Function
	· ·	None - Low or No Function
C.	Nutrient and Toxicant Removal	Likely or not likely to Provide
	1 Courses of every subjects (featility and to do at the state	(Y or N)
	Sources of excess numerits (reminizers) and toxicants (pesticides and	
	neavy metals) are present upgradient of the wetland.	
	2 Wetland is inundated of has indicators that flooding is a seasonal	
	event during the growing season.	4
	3 wetland provides long duration for water detention.	5
	4 wettand has at least 30% aerial cover of live dense herbaceous	
	vegetation.	3-5 (Y) - High Function Y
	Fine grained mineral or organic materials are present for the wetland.	1-2 (Y) - Moderate Function
		None - Low or No Function

NOTE: Base wetland function assessment on existing conditions, not future conditions.

Date: 7-19-13

D.	Eros	sion Control and Shoreline Stabilization	Likely of not likely to Provide
1	(if as	ssociated with a watercourse or shoreline)	(Y or N)
	-		ANT
	1 14/64	and bac dones, energy absorbing vegetation bordering the water	1 9
	1 1101	and has dense, chergy absorbing vogeration bordering the water	
	cour	se and no evidence of erosion.	2 <u> </u>
	2 A he	rbaceous layer is part of this dense vegetation.	3 <u> </u>
	3 Tree	s and shrubs able to withstand erosive flood events are also part	
	of thi	is dense vegetation.	2-3 (Y) - High Function
	01 (11		1 (V) - Moderate Eurotion
			Nene Lewer Na Eurotian
			None - Low of No Function
E,	Proc	luction of Organic Matter and its Export	Likely or not likely to Provide
			(Y or N)
	1 Wetl	and has at least 30% aerial cover of dense herbaceous	1 4
	1 1100	tallan	2
	vege		
	2 W00	dy plants in wetland are mostly deciduous.	3
	3 High	degree of plant community structure, vegetation density, and	4
	spec	ies richness present.	5 V
	4 Inter	spersion of vegetation and water is high in wetland.	6** 1
	5 Mot	and is inundated or has indicators that flooding is a seasonal	,
	5 4460	taile is intriduced of his indicators that nooding is a societar	4.6 (V) High Eurotian)
	even	it during the growing season.	4-6 (f) - High Function V
	6 Wetl	and has outlet from which organic matter is flushed.**	1-3 (Y) - Moderate Function
	**lf#	6 is No, then wetland automatically rated as low or No function	None - Low or No Function
F.	Gen	eral Wildlife Habitat Suitability	Likely or not likely to Provide
Ľ.,		, , , , , , , , , , , , , , , , , , ,	(Y or N)
		to a difference of the standard for a development of	4 · · · · ·
	1 wet	and is not tragmented by development.	
	2 Upla	ind surround wetland is undeveloped.	2
	3 Wetl	and has connectivity with other habitat types.	3
	4 Divs	enty of plant species is high.	4
	5 11/01	land has more than one Cowardin Class (e.g. PEO, PSS, PEM)	5 1
	C Uné	high degree of Converdin Class interspersion	
•	o nas		
	/ Evia	ence of wildlife use (e.g. tracks, scat, gnawed stumps) present.	· <u> </u>
			5-7 (Y) - High Function √
			1-4 (Y) - Moderate Function
		`	None - Low or No Function
	Gan	aral Eich Uchitat	Likely or not likely to Provide
G.	Gen		
1	(Mus	st be associated with a fish-bearing stream or lake)	
			10/1
	1 Wetl	land has perennial or intermittent surface-water connection to a	1
	fish-l	bearing water body.	2
1	2 \//oti	and has sufficient size and denth of open water so as not to	3
1	2 1100	na a completely during winter	4
I	neez	ze completely during winter.	
	3 Obse	ervation of fish.	5
	4 Herb	baceous and/or woody vegetation is present in wetland and/or	6
	buffe	er to provide cover, shade, and/or detrital matter.	
	5 Snav	whing areas are present (aquatic vegetation and/or gravel beds).	4-6 (Y) - High Function
	e luno	millo rearing areas	1-3 (Y) - Moderate Function
	o Juve	ame rearing areas.	None - Low or No Eunction
Н.	Nati	ve Plant Richness	Likely or not likely to Provide
			(Y or N)
	1 Dom	inant and codominant plants are native.	
	2 10/04	land contains two or more Cowardin Classes	
		land has three as more strate of logisticin	
	3 wet	and has three or more strata of vegetation.	
	4 Wet	land has mature trees.	4 <u>N</u>
			3-4 (Y) - High Function
			1-2 (Y) - Moderate Function J
			None - Low or No Function

Date: 7-19-13

Π.	Educational or Scientific Value	1 Martin and at the tax at the
ſ.		Likely or not likely to Provide
		(Y or N)
Į	 Site has documented scientific or educational use. 	1 N
1	2 Wetland is in public ownership	2 1
	3 Accessible trails available.	
ļ		
1		2-3 (Y) - High Function
1		1 (Y) - Moderate Function
Ļ		None - Low or No Function
J.	Uniqueness and Heritage	Likely or not likely to Provide
		(Y or N)
	1 Wetland contains documented occurrences of a state or federally	1** K
	listed threatened or endanged species.**	2** <u></u>
	2 Weltand contains documented critical habitat, high quality	3 4
	ecosystems, or priority species respectively designated by the	4** <u></u>
	USFWS.**	·/v
	3 Wetland has biological, geological, or other features that are	
	determined to be rare.	3-4 (Y) - High Function
	4 Wetland type is a highly valuable wetland type of the State.**	1-2 (Y) - Moderate Eurotion
	**If #1,#2, or #4 is Yes, then wetland is automatically rated as high	None - Cowlor No Eurotion
К.	Groundwater Interchange	Interest Completion
	Ground nation interoritatinge	Likely or not likely to Provide
	1 Presence of soons or enringe	(Y or N)
	2 Microroloif of wetland ourfood	<u> </u>
	2 Incontent of weitand subace	2
	(e.g. alluvium)	³ <u> </u>
		2-3 (Y) - High Function
		1 (Y) - Moderate Function
		None - Low or No Function

WETLAND FUNCTIONS DATA FORM

Alaska Regulatory Best Professional Judgement Characterization Adapted from Regulatory Guidance Letter 09-01

Wetland ID: DP17 Date: 7-20-13 PSS3/PEMIB Investigators: C.Schudel J. Blank Wetland Type: PE Α. **Flood Flow Alteration** Likely or not likely to Provide (Storage and Desynchronization) (Y or N) 1 Wetland occurs in the upper portion of its watershed. 1 2 Wetland is relatively flat area and is capable of retaining higher 2 volumes of water during storm events, than under normal rainfall 3 events. 4 3 Wetland is a closed (depressional) system. 5 4 If flowthrough, wetland has constructed outlet with signs of fluctuating 6 water levels, algal mats, and/or lodged debris. 7 5 Wetland has dense woody vegetation. 6 Wetland receives floodwater from an adjacent water course. 5-7 (Y) - High Function 7 Floodwater come as sheet flow rather than channel flow. 1-4 (Y) - Moderate Function ✓ None - Low or No Function Sediment Removal В. Likely or not likely to Provide (Y or N) 1 Sources of excess sediment (from tillage, mining or construction) are 1 N present upgradient of the wetland. 2 2 Slow-moving water and/or a deepwater habitat are present in the З wetland. 4 3 Dense herbaceous vegetation is present. 5 4 Inerspersion of vegegetation and water is high in wetland. 6 5 Ponding of water is high in wetland. 6 Sediment deposits are present in wetland. 4-6 (Y) - High Function 1-3 (Y) - Moderate Function√ None - Low or No Function C. Nutrient and Toxicant Removal Likely or not likely to Provide (Y or N) 1 Sources of excess nutrients (fertilizers) and toxicants (pesticides and 1 heavy metals) are present upgradient of the wetland. 2 2 Wetland is inundated or has indicators that flooding is a seasonal 3 event during the growing season. 4 5 3 Wetland provides long duration for water detention.

 3 Wetland provides long duration for water detention.

 4 Wetland has at least 30% aerial cover of live dense herbaceous vegetation.

 5 Fine grained mineral or organic materials are present for the wetland.

 4 Wetland has at least 30% aerial cover of live dense herbaceous vegetation.

 5 Fine grained mineral or organic materials are present for the wetland.

 1-2 (Y) - Moderate Function None - Low or No Function

NOTE: Base wetland function assessment on existing conditions, not future conditions.

		Evenier Control and Chaveline Stabilization	Likely of not likely to Drovide
р.			Likely of not likely to Provide
		(if associated with a watercourse or shoreline)	(Y OF N) NA
			12.1
	1	Wetland has dense, energy absorbing vegetation bordering the water	• • · · · · · · · · · · · · · · · · · ·
		course and no evidence of erosion.	2
	2	A herbaceous layer is part of this dense vegetation.	3
	3	Trees and shruhs able to withstand erosive flood events are also part	
	Ŭ	of this danse vegetation	2-3 (V) - High Eurotion
		or this dense vegetation.	4 (V) Medewate Exactles
			(Y) - Moderate Punction
			None - Low or No Function
E.		Production of Organic Matter and its Export	Likely or not likely to Provide
			(Y or N)
	1	Wetland has at least 30% aerial cover of dense herbaceous	1 1
		vegetation.	2 1
,	2	Woody plants in wetland are mostly deciduous.	3 1
	з	High degree of plant community structure, vegetation density, and	4
	v	enocioe richaese present	5
		species ficilities present.	
	4	Interspersion of vegetation and water is high in wettand,	6
1	5	wettahu is mundated of has mulcators (hat hooding is a seasona)	
	_	event during the growing season.	4-6 (Y) - High Function V
	6	Wetland has outlet from which organic matter is flushed.**	1-3 (Y) - Moderate Function
		**If #6 is No, then wetland automatically rated as low or No function	None - Low or No Function
F.		General Wildlife Habitat Suitability	Likely or not likely to Provide
			(Y or N)
i i	1	Wetland is not fragmented by development.	
	2	Upland surround wetland is undeveloped.	
	3	Wetland has connectivity with other babitat lynes	$\frac{1}{3}$ $\frac{1}{\sqrt{3}}$
	1	Diventiv of plant species is bigh	
	- 4	Divisional to a supervise of the second seco	
	5	wetland has more than one Cowardin Class (e.g. PPO, PSS, PEM)	
	6	Has high degree of Corwardin Class Interspersion	
	7	Evidence of wildlife use (e.g. tracks, scat, gnawed stumps) present.	
1			
			5-7 (Y) - High Function V
			1-4 (Y) - Moderate Function
			None - Low or No Function
G.		General Fish Habitat	Likely or not likely to Provide
		(Must be associated with a fish-bearing stream or lake)	(Y or N)
			NIT
	1	Wetland has perennial or intermittent surface-water connection to a	1
		fish-bearing water body.	2
	2	Wetland has sufficient size and depth of open water so as not to	3
	-	freeze completely during winter	4
	2	Observation of fish	
	3	Observation of fish.	5
	4	Herbaceous and/or woody vegetation is present in wettand and/or	0
	_	butter to provide cover, shade, and/or detrital matter.	
	5	Spawning areas are present (aquatic vegetation and/or gravel beds).	4-6 (Y) - High Function
	6	Juvenile rearing areas.	1-3 (Y) - Moderate Function
			None - Low or No Function
H,		Native Plant Richness	Likely or not likely to Provide
1		·	(Y or N)
1	1	Dominant and codominant plants are native.	
1	2	Wetland contains two or more Cowardin Classes.	2
1	3	Wetland has three or more strata of vegetation.	3 <u>N</u>
I	4	Wetland has mature trees.	4 thereward Y)
I			3-4 (Y) - High Function
1			1-2 (Y) - Moderate Function
1			Nono Low or No Eurotion
1			INVINE - LUW OF NU PUNCTION

Date: 7.20-13

Ι.	Educational or Scientific Value	Likely or not likely to Provide
		(Y or N)
	1 Site has documented scientific or educational use.	1 6/
	2 Wetland is in public ownership	
	3 Accessible trails available.	
	•	
		2-3 (Y) - High Function
1		1 (Y) - Moderate Function
		None - Low or No Function
J.	Uniqueness and Heritage	Likely or not likely to Provide
		(YorN)
	1 Wetland contains documented occurrences of a state or federally	1** N
	listed threatened or endanged species.**	2** N
l I	2 Weltand contains documented critical habitat, high quality	3
	ecosystems, or priority species respectively designated by the	4** <u>N</u>
	USFWS.**	
	3 Wetland has biological, geological, or other features that are	
	determined to be rare.	3-4 (Y) - High Function
	4 Wetland type is a highly valuable wetland type of the State.**	1-2 (Y) - Moderate Function
<u> </u>	**If #1,#2, or #4 is Yes, then wetland is automatically rated as high	None (Low or No Function
К.	Groundwater Interchange	Likely or not likely to Provide
		(Y or N)
	1 Presence of seeps or springs	1 N
	2 Microreleif of wetland surface	2 7
	3 Sufficial geologic deposits under wetland are permeable	3
	(e.g. alluvium)	
		2-3 (Y) - High Function ✓
		1 (Y) - Moderate Function
		None - Low or No Function

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WETLAND FUNCTIONS DATA FORM

Alaska Regulatory Best Professional Judgement Characterization

Adapted from Regulartory Guidance Letter 09-01

Wetland ID: DP19, Date: 7-20-	13
Wetland Type: PSS 413/PEM1B Investigators: C.S	ichudel J. Blank
A. Flood Flow Alteration	Likely or not likely to Provide
(Storage and Desynchronization)	(V or N)
(erorage and booynamentation)	
d Matter descurs in the conservation of the state of	
I wetland occurs in the upper portion of its watershed.	1 <u>N</u>
2 Wetland is relatively flat area and is capable of retaining higher	2 .
volumes of water during storm events, than under normal rainfall	3 3 1
events.	4 544
3 Wetland is a closed (depressional) system.	5 1
4 If flowthrough, wetland has constructed outlet with signs of fluctuating	6
water levels algal mats and/or lodged debris	
5 Watland has dense weedy vegetation	/ <u>_N</u>
6 Molland reactives fleedwater frem an adjacent water source	
7 Fleaduater ages as about (lawrath all	5-7 (Y) - High Function
7 Floodwaler come as sheet flow rather than channel flow.	1.4 (Y) - Moderate Function √
	None - Low or No Function
B. Sediment Removal	Likely or not likely to Provide
	(Y or N)
1 Sources of excess sediment (from tillage, mining or construction) are	1 1
present upgradient of the wetland.	2 31
2 Slow-moving water and/or a deepwater habitat are present in the	
wetland.	4
3 Dense herbaceous vegetation is present	
4 Inerspersion of Vegegetation and water is high in wotland	
5 Ponding of water is high in waterd	0 <u> </u>
6 Sediment denesite are present in wettend	
o Sediment deposits are present in wettand,	4-6 (Y) - High Function
	1-3 (Y) - Moderate Function √
	None - Low or No Function
C. Nutrient and Toxicant Removal	Likely or not likely to Provide
	(Y or N)
1 Sources of excess nutrients (fertilizers) and toxicants (pesticides and	1 N
heavy metals) are present upgradient of the wetland.	
2 Wetland is inundated or has indicators that flooding is a seasonal	
event during the growing season.	
3 Wetland provides long duration for water detention	
4 Wetland has at least 30% aerial cover of live dance between-	° <u> </u>
vagatation	
	3-5 (Y) - High Function √
In the grained mineral or organic materials are present for the wetland.	1-2 (Y) - Moderate Function
	None - Low or No Function

NOTE: Base wetland function assessment on existing conditions, not future conditions.

Example Ranking: If ranking the capacity for a wetland to perform a given wetland function into high, moderate, low or none categories, use the following example as guidance. For Flood Flow Alteration, answering yes to five to seven attributes would rate the wetland as high functioning; answering yes to one to four attributes would rate the wetland as moderate; and not answering yes to any attributes would rate the wetland as low, or if evaluator is certain the wetland does not perform this function, it can be rated as none.

Date: 7.20-13

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Wetland ID: <u>)|219</u>

6	Eresion C	ontrol and Shoreline Stabilization	Likely or not likely to Provide
υ.	Erosion C	entrol and Shoreline Stabilization	(Y or N)
	(II associat	eu will a watercourse of shorelinej	NA NA
		- damage an event abapting registration bordering the water	1
	1 Wetland na	as dense, energy absorbing vegetation bordening the water	2
	course and	no evidence of erosion.	2 <u> </u>
	2 A nerbace	ous layer is part of this dense vegetation.	· · · · · · · · · · · · · · · · · · ·
	3 Trees and		0.0 (V) High Eurotian
	of this den	se vegetation.	2-3 (1) - Figir Function
			I (Y) - Woderate Function
			None - Low of No Function
E.	Productio	n of Organic Matter and its Export	Likely or not likely to Provide
			(Y or N)
	1 Wetland h	as at least 30% aerial cover of dense herbaceous	1 <u>Y</u>
	vegetation		2 <u>N</u>
ł	2 Woody pla	ints in wetland are mostly deciduous.	3
ł	3 High degre	ee of plant community structure, vegetation density, and	4 <u>N</u>
1	species ric	hness present.	5 44
1	4 Interspersi	on of vegetation and water is high in wetland.	6** <u> </u>
	5 Wetland is	inundated or has indicators that flooding is a seasonal	
	event durir	ng the growing season.	4-6 (Y) - High Function ✓
	6 Wetland h	as outlet from which organic matter is flushed.**	1-3 (Y) - Moderate Function
	**If #6 is N	o, then wetland automatically rated as low or No function	None - Low or No Function
F.	General W	/IIdlife Habitat Suitability	Likely or not likely to Provide
			(Y or N)
	1 Wetland is	not fragmented by development.	1 <u>Y</u>
	2 Upland su	rround wetland is undeveloped.	2
	3 Wetland h	as connectivity with other habitat types.	3
	4 Divserity o	f plant species is high.	4 1/
	5 Wetland h	as more than one Cowardin Class (e.g. PFO, PSS, PEM)	5 7
	6 Has high c	learee of Corwardin Class interspersion	6 7
	7 Evidence	of wildlife use (e.g. tracks, scat, gnawed stumps) present.	7
	• =•••••		
			5-7 (Y) - High Function √
		,	1-4 (Y) - Moderate Function
			None - Low or No Function
G	General F	ish Habitat	Likely or not likely to Provide
~	(Must he a	associated with a fish-bearing stream or lake)	(Yor N) NIA
	111401200	,	1011
	1 Wetland h	as perennial or intermittent surface-water connection to a	1
	fish-hearin	a water hody.	2
	2 Wetland h	as sufficient size and depth of open water so as not to	3
	freeze con	nntetelv during winter.	4
	3 Observativ	an of fish	5
	4 Herbaceo	us and/or woody vegetation is present in wetland and/or	6
	huffer to p	rovide cover, shade, and/or detrital matter.	
	5 Spouring	areas are present (aquatic vegetation and/or gravel beds)	4-6 (Y) - High Function
	6 Juvonilo r	aidas are present (uquane regenation and/or graner bete).	1-3 (Y) - Moderate Function
1	6 Juvenile h	alling aleas.	None - Low or No Function
-	Notice DI	Int Dishnors	Likely or not likely to Provide
In.	Native Pla	ant munices	(Y or N)
	d. Demi	and and aminant plants are notive	
	Dominant	and couominant plants are native.	
	2 wetland c	ontains two of more Cowardin Classes.	
	3 wetland h	as infee or more strata of vegetation.	
	4 Wetland h	as mature trees.	9-4 (V) - High Eunstian
1			1-2 (Y) - Moderate Function
			None - Low or No Eulotion
			HANNE - FOM OF HO L GHORION

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Date: 7,20-13

I. Educational or Scientific Value	Likely or not likely to Provide
	(Y or N)
1 Site has documented scientific or educatio	naluse, 1 N
2 Wetland is in public ownership	2 <u>V</u>
3 Accessible trails available.	3 <u>N</u>
	2-3 (Y) - High Function
	1 (Y) - Moderate Function 🗸
	None - Low or No Function
J. Uniqueness and Heritage	Likely or not likely to Provide
2 1 1	(Y or N)
1 Wetland contains documented occurrence	s of a state or federally 1**
listed threatened or endanged species.**	2** <u>N</u>
2 Weltand contains documented critical habi	tat, high quality 3 N
ecosystems, or priority species respectivel	y designated by the 4**
USFWS.**	
3 Wetland has biological, geological, or othe	r teatures that are
determined to be rare.	3-4 (Y) - High Function
4 wetland type is a highly valuable wetland t	ype of the State. A 1-2 (Y) - Moderate Function
"If #1,#2, or #4 is Yes, then wetland is aut	omatically rated as high INONE -LOW or NO Function
K. Groundwater Interchange	Likely or not likely to Provide
	(Y or N)
1 Presence of seeps or springs	
2 Microrelett of wetland surface	
3 Sunicial geologic deposits under wetland a	
(e.g. alluvium)	
	2-3 (T) - Moderate Function V
8	I (Y) - MODERATE FUNCTION
· ·	None - Low or No Function

Wetland Functions Data Form

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WETLAND FUNCTIONS DATA FORM

Alaska Regulatory Best Professional Judgement Characterization Adapted from Regulartory Guidance Letter 09-01

Wetland ID: DP20 Date: 7	-20-13
Wetland Type: PSS PEMIE Investigator	s: C. Schudel J. Blank
A. Flood Flow Alteration (Storage and Desynchronization)	Likely or not likely to Provide (Y or N)
 Wetland occurs in the upper portion of its watershed. Wetland is relatively flat area and is capable of retaining higher volumes of water during storm events, than under normal rainfall events. Wetland is a closed (depressional) system. If flowthrough, wetland has constructed outlet with signs of fluctu water levels, algal mats, and/or lodged debris. Wetland has dense woody vegetation. Wetland receives floodwater from an adjacent water course. Floodwater come as sheet flow rather than channel flow. 	ating $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$
 B. Sediment Removal 1 Sources of excess sediment (from tillage, mining or construction) present upgradient of the wetland. 2 Slow-moving water and/or a deepwater habitat are present in the wetland. 3 Dense herbaceous vegetation is present. 4 Inerspersion of vegegetation and water is high in wetland. 5 Ponding of water is high in wetland. 6 Sediment deposits are present in wetland. 	are Likely or not likely to Provide (Y or N) 2 N 3 Y 4 N 5 A 6 N 4-6 (Y) - High Function 1-3 (Y) - Moderate Function √ None - Low or No Function
 Nutrient and Toxicant Removal Sources of excess nutrients (fertilizers) and toxicants (pesticides a heavy metals) are present upgradient of the wetland. Wetland is inundated or has indicators that flooding is a seasonal event during the growing season. Wetland provides long duration for water detention. Wetland has at least 30% aerial cover of live dense herbaceous vegetation. Fine grained mineral or organic materials are present for the wetland 	and Likely or not likely to Provide (Y or N) 1 <u>N</u> 2 <u>N</u> 3 <u>Y</u> 4 <u>Y</u> 5 <u>Y</u> 3-5 (Y) - High Function 1-2 (Y) - Moderate Function None - Low or No Function

NOTE: Base wetland function assessment on existing conditions, not future conditions.

Example Ranking: If ranking the capacity for a wetland to perform a given wetland function into high, moderate, low or none categories, use the following example as guidance. For Flood Flow Alteration, answering yes to five to seven attributes would rate the wetland as high functioning; answering yes to one to four attributes would rate the wetland as not answering yes to any attributes would rate the wetland as low, or if evaluator is certain the wetland does not perform this function, it can be rated as none.

Date: 7-20-13

		Likely or not likely to Provide
D.	Erosion Control and Shoreline Stabilization	(Y or N)
	(if associated with a watercourse or snoreline)	NAT
1	Weiland has dense, energy absorbing vegetation bordening the water	
	course and no evidence of erosion.	2
2	A herbaceous layer is part of this dense vegetation.	3
3	Trees and shrubs able to withstand erosive flood events are also part	
	of this dense vegetation.	2-3 (Y) - High Function
		1 (Y) - Moderate Function
		None - Low or No Function
E.	Production of Organic Matter and its Export	Likely or not likely to Provide
	-	(Y or N)
1	Wetland has at least 30% aerial cover of dense herbaceous	1 <u> </u>
	vegetation.	2 <u>N</u>
	Woody plants in wetland are mostly deciduous.	3 <u>N</u>
-	High degree of plant community structure, vegetation density, and	4 <u>N</u>
	species richness present.	5 N
	Linterspersion of vegetation and water is high in wetland.	6** 1
	Wetland is inundated or has indicators that flooding is a seasonal	
`	overt during the growing season	4-6 (Y) - High Function
	Wotland has outlet from which organic matter is flushed.**	1-3 (Y) - Moderate Function
	**** #6 in No. then wetland automatically rated as low or No function	None - Low or No Function
	A work with the second and a second and the second as the second se	Likely or not likely to Provide
r .	General Wildlife Habitat Sultability	(Y or N)
	(1) and the set for an entrol by development	
	Wetland is not tragmented by development.	
	2 Upland surround wetrand is undeveloped.	
	3 Wetland has connectivity with other habitat types.	
	4 Divserity of plant species is liigh.	
	5 Wetland has more than one Cowardin Class (e.g. PFO, PSS, PEW)	
	3 Has high degree of Corwardin Class interspersion	
	7 Evidence of wildlife use (e.g. tracks, scat, gnawed stumps) present.	
	·	5 7 (V) High Eurotion
		1 4 (V) Moderate Function
		Nono - Low or No Eunction
		None - Low of No Function
G.	General Fish Habitat	
	(Must be associated with a fish-bearing stream or lake)	(YOFN) NAT
	1 Wetland has perennial or intermittent surface-water connection to a	1
l i	fish-bearing water body.	2
1	2 Wetland has sufficient size and depth of open water so as not to	3
1	freeze completely during winter.	4
	3 Observation of fish.	5
	4 Herbaceous and/or woody vegetation is present in wetland and/or	6
ļ	buffer to provide cover, shade, and/or detrital matter.	
1	5 Spawning areas are present (aquatic vegetation and/or gravel beds).	4-6 (Y) - High Function
1	6 Juvenile rearing areas.	1-3 (Y) - Moderate Function
		None - Low or No Function
Н	Native Plant Richness	Likely or not likely to Provide
ľ"		(Y or N)
1	t. Dominant and codominant plants are native.	
	1 Molland contains two or more Cowardin Classes	2 1
1	2 Wetland bas three or more strate of venetation	3
1	a wetland has miles of more strate of vegetation.	4 N
1	4 Wellahu has malule nees.	3-4 (Y) - High Function
1		1-2 (Y) - Moderate Function
		None - Low or No Function

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1.	Educational or Scientific Value	Elfectre og met Blechete Duevelde
1		Likely of not likely to Provide
		(Y or N)
	1 Site has documented scientific or educational use.	1 1 N
	2 Wetland is in public ownership	2
	3 Accessible trails available.	3 41
		2-3 (Y) - High Function
		1 (Y) - Moderate Function
	· 0,	None - Low or No Eulerion
J.	Unloveness and Heritage	I that as not life into Provid
		LIKELY OF NOT LIKELY TO PROVIDE
ĺ	4. Watland contains documented occurrences of a state or federally	(Y,or N)
		1** <u>N</u>
	listed threatened or endanged species.**	2** N
	2 Weltand contains documented critical habitat, high quality	3
ł	ecosystems, or priority species respectively designated by the	4** <u>N</u>
	USFWS.**	·/V
l	3 Wetland has biological, geological, or other features that are	
l ·	determined to be rare.	
1	4 Watland time is a highly valuable watland time of the Orate th	3-4 (Y) - High Function
l I	**** ## #0. ov #4 in Man then wetter the automation to be the	1-2 (Y) - Moderate Function
<u> </u>	If #1,#2, of #4 is res, then wetland is automatically rated as high	None - Low or No Function
к.	Groundwater Interchange	Likely or not likely to Provide
1		(Y or N)
1	1 Presence of seeps or springs	
l –	2 Microreleif of wetland surface	
1	3 Surficial geologic deposits under wetland are permeable	
1	(e.a. alluvium)	, <u> </u> ,
I	(
I.		2-3 (Y) - High Function
1		1 (Y) - Moderate Function ✓
	· · · · · · · · · · · · · · · · · · ·	None - Low or No Function

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WETLAND FUNCTIONS DATA FORM

Alaska Regulatory Best Professional Judgement Characterization Adapted from Regulatory Guidance Letter 09-01

Wetland ID: DP22 Date:	7-20-13
Wetland Type: PEM I P5515 Investiga	tors: C. Schudel J. Blank
A. Flood Flow Alteration	likely or not likely to Broyido
(Storage and Desynchronization)	(Y or N)
1 Wetland occurs in the upper portion of its watershed.	1 NJ
2 Wetland is relatively flat area and is capable of retaining high	er 2 1
volumes of water during storm events, than under normal rain	fall 3 X U
events.	4
3 Wetland is a closed (depressional) system.	5
4 If flowthrough, wetland has constructed outlet with signs of flue	ctuating 6 N
water levels, algal mats, and/or lodged debris.	7 <u>N</u>
5 Wetland has dense woody vegetation.	
6 Wetland receives floodwater from an adjacent water course.	5-7 (Y) - High Function 🕅
7 Floodwater come as sheet flow rather than channel flow.	1-4 (Y) - Moderate Function V
P. Cadimant Damaus	None - Low or No Function
D. Sediment Removal	Likely or not likely to Provide
1 Sources of example and mont //rem tillens intrins and in the	(Y or N)
present upgradient of the wetland	on) are 1 <u>N</u>
2 Slow-moving water and/or a deenwater habitat are present in t	$\frac{2}{N}$
wetland.	
3 Dense herbaceous vegetation is present	
4 Inerspersion of vegegetation and water is high in wetland	$6 - \frac{\gamma}{M}$
5 Ponding of water is high in wetland.	
6 Sediment deposits are present in wetland.	4-6 (Y) - High Eurotion
	1-3 (Y) - Moderate Function
	None - Low or No Function
C. Nutrient and Toxicant Removal	Likely or not likely to Provide
	(Y or N)
 Sources of excess nutrients (fertilizers) and toxicants (pesticide 	es and 1 N
heavy metals) are present upgradient of the wetland.	2 1
2 Wetland is inundated or has indicators that flooding is a seaso	nal 3 🗸
event during the growing season.	4
3 Wetland provides long duration for water detention.	5 _ Y
4 vvettand has at least 30% aerial cover of live dense herbaceout variatetion	is
vegetation,	3-5 (Y) - High Function √
o Fine grained mineral or organic materials are present for the w	etland. 1-2 (Y) - Moderate Function
	None - Low or No Function

NOTE: Base wetland function assessment on existing conditions, not future conditions.

Example Ranking: If ranking the capacity for a wetland to perform a given wetland function into high, moderate, low or none categories, use the following example as guidance. For Flood Flow Alteration, answering yes to five to seven attributes would rate the wetland as high functioning; answering yes to one to four attributes would rate the wetland as moderate; and not answering yes to any attributes would rate the wetland as iow, or if evaluator is certain the wetland does not perform this function, it can be rated as none.

Date: 7-20-13

n	Frosion Control and Shoreline Stabilization	Likely or not likely to Provide
<i>.</i>	(if associated with a watercourse or shoreline)	(Yor N)
	(n dobblated man a naterodies er endemer	NA NA
1	Wetland has dense, energy absorbing vegetation bordering the water	1 .
I	course and no evidence of erosion.	2
9	A horbaceous laver is part of this dense venetation.	3
2	Trees and shrubs able to withstand erosive flood events are also part	· · · · · · · · · · · · · · · · · · ·
	of this dance vegetation	2-3 (Y) - High Function
	of this delise vegetation.	1 (Y) - Moderate Eunction
		None - Low or No Function
c	Production of Organic Matter and its Export	Likely or not likely to Provide
L .	1 Toddonon of organic matter and the English	(Y or N)
• •	Wetland has at least 30% aerial cover of dense herbaceous	
		2 1
	Woody plants in wetland are mostly deciduous.	3 344 1
	B High degree of plant community structure, vegetation density, and	4
	snacies richness present	5 N
	L Interspersion of vegetation and water is high in wetland.	6** ~/
	5 Wettand is inundated or has indicators that flooding is a seasonal	
i.	event during the growing season.	4-6 (Y) - High Function
4	Wetland has outlet from which organic matter is flushed.**	1-3 (Y) - Moderate Function
, c	**If #6 is No, then wetland automatically rated as low or No function	None - Low or No Function
E	Conoral Wildlife Habitat Suitability	Likely or not likely to Provide
г.	General windine matheat Sunability	(Y or N)
	t Motiond is not fragmented by development	1 1
	Listend auround watend is undeveloped	
	2 Opiand surround weitand is undeveloped.	
	A Diversity of plant spacios is high	4 1
	4 Divisionity of plant species is high,	
	b Wetland has more than one Cowardin Class (e.g. FFC, FSS, FEW)	
	6 Has high degree of Corwardin Class interspersion	
	/ Evidence of wilding use (e.g. fracks, scar, gnawed stumps) present.	·
		5-7 (Y) - High Function
		1-4 (Y) - Moderate Function
		None - Low or No Function
C	Conorol Fich Habitat	Likely or not likely to Provide
а.	General Fish habitat	(Y or N) AIA
	(MUST De associated with a fish-bearing stream of fake)	
	t Wetland has perennial or intermittent surface-water connection to a	1
	fish-bearing water hody	2
	2 Wetland has sufficient size and denth of open water so as not to	3
	freeze completely during winter.	• 4
	3 Observation of fish	5
	Herbaceous and/or woody venetation is present in wetland and/or	6
ĺ	buffer to provide cover shade and/or detrital matter	· .
	5 Spowning areas are present (aquatic vegetation and/or gravel bade)	4-6 (Y) - High Function
	o opamining areas are procent (aquano vegotation and/or gravor boas). 6. huvenilo reazing areas	1-3 (Y) - Moderate Function
	o ouvering rearing areas.	None - Low or No Function
	Notive Plant Richness	Likely or not likely to Provide
п.		(Y or N)
	1. Deminant and codominant plants are nativo	1 1
	1 Dominant and codominant plants are native.	
	2 Wettand contains two or more clowardin classes.	3
	3 wetland has three or more strata of vegetation.	
	a Set of the later strategies because the set of the se	
	4 Wetland has mature trees.	4 (V) High Europion V
	4 Wetland has mature trees.	4 <u>K</u> V) 3-4 (Y) - High Function

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Date: 7-20-18

 Educational or Scientific Value 1 Site has documented scientific or educational use. 2 Wetland is in public ownership 3 Accessible trails available. 	Likely or not likely to Provide (Y or N) 1 <u>N</u> 2 <u>Y</u> 3 N
	2-3 (Y) - High Function 1 (Y) - Moderate Function None - Low or No Function
J. Uniqueness and Heritage	Likely or not likely to Provide
 Wetland contains documented occurrences of a state or federally listed threatened or endanged species.** Wetland contains documented critical habitat, high quality ecosystems, or priority species respectively designated by the USFWS.** Wetland has biological, geological, or other features that are determined to be rare. Wetland type is a highly valuable wetland type of the State.** **If #1,#2, or #4 is Yes, then wetland is automatically rated as high 	$\begin{array}{c} (Y \text{ or } N) \\ 1^{**} \\ 2^{**} \\ 3 \\ 4^{**} \\ 3^{**} \\ 1^{*} \\ 1^{*} \\ 3^{*} \\ 1^{*} \\$
 K. Groundwater Interchange 1 Presence of seeps or springs 2 Microreleif of wetland surface 3 Surficial geologic deposits under wetland are permeable (e.g. alluvium) 	Likely or not likely to Provide (Y or N) 1 2 3 2-3 (Y) - High Function √ 1 (Y) - Moderate Function None - Low or No Function

WETLAND FUNCTIONS DATA FORM

Alaska Regulatory Best Professional Judgement Characterization Adapted from Regulartory Guidance Letter 09-01

Wetland ID: DP23 Date: 7-2	1-13
Wetland Type: PEM ISSIC (topo Lows) Investigators:	C.Schudel J. Blank
A. Flood Flow Alteration (Storage and Desynchronization)	Likely or not likely to Provide (Y or N)
 Wetland occurs in the upper portion of its watershed. Wetland is relatively flat area and is capable of retaining higher volumes of water during storm events, than under normal rainfall events. Wetland is a closed (depressional) system. If flowthrough, wetland has constructed outlet with signs of fluctuating water levels, algal mats, and/or lodged debris. Wetland has dense woody vegetation. Wetland receives floodwater from an adjacent water course. Floodwater come as sheet flow rather than channel flow. 	$\begin{array}{c ccccc} 1 & N \\ 2 & A & Y \\ 3 & N \\ 4 & Y \\ 5 & & \\ 5 & & \\ 6 & & \\ 7 & N \\ 5 & & \\ 5 & & \\ 6 & & \\ 7 & & \\ 5 & & \\ 7 & & \\ 5 & & \\ 5 & & \\ 7 & & \\ 5 & & \\ 5 & & \\ 7 & & \\ 5 & & \\ 5 & & \\ 7 & & \\ 7 & & \\ 5 & & \\ 7 & \\$
 B. Sediment Removal 1 Sources of excess sediment (from tillage, mining or construction) are present upgradient of the wetland. (<i>Frrm Grant Cr.</i>) 2 Slow-moving water and/or a deepwater habitat are present in the wetland. 3 Dense herbaceous vegetation is present. 4 Inerspersion of vegegetation and water is high in wetland. 5 Ponding of water is high in wetland. 6 Sediment deposits are present in wetland. 	Likely or not likely to Provide (Y or N) 1 2 3 4 4 5 6 N 4-6 (Y) - High Function 1-3 (Y) - Moderate Function None - Low or No Function
 C. Nutrient and Toxicant Removal 1 Sources of excess nutrients (fertilizers) and toxicants (pesticides and heavy metals) are present upgradient of the wetland. 2 Wetland is inundated or has indicators that flooding is a seasonal event during the growing season. 3 Wetland provides long duration for water detention. 4 Wetland has at least 30% aerial cover of live dense herbaceous vegetation. 5 Fine grained mineral or organic materials are present for the wetland. 	Likely or not likely to Provide (Y or N) 1 N 2 Y 3 Y 4 Y 3-5 (Y) - High Function 1-2 (Y) - Moderate Function None - Low or No Function

NOTE: Base wetland function assessment on existing conditions, not future conditions.

Example Ranking: If ranking the capacity for a wetland to perform a given wetland function into high, moderate, low or none categories, use the following example as guidance. For Flood Flow Alteration, answering yes to five to seven attributes would rate the wetland as high functioning; answering yes to one to four attributes would rate the wetland as moderate; and not answering yes to any attributes would rate the wetland as low, or if evaluator is certain the wetland does not perform this function, it can be rated as none.

Date: 7-21-13

Wetland ID: DP 23

h		Erosion Control and Shoreline Stabilization	Likely or not likely to Provide
D.		(if accessibled with a watercourse or charaline)	(Y or N)
		(n associated with a watercourse of shorewite)	(1 0.11)
	1	Wetland has dense, energy absorbing vegetation bordering the water	
		course and no evidence of erosion.	2
	2	A herbaceous layer is part of this dense vegetation.	3
	3	Trees and shrubs able to withstand erosive flood events are also part	· · ·
		of this dense vegetation.	2-3 (Y) - High Function √
			1 (Y) - Moderate Function
			None - Low or No Function
-		Descluption of Organia Matter and its Export	Likely or not likely to Provide
5.		Production of Organic Matter and its Export	(V or N)
	1	Wetland has at least 30% aerial cover of dense neroaceous	
		vegetation.	$\frac{2}{\gamma}$
	2	Woody plants in wetland are mostly deciduous.	3
	З	High degree of plant community structure, vegetation density, and	
		species richness present.	5
	4	Interspersion of vegetation and water is high in wetland.	6** <u>'</u>
1	5	Wetland is inundated or has indicators that flooding is a seasonal	· · /
1	-	event during the growing season.	4-6 (Y) - High Function V
	6	Wetland has outlet from which organic matter is flushed.**	1-3 (Y) - Moderate Function
	0	**If #6 is No, then wetland automatically rated as low or No function	None - Low or No Function
		A works No, then we dance automationary raised at for or no remember.	Likely or not likely to Provide
F.		General wildlife Habitat Sunability	
	1	Wetland is not fragmented by development.	
	2	Upland surround wetland is undeveloped.	
	З	Wetland has connectivity with other habitat types.	
1	4	Divserity of plant species is high.	4
	5	Wetland has more than one Cowardin Class (e.g. PFO, PSS, PEM)	5
	6	Has high degree of Corwardin Class interspersion	6 '\
	7	Evidence of wildlife use (e.g. tracks, scat, gnawed stumps) present.	7 7
			,
			5-7 (Y) - High Function V
			1-4 (Y) - Moderate Function
			None - Low or No Function
<u> </u>		O	Likely or not likely to Provide
G.		General Fish Habitat	(V or N) a later
1 ·		(Must be associated with a lish-bearing stream or lake)	(FOIN) AA
	1	Wetland has perennial or intermittent surface-water connection to a	
		fish-bearing water body.	2 <u>N</u>
	2	Wetland has sufficient size and depth of open water so as not to	3 <u>N</u>
		freeze completely during winter.	4
	З	Observation of fish.	5 <u>Y</u>
	4	Herbaceous and/or woody vegetation is present in wetland and/or	6 4
	,	buffer to provide cover, shade, and/or detrital matter.	
	5	Snawning areas are present (aquatic vegetation and/or gravel beds).	4-6 (Y) - High Function 🗸
	6	by only another areas	1-3 (Y) - Moderate Function
	0	Juvenine learny areas.	None - Low or No Function
<u> </u>			Likely or not likely to Provide
Н.		Native Plant Richness	
	1	Dominant and codominant plants are native.	
	2	Wetland contains two or more Cowardin Classes.	
	3	Wetland has three or more strata of vegetation.	3
	4	Wetland has mature trees.	4
			3-4 (Y) - High Function 🗸
			1-2 (Y) - Moderate Function
			None - Low or No Function

Date: 7-21-13

Wetland ID: <u>DP23</u>

1.	Educational or Scientific Value	Likely or not likely to Provide
		(Y or N)
1	1 Site has documented scientific or educational use.	1 N
	2 Wetland is in public ownership	$\frac{1}{2}$
	3 Accessible trails available.	
1		
		2-3 (Y) - High Function
		1 (Y) - Moderate Function V
		None - Low or No Function
J.	Uniqueness and Heritage	Likely or not likely to Provide
ſ		(Y pr N)
	Wetland contains documented occurrences of a state or federally	1**
	listed threatened or endanged species.**	2**
	2 Weltand contains documented critical habitat, high quality	3
	ecosystems, or priority species respectively designated by the	4** <u>N</u>
	0 Weilend hee highering and since an allow that we like the	
	o weitand has biological, geological, or other teatures that are	
	determined to be falle,	3-4 (Y) - High Function
	/ # weitand type is a nightly valuable wetland type of the State.	1-2 (Y) - Moderate Function
	in #1,#2, of #4 is res, men welland is automatically rated as high	None - (Low pr No Function
к.	Groundwater Interchange	Likely or not likely to Provide
Į		(Y or N)
ĺ	1 Presence of seeps or springs	1 <u>N</u>
	2 Microreleit of wetland surface	2
	(e.g. alluvium)	3
		2-3 (Y) - High Function 🗸
		1 (Y) - Moderate Euroction
		None - Low or No Eurotion

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WETLAND FUNCTIONS DATA FORM

Alaska Regulatory Best Professional Judgement Characterization Adapted from Regulatory Guidance Letter 09-01

Wetland ID: DP 24 JB Date: 7-22-13	3				
Wetland Type: REAT 1 SSTC (topo bowg) nvestigators: C. Schudel J. Blank					
A. Flood Flow Alteration	Likely or not likely to Provide				
(Storage and Desynchronization)	(Y or N)				
1 Wetland occurs in the upper portion of its watershed.	1 N				
2 Wetland is relatively flat area and is capable of retaining higher	2 1				
volumes of water during storm events, than under normal rainfall	3 N				
events,	4 <u>4</u> N				
3 Wetland is a closed (depressional) system.	5				
4 If flowthrough, wetland has constructed outlet with signs of fluctuating	6				
water levels, algal mats, and/or lodged debris.	7 N				
5 Wetland has dense woody vegetation.					
6 Wetland receives floodwater from an adjacent water course.	5-7 (Y) - High Function				
7 Floodwater come as sheet flow rather than channel flow.	1-4 (Y) - Moderate Function 🗸				
	None - Low or No Function				
B. Sediment Removal	Likely or not likely to Provide				
	(Y or N)				
1 Sources of excess sediment (from tillage, mining or construction) are	1 <u>N</u>				
A Slow moving water and/er a dearwater babilitation	2				
2 Slow-moving water and/or a deepwater nabitat are present in the					
3 Dense berbasseus vagetation is present	$4 - \frac{\gamma}{1}$				
 Dense inerbaceous vegeration and water is bish in wetland 					
5 Ponding of water is bigh in wetland	6				
A Sediment denosite are present in watland					
o occantoni deposita are present in weitand.	4-6 (1) - High Function V				
	Nono Low of No Eurotion				
C Nutrient and Toxicant Removal	I likely of the Function				
or notion and sociount nonova:	Likely of not likely to Provide				
1 Sources of excess nutrients (fertilizers) and toxicants (nesticides and					
heavy metals) are present upgradient of the wetland					
2 Wetland is inundated or has indicators that flooding is a seasonal					
event during the growing season.					
3 Wetland provides long duration for water detention.					
4 Wetland has at least 30% aerial cover of live dense herbaceous					
vegetation.	3-5 (Y) - High Function				
5 Fine grained mineral or organic materials are present for the wetland.	1-2 (Y) - Moderate Function				
	None - Low or No Function				

NOTE: Base wetland function assessment on existing conditions, not future conditions.

Example Ranking: If ranking the capacity for a wetland to perform a given wetland function into high, moderate, low or none categories, use the following example as guidance. For Flood Flow Alteration, answering yes to five to seven attributes would rate the wetland as high functioning; answering yes to one to four attributes would rate the wetland as moderate; and not answering yes to any attributes would rate the wetland as low, or if evaluator is certain the wetland does not perform this function, it can be rated as none.

Date: <u>7-22-1</u>3

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Wetland ID: DP24

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	Erosion Control and Shoreline Stabilization	Likely or not likely to Provide
Ľ.	(if associated with a watercourse or shoreline)	(Y or N)
	() associated min a materiolarise of shorowing	
	1 Wetland has dense, energy absorbing vegetation bordering the wate	r 1 N
Į –	course and no evidence of erosion.	2
	2 A herbaceous laver is part of this dense vegetation.	3 1
1	3 Trees and shrubs able to withstand erosive flood events are also part	t 1 - 1
	of this dense vegetation.	2-3 (Y) - High Function
	2,	1 (Y) - Moderate Function
		None - Low or No Function
F.	Production of Organic Matter and its Export	Likely or not likely to Provide
[_'		(Y or N)
	1 Wetland has at least 30% aerial cover of dense herbaceous	1 4
	vegetation	2 1
	2 Woody plants in wetland are mostly deciduous.	3 4 1
	3 High degree of plant community structure, vegetation density, and	4 4
1	species richness present.	5 1
	4 Interspersion of vegetation and water is high in wetland.	6** 7
	5 Wetland is inundated or has indicators that flooding is a seasonal	
1	event during the growing season.	4-6 (Y) - High Function√
1	6 Wetland has outlet from which oroanic matter is flushed.**	1-3 (Y) - Moderate Function
	**If #6 is No, then wetland automatically rated as low or No function	None - Low or No Function
F	General Wildlife Habitat Sultability	Likely or not likely to Provide
ľ.	deneral midine manual editability	(Y or N)
	1 Wetland is not fragmented by development	1 V
	2 Lipland surround wetland is undeveloped.	2 1
	3 Wetland has connectivity with other habitat types.	$\frac{1}{3}$ $\frac{1}{\sqrt{3}}$
	4 Divserity of plant species is high.	4 N
	5 Wetland has more than one Cowardin Class (e.g. PEO, PSS, PEM	5 7
	6 Has biob degree of Convardin Class interspersion	6 <u>414</u>
	7 Evidence of wildlife use (e.g. tracks, scat, gnawed stumps) present.	7 -1
	7 Evidence of malife abe (eig. waske) osal granea etamper process	
		5-7 (Y) - High Function
		1-4 (Y) - Moderate Function
		None - Low or No Function
	General Fish Habitat	Likely or not likely to Provide
Ŭ.	(Must be associated with a fish-bearing stream or lake)	$(Y \text{ or } N) \rightarrow \pm 4$
I '	(Must be associated min a new searing encant of hanoy	tor.
	1 Metland has perennial or intermittent surface-water connection to a	1
	fieb-bearing water body	2 1
	2 Wetland has sufficient size and denth of open water so as not to	3 <u>V</u>
1	freeze completely during winter.	4 1
1	3 Observation of fish.	5 4
1	4 Herbaceous and/or woody vegetation is present in wetland and/or	6
	buffer to provide cover, shade, and/or detritat matter.	
	5 Snawning areas are present (aquatic vegetation and/or gravel bads)	4-6 (Y) - High Function
	6 Juvenile rearing areas.	1-3 (Y) - Moderate Function
	o outorino fouring diouor	None - Low or No Function
	Native Plant Bichness	Likely or not likely to Provide
Ľ.	Hallike Flaint Filoniness	(Y or N)
1	1 Dominant and codominant plants are native	
	1 Dominant and coursening in plants are native, 2 Watland containe two or more Cowardin Classes	2
	2 Wetland Contains two or more strate of vegetation	
1	3 weitanu has intee or more sitala or vegetation.	
1	4 weganu has malure nees.	3-4 (V) - High Function M
		1-9 (V) - Moderate Eurotion
		None - Low or No Eurotion
1		NONG - LOW OF NO FUNCTION

Educational or Scientific Volue	
	Likely or not likely to Provide
1 Olio has desceribule desta differenza di sul	(Y or N)
1 Site has documented scientific or educational use.	1 <u>N</u>
2 Wetland is in public ownership	2 1
3 Accessible trails available.	3 <u>N</u>
2	-3 (Y) - High Function
1	(Y) - Moderate Function
N	lone - Low or No Function
J. Uniqueness and Heritage	Likely or not likely to Provide
	(Y or N)
1 Wetland contains documented occurrences of a state or federally	1** A
listed threatened or endanged species.**	2**
2 Weltand contains documented critical habitat, high quality	$3 \overline{\lambda}$
ecosystems, or priority species respectively designated by the	4** <u> </u>
USFWS.**	- <u>///</u>
3 Wetland has biological, geological, or other features that are	v. :
determined to be rare.	-4 (Y) - High Function
4 Wetland type is a highly valuable wetland type of the State.**	-2 (Y) - Mederate Eulotion
**If #1,#2, or #4 is Yes, then wetland is automatically rated as high	one -Low dr No Eunction
K. Groundwater Interchange	Likely or not likely to Provide
	(V or N)
1 Presence of seeps or springs	
2 Microreleif of wetland surface	
3 Surficial geologic deposits under wetland are permeable	
(e.g. alluvium)	°
	9 (V) High Europies
	(1) - Moderate Function
	one - Low or No Function

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WETLAND FUNCTIONS DATA FORM

Alaska Regulatory Best Professional Judgement Characterization Adapted from Regulatory Guidance Letter 09-01

Wetland ID:	DP25	Date:	7-27	2-13	
Wetland Type:	PEM-/5510 17=	3MIC Invest	tigators:	C.Schvolel	J. Blank
A. Flood Fic (Storage	ow Alteration and Desynchronization)			Likely or	not likely to Provide (Y or N)
 Wetland a Wetland i volumes a events. Wetland i If flowthro water leve Wetland i Wetland i Wetland i Wetland i Wetland i Wetland i 	occurs in the upper portion s relatively flat area and is of water during storm even s a closed (depressional) : ough, wetland has construc- ols, algal mats, and/or lodg has dense woody vegetation receives floodwater from a er come as sheet flow rath	of its watershed. capable of retaining hi ts, than under normal i system. sted outlet with signs of jed debris. on. n adjacent water cours er than channel flow.	igher rainfall f fluctuating se.	1 2 3 4 5 5 7 5-7 (Y) - High 1-4 (Y) - Moc	N N N N N N N N N N N N N N N N N N N
 B. Sediment 1 Sources o present up 2 Slow-movi wetland. 3 Dense hei 4 Inerspersii 5 Ponding o 6 Sediment 	Removal if excess sediment (from til ogradient of the wetland, ing water and/or a deepwa rbaceous vegetation is pre on of vegegetation and wa if water is high in wetland, deposits are present in we	llage, mining or constru iter habitat are present sent. iter is high in wetland, etland.	uction) are t in the	Likely or 1 1 2 - 3 4 - 5 - 4-6 (Y) - Higt 1-3 (Y) - Mod None - Low c	not likely to Provide (Y or N)
 C. Nutrient a 1 Sources of heavy met 2 Wetland is event durir 3 Wetland pi 4 Wetland his vegetation 5 Fine grains 	nd Toxicant Removal excess nutrients (fertilized als) are present upgradien inundated or has indicato 19 the growing season. rovides long duration for w as at least 30% aerial cove ed mineral or organic mate	rs) and toxicants (pesti It of the wetland. rs that flooding is a se rater detention. er of live dense herbac erials are present for th	icides and asonat eous e wetland.	Likely or r 1	Provide (Y or N) Function √ erate Function r No Function

NOTE: Base wetland function assessment on existing conditions, not future conditions.

Example Ranking: If ranking the capacity for a wetland to perform a given wetland function into high, moderate, low or none categories, use the following example as guidance. For Flood Flow Alteration, answering yes to five to seven attributes would rate the wetland as high functioning; answering yes to one to four attributes would rate the wetland as moderate; and not answering yes to any attributes would rate the wetland as low, or if evaluator is certain the wetland does not perform this function, it can be rated as none.

Date: 7-22-13

	Likely of not likely to Dravida
D. Erosion Control and Shoreline Stabilization	Likely or not likely to Provide
(if associated with a watercourse or shoreline)	
	LA ·
1 Wetland has dense, energy absorbing vegetation bordering the water	1
course and no evidence of erosion.	2 _/
2 A herbaceous layer is part of this dense vegetation.	З <u>И</u>
3 Trees and shrubs able to withstand erosive flood events are also part	
of this dense vegetation	2-3 (Y) - High Function √
of this dense vogetation	1 (Y) - Moderate Function
	None - Low or No Function
	Likely or not likely to Broyide
E. Production of Organic Matter and its Export	
	(Y OF N)
1 Wetland has at least 30% aerial cover of dense herbaceous	
vegetation.	2
2 Woody plants in wetland are mostly deciduous.	3 <u>N</u>
3 High degree of plant community structure, vegetation density, and	4
species richness present.	5
A Interspersion of vegetation and water is high in wetland.	6** 7.
5 Wetland is inundated or has indicators that flooding is a seasonal	
D We chang is a resulting concort	4-6 (Y) - High Function
event during the growing season.	1-3 (Y) - Moderate Function
6 Wetland has outlet from which organic matter is hushed.	None - Low or No Eurotion
**If #6 is No, then wetland automatically rated as low of No function	None - Low of No Fallence Drevide
F. General Wildlife Habitat Suitability	Likely or not likely to Provide
	(Y or N)
1 Wetland is not fragmented by development.	1 <u>`}</u>
2 Unland surround wetland is undeveloped.	2
3 Wetland has connectivity with other habitat types.	3
4 Divserity of plant species is high.	4
5 Wattend besimere then one Cowardin Class (e.g. PEO, PSS, PEM)	5 7
6 Use birb degree of Converdin Class interspersion	6
6 Has high degree of Corwardin Class interspersion	
7 Evidence of wildlife use (e.g. tracks, scat, ghawed stumps) present.	· · · · · · · · · · · · · · · · · · ·
	C Z (V) Allich Eurotion
	5-7 (f) - High Fullction +
	1-4 (Y) - Moderate Function
	None - Low or No Function
G. General Fish Habitat	Likely or not likely to Provide
(Must be associated with a fish-bearing stream or lake)	. (Y or N)
t Wetland has parampial or intermittent surface-water connection to a	1 44
i welanu nas perennar or internation sunace mater connocion to a	2 XEN
INST-Dealing water bouy.	
2 Wetland has sufficient size and depth of open water so as not to	
treeze completely dunng winter.	
3 Observation of fish.	
4 Herbaceous and/or woody vegetation is present in wetland and/or	
buffer to provide cover, shade, and/or detrital matter.	
5 Spawning areas are present (aquatic vegetation and/or gravel beds).	4-6 (Y) - High Function ✓ 🔏
6 Juvenile rearing areas.	1-3 (Y) - Moderate Function
	None - Low or No Function
H Native Plant Bichness	Likely or not likely to Provide
	(Y or N)
the sector design is a state of a state of the	
1 Dominant and codominant plants are native.	
2 Wetland contains two or more Cowardin Classes.	
3 Wetland has three or more strata of vegetation.	
4 Wetland has mature trees.	4 <u>N</u>
	3-4 (Y) - High Function
	1-2 (Y) - Moderate Function
	None - Low or No Function
	HAOUR - FOM OLLIO L RUCION

Date: <u>7.22-1</u>B

1. Educational or Scientific value Likely or not likely to Pro 1 Site has documented scientific or educational use. 1	vide
1 Site has documented scientific or educational use.	
1 Site has documented scientific or educational use.	
2 Wetland is in public ownership 2 $$	
3 Accessible trails available. 3	
2-3 (Y) - High Function	
1 (Y) - Moderate Function 🗸	
None - Low or No Function	
J. Uniqueness and Heritage Likely or not likely to Pro-	vide
(Y or N)	
1 Wettand contains documented occurrences of a state or federally	
listed threatened or endanged species.** 2** 2**	
2 Weltand contains documented critical habitat, high quality 3	
ecosystems, or priority species respectively designated by the 4**	
USFWS.**	
3 Wetland has biological, geological, or other features that are	
determined to be rare. 3-4 (Y) - High Function	
4 Wetland type is a highly valuable wetland type of the State.** 1-2 (Y) - Moderate Function	
**If #1,#2, or #4 is Yes, then wetland is automatically rated as high None - Low or No Function	
K. Groundwater Interchange Likely or not likely to Pro-	/ide
(Y or N)	
1 Presence of seeps or springs	
2 Microreleif of wetland surface	
3 Surficial geologic deposits under wetland are permeable 3	
(e.g. alluvium)	
2-3 (Y) - High Function	
1 (Y) - Moderate Function	
None - Low or No Function	

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WETLAND FUNCTIONS DATA FORM

Alaska Regulatory Best Professional Judgement Characterization

Adapted noni Regula	anory Gu	luance	Letter	9-01	
p27	Date:	7-	23-1	13	
'emie	Investig	ators:	C.Scl	hudel	J. Blank
Iteration					not likely to Brayida
Desynchronization)				LIKEIYOI	(Y or N)
rs in the upper portion of its watersha atively flat area and is capable of ret ter during storm events, than under losed (depressional) system. wetland has constructed outlet with Igal mats, and/or lodged debris. lense woody vegetation. ves floodwater from an adjacent water me as sheet flow rather than choose	ed. aining higi normal rai signs of fi er course.	ner nfall uctuatir	ng .	1 2 3 4 5 6 7 5-7 (Y) - Hig	$\begin{array}{c} Y \\ Y \\ N \\ N \\ N \\ Y \\ Y \\ Y \\ Y \\ Y \\$
	a now.			1-4 (Y) - MO(None - Louv	derate Function
noval				Likely or	met likeliste Drestels
eess sediment (from tillage, mining o dient of the wetland. vater and/or a deepwater habitat are eous vegetation is present. vegegetation and water is high in w er is high in wetland. osits are present in wetland.	r construc present in etland.	tion) an	e	1 2 3 4 5 6 4-6 (Y) - Higi 1-3 (Y) - Moo	Not likely to Provide (Y or N) → → → → → → → → → → → → →
oxicant Hemoval ess nutrients (fertilizers) and toxican are present upgradient of the wetland indated or has indicators that flooding e growing season. es long duration for water detention. least 30% aerial cover of live dense ineral or organic materials are prese	ts (pesticio d. I is a seas herbaceo nt for the v	des and onal us vetland	1 L 1	Likely or 1 2 3 4 5 3-5 (Y) - High 1-2 (Y) - Mod None - Low of	not likely to Provide (Y or N) <u>N</u> <u>Y</u> <u>Y</u> T Function J erate Function or No Euroction
	Adapted norm Regula PCF PEWNE Iteration Desynchronization) rs in the upper portion of its watership atively flat area and is capable of ret ter during storm events, than under losed (depressional) system. wetland has constructed outlet with lgal mats, and/or lodged debris. ense woody vegetation. /es floodwater from an adjacent water me as sheet flow rather than channel noval ress sediment (from tillage, mining o lient of the wetland. rater and/or a deepwater habitat are eous vegetation is present. vegegetation and water is high in w er is high in wetland. isits are present in wetland. foxicant Removal ess nutrients (fertilizers) and toxican are present upgradient of the wetland idated or has indicators that flooding e growing season. es long duration for water detention. least 30% aerial cover of live dense ineral or organic materials are presen	PCH Date: PEMIE Investig Iteration Desynchronization) rs in the upper portion of its watershed. atively flat area and is capable of retaining high ter during storm events, than under normal rai losed (depressional) system. welland has constructed outlet with signs of fligal mats, and/or lodged debris. ense woody vegetation. res floodwater from an adjacent water course. me as sheet flow rather than channel flow. noval ress sediment (from tillage, mining or constructilient of the wetland. rater and/or a deepwater habitat are present in sous vegetation is present. vegegetation and water is high in wetland. er is high in wetland. rest are present in wetland. foxicant Removal ess nutrients (fertilizers) and toxicants (pesticicater present upgradient of the wetland. red are present upgradient of the wetland. red are present upgradient of the wetland. red ated or has indicators that flooding is a sease e growing season. es long duration for water detention. least 30% aerial cover of live dense herbaceo ineral or organic materials are present for the velant	Date: 7 Date: 7 PEMIE Investigators: Iteration Desynchronization) rs in the upper portion of its watershed. atively flat area and is capable of retaining higher ter during storm events, than under normal rainfall losed (depressional) system. welland has constructed outlet with signs of fluctuating light mats, and/or lodged debris. lense woody vegetation. ves floodwater from an adjacent water course. ress sediment (from tillage, mining or construction) ar ilent of the wetland. arear and/or a deepwater habitat are present in the excus vegetation is present. vegegetation is present. vegegetation and water is high in wetland. ress nutrients (fertilizers) and toxicants (pesticides and are present in wetland. ress nutrients (fertilizers) and toxicants (pesticides and are present upgradient of the wetland. readited or has indicators that flooding is a seasonal e growing season. es long duration for water detention. least 30% aerial cover of live dense herbaceous ineral or organic materials are present for the wetland.	PCF Date: 7-23- PGMIE Investigators: C.Sc Iteration Desynchronization) rs in the upper portion of its watershed. atively flat area and is capable of retaining higher iter during storm events, than under normal rainfall losed (depressional) system. welland has constructed outlet with signs of fluctuating ligal mats, and/or lodged debris. ense woody vegetation. ves floodwater from an adjacent water course. me as sheet flow rather than channel flow. noval ess sediment (from tillage, mining or construction) are iter and/or a deepwater habitat are present in the eous vegetation is present. vegegetation and water is high in wetland. er is high in wetland. wisits are present in wetland. ess nutrients (fertilizers) and toxicants (pesticides and are present upgradient of the wetland. oxicant Removal es ong duration for water detention. least 30% aerial cover of live dense herbaceous erial or organic materials are present for the wetland.	PCF Date: 7 - 2.3 - 1.3 PGMIE Investigators: C.Sch used Iteration Desynchronization) 1 rs in the upper portion of its watershed. 1 atively flat area and is capable of retaining higher 2 ter during storm events, than under normal rainfall 4 losed (depressional) system. 5 wetland has constructed outlet with signs of fluctuating 6 Igal mats, and/or lodged debris. 7 ense woody vegetation. 7 ress floodwater from an adjacent water course. 5-7 (Y) - Hig me as sheet flow rather than channel flow. 1 noval Likely or uess sediment (from tillage, mining or construction) are 1 lent of the wetland. 2 rater and/or a deepwater habitat are present in the 3 sous vegetation is present. 5 vegegetation and water is high in wetland. 6 r is high in wetland. 1 are present upgradient of the wetland. 2 oxicant Removal 1 e growing season. 4 e growing season. 3 <

NOTE: Base wetland function assessment on existing conditions, not future conditions.

Example Ranking: If ranking the capacity for a wetland to parform a given wetland function into high, moderate, low or none categories, use the following example as guidance. For Flood Flow Alteration, answering yes to five to seven attributes would rate the wetland as high functioning; answering yes to one to four attributes would rate the wetland as moderate; and not answering yes to any attributes would rate the wetland as low, or if evaluator is certain the wetland does not perform this function, it can be rated as none.

Date: _ 7-23-13

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D.	Erosion Control and Shoreline Stabilization	Likely or not likely to Provide	
L	(if associated with a watercourse or shoreline)	(Y or N)	
	·		
	1 Wetland has dense, energy absorbing vegetation bordering the water	1 <u> </u>	
	course and no evidence of erosion.	2 1	
	2 A herbaceous layer is part of this dense vegetation.	3	
	3 Trees and shrubs able to withstand erosive flood events are also part		
	of this dense vegetation.	2-3 (Y) - High Function 🗸	
	of this dense togethere	1 (Y) - Moderate Function	
		None - Low or No Function	
F	Revelue of Organia Matter and its Export	Likely or not likely to Provide	
E.	Production of Organic matter and its Export	(Y or N)	
	A NUMBER OF THE AND A STATE AN	1 1	
	1 Wetland has at least 30% aerial cover of dense herbaceous		
	vegetation.		
	2 Woody plants in wetland are mostly deciduous.		
	3 High degree of plant community structure, vegetation density, and		
	species richness present.	0 <u>1</u>	
L	4 Interspersion of vegetation and water is high in wetland.	° <u>→</u> ,	
	5 Wetland is inundated or has indicators that flooding is a seasonal		
	event during the growing season.	4-6 (Y) - High Function	
	6 Wetland has outlet from which organic matter is flushed.**	1-3 (Y) - Moderate Function	
	**If #6 is No, then wetland automatically rated as low or No function	None - Low of No Function	
F.	General Wildlife Habitat Suitability	Likely or not likely to Provide	
		(Y or N)	
	1 Wetland is not fragmented by development.	1 <u>V</u>	
	2 Upland surround wetland is undeveloped.	2	
	3 Wetland has connectivity with other habitat types.	3	
	4 Divserity of plant species is high.	4 <u>N</u>	
	5 Wetland has more than one Cowardin Class (e.g. PFO, PSS, PEM)	5 <u>N 21 N</u>	
	6 Has high degree of Corwardin Class interspersion	6 <u>N</u>	
	7 Evidence of wildlife use (e.g. tracks, scat, gnawed stumps) present.	7	. hull
		Elevann to	"J"
		5-7 (Y) - High Function V × Ve Waterbr	vol .
		1-4 (Y) - Moderate Function" walnut (1)	iMitel]
	· ·	None - Low or No Function	•
G	. General Fish Habitat	Likely or not likely to Provide	
	(Must be associated with a fish-bearing stream or lake)	(YorN) NA	
	1 Wetland has perennial or intermittent surface-water connection to a	1	
	fish-bearing water body.	2 1	
	2 Wetland has sufficient size and depth of open water so as not to	3 *	
	freeze completely during winter.	4	
	3 Observation of fish.	5	
	A Berbaceous and/or woody vegetation is present in wetland and/or	6 7	
	buffer to provide cover, shade, and/or detrital matter.		
	5 Spawning areas are present (aquatic vegetation and/or gravel beds).	4-6 (Y) - High Function	
	6 Inventile rearing areas	1-3 (Y) - Moderate Function	
	0 Suverme rearing areas.	None - Low or No Function	
Ŀ	1 Notivo Plant Richness	Likely or not likely to Provide	
l,	I' NATIAR LIGITE LICITICOS	(Y or N)	
	1 Dominant and codominant plants are native		
1	L'Dominiant and couoninant plants are native.	2 1	
	2 Welland contains two of more cowardin classes.		
	3 weiland has infee or more strate or vegetation.		
1	4 weiland has malure rees.	3-4 (Y) - High Function	
		1-2 (Y) - Moderate Function	
		None - Low or No Function	
1			

Date: _______3-13

Likely or not likely to Provide
(Y or N)
1 N
2 1
3 <u>N</u>
2-3 (Y) - High Function
1 (Y) - Moderate Function
None - Low or No Function
Likely or not likely to Provide
(Y gr N)
1** <u>N</u>
2** <u>N</u> .
3 <u>N,</u>
4** <u></u>
3-4 (Y) - High Function
1-2 (Y) Moderate Function
None (Low)or No Function
Likely or not likely to Provide
(Y or N)
1N
2 1
3
2-3 (Y) - High Function /
1 (Y) - Moderate Function
None - Low or No Function

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WETLAND FUNCTIONS DATA FORM

Alaska Regulatory Best Professional Judgement Characterization Adapted from Regulartory Guidance Letter 09-01

Wetland ID: DP 29 Date: 7-24-	13
Wetland Type: PSSI/PEM SB Investigators: (,S	chudel J. Blank
A. Flood Flow Alteration (Storage and Desynchronization)	Likely or not likely to Provide (Y or N)
 Wetland occurs in the upper portion of its watershed. Wetland is relatively flat area and is capable of retaining higher volumes of water during storm events, than under normal rainfall events. Wetland is a closed (depressional) system. If flowthrough, wetland has constructed outlet with signs of fluctuating water levels, algal mats, and/or lodged debris. Wetland has dense woody vegetation. Wetland receives floodwater from an adjacent water course. Floodwater come as sheet flow rather than channel flow. 	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$
B. Sediment Removal	None - Low or No Function
 Sources of excess sediment (from tillage, mining or construction) are present upgradient of the wetland. Slow-moving water and/or a deepwater habitat are present in the wetland. Dense herbaceous vegetation is present. Inerspersion of vegegetation and water is high in wetland. Ponding of water is high in wetland. Sediment deposits are present in wetland. 	$\begin{array}{c} (Y \text{ or } N) \\ 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ - \\ 4 \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ -$
 C. Nutrient and Toxicant Removal 1 Sources of excess nutrients (fertilizers) and toxicants (pesticides and heavy metals) are present upgradient of the wetland. 2 Wetland is inundated or has indicators that flooding is a seasonal event during the growing season. 3 Wetland provides long duration for water detention. 4 Wetland has at least 30% aerial cover of live dense herbaceous vegetation. 5 Fine grained mineral or organic materials are present for the wetland. 	Likely or not likely to Provide (Y or N) 1 N' 2 Y 3 Y 4 Y 5 Y 3-5 (Y) - High Function 1-2 (Y) - Moderate Function None - Low or No Function

NOTE: Base wetland function assessment on existing conditions, not future conditions.

Example Ranking: If ranking the capacity for a wetland to perform a given wetland function into high, moderate, low or none categories, use the following example as guidance. For Flood Flow Alteration, answering yes to five to seven attributes would rate the wetland as high functioning; answering yes to one to four attributes would rate the wetland as moderate; and not answering yes to any attributes would rate the wetland as low, or if evaluator is certain the wetland does not perform this function, it can be rated as none.

Date: 7-24-13

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D.	Erosion Control and Shoreline Stabilization	Likely or not likely to Provide
	(if associated with a watercourse or shoreline)	(Y or N)
	1 Wotland has donce, anorgy absorbing vegetation bordering the water	1 toty
	weitand has dense, energy absorbing vegetation bordoning the water	$2 + \frac{-\epsilon_{\rm eff} \alpha}{1 + \epsilon_{\rm eff} \sqrt{1 + \epsilon_{\rm eff} 1 + \epsilon_{\rm$
	course and no evidence of erosion.	2 12
	2 A herbaceous layer is part of this dense vegetation.	
	3 Trees and shrubs able to withstand erosive flood events are also part	
	of this dense vegetation.	2-3 (Y) - High Function *
		1 (Y) - Moderate Function
		None - Low or No Function
E.	Production of Organic Matter and its Export	Likely or not likely to Provide
		(Y or N)
	1 Wetland has at least 30% aerial cover of dense herbaceous	
		2 1
	Veyetation.	
	2 Woody plants in welland are mostly deciduous.	
	3 High degree of plant community structure, vegetation density, and	
	species richness present.	
	4 Interspersion of vegetation and water is high in wetland.	ь <u>ү</u>
	5 Wetland is inundated or has indicators that flooding is a seasonal	· · · · · · · · · · · · · · · · · · ·
	event during the growing season.	4-6 (Y) - High Function √
	6 Wetland has outlet from which organic matter is flushed.**	1-3 (Y) - Moderate Function
	**If #6 is No, then wetland automatically rated as low or No function	None - Low or No Function
F	General Wildlife Habitat Suitability	Likely or not likely to Provide
· ·	denoral minune naskat ounasing	(Y or N)
	A Matter disust for smanted by development	
	Wettand is not tragmented by development.	
	2 Upland surround wetland is undeveloped.	
	3 Wetland has connectivity with other nabitat types.	
	4 Divserity of plant species is high.	
	5 Wetland has more than one Cowardin Class (e.g. PFO, PSS, PEM)	5
	6 Has high degree of Corwardin Class interspersion	
1	7 Evidence of wildlife use (e.g. tracks, scat, gnawed stumps) present.	7
		5-7 (Y) - High Function √
	·	1-4 (Y) - Moderate Function
		None - Low or No Function
6	Ceneral Fish Habitat	Likely or not likely to Provide
u.	Abust he acception with a fish-hearing stream or lake)	(YorN) X/A
	(INUSI DE ASSOCIATED WITT à listr-bearing stream of lake)	
		1 24-
	1 Wetland has perennial or intermittent surface-water connection to a	
	fish-bearing water body.	
	2 Wetland has sufficient size and depth of open water so as not to	3
	freeze completely during winter.	4
ł	3 Observation of fish.	5
I	4 Herbaceous and/or woody vegetation is present in wetland and/or	6
Ι.	buffer to provide cover, shade, and/or detrital matter.	· · · · · · · · · · · · · · · · · · ·
	5 Spawning areas are present (aquatic vegetation and/or gravel beds).	4-6 (Y) - High Function
	6 Juvenile rearing areas	1-3 (Y) - Moderate Function
	a bayenile founing aroue.	None - Low or No Function
<u> </u>	Native Diant Diabases	Likely or not likely to Provide
н.	Native Plant Richness	
Í		
Í	1 Dominant and codominant plants are native.	
	2 Wetland contains two or more Cowardin Classes.	
I	3 Wetland has three or more strata of vegetation.	3 <u>N</u>
1	4 Wetland has mature trees.	4 <u>N</u>
		3-4 (Y) - High Function
1		1-2 (Y) - Moderate Function √
		None - Low or No Function

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Date: 7-24-13

Wetland ID:

DPZ9

Ï.	Educational or Scientific Value	
	Euroanonal of Ociennine Value	Likely or not likely to Provide
		(Y or N)
	1 Site has documented scientific or educational use.	1 N
F	2 Wetland is in public ownership	2 1
	3 Accessible trails available.	3 N
1		
		2-3 (Y) - High Function
		1 (Y) - Moderate Function
		None - Low or No Eurotion
J.	Uniqueness and Heritage	Likely or not likely to Broyldo
	• •	
	1 Wetland contains documented occurrences of a state or	fodorally 1** A
	listed threatened or endanged species **	
	2 Moltand contains decumented exiting hebitet high analis	$\frac{2^{n}}{N}$
	2 Weitand contains documented chical habitat, high qualit	y <u>3 N</u>
	ecosystems, or priority species respectively designated b	y the 4** /V
	USFWS.**	
	3 Wetland has biological, geological, or other features that	are
	determined to be rare.	3-4 (Y) - High Function
	4 Wetland type is a highly valuable wetland type of the Stat	e.** 1-2 (Y) - Moderate Function
	**If #1,#2, or #4 is Yes, then wetland is automatically rate	d as high None - Low or No Function
К.	Groundwater Interchange	Likely-or not likely to Provide
		(Y or N)
	1 Presence of seeps or springs	
	2 Microreleif of wetland surface	
	3 Sufficial geologic deposits under wetland are permeable	
	(e.g. alluvium)	° <u></u>
		2-3 (Y) - High Function
		1 (Y) - Moderate Function
		None - Low or No Eulerian
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WETLAND FUNCTIONS DATA FORM

Alaska Regulatory Best Professional Judgement Characterization

Adapted from Regulartory Guidance Letter 09-01

Wetland ID:	DP31	Date: 7-24-1	3
Wetland Type: PSS/EMIE Investigators: C.Sch-del J. Blank			
A. Flood Fig (Storage	w Alteration and Desynchronization)		Likely or not likely to Provide (Y or N)
 Wetland d Wetland i volumes d events. Wetland ii If flowthro water leve Wetland ii Wetland ii Wetland ii Floodwate 	occurs in the upper portion of s relatively flat area and is ca of water during storm events, s a closed (depressional) sys ugh, wetland has constructed els, algal mats, and/or lodged has dense woody vegetation. eceives floodwater from an a or come as sheet flow rather t	its watershed. pable of retaining higher than under normal rainfall tem. I outlet with signs of fluctuating debris. djacent water course. han channet flow.	1 2 3 4 5 6 7 5-7 (Y) - High Function 1-4 (Y) - Moderate Function None - Low or No Function
 B. Sediment 1 Sources o present up 2 Slow-movi wetland. 3 Dense her 4 Inerspersie 5 Ponding o 6 Sediment of 	Removal f excess sediment (from tillag ogradient of the wetland. ng water and/or a deepwater baceous vegetation is preser on of vegegetation and water f water is high in wetland. deposits are present in wetlan	ye, mining or construction) are habitat are present in the nt. is high in wetland. nd.	Likely or not likely to Provide (Y or N) 1 <u>N</u> 2 <u>Y</u> 3 <u>Y</u> 4 <u>Y</u> 5 <u>Y</u> 6 <u>Y</u> 4-6 (Y) - High Function J 1-3 (Y) - Moderate Function None - Low or No Function
 C. Nutrient a 1 Sources of heavy met 2 Wetland is event durir 3 Wetland pi 4 Wetland havegetation. 5 Fine graine 	nd Toxicant Removal excess nutrients (fertilizers) als) are present upgradient of inundated or has indicators t ig the growing season. rovides long duration for wate as at least 30% aerial cover o ed mineral or organic material	and toxicants (pesticides and f the wetland. that flooding is a seasonal or detention. If live dense herbaceous are present for the wetland.	Likely or not likely to Provide (Y or N) 1 N 2 Y 3 Y 4 5 Y 3-5 (Y) - High Function 1-2 (Y) - Moderate Function None - Low or No Function

NOTE: Base wetland function assessment on existing conditions, not future conditions.

Example Ranking: If ranking the capacity for a wetland to perform a given wetland function into high, moderate, low or none categories, use the following example as guidance. For Flood Flow Alteration, answering yes to five to seven attributes would rate the wetland as high functioning; answering yes to one to four attributes would rate the wetland as moderate; and not answering yes to any attributes would rate the wetland as low, or if evaluator is certain the wetland does not perform this function, it can be rated as none.

Date: 7-24-13

6	••••	Evention Control and Shoreline Stabilization	Likely or not likely to Provide
μ.			(Y or N)
		(Il associated with a watercourse of shoreme)	(1011)
	4	Walland bas dones, one ray absorbing vegetation bordering the water	1 4
	I	opurso and no evidence of erosion	2 1
	2	A berbaceous layer is part of this dense venetation	3 1
	2	Trees and shruhs able to withstand erosive flood events are also part	······································
	0	of this dense venetation	2-3 (Y) - High Function
			1 (Y) - Moderate Function
			None - Low or No Function
-		Production of Organic Matter and its Export	Likely or not likely to Provide
с.		Production of organic matter and no export	(Y or N)
	4	Metland has at least 30% aerial cover of dense herbaceous	1 1
	'	venetation	2 4
	2	Woody plants in wetland are mostly deciduous.	3 44
	3	High degree of plant community structure, vegetation density, and	4 7
	Ũ	species richness present.	5 7
	4	Interspersion of vegetation and water is high in wetland.	6** 1
1	5	Wetland is inundated or has indicators that flooding is a seasonal	· · · · · · · · · · · · · · · · · · ·
	-	event during the growing season.	4-6 (Y) - High Function √
	6	Wetland has outlet from which organic matter is flushed.**	1-3 (Y) - Moderate Function
		**If #6 is No, then wetland automatically rated as low or No function	None - Low or No Function
F.		General Wildlife Habitat Suitability	Likely or not likely to Provide
I .			(Y or N)
	1	Wetland is not fragmented by development.	1 1
	2	Upland surround wetland is undeveloped.	2
	3	Wetland has connectivity with other habitat types.	3 7
	4	Divserity of plant species is high.	4 <u>-17 U</u>
	5	Wetland has more than one Cowardin Class (e.g. PFO, PSS, PEM)	5
	6	Has high degree of Corwardin Class interspersion	6
	7	Evidence of wildlife use (e.g. tracks, scat, gnawed stumps) present.	7 <u> </u>
			5-7 (Y) - High Function J
		and the second second second second second second second second second second second second second second second	1-4 (Y) - Moderate Function
			None - Low or No Function
G,		General Fish Habitat	Likely or not likely to Provide
		(Must be assoclated with a fish-bearing stream or lake)	(Yor-N) NK
I.			
	1	Wetland has perennial or intermittent surface-water connection to a	1
		fish-bearing water body.	
	2	Wetland has sufficient size and depth of open water so as not to	3
		freeze completely during winter.	4
	3	Observation of fish.	5
	4	Herbaceous and/or woody vegetation is present in wetland and/or	6
		buffer to provide cover, shade, and/or detrital matter.	
	5	Spawning areas are present (aquatic vegetation and/or gravel beds).	4-6 (Y) - High Function
	6	Juvenile rearing areas.	1-3 (Y) - Moderate Function
Ŀ			None - Low or No Function
H.		Native Plant Richness	Likely or not likely to Provide
			(Y or N)
	1	Dominant and codominant plants are native.	
	2	Wetland contains two or more Cowardin Classes.	$\begin{vmatrix} 2 & -\frac{7}{1} \end{vmatrix}$
	3	Wetland has three or more strata of vegetation.	
	4	Wetland has mature trees.	4 <u>(N</u>)
			1 Q (V) Moderate Eurotian
			Nona - Lour of No Eurotion
I.			INOUG - FOM OF IND PUTICIION

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Date: <u>7-7.4</u>-13

I.	Educational or Scientific Value	
l.		Likely or not likely to Provide
	1 Olio haa daammaa bada 1 (11)	(Y or N)
	T Site has documented scientific or educational use.	1 N
Í.	2 Wetland is in public ownership	2 1
ļ	3 Accessible trails available.	3 1/1
1		
		2-3 (Y) - High Function ∨ /
		1 (Y) - Moderate Function
Ļ		None - Low or No Function
J.	Uniqueness and Heritage	Likely or not likely to Provide
	t Mailand contains documented conversion of a state of the	(Y or N)
	Predation contains documented occurrences of a state or federally	1*** <u> </u>
	listed threatened or endanged species.**	2** <u> </u>
	2 Weltand contains documented critical habitat, high quality	3 //
	ecosystems, or priority species respectively designated by the	4**
	USFWS.**	······································
	3 Wetland has biological, geological, or other features that are	
	determined to be rare.	3-4 (Y) - High Eurotion
	4 Wetland type is a highly valuable wetland type of the State.**	1-2 (Y) Moderate Function
	**If #1,#2, or #4 is Yes, then wetland is automatically rated as high	None Lowor No Eunction
К.	Groundwater Interchange	Likely or not likely to Dravid-
		Likely of not likely to Provide
	1 Presence of seens or springs	(Y Or N)
	2 Microreleif of weiland surface	1
	2 Surficial geologia deposite under watter der state	2
	(a g. plunium)	3
	(e.y. aliuvium)	· · ·
		2-3 (Y) - High Function √
		1 (Y) - Moderate Function
		None - Low or No Function
		None - Low or No Function
WETLAND FUNCTIONS DATA FORM

Alaska Regulatory Best Professional Judgement Characterization

Adapted from Regulationy Guidance Letter 09-01

			aapted nom negata	lory du	iuance i	-eller 0	9-01		
W	etland ID:	DP33		Date:	ক্ষ	3 3	7-24-	-13	
w	etland Type:	PEMIH		Investig	ators:	Grea	chudel	J. Blank	-
Α.	Flood Flo (Storage a	ow Alteration and Desynchroniza	ion)				Likely	or not likely to (Y or N)	Provide
	 Wetland d Wetland is volumes d events. Wetland is Wetland is If flowthroo water leve Wetland h Wetland h Wetland n Floodwate 	occurs in the upper s relatively flat area of water during storr s a closed (depress ugh, wetland has co els, algal mats, and/ has dense woody ve eccives floodwater or come as sheet flood	portion of its watershed and is capable of retain n events, than under n ional) system. onstructed outlet with s or lodged debris. getation, from an adjacent water w rather than channel	d. ining higi ormal rai igns of fi course. flow.	her infall uctuating]	1 2 3 4 5 6 7 5-7 (Y) - H 1-4 (Y) - M None - Lov	N N N N Y tes Y derate Function oderate Function	n J
В.	Sediment	Removal					Likely	or not likely to l	Provide
	 Sources o present up Slow-movi wetland. Dense her Dense her Inerspersion Ponding of Sediment of 	f excess sediment (ogradient of the wet ng water and/or a d baceous vegetation on of vegegetation a f water is high in we deposits are preser	from tillage, mining or and. eepwater habitat are p is present. and water is high in we tland. t in wetland.	construc resent ir tland,	tion) are 1 the		1 2 3 4 5 6 4-6 (Y) - Hi 1-3 (Y) - Ma	(Y or N)	n
C.	Nutrient a	nd Toxicant Remo	val				Likely o	r not likely to F	rovide
	 Sources of heavy meta Wetland is event durin Wetland pr Wetland hat 	excess nutrients (f als) are present upg inundated or has ir ig the growing seas ovides long duratio as at least 30% aeri	ertilizers) and toxicants iradient of the wetland, idicators that flooding i on. n for water detention, al cover of live dense f	s (pestici s a seas nerbacec	des and onal ous		1 2 3 4 5	(Y or N)	
	vegetation.					i	9.5 /V\ _ Li	ah Eurotian /	

NOTE: Base wetland function assessment on existing conditions, not future conditions.

5 Fine grained mineral or organic materials are present for the wetland.

С

Example Ranking: If ranking the capacity for a wetland to perform a given wetland function into high, moderate, low or none categories, use the following example as guidance. For Flood Flow Alteration, answering yes to five to seven attributes would rate the wetland as high functioning; answering yes to one to four attributes would rate the wetland as moderate; and not answering yes to any attributes would rate the wetland as low, or if evaluator is certain the wetland does not perform this function, it can be rated as none.

3-5 (Y) - High Function 🗸

1-2 (Y) - Moderate Function None - Low or No Function

Date: 7-25-13

_		
D.	Erosion Control and Shoreline Stabilization	Likely or not likely to Provide
	(if associated with a watercourse or shoreline)	(Y or N)
l		
	1 Wetland has dense, energy absorbing vegetation bordering the wate	er 1
	course and no evidence of erosion.	2 4
	2 A herbaceous laver is part of this dense vegetation.	3 N
	3 Trees and shrubs able to withstand erosive flood events are also pa	rt7
	of this dense vegetation	2-3 (Y) - High Function V
	of this dense vegetation.	1 (Y) - Moderate Function
	,	None - Low or No Function
	The second second for Evenent	Likely or not likely to Provide
E.	Production of Organic Matter and its Export	
	1 Wetland has at least 30% aerial cover of dense herbaceous	
	vegetation.	
	2 Woody plants in wetland are mostly deciduous.	3 XN
	3 High degree of plant community structure, vegetation density, and	4
	species richness present.	5
1	4 Interspersion of vegetation and water is high in wetland.	6**
1	5 Wetland is inundated or has indicators that flooding is a seasonal	
1	event during the growing season.	4-6 (Y) - High Function √
	6 Wetland has outlet from which organic matter is flushed.**	1-3 (Y) - Moderate Function
	**If #6 is No, then wetland automatically rated as low or No function	None - Low or No Function
E	General Wildlife Habitat Sultability	Likely or not likely to Provide
ľ	General Whallo Habitat Oktability	(Y or N)
	t Motiond is not fragmented by development	1 V
	Wethand is not inaginemed by development. Delend surround wattend is undeveloped	
	2 Upland suffound wetland is undeveloped.	
	3 Weitand has connectivity with other habitat types.	
	4 Divserity of plant species is high.	
	5 Weiland has more than one Cowardin Class (e.g. PFO, PSS, PEW.	
	6 Has high degree of Corwardin Class interspersion	$\frac{0}{7}$ $\frac{N}{N}$
	7 Evidence of wildlife use (e.g. tracks, scat, gnawed stumps) present.	· · · · · · · · · · · · · · · · · · ·
	(Che & huldhing for and have)	C 7 (10) Llich Function
	4 (dead duck ing internet)	5-7 (Y) - Flight Function
		1-4 (Y) - Moderate Function V
		None - Low or No Function
G.	General Fish Habitat	Likely or not likely to Provide
	(Must be associated with a fish-bearing stream or lake)	(YorN) KA
	1 Wetland has perennial or intermittent surface-water connection to a	
	fish-bearing water body.	2 <u></u>
	2 Wetland has sufficient size and depth of open water so as not to	3
	freeze completely during winter.	4 7
	3 Observation of fish.	5
	4 Herbaceous and/or woody vegetation is present in wetland and/or	6 >
	buffer to provide cover, shade, and/or detrital matter.	
	5 Spawning areas are present (aquatic vegetation and/or gravel beds	s), 4-6 (Y) - High Function
	6 Juvenile rearing areas	1-3 (Y) - Moderate Function
		None - Low or No Function
Ц	Native Plant Bichness	Likely or not likely to Provide
I "	HARA LINE HARAON	(Y or N)
	t Dominant and codominant plants are native	1 <u>V</u>
	1 Dominant and containe two or more Cowardin Classes	2 11
	2 Wetland contains two or more strate of vegetation	$\frac{1}{3}$ $\frac{1}{\sqrt{N}}$
	o wenand has milee of more strata of vegetation.	
	4 weiland has mature trees.	2-4 (V) - High Eurotion
		t O (V) Mederate Eurotion V
ſ		1=2 (T) - Woderale Function V
		INVITE - LOW OF INVITUACION

Date: <u>7-25-1</u>3

Ĩ.	Educational or Scientific Value	
l.		Likely or not likely to Provide
		(Y or N)
	1 Site has documented scientific or educational use.	1 N
	2 Wetland is in public ownership	2 7
	3 Accessible trails available.	3 1
		2-3 (Y) - High Function
		1 (Y) - Moderate Function
_		None - Low or No Function
J.	Uniqueness and Heritage	Likely or not likely to Provide
I		(YorN)
	1 wetland contains documented occurrences of a state or federally	1** N
ł	listed threatened or endanged species.**	2** 1
	2 Weltand contains documented critical habitat, high quality	3
	ecosystems, or priority species respectively designated by the	
	USFWS.**	
	3 Wetland has biological, geological, or other features that are	
1	determined to be rare.	2 4 (V) Uigh Eurotian
	4 Wetland type is a bighly valuable wetland type of the State #	
	**If #1 #2 or #4 is Vog. then wetlend is outpreticelly reted as the	1-2 (Y) - Moderate Function
	n #1,#2, or #4 is res, then welland is automatically rated as high	None (Low)or No Function
κ.	Groundwater Interchange	Likely or not likely to Provide
		(Y or N)
	1 Presence of seeps or springs	1 N
	2 Microretelf of wetland surface	2 1
	3 Surficial geologic deposits under wetland are permeable	3
	(e.g. alluvium)	
		2-3 (Y) - High Function
		1 (Y) - Moderate Function
		Nono Low or Ma Function
		Inone - LOW OF NO FUNCTION

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WETLAND FUNCTIONS DATA FORM

Alaska Regulatory Best Professional Judgement Characterization Adapted from Regulatory Guidance Letter 09-01

Wetland ID: DP 35 Date: 7-15-	13
Wetland Type: PEMIEPSSIE Investigators: CSC PEMIESSIE	chudel J. Blank
A. Flood Flow Alleration	Likely or not likely to Provide
(Storage and Desynchronization)	(Y or N)
 Wetland occurs in the upper portion of its watershed. Wetland is relatively flat area and is capable of retaining higher volumes of water during storm events, than under normal rainfall events. Wetland is a closed (depressional) system. If flowthrough, wetland has constructed outlet with signs of fluctuating water levels, algal mats, and/or lodged debris. Wetland has dense woody vegetation. Wetland receives floodwater from an adjacent water course. Floodwater come as sheet flow rather than channel flow 	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
	None - Low or No Eunction
B. Sediment Removal	Likely or not likely to Bravida
 Sources of excess sediment (from tillage, mining or construction) are present upgradient of the wetland. Slow-moving water and/or a deepwater habitat are present in the wetland. Dense herbaceous vegetation is present. Inerspersion of vegegetation and water is high in wetland. Ponding of water is high in wetland. Sediment deposits are present in wetland. 	4-6 (Y) - High Function None - Low or No Function
 Numeric and Toxicant Removal Sources of excess nutrients (fertilizers) and toxicants (pesticides and heavy metals) are present upgradient of the wetland. Wetland is inundated or has indicators that flooding is a seasonal event during the growing season. Wetland provides long duration for water detention. Wetland has at least 30% aerial cover of live dense herbaceous vegetation. Fine grained mineral or organic materials are present for the wetland. 	Likely or not likely to Provide (Y or N) 1 <u>N</u> 2 <u>4</u> 3 <u>4</u> 5 <u>4</u> 3-5 (Y) - High Function $\sqrt{1-2}$ (Y) - Moderate Function None - Low or No Euroction

NOTE: Base wetland function assessment on existing conditions, not future conditions.

Example Ranking: If ranking the capacity for a wetland to perform a given wetland function into high, moderate, low or none categories, use the following example as guidance. For Flood Flow Alteration, answering yes to five to seven attributes would rate the wetland as high functioning; answering yes to one to four attributes would rate the wetland as moderate; and not answering yes to any attributes would rate the wetland does not perform this function, it can be rated as none.

Date: 7-25-13

			Likely or pot likely to Provide
D.		Erosion Control and Shoreline Stabilization	
l		(if associated with a watercourse or shoreline)	(1 OF N)
	1	Wetland has dense, energy absorbing vegetation bordering the water	
		course and no evidence of erosion.	2
	2	A herbaceous layer is part of this dense vegetation.	3
	3	Trees and shrubs able to withstand erosive flood events are also part	. /
		of this dense vegetation.	2-3 (Y) - High Function ✓
			1 (Y) - Moderate Function
			None - Low or No Function
E.		Production of Organic Matter and its Export	Likely or not likely to Provide
C .		Production of organic matter and no expert	(Y or N)
		We should be a still part (00%) partial payor of dance both account	1
	1	Wetland has at least 30% aerial cover of dense herbaceous	
	_	vegetation.	
	2	Woody plants in wetland are mostly deciduous.	
	3	High degree of plant community structure, vegetation density, and	$\frac{4}{-\frac{1}{2}}$
		species richness present.	
1	4	Interspersion of vegetation and water is high in wetland.	ъ́́ <u> </u>
1	5	Wetland is inundated or has indicators that flooding is a seasonal	
		event during the growing season.	4-6 (Y) - High Function ✓
	6	Wetland has outlet from which organic matter is flushed.**	1-3 (Y) - Moderate Function
		**If #6 is No, then wetland automatically rated as low or No function	None - Low or No Function
F.		General Wildlife Habitat Suitability	Likely or not likely to Provide
l' '			(Y or N)
	4	Motiond is not fragmented by development	1 1
	1	Upland curround watland is undeveloped	2 1
1	2	Welland has connectivity with other babitat types	3
1	3	Weitand has connectivity with other habitat types.	4
	4	Divsently of plant species is high.	5
	5	Wetland has more than one Cowardin Gass (e.g. PPO, PSS, PEM)	
	6	Has high degree of Corwardin Class Interspersion	
	7	Evidence of wildlife use (e.g. tracks, scat, gnawed stumps) present.	·
			E Z DO LINE For short
			5-7 (Y) - High Function Y
			1-4 (Y) - Moderate Function
			None - Low of No Function
G.		General Fish Habitat	Likely or not likely to Provide
		(Must be associated with a fish-bearing stream or lake)	(YorN) NA
	f	Wetland has perennial or intermittent surface-water connection to a	
	ı	fish-hearing water body.	2 .NT
	2	Wetland has sufficient size and depth of open water so as not to	3 1
	4	freeze completely during winter	4 7
	~	Received on protony during minute	5
I	J	Upservation of itsh.	6
	4	meinaceous anu/or woody vegetation is present in weitand and/or	
		buller to provide cover, shade, and/or definition and/or everyther to	4.6 (V) - High Eurotion
	5	Spawning areas are present (aquatic vegetation and/or gravel beds).	4-6 (T) - Flight Function
1	6	Juvenile rearing areas.	Nono Low or No Eurotica
			None - Low of No Punction
H.		Native Plant Richness	Likely or not likely to Provide
			(Y or N)
	1	Dominant and codominant plants are native.	1
	2	Wetland contains two or more Cowardin Classes.	2 <u></u>
	2	Wetland has three or more strata of vegetation.	3 <u>N</u>
	1	Weiland has mature trees.	4 N
1	-		3-4 (Y) - High Function
			1-2 (Y) - Moderate Function
			None - Low or No Function

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Date: 7-25-13

1 Site has documented scientific or educational use. 1 V 2 Wetland is in public ownership 2 V	
1 Site has documented scientific or educational use. 1 N 2 Wetland is in public ownership 2 Y	
2 Wetland is in public ownership 2	
3 Accessible trails available.	
2-3 (Y) - High Function	
1 (Y) - Moderate Function	
None - Low or No Function	
J. Uniqueness and Heritage Likely or not likely to Pro	vide
(Y or _i N)	
1 Wetland contains documented occurrences of a state or federally	
listed threatened or endanged species.** 2** 2**	
2 Weltand contains documented critical habitat, high quality 3	
ecosystems, or priority species respectively designated by the 4** N	
USFWS.**	
3 Wetland has biological, geological, or other features that are	
determined to be rare. 3-4 (Y) - High Function	
4 Wetland type is a highly valuable wetland type of the State.** 1-2 (Y) - Moderate Function	
**If #1,#2, or #4 is Yes, then wetland is automatically rated as high None - (Low) r No Function	
K. Groundwater Interchange Likely or not likely to Pro	vide '
(Y or N)	
1 Presence of seeps or springs 1 N	
2 Microreleif of wetland surface 2	
3 Surficial geologic deposits under wetland are permeable 3	
(e.g. alluvium)	
2-3 (Y) - High Function √	
1 (Y) - Moderate Function	
None - Low or No Function	

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WETLAND FUNCTIONS DATA FORM

Alaska Regulatory Best Professional Judgement Characterization Adapted from Regulartory Guidance Letter 09-01

Wetland ID: DP37 Da	ate: 7-25-13
Wetland Type: PF04B/PEMIB Inv	vestigators: (°. Schudel J. Blank
A. Flood Flow Alteration (Storage and Desynchronization)	Likely or not likely to Provide (Y or N)
 Wetland occurs in the upper portion of its watershed. Wetland is relatively flat area and is capable of retaining volumes of water during storm events, than under norm events. Wetland is a closed (depressional) system. If flowthrough, wetland has constructed outlet with sign water levels, algal mats, and/or lodged debris. Wetland has dense woody vegetation. Wetland receives floodwater from an adjacent water co 7 Floodwater come as sheet flow rather than channel flow 	by higher hal rainfall s of fluctuating V_{r} $V_{$
 B. Sediment Removal 1 Sources of excess sediment (from tillage, mining or cor present upgradient of the wetland. 2 Slow-moving water and/or a deepwater habitat are pres wetland. 3 Dense herbaceous vegetation is present. 4 Inerspersion of vegegetation and water is high in wetlar 5 Ponding of water is high in wetland. 6 Sediment deposits are present in wetland. 	bent in the $4-6$ (Y) - High Function J
 C. Nutrient and Toxicant Removal 1 Sources of excess nutrients (fertilizers) and toxicants (p heavy metals) are present upgradient of the wetland. 2 Wetland is inundated or has indicators that flooding is a event during the growing season. 3 Wetland provides long duration for water detention. 4 Wetland has at least 30% aerial cover of live dense hert vegetation. 5 Fine grained mineral or organic materials are present for 	esticides and seasonal r the wetland. Likely or not likely to Provide (Y or N) 1 <u>N</u> 2 <u>N</u> 3 <u>N</u> 4 <u>Y</u> 5 <u>Y</u> High Function 1-2 (Y) - Moderate Function None - Low or No Function

NOTE: Base wetland function assessment on existing conditions, not future conditions.

Example Ranking: If ranking the capacity for a wetland to perform a given wetland function into high, moderate, low or none categories, use the following example as guidance. For Flood Flow Alteration, answering yes to five to seven attributes would rate the wetland as high functioning; answering yes to one to four attributes would rate the wetland as noderate; and not answering yes to any attributes would rate the wetland does not perform this function, it can be rated as none.

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Date: 7-25-13

Wetland ID: <u>DP 87</u>

D Evenion Control and Shoreline Stabilization	Likely or not likely to Provide
(if an conjuted with a watercourse or shoreline)	(Y or N)
	NA
t. Wetland has dense, energy absorbing vegetation bordering the water	1
course and no evidence of erosion.	2
2 A berbaceous laver is part of this dense vegetation.	3
3 Trees and shrubs able to withstand erosive flood events are also part	
of this dense vegetation.	2-3 (Y) - High Function
	1 (Y) - Moderate Function
	None - Low or No Function
E Production of Organic Matter and its Export	Likely or not likely to Provide
	(Y or N)
t Wotland has at least 30% aerial cover of dense herbaceous	1
venetation	2 N
2 Woody plants in wetland are mostly deciduous.	3 NM
3 High degree of plant community structure, vegetation density, and	4 <u>N</u>
species richness present.	5 <u>N</u>
4 Interspersion of vegetation and water is high in wetland.	6** <u>BY</u>
5 Wetland is inundated or has indicators that flooding is a seasonal	
event during the growing season.	4-6 (Y) - High Function
6 Wetland has outlet from which organic matter is flushed.**	1-3 (Y) - Moderate Function V
** If #6 is No, then wetland automatically rated as low or No function	None - Low or No Function
F. General Wildlife Habitat Suitability	Likely or not likely to Provide
	(Y or N)
1 Wetland is not fragmented by development.	1 <u>Y</u>
2 Upland surround wetland is undeveloped.	2
3 Wetland has connectivity with other habitat types.	3 <u>X V</u>
4 Divserity of plant species is high.	4 <u>N</u>
5 Wetland has more than one Cowardin Class (e.g. PFO, PSS, PEM)	5 0
6 Has high degree of Corwardin Class interspersion	
7 Evidence of wildlife use (e.g. tracks, scat, gnawed stumps) present.	7
	5-7 (Y) - High Function
	1-4 (Y) - Moderate Function
	None - Low of No Function
G. General Fish Habitat	Likely or not likely to Provide
(Must be associated with a fish-bearing stream or lake)	(YOTN) NA-
 Wetland has perennial or intermittent surface-water connection to a 	
fish-bearing water body.	2
2 Wetland has sufficient size and depth of open water so as not to	
freeze completely during winter.	ц с
3 Observation of fish.	
4 Herbaceous and/or woody vegetation is present in wetland and/or	°
buffer to provide cover, shade, and/or detrital matter.	4.6 (V) - High Eurotion
5 Spawning areas are present (aquatic vegetation and/or gravel beos).	1-3 (Y) - Moderate Function
6 Juvenile rearing areas.	None - Low or No Function
	Likely or not likely to Provide
H. Native Plant Richness	
1 Dominant and codominant plants are native.	
2 Wetland contains two or more Cowardin Classes.	3 11
3 Wetland has three or more strata of vegetation.	
4 Wetland has mature trees.	3-4 (Y) - High Function J
	1-2 (Y) - Moderate Function
	None - Low or No Function

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11.	Educational or Scientific Value	
		Likely or not likely to Provide
	1 Site has desumanted activities an education at a	(Y or N)
	2 Methand is in sublic scientific or educational use.	1 _N
	2 wettand is in public ownership	2
	3 Accessible trails available.	3 1
l		2-3 (Y) - High Function
		1 (Y) - Moderate Function 🗸
Ŀ		None - Low or No Function
J.	Uniqueness and Heritage	Likely or not likely to Provide
		(YorN)
	1 Wetland contains documented occurrences of a state or federally	1 1** N
	listed threatened or endanged species.**	2** //
	2 Weltand contains documented critical habitat, high quality	
	ecosystems, or priority species respectively designated by the	
	USFWS.**	· · · · · · · · · · · · · · · · · · ·
	3 Wetland has biological, geological, or other features that are	
	determined to be rare.	3-4 (V) High Eurotian
	4 Wetland type is a highly valuable wetland type of the State **	
	**If #1.#2. or #4 is Yes, then wetland is automatically rated on birth	1-2 (Y) - Moderate Function
K.	Groundwater Intershange	Ivone - Low or No Function
•••	aloundhatator interchange	Likely or not likely to Provide
	1 Presence of soons or environ	(Y or N)
	2 Microroloit of wotland surface	1 AU
	2 Microrelen of welland sufface	2 1
	(a g all within)	3 <u>y'</u>
	(e.g. anuvium)	
		2-3 (Y) - High Function√
		1 (Y) - Moderate Function
		None - Low or No Function

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WETLAND FUNCTIONS DATA FORM

Alaska Regulatory Best Professional Judgement Characterization

Adapted from Regulartory Guidance Letter 09-01

We	Iland ID: DP 39 Date: 7-25-1	13
We	Iland Type: PSS(/GM1ビ Investigators: 0.8	Schudel J.Blank
Α.	Flood Flow Alteration	Likely or not likely to Provide
	(Storage and Desynchronization)	(Y or N)
	1 Wetland occurs in the upper portion of its watershed.	
	2 Wetland is relatively flat area and is capable of retaining higher	
	volumes of water during storm events, than under normal rainfall	3 61
	events.	4 <u>V N</u>
	3 Wetland is a closed (depressional) system.	5 1
	4 If flowthrough, wetland has constructed outlet with signs of fluctuating	6
	water levels, algal mats, and/or lodged debris.	$\frac{1}{7}$ $\frac{1}{1}$
	5 Wetland has dense woody vegetation	·
	6 Wetland receives floodwater from an adjacent water course.	5-7 (Y) - High Function
	7 Floodwater come as sheet flow rather than channel flow.	1-4 (Y) - Moderate Function
		None - Low or No Function
В.	Sediment Removal	Likely or not likely to Provide
		(Y or N)
	1 Sources of excess sediment (from tillage, mining or construction) are	1 N
	present upgradient of the wetland.	2 1
	2 Slow moving water and/or a deepwater habitat are present in the	3 1
	wetland.	4
	3 Dense herbaceous vegetation is present,	5 94 1
	4 Inerspersion of vegegetation and water is high in wetland,	6 4
I	5 Ponding of water is high in wetland.	·
	6 Sediment deposits are present in wetland.	4-6 (Y) - High Function√
		1-3 (Y) - Moderate Function
		None - Low or No Function
C.	Nutrient and Toxicant Removal	Likely or not likely to Provide
		(Y or N)
	1 Sources of excess nutrients (fertilizers) and toxicants (pesticides and	1 1
	heavy metals) are present upgradient of the wetland.	$2 \sqrt{\sqrt{1-1}}$
	2 Wetland is inundated or has indicators that flooding is a seasonal	3 1/
	event during the growing season.	4 89
[:	3 Wetland provides long duration for water detention.	5
·	4 Wetland has at least 30% aerial cover of live dense herbaceous	
	vegetation.	3-5 (Y) - High Function $$
:	5 Fine grained mineral or organic materials are present for the wetland.	1-2 (Y) - Moderate Function
	,	None - Low or No Function

NOTE: Base wetland function assessment on existing conditions, not future conditions.

Example Ranking: If ranking the capacity for a wetland to perform a given wetland function into high, moderate, low or none categories, use the following example as guidance. For Flood Flow Alteration, answering yes to five to seven attributes would rate the wetland as high functioning; answering yes to one to four attributes would rate the wetland as moderate; and not answering yes to any attributes would rate the wetland as low, or if evaluator is certain the wetland does not perform this function, it can be rated as none.

Date: <u>1-25-13</u>

		Freeion Control and Shoreline Stabilization	Likely or not likely to Drevisio
Ľ		lit associated with a watercourse or shoreline)	
		(II associated with a watercourse of shoreline)	(TOLIN)
		Mattend has done a control character us relation bendering the water	
1		we liand has dense, energy absorbing vegetation bordening the water	
	~	A herbaceus lever is part of this dense vegetation	
	2	A neroaceous layer is part of this dense vegetation.	
	3	Trees and shrubs able to withstand erosive flood events are also part	
		of this dense vegetation.	2-3 (Y) - High Function Y
			1 (Y) - Moderate Function
			None - Low or No Function
E.		Production of Organic Matter and its Export	Likely or not likely to Provide
			(Y or N)
	1	Wetland has at least 30% aerial cover of dense herbaceous	1
		vegetation.	2 1
	2	Woody plants in wetland are mostly deciduous.	3 1/1
	3	High degree of plant community structure, vegetation density, and	4 <u>v</u>
		species richness present.	5 <u>V</u>
	4	Interspersion of vegetation and water is high in wetland.	6** <u>'Y</u>
1	5	Wetland is inundated or has indicators that flooding is a seasonal	/
		event during the growing season.	4-6 (Y) - High Function 🗸
	6	Wetland has outlet from which organic matter is flushed.**	1-3 (Y) - Moderate Function
		**If #6 is No, then wetland automatically rated as low or No function	None - Low or No Function
F.		General Wildlife Habitat Suitability	Likely or not likely to Provide
ľ			(Y or N)
	1	Wetland is not fragmented by development.	1 1
	2	Upland surround wetland is undeveloped.	2 1
	3	Wetland has connectivity with other habitat types.	3 y
	4	Divserity of plant species is high.	4 <u>N</u>
	5	Wetland has more than one Cowardin Class (e.g. PFO, PSS, PEM)	5 1
	6	Has high degree of Corwardin Class interspersion	6 7
	7	Evidence of wildlife use (e.g. tracks, scat, gnawed stumps) present.	7 4
F I			5-7 (Y) - High Function J
			1-4 (Y) - Moderate Function
			None - Low or No Function
G.		General Fish Habitat	Likely or not likely to Provide
		(Must be associated with a fish-bearing stream or lake)	(YorN) λ(A
	1	Wetland has perennial or intermittent surface-water connection to a	1 1
		fish-bearing water body.	2
	2	Wetland has sufficient size and depth of open water so as not to	3 1
		freeze completely during winter.	4 🚿
	3	Observation of fish.	5 🖌
	4	Herbaceous and/or woody vegetation is present in wetland and/or	6 3
		buffer to provide cover, shade, and/or detrital matter.	·
	5	Spawning areas are present (aquatic vegetation and/or gravel beds).	4-6 (Y) - High Function
	6	Juvenile rearing areas.	1-3 (Y) - Moderate Function
			None - Low or No Function
H.		Native Plant Richness	Likely or not likely to Provide
			(Y or N)
	1	Dominant and codominant plants are native.	
	2	Wetland contains two or more Cowardin Classes	
	3	Wetland has three or more strata of venetation	3
	4	Wetland has mature trees.	
	T		3-4 (Y) - High Eunction
Í			1-2 (Y) - Moderate Function
			Name Law ex Na Evantion

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Date: 7-25-13

Wetland ID: DP39

I. Educational or Scientific Value	Likely or not likely to Provide
 Site has documented scientific or educational use. Wetland is in public ownership Accessible trails available. 	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
	2-3 (Y) - High Function 1 (Y) - Moderate Function None - Low or No Function
J. Uniqueness and Heritage	Likely or not likely to Provide
 Wetland contains documented occurrences of a state or federally listed threatened or endanged species.** Weltand contains documented critical habitat, high quality ecosystems, or priority species respectively designated by the USEWS ** 	$ \begin{array}{cccc} 1^{**} & N \\ 2^{**} & H \\ 3 \\ 4^{**} & N \\ 4^{**} & N \end{array} $ $ \begin{array}{cccc} (Y \text{ or } N) \\ ATH, TOWA \\ (USFS) \end{array} $
3 Wetland has biological, geological, or other features that are	
4 Wetland type is a highly valuable wetland type of the State.** **If #1,#2, or #4 is Yes, then wetland is automatically rated as high	3-4 (Y) - High Function 1-2 (Y) - Moderate Function None (Lowor No Function
K. Groundwater Interchange	Likely or not likely to Provide
1 Presence of seeps or springs 2 Microreleif of wetland surface 3 Surficial geologic deposits under wetland are permeable (e.g. alluvium)	$ \begin{array}{c} (Y \text{ or } N) \\ 1 & N \\ 2 & N \\ 3 & Y \\ \end{array} $
	2-3 (Y) - High Function 1 (Y) - Moderate Function None - Low or No Function

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一番のけん ALL-WEATHER FIELD No. 353N CITSSS GRANT LAVE KENAN HNDRO FIELD BOOK # <u>GULLIUIUU</u>

later on the thear wind in Spring, lots-B freder enkinels her by ceered Shap community on + evidence of prev. Inundation. Are chuld whater water com but the w che nucle, active. Jone Corcart lake - Wetterne pg 1/5 Represententine Sample pt. R 0900 metus Scenar Mh Mr geomorph was came out 11.00 Brown sit read 10:15 Left SMA In plane Numerone temporany/ 2-15 = budny pls. photos: 419-623 areas inundated 0800 packed bear 6PS Pts. I = D P 0I0178583 7-16-13 1 1 1 Į I а 1 Calamagrosts curvedensis in datashedis throughout field water dutashed Apostiz gigunter, Agustiz stolonitura, toused on pust-field all all all all their fins POST-FIELD WIDATES TO FIELD NOTES updated where needed in field DATE -NINI codes. Newsre been inplanted update travagiout Field noted -Reference to the presence of + photo nininfoins have been bused on post-field attac REFERENCE CONTENTS rotot PAGE

6 ft across, herbaceeus veg 100,03 drag on barics, bequerdamed, surgel a ount Plow Bhanniela (6952 us observed 100, pts). 10,3 eet lowmon thy writewite Bridry Pt. Btwin DP03 DD04 communities Bridmy of blink lake Shore #)PO3 7-14-13 Grand take wettands Pf3155 marthe ch abandwreel Side channel stupbunk 23Adeep Silty graves 003 = 6PS 0735 Stagnant extrem Perp. pt. By the bene Scrubshart ~~105 ELPS 0702 et 20 side énannel silter givened bottom - 25t deep Dead trans communities = 6-PS pts 22-34 ish 510 DPD3 PEWI231E in baries , behundamed evanuel with withe, veg photos 634+635 S/w to no flim protos: 436-641 GPS PL# 21 1003 35 xx - 58 ----ldcated betwww.2 antflowchender a hand bhun the PSS/PEM-Shadir (area cut) 20 min that I sheep chift Tris comments is generally terma * UNDA-1024-1226 SCENAUX SNOTS. one of the manuels. 7-16-13 brant lister wettends . 1 Shink community. This pl. is Repersent atrue of Alder / willow why perhans of un channelized 50 A across at wellst Gravel Sandy soils Photos (31-633 GPS: OPOL 'Sheam! philotiss 427-630 UPS: DP02 = pt 16 Bndmy = 17, -18 1330 DP02 PS51E atur PEU Ev i branched outwash med - Fast flow boundary). with ravel bailow siret flow. 1 Billing 5

Drave Darch to large in provse part P2555 7 margue thurston in EA form Ash Amil abopt wildlife for then we need to this Functioned かんから Neter Arranged A be proper to la it so didn't leave 7-120-13 Errunt lake Wetlands A dearmetter Ash Hence if the lake yes for + doing duty at a de Hydrom end of Way ä Assessment Sweets at game w/ SMA, until relam IJ Aleranged to have Never Dick us Briding between Digoy (PSS) + DROSTUP)_ Pr 415 Rep. pt. B. True PSSIB willow) alder community > PSSI (PENIBJE determened vary cettonwoods + tree stratum salix alexans an no @ Co'00 pm. but a pizh in at Upland / W ettand boundary 1600 DPON - PSSIB 6pspt \$ 50. 7-16-13 Graint larker wetlands Shore PEN BRINILLS-LLG 1.45 pm. Recented the enter Notes: up1/pss bridge LO-LEY 1440 DPOS UPL OPS PHASA Representative upland pt Owner pro with GPS GAS, 60- 74 Ley photos: 642-646 Props: 447-650 of the lake area. three was gaby.

prive is it strutchack fish found Phrotos 2000 [ben-ba Band PEMIJSSI Produy (see fieldmerp 22) 1005 0107 \$ 605#12 6 cut 86 gravel/sand bottom that is lear 4 stagnent NK & banks 2 PSSIB center B chunnel see 5 Brdry pts GPS 4-11 = Brusen the Olso Pt. rep. DPOH PSSIB ry ft wide, who to 2 ft deep, Ups ph hep of DROS upland at shere rest 0705. 0940 6206- 17518 1000 -000 -000 -00 1000 enthe v crearel. 7-17-13 (5200-10 dennim. No Flow alder estor worken photo ical-lat-6752 pt taken in photo to 613 leb 3-leui 5 5 3~0) pis. Nu prosible today a chren une on gutting as many data & absented this photos we took from the plane. Not: Since resolution of verials and Obs. pt. taken to doc. that this comm. hird fresh yestrated, so Star Pield - will be vidift to transfer + QMOG in GIS, instad we will tout P Matos 6 61 4 662 40 Antonioning to to map the boundaried in US. PEMI SSI E THORY 0730 Field prep, vord gran with un like Beter they may read poundaried accuratly in the 0500 Met at SMA, took & on time 0930 OP. U.E. is shelf it wit map support it is U. difficult to map 7-17-13 Craint lade Wethinds In * New UPS "Ble Grant when OILTIS" Iraded Plant. is you same similar to DPOS area Will proceed triat it is. 0900 Annived at late-Pro-ory 0930 ORA4-(とやら ま)

Sprnce (Fach) dre colliant powards trees as the beindary this will 4 N 11 in DRUT. For the bionnen blon photos, we took them plane & we ista tan appearls to be converting to re the salve alex IN NCHAND BULL BULL TRANS TONIS gradient & diff to decineate This an upland (i.e. externored & white pt. Hep & wpr. community in old must likely include more walands the lake side mary in 03 the tall be a conservative bandany, t GPS#M= apprex briding bright DPOLE DPOT Will need to the we le 82 - 84 to help w mapping. : 7-17-13 Grunt Jula 2 to the words + . tree on alrial 1 4 25 DP 07 - Mp1-139-329 sotada Sinarchine. したら井して ľ ľ П Н leas clear stagnent some adace with wide with deep , No flow to the up land avertual is noted pt. Rep. 2 PSSIB common similar There is a broad transition tone gravel sand & shicks in bottom Side channed w/ beaver dam. -Pt rep. B. S.S. comm. a.d. to lote Same description as 0P08 S. Nor In oid outwadh fan 11:15 DPO16 - PSSIC/PENICY -Ves backs = PSSIB comm. 7-17-B Great Laber photo lett. pholo LIBUTI loyts OPIO -PSSIB br135 (3 1030.0009 -prutations GPS 14 62515... 1615 6P08

Col. 13 Deide of hum to D where is surves unleved from this spot (go by tall thees in accred) Ves is order sal Ver banks are the alder willow ten Achve ciran tel menders trom on N side de l'organt worde tau pt Nep. 23 strub community AZAN OCIEMNEL 4-5 Ft wide. pt. taken in middle of ontwent 1300 DP08- Per 1351/ PEH11 B 1-2 ft deep alear, flowing PSSIC community. to we veg in active lan. \$ 075 23 p.hohs/205-710 Photosion-roy B, N, N,S (Jount Laber 7-17-13 situr alex, agring BOC-PPJ at onci 1247 - P1-90 - 12421 GPS 21 ĠPS 22 4 fremed pssic @ opiz. + uplands minudly decumentiting continued actenting pt taken at approx priday phone . U drier trunsitional arrea. Not awrully Sed but clearly floods at thread Sails V. day lenge gravel, sand 45:11. -1. 12 SIN but anea church other well downed Rev 13+ Bindence of early season Aleeding at due not retent enough Ho C to 1245. OP13 - upland pausition S/S wetlewit commentations establish hydric conditions Old channel, abandoned but no standing Had Consult labe Photos: 1083-1090 12,30 6812 - 85510 photo legi-98. photos. Usi2-88 6p5 20 1200 0011 GPS - 19 (5PS#18 シレゴーじ 5 2

Small week of laker, bolles achie this is cannot no in und attom <u>ب</u> beaver daw @ out Flow channed evident wavertald in this area and peckets of within woods that we an Small high monds the small to * Observed a scyliping ~2" long L n. Inundated whater. This over Talien @ ,NE Conner of beaver map-but with that the evenins An See 11 0 P 17 Phete 123-725, 726 small upland islands 7-17-13- Concert labe pinotes = 729-22 prubs 727-732 DPIT - I 1430 OP.16 695 27 9.40 UPILO ---JD PS=26 ſ <u>Д</u> of shore where it appears to be converting the water (N) of N most active entireduce pt-rep. 00 a true 2-ted grade comm. Can't make out a briding on may but on derive photo taken from 5 Same willow alder community Typical P351B addres (will a comme leceted in an alcone in the Dend light giv area bluer this & the were been seeine but this area back to the land yas opposed to open is seasonally servicementer Fan, + D.809 is the S/S comm. Far, its the darker concular area in the H2U. DPOS is the plane this PENLE IS Merin LES 24 , Phendes MILTIY Rowled by DPOS4 DPID 7-17-13 Grant Laber 1300 PIO - PEMIF photo 215-719 M20 0P15. P551E 1340DPOG- PSSIB lake Haio E. P.S . 25

Flow, Houselean, substant growth surger V in river Silt wit some organice, reg banks RB of ontwash Curl @ 510, comm. gord CEPS STB- ist continued but my along - 20 PSS / 120 Downad of 1 CSS 08 - 1 C least pt should be rest to liat commendary of 2B weds @ Y ~ 10 ft wide i Lft deep . V. Slow. ontwark starting of Un raise Small inlet/channel South 800 P12 10/11 buding pt tablemon 7-16-13. 10 8-70 PSS/ Juleshore = adj. PSS comprendity (525 brdry i 2-1(1) brdry all or mostly pss. 75-50 = L: Bink 71: 74 = EBank 6P18. Channel IN TIVE. proto 154 0 community @ 0P15, elevation change 4 Sub shark weinge a chorner for quide (rps 43ish-131= inleg PEMLE boundary pt. to cated in upland commentation out the late "intel and This is at transition to take short 1055 bridge lete shore) upt bridge @ DP11 52-56 - RES/ CM. / Laked wine Dowindowing Wertand 3 a continuation of on NE side of "brdight wethind mile 6 BS 28-33 briding pts blum up. Fur Frans tur boundary w 1955, E the base of an avalanche/debris 5 the PSSIE we saw at OPIG that wraps are and to for esta Trinklahmen Boundary pt wet Phutos 748-753 DP1545 DP11 Wplend Crrs 36-42134 6P5 35 Transition ent wask

Fals Azelia (menzeria fenchinea 0830 Beat + can simtly to out the 19 してたした Veg= Wedton Leinbele, pager birch 0P20 4yland @ cosh of corridor Hhining Shaw to diff. lots of **A** Typical of uppland for eff. wer Monutaria Asia, Delivis Clerb, al top of V Sherp slope above iv ettern everencel 0945 Recon with to hull Decumentry upique dos -10-118-13mid turper (05 A BY Furth dog wood of brant. Cel 310 OPM upland Grant (been witer in the Pruch = 135-754 Usuo theld piego areas that 200 donen falle CDS II Con. Low Swamp 7-15-13 11/10/1 ľ ľ Ŋ H I Ĩ ľ Data &ALQC @ resulter Coordinated Logistics h I H to begue corridor where pring termontand Armyde to here Such prevenue of Sizu. Vuenanmal @ ~ lois -17-13 Srunt Lerin -1920 end of dery. 2

of corridor [pics #] without Pt takin at drainage - confirming \$5 th drainages. Ad a 30 ft wibe a- small R34B3H mnning dow pics 7711/772 @ 67546 (Strue N) strepens guidely @ 625.7, without Poly blux 675 647 in office for ends, 4 chennel becomes harrow an 23 uB 34. We are documenting 775-777 @ 665 8 (DP(2) 5, N, * H, D Wide, we GPS # le is the Sedge 5 tris as a PSI EMIE welland WI the North the Plow, V. Satt batton, 22 " Life" wether (15 Note: Hydro une 15 good for ~ 30 Ft wide enamel 14 midde, with the middle. Wethand is ~30 ft. wide sume conditions . Terraine ends at 103 # 7, Still about 30 ft. previ HDR pt # 112 HDR called this. red the wide & similar to channel 773/74 @ 6 \$ 5 7 (S then W) F 7-15-13 Grand Luke - Westernd 1530 DP17 PSSI JEMIE 400. @ 0P 22 4 00 of enrider. 5 205 Ħ ľ Π I I Ľ \prod I H I Ľ Ľ wid the of corridor cont-thenlose into add wetland. Typical hemical Lives ... 1=2A with dry channel Confirmed location Use mapped 693= check pt - then deleted Doc. contrued upl. acress Drainage prev. doc. by HDE Contrinued upt on both side comp. Step rigged terrane 7-67 = Plice in my legt Pt Atto above 12 g bowl below 778+13 Committeele Wetlands azal a, euro. Nig. Icinui deiche large L" anglular rocks GLL-SALL saland 5 525 GPS4 probs763-764 of 2 minage No W. L'S not necessary. CPSZ Photos 760-762 tops op 21 upind 1500 6PZZ R45B34 Steep Nº 140. 4+20 Fall. 20

17 0200 upiend at edges, carridy ennage du equit en everent al ady mapped whethend . Ty preal 33 6821 = Upl. above Dig punch loon From 7-18-13 Reland Hydralles beinech, ac tit, phone received the غالب والمعمد X As & I ohin Bluken if his chain Surveyed the side chalancelles Meinvilan 3ub-220-0694 hembert - torelate examine Wettends euro nig leinhichennet 4 - 1 gave stud theid work Farthing Notta 6PS 3 - a check the t we cert a with 0800 Fred prep -19-13 . (mint-led Summe 70. (575 = ¥ 6 25 2 ľ Π Π of corridor a tot of this pt lother true artec in electupt to finizanday fod ay. Upl. confined a carses widte While out puck to cur ~ 1 pm da is typical of the hemlock up! breet Documenting upland commady to wettend@ PPIL . This Comm T. (1)25 - 3 - 1 N, N, N - 787 - 2 rr : 2 2 0 ind we have been hiking thru the 7-18-13 Convirt Lidne Wichaud Cendethous V. Steep + migged 600 DPIS Upland - Apon

12 It wide + 10 Et long w/ in comba but is sub sife to the N+5 9 this GPS becation No wetlend 3 at their pt 117 Suep/ channel 3 Just a small what muddy spat. F @265-161: 32-040 Notal 7-18-13 encreach into a fi mapped without 0922 Upland - writinaiton & same 0723 Upland - eartherton of same henriced forced, earrider de equit obs a channel were thydro ine feilows topo could have the Q after incarry rains - but not chemine er confining that we did not 0824 & Hydro line on map. probs 788-790 (So No 7-18-13 continued work 1414 truing upland Photo: 783-85 7-19-13 Grant lad p hete = 7 80- 5 GISS=10 Convers. (SPS=1| 21.242) 24

Configures Strawlight this pt. 1300 0 029 Wp1 ad & Grantled 453 1245 OP 28 - doct no WL forme on 228, CIS 54 840 See bet slate pup upl. conder pet-pag equ. ard Breek 1200 Wettind ماتحم 5W @ BPIH - SE , SONS 804-807 220 -Lozyenitrinal throughout Trail lake confile アメト Cha. ang. (fimbed 252 Photos 31,2-516 500-695-8 - 10 - 1205 - 201 - 10 130 0827 - WPL 3 -pic-glace. po Shield 01220 pic giace, tran si RIC-91 NOC-7-19-13 - 1- marin pho hos -1015 DP 101 وجح مح ل ا ا ا Por ch ٢ treet 600 F \llbracket I Π <u>5</u> into ad pre-merphered 1551/ourib 20p-Junos シアキャイン 2. Pt lang) wide menudining 123MB map 2 for chennel & wetland. K-P53 198-99 W. 176, BONN, CLOBE @ 44 Chunnels, withen Swade feed running turn it. Sue corriduc BOO-Spl DPL4 + Chammed menzy Hentertaite almes vir firest 10:15 Dr14 PENU/551E With a Jor- 303 (1/2 5 , dater, day Grant lake Wetlend (2P5=1 pro tos - 294-95 4 = DP(4) & chenne denon up elong 4 3= W Jersburk Photos = 191-191 10-10 Back to 7-19-13 Notes GPS=2-E.FKStart 2 to replan b tren thus a Re boundary love Printing 0945 065 7-19-13 20 Į.

1515 0234 5 does we at this corete a the up! in the duin age supt ~ 4' Wide ever No wetland finge Red & Large D- 8" angular rocks 박/5 29 2-6. angular rod manpped 299 wet land to the NZ oil d'allervial meterral indived SW can see by back edgle read great from SW to invery, to w Plow going NE to is at the NW corner of prev. 50:15 - truthe orgimin layer over TYP. Pic grand puper buch 1430 0P32 - Juy side evenwel photos 825-32 Soils dry 1445 6933 - 3m. Letive channed Acres how how enno . 7-19-13 (21 Wettlands. on to \$37- 8-16 the wettend motis - 833-36 Ne' diretton 6 83 B 6-105 M **P** ľ agres gig cap can at ſ ľ High Draw . even beny (vib, adue) Ϊ hrewed, grow new, indy firm rest I Doc. wpland he rox coon comme proportional particulation because the logar of the <u>N</u> UP 32 4 pl. plust 823-825 puper haring out hun pic stanc 5 heem @ This with & Vitimityis the protocial pre-map mestres the tot of the protocial in the tot is the protocial in the tot is the protocial in the tot is the protocial in the protocial in the protocial is the protocial in the protocial in the protocial is the protocial in the protocial in the protocial is the protocial in the protocial in the protocial is the protocial in the protocial is the protocial in the protocial is the protocial in the protocial is the protocial in the protocial is the protocial in the protocial is the protocial in the protocial is the protocial in the protocial is the protocial in the protocial is the protocial in the protocial is the protocial in the protocial is the protocial is the protocial is the protocial in the protocial is the protocial Area floods, but is well drawed 4 appears a comme try prizal of pre-map was the hange on the up of don't 1345 0P31-dupland dog Mu WL becoked in veriand tout tobering. Dow wey con agent at 7-19-13 Wetlands (opsile ----are as on vield map #3 Banks too steep photos - 826-827. itto Delle upl. equision. uprenddog ward -11-54-9 してん 28

731 off into a where the wet worst partite b. meing cost budy pits as a guide f edit preme ppede we been doved S/S EN WEHAND. Will need to Frhan Can, login can = herbs The dramage subs bullow of the music with earlier that & Granzw/ white delicate sed heard in trait love = Nert des atropures H20 @ Doat and in grant core side of • yesterdays OP34. We mapped "I concretion now aparts" topographic drawage noted at 1030 DRIT PSS 5000100 7-20-13 1- 1- 1-4 (ands 0 \$30 gent pup. D sou Start af day Note, we have tapers phobs = 3155 - 3122 Budy= 615 2-11 pre-mapped 625=1.0917 I I I I Π 1525 0 835 aver ho h of water & 5 K Note: - Lean with scrauged shin Silver Le BE 17418- 2-bornadiena, pts affle duty bree apt minur, but still called in to protos sus-y6 11230 Barry to Ereld huide Workland to decument wet durity eoniditions. Comment lenter 7-19:13 printing fred with the azalsa pannizhi nila 1850 und of day pine be sell. Syly 69515 UISIN

1230 Drzo Resthands PSSIPANIA 1315 QP37 Wp land miny working @ Brod PSSIB is in the widdle surrounded by a ring of adors. J.J. surrounded dy a vive of marginal bet stan PEM Mixq boo king Water pie glune acadia, betpap n M 6PS'd updated boundary Br DP20 Note: HDR's Pt. 125 is confirmed. photos 31902 upl NN 3989421 SE italing bps. pb. & ween field SIBY - Standing ... Update boundaries in pre map. PENNI OPEN 7-20-19 Comme lealer Wetlembs Su map#7 tov 675 # 20-23 lon Firming pre-mapped wettand HDZS pt #723 is in this WL into DPZO wetrand photo. 3183-3180 may #7. a led dec. JPS 18 -----7-20-13 Grant later Wethender in topo lows vi "deep they the date burndnen static to the pits pt Doc. wyl. at this be we 625 14 po 6 worlooking DP1912-1-Typical white spread, humlock Wpdate pre-map wetland type Wetland @ PETT DP17. IPPIS at the data sheet for Up! Comme they surrounds 1200 DP19 PENAL PENIB Confirming wetland location. Vac ulig. + menzesia (azulia) see corridor marty ک ع & ung. nig un dershy. Pur bs = 31263 - 3149 3174 -3182 695 = 12 V photo 3170 - 3175 n: 45 0 Bbb wp) DP18-4pl. 15% photos 1130 8

PFO 4 readonnables datashed. Only arenge is we say of the stat instat 5 1-135 1515: 6P39 P55 4/16 21 # 119 Conf. numerous topos that wild that - Det P35 area is transitional a on Tu maintain W.L. conditions, PFO DO WINNAMIN is conservinded sheet wooks compect except we PTD comme that burdens the The day side but there are 7-20-13 (mant lake Wetland perm. Flooded 'H' Conditions. their PSSy) B evaluation did wet obs. a pie sit and (-P5 = 30 4th observed equ p 1025-1215: 3179-3201 15.30: 0.940 PFOUS pret 3202- 05 Lagues statunife (255 : 3) L T Hun to ck, paper brek, Whi tespread 1425-0938 upland Cont-upl From 1021 & this K. Wpdate pre-manpped we trank budy & hype w/ 6 PS d "budiny pts & noted Struted Spruce trea w. Ad. PFDE pt. - pnotes los using @ Wichund Herbaccone/ Sis withoud w. open low firmed upple ADE'S Pt #122 7-20-13 (grand Under Wetland aralia Dogwood when commenty unwediated (E) DP22 PENN/SSIE photos: 2191-3193 3195-3198 - for coundar may & 1340 DP 21 upland P. h.o. h. 3194 EPS 25. -6ps 24 sal on d 633.29 1430 स्र

Not: uptate wetland buding using 7-20-13 Crank Lake Wetland 7/7 37 + a: 1:1 line or the R3NB that HBRnoted at their pt. # 120. 2thes of aMac. 615 work Note: did not see the hidro Shaweth Reld @ Tom lines on new 8. birch (shundd) + whigh spilshead) ľ 7-20-13 brunt lube without 41 swale GPS pts 34-38 document Whothe 3209- 3211 (N,W,S). the curter stre - in GIS add a at the approx proposed swater lines 1030 OP42 start of a vegetated mosaic lon munity of sing. can (burnetle) equi. and for the retention lake "30% 510pe paperbirch Wht spruce. Fine comm. Same Similar command PP21 8.H. DAFFER (4' one reversize) to explore the goil con ditions. 1410 OPYN Confinued up1. We'll call it a PEMILE to be high more quan, ook fur protos 206-208 (N,NW,S) 0P4) upland 51-2122 SULUND vonservative. 695 33 675 32 1545 සි
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community w/ hrewel, couparsury W) martune Why Spince of lottomods Weter R551 B. pre-mappy on map lis Wetland Bringe of agrosts + cord 50 above water on noticed to anter low trues in newal mut fleak the alker is an upland well drawned alder and payer buch suchanwoods t upland to the N + S of this pt N. a rp. w. alder fringe Celevated Talles from poat to do cumut trat with been sterned Typical \$ 7-24-13 Grant lake Wetlandt - ONN 3 49 (S) + 270 (N) GPS4. production bound of 277-277 mature while sprace 31N0 L700 2221 1255 OPLER WOLDANTA Same w/ map left Su map 58 Ĩ drained alder (estammod) pruce durnage, See map 3 for boundy 4 N. Side to decument des champ. pt them in H20 btwn island enter the tares we tand finge #11 lev is upland. see well -to the present the one trade We pitted amandit - an beind Notr No Close up may of Eland ち on wat side of island wapped on Note PSIB pre-manpped-on-map DP 30 (earl) is in the maister part of GP5 3 - p-hoto 2407-6 266-2888 Wohing East (is wind on Rt). this upland - ad 1 - to a small barble under mayor + true smight Cottonwoo ds/-Spruce-de fine edge. 7-24-13 Erent lake Wethinds fringe mappedon map 42 as mapped on were #2. 1- PS 2 - photos 24 0 - 245. OPUS PENIE

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Photo A.2a-1. Representative photo of an herbaceous dominated depressional wetland. Photo taken at DP14 (PEM/PSS1E) on 7/19/13.



Photo A.2a-2. Representative photo of an herbaceous dominated lacustrine fringe wetland. Photo taken at OP86 on 7.24.13.



Photo A.2a-3. Representative photo of an herbaceous floodplain forest & scrub dominated riverine wetland on Grant Creek. Photo taken at OP51 on 7.22.13.



Photo A.2a-4. Representative photo of an herbaceous floodplain forest & scrub dominated riverine wetland in the complex wetland/upland mosaic associated with the Grant Creek side channels. Photo taken at DP23 on 7.21.13.



Photo A.2a-5. Representative photo of scrub-shrub dominated depressional wetland. Photo taken at DP17 on 7.20.13.



Photo A.2a-6. Representative photo of scrub-shrub dominated lacustrine wetland. Photo taken at DP04 on 7.16.13.



Photo A.2a-7. Representative photo of scrub-shrub dominated riverine wetland. Photo taken at DP39 on 7.25.13.



Photo A.2a-8. Representative photo of a scrub-shrub floodplain forest & scrub dominated riverine wetland. Photo taken at DP02 on 7.16.13



Photo A.2a-9. Representative photo of a scrub-shrub floodplain forest & scrub dominated riverine wetland in the complex wetland/upland mosaic associated with the Grant Creek side channels. Photo taken at DP24 on 7.22.13.



Photo A.2a-10. Representative photo of a forest dominated slope wetland. Photo taken at DP37 on 7.25.13.



Photo A.2a-11. Representative photo of an open water lacustrine waterbody. Aerial photo of Grant Lake looking west towards narrows, taken on 7.16.13.



Photo A.2a-12. Representative photo of an active riverine waterbody. Photo of Grant Creek at OP45 taken on 7.21.13.



Photo A.2a-13. Representative photo of non-vegetated and intermittent/ephemeral (dry) channel areas associated with Inlet Creek on west end of Grant Lake. Photo taken on 7.17.13.



Photo A.2a-14. Representative photo of an intermittent/ephemeral (inactive) riverine waterbody. Photo taken at OP32 on 7.19.13.

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Appendix 3: Wildlife

Appendix 3a: Breeding Landbird and Shorebird Data Appendix 3b: Northern Goshawk Data Appendix 3c: Wildlife Related Materials

- Appendix 3a. Breeding Landbird and Shorebird Data
- June 15-16, 2013 Breeding Bird Surveys
- June 15-16, 2013 Breeding Bird Point Vegetation Data
- May 21-22, 2013 Breeding Bird Surveys
- Photos A.3a-1 through A.3a-14: Breeding Bird Point Vegetation Pictures

ALMS (Circle appropriate values)
Length of count (min): Spacing between pts (m): Observers rotated among pts: Double-observer method used: Species counted in restricted radius (m): Species excluded from point counts:
OBSERVER INFORMATION
Name: AMAL R ASMI
Affiliation: ERM AUASKA, INC.
Address: 748 GAFFNEY RD, SUITE 102
City: FAIRBANKS State: AK Zip: 99701 Tel: 207-458-8233 email: AMAL. ASMI@ERM.COM
SURVEY EXPERIENCE (# years): Bird surveys Distance estimation 8+ Birding in Alaska 15+
CONTACT INFORMATION (If different)
Name: First name Middle initial Last name
Affiliation:
Address:
City: State: Zip:
Tel: email:



USGS Alaska Science Center May 2004

ALIV	LIVIS LOCATION DATA							(GPS	S dat	um:_	10:			Dates: 52 16 JUNE 2013 Block name:							
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	4		1	1	N	V		/							±							
in State	5	4	-	K	1	1									±		1					
	6		1		1										±	-		14	1			
NTLAKE	7	60	64	-5	57	1	6	1	4	9	3	52	24	Ø	: GL	7+20		20 M	SE	2		DUE TO INUNDATION OF OPIGOMA
	8												-	1	±	-	-					
	9										-	1	1		±						-	
93-10	10								/	1					±		1	1000	General	1		
	11					4	1	/		-	_				±						-	
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	13		10	P	>`						_				±				-	a		
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	16		+						1	-	-				±							
760-1	17									-	-	_	-	-	±					_		
	18		+	-					_	-	_	_	-		<u>+</u>		-		71 J			
	19	-	-	+	-				_	-	-	-	-	-	±		-			-		
	20	-	+	-						-	_	_			±						-	
	21		+	-					_	-	-	_			±						-	
	22		-		_				0			_			±						-	
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	24		+	-					_	-	-		-		±	-						
	25														±							

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START: 40°F SKY-0





LIST OF BIRDS DETECTED DURING SURVEY

Species	Time	#	Beh	Dist	Species	Time	#	Beh	Dist
HETH	3	1	5	IDD					
OCWA	5	1	5	80.					
			-	-			_		-
					-				
-		-					-		-
-									
		-		15					
				140					
1.0							•		
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1	-		1	201					-
	15		1	212			_		_
-		_		11221	-				
Chill.									
1.11.1	1		-						
-									
-									

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ALMS MAP OF BIRDS DETECTED DURING SURVEY	LI	ST OI	F
Block #: GRANT LAKE Date: 15 JUNE 2013	Species	Time	Ē
Observer: Observer: Observer:	OCWA	3	
Direction 3 (b)	WIWA	8	
270° MrG (5) 37159	PISI	5	-
150 2014 +0	TOWA	3	
ab 10 10 -63-104	REKI	13	
mail Tolun	VATH	3	
TRIMES ZUTTS COUNTY - 20	OCWA	3	
10150 -10150 5-51	SWAA	5	
(SP AND AN (EC))	YRNA	3	
3 JUN PETER FIC	OCWA	3	
FIC I	RISI	8	
20 10	PISI	10	
Minne Minne			
(S)	1		-
			L
			L
			1
	-	-	-
		-	╞
		*	+
CACO, How oud a service	31.5		+
Species between this and previous point: CLOT TOWN TOWN TO WE TO THE TOWN TO T	27.14		+
Non-landbird species present but not counted:	10.4		+
Mammais:			-
NOTES:	-		-

#3

Species	Time	#	Beh	Dist	Species	Time	#	Beh	Dist
OCWA	3	1	0	20					
WIWA	8	1	5	190					
PISI	5	1	F.C	90					
TOWA	3	1	5	100					
REKI	13	1	5	>150					-
VATH	3	1	5	7197					1
OCWA	3	1	5	40					
SWAA	5	1	5	7150			-		
YENA	3	1	5	790					
OCWA	3	1	5	83		4			
RISI	8	2	FC	40		*			
PSA	10	1	FIC	SØ.	•	4			/
*		-			-		-	1	
				-		_			
-					221				
				- Alter			-		
							-		-
	-	1					-		
10	*		-		-		-		
39.4									-
	-		-	201					
ES-ML		-	4	Ser.					
		-							
								-	

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#5

Species	Time	#	Beh	Dist	Species	Time	#	Beh	Dist
WIWA	3	1	5	100					
VAAH!	3	1	5	80.					
VARTH	3	1	5	100					
VATA	8)	5	>190					
COLO	3)	Fic	50					
VATA	3	1	5	7190					
VASH	8	1	5	80					
Rekl	3	1	5	125		-			
VATH	3		5	SØ	- 1 - 1				
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10 L		- 5					-		
-					-				-
						14			2
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#6

Species	Time	#	Beh	Dist	Species	Time	#	Beh	Dist
WWA	5	(5	100					
VARTA	5	1	S	60					
FOSP	8	1	5	>190					
VWAR	10	1	5	>150					
WIWA	3	1	5	>190					
FOSP.	3	1	5	7190				1.	
OCWA	3	(S	>150\$					
HETH	3	1	5	>190	-			_	
TOWA	3		5	7150	-		-		_
WIWIA	3	1	5	>15p					
YRWA	.3	1	S	80					
				/					
			-						
			1.1						
							_		-
	-						-		-
				113			-		
	-						-		
			-			-			-
	- 4			N 10		1	-		
1		-					-		
				2	-				
				-					
1									

END 50°F; W-

Beh

Dist



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BIRDS - HEARD IDM AWAY FROM PUT - PERIS HEAT; WIWA

TEMP SONANT: 477 S-D; W-D



4

LIST OF BIRDS DETECTED DURING SURVEY

Species	Time	#	Beh	Dist	Species	Time	#	Beh	Dist
HETH	3	1	5	7150	Χ.	·			
RCKI	8	1	S	iod.					
TOWA	3	1	S	itod		1	1		
RCKI	3	1	5	7150			A +		
WIWA	3	1	5	>150			-		
OCWA	3	1	5	80		2			
VATH	3	(5	30					1
HETH	3	1	S.	60		1		-	2
QUA	3	1	5	80		-			-
SWITH	3	1	5	90					
WIWA	3	(5	60					
HETH	3	1	5	100		-	-		
YRWA	8		5	60					1
WIWA	3	1	S	30				-	
TOWA	5	1	5	60					
CBCH	10	1	C	90	_				-
_									
				-					
		_							-
				-					
		-			-		-	1	
•		-			15110		-		-
			-		-				
		123				- 21	-		
					1				-
		-				1	-		
		-							



#2

Species	Time	#	Beh	Dist	Species	Time	#	Beh	Dist
TOWA	3)	5	>15\$					
RCKI	8	1	5	>15p					
HETH	3	1	5	80)	+		-		
PISI	5	1	FiC	90	-				
AMD).	3	1	C	100					1
RCKI	8	1	5	>150					
HETH.	3	1	5	50					
SWOT:	3	1	5	40					1
WINA	3		5	750					
RCKI	8		5	40				1	
OCWA	8	K	0	40	-				
CBCH:	10	i	C	80	1		-		
REDP	3	1	F.C	400					
WINA	3	1	5	90					
YRWA	3	1	5	90					
WIWA	3	1	5	80			4		
TOWA.	8	1	S	90					
DCWA	3	1	5	50					
				/					
	1								
								1	
-						1		15-10	
					-	-			
			1					1 1	
							1		

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VATH 5-30

BX.

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#3

Species	Time	#	Beh	Dist	Species	Time	#	Beh	Dist
YRWA	3	1	5	60					
DOWA	3	1	5	100				1	
AMRO	3	1	5	60					
REKI	3	1	5	>150					
DUNA	3	1	5	60	6				
VANH	3	-	5	48					
VANH.	3		C	40					
WWCR	5		Fic	20					
VADA	5)	5	>150					
VADA	3	1	C	ID					
Suth	5	1	5	80					
HERH	5		5	90	4				
Score	3)	5	50					
VENA	10)	5	80					
				/					
								1	
					`				
			-						
				1					
÷ .	-		*		-		-		-
			-	a f					
				32					



#4

Species	Time	#	Beh	Dist	Species	Time	#	Beh	Dist
DOWA	3	1	5	80					
DCWA	3	1	5	30.	1.1.1				
PIGR	3	1	5	40					
SWITH	5	1	5	BD	<i>k</i> .				
DUNA	3	1	S	AD					
HADT	8	1	5	150					
Meji j				1					
	1				4				122
									1
	-								
7 1.1			• •		-		-		
						-			
							+		
	1.1								
				-					
			-	210					
						-			
				-					1
					12 ×		-		
					1				
-						1			



Species	Time	#	Beh	Dist	Species	Time	#	Beh	Dist
Hent	3	1	V	10					
DOWA	3	1	1	20.					
SWAT	3	1	\$	80			-		
ANKO	ΙØ	1	C	50				-	
	-						-		
14									
-									
-							1		
	1								
-				-			14		
							-		-
		-		1					



Species	Time	#	Beh	Dist	Species	Time	#	Beh	Dist
DOWA	3	1	S	50					
2CK1	2	1	SV	D.					
YRWA	100	1.	5	Ad			2		
	17			9		1			
				6					
									0-11
								-	
-									
									-
	1								
1		-			1				
0.10	1.3								
S. S.									
-			4						
	*								

TEMP= 50 % S END: 0818 W

#7



LIST OF BIRDS DETECTED DURING SURVEY

Species	Time	#	Beh	Dist	Species	Time	#	Beh	Dist
SWATH	3	l	C	40					
OCWA	0	1	C	40.					35
CWA	3	1	5	30				-	
PIS!	5	1	Fic	30					
HETH	3	1	C	60				-	
PCK1.	3	1	5	60					
HETH	3	1	C	Frb					
VATH	3	1	5	AD					
ANRD.	3	1	C	50					
OCWA	3	1	C	50					
YRWA	3	1	5	60		-			
GNGL	10	1	C	>50					
	-1								
							-		
		_	-				-		
							0	1	
		-							
			1						-
-							_		
					-		_		
							-		

	10		Land unit:	RANT LAKE	Dates: 16-17 dive 2013			
	NS BIRD AND MA	MMAL SUN	MARY CHECKLIST	Block numb	er:	Observers	: ARA 1 RUB	
-				Block name		Total effor	t:hrs	km
RTLO PALO COUGR HORGR PECO TUSW TRAGG GWTE MALL NOFHO AMWIC CGBUT MALL NOFHO AMWIC CGBUT MALL NOFHO AMWIC CGBUT CG	Red-throated Loon Pacific Loon Common Loon Horned Grebe Red-necked Grebe Pelagic Cormorant Tundra Swan Trumpeter Swan Canada Goose Green-winged Teal Mallard Northern Pintail Northern Pintail Northern Pintail Northern Shoveler American Wigeon Greater Scaup Lesser Scaup Lesser Scaup Lesser Scaup Lesser Scaup Larlequin Duck Long-tailed Duck Black Scoter White-winged Scoter Common Goldeneye Barrow's Goldeneye Barrow's Goldeneye Barrow's Goldeneye Bufflehead Common Merganser Red-breasted Merganser Osprey Bald Eagle Northern Harrier Sharp-shinned Hawk Northern Goshawk Swainson's Hawk Red-tailed Hawk Rough-legged Hawk Golden Eagle American Kestrel Merlin Gyrfalcon Spruce Grouse Blue Grouse Willow Ptarmigan Sandhill Crane Black-bellied Plover American Golden-Plover Pacific Golden-Plover Pacific Golden-Plover Balak Cystercatcher Greater Yellowlegs Lesser Yellowlegs	PAJA LTJA BOGU HERG GLGU HERG GLGU BLKI ARTE ALTE COMU BLSW CODO RBDOW BLSW CASW BBOW BBOW SEGOW BLSW VASW BBCFL VSFL BBWO VSFL BBWO VSFL BBWO NOFFL HAFL SARS CLSW BBMAR STJA BBMAR NOCR	Parasitic Jaeger Long-tailed Jaeger Bonaparte's Gull Mew Gull Herring Gull Glaucous-winged Gull Glaucous Gull Black-legged Kittiwake Arctic Tern Aleutian Tern Common Murre Pigeon Guillemot Marbled Murrelet Tufted Puffin Horned Puffin Rock Dove Great Horned Owl Northern Hawk Owl Barred Owl Great Gray Owl Short-eared Owl Black Swift Vaux's Swift Rufous Hummingbird Belted Kingfisher Red-breasted Sapsucker Downy Woodpecker Hairy Woodpecker Hairy Woodpecker Black-backed Woodpecker Black-backed Woodpecker Northern Flicker Vellow-shafted Flicker Red-shafted Flicker Northern Flicker Olive-sided Flycatcher Western Wood-Pewee Alder Flycatcher Hammond's Flycatcher Say's Phoebe Horned Lark Tree Swallow Violet-green Swallow Sant Swallow Cliff Swallow Bark Swallow Cliff Swallow Bar Swallow Cliff Swallow Bar Swallow Cliff Swallow Bar Swallow Cliff Swallow Bar Swallow Cliff Swallow Bar Swallow Cliff Swallow Bar Swallow Cliff Swallow Bar Swallow Cliff Swallow Bar Swallow Cliff Swallow Bar Swallow Cliff Swallow Bar Swallow Cliff Swallow Bar Swallow Cliff Swallow Bar Swallow Cliff Swallow Bar Swallow Cliff Swallow Bar Swallow Cliff Swallow Bar Swallow Cliff Swallow Bar Swallow Cliff Swallow Bar Swallow Cliff Swallow Bar Swallow Cray Jay	RCKI BLUEH NOSOH TOGCTHH HAMRH VATAGA SWEHTHO SWEWA HAMRH VAMPI AA	Ruby-crowned Kinglet Bluethroat Northern Wheatear Townsend's Solitaire Gray-cheeked Thrush Swainson's Thrush Hermit Thrush American Robin Varied Thrush Yellow Wagtail White Wagtail American Pipit Bohemian Waxwing Cedar Waxwing Northern Shrike Warbling Vireo Red-eyed Vireo Orange-crowned Warbler Yellow Warbler Audubon's Warbler Audubon's Warbler Yellow-rumped Warbler Yellow-rumped Warbler Blackpoll Warbler American Redstart Northern Waterthrush MacGillivray's Warbler Common Yellowthroat Wilson's Warbler American Tree Sparrow Chipping Sparrow Savannah Sparrow Fox Sparrow Song Sparrow Sitae-colored Junco Dark-eyed Junco Lapland Longspur Snow Bunting Rusty Blackbird Gray-crowned Rosy-Finch Pine Grosball White-winged Crossbill Common Redpoll Hoary Redpoll Pine Siskin		Shrew (sp.) Bat (sp.) Arctic fox Coyote Wolf Red fox Lynx River otter Wolverine Marten Fisher Ermine Least weasel Mink Black bear Brown bear X Moose Mule deer Caribou Bison Mountain goat Muskox Dall's sheep Alaska marmot Hoary marmot Woodchuck Arctic ground squirrel Red squirrel Northern flying squirr Beaver Jumping mouse (sp.) Collared lemming Brown lemming Microtus vole (sp.) Collared lemming Brown lemming Microtus vole (sp.) Collared pika Snowshoe hare Tundra hare MAMMAL EVIDEN Visual observation Tracks Sign Dam	g CE
X SPSA UPSA WHIM SESA WESA LESA ROSA DUNL WISN RNPH	Spotted Sandpiper Upland Sandpiper Whimbrel Semipalmated Sandpiper Western Sandpiper Least Sandpiper Rock Sandpiper Dunlin Wilson's Snipe Red-necked Phalarope	CORA BCCH BCCH CBCH RBNU BRCR WIWR BRCR WIWR ARWA GCKI	Common Raven Black-capped Chickadee Boreal Chickadee Chestnut-backed Chickadee Red-breasted Nuthatch Brown Creeper Winter Wren American Dipper Arctic Warbler Golden-crowned Kinglet	BREEDING X Detect H Observ P Pair of S Singing C Courts	BIRD EVIDENCE ed, no evidence of breeding ved in possible nesting habitat oserved in suitable habitat g male hin display	B Bui A Ala D Dis N Nes Y Doy F Adu	lding or excavating nest rm call traction display, injury-fi st observed wny or recently fledged ult with fecal sac or foor	eigning young

ALMS HABITAT BLOCK DATA	Block #: Block name: GPANT LAKE Topo map quad:
PHOTOS	EXOTIC PLANTS
Digital → Interfaced with GPS? Slide film ☐ Yes Print film Ø No	Mark each EXOTIC PLANT SPECIES detected anywhere within the grid of points.
OBSERVER INFORMATION	Canada Thistle (<i>Cirsium arvense</i>)
Name: AMAL R AMA First name Middle initial Last name Affiliation: ERM MASKA INC.	White Sweetclover (<i>Melilotus albus</i>) Other: Other:
Address: 748 GAFFNEY ROAD, SUITE 102	MISCELLANEOUS FIELD NOTES
	Point Notes
City: FAIRISANKS State: AK Zip: 99701 Tel: 907-458-8273email: AMAL AJMIQ ERM. COM	AL WENT WELL EXCEPT PAT #7- WE HAD TO MOVE IT REAUSE CREEK
Additional observers: KOBERT J. RECKMAN	HAD INUNDATED PAT.
	GU#11; GL#10; GL#8; GL#6; GL#9; GL
CONTACT INFORMATION (If different)	
Name:	16 JUNE: OD DER FOR DAY: GL#1; GL#2; GL#3
First name Middle initial Last name Affiliation:	GU#4; GU#5
Address:	
City: State: Zip:	
Tel:email:	

<u>ALMS</u>	HABITA	T DESCRIPTIO	Lan Bloo	ck#:	Date: 15 JUNE 2013 Point #: 61#13 Observers: APA : FSB Habitat # of 2 % of circle: 10% GRATU
	С	LASSIFICATION			VEGETATION
 1. Water body w NWI: 2. Water body w NWI: 3. Vegetated w NWI: 4. Non-wetland Solid bedr Rocks, sto NWI: 5. Non-wetland NWI: 	with no flo Kessel: _ with > 2% Kessel: _ etland wit Kessel: _ l with < 2% rock ones, grave Kessel: _ with > 2% Kessel: _	ating or emergent version of version cover.	getation. NA y. Persistent	PANT LAKE	SINGLE-STEMMED TREES > 3 m % coniferous:
TREE size class	DBH Code	DBH (in) Coniferous Decidu	ous Conife	DBH (cm) erous Deciduous	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
TREE size class Seedling	DBH Code	DBH (in) Coniferous Decidu < 1.0 < 1.0	ous Conife	DBH (cm) erous Deciduous 2.5 < 2.5	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
TREE size class Seedling Sapling	DBH Code 1 2	DBH (in) Coniferous Decidu < 1.0 < 1.0 1.0-4.9 1.0-4	ous Conife < 2 9 2.5-	DBH (cm) erous Deciduous 2.5 < 2.5 -13 2.5–13	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
TREE size class Seedling Sapling Poletimber	DBH Code 1 2 3	DBH (in) Coniferous Decidu < 1.0 < 1.0 1.0-4.9 1.0-4 5-8.9 5-10	ous Conife 0 < 2 9 2.5- 9 14-	DBH (cm) erous Deciduous 2.5 < 2.5 -13 2.5–13 -23 14–28	1. <
TREE size class Seedling Sapling Poletimber Small Sawtimber	DBH Code 1 2 3 4	DBH (in) Coniferous Decidu < 1.0 < 1.0 1.0-4.9 1.0-4 5-8.9 5-10 9-19.9 11-19	ous Conife 9 2.5- 9 14- .9 23-	DBH (cm) erous Deciduous 2.5 < 2.5	1. 4 ROSACE 2. 5 4 3. 4 4.
TREE size class Seedling Sapling Poletimber Small Sawtimber Large Sawtimber Giant Sawtimber	DBH Code 1 2 3 4 5 6	DBH (in) Coniferous Decidu < 1.0	Dus Conife 9 2.5- 9 14- .9 23- .9 50- .9 50-	DBH (cm) erous Deciduous 2.5 < 2.5	1. 4 POSMCB 2. 4 4 3. 100 4. 100 4. 100 4. 100 4. 100 4. 100 1. 100
TREE size class Seedling Sapling Poletimber Small Sawtimber Large Sawtimber Giant Sawtimber Giant Sawtimber COVER CLASS CODES for LARGEST TREES, SHRUBS, NON-WOODY	DBH Code 1 2 3 4 5 6 Code 0 1	DBH (in) Coniferous Decidu < 1.0 < 1.0 1.0-4.9 1.0-4 5-8.9 5-10 9-19.9 11-19 20-39.9 20-39 > 40 > 40 % cover None << 1 %	ous Conife 9 2.5- 9 14- .9 23- .9 50- > 1 Code 4 5	DBH (cm) erous Deciduous 2.5 < 2.5	1. <
TREE size class Seedling Sapling Poletimber Small Sawtimber Giant Sawtimber Giant Sawtimber COVER CLASS CODES for LARGEST TREES, SHRUBS, NON-WOODY PLANTS, &	DBH Code 1 2 3 4 5 6 Code 0 1 2	DBH (in) Coniferous Decidu < 1.0	ous Conife 9 2.5- 9 14- .9 23- .9 50- > 1 Code 4 5 6	DBH (cm) erous Deciduous 2.5 < 2.5	1. <

ALMS HABITAT POINT DATA	Land unit: GPANT LAKE Block # Date: 15 OULE 20/3 Point #: 61#13 Observers: APA PAB
TOPOGRAPHY	COARSE WOODY DEBRIS (Within 50-m radius circle)
Elevation (m) Aspect ° Slope ° TOPOGRAPHIC POSITION Summit Highslope K Basin	No. coniferous snags: 1 2 3-4 5-6 7-9 10-12 >12 No. deciduous snags: 1 2 3-4 5-6 7-9 10-12 >12 % cover downed logs: <<1 <1 1-5 6-25 26-50 51-75 76-100%
Ridge Midslope Valley Lowslope Plain	HABITAT QUESTIONNAIRE (Answer all questions for each point)
LOCAL FEATURES Cliff/rock face Step in slope Alluvia/moraine Cut-bank Floodplain Dunes Other GRANT HALE	1. Is there a water body at least partly inside the 50-m radius circle? Image: Comparison of the state
PHOTO Facing North: Facing South: Roll/frame or Facing East: Facing West: Digital ID # Facing East: Facing West:	Image: Second second
DISTURBANCE Image Image Image Yrs since disturbance Type % of Severity Yrs since disturbance Insect damage Image Disease Image	B. Is the water body at least 10 m wide? If YES, this is wetland habitat. If part of water body is vegetated and part unvegetated, there may be > 1 habitat. Use NWI Key to determine wetland classes and fill out HABITAT DESCRIPTION form for each one.
Beaver ponds Beaver cuttings Since S	2. Apart from water bodies described above, is saturation with water the dominant factor in determining soil development and plant community for any other habitat > 10 m wide occurring at least partly in the circle? This includes areas at least annually saturated with or covered by water, areas dotted with small ponds, and areas with obligate wetland plants or numerous facultative wetland species (see NWI wetland indicator lists). If YES, this is a separate wetland habitat. Use NWI Key to determine wetland class and fill out HABITAT DESCRIPTION form.
Other human disturbances Cher	 3. Is there a large patch of unvegetated ground, not associated with a water body, that is at least partly inside the 50-m circle? This can include rock, bare ground, or snow or ice with no protruding vegetation, but the patch must be at least 400 m² in size (11-m radius).
 MINOR: Little evidence of disturbance, damage limited to small part of circle, or widespread but slight. Minor driver for succession. 2 SEVERE: Damage obvious and widespread in circle, including killing or removing much of the vegetation or underlying substrate. Damage resulting in widespread secondary succession. 	 If YES, this is a separate habitat; fill out HABITAT DESCRIPTION form. 4. For any other parts of the 50-m radius circle, fill out one HABITAT DESCRIPTION form for each discrete non-wetland habitat type. DO NOT separate out components of common habitat mosaics (see instructions). For any of these habitats, is the soil very well drained, unable to hold moisture long after precipitation, and dry most of the year?

ALMS +	ABITA	TDESCR		Land unit: Block #: _	GRANTLI	Date: 17 JUNE 2013 Observers: APA; RJB Point #: GU#13 Habitat # 2 of 2 % of circle: 40%
	C		ATION			VEGETATION
 1. Water body w NWI: 2. Water body w NWI: 3. Vegetated we NWI: 4. Non-wetland Solid bedre Rocks, stor NWI: 5. Non-wetland NWI: 	vith no flo Kessel: vith > 2% Kessel: etland wi Kessel: with < 2° ock nes, grav Kessel: with > 2° Kessel:	bating or ema vegetation vegetation v thout open w v % vegetation el Sand v % vegetation v % vegetation v	ergent vegeta iereck: <u>NA</u> cover. iereck: <u></u> vater body. iereck: <u></u> n. soil <u>D</u> Pe iereck: <u>NA</u> i cover. iereck: <u></u>	ation. ersistent snow	or ice	SINGLE-STEMMED TREES > 3 m % TREE canopy cover: 5 % coniferous: 6 Avg. ht. (m) DBH Cover 3-5 1. 10 2. 10 3. 10 4. 10 SINGLE-STEMMED SAPLINGS, SEEDLINGS, OR DWARF TREES < 3 m
TREE size class	DBH Code	DBH Coniferous	l (in) Deciduous	DBH Coniferous	l (cm) Deciduous	1. 10 <u>4</u> <u>VIBEDU</u> 2. 10 <u>4</u> <u>ROSACE</u>
Seedling Sapling Poletimber Small Sawtimber Large Sawtimber Giant Sawtimber	1 2 3 4 5 6	< 1.0 1.0-4.9 5-8.9 9-19.9 20-39.9 > 40	< 1.0 1.0-4.9 5-10.9 11-19.9 20-39.9 > 40	< 2.5 2.5–13 14–23 23–49 50–101 > 102	< 2.5 2.5–13 14–28 28-49 50–101 > 102	3. 10 4 VACULI 4. 10 4 VACULI NON-WOODY PLANTS Cover class Species (list by dominance) Graminoids 7 GRABS Herbs 3 VIOPAL'S POTPAL'S Ferns 4 OAK
COVER CLASS CODES for LARGEST TREES, SHRUBS, NON-WOODY PLANTS, & GROUND COVER	Code 0 1 2 3	% cove None << 1 % < 1 % 1–5 %	er C % % %	code % 4 6 5 26 6 51 7 76-	cover 25 % 5-50 % 75 % -100 %	Horsetails Zero GROUND COVER Ø Mosses/hepatics Ø Lichens Ø Litter P Bare ground Ø Ephemeral snow Ø

#1

ALMS HABITAT POINT DATA	Land unit: <u>GRANTUNE</u> Date: <u>HJUNE 2013</u> Observers: <u>ARA'</u> , <u>RJB</u> Block #: <u>GLH13</u> Point #: <u>GLH13</u>
TOPOGRAPHY	COARSE WOODY DEBRIS (Within 50-m radius circle)
Elevation (m) Aspect O Slope O TOPOGRAPHIC POSITION Summit Highslope Basin	No. coniferous snags: 1 2 3-4 5-6 7-9 10-12 >12 No. deciduous snags: 1 2 3-4 5-6 7-9 10-12 >12 % cover downed logs: <<1
Ridge Midslope Lowslope Plain	HABITAT QUESTIONNAIRE (Answer all questions for each point.)
LOCAL FEATURES Cliff/rock face Step in slope Cliff/rock face Step in slope Cut-bank Floodplain Dunes Other GRANT PHOTO Facing North: Facing South:	1. Is there a water body at least partly inside the 50-m radius circle? YES NO A. If YES, indicate the water type, shore type, and shore vegetation. Image: Comparison of type and vegetation. Water type: Shore type and vegetation: Image: Comparison of type and vegetation. Image: Comparison of type and vegetation. Image: Comparison of type and vegetation. Image: Comparison of type and vegetation. Image: Comparison of type and vegetation. Image: Comparison of type and vegetation. Image: Comparison of type and vegetation. Image: Comparison of type and vegetation. Image: Comparison of type and vegetation. Image: Comparison of type and vegetation. Image: Comparison of type and vegetation. Image: Comparison of type and vegetation. Image: Comparison of type and vegetation. Image: Comparison of type and vegetation. Image: Comparison of type and vegetation. Image: Comparison of type and vegetation. Image: Comparison of type and vegetation. Image: Comparison of type and vegetation. Image: Comparison of type and vegetation. Image: Comparison of type and vegetation. Image: Comparison of type and vegetation. Image: Comparison of type and vegetation. Image: Comparison of type and vegetation. Image: Comparison of type and vegetation. Image: Comparison of type and vegetation.<
Digital ID # Facing East: Facing West:	$\square River/Stream \square < 30\% \text{ vegetated}$ $\square Lake/Pond \square > 30\% \text{ vegetated}$
DISTURBANCE None % of Severity Type circle code < 2	B. Is the water body at least 10 m wide? If YES, this is wetland habitat. If part of water body is vegetated and part unvegetated, there may be > 1 habitat. Use NWI Key to determine
Insect damage	 wetland classes and fill out HABITAT DESCRIPTION form for each one. Apart from water bodies described above, is saturation with water the dominant factor in determining soil development and plant community for any other habitat > 10 m wide occurring at least partly in the circle? This includes areas at least annually saturated with or covered by water, areas dotted with small ponds, and areas with obligate wetland plants or numerous facultative wetland species (see NWI wetland indicator lists).
Landslide/avalanche Logging Roads	If YES, this is a separate wetland habitat. Use NWI Key to determine wetland class and fill out HABITAT DESCRIPTION form.
Other human disturbances Other	3. Is there a large patch of unvegetated ground, not associated with a water body, that is at least partly inside the 50-m circle? This can include rock, bare ground, or snow or ice with no protruding vegetation, but the patch
DISTURBANCE SEVERITY CODES	must be at least 400 m ² in size (11-m radius).
 MINOR: Little evidence of disturbance, damage limited to small part of circle, or widespread but slight. Minor driver for succession. SEVERE: Damage obvious and widespread in circle, including killing or removing much of the vegetation or underlying substrate. 	 If YES, this is a separate habitat; fill out HABITAT DESCRIPTION form. For any other parts of the 50-m radius circle, fill out one HABITAT DESCRIPTION form for each discrete non-wetland habitat type. DO NOT separate out components of common habitat mosaics (see instructions). For any of these habitats, is the soil very well drained, unable to hold.
Damage resulting in widespread secondary succession.	moisture long after precipitation, and dry most of the year?

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<u>ALMS</u> н	IABITA	T DESCR	IPTION	Land unit: Block #: _	GRANT L	Date: 15 MINE 2013 Point #: 61#14 Observers: APA PSB Point #: 61#14 Habitat # of % of circle: 100						
	С	LASSIFIC	ATION			VEGETATION						
 1. Water body w NWI: 2. Water body w NWI: 3. Vegetated we NWI: 4. Non-wetland w Solid bedrow Rocks, stor NWI: 5. Non-wetland w NWI: 	ith no flo Kessel: . vith > 2% Kessel: . etland with Kessel: . with < 2% bock Mess grave Kessel: . with > 2% Kessel: .	ating or ema vegetation of hout open w vi vegetation Bare Sand vegetation	ergent vegeta iereck: <u>NA</u> cover. iereck: <u></u> vater body. ereck: <u></u> n. soil <u>Pe</u> iereck: <u>NA</u> cover. iereck: <u></u>	ation. ersistent snow	or ice	SINGLE-STEMMED TREES > 3 m % TREE canopy cover: % coniferous: Image: Strees Avg. ht. (m) DBH Cover TREE LAYER species % cover 3-5 5-9 9-21 > 21 class class class 1. TSUMPR 40 Image: Strees 3-5 5-9 9-21 > 21 class dias EE I size class C	DBH Code	DBH Coniferous	l (in) Deciduous	DBH Coniferous	l (cm) Deciduous	1. OR 4 BOTNAN; 2. OS 4 LEDDEC
Seedling Sapling Poletimber Small Sawtimber Large Sawtimber Giant Sawtimber	1 2 3 4 5 6	< 1.0 1.0-4.9 5-8.9 9-19.9 20-39.9 > 40	< 1.0 1.0-4.9 5-10.9 11-19.9 20-39.9 > 40	< 2.5 2.5–13 14–23 23–49 50–101 > 102	< 2.5 2.5–13 14–28 28-49 50–101 > 102	3. 4. 4. 4. 4. 4. VAC WLI NON-WOODY PLANTS Cover class Species (list by dominance) Graminoids 4. 4. Herbs 4. Ferns 4.						
COVER CLASS CODES for LARGEST TREES, SHRUBS, NON-WOODY PLANTS, & GROUND COVER	Code 0 1 2 3	% cove None << 1 % < 1 % 1–5 %	er C	code % 4 6 5 26 6 51 7 76-	cover 25 % 50 % 75 % -100 %	Horsetalls Horsetalls GROUND COVER Hoss Mosses/hepatics Hoss Lichens Litter Bare ground Hoss Ephemeral snow Hoss						

N

ALMS HABITAT POINT DATA	Land unit: GRANT LAKE Block #: Date: 15 duite 2013 Point #: Observers: Alto Rds Rds
TOPOGRAPHY	COARSE WOODY DEBRIS (Within 50-m radius circle)
Elevation (m) Aspect Slope ° TOPOGRAPHIC POSITION Summit Highslope Basin	No. coniferous snags: 1 2 3-4 5-6 7-9 10-12 >12 No. deciduous snags: 1 2 3-4 5-6 7-9 10-12 >12 % cover downed logs: <
Ridge Midslope Valley Lowslope Plain	HABITAT QUESTIONNAIRE
LOCAL FEATURES Cliff/rock face Cut-bank Cut-ban	1. Is there a water body at least partly inside the 50-m radius circle? YES NO A. If YES, indicate the water type, shore type, and shore vegetation. Image: Comparison of type and vegetation. Water type: Shore type and vegetation: Image: Marine Image: Bedrock, boulders, large stones
PHOTO Roll/frame or Facing North: Facing South: Digital ID # Facing East: Facing West: Facing West:	Estuarine Organic material, mud, sand, gravel, cobbles River/Stream < 30% vegetated
DISTURBANCE None Type % of Severity circle code Yrs since disturbance < 2 > 2 # if known	B. Is the water body at least 10 m wide? If YES, this is wetland habitat. If part of water body is vegetated and part unvegetated, there may be > 1 habitat. Use NWI Key to determine
Disease	 2. Apart from water bodies described above, is saturation with water the dominant factor in determining soil development and plant community for any other habitat > 10 m wide occurring at least partly in the circle? This includes areas at least annually saturated with or covered by water, areas dotted with small ponds, and areas with obligate wetland plants or numerous facultative wetland species (see NWI wetland indicator lists). If YES, this is a separate wetland habitat. Use NWI Key to determine wetland class and fill out HABITAT DESCRIPTION form.
Other human disturbances Other Other DISTURBANCE SEVERITY CODES	 3. Is there a large patch of unvegetated ground, not associated with a water body, that is at least partly inside the 50-m circle? This can include rock, bare ground, or snow or ice with no protruding vegetation, but the patch must be at least 400 m² in size (11-m radius).
 MINOR: Little evidence of disturbance, damage limited to small part of circle, or widespread but slight. Minor driver for succession. SEVERE: Damage obvious and widespread in circle, including 	 If YES, this is a separate habitat; fill out HABITAT DESCRIPTION form. 4. For any other parts of the 50-m radius circle, fill out one HABITAT DESCRIPTION form for each discrete non-wetland habitat type. DO NOT separate out components of common habitat mosaics (see instructions).
killing or removing much of the vegetation or underlying substrate. Damage resulting in widespread secondary succession.	For any of these habitats, is the soil very well drained, unable to hold moisture long after precipitation, and dry most of the year?

#2

ALMS	HABITA	AT DESCR		Land un Block #:	hit: <u>GRANT</u>	Dat Obs	te: <u>15 dur</u> servers: Alf	8 2013 H RJB	Point #: 4 Habitat # % of circle:	#12 []
	c	LASSIFIC	ATION				V	EGETATION	N	
 1. Water body NWI:	with no flo Kessel: with > 2% Kessel: vetland wi Kessel: d with < 2 rock ones, grav Kessel:	oating or emo vegetation without open w voithout open voithout open w voithout open voithout	ergent veget /iereck: <u>NA</u> cover. /iereck: <u></u> vater body. /iereck: <u></u> n. soil P I /iereck: <u>NA</u>	ation.	w or ice	SINGLE-STEMMI % TREE canopy of TREE LAYER spe 1 2 3 4 SINGLE-STEMMI Species (list for eac 1 2 2 SINGLE-STEMMI Species (list for eac 1	ED TREES > cover:	3 m % coniferous: Avg. cover 3-5 5-9 9 9 1 2 1 2 1 3 5, SEEDLINGS cover Avg. ht 2 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1	99 ht. (m) 9-21 > 21 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Largest trees DBH Cover class class 4 4 4 4 4 4 4 4 4 4 4 4 4
5. Non-wetland	l with > 2 Kessel:	% vegetation	iereck:		* *	SHRUBS (Multiple Layer Avg. ht.(m)	e-stemmed, we Cover class	oody plants) Species (list fo	or each layer)	- Man Marken
5. Non-wetland NWI: NA TREE size class	DBH Code	% vegetation <u> い し し し し し し し し し し し し し し し し し し</u>	ri cover. /iereck: H (in) Deciduous	- DB Coniferou	H (cm) s Deciduous	SHRUBS (Multiple Layer Avg. ht.(m) 1.	e-stemmed, we Cover class	Dody plants) Species (list for MBNFBR CORCAN	or each layer)	ols HUCKBER
5. Non-wetland NWI: <u>NA</u> TREE size class Seedling	DBH Code	% vegetation 加上 v DBH Coniferous < 1.0	r cover. /iereck: H (in) Deciduous < 1.0	DB Coniferou < 2.5	H (cm) s Deciduous < 2.5	SHRUBS (Multiple Layer Avg. ht.(m) 1. 2. 3.	e-stemmed, we Cover class	Dody plants) Species (list for NBNFBR CORCAN VACMT EMPNIG	or each layer)	OLS HUCKBER
5. Non-wetland NWI: <u>NA</u> TREE size class Seedling Sapling	DBH Code 1 2	% vegetation DBH Coniferous < 1.0 1.0–4.9	r cover. /iereck: H (in) Deciduous < 1.0 1.0–4.9		H (cm) s Deciduous < 2.5 2.5–13	SHRUBS (Multiple Layer Avg. ht.(m) 1. 2. 3. 4.	e-stemmed, we Cover class	Dody plants) Species (list for MBN FBR CORCAN VACMA EMPNIG	or each layer)	ols HUCKBER
5. Non-wetland NWI: <u>NA</u> TREE size class Seedling Sapling Poletimber	DBH Code 1 2 3	% vegetation DBH Coniferous < 1.0 1.0–4.9 5–8.9	H (in) Deciduous < 1.0 1.0-4.9 5-10.9	DB Coniferou < 2.5 2.5–13 14–23	H (cm) s Deciduous < 2.5 2.5–13 14–28	SHRUBS (Multiple Layer Avg. ht.(m) 1. 2. 3. 4. NON-WOODY PLANTS	e-stemmed, we Cover class	Species (list h	or each layer)	<u>ols Huck</u> bel
5. Non-wetland NWI: <u>NA</u> TREE size class Seedling Sapling Poletimber Small Sawtimber	DBH Code 1 2 3 4	% vegetation DBF Coniferous < 1.0 1.0–4.9 5–8.9 9–19.9	t cover. /iereck: H (in) Deciduous < 1.0 1.0–4.9 5–10.9 11–19.9	DB Coniferou < 2.5 2.5–13 14–23 23–49	H (cm) s Deciduous < 2.5 2.5–13 14–28 28-49	SHRUBS (Multiple Layer Avg. ht.(m) 1. 2. 3. 4. NON-WOODY PLANTS Graminoids	e-stemmed, we Cover class	Species (list b	or each layer)	<u>ols Huck</u> bel
5. Non-wetland NWI: <u>NA</u> TREE size class Seedling Sapling Poletimber Small Sawtimber Large Sawtimber	DBH Code 1 2 3 4 5	% vegetation ↓ v DBH Coniferous < 1.0 1.0–4.9 5–8.9 9–19.9 20–39.9	A cover. /iereck: H (in) Deciduous < 1.0 1.0–4.9 5–10.9 11–19.9 20–39.9	DB Coniferou < 2.5 2.5–13 14–23 23–49 50–101	H (cm) s Deciduous < 2.5 2.5–13 14–28 28-49 50–101	SHRUBS (Multiple Layer Avg. ht.(m) 1. 2. 3. 4. NON-WOODY PLANTS Graminoids Herbs	e-stemmed, w Cover class	Species (list b	or each layer)	ols Huckber
5. Non-wetland NWI: <u>NA</u> TREE size class Seedling Sapling Poletimber Small Sawtimber Large Sawtimber Giant Sawtimber	DBH Code 1 2 3 4 5 6	% vegetation ↓ v DBH Coniferous < 1.0 1.0–4.9 5–8.9 9–19.9 20–39.9 > 40	A cover. /iereck: Deciduous < 1.0 1.0–4.9 5–10.9 11–19.9 20–39.9 > 40	DB Coniferou < 2.5 2.5–13 14–23 23–49 50–101 > 102	H (cm) s Deciduous < 2.5 2.5–13 14–28 28-49 50–101 > 102	SHRUBS (Multiple Layer Avg. ht.(m) 1. 2. 3. 4. NON-WOODY PLANTS Graminoids Herbs Ferns	e-stemmed, we Cover class	Species (list b	or each layer)	<u>ols Huckb</u> er
5. Non-wetland NWI: <u>NA</u> TREE size class Seedling Sapling Poletimber Small Sawtimber Large Sawtimber Giant Sawtimber Giant Sawtimber	DBH Code 1 2 3 4 5 6 Code	% vegetation ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	r cover. /iereck: Deciduous < 1.0 1.0–4.9 5–10.9 11–19.9 20–39.9 > 40 er	DB Coniferou < 2.5 2.5–13 14–23 23–49 50–101 > 102	BH (cm) s Deciduous < 2.5 2.5–13 14–28 28-49 50–101 > 102 % cover	SHRUBS (Multiple Layer Avg. ht.(m) 1. 2. 3. 4. NON-WOODY PLANTS Graminoids Herbs Ferns Horsetails GROUND COVER Mosses/hepatics	e-stemmed, we Cover class	body plants) Species (list for NBNEBR CORCAN VACULT EMPNIC Species (list b GLASS	or each layer)	ols Huckber
5. Non-wetland NWI: <u>NA</u> TREE size class Seedling Sapling Poletimber Small Sawtimber Giant Sawtimber Giant Sawtimber COVER CLASS CODES for ARGEST TREES SHRUBS.	DBH Code 1 2 3 4 5 6 Code	% vegetation ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	n cover. /iereck: H (in) Deciduous < 1.0 1.0-4.9 5-10.9 11-19.9 20-39.9 > 40 er er	DB Coniferou < 2.5 2.5–13 14–23 23–49 50–101 > 102 Code %	H (cm) <u>s</u> Deciduous < 2.5 2.5–13 14–28 28-49 50–101 > 102 % cover 6–25 %	SHRUBS (Multiple Layer Avg. ht.(m) 1. 2. 3. 4. NON-WOODY PLANTS Graminoids Herbs Ferns Horsetails GROUND COVER Mosses/hepatics Lichens	e-stemmed, we Cover class	MOSS	2) or each layer) py dominance)	ols HuckBee
5. Non-wetland NWI: NA TREE size class Seedling Sapling Poletimber Small Sawtimber Giant Sawtimber Giant Sawtimber Giant Sawtimber COVER CLASS CODES for LARGEST TREES SHRUBS, NON-WOODY	with > 2' Kessel: DBH Code 1 2 3 4 5 6 Code , 0 1	% vegetation DBH Coniferous < 1.0 1.0–4.9 5–8.9 9–19.9 20–39.9 > 40 % cove None << 1 %	r cover. /iereck: Deciduous < 1.0 1.0-4.9 5-10.9 11-19.9 20-39.9 > 40 er (DB Coniferou < 2.5 2.5–13 14–23 23–49 50–101 > 102 Code 9 4 5 2	BH (cm) s Deciduous < 2.5 2.5–13 14–28 28-49 50–101 > 102 % cover 6–25 % 26–50 %	SHRUBS (Multiple Layer Avg. ht.(m) 1. 2. 3. 4. NON-WOODY PLANTS Graminoids Herbs Ferns Horsetails GROUND COVER Mosses/hepatics Lichens Litter	e-stemmed, we Cover class	MOSS	Dy dominance)	ols Huckber
5. Non-wetland NWI: <u>NA</u> TREE size class Seedling Sapling Poletimber Small Sawtimber Giant Sawtimber Giant Sawtimber COVER CLASS CODES for ARGEST TREES SHRUBS, NON-WOODY PLANTS, &	DBH Code 1 2 3 4 5 6 Code 1 2 3 4 5 6 1 2 1 3 4 5 6 1 2 2 1 2 2	% vegetation DBH Coniferous < 1.0 1.0–4.9 5–8.9 9–19.9 20–39.9 > 40 % cove None << 1 % < 1 %	n cover. /iereck: H (in) Deciduous < 1.0 1.0-4.9 5-10.9 11-19.9 20-39.9 > 40 er % %	DB Coniferou < 2.5 2.5–13 14–23 23–49 50–101 > 102 Code %	BH (cm) s Deciduous < 2.5 2.5–13 14–28 28-49 50–101 > 102 % cover 6–25 % 26–50 % 51–75 %	SHRUBS (Multiple Layer Avg. ht.(m) 1. 2. 3. 4. NON-WOODY PLANTS Graminoids Herbs Ferns Horsetails GROUND COVER Mosses/hepatics Lichens Litter Bare ground	e-stemmed, we Cover class	MOSS	by dominance)	<u>ols Huckb</u> er

ALMS HABITAT POINT DATA	Land unit: GRANT LIKE Block #: Date: 15 June 2013 Point #: GL#12. Observers: APAS RJB Point #: GL#12.
TOPOGRAPHY	COARSE WOODY DEBRIS (Within 50-m radius circle)
Elevation (m) Aspect MAL ^o Slope <u>5 °</u> TOPOGRAPHIC POSITION	No. coniferous snags: 1 2 3-4 5-6 7-9 10-12 >12 No. deciduous snags: 1 2 3-4 5-6 7-9 10-12 >12 % cover downed logs: << 1
Ridge Midslope Valley Lowslope Plain	HABITAT QUESTIONNAIRE (Answer all questions for each point.)
OCAL FEATURES Cliff/rock face Step in slope Alluvia/moraine Cut-bank Floodplain Dunes Other Facing North: Facing South: Facing East: Facing West: Facing West:	1. Is there a water body at least partly inside the 50-m radius circle? Image: Shore type, and shore vegetation. A. If YES, indicate the water type, shore type, and shore vegetation. Image: Shore type and vegetation. Water type: Shore type and vegetation: Image: Marine Image: Bedrock, boulders, large stones Image: Estuarine Organic material, mud, sand, gravel, cobbles Image: River/Stream < 30% vegetated
VISTURBANCE None Yrs since disturbance % of Severity Yrs since disturbance ype circle code <2	 B. Is the water body at least 10 m wide? If YES, this is wetland habitat. If part of water body is vegetated and part unvegetated, there may be > 1 habitat. Use NWI Key to determine wetland classes and fill out HABITAT DESCRIPTION form for each one. 2. Apart from water bodies described above, is saturation with water the dominant factor in determining soil development and plant community for any other habitat > 10 m wide occurring at least partly in the circle? This includes areas at least annually saturated with or covered by water, areas dotted with small ponds, and areas with obligate wetland plants or numerous facultative wetland species (see NWI wetland indicator lists).
Landslide/avalanche	 If YES, this is a separate wetland habitat. Use NWI Key to determine wetland class and fill out HABITAT DESCRIPTION form. Is there a large patch of unvegetated ground, not associated with a water bedy, that is at least partly inside the 50 m circle? This can include rock
DISTURBANCE SEVERITY CODES	bare ground, or snow or ice with no protruding vegetation, but the patch must be at least 400 m ² in size (11-m radius).
MINOR: Little evidence of disturbance, damage limited to small part of circle, or widespread but slight. Minor driver for succession. SEVERE: Damage obvious and widespread in circle, including	 If YES, this is a separate habitat; fill out HABITAT DESCRIPTION form. 4. For any other parts of the 50-m radius circle, fill out one HABITAT. DESCRIPTION form for each discrete non-wetland habitat type. DO NOT separate out components of common habitat mosaics (see instructions).
killing or removing much of the vegetation or underlying substrate. Damage resulting in widespread secondary succession.	For any of these habitats, is the soil very well drained, unable to hold moisture long after precipitation, and dry most of the year?

ALMS +	ABITAT DES	CRIPTION	Land unit: Block #: _	GRANT	Date: <u>Solve 2013</u> Observers: <u>ALASPJE</u> Point #: <u>GLAN</u> Habitat # of % of circle: <u>100</u>
	CLASS	FICATION			VEGETATION
 1. Water body w NWI: 2. Water body w NWI: 3. Vegetated we NWI: 4. Non-wetland Solid bedre Rocks, sto NWI: 5. Non-wetland NWI:NA 	vith no floating or Kessel: vith > 2% vegetar Kessel: etland without op Kessel: with < 2% vegetar nes, gravel Kessel: with > 2% vegetar Kessel:	emergent veget Viereck: <u>NA</u> ion cover. Viereck: <u></u> en water body. Viereck: <u></u> ation. Bare soil <u>P</u> Sand Viereck: <u>NA</u> tion cover. Viereck: <u></u>	ation. - ersistent snow	or ice	SINGLE-STEMMED TREES > 3 m % TREE canopy cover: % coniferous: 9 TREE LAYER species % cover 3-5 5-9 9-21 > 21 Class 1. 1. 1. 1. 1. 2. 1. 1. 1. 1. 1. 3. 1. 1. 1. 1. 1. 3. 1. 1. 1. 1. 1. 3. 1. 1. 1. 1. 1. 3. 1. 1. 1. 1. 1. 3. 1. 1. 1. 1. 1. 4. 1. 1. 1. 1. 1. 3. 1. 1. 1. 1. 1. 4. 1. 1. 1. 1. 1. SINGLE-STEMMED SAPLINGS, SEEDLINGS, OR DWARF TREES < 3 m 1. 1. 1. 2. 1. 1. 1. 1. 1. 2. 1. 1. 1. 1. 1. 2. 1. 1. 1.
TREE size class	DBH Code Coniferd	DBH (in) ous Deciduous	DBH Coniferous	(cm) Deciduous	1. <u>10</u> <u>4</u> <u>Nevtear</u> 2. <u>10</u> <u>3</u> <u>OPLHOR</u>
Seedling Sapling Poletimber Small Sawtimber Large Sawtimber Giant Sawtimber	1 < 1.0	< 1.0 9 1.0-4.9 5-10.9 9 11-19.9 9 20-39.9 > 40	< 2.5 2.5–13 14–23 23–49 50–101 > 102	< 2.5 2.5–13 14–28 28-49 50–101 > 102	3. 014 4. 012 Second Second
COVER CLASS CODES for LARGEST TREES, SHRUBS, NON-WOODY PLANTS, &	Code % 0 N 1 <	cover (one 1 % 1 %	Code % 4 6 5 26 6 51	-25 % -50 % -75 %	Ferns Image: Constraint of the second seco

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ALMS HABITAT POINT DATA	Land unit: GRANTIANE Block #: Date: 15 June 2013 Point #: Observers: APA BIB	
TOPOGRAPHY	COARSE WOODY DEBRIS (Within 50-m radius circle)	
Elevation (m) Aspect Aspect Slope 2 0 TOPOGRAPHIC POSITION Image Highslope Basin Ridge Midslope Valley Lowslope Plain	No. coniferous snags: 1 2 3-4 5-6 7-9 10-12 10-12 No. deciduous snags: 1 2 3-4 5-6 7-9 10-12 10-12 % cover downed logs: < 1 1 5-6 17-9 10-12 10-12 #ABITAT QUESTIONNAIRE (Answer all questions for each point) 10-12 10-12 10-12 10-12]>12]>12]76-100%
LOCAL FEATURES Cliff/rock face Cut-bank Cut-ban	 1. Is there a water body at least partly inside the 50-m radius circle? A. If YES, indicate the water type, shore type, and shore vegetation. Water type: Shore type and vegetation: Marine Bedrock boulders large stopes 	YES NO
PHOTO Roll/frame or Digital ID # Facing North: Facing South: Facing East: Facing South: Facing South: DISTURBANCE None Yrs since disturbance % of Severity Yrs since disturbance Type circle code Yrs since disturbance Insect damage	 Estuarine Organic material, mud, sand, gravel, cobbles River/Stream Lake/Pond > 30% vegetated B. Is the water body at least 10 m wide? If YES, this is wetland habitat. If part of water body is vegetated and part unvegetated, there may be > 1 habitat. Use NWI Key to determine wetland classes and fill out HABITAT DESCRIPTION form for each one. 	口卤
Beaver ponds Beaver cuttings Other animal activity	2. Apart from water bodies described above, is saturation with water the dominant factor in determining soil development and plant community for any other habitat > 10 m wide occurring at least partly in the circle? This includes areas at least annually saturated with or covered by water, areas dotted with small ponds, and areas with obligate wetland plants or numerous facultative wetland species (see NWI wetland indicator lists). If YES, this is a separate wetland habitat. Use NWI Key to determine wetland class and fill out HABITAT DESCRIPTION form.	口文
Other human disturbances	 3. Is there a large patch of unvegetated ground, not associated with a water body, that is at least partly inside the 50-m circle? This can include rock, bare ground, or snow or ice with no protruding vegetation, but the patch must be at least 400 m² in size (11-m radius). If YES, this is a separate habitat; fill out HABITAT DESCRIPTION form. 4. For any other parts of the 50-m radius circle, fill out one HABITAT DESCRIPTION form. 	□¢
2 SEVERE: Damage obvious and widespread in circle, including killing or removing much of the vegetation or underlying substrate. Damage resulting in widespread secondary succession.	Separate out components of common habitat mosaics (see instructions). For any of these habitats, is the soil very well drained, unable to hold moisture long after precipitation, and dry most of the year?	ØD

ΔΙ	MS	н
	TAD	п

ABITAT DESCRIPTION

CLASSIFICATION

Viereck:





Bare ground Ephemeral snow

Point #: G I labitat # 10

Avg. DBH class

Observers PIASA	% of circle:_	100
VEGET	TATION	
SINGLE-STEMMED TREES > 3 m. % TREE canopy cover: <u>92</u> % cor	niferous: <u>99</u>	Largest trees
TREE LAYER species % cover 1. 1. 1. 1. 2. PICGA	Avg. ht. (m) 3-5 5-9 9-21 > 21	DBH Cover class class 4 4 3

% cover Avg. ht.(m)

	SINCLE STEMMED	SADI INCS	SEEDI INCS	OP DWARE TREES < 3 m
	SINGLE-STEIVIVIED	SAFLINGS,	SEEDLINGS,	ON DWARF INCLOSSIN

Species (list for each layer)

LOL.

	ocks,	stones, gravel	Sand		
NIXA/I.	NIA	Kanaali	Vierock	NIA	

1. Water body with no floating or emergent vegetation.

NWI: _____ Kessel: _____ Viereck: NA

2. Water body with > 2% vegetation cover.

3. Vegetated wetland without open water body. NWI: _____ Kessel: _____ Viereck: ____

NWI: _____ Kessel: _____

4. Non-wetland with < 2% vegetation.

Solid bedrock

INVVI: INA Kessel: VIERECK:

5. Non-wetland with > 2% vegetation cover. NWI: NA Kessel: TI-b

Viereck: _

Bare soil Persistent snow or ice

TREE	DBH	DBH	1 (in)	DBH (cm)		
size class	Code	Coniferous	Deciduous	Coniferous	Deciduous	
Seedling	1	< 1.0	< 1.0	< 2.5	< 2.5	
Sapling	2	1.0-4.9	1.0-4.9	2.5-13	2.5-13	
Poletimber	3	5-8.9	5-10.9	14-23	14-28	
Small Sawtimber	4	9-19.9	11-19.9	23-49	28-49	
Large Sawtimber	5	20-39.9	20-39.9	50-101	50-101	
Giant Sawtimber	6	> 40	> 40	> 102	> 102	

COVER CLASS CODES for	Code	% cover	Code	% cover	
SHRUBS	0	None	4	6-25 %	
NON-WOODY	1	<< 1 %	5	26-50 %	
PLANTS, &	2	< 1 %	6	51-75 %	
GROUND COVER	3	1-5 %	7	76-100 %	

1 TSUMOR	2	200	IND	NA
2		ap		
SHRUBS (Multiple- Layer Avg. ht.(m) 1. 2. 3. 4.	Cover class	oody pla Species MBN VAC VAC	nts) s (list for each ABR ABR ABR ABR ABR ABR ABR ABR ABR ABR	layer)
NON-WOODY PLANTS Graminoids Herbs Ferns Horsetails	Cover class	Species	s (list by domi	nance)
GROUND COVER Mosses/hepatics Lichens Litter	4-25-4	MOS PELL	S BRIGH CKS	

ALMS HABITAT POINT DATA	Land unit: <u>GPNAT LAYE</u> Date: <u>15 OWA 2013</u> Observers: <u>Black #:</u> <u>GL# 10</u> Observers: <u>Black #:</u>	111
TOPOGRAPHY	COARSE WOODY DEBRIS (Within 50-m radius circle)	
Elevation (m) Aspect Aspect Slope 9 TOPOGRAPHIC POSITION Summit Highslope Basin Didage Didage Didage	No. coniferous snags: 1 2 3-4 5-6 7-9 10-12 1 No. deciduous snags: 1 2 3-4 5-6 7-9 10-12 1 % cover downed logs: < 1 1 1-5 6-25 26-50 51-75	>12 >12 76-100%
	HABITAT QUESTIONNAIRE	
LOCAL FEATURES Cliff/rock face Cut-bank Floodplain Other	 1. Is there a water body at least partly inside the 50-m radius circle? A. If YES, indicate the water type, shore type, and shore vegetation. Water type: Shore type and vegetation: Marine Bedrock boulders large stones 	
PHOTO Facing North: Facing South: Roll/frame or Facing East: Facing West: Digital ID # Facing East: Facing West:	Image stores Estuarine Organic material, mud, sand, gravel, cobbles River/Stream Lake/Pond 30% vegetated	
Yrs since disturbance % of rype Severity circle Yrs since disturbance Insect damage	 B. Is the water body at least 10 m wide? If YES, this is wetland habitat. If part of water body is vegetated and part unvegetated, there may be > 1 habitat. Use NWI Key to determine wetland classes and fill out HABITAT DESCRIPTION form for each one. 2. Apart from water bodies described above, is saturation with water the dominant factor in determining soil development and plant community for any other habitat > 10 m wide occurring at least partly in the circle? This 	o ø
Fire Flooding Wind Landslide/avalanche Logging	Includes areas at least annually saturated with or covered by water, areas dotted with small ponds, and areas with obligate wetland plants or numerous facultative wetland species (see NWI wetland indicator lists). If YES, this is a separate wetland habitat. Use NWI Key to determine wetland class and fill out HABITAT DESCRIPTION form.	o,à
Other human disturbances Content	3. Is there a large patch of unvegetated ground, not associated with a water body, that is at least partly inside the 50-m circle? This can include rock, bare ground, or snow or ice with no protruding vegetation, but the patch must be at least 400 m ² in size (11-m radius).	o à
MINOR: Little evidence of disturbance, damage limited to small part of circle, or widespread but slight. Minor driver for succession. SEVERE: Damage obvious and widespread in circle, including	 If YES, this is a separate habitat; fill out HABITAT DESCRIPTION form. 4. For any other parts of the 50-m radius circle, fill out one HABITAT DESCRIPTION form for each discrete non-wetland habitat type. DO NOT separate out components of common habitat mosaics (see instructions). 	
killing or removing much of the vegetation or underlying substrate. Damage resulting in widespread secondary succession.	For any of these habitats, is the soil very well drained, unable to hold moisture long after precipitation, and dry most of the year?	XD

ALMS +	HABIT	AT DESCR	RIPTION	Land unit: Block #: _	GRANT U	NE Date: Source Source Point #: GL# 8 Observers: Delta B Habitat # of 1 % of circle: 55%
1	(LASSIFIC	ATION			VEGETATION
 1. Water body v NWI: 2. Water body v NWI: 3. Vegetated we NWI: 4. Non-wetland Solid bedr Rocks, sto NWI: 5. Non-wetland NWI:NA 	vith no fl Kessel: with > 2% Kessel: etland w Kessel: with < 2 rock mes, grav Kessel: with > 2 Kessel:	bating or em	ergent vegeta iereck: <u>NA</u> cover. iereck: vater body. iereck: n. soil Pe iereck: <u>NA</u> iereck: <u>NA</u>	ation. ersistent snow	or ice	SINGLE-STEMMED TREES > 3 m % TREE canopy cover: % coniferous: Market % covien 1. 1. 1. 1. 2. 1. 1. 1. 2. 1. 3. 1. 3. 1. 4. 1. 3. 1. 4. 1. 3. 1. 4. 1. 2. 1. 4. 1. 3. 1. 4. 1. 3. 1. 4. 1. 4. 1. 4. 1. 5. 1. 5. 1. 5. 1. 5. 1. 5. 1. 5. 1. 5. 1. 5. 1. 5. 1. 5. 1. 5. 1. 5. 1. 5. 1.
TREE size class	DBH Code	DBH	l (in) Deciduous	DBH	(cm) Deciduous	1. ID <u>4</u> MENFER 2. 20 <u>4</u> <u>SALSPA</u> .
Seedling Sapling Poletimber Small Sawtimber Large Sawtimber Giant Sawtimber	1 2 3 4 5 6	< 1.0 1.0–4.9 5–8.9 9–19.9 20–39.9 > 40	< 1.0 1.0-4.9 5-10.9 11-19.9 20-39.9 > 40	< 2.5 2.5–13 14–23 23–49 50–101 > 102	< 2.5 2.5–13 14–28 28-49 50–101 > 102	3. A KIBIKI 4. A OPLHOR A OPLHOR NON-WOODY PLANTS PLANTS Cover class Graminoids 3 Herbs 2 Ferns 5 Market Sile
COVER CLASS CODES for LARGEST TREES, SHRUBS, NON-WOODY PLANTS, & GROUND COVER	Code 0 1 2 3	% cove None << 1 % < 1 % 1–5 %	er C	Code % 4 6 5 26 6 51 7 76–	cover -25 % -50 % -75 % 100 %	Horsetails Image: Constraint of the second diagram withe second diagram with the second diagram with the second diagram

ALMS HABITAT POINT DATA	Land unit: GRANT LAKE Block #: Date: 5. UNB 2013 Point #: GL#8 Observers: ARA / RB Point #: GL#8	_			
TOPOGRAPHY	COARSE WOODY DEBRIS (Within 50-m radius circle)				
Elevation (m) Aspect NN° Slope 40° TOPOGRAPHIC POSITION Summit Highslope Basin	No. coniferous snags: 1 2 3-4 5-6 7-9 10-12 10-12 No. deciduous snags: 1 2 3-4 5-6 7-9 10-12 10-12 % cover downed logs: <<1]>12]>12]76-100%			
Ridge Midslope Valley Lowslope Plain	HABITAT QUESTIONNAIRE (Answer all questions for each point.)				
LOCAL FEATURES Cliff/rock face Step in slope Alluvia/moraine Cut-bank Floodplain Dunes Other Floodplain Dunes PHOTO Facing North: Facing South: Colifframe or Facing East: Facing West:	1. Is there a water body at least partly inside the 50-m radius circle? A. If YES, indicate the water type, shore type, and shore vegetation. Water type: Shore type and vegetation: Marine Bedrock, boulders, large stones Estuarine Organic material, mud, sand, gravel, cobbles River/Stream < 30% vegetated				
DISTURBANCE None % of Severity circle code Yrs since disturbance < 2	 Lake/Pond				
Insect damage	 wetland classes and fill out HABITAT DESCRIPTION form for each one. 2. Apart from water bodies described above, is saturation with water the dominant factor in determining soil development and plant community for any other habitat > 10 m wide occurring at least partly in the circle? This includes areas at least annually saturated with or covered by water, areas dotted with small ponds, and areas with obligate wetland plants or numerous facultative wetland species (see NWI wetland indicator lists). If YES, this is a separate wetland habitat. Use NWI Key to determine wetland class and fill out HABITAT DESCRIPTION form. 				
Other human disturbances	3. Is there a large patch of unvegetated ground, not associated with a water body, that is at least partly inside the 50-m circle? This can include rock, bare ground, or snow or ice with no protruding vegetation, but the patch must be at least 400 m ² in size (11-m radius).				
 MINOR: Little evidence of disturbance, damage limited to small part of circle, or widespread but slight. Minor driver for succession. 2 SEVERE: Damage obvious and widespread in circle, including 	 4. For any other parts of the 50-m radius circle, fill out one HABITAT DESCRIPTION form. 4. For any other parts of the 50-m radius circle, fill out one HABITAT DESCRIPTION form for each discrete non-wetland habitat type. DO NO separate out components of common habitat mosaics (see instructions). 				
killing or removing much of the vegetation or underlying substrate. Damage resulting in widespread secondary succession.	For any of these habitats, is the soil very well drained, unable to hold moisture long after precipitation, and dry most of the year?				

#6

ALMS H		T DESCR	IPTION	Land unit: Block #: _	GRANT L	Date: SANE 2013 Observers: ARA SEC Point #: GU#8 Habitat # 2 of 2 % of circle: 45	
	c		ATION			VEGETATION	
 1. Water body with no floating or emergent vegetation. NWI: Kessel: Viereck: 2. Water body with > 2% vegetation cover. NWI: Kessel: Viereck: 3. Vegetated wetland without open water body. NWI: Kessel: Viereck: 4. Non-wetland with < 2% vegetation.					SINGLE-STEMMED TREES > 3 m % TREE canopy cover: % coniferous: Avg. ht. (m) TREE LAYER species % cover 1. How R 2. How R 3. How R 4. How R 3. How R 4. How R SINGLE-STEMMED SAPLINGS, SEEDLINGS, OR DWARF TREES < 3 m Species (list for each layer) % cover Avg. ht.(m) Avg. bt.(m) Avg. DBH class 1. How R 3. How R 3. How R 3. How R 3. How R 4. How R 4. How R 4. How R 5. How R 3. How R 4. How R 4. How R 4. How R 5. How R 4. How R 4. How R 4. How R 5. How R 6. How R <		
TREE I size class C	DBH Code	DBH Coniferous	l (in) Deciduous	DBH Coniferous	(cm) Deciduous	1. 10 <u>4</u> Menter 2. 10 <u>3</u> <u>RIBTRI</u> <u>3</u> <u>RIBTRI</u>	
Seedling Sapling Poletimber Small Sawtimber Large Sawtimber Giant Sawtimber	1 2 3 4 5 6	< 1.0 1.0-4.9 5-8.9 9-19.9 20-39.9 > 40	< 1.0 1.0-4.9 5-10.9 11-19.9 20-39.9 > 40	< 2.5 2.5–13 14–23 23–49 50–101 > 102	< 2.5 2.5–13 14–28 28-49 50–101 > 102	3. 3. 3. 3. VACULI 4. 3. VACULI NON-WOODY VACULI PLANTS Cover class Species (list by dominance) Graminoids 4. GRASS Herbs 2. BPLANG Ferns 4. OAK FEEN	
COVER CLASS CODES for LARGEST TREES, SHRUBS, NON-WOODY PLANTS, & GROUND COVER	Code 0 1 2 3	% cove None << 1 % < 1 % 1–5 %	er C	Code % 4 6 5 26 6 51 7 76-	cover 25 % 50 % 75 % -100 %	Horsetails GROUND COVER Mosses/hepatics Lichens Litter Bare ground Ephemeral snow	

#6

ALMS HABITAT POINT DATA	Land unit: Getter Block #: Date: 5 UNE 2013 Observers: RA, RUB
TOPOGRAPHY	COARSE WOODY DEBRIS (Within 50-m radius circle)
Elevation (m) Aspect o Slope o TOPOGRAPHIC POSITION Summit Highslope Basin	No. coniferous snags: 1 2 3-4 5-6 7-9 10-12 >12 No. deciduous snags: 1 2 3-4 5-6 7-9 10-12 >12 % cover downed logs: <
Ridge Midslope Valley Lowslope Plain	HABITAT QUESTIONNAIRE (Answer all questions for each point.)
LOCAL FEATURES Cliff/rock face Step in slope Alluvia/moraine Cut-bank Floodplain Dunes Other Other Floodplain Floodplain PHOTO Facing North: Facing South: Facing South: Facing East: Facing West: Facing West:	1. Is there a water body at least partly inside the 50-m radius circle? YES NO A. If YES, indicate the water type, shore type, and shore vegetation. □ Water type: Shore type and vegetation: □ Marine □ Bedrock, boulders, large stones □ Estuarine □ Organic material, mud, sand, gravel, cobbles □ No □ > 30% vegetated
DISTURBANCE Image None Yrs since disturbance % of Severity Yrs since disturbance Type circle code < 2	 B. Is the water body at least 10 m wide? If YES, this is wetland habitat. If part of water body is vegetated and part unvegetated, there may be > 1 habitat. Use NWI Key to determine wetland classes and fill out HABITAT DESCRIPTION form for each one.
Disease	 2. Apart from water bodies described above, is saturation with water the dominant factor in determining soil development and plant community for any other habitat > 10 m wide occurring at least partly in the circle? This includes areas at least annually saturated with or covered by water, areas dotted with small ponds, and areas with obligate wetland plants or numerous facultative wetland species (see NWI wetland indicator lists). If YES, this is a separate wetland habitat. Use NWI Key to determine wetland class and fill out HABITAT DESCRIPTION form. 3. Is there a large patch of unvegetated ground, not associated with a water
Other Other	body, that is at least partly inside the 50-m circle? This can include rock, bare ground, or snow or ice with no protruding vegetation, but the patch must be at least 400 m ² in size (11-m radius).
 MINOR: Little evidence of disturbance, damage limited to small part of circle, or widespread but slight. Minor driver for succession. SEVERE: Damage obvious and widespread in circle, including killing or removing much of the vegetation or underlying substrate 	 If YES, this is a separate habitat; fill out HABITAT DESCRIPTION form. For any other parts of the 50-m radius circle, fill out one HABITAT DESCRIPTION form for each discrete non-wetland habitat type. DO NOT separate out components of common habitat mosaics (see instructions).
Damage resulting in widespread secondary succession.	moisture long after precipitation, and dry most of the year?

ALMS H	ABITA	DESCR	IPTION	Land unit: Block #: _	GRANT U	Date: 15 JUNE 2013 Observers: APA; PJB Point #: 60#6 2 Habitat # of 2 % of circle: 60
	CL	ASSIFIC	ATION			VEGETATION
 1. Water body with no floating or emergent vegetation. NWI:Kessel:Viereck: 2. Water body with > 2% vegetation cover. NWI:Kessel:Viereck: 3. Vegetated wetland without open water body. NWI:Kessel:Viereck: 4. Non-wetland with < 2% vegetation. Solid bedrock						SINGLE-STEMMED TREES > 3 m % TREE canopy cover: % coniferous: Avg. ht. (m) DBH Cover 3-5 1. PCMPR 2. SET PAP 3. 3. 4. 3. 5. 9.21 > 21 Class class 3. 3. 4. 3. 5. 9.21 > 21 Class class 2. SET PAP 3. 3. 4. 3. 5. 9.21 > 21 Class class 3. 3. 4. 3. 5. 9.21 > 21 SINGLE-STEMMED SAPLINGS, SEEDLINGS, OR DWARF TREES < 3 m
TREE D size class C	DBH _ Code C	DBH oniferous	l (in) Deciduous	DBH Coniferous	(cm) Deciduous	1. DIF <u>6</u> <u>SAUSPA</u> . 2. DIS <u>4</u> <u>BETGLA</u>
Seedling Sapling Poletimber Small Sawtimber Large Sawtimber Giant Sawtimber	1 2 3 4 5 6	< 1.0 1.0-4.9 5-8.9 9-19.9 20-39.9 > 40	< 1.0 1.0-4.9 5-10.9 11-19.9 20-39.9 > 40	< 2.5 2.5–13 14–23 23–49 50–101 > 102	< 2.5 2.5–13 14–28 28-49 50–101 > 102	3. 0141 4 1000000000000000000000000000000000000
COVER CLASS CODES for LARGEST TREES, SHRUBS, NON-WOODY PLANTS, & GROUND COVER	Code 0 1 2 3	% cove None << 1 % < 1 % 1–5 %	er C	code % 4 6 5 26 6 51 7 76–	cover -25 % -50 % -75 % 100 %	Horsetails GROUND COVER Mosses/hepatics Lichens Litter Bare ground Ephemeral snow

ALMS HABITAT POINT DATA	Land unit: GLAVE Date: Block #: Observers: ARA', R.B.				
TOPOGRAPHY	COARSE WOODY DEBRIS (Within 50-m radius circle)				
Elevation (m) Aspect O Slope O TOPOGRAPHIC POSITION Summit Highslope D Basin	No. coniferous snags: 1 2 3-4 5-6 7-9 10-12 >12 No. deciduous snags: 1 2 3-4 5-6 7-9 10-12 >12 % cover downed logs: <<1				
Ridge Midslope Valley Lowslope Plain	HABITAT QUESTIONNAIRE (Answer all questions for each point.)				
LOCAL FEATURES Cliff/rock face Step in slope Alluvia/moraine Cut-bank Floodplain Dunes Other Floodplain Dunes PHOTO Facing North: Facing South: Roll/frame or Facing South: Facing South:	1. Is there a water body at least partly inside the 50-m radius circle? Image: Shore type, and shore vegetation. A. If YES, indicate the water type, shore type, and shore vegetation. Image: Shore type and vegetation. Water type: Shore type and vegetation. Image: Marine Image: Bedrock, boulders, large stones Image: Estuarine Image: Organic material, mud, sand, gravel, cobbles Image: River/Stream Image: Store type and vegetated				
Digital ID # Facing East: Facing West: Facin	□ Lake/Pond □ > 30% vegetated B. Is the water body at least 10 m wide?				
Type Severity circle Insect damage Disease Beaver ponds Beaver cuttings	 If YES, this is wetland habitat. If part of water body is vegetated and part unvegetated, there may be > 1 habitat. Use NWI Key to determine wetland classes and fill out HABITAT DESCRIPTION form for each one. 2. Apart from water bodies described above, is saturation with water the dominant factor in determining soil development and plant community for any other habitat > 10 m wide occurring at least partly in the circle? This 				
Fire Image: Second se	includes areas at least annually saturated with or covered by water, areas dotted with small ponds, and areas with obligate wetland plants or numerous facultative wetland species (see NWI wetland indicator lists). If YES, this is a separate wetland habitat. Use NWI Key to determine wetland class and fill out HABITAT DESCRIPTION form.				
Other human disturbances Other Other DISTURBANCE SEVERITY CODES	3. Is there a large patch of unvegetated ground, not associated with a water body, that is at least partly inside the 50-m circle? This can include rock, bare ground, or snow or ice with no protruding vegetation, but the patch must be at least 400 m ² in size (11-m radius)				
 MINOR: Little evidence of disturbance, damage limited to small part of circle, or widespread but slight. Minor driver for succession. SEVERE: Damage obvious and widespread in circle, including 	 If YES, this is a separate habitat; fill out HABITAT DESCRIPTION form. 4. For any other parts of the 50-m radius circle, fill out one HABITAT DESCRIPTION form for each discrete non-wetland habitat type. DO NOT separate out components of common habitat mosaics (see instructions). 				
killing or removing much of the vegetation or underlying substrate. Damage resulting in widespread secondary succession.	For any of these habitats, is the soil very well drained, unable to hold moisture long after precipitation, and dry most of the year?				

ALMS +	ABITA	T DESCR	RIPTION	Land unit Block #: _	GRANT U	Date: 15 June 2013 Point #: 6146 Observers: 1745 PJB Habitat # 2 of 2 % of circle: 40
	c	LASSIFIC	ATION			VEGETATION
 1. Water body with no floating or emergent vegetation. NWI:Kessel:Viereck: 2. Water body with > 2% vegetation cover. NWI:Kessel:Viereck: 3. Vegetated wetland without open water body. NWI:Kessel:Viereck: 4. Non-wetland with < 2% vegetation. Solid bedrock Bare soil Persistent snow or ice Rocks, stones, gravel Sand NWI:Kessel:Viereck: 5. Non-wetland with > 2% vegetation cover. NWI:Kessel:Viereck: 				ation. ersistent snow	SINGLE-STEMMED TREES > 3 m % TREE canopy cover: % coniferous: Avg. ht. (m) Largest trees TREE LAYER species % cover 1. Avg. ht. (m) 2. Avg. ht. (m) 3. Avg. ht. (m) 4. Avg. ht. (m) SINGLE-STEMMED SAPLINGS, SEEDLINGS, OR DWARF TREES < 3 m	
TREE size class	DBH Code	DBH Coniferous	H (in) Deciduous	DBH	I (cm) Deciduous	1. 15 <u>5</u> MENTER 2. DI <u>4</u> EMPNIG;
Seedling Sapling	1 2	< 1.0 1.0–4.9	< 1.0 1.0–4.9	< 2.5 2.5–13	< 2.5 2.5–13	4. PIL 4 RUBCHA
Poletimber Small Sawtimber Large Sawtimber Giant Sawtimber	3 4 5 6	5–8.9 9–19.9 20–39.9 > 40	5–10.9 11–19.9 20–39.9 > 40	14–23 23–49 50–101 > 102	14–28 28-49 50–101 > 102	NON-WOODY PLANTS Cover class Species (list by dominance) Graminoids Ø Herbs 3 Ferns Ø
COVER CLASS CODES for LARGEST TREES, SHRUBS, NON-WOODY PLANTS, &	Code 0 1 2	% cov None << 1 %	er C 9 %	Code % 4 6 5 26 6 51	cover 6–25 % 6–50 %	Horsetails GROUND COVER Mosses/hepatics Lichens Litter Bare ground D HORSES Structs
GROUND COVER	3	1-5 %	6	7 76-	-100 %	Ephemeral snow

ALMS HABITAT POINT DATA	Land unit: GIRANT LAKE Block #: Date: 5.01 NE 2013 Point #: GL#6 Observers: ARAS RSB Point #: GL#6				
TOPOGRAPHY	COARSE WOODY DEBRIS (Within 50-m radius circle)				
Elevation (m) Aspect NE ° Slope 35 ° TOPOGRAPHIC POSITION Summit Highslope Basin	No. coniferous snags: I				
Ridge Midslope Lowslope Plain	HABITAT QUESTIONNAIRE (Answer all questions for each point.)				
LOCAL FEATURES Cliff/rock face Step in slope Alluvia/moraine Cut-bank Floodplain Dunes Other	1. Is there a water body at least partly inside the 50-m radius circle? Image: Shore type, shore type, and shore vegetation. A. If YES, indicate the water type, shore type, and shore vegetation. Image: Shore type and vegetation. Water type: Shore type and vegetation. Image: Marine Image: Bedrock, boulders, large stones Image: Estuarine Organic material, mud, sand, gravel, cobbles Image: River/Stream < 30% vegetated				
DISTURBANCE None Yrs since disturbance Type circle code Yrs since disturbance < 2 > 2 # if known	B. Is the water body at least 10 m wide? If YES, this is wetland habitat. If part of water body is vegetated and part unvegetated, there may be > 1 habitat. Use NWI Key to determine				
Disease	 2. Apart from water bodies described above, is saturation with water the dominant factor in determining soil development and plant community for any other habitat > 10 m wide occurring at least partly in the circle? This includes areas at least annually saturated with or covered by water, areas dotted with small ponds, and areas with obligate wetland plants or numerous facultative wetland species (see NWI wetland indicator lists). 				
Landslide/avalanche Logging Roads	 If YES, this is a separate wetland habitat. Use NWI Key to determine wetland class and fill out HABITAT DESCRIPTION form. 3. Is there a large patch of unvegetated ground, not associated with a water body, that is at least partly inside the 50-m circle? This can include rock, 				
DISTURBANCE SEVERITY CODES	bare ground, or snow or ice with no protruding vegetation, but the patch must be at least 400 m ² in size (11-m radius).				
 MINOR: Little evidence of disturbance, damage limited to small part of circle, or widespread but slight. Minor driver for succession. SEVERE: Damage obvious and widespread in circle, including 	 If YES, this is a separate habitat; fill out HABITAT DESCRIPTION form. 4. For any other parts of the 50-m radius circle, fill out one HABITAT DESCRIPTION form for each discrete non-wetland habitat type. DO NOT separate out components of common habitat mosaics (see instructions). 				
killing or removing much of the vegetation or underlying substrate. Damage resulting in widespread secondary succession.	For any of these habitats, is the soil very well drained, unable to hold moisture long after precipitation, and dry most of the year?				

47

Land unit: GRANT LAKES Date: IS JUNE 2013 Point #: Ol ALMS HABITAT DESCRIPTION : A94 Block #: Observers: Habitat #_ of IDN % of circle:_ CLASSIFICATION VEGETATION 1. Water body with no floating or emergent vegetation. SINGLE-STEMMED TREES > 3 m % TREE canopy cover: <u>95</u> % coniferous: <u>46</u> NWI: Kessel: Viereck: NA Largest trees 2. Water body with > 2% vegetation cover. Avg. ht. (m) DBH Cover % cover 3-5 5-9 9-21 > 21 TREE LAYER species class NWI: _____ Kessel: _____ Viereck: ____ class RETPAP 45 3. Vegetated wetland without open water body. PIGIA NWI: _____ Kessel: _____ Viereck: 4. Non-wetland with < 2% vegetation. Solid bedrock Bare soil Persistent snow or ice SINGLE-STEMMED SAPLINGS, SEEDLINGS, OR DWARF TREES < 3 m Species (list for each layer) % cover Avg. ht.(m) Avg. DBH class Rocks, stones, gravel Sand RCGLA D NWI: NA Kessel: Viereck: NA 5. Non-wetland with > 2% vegetation cover. NWI: NA Kessel: THC. SHRUBS (Multiple-stemmed, woody plants) Viereck: Layer Avg. ht.(m) Cover class Species (list for each layer) MENFER Ch 1. DBH (cm) DBH (in) TREE DBH 2. Coniferous Deciduous Coniferous Deciduous size class Code 3. 1 < 1.0 < 1.0 < 2.5 < 2.5 Seedling RUBARC 4 2 1.0 - 4.91.0-4.9 2.5 - 132.5 - 13Sapling NON-WOODY 5 - 8.95 - 10.914 - 2314 - 28Poletimber 3 PLANTS Cover class Species (list by dominance) 23-49 28-49 Small Sawtimber 9-19.9 11 - 19.93 GRASS Graminoids Large Sawtimber 5 20-39.9 20-39.9 50-101 50-101 PYROLA EPIANG: Herbs **Giant Sawtimber** 6 > 40 > 40 > 102 > 102 OAK FERN + WORN FERN Ferns Horsetails COVER CLASS Code % cover % cover Code GROUND COVER CODES for MOSS Mosses/hepatics LARGEST TREES. 0 None 6-25 % 4 Lichens SHRUBS, BWK CTIPKS << 1 % 26-50 % 1 5 Litter NON-WOODY PLANTS, & 2 < 1 % 6 51-75 % Bare ground **GROUND COVER** 1-5 % Ephemeral snow 3 7 76-100 %

ALMS HABITAT POINT DATA	Land unit: <u>GRANT LAKE</u> Date: <u>5 JUNE 2013</u> Observers: <u>RA</u> 5 RB				
TOPOGRAPHY	COARSE WOODY DEBRIS (Within 50-m radius circle)				
Elevation (m) Aspect NW ° Slope 5 ° TOPOGRAPHIC POSITION Summit Highslope Basin	No. coniferous snags: 1 2 3-4 5-6 7-9 10-12 > No. deciduous snags: 1 2 3-4 5-6 7-9 10-12 > % cover downed logs: <	12 12 5-100%			
Ridge Midslope Valley Lowslope Plain	HABITAT QUESTIONNAIRE (Answer all questions for each point.)				
LOCAL FEATURES Cliff/rock face Step in slope Alluvia/moraine Cut-bank Floodplain Dunes Other	1. Is there a water body at least partly inside the 50-m radius circle? Image: Comparison of the state				
DISTURBANCE None % of Severity Type circle code 2 2 2 # if known	B. Is the water body at least 10 m wide? If YES, this is wetland habitat. If part of water body is vegetated and part unvegetated, there may be > 1 habitat. Use NWI Key to determine	J 🛛			
Insect damage	 wetland classes and fill out HABITAT DESCRIPTION form for each one. Apart from water bodies described above, is saturation with water the dominant factor in determining soil development and plant community for any other habitat > 10 m wide occurring at least partly in the circle? This includes areas at least annually saturated with or covered by water, areas dotted with small ponds, and areas with obligate wetland plants or numerous facultative wetland species (see NWI wetland indicator lists).) Ø			
Landslide/avalanche Logging D D D D Roads D D D D Other human disturbances D D D D	If YES, this is a separate wetland habitat. Use NWI Key to determine wetland class and fill out HABITAT DESCRIPTION form.3. Is there a large patch of unvegetated ground, not associated with a water body, that is at least partly inside the 50-m circle? This can include rock,				
DISTURBANCE SEVERITY CODES	bare ground, or snow or ice with no protruding vegetation, but the patch must be at least 400 m ² in size (11-m radius).				
 MINOR: Little evidence of disturbance, damage limited to small part of circle, or widespread but slight. Minor driver for succession. SEVERE: Damage obvious and widespread in circle, including 	 If YES, this is a separate habitat; fill out HABITAT DESCRIPTION form. 4. For any other parts of the 50-m radius circle, fill out one HABITAT DESCRIPTION form for each discrete non-wetland habitat type. DO NOT separate out components of common habitat mosaics (see instructions). 				
Killing or removing much of the vegetation or underlying substrate. Damage resulting in widespread secondary succession.	For any of these habitats, is the soil very well drained, unable to hold moisture long after precipitation, and dry most of the year?	1 1			

#8
	HABITA	TDESCR	IPTION	Land u Block	unit: GRANT	Date: 6 JUNE 2003 Point #: 61.# 7 Observers: APA'S RSB Habitat # of % of circle:[DDD]		
	С	LASSIFIC	ATION			VEGETATION		
 Water body with NWI: 2. Water body with NWI: 3. Vegetated with NWI: 4. Non-wetland in Solid bedwith Rocks, store 	with no flo Kessel: _ with > 2% Kessel: _ retland with Kessel: _ d with < 2% rock	ating or eme vegetation ov hout open w bou	ergent veget iereck: <u>NA</u> cover. iereck: vater body. ereck: n. soil P	ation. GRAN ersistent sn	NT OREEK.	SINGLE-STEMMED TREES > 3 m % TREE canopy cover: % coniferous: 20 Image: TREE LAYER species % cover 3-5 5-9 9-21 > 21 1. Image: Trees % cover 3-5 5-9 9-21 > 21 2. Image: Trees % cover Image: Trees Image: Trees 2. Image: Trees Image: Trees Image: Trees Image: Trees 3. Image: Trees Image: Trees Image: Trees Image: Trees 3. Image: Trees Image: Trees Image: Trees Image: Trees 4. Image: Trees Image: Trees Image: Trees Image: Trees 3. Image: Trees Image: Trees Image: Trees Image: Trees 4. Image: Trees Image: Trees Image: Trees Image: Trees 4. Image: Trees Image: Trees Image: Trees Image: Trees 5. Image: Trees Image: Trees Image: Trees Image: Trees 4. Image: Trees Image: Trees Image: Trees Image: Trees 5. Image: Trees Image: Trees Image: Trees <t< th=""></t<>		
NWI: <u>NA</u> 5. Non-wetland NWI: <u>NA</u>	Kessel: _ I with > 2% Kessel: _	vegetation	iereck: <u>NA</u> cover. iereck:			2. PICGUA 2 SHRUBS (Multiple-stemmed, woody plants) Layer Avg. ht.(m) Cover class Species (list for each layer)		
NWI: <u>NA</u> 5. Non-wetland NWI: <u>NA</u> TREE size class	Kessel: _ I with > 2% Kessel: _ DBH - Code (6 vegetation V DBH Coniferous	iereck: <u>NA</u> cover. iereck: I (in) Deciduous	- D Conifero	DBH (cm) ous Deciduous	1. 2. PIGUA 1 1 2 2. PIGUA 1 1 1 2 SHRUBS (Multiple-stemmed, woody plants) Layer Avg. ht.(m) Cover class Species (list for each layer) 1. 1 1 1 1 2. 1 1 1 2. 1 1 1 2. 1 1 1		
NWI: <u>NA</u> 5. Non-wetland NWI: <u>NA</u> TREE size class Seedling	Kessel: _ I with > 2% Kessel: _ DBH Code (1	6 vegetation V DBH Coniferous < 1.0	iereck: <u>NA</u> cover. iereck: I (in) Deciduous < 1.0	D Conifero < 2.5	DBH (cm) ous Deciduous	1. 2. PIGUA 1 1 2 2. PIGUA 1 1 1 2 SHRUBS (Multiple-stemmed, woody plants) Layer Avg. ht.(m) Cover class Species (list for each layer) 1. 1 1 1 1 2. 1 1 1 3. 1 1 1 4 1 1 1		
NWI: NA 5. Non-wetland NWI: NA TREE size class Seedling Sapling	Kessel: _ I with > 2% Kessel: _ DBH _ Code _ 1 2	6 vegetation 6 vegetation V DBH Coniferous < 1.0 1.0–4.9	iereck: <u>NA</u> cover. iereck: I (in) Deciduous < 1.0 1.0–4.9	- 	DBH (cm) ous Deciduous 5 < 2.5 3 2.5–13	1. <		
NWI: <u>NA</u> 5. Non-wetland NWI: <u>NA</u> TREE size class Seedling Sapling Poletimber	Kessel: _ with > 2% Kessel: _ Code _ 1 2 3	V 6 vegetation V DBH Coniferous < 1.0 1.0–4.9 5–8.9	iereck: <u>NA</u> cover. iereck: I (in) Deciduous < 1.0 1.0–4.9 5–10.9	D Conifero < 2.5 2.5–13 14–23	DBH (cm) ous Deciduous 5 < 2.5 3 2.5–13 3 14–28	1. 2. PIGUA 2. 2. PIGUA 1. 1.5 2. SHRUBS (Multiple-stemmed, woody plants) Layer Avg. ht.(m) Cover class Species (list for each layer) 1. 1. 1. 1. 2. 1.5 1. 1. 3. 1.5 1. 4. 1.5 1. 9. 1.5 1. 1. 1.5 1. 2. 1.5 1. 3. 1.5 1. 4. 1.5 1. 9. 1.5 1. 1. 1.5 1. 2. 1.5 1. 3. 1.5 2. 4. 1.5 3. 1.5 1. 2. 1.5 3. 1.5 4. 1.5 7. 1.5 8. 1.5 9. 1.5 1. 1.5 1. 1.5 1. 1.5 2. 1.5 3. 1.5 3. 1.5 3. 1.5 4. 1.5 5. 1.5 <td< td=""></td<>		
NWI: NA 5. Non-wetland NWI: NA TREE size class Seedling Sapling Poletimber Small Sawtimber	Kessel: _ with > 2% Kessel: _ DBH _ Code _ 1 2 3 4	V vegetation V DBH Coniferous < 1.0 1.0–4.9 5–8.9 9–19.9	iereck: <u>NA</u> cover. iereck: I (in) Deciduous < 1.0 1.0-4.9 5-10.9 11-19.9	D Conifero < 2.5 2.5–13 14–23 23–49	DBH (cm) ous Deciduous 5 < 2.5 3 2.5–13 3 14–28 9 28-49	1. <		
NWI: NA 5. Non-wetland NWI: NA TREE size class Seedling Sapling Poletimber Small Sawtimber Large Sawtimber	Kessel: _ with > 2% Kessel: _ Code (1 2 3 4 5	V 6 vegetation V DBH Coniferous < 1.0 1.0-4.9 5-8.9 9-19.9 20-39.9	iereck: <u>NA</u> cover. iereck: <u></u> I (in) Deciduous < 1.0 1.0–4.9 5–10.9 11–19.9 20–39.9	D Conifero < 2.5 2.5–13 14–23 23–49 50–10	DBH (cm) Dus Deciduous 5 < 2.5	1. 1. <td< td=""></td<>		
NWI: NA 5. Non-wetland NWI: NA TREE size class Seedling Sapling Poletimber Small Sawtimber Large Sawtimber Giant Sawtimber	Kessel: _ with > 2% Kessel: _ DBH _ Code _ 1 2 3 4 5 6	V 6 vegetation V DBH Coniferous < 1.0 1.0–4.9 5–8.9 9–19.9 20–39.9 > 40	iereck: <u>NA</u> cover. iereck: <u></u> I (in) Deciduous < 1.0 1.0–4.9 5–10.9 11–19.9 20–39.9 > 40	D Conifero < 2.5 2.5–13 14–23 23–49 50–10 > 102	DBH (cm) ous Deciduous 5 < 2.5 3 2.5–13 3 14–28 9 28-49 9 28-49 91 50–101 2 > 102	1. 1. <td< td=""></td<>		
NWI: NA 5. Non-wetland NWI: NA TREE size class Seedling Sapling Poletimber Small Sawtimber Large Sawtimber Giant Sawtimber Giant Sawtimber	Kessel: _ with > 2% Kessel: _ Code 0 1 2 3 4 5 6 Code	✓ 6 vegetation ✓ 6 vegetation ✓ DBH Coniferous < 1.0 1.0–4.9 5–8.9 9–19.9 20–39.9 > 40 % cove	iereck: <u>NA</u> cover. iereck: I (in) Deciduous < 1.0 1.0-4.9 5-10.9 11-19.9 20-39.9 > 40 er (D Conifero < 2.5 2.5–13 14–23 23–49 50–10 > 102 Code	DBH (cm) ous Deciduous 5 < 2.5 3 2.5–13 3 14–28 9 28-49 01 50–101 2 > 102 % cover	1. 1. <td< td=""></td<>		
NWI: NA 5. Non-wetland NWI: NA TREE size class Seedling Sapling Poletimber Small Sawtimber Large Sawtimber Giant Sawtimber Giant Sawtimber COVER CLASS CODES for LARGEST TREES,	Kessel: _ with > 2% Kessel: _ DBH _ Code _ 1 2 3 4 5 6 Code _ 0	V 6 vegetation 6 vegetation 0 DBH Coniferous < 1.0 1.0–4.9 5–8.9 9–19.9 20–39.9 > 40 % cove None	iereck: <u>NA</u> cover. iereck: I (in) Deciduous < 1.0 1.0-4.9 5-10.9 11-19.9 20-39.9 > 40	D Conifero < 2.5 2.5–13 14–23 23–49 50–10 > 102 Code	DBH (cm) ous Deciduous 5 < 2.5 3 2.5–13 3 14–28 9 28-49 9 28-49 9 50–101 2 > 102 % cover 6–25 %	1. 1. <td< td=""></td<>		
NWI: NA 5. Non-wetland NWI: NA TREE size class Seedling Sapling Poletimber Small Sawtimber Giant Sawtimber Giant Sawtimber COVER CLASS CODES for LARGEST TREES, SHRUBS, NON-WOODY	Kessel: _ with > 2% Kessel: _ DBH Code 0 1 2 3 4 5 6 Code 0 1	V 6 vegetation V DBH Coniferous < 1.0 1.0–4.9 5–8.9 9–19.9 20–39.9 > 40 % cove None << 1 %	iereck: <u>NA</u> cover. iereck: I (in) Deciduous < 1.0 1.0-4.9 5-10.9 11-19.9 20-39.9 > 40 er (D Conifero < 2.5 2.5–13 14–23 23–49 50–10 ⁻ > 102 Code	DBH (cm) ous Deciduous 5 < 2.5 3 2.5–13 3 14–28 9 28-49 1 50–101 2 > 102 % cover 6–25 % 26–50 %	1. 1. <td< td=""></td<>		
NWI: NA 5. Non-wetland NWI: NA TREE size class Seedling Sapling Poletimber Small Sawtimber Large Sawtimber Giant Sawtimber Giant Sawtimber COVER CLASS CODES for LARGEST TREES, SHRUBS, NON-WOODY PLANTS, &	Kessel: _ with > 2% Kessel: _ Code _ 1 2 3 4 5 6 Code _ 0 1 2 3 4 5 6	V 6 vegetation V DBH Coniferous < 1.0 1.0–4.9 5–8.9 9–19.9 20–39.9 > 40 % cove None << 1 % < 1 %	iereck: <u>NA</u> cover. iereck: I (in) Deciduous < 1.0 1.0-4.9 5-10.9 11-19.9 20-39.9 > 40 er (D Conifero < 2.5 2.5–13 14–23 23–49 50–10 > 102 Code 4 5 6	DBH (cm) DUS Deciduous 5 < 2.5 3 2.5–13 3 14–28 9 28-49 9 28-50–101 2 > 102 % cover 6-25 % 26-50 % 51-75 %	1. 1. <td< td=""></td<>		

TOPOGRAPHY COARSE WOODY DEBRIS (Within 50-m radius circle) Elevation (m) Aspect 0 Slope 0 0 No. coniferous snags: 1 2 3-4 5-6 7-9 10-12 0 1 1 0	2 2 -100%
Elevation (m) Aspect 0 Slope 0 TOPOGRAPHIC POSITION Image Image<	2 2 -100%
Ridge Midslope Valley Lowslope Plain (Answer all questions for each point.) LOCAL FEATURES Step in slope Alluvia/moraine Cliff/rock face Step in slope Alluvia/moraine Cut-bank Floodplain Dunes	
LOCAL FEATURES Step in slope Alluvia/moraine 1. Is there a water body at least partly inside the 50-m radius circle? YE Cliff/rock face Step in slope Alluvia/moraine Alluv	S NO
Other Water type: Shore type and vegetation: Marine Bedrock, boulders, large stones	
PHOTO Roll/frame or Digital ID # Facing North: Facing South: Estuarine Organic material, mud, sand, gravel, cobbles Roll/frame or Digital ID # Facing East: Facing West: Lake/Pond 30% vegetated	
DISTURBANCE Image: None wide wide wide wide wide wide wide wid	
Insect damage	(□
Other human disturbances	
 1 MINOR: Little evidence of disturbance, damage limited to small part of circle, or widespread but slight. Minor driver for succession. 2 SEVERE: Damage obvious and widespread in circle, including killing or removing much of the vegetation or underlying substrate. Damage resulting in widespread secondary succession. If YES, this is a separate habitat; fill out HABITAT DESCRIPTION form. For any other parts of the 50-m radius circle, fill out one HABITAT DESCRIPTION form for each discrete non-wetland habitat type. DO NOT separate out components of common habitat mosaics (see instructions). For any of these habitats, is the soil very well drained, unable to hold moisture long after precipitation, and dry most of the year? 	

ALMS HA	ABITAT DESCRIPTION	Land unit: GRANT L Block #:	Date: 16 SUNE 2013 Point #: 61#1 Observers: APA; RSB Habitat # of % of circle: 100
	CLASSIFICATION		VEGETATION
 1. Water body with NWI:	th no floating or emergent vege Kessel:	tation. - Persistent snow or ice	SINGLE-STEMMED TREES > 3 m % TREE canopy cover: % coniferous: 10 TREE LAYER species % cover 3-5 5-9 9-21 > 21 class class 1. 10 10 10 10 14 14 2. 10 10 10 14 14 3. 10 10 10 14 14 4. 10 10 10 14 14 4. 10 10 10 14 14 4. 10 10 14 14 14 4. 10 10 14 14 14 4. 10 10 14 14 14 4. 10 10 14 14 14 4. 10 10 14 14 14 4. 10 10 14 14 14 4. 10 10 14 14 14 10 10 10 10 14 14 2. <td< th=""></td<>
TREE D size class Co	BH	DBH (cm) Coniferous Deciduous	1. 05 <u>4</u> <u>VACUU</u> 2. 10 <u>3</u> <u>VIBEDOU</u>
Seedling Sapling Poletimber Small Sawtimber Large Sawtimber Giant Sawtimber	1 < 1.0	< 2.5 < 2.5 2.5–13 2.5–13 14–23 14–28 23–49 28-49 50–101 50–101 > 102 > 102	3. 4. A. A. A. A. A. A. A. A. A. A
COVER CLASS CODES for LARGEST TREES, SHRUBS, NON-WOODY PLANTS, & GROUND COVER	Code % cover 0 None 1 << 1 %	Code % cover 4 6–25 % 5 26–50 % 6 51–75 % 7 76–100 %	Horsetails S GROUND COVER 5 Mosses/hepatics 5 Lichens 3 Litter 4 Bare ground 0 Ephemeral snow 0

COARSE WOODY DEBRIS (Within 50-m radius circle) coniferous snags: 1 2 3-4 5-6 7-9 10-12 >12 deciduous snags: 1 2 3-4 5-6 7-9 10-12 >12 deciduous snags: 1 2 3-4 5-6 7-9 10-12 >12 cover downed logs: <<1 1 1-5 6-25 26-50 51-75 76-100% HABITAT QUESTIONNAIRE (Answer all questions for each point.) YES NO A. If YES, indicate the water type, shore type, and shore vegetation. Water type: Shore type and vegetation:
coniferous snags: 1 2 2 3-4 5-6 7-9 10-12 >12 deciduous snags: 1 2 3-4 5-6 7-9 10-12 >12 sover downed logs: <1 1 1-5 6-25 26-50 51-75 76-100% HABITAT QUESTIONNAIRE (Answer all questions for each point.) YES NO Shore and vegetation: Marine Bedrock, boulders, large stones Image: Store sto
HABITAT QUESTIONNAIRE (Answer all questions for each point.) YES NO Is there a water body at least partly inside the 50-m radius circle? A. If YES, indicate the water type, shore type, and shore vegetation. Image: Colspan="2">Water type: Colspan="2">Shore type and vegetation: Marine Bedrock, boulders, large stones Image: Colspan="2">Colspan="2" Colspan="2">Colspan="2" Colspan="2">Colspan="2" Colspan="2">Colspan="2" Colspan="2">Colspan="2" Colspan="2">Colspan="2" Colspan="2" Colspan="2" Colspan="2">Colspan="2" Colspan="2" Colspan="2" Colspan="2">Colspan="2" Colspan="2" Colspa="2" Colspan="2" Colspan="2"
YES NO Is there a water body at least partly inside the 50-m radius circle? A. If YES, indicate the water type, shore type, and shore vegetation. Water type: Shore type and vegetation: Marine Bedrock, boulders, large stones Estuarine Organic material, mud, sand, gravel, cobbles
\square River/Stream $\square \leq 30\%$ vegetated
□ Lake/Pond □ > 30% vegetated
B. Is the water body at least 10 m wide? If YES, this is wetland habitat. If part of water body is vegetated and part unvegetated, there may be > 1 habitat. Use NWI Key to determine wetland classes and fill out HABITAT DESCRIPTION form for each one.
Apart from water bodies described above, is saturation with water the dominant factor in determining soil development and plant community for any other habitat > 10 m wide occurring at least partly in the circle? This includes areas at least annually saturated with or covered by water, areas dotted with small ponds, and areas with obligate wetland plants or numerous facultative wetland species (see NWI wetland indicator lists).
s there a large patch of unvegetated ground, not associated with a water body, that is at least partly inside the 50-m circle? This can include rock, bare ground, or snow or ice with no protruding vegetation, but the patch must be at least 400 m ² in size (11-m radius).
If YES, this is a separate habitat; fill out HABITAT DESCRIPTION form. For any other parts of the 50-m radius circle, fill out one HABITAT DESCRIPTION form for each discrete non-wetland habitat type. DO NOT separate out components of common habitat mosaics (see instructions). For any of these habitats, is the soil very well drained, unable to hold
B Adairdn Ifw sbbr If FDs Fr

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ALMS

HABITAT DESCRIPTION





Point #: <u>G(#2</u> Habitat #____ of ____ % of circle: <u>IDD - GLM CA</u>

CLASSIFICATION	VEGETATION
 1. Water body with no floating or emergent vegetation. NWI:Kessel:Viereck: 2. Water body with > 2% vegetation cover. NWI:Kessel:Viereck: 3. Vegetated wetland without open water body. NWI:Kessel:Viereck: 4. Non-wetland with < 2% vegetation. Solid bedrock Bare soil Persistent snow or ice Rocks, stones, gravel Sand NWI: Kessel:Viereck: 5. Non-wetland with > 2% vegetation cover. NWI: Kessel: Viereck: 	SINGLE-STEMMED TREES > 3 m % TREE canopy cover: 9 % coniferous: 95 <u>Avg. ht. (m)</u> <u>TREE LAYER species</u> 1. <u>Avg. ht. (m)</u> <u>Avg. bBH</u> <u>Cover</u> class class <u>Avg. ht. (m)</u> <u>Avg. bBH</u> <u>Avg. bBH <u>Avg. bBH</u> <u>Avg. bBH</u> <u>Avg. bBH <u>Avg. bBH</u> <u>Avg. bBH <u>Avg. bBH</u> <u>Avg. bBH <u>Avg. bBH</u> <u>Avg. bBH <u>Avg. bBH</u> <u>Avg. bBH</u> <u>Avg. bBH <u>Avg. bBH</u> <u>Avg</u></u></u></u></u></u></u>
TREE size classDBH CodeDBH (in)DBH (cm)CodeConiferousDeciduousConiferousDeciduous	2. DZ <u>4</u> EMPNIG
Seedling1< 1.0< 1.0< 2.5< 2.5Sapling2 $1.0-4.9$ $1.0-4.9$ $2.5-13$ $2.5-13$ Poletimber3 $5-8.9$ $5-10.9$ $14-23$ $14-28$ Small Sawtimber4 $9-19.9$ $11-19.9$ $23-49$ $28-49$ Large Sawtimber5 $20-39.9$ $20-39.9$ $50-101$ $50-101$ Giant Sawtimber6> 40> 40> 102> 102	3. 4. 4. 4. 4.
COVER CLASS CODES for LARGEST TREES, SHRUBS, NON-WOODY Code % cover Code % cover 0 None 4 6–25 % 1 << 1 %	Horsetails Image: Constraint of the second

USGS Alaska Science Center May 2004

15%

ALMS HABITAT POINT DATA	Land unit: GRANT UARE Block #: Date: 16 JULE: 2013 Observers: PAS P.J.B
TOPOGRAPHY ,	COARSE WOODY DEBRIS (Within 50-m radius circle)
Elevation (m) Aspect Slope 700° TOPOGRAPHIC POSITION Summit Highslope Basin	No. coniferous snags: 1 2 3-4 5-6 7-9 10-12 >12 No. deciduous snags: 1 2 3-4 5-6 7-9 10-12 >12 % cover downed logs: <
Ridge Midslope Valley Lowslope Plain	HABITAT QUESTIONNAIRE (Answer all questions for each point)
LOCAL FEATURES Cliff/rock face Cut-bank Floodplain Dunes Cother Floodplain Dunes PHOTO Facine Marke	1. Is there a water body at least partly inside the 50-m radius circle? YES NO A. If YES, indicate the water type, shore type, and shore vegetation. Image: Comparison of type and vegetation: Water type: Shore type and vegetation: Marine Image: Comparison of type and comparison of type and complete type. A. If YES, indicate the water type, shore type, and shore vegetation. Water type: Shore type and vegetation: Image: Comparison of type and type and type type. Image: Comparison of type and type. Image: Comparison of type and type. Image: Comparison of type. Image: Comparison of type. Image: Comparison of type. Image: Comparison of type. Image: Comparison of type. Image: Comparison of type. Image: Comparison of type. Image: Comparison of type. Image: Comparison of type. Image: Comparison of type. Image: Comparison of type. Image: Comparison of type. Image: Comparison of type. Image: Comparison of type. Image: Comparison of type. Image: Comparison of type. Image: Comparison of type. Image: Comparison of type.
Roll/frame or Digital ID # Facing North. Facing South. Facing East: Facing West:	River/Stream < 30% vegetated
Type Yrs since disturbance Insect damage Insect damage	 B. Is the water body at least 10 m wide? If YES, this is wetland habitat. If part of water body is vegetated and part unvegetated, there may be > 1 habitat. Use NWI Key to determine wetland classes and fill out HABITAT DESCRIPTION form for each one.
Disease	 Apart from water bodies described above, is saturation with water the dominant factor in determining soil development and plant community for any other habitat > 10 m wide occurring at least partly in the circle? This includes areas at least annually saturated with or covered by water, areas dotted with small ponds, and areas with obligate wetland plants or numerous facultative wetland species (see NWI wetland indicator lists). If YES, this is a separate wetland habitat. Use NWI Key to determine wetland class and fill out HABITAT DESCRIPTION form.
Other human disturbances Other Oth	 3. Is there a large patch of unvegetated ground, not associated with a water body, that is at least partly inside the 50-m circle? This can include rock, bare ground, or snow or ice with no protruding vegetation, but the patch must be at least 400 m² in size (11-m radius).
 MINOR: Little evidence of disturbance, damage limited to small p of circle, or widespread but slight. Minor driver for succession. 2 SEVERE: Damage obvious and widespread in circle, including 	 art If YES, this is a separate habitat; fill out HABITAT DESCRIPTION form. For any other parts of the 50-m radius circle, fill out one HABITAT DESCRIPTION form for each discrete non-wetland habitat type. DO NOT separate out components of common habitat mosaics (see instructions).
killing or removing much of the vegetation or underlying substrate Damage resulting in widespread secondary succession.	For any of these habitats, is the soil very well drained, unable to hold moisture long after precipitation, and dry most of the year?

ALMS	HABITA	T DESCR	IPTION	Lan Bloc	d unit: <u>G</u> ck #:	ANTU	KE	Date Obs	e: <u>16 June</u> ervers: <u>A</u> B	2013 A3 RIB	Point #: Habitat # % of circle	30#3 1 Stof - 100%	-GRANT CR
CLASSIFICATION									v	EGETATI	ON	ŧ.	
 1. Water body we NWI: 2. Water body we NWI: 3. Vegetated we NWI: 4. Non-wetland Development of the Solid bedref of the Rocks, store NWI: 5. Non-wetland NWI: 5. Non-wetland NWI: 	with no flo Kessel: with > 2% Kessel: etland wi Kessel: with < 2 rock ones, grav Kessel: with > 2%	bating or eme Vi vegetation of vegetation of Vi thout open w Vi wegetation Pare s vegetation Vi % vegetation Vi % vegetation Vi	ergent vege ereck: <u>NA</u> cover. ereck: <u></u> ater body. ereck: <u></u> soil f ereck: <u>NA</u> cover. ereck: <u></u>	tation. - - Persistent -	snow or ice		SINGLE-ST % TREE ca TREE LAYE 1 2 3 4 SINGLE-ST Species (list 1 2 SHRUBS (M Layer Avg.	EMME nopy ca ER spear A EMME for each OB Multiple ht.(m)	D TREES > over: <u>BS</u> cies % D SAPLINGS D SAPLINGS Naver) % SCHED -stemmed, w Cover class	3 m % coniferou cover 3-5 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	IS: <u>rg. ht. (m)</u> 5-9 9-21 > 21	Large DBH class 4 4 RF TREE Avg. DBH	st trees Cover class 5 5 S < 3 m class
TREE size class	DBH Code	DBH Coniferous	(in) Deciduous	Conife	DBH (cm) erous Dec	iduous	1. <u>1</u> 2. <u>1</u>	D	AAN	VIBEDU POSACE	5	-	_
Seedling	1	< 1.0	< 1.0	< 2	.5 <	2.5	3. <u>()</u> 4. D	D	3	CORCAN	1		
Sapling	2	1.0-4.9	1.0-4.9	2.5-	-13 2.	5-13							
Small Soutimber	3	0_10.0	5-10.9	14-	23 14 10 29	+-20 8-10	PLANTS		Cover class	Species (lis	t by dominanc	e)	
Large Sawtimber	5	20-39.9	20-39 0	50-1	101 50	-101	Graminoids		4	GRASS	1 makasing	Connol	· Charpe
Giant Sawtimber	6	> 40	> 40	> 1	02 >	102	Herbs Ferns		45	OHR-PV	DOD	CIEKEKI	SANCIKI
COVER CLASS CODES for	Code	% cove	r	Code	% cover		Horsetails GROUND C	COVER	4	MASS			
SHRUBS	0	None		4	6-25 %	6	Lichens	1103	3	, min		3	
NON-WOODY	1	<< 1 %	6	5	26-50 %	6	Litter		6	LEANES /	STICKS		
PLANTS, & GROUND COVER	23	< 1 % 1–5 %		6 7	51–75 % 76–100 %	6	Bare ground Ephemeral s	now	8			-	

ALMS HABITAT POINT DATA	Land unit: <u>GRAM IARE</u> Date: <u>16 IIII 2013</u> Observers: <u>APA' PJB</u> Block #: <u>6143</u> Point #: <u>6143</u>	-
TOPOGRAPHY	COARSE WOODY DEBRIS (Within 50-m radius circle)	
Elevation (m) Appendix Aspect o Slope	No. coniferous snags: 1 2 3-4 5-6 7-9 10-12 10-12 No. deciduous snags: 1 2 3-4 5-6 2 -9 10-12 10-12 % cover downed logs: 1 2 1-1 5 6-25 26-50 51-75 10-12]>12]>12]76-100%
	(Answer all questions for each point.)	
OCAL FEATURES Cliff/rock face Step in slope Alluvia/moraine Cut-bank Floodplain Dunes Other Grant (R. BANK) Other	 1. Is there a water body at least partly inside the 50-m radius circle? A. If YES, indicate the water type, shore type, and shore vegetation. Water type: Shore type and vegetation: Marine Marine Bedrock, boulders, large stones 	
PHOTO Roll/frame or Digital ID # Facing North: Facing South: Facing East: Facing West:	Estuarine Organic material, mud, sand, gravel, cobbles River/Stream < 30% vegetated	
DISTURBANCE None Yrs since disturbance % of Severity Yrs since disturbance Type circle code 2 > 2 # if known Insect damage	 B. Is the water body at least 10 m wide? If YES, this is wetland habitat. If part of water body is vegetated and part unvegetated, there may be > 1 habitat. Use NWI Key to determine wetland classes and fill out HABITAT DESCRIPTION form for each one 2. Apart from water bodies described above, is saturation with water the dominant factor in determining soil development and plant community for any other habitat > 10 m wide occurring at least partly in the circle? This includes areas at least annually saturated with or covered by water, areas 	×
Flooding Wind Landslide/avalanche Logging Roads	dotted with small ponds, and areas with obligate wetland plants or numerous facultative wetland species (see NWI wetland indicator lists). If YES, this is a separate wetland habitat. Use NWI Key to determine wetland class and fill out HABITAT DESCRIPTION form.	
Other human disturbances Other DISTURBANCE SEVERITY CODES	3. Is there a large patch of unvegetated ground, not associated with a water body, that is at least partly inside the 50-m circle? This can include rock, bare ground, or snow or ice with no protruding vegetation, but the patch must be at least 400 m ² in size (11-m radius).	οø
MINOR: Little evidence of disturbance, damage limited to small part of circle, or widespread but slight. Minor driver for succession. SEVERE: Damage obvious and widespread in circle, including killing or removing much of the vegetation or underlying substrate.	 If YES, this is a separate habitat; fill out HABITAT DESCRIPTION form. 4. For any other parts of the 50-m radius circle, fill out one HABITAT DESCRIPTION form for each discrete non-wetland habitat type. DO NOT separate out components of common habitat mosaics (see instructions). For any of these habitats, is the soil very well drained, unable to hold 	

ALMS

HABITAT DESCRIPTION

Land unit: GRANT LAKE Block #:

Date: 16 118 2013 Observers: ATA'S ESE

Point #: <u>GUM</u> Habitat #____ of ____ % of circle: <u>____0</u> #1

C	LASSIFICATION			VEGETATION
 1. Water body with no floor NWI: Kessel: 2. Water body with > 2% NWI: Kessel: 3. Vegetated wetland with NWI: Kessel: 4. Non-wetland with < 2% Solid bedrock Solid bedrock Rocks, stones, grav NWI:NA Kessel: 5. Non-wetland with > 2% 5. Non-wetland with > 2% 	ating or emergent vegeta Viereck: <u>NA</u> vegetation cover. Viereck: <u>NA</u> hout open water body. Viereck: <u>NA</u> 6 vegetation. Bare soil Po Po Pol Pol Pol Pol Pol Pol Po	ation.	r ice	SINGLE-STEMMED TREES > 3 m % TREE canopy cover: % coniferous: Avg. ht. (m) Largest trees TREE LAYER species % cover 3. 4. SINGLE-STEMMED SAPLINGS, SEEDLINGS, OR DWARF TREES < 3 m
TREE DBH	DBH (in)	DBH ((cm)	Layer Avg. ht.(m) Cover class Species (list for each layer) 1. 5 4 UBDGRO
size class Code Seedling 1 Sapling 2	 Coniferous Deciduous < 1.0 < 1.	< 2.52.5–13	< 2.52.5–13	3. 110 <u>4</u> <u>EIBIRI</u> 4. 110 <u>4</u> <u>DPLHOR</u>
Poletimber3Small Sawtimber4Large Sawtimber5	5-8.95-10.99-19.911-19.920-39.920-39.9	14–23 23–49 50–101	14–28 28-49 50–101	NON-WOODY PLANTS Cover class Species (list by dominance) Graminoids GRASS Herbs TRIARC EPI AV6 3
Giant Sawtimber 6 COVER CLASS CODES for Code	> 40 > 40 % cover C	> 102	> 102 over	Ferns Horsetails GROUND COVER Massage/happaties
LARGEST TREES, SHRUBS, NON-WOODY PLANTS, & 2 GROUND COVER 3	None << 1 % < 1 % 1–5 %	4 6 5 26 6 51 7 76-1	25 % -50 % -75 % 00 %	Lichens Litter Bare ground Ephemeral snow

ALMS HABITAT POINT DATA	Lànd unit: GRANT UNKE Block #: Date: 16 June 2013 Point #: Observers: Aug. S. R.B.	
TOPOGRAPHY	COARSE WOODY DEBRIS (Within 50-m radius circle)	
Elevation (m) Aspect MMC ° Slope Slope 5 ° TOPOGRAPHIC POSITION Summit Highslope Basin	No. coniferous snags: 1 2 3-4 5-6 7-9 10-12 10-12 No. deciduous snags: 1 2 3-4 5-6 7-9 10-12 10-12 % cover downed logs: <<1]>12]>12]76-100%
Ridge Midslope Valley	HABITAT QUESTIONNAIRE (Answer all questions for each point.)	
LOCAL FEATURES Cliff/rock face Step in slope Alluvia/moraine Cut-bank Floodplain Dunes Other VALUA GREATION Dunes PHOTO Facing North: Facing South:	1. Is there a water body at least partly inside the 50-m radius circle? A. If YES, indicate the water type; shore type, and shore vegetation. Water type: Shore type and vegetation: Marine Bedrock, boulders, large stones Estuarine Organic material, mud, sand, gravel, cobbles River/Stream < 30% vegetated	YES NO
Digital ID # Facing East. Pacing Vost. DISTURBANCE None Yrs since disturbance % of circle Code <2 > 2 # if known Insect damage	 Lake/Pond > 30% vegetated B. Is the water body at least 10 m wide? If YES, this is wetland habitat. If part of water body is vegetated and part unvegetated, there may be > 1 habitat. Use NWI Key to determine wetland classes and fill out HABITAT DESCRIPTION form for each one 	D D
Disease	 Apart from water bodies described above, is saturation with water the dominant factor in determining soil development and plant community for any other habitat > 10 m wide occurring at least partly in the circle? This includes areas at least annually saturated with or covered by water, areas dotted with small ponds, and areas with obligate wetland plants or numerous facultative wetland species (see NWI wetland indicator lists). If YES, this is a separate wetland habitat. Use NWI Key to determine wetland class and fill out HABITAT DESCRIPTION form. Is there a large patch of unvegetated ground, not associated with a water 	口肉
Other Line Line Line DISTURBANCE SEVERITY CODES 1 MINOR: Little evidence of disturbance, damage limited to small part of circle, or widespread but slight. Minor driver for succession. 2 SEVERE: Damage obvious and widespread in circle, including killing or removing much of the vegetation or underlying substates	 3. Is there a large patch of unvegetated ground, not associated with a water body, that is at least partly inside the 50-m circle? This can include rock, bare ground, or snow or ice with no protruding vegetation, but the patch must be at least 400 m² in size (11-m radius). If YES, this is a separate habitat; fill out HABITAT DESCRIPTION form. 4. For any other parts of the 50-m radius circle, fill out one HABITAT DESCRIPTION form for each discrete non-wetland habitat type. DO NOT separate out components of common habitat mosaics (see instructions). 	
Killing or removing much of the vegetation or underlying substrate. Damage resulting in widespread secondary succession.	For any of these habitats, is the soil very well drained, unable to hold moisture long after precipitation, and dry most of the year?	

	HABIT	AT DESCR	RIPTION	Land unit: Block #: _	GRANT	Unke Date: by INE 2013 Point #: GL#S Observers: APAS PS Habitat # of 2 % of circle: App
	(CLASSIFIC	CATION			VEGETATION
 1. Water body NWI: 2. Water body NWI: 3. Vegetated w NWI: 4. Non-wetland Solid bed Rocks, st NWI: 5. Non-wetland NWI: 	with no fl Kessel: with > 29 Kessel: /etland w Kessel: d with < 2 lrock ones, grav Kessel: d with > 2 Kessel:	oating or em	ergent veget /iereck: <u>NA</u> cover. /iereck: <u>-</u> vater body. /iereck: <u>-</u> n. soil <u>P</u> /iereck: <u>NA</u> n cover. /iereck: <u>-</u>	ation.	or ice	SINGLE-STEMMED TREES > 3 m % TREE canopy cover: % coniferous: Image: Stress in the stress
						1 TTA 4 MANYER
TREE size class	DBH Code	DBH	H (in) Deciduous	Coniferous	(cm) Deciduous	2. QZ A LINBOR
TREE size class Seedling	DBH Code 1	DBH Coniferous < 1.0	H (in) Deciduous < 1.0	DBH Coniferous < 2.5	(cm) Deciduous < 2.5	2. OZ <u>4</u> <u>UNBOR</u> 3. <u>ID</u> <u>4</u> <u>VIBEDU</u> 4 <u>VIBEDU</u>
TREE size class Seedling Sapling	DBH Code 1 2	DBH Coniferous < 1.0 1.0-4.9	H (in) Deciduous < 1.0 1.0–4.9	DBH Coniferous < 2.5 2.5–13	(cm) Deciduous < 2.5 2.5–13	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
TREE size class Seedling Sapling Poletimber	DBH Code 1 2 3	DBH Coniferous < 1.0 1.0–4.9 5–8.9	H (in) Deciduous < 1.0 1.0–4.9 5–10.9	DBH Coniferous < 2.5 2.5–13 14–23	(cm) Deciduous < 2.5 2.5–13 14–28	1. 1. 2. 1. 3. 1. 4. 1. 4. 1. A.
TREE size class Seedling Sapling Poletimber Small Sawtimber	DBH Code 1 2 3 4	DBH Coniferous < 1.0 1.0-4.9 5-8.9 9-19.9	H (in) Deciduous < 1.0 1.0–4.9 5–10.9 11–19.9	DBH Coniferous < 2.5 2.5–13 14–23 23–49	(cm) Deciduous < 2.5 2.5–13 14–28 28-49	1. 1. 2. 1. 3. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 5. 1. 1.
TREE size class Seedling Sapling Poletimber Small Sawtimber Large Sawtimber	DBH Code 1 2 3 4 5	DBH Coniferous < 1.0 1.0-4.9 5-8.9 9-19.9 20-39.9	H (in) Deciduous < 1.0 1.0–4.9 5–10.9 11–19.9 20–39.9	DBH Coniferous < 2.5 2.5–13 14–23 23–49 50–101	(cm) Deciduous < 2.5 2.5–13 14–28 28-49 50–101	1. 1. 2. 1. 3. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 5. 1. 7.
TREE size class Seedling Sapling Poletimber Small Sawtimber Large Sawtimber Giant Sawtimber	DBH Code 1 2 3 4 5 6	DBH Coniferous < 1.0 1.0-4.9 5-8.9 9-19.9 20-39.9 > 40	H (in) Deciduous < 1.0 1.0–4.9 5–10.9 11–19.9 20–39.9 > 40	DBH Coniferous < 2.5 2.5–13 14–23 23–49 50–101 > 102	(cm) Deciduous < 2.5 2.5–13 14–28 28-49 50–101 > 102	1. 1. 2. 1. 3. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 5. 1. 9. 1. 1.
TREE size class Seedling Sapling Poletimber Small Sawtimber Large Sawtimber Giant Sawtimber COVER CLASS CODES for	DBH Code 1 2 3 4 5 6 Code	DBH Coniferous < 1.0 1.0-4.9 5-8.9 9-19.9 20-39.9 > 40	H (in) Deciduous < 1.0 1.0-4.9 5-10.9 11-19.9 20-39.9 > 40 er C	DBH Coniferous < 2.5 2.5–13 14–23 23–49 50–101 > 102	(cm) Deciduous < 2.5 2.5–13 14–28 28-49 50–101 > 102 cover	1. 1. 2. 1. 3. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 5. 1. 1.
TREE size class Seedling Sapling Poletimber Small Sawtimber Large Sawtimber Giant Sawtimber COVER CLASS CODES for LARGEST TREES SHRUBS,	DBH Code 1 2 3 4 5 6 Code	DBH Coniferous < 1.0 1.0-4.9 5-8.9 9-19.9 20-39.9 > 40	H (in) Deciduous < 1.0 1.0-4.9 5-10.9 11-19.9 20-39.9 > 40 er C	DBH Coniferous < 2.5 2.5–13 14–23 23–49 50–101 > 102	(cm) Deciduous < 2.5 2.5–13 14–28 28-49 50–101 > 102 cover -25 %	1. 1. 1. 2. 1. 1. 3. 1. 1. 4. 1. 1. 4. 1. 1. 1.
TREE size class Seedling Sapling Poletimber Small Sawtimber Large Sawtimber Giant Sawtimber COVER CLASS CODES for LARGEST TREES SHRUBS, NON-WOODY	DBH Code 1 2 3 4 5 6 Code	DBH Coniferous < 1.0 1.0-4.9 58.9 919.9 2039.9 > 40 % cove < 1 0	H (in) Deciduous < 1.0 1.0-4.9 5-10.9 11-19.9 20-39.9 > 40 er C	DBH Coniferous < 2.5 2.5–13 14–23 23–49 50–101 > 102 Code % 4 6 5 26	(cm) Deciduous < 2.5 2.5–13 14–28 28-49 50–101 > 102 cover -25 % -50 %	1. 1. 1. 2. 1. 1. 3. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 5. 1. 1. 1.
TREE size class Seedling Sapling Poletimber Small Sawtimber Giant Sawtimber Giant Sawtimber COVER CLASS CODES for LARGEST TREES SHRUBS, NON-WOODY PLANTS, &	DBH Code 1 2 3 4 5 6 Code , 0 1 2	DBH Coniferous < 1.0 1.0-4.9 5-8.9 9-19.9 20-39.9 > 40 % cove < 1 % < 1 %	H (in) Deciduous < 1.0 1.0-4.9 5-10.9 11-19.9 20-39.9 > 40 er C	DBH Coniferous < 2.5 2.5–13 14–23 23–49 50–101 > 102 Code % 4 6 5 26 6 51	(cm) Deciduous < 2.5 2.5–13 14–28 28-49 50–101 > 102 cover -25 % -50 % -75 %	1. 1. 1. 2. 1. 1. 3. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 4. 1. 5. 1. 1. 1.

ALMS HAR	BITAT POINT DA	ATA	Land unit: GRANT UNKE Block #: Date: Date: Point #: Observers: GLAS	4
	TOPOGRAPHY		COARSE WOODY DEBRIS (Within 50-m radius circle)	
Elevation (m)	Aspect 22 ° TION	Slope <u>6</u> °	No. coniferous snags: 1 2 3-4 5-6 7-9 10-12 10-12 No. deciduous snags: 1 2 3-4 5-6 7-9 10-12 10-12 % cover downed logs: <<1 <1 1-5 6-25 26-50 51-75 10-12	>12 >12 76-100%
Ridge	Midslope	☐ Valley ☐ Plain	HABITAT QUESTIONNAIRE (Answer all questions for each point.)	
LOCAL FEATURES Cliff/rock face Cut-bank Other	Step in slope	Alluvia/moraine	 1. Is there a water body at least partly inside the 50-m radius circle? A. If YES, indicate the water type, shore type, and shore vegetation. Water type: Shore type and vegetation: Marine Bedrock, boulders, large stones 	
PHOTO Roll/frame or Digital ID #	orth: F ast: F	acing South:	Estuarine Organic material, mud, sand, gravel, cobbles River/Stream < 30% vegetated	
Type Insect damage	% of Severity circle code	Yrs since disturbance < 2 > 2 # if known	B. Is the water body at least 10 m wide? If YES, this is wetland habitat. If part of water body is vegetated and part unvegetated, there may be > 1 habitat. Use NWI Key to determine wetland classes and fill out HABITAT DESCRIPTION form for each one.	
Disease Beaver ponds Beaver cuttings Other animal activity Fire Flooding Wind Landslide/avalanche Logging Roads			2. Apart from water bodies described above, is saturation with water the dominant factor in determining soil development and plant community for any other habitat > 10 m wide occurring at least partly in the circle? This includes areas at least annually saturated with or covered by water, areas dotted with small ponds, and areas with obligate wetland plants or numerous facultative wetland species (see NWI wetland indicator lists). If YES, this is a separate wetland habitat. Use NWI Key to determine wetland class and fill out HABITAT DESCRIPTION form.	
Other human disturbance Other DISTUR			3. Is there a large patch of unvegetated ground, not associated with a water body, that is at least partly inside the 50-m circle? This can include rock, bare ground, or snow or ice with no protruding vegetation, but the patch must be at least 400 m ² in size (11-m radius).	
MINOR: Little evidenc of circle, or widesprea SEVERE: Damage ob	e of disturbance, da d but slight. Minor d vious and widesprea	mage limited to small part river for succession. ad in circle, including	 If YES, this is a separate habitat; fill out HABITAT DESCRIPTION form. 4. For any other parts of the 50-m radius circle, fill out one HABITAT DESCRIPTION form for each discrete non-wetland habitat type. DO NOT separate out components of common habitat mosaics (see instructions). 	
Damage resulting in w	ch of the vegetation videspread secondar	or underlying substrate. ry succession.	For any of these habitats, is the soil very well drained, unable to hold moisture long after precipitation, and dry most of the year?	Ø D

ALMS +	ABITA	T DESCR	RIPTION	Land unit Block #:_	EIBANT	Date: 16 June 2013 Point #: 61#5 Observers: Mathing Back of 12 % of circle: 36
	c	LASSIFIC	ATION			VEGETATION
 1. Water body w NWI: 2. Water body w NWI: 3. Vegetated wa NWI: 4. Non-wetland Solid bedr Rocks, sto NWI: 5. Non-wetland NWI: 	vith no flo Kessel: vith > 2% Kessel: etland wi Kessel: with < 2 ock nes, grav Kessel: with > 2 Kessel:	bating or em	ergent vegeta /iereck: <u>NA</u> cover. /iereck: <u></u> vater body. /iereck: <u></u> n. soil <u>Pe</u> / /iereck: <u>NA</u>	ation. ersistent snow	or ice	SINGLE-STEMMED TREES > 3 m % TREE canopy cover: % coniferous: Image: Avg. ht. (m) Largest trees Note: Avg. ht. (m) DBH Cover TREE LAYER species % cover 3-5 5-9 9-21 > 21 class class 1. Image: Avg. ht. (m) 3. Image: Avg. ht. (m)
TREE size class	DBH Code	DBH	H (in) Deciduous	DBH	I (cm) Deciduous	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
Seedling Sapling Poletimber Small Sawtimber	1 2 3 4	< 1.0 1.0–4.9 5–8.9 9–19 9	< 1.0 1.0-4.9 5-10.9 11-19.9	< 2.5 2.5–13 14–23 23–49	< 2.5 2.5–13 • 14–28 28-49	3. 100 2 1000000000000000000000000000000000000
Large Sawtimber Giant Sawtimber	5	20–39.9 > 40	20–39.9 > 40	50–101 > 102	50–101 > 102	Graminoids Herbs Ferns
COVER CLASS CODES for LARGEST TREES, SHRUBS, NON-WOODY	Code 0 1	% cov None << 1 °	er C e %	Code % 4 6 5 26	cover 6–25 % 6–50 %	Horsetails 5 GROUND COVER Mosses/hepatics 7 Lichens 0 Litter 6 Litter 6
PLANTS, & GROUND COVER	23	< 1 9 1–5 9	16 16	6 51 7 76-	I–75 % -100 %	Bare ground

ALMS HABITAT POINT DATA	Land unit: <u>GRANT LAKE</u> Date: <u>Date: 203</u> Observers: <u>RB</u> Block #: <u>CLUS</u>								
TOPOGRAPHY	COARSE WOODY DEBRIS (Within 50-m radius circle)								
Elevation (m) Aspect ° Slope ° TOPOGRAPHIC POSITION Summit Highslope Basin	No. coniferous snags: 1 2 3-4 5-6 7-9 10-12 No. deciduous snags: 1 2 3-4 5-6 7-9 10-12 % cover downed logs: 1-5 6-25 26-50 51-75]>12]>12]76-100%							
Ridge Midslope Valley Lowslope Plain	HABITAT QUESTIONNAIRE (Answer all questions for each point.)								
LOCAL FEATURES Cliff/rock face Step in slope Alluvia/moraine Cut-bank Floodplain Dunes Other Floodplain Dunes PHOTO Facing North: Facing South: Digital ID # Facing East: Facing West:	 1. Is there a water body at least partly inside the 50-m radius circle? A. If YES, indicate the water type, shore type, and shore vegetation. Water type: Shore type and vegetation: Marine Bedrock, boulders, large stones Estuarine Organic material, mud, sand, gravel, cobbles River/Stream < 30% vegetated 								
DISTURBANCE None Yrs since disturbance Type % of severity circle code < 2 > 2 # if known	 B. Is the water body at least 10 m wide? If YES, this is wetland habitat. If part of water body is vegetated and part unvegetated, there may be > 1 habitat. Use NWI Key to determine wetland classes and fill out HABITAT DESCRIPTION form for each one 	口凤							
Disease	2. Apart from water bodies described above, is saturation with water the dominant factor in determining soil development and plant community for any other habitat > 10 m wide occurring at least partly in the circle? This includes areas at least annually saturated with or covered by water, areas dotted with small ponds, and areas with obligate wetland plants or numerous facultative wetland species (see NWI wetland indicator lists). If YES, this is a separate wetland habitat. Use NWI Key to determine wetland class and fill out HABITAT DESCRIPTION form.	×							
Other human disturbances Other Other DISTURBANCE SEVERITY CODES	3. Is there a large patch of unvegetated ground, not associated with a water body, that is at least partly inside the 50-m circle? This can include rock, bare ground, or snow or ice with no protruding vegetation, but the patch must be at least 400 m ² in size (11-m radius).								
 MINOR: Little evidence of disturbance, damage limited to small part of circle, or widespread but slight. Minor driver for succession. SEVERE: Damage obvious and widespread in circle, including killing or removing much of the vegetation or underlying substants. 	 If YES, this is a separate habitat; fill out HABITAT DESCRIPTION form. 4. For any other parts of the 50-m radius circle, fill out one HABITAT DESCRIPTION form for each discrete non-wetland habitat type. DO NOT separate out components of common habitat mosaics (see instructions). 								
Damage resulting in widespread secondary succession.	For any of these habitats, is the soil very well drained, unable to hold moisture long after precipitation, and dry most of the year?	DØ							

\$5

ALMS SURVEY DETAILS (Circle appropriate values)
Length of count (min): 3 5 8 10 other Spacing between pts (m): 250 500 Observers rotated among pts: yes no Double-observer method used: yes no Species counted in restricted radius (m):
Species excluded from point counts:
OBSERVER INFORMATION Name: AMAL R AJMI First name Middle initial Last name Affiliation: ERM, AUSSIA NC
Address: P.O. BOX 85207
Tel:email:email:amal,ajmi@erm.com
SURVEY EXPERIENCE (# years): Bird surveys X Distance estimation 8+ Birding in Alaska 15+
CONTACT INFORMATION (If different)
First name Middle initial Last name
Address:
City: State: Zip:
Tel:email:



ALN	ALMS LOCATION DATA GPS type & no:												PS t	ype	e & um:	no:	BAMIN 083	AMA E TREX Land unit: GRANT LARE 3 VISTAC Dates: 21, 22 May 2013					Block number: Block name:		
			- 3	Lati	itud	e (I	N)				Lo	ngi	tude	e (2	rE)		Location	on		Moved FRO	M orig pt	Pho	to	Notes about point and survey markers (give
Waypt #	Pt	d	d	d	d	d	0	1	d	d	d	d	d	d	d	d	d	error (m)	Elev (m)	Map	Distance (m)	Bearing	#	Dir	reason if point moved or inaccessible)
	1	6	Ø	4	5	7	-8	3 5	5	1	4	9	3	6	7	K	E	: 7							
	2	6	Ó	4	5	1	71	9	7	1	4	9	3	6	3) !	36	± 1			1				4
	3	6	Ó	4	5	1	2)	1	7	1	4	9	3	6	2	t	51	: Ø							
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-	9	6	4	1	E	-	1	1	2	1	A	10	2	A	1		12	= 4							
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	11	0	V X	4	2	0		20	2	1	4	7	2	1	4	1	1	± P					-		
-	12	6	U A	4	2	9	51	27	1	+	4	7	2	0	E	21	17	±1	-				-		
-	13	0	2	9	0	10	19	2	1	1	4	9	3	20	51		6	<u>+ D</u>						+	
-	14	6	Q	9	0	1	6	-1	4	1	4	9	3	3	1	19	P	±			-		1	-	
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USGS Alaska Science Center May 2004

VATH S-30 EX.



#3

Dist



Species	Time	#	Beh	Dist	Species	Time	#	Beh	Dist
P151	5	4	CFO	Ø		- 1			
PISI	8	3	GFO	Ø					
PAWR	3	1	S	80					
VANTA	3	1	S	>150					
VATH	3	1	S	190				-	
RCKI	3	1	S	90					
VATH	3)	S	30					
PISI	3	2	GFD	Ø	1				
PISI	5	1	C,FO	30					
VATH	8	1	S	20					
VATH	5	1	S	SØ	-				
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VATT4 5-30 EX.

Block #: GRANT LAKE	Date: 21 MAY 2013
Observer: ARA', RJB	60,499 :-149,336
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VAN7154	
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118	1 999 5-19 (3)(1)
	The bes
8-80	
(3)	
(FIC)	
Species between this and previous n	point: VARH: RCKI: PISI: FOWA:
Non-landbird species present but not	counted:
NAST NADA	60 DIPRVILADRE

Species	Time	#	Beh	Dist	Species	Time	#	Beh	Dist
VATH	5	1	5	150					
VATH	5	1	S	7150					
PISI	5	1	F.V.C	20					
VATH	3	1	5	50					
PIG1	5	10	C,FD	20					
RCKI	3	1	5	30					
REDP	3	5	C,FD	40					
REDP	5	2	F.V.C	20					
REDP	5	1	F.C	10					
PISI	5	2	Fil	Ø					_
PISI.	8	3	F.C	30					
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USGS Alaska Science Center May 2004

EX.

#5



Species	Time	#	Beh	Dist	Species	Time	#	Beh	Dist
REME	10	2	V	100					
BAGO	3	2	V	100					
RCKI	3	1	5	>150					
VATH	3	1	5	100			-		1
FOSP	3	1	5	7150					
PISI	8	2	V.C	10					
CBCH	5	1	V	1Ø		-			-
PISI	3	1	Fic	Ø					
REPP	5	1	V	30			-		
PISI	5	3	FIC	30				-	
RCRI	3	1	S	90		-	1		
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USGS Alaska Science Center May 2004 MVSS /SPRUCE (PICMAR)

#1)

Time

#

Beh

Dist



HZ.

Species	Time	#	Beh	Dist	Species	Time	#	Beh	Dist
VAM	5	1	5	7190					
CBCA	5	l	C	80					
RCKI	3)	5	90					
VARTH	5	1	5	100		-			
VATH	3	1	5	80					
SCAU	3)	5	80					
PISI	8	1	C	7150					-
WISN	8	1	C	100					_
GRIE	3	1	CFE	40			_		-
VANI	8	1	C	60					
WEN	8	1	F.d.V	30					
PISI	3	1	F.C	10					1
RCKI	3	1	5	80					
CBCH	10	1	C	40	-				- 20-
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USGS Alaska Science Center May 2004 $5-3\phi$

EX.

VATH



Species	Time	#	Beh	Dist	Species	Time	#	Beh	Dist
RCKI	3	1	5	150					
SGU	5	1	5	7150			I		
WISN	8	1	C	80					
VATH	3	1	5	100					
VADA	3	1	5	84					
VAMA	3)	5	70					
YRWA	3	1	5	50			8		
PISI	8	1	FC	90					
WWCR	10	1	FC	57	-				
RCKI	8	1	C	20		-			
RCKI	3		S	90					
WISN	3	1	FD	Ø					1
VATH	3	1	5	60					
SACR	8	5	6	7150					
RCKI	3	1	5	90					
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VATH 5-30 EX.



Species	Time	#	Beh	Dist	Species	Time	#	Beh	Dist
VATH	5	1	5	60					
VANH	3	1	0	20					
Hent	8	1	V	200					
PCKI	5	1	S	bo					
AMDI	8	1	C	30					
MERGS.	10	i	C	70					1
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VATH 5-30 EX,

(#6)



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Species	Time	#	Beh	Dist	Species	Time	#	Beh	Dist
LANTH.	3	1	5	150					
WATH	3	1	5	70					
VATH	3	1	4	100				1	
RCKI	N	1	5	40					
ANRO	3	1	5	80					
VATH	3	1	S	60					
VRWA	5	1	5	70					
PISI	D	2	FC	60	1				
SCIU	10	2	C	20					-
AMRÓ	8	1	F.C.V	Ø					
AMRO	8	1	C	Ø					
RCKI	3	(5	200					
AMDI	10	1	C	60					1
(IIII)	14			Ý					
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			Mr.						
2.016									
					-	1965		200	-
				-		-			-
			1	(E)D					

ALM	AS BIRD AND MA	AMMAL SUN	MARY CHECKLIST	Land unit: Block number Block name:	RANT LAKE MIN 2013 er:	Dates: 2 Observers: Total effort:	MAY -22 MAY ARAS RJB hrs	2.013
RTLO PALO COLO HOGR RNGR PECO TUSW TRUS CAGO GWTE MALL NOPI MALL NOPI MALL NOPI MALL NOPI MALL SUSC LESC LESC LESC SUSC COGO BUFF COGO BUFF COSPR BAEA SSHA	Red-throated Loon Pacific Loon Common Loon Horned Grebe Red-necked Grebe Pelagic Cormorant Tundra Swan Trumpeter Swan Canada Goose Green-winged Teal Mallard Northern Pintail Northern Pintail Northern Shoveler American Wigeon Greater Scaup Lesser Scaup Harlequin Duck Long-tailed Duck Black Scoter Surf Scoter White-winged Scoter Common Goldeneye Barrow's Goldeneye Barrow's Goldeneye Buffiehead Common Merganser Red-breasted Merganser Osprey Bald Eagle Northern Harrier Sharo-shinned Hawk	PAJA PAJA LTJA BOGU MEGU MEGU GUGU BLKI ARTE ALTE COMU PIGU MAMU TUPU HOPU RODO GHOW HOPU BDOW GGOW SEOW BLSW VASW RUHU BEKI	Parasitic Jaeger Long-tailed Jaeger Bonaparte's Gull Mew Gull Herring Gull Glaucous-winged Gull Glaucous-winged Gull Glaucous Gull Black-legged Kittiwake Arctic Tern Aleutian Tern Common Murre Pigeon Gulllemot Marbled Murrelet Tufted Puffin Horned Puffin Rock Dove Great Horned Owl Northern Hawk Owl Barred Owl Great Gray Owl Short-eared Owl Black Swift Vaux's Swift Rufous Hummingbird Belted Kingfisher Red-breasted Sapsucker Downy Woodpecker Hairy Woodpecker	Block number:		Total effort:	hrs	km
H - C MERL AMKE AMKE AMKE AMKE AMKE AMKE AMKE AMCP ACCR AMCP AMCP ACCR AMCP ACCR AMCP ACCR AMCP ACCR AMCP ACCR AMCP ACCR AMCP ACCR AMCP ACCR ACCR AMCP ACCR	Sharp-shimed Hawk Swainson's Hawk Red-tailed Hawk Rough-legged Hawk Golden Eagle American Kestrel Merlin Gyrfalcon Spruce Grouse Blue Grouse Willow Ptarmigan Rock Ptarmigan Rock Ptarmigan Black-bellied Plover American Golden-Plover Pacific Golden-Plover Semipalmated Plover Black Oystercatcher Greater Yellowlegs Lesser Yellowlegs Solitary Sandpiper Spotted Sandpiper Upland Sandpiper Whimbrel Semipalmated Sandpiper Western Sandpiper Least Sandpiper	NOFL VSFL RSFL NOFL VSFL NSFL NOFL NSFL NOFL NOFL NSFL NOCR NOCRA NOC	Northern Flicker Yellow-shafted Flicker Red-shafted Flicker Olive-sided Flycatcher Western Wood-Pewee Alder Flycatcher Hammond's Flycatcher Pacific-slope Flycatcher Say's Phoebe Horned Lark Tree Swallow Violet-green Swallow N. Rough-winged Swallow Bank Swallow Cliff Swallow Bank Swallow Gray Jay Steller's Jay Black-billed Magpie American Crow Northwestern Crow Common Raven Black-capped Chickadee Boreal Chickadee Chestnut-backed Chickadee Red-breasted Nuthatch Brown Creeper	CHSP SAVS SOSP SOSP SOSP SOSP SOSP SCJU ORJU DEJU LALO SNBU LALO SNBU RUBL RUBL RUBL RUBL RUBL RUBL BREEDING X Detectt H Observ	Chipping Sparrow Savannah Sparrow Song Sparrow Song Sparrow Golden-crowned Sparrow White-crowned Sparrow Slate-colored Junco Oregon Junco Dark-eyed Junco Lapland Longspur Snow Bunting Rusty Blackbird Gray-crowned Rosy-Finch Pine Grosbeak Red Crossbill White-winged Crossbill Common Redpoll Hoary Redpoll Pine Siskin	B Build A Alam	Jumping mouse (sp.) Red-backed vole (sp.) Collared lemming Brown lemming Microtus vole (sp.) Muskrat Northern bog lemming Deer mouse (sp.) Porcupine Collared pika Snowshoe hare Tundra hare MAMMAL EVIDENCE Visual observation Tracks Sign Dam	
CLESA ROSA DUNL WISN RNPH	Rock Sandpiper Rock Sandpiper Dunlin Wilson's Snipe Red-necked Phalarope	S WIWR M AMDI ARWA GCKI	Winter Wren American Dipper Arctic Warbler Golden-crowned Kinglet	P Pair ob S Singing C Courts	eo in possible nesting nabita served in suitable habitat i male nip display	N Nest Y Dowr F Adult	action display, injury-feig observed ny or recently fledged yo with fecal sac or food fo	ung or young

Breeding Bird Point Vegetation Pictures



Photo A.3a-1. Point 1 Facing East.



PhotoA.3a-2. Point 2 Facing East.



Photo A.3a-3. Point 3 Facing East.



PhotoA.3a-4. Point 4 Facing East.



Photo A.3a-5. Point 5 Facing East.



PhotoA.3a-6. Point 6 Facing East.



Photo A.3a-7. Point 7 Facing East.



PhotoA.3a-8. Point 8 Facing East.


Photo A.3a-9. Point 9 Facing East.



PhotoA.3a-10. Point 10 Facing East.



Photo A.3a-11. Point 11 Facing East.



PhotoA.3a-12. Point 12 Facing East.



Photo A.3a-13. Point 13 Facing East.



PhotoA.3a-14. Point 14 Facing East.

Appendix 3b. Northern Goshawk Data

July 8-9, 2013 Northern Goshawk Surveys

July 16-17, 2013 Northern Goshawk Surveys

WEATHER Precipitati	CONDITIONS (i.e., temp. cloud cover	r, wind): % Cloud Co	over: (20)	%: 80%	Air Temperat	ure (F°): 🛺	6075	STOP	Wind (Beaufort):	2:0	
Station Number:	Coordinates: DATA SHEET ON FILE.	Start Time:	Stop Time:	Time of Response:	Time Elapsed Since First Broadcast:	Estimated Bearing to Response:	Estimated Distance to Response:	Description of Detection: Silent visual detection - SGOS; Vocal detection - VGOS; Vocal and visual detection - BGOS; Inactive goshawk stick nest- OSN; Goshawk nest with young -ANY; Nest with young fledged - ANF	Age of Birds Detected: Adult (A); Juvenile (J); Nestling (N); Age Unknown (U)	Notes: (include Photo #'s if taken; Detection of possible goshawk prey remains; Other species detected in between survey stations; General habitat description):	Comments (e.g., observer confidence in species classification, distance and bearing, etc.):
GHE	15T NOGO WAIL	1359	404	Ф						VERY QUIET ON TWEETY BIRDS	
	= nucle recently			Γ						HOT !! MIDDAY.	
師ち	IST NOGO FUEDEING	1416	H21	Φ	_					25	
				100	-		-	-			
GH#9	2MD NOGO FLEDGING	143p	1435	P	-	- 20				$\left \right\rangle$	
	-			10-					<	$\left \right\rangle$	-
GHHA	2MD NOGO WAL	15100	1505	P							

Station Number:	Coordinates: DARASHEET ON FILE	Start Time:	Stop Time:	Time of Response:	Time Elapsed Since First Broadcast:	Estimated Bearing to Response:	Estimated Distance to Response:	Description of Detection: Silent visual detection - SGOS; Vocal detection - VGOS; Vocal and visual detection - BGOS; Inactive goshawk stick nest- OSN; Goshawk nest with young -ANY; Nest with young fledged - ANF	Age of Birds Detected: Adult (A); Juvenile (J); Nestling (N); Age Unknown (U)	Notes: (include Photo #'s if taken; Detection of possible goshawk prey remains; Other species detected in between survey stations; General habitat description):	Comments (e.g., observer confidence in species classification, distance and bearing, etc.):
GIB	IST NOGO WAIL ZND NOGO FLEDGING	1516	1522	Ø					~	Hetty; SCOU;	ú
GH#2	255 NOGO FUELDAING	1530	154	Ø						CBCH; HETH	5
GHĦ	15T NOGO WAIL 2ND NOGO FREDGING	1629	1634	Ø		END 1	XDA			TRES'S APRITE'S HERH	5
9. July GHB	15T NOGO FIEDGING 2ND NOGO WAIL	065A	ФЬ58	φ						VATH'SHEAH'; PISI'; WWCR'; AMIRO; YMEGU	~ 5 ~
G#7	IST NOGO WAIL	0733	Q737	ф						PAWR; VATH; HETH; WMCR;	~

Station Number:	Coordinates:	Start Time:	Stop Time:	Time of Response:	Time Elapsed Since First Broadcast:	Estimated Bearing to Response:	Estimated Distance to Response:	Description of Detection: Silent visual detection - SGOS; Vocal detection - VGOS; Vocal and visual detection - BGOS; Inactive goshawk stick nest- OSN; Goshawk nest with young -ANY; Nest with young fledged - ANF	Age of Birds Detected: Adult (A); Juvenile (J); Nestling (N); Age Unknown (U)	Notes: (include Photo #'s if taken; Detection of possible goshawk prey remains; Other species detected in between survey stations; General habitat description):	Comments (e.g., observer confidence in species classification, distance and bearing, etc.):
GHHIP	IST NOGIO FLEDGUNG	рвф3	Q8#7	φ						HETH; PAWR;	~
G#11	IST NOGO WAIL	¢82.2.	<i>Ф</i> 826	φ						HETH; VATH;	m
GHĦZ	15T KIDGO FLEDGUNG ZND NOGO WAIL	¢848	Ø852	¢						YRWA'S HOTA'S VATH	~
GH#3	15 NOGO WAIL. ZND NOGO FLEDGLING	(1909	D913	φ	_					PIGE; HETH'STOSP'S RCKI; WIWA; WWCR: VATH; YWAR;	m
GAªA	155 NOGO FURDGUNG ZND NOGO WAIL	¢925	d929	Ф						YWAR; HETH; FOSP; SWAH; GRAJ; VATH; SPBA;	<u> </u>

Station Number:	Coordinates:	Start Time:	Stop Time:	Time of Response:	Time Elapsed Since First Broadcast:	Estimated Bearing to Response:	Estimated Distance to Response:	Description of Detection: Silent visual detection - SGOS; Vocal detection - VGOS; Vocal and visual detection - BGOS; Inactive goshawk stick nest- OSN; Goshawk nest with young -ANY; Nest with young fledged - ANF	Age of Birds Detected: Adult (A); Juvenile (J); Nestling (N); Age Unknown (U)	Notes: (include Photo #'s if taken; Detection of possible goshawk prey remains; Other species detected in between survey stations; General habitat description):	Comments (e.g., observer confidence in species classification, distance and bearing, etc.):
GH#K	IST NOGO WHIL 2ND NOGO FLEDGUNG	0941	0945	Ф	1					AMDI; SUTH3 VATH;	~

9 JULY INCIDENTIALS: VATH ; HETH; SWITH; PISI; REOP; AMRO; WWOR; MEGU; PAWR; AMDI; YRWA; WIWA YWAR; FOOP; PIGR; RCKI; GRAJ; SPSA;

* THERE IS A LOT MORE BEAR SIGN IN THE FORM OF SCAP PILES (3).

* BAEA NEST @ MAN CAMP; CHICKS) APPEAR HATCHED OUT AS DETERMINED FROM ADMUT FEEDING & BEHAVIOR.

* MERL A ARE DEFENDING "NEST" AREA FROM BAEA. HARCHED YOUNG NOT VERIFIED, BUT NEST IS CONEWHERES ON IS. BELOW "NARROWS" ACROSS FROM PRIVATE PROPERTY.

* VEG. WAS VERY DEVELOPED & DIFFICULT TO TRAVERS - TOOK 1/3 LONGER TO RUN 9 JULY POINTS.

					NOR	THERN GOSH	AWK BROAD	CAST SURVEY			
LOCATIO	KRANT LAKE	DATE: 1	29/17	JUNE 20	OBSERVERS:	ARAS 1	EdB		ROUTE START Pt.	GHH , 2, 3 ROUTE END PE	
ROUTE ST	TART TIME: DOD 'S DAS	8	4 101.	END	TIME: 1323	; DE	324		4,9,5,6	· TGH+B37310,1	1,12,13,14
WEATHER	R CONDITIONS (i.e., temp, cloud cove	r, wind): % Cloud C	over:		Air Temperat	ture (F°):	13-2		Wind (Beaufort):		1 1. 0
			1			1	1	1			
Station Number:	Coordinates:	Start Time:	Stop Time:	Time of Response:	Time Elapsed Since First Broadcast:	Estimated Bearing to Response:	Estimated Distance to Response:	Description of Detection: Silent visual detection - SGOS; Vocal detection - VGOS; Vocal and visual detection - BGOS; Inactive goshawk stick nest- OSN; Goshawk nest with young -ANY; Nest with young fledged - ANF	Age of Birds Detected: Adult (A); Juvenile (J); Nestling (N); Age Unknown (U)	Notes: (include Photo #'s if taken; Detection of possible goshawk prey remains; Other species detected in between survey stations; General habitat description):	Comments (e.g., observer confidence in species classification, distance and bearing, etc.):
GH#I	16 JUNE 20/3 ONCE ONLY #1 ミ #2 - NOGO 2NOTE WHIL #3- NOGO BEEGING CHOL	<i>Ф</i> ЭФФ	Ø9Ø2	φ						1180	
	5-0 : W-0 TEMF=52F #1 \$ #2-NOGO			4						ROKI, OCWA, HEDH, VINY	+
GH#2	#3 - NOGO BEGGING	1\$28	1030	φ						2	
	ONCE ONCL									POKI, OCCUA,	
6443	1ST BOUND NOGO - 2 NOTE WALL 2ND ROUND	1124	1128	Ø		1					
	NOGO BEGBING CPU									ocivita,	
644	15 20110 . NOGO-BEGGINGCALL	12/3	1219	Ø			-1-11				
पता	240 ROUND NOGO-2 NOTE WAIL	5		1						ocura, AMRO, BARA	

Station Number:	Coordinates:	Start Time:	Stop Time:	Time of / Response:	Time Elapsed Since First Broadcast:	Estimated Bearing to Response:	Estimated Distance to Response:	Description of Detection: Silent visual detection - SGOS; Vocal detection - VGOS; Vocal and visual detection - BGOS; Inactive goshawk stick nest- OSN; Goshawk nest with young -ANY; Nest with young fledged - ANF	Age of Birds Detected: Adult (A); Juvenile (J); Nestling (N); Age Unknown (U)	Notes: (include Photo #'s if taken; Detection of possible goshawk prey remains; Other species detected in between survey stations; General habitat description):	Comments (e.g., observer confidence in species classification, distance and bearing, etc.):
GHS	IST POUND NOGO - NHIL CHU # NOGO - DETEONON	1228	124)(1240	2 MIN	20°	2ФМ	BGOS VISUAL FULDUER DURING WAIL CAU, THEN VOCAULON	ADUUT P LARGE	NONE - ROKI; OCWA; AMRO; YREWA; BOCH LOOK TO BBS PT#GE	Pognue 100%
GH\$5	IST ZAIND NOGO-WAIL CALL ZND: ROUND NOGO-BEEGING CAL -TEMP- 68°F	1258	130/2	Ø						ocusa; wiwa; towa HETH;	
GH%	IST ZOUND W-D HOGO-BEGGING CAU ZOND ROUND NOGO-WANL CALL	1319	1323	Ø						YEWAS OCWAS ROKI	-
GH#8	IFJUNE 2013 5-05 W-OT; 50F 18 ROUND - WALCAL 2ND ROUND - BEGING CHIL	Ø458	¢504	Ø						HETH'S WIWAS TOWA'S AMIRO'S LISP'S VATH'S NOWA'S YRWAS	
GH#7	15t ROUND - BEGGIN CHU 2ND ROUND - WAUCAL	¢53)	Ø536	P						HETH ; ECKISTOWA; SOM; COLO; AMRO; VATH	

Station Number:	Coordinates:	Start Time:	Stop Time:	Time of Response:	Time Elapsed Since First Broadcast:	Estimated Bearing to Response:	Estimated Distance to Response:	Description of Detection: Silent visual detection - SGOS; Vocal detection - VGOS; Vocal and visual detection - BGOS; Inactive goshawk stick nest- OSN; Goshawk nest with young -ANY; Nest with young fledged - ANF	Age of Birds Detected: Adult (A); Juvenile (J); Nestling (N); Age Unknown (U)	Notes: (include Photo #'s if taken; Detection of possible goshawk prey remains; Other species detected in between survey stations; General habitat description):	Comments (e.g., observer confidence in species classification, distance and bearing, etc.):
6Hthp	15 ROUND - WHIL CARL 2ND ROUND STELLICAU	\$ \$	<i>\$6</i> 97	Ø						VATH'S OWN'S HETH'S	
GHħŋ	IST ZOUND - BECLINGICALL ZMD ROUND - WALL	0625	ØESD	φ						PAWE! ; OCWA; VATH; TOWA; HETH YRWA	
G##12	19 ROUND - WARLCHUL 2ND ROUND - BEGGINGCHU	ØGA	10659	φ						VATH'S OCWAYS HETH	
GH#13	IST ROUND BEGGING CALL 2ND ROUND - WAIL CALL	0720	Ф726	φ	_					HERTY YEWAS WIWAS FOSP'S YWAR'S RCKI, OCWA'S COLO'S	
GH#	155 ROUND WALL CALL 2ND ROUND - BEEGGING CALL	¢74¢	p746	φ						COLOS GOUDENEVEQ VRWAS DOWAS YWAR: VATHS SOCIAS OCUAS HEAH.	

Station Number:	Coordinates:	Start Time:	Stop Time:	Time of Response:	Time Elapsed Since First Broadcast:	Estimated Bearing to Response:	Estimated Distance to Response:	Description of Detection: Silent visual detection - SGOS; Vocal detection - VGOS; Vocal and visual detection - BGOS; Inactive goshawk stick nest- OSN; Goshawk nest with young -ANY; Nest with young fledged - ANF	Age of Birds Detected: Adult (A); Juvenile (J); Nestling (N); Age Unknown (U)	Notes: (include Photo #'s if taken; Detection of possible goshawk prey remains; Other species detected in between survey stations; General habitat description):	Comments (e.g., observer confidence in species classification, distance and bearing, etc.):
GHTS	2ND ROUND - WAIL CALL 2ND ROUND - WAIL CALL S-D-W-D-T=58°	Ф818 Г. F.	0824	φ					7	GOUDENEVE 28+12 Davit's ADJA	

9656 1 MARTHER F SAME - NOBIN -Mad Ja 100 M 8/5-1 - OND HEARIN & SIANOIN-Mark HAD-MARK MARK - MARK / SIANO MARK - MARK / SIANO 8000 - Jak - Sold - Jak 1000 - Jak And de in hunde

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Appendix 3c. Wildlife Related Materials

Table A.3c-1. Plant Species and Codes

Wildlife Fieldnotes

Tree Codes	Common Name	Scientific Name				
PICGLA	White Spruce	Picea glauca				
PICLUT	Lutz Spruce	Picea x lutzii				
PICMAR	Black Spruce	Picea mariana				
PICSIT	Sitka Spruce	Picea sitchensis				
TSUMER	Mountain Hemlock	Tsuga mertensiana				
POPBAL	Cottonwood	Populus balsamifera				
BETPAP	Birch	Betula paperifera				
Shrub Codes	Common Name	Scientific Name				
ALNSPP	Alder Species	Alnus sp.				
ALNVIR	Sitka Alder	Alnus viridis ssp. Sinuata				
ANDPOL	Dwarf Bog-rosemary	Andromeda polifolia				
BETGLA	Dwarf Birch	Betula glandulifera				
BETNAN	Bog Birch	Betula nana				
CORCAN	Dwarf Dogwood	Cornus canadensis				
EMPNIG	Mossberry	Empetrum nigrum				
LEDDEC	Narrow-leaf Labrador Tea	Ledum decumbens				
LEDGRO	Labrador Tea	Ledum groenlandicum				
LEDSPP	Labrador Tea Species	Ledum sp.				
LINBOR	Twinflower	Linnaea borealis				
MENFER	False Azalea	Menziesia ferruginea				
OPLHOR	Devil's Club	Oplopanax horridus				
RIBTRI	Wild Red Current	Ribes triste				
ROSACI	Prickly Rose	Rosa acicularis				
RUBARC	Nagoonberry	Rubus arcticus				
RUBCHA	Cloudberry	Rubus chamaemorus				
RUBPED	Five-leaved Bramble	Rubus pedatus				
SALALA	Felt-leaf Willow	Salix alaxensis				
SALSPP	Willow Species	Salix sp.				
SALSTI	Sitka Willow	Salix stichensis				
SHECAN	Soapberry	Shepherdia canadensis				
SPIBEA	Steven's Spirea	Spiraea beauverdiana				
VACALA	Alaska Huckleberry	Vaccinium alaskensis				
VACOVA	Tall (early) Blueberry	Vaccinium ovalifolium				
VACVIT	Lingonberry	Vaccinium vitis-idaea				
VIBEDU	High-bush Cranberry	Viburnum edule				

 Table A.3c-1.
 Plant species and codes.

Herbaceous Codes	Common Name	Scientific Name
ANFRIC	Vellow Anemone	Anemone richardsonii
CALCAN	Blueioint	Calamagrostis canadensis
CHAANG	Fireweed	Chamerion angustifolium
CHALAT	River Beauty	Chamerion latifolium
COMPAL	Marsh Cinquefoil	Comarum palustre
DRYOCT	Fight-petaled Dryas	Dryas octopetala
FOUARV	Common Horsetail	Fauisetum arvense
EQUSPP	Horsetail Species	Equisetum ar vense Equisetum sp
GALTRI	Small Bedstraw	Galium trifidum
GEOLIV	Bastard Toad-flax	Geocaulon lividum
GERERI	Northern Geranium	Geranium erianthum
HERLAN	Cow Parsnip	Heracleum lanatum
LUPSPP	Lupine Species	Lupinus sp.
PYRASA	Pink Wintergreen	Pyrola asarifolia
STRAMP	Clasping Twistedstalk	Streptopus amplexifolius
TRIARC	Northern Starflower	Trientalis arctica
VIOLAN	Alaska Violet	Viola langsdorfii
VIOSPP	Violet Species	Viola sp.
Fern Codes	Common Name	Scientific Name
DRYEXP	Wood Fern	Dryopteris expansa
GYMDRY	Oak Fern	Gymnocarpium dryopteris
Lichen Codes	Common Name	Scientific Name
CLASPP	Reindeer Lichen Species	Cladina sp.
PELBRI	Freckle Pelt	Peltigera britannica
Moss Codes	Common Name	Scientific Name
HYLSPL	Step Moss	Hylocomium splendens
PLESCH	Red-stemmed Feathermoss	Pleurozium schreberi

Field Notes for July 8-9 Northern Goshawk Surveys:

The second Northern Goshawk survey was completed July 9, 2013. A total of 15 points were surveyed using the methods described in the study plan.

Logistics: Mark Miller helped with shuttling Amal and Bobby across the river. Amal and Bobby were based a short distance out of the man-camp.

Monday: Travel, set up camp, and surveyed goshawk points: 1, 2, 3, 4, 9, 5 and 6.

Tuesday: surveyed goshawk points: 7, 8, 10, 11, 12, 13, 14 and 15. Traveled back to Anchorage / Fairbanks.

Field data: The forms have been uploaded into SharePoint along with notes.

Bald Eagle Nest: Eagles are currently feeding hatched young as assessed from their behaviour.

Merlins: The pair are currently still in the area and actively defending a "nest" territory as assessed from their behaviour.

The survey was completed. The vegetation was not difficult on Monday, but was very difficult on Tuesday further in towards the lake. It took 1/3 longer to do the last 8 points. The Devil's club and False Azalea impede travel, the fern are so developed you can't see the ground for sure footing, and the humidity is up making rocks and branches very slick. The survey was more challenging, but doable especially because we broke it down into "2" days rather than one long one.

Incidental list: Varied Thrush; Ruby-crowned Kinglet; Yellow-rumped Warbler; American Dipper; Bald Eagle; Chestnut-backed Chickadee; Merlin; Mew Gull; Swainson's Thrush; Hermit Thrush; Slate-colored Junco; Orange-crowned Warbler; Spotted Sandpiper; Tree Swallow; Gray Jay; Yellow Warbler; Wilson's Warbler; Arctic Tern; Pine Siskin; Redpoll; Pine Grosbeak; White-winged Crossbill; Fox Sparrow; Pacific Wren.

There was more, fresher bear sign in the form of scat (3).

Field Notes for May 21-22 Breeding Bird Surveys:

The first field survey of Breeding birds went well. I flew down to Anchorage on Monday 20 May, Bobby Beckmen picked me up and we set out for Moose Pass. I contacted John Stevenson along the way to let him know we were coming and we all converged at the house in Moose Pass. John took us out across the Narrows in the boat and we made camp on the south side of the creek. We decided to find a few points and get an idea of the habitat and terrain. Tuesday morning we surveyed points: 7, 8, 10, 11, 12, 13, 14. Wednesday we surveyed points: 9, 6, 5, 4, 3, 2, 1. The crossing in the canoe was uneventful and easy. We completed surveys for all 14 points. The weather was very agreeable. The forms will be uploaded into SharePoint by the end of the day, along with notes, the few picture we took and incidental information. We took coordinates for the Bald Eagle nest at the camp sight. They are currently incubating eggs from their behaviour. Bobby and I were curious about a pair of Merlin in the immediate area, so we found them and took coordinates of a suspected nest sight, however, I do not believe they are incubating yet (based on their behaviour).

NAD83

60.45676; 149.36002 Bald Eagle Nest (Incubating) 60.45599; 149.36365 Suspected Merlin Nest site.

We decided **NOT** to take the Vegetation information this time around as most of the plants were senesced and very difficult to ID. We will accomplish that in June when the vegetation is in a better state (leaves and flowers).

I will be honest and say that we had it easy this time around. I feel we will have more complications once the vegetation grows up, it will make traveling slower, more difficult and more painful. I got slapped with a Devils club (not bad, but certainly could do without), and foresee a lot more of that in June and July. I am hoping this will not affect my assessment of travel time and survey time. We will try to keep up the pace.

I have included some pictures for your view. Grant lake is still very much iced over. However, the snow has pretty much receded from the whole survey area, with only small pockets here and there. The birds were singing, but there was a marked lack of certain species, especially the insectivores. I suspect that they will be arriving soon and our June surveys will pick them up.

Our incidental list: Varied Thrush; Ruby-crowned Kinglet; Yellow-rumped Warbler; American Dipper; Bald Eagle; Chestnut-backed Chickadee; Black-capped Chickadee; Boreal Chickadee; Merlin; Mew Gull; Brown Creeper; Hermit Thrush; Loon Species (either Pacific or Common, was very bad lighting and couldn't tell); Slate-colored Junco; Orange-crowned Warbler; Belted Kingfisher; Greater Yellowlegs; Golden-crowned Sparrow; Spruce Grouse; Harlequin Ducks. There was Moose sign everywhere. The crews reported seeing a moose the day before we arrived. There was NO bear sign.

Field Notes for June 14-17 Breeding Bird & Northern Goshawk Surveys:

The second and final songbird survey was completed June 16, 2013. A total of 14 points were surveyed using the methods described in the study plan.

Logistics: John Stevenson helped with shuttling Amal and Bobby across the river. Amal and Bobby were based a short distance out of the man-camp.

Friday: Travel, obtained waders and rope from Seward, shuttle across the river, set up camp, tested safety of weir, visual inspection of water levels

Saturday: surveyed breeding bird points: 7, 8, 10, 11, 12, 13, and 14. Vegetation survey of points: 7, 8, 10, 11, 12, 13, 14, 9 and 6.

Sunday: surveyed breeding bird points: 9, 6, 5, 4, 3, 2, 1. Vegetation survey of points: 5, 4, 3, 2, and 1. Surveyed goshawk points: 1, 2, 3, 4, 9, 5 and 6.

Monday: surveyed goshawk points: 7, 8, 10, 11, 12, 13, 14 and 15.

Field data: The forms have been uploaded into SharePoint along with notes, the few picture we took and incidental information.

Bald Eagle Nest: Eagles are currently incubating eggs as assessed from their behaviour.

Merlins: The pair are currently still in the area and suspected to be incubating eggs.

All surveys were completed. The Breeding Bird surveys are now finished. The last 2013 Goshawk survey is scheduled for July 8-10. I have included some pictures, for your view. Grant Lake is now ice free, and the snow only remains in the highest elevations. All expected birds were singing, and we documented a Red-breasted Merganser hen with 10 downy chicks (roughly 1-7 days old).

Incidental list: Varied Thrush; Ruby-crowned Kinglet; Yellow-rumped Warbler; American Dipper; Bald Eagle; Chestnut-backed Chickadee; Boreal Chickadee; Merlin; Glaucous-winged Gull; Brown Creeper; Hermit Thrush; Common Loon; Slate-colored Junco; Orange-crowned Warbler; Belted Kingfisher; Spotted Sandpiper; Golden-crowned Sparrow; Harlequin Ducks; Violet-green Swallow; Common Raven; Wilson's Snipe; Alder Flycatcher; Osprey; Pacific Wren.

A cow moose and calf came through our camp one night, but left without incident. There was moose sign everywhere along our survey routes. There was bear sign in the form of scat.