Wetlands Delineation Report

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Liberty Development
Wetland Delineation Report
Foggy Island Bay, Alaska

August 2015

Prepared for

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ABBREVIATIONS

AES	ASRC Energy Services Alaska, Inc.
ANSRAM	Arctic North Slope Rapid Assessment Method
ARNI	Aquatic Resource of National Importance
ASA	Aquatic Site Assessment
CWA	Clean Water Act
E1UB	Estuarine Subtidal Unconsolidated Bottom
EPA	Environmental Protection Agency
FAC	Facultative
FACU	Facultative Upland
FACW	Facultative Wetland
ft	feet
GIS	Geographic Information Services
GPS	Global Positioning System
HGM	Hydrogeomorphic
Hilcorp	Hilcorp Alaska, LLC
L1UBH	Lacustrine Limnetic Unconsolidated Bottom Permanently Flooded
M1UB	Marine Subtidal Unconsolidated Bottom
M2US	Marine Intertidal Unconsolidated Shore
N/A	not applicable
NWI	National Wetland Inventory
OBL	Obligate
OFS	Overall Functional Score
ORM	Operations and Maintenance Business Information Link Regulatory Module
PEM1B/C	Palustrine Emergent Persistent Saturated/ Seasonally Flooded
PEM1C	Palustrine Emergent Persistent Seasonally Flooded
PEM1H	Palustrine Emergent Persistent Permanently Flooded
PUBH	Palustrine Unconsolidated Bottom Permanently Flooded
R2UB	Riverine Lower Perennial Unconsolidated Bottom
TNW	Traditional Navigable Water
UPL	Upland
USACE	United States Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VSM	vertical support members
WOUS	Wetlands and Waters of the United States

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1.0 Executive Summary

The purpose of this Wetlands and Waters of the United States (WOUS) Delineation Report is to support Hilcorp Alaska, LLC's (Hilcorp's) Liberty Development, east of Deadhorse, Alaska. This information was collected to determine the location and extent of wetlands and other WOUS in the project area which are potentially subject to the jurisdiction of the United States Army Corps of Engineers (USACE) under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act (CWA).

Hilcorp proposes to construct a self-contained offshore drilling and production facility located in the Beaufort Sea Outer Continental Shelf. A 12-inch sales oil pipeline inside a 16-inch outer pipe will transport crude oil from the facility to the Badami Sales Oil Pipeline. The offshore portion of the pipeline will be trenched. The overland portion of the pipeline will be trenched for 350 feet (ft) from the shoreline, and then elevated approximately 7 ft high on vertical support members (VSMs) for most of the remaining distance to the Badami tie-in. The onshore pipeline will go underneath a newly constructed gravel pad (approximately 50 ft x 35 ft) where it intersects with the Badami ice road. A second gravel pad (approximately 170 ft x 155 ft) will be constructed at the pipeline tie-in point with the Badami Pipeline. Hilcorp also proposes to mine gravel from a selected nearby site.

ASRC Energy Services Alaska, Inc., (AES) performed this wetlands and other WOUS delineation in accordance with the USACE Wetlands Delineation Manual (Environmental Laboratory 1987) and the Regional Supplement to the USACE Wetland Delineation Manual: Alaska Region (Version 2.0) (USACE 2007). AES's fieldwork and mapping efforts found the study area consists of wetlands and other WOUS, with no delineated uplands.

AES performed an Aquatic Site Assessment (ASA) based on the wetland functions and values described by the Arctic Slope Regional Corporation's Wetland Mitigation Bank's "Arctic North Slope Rapid Assessment Method" (ANSRAM). This method includes traditional evaluation of functions and values with specific elements of North Slope interest (e.g. subsistence, *Arctophila fulva*, disturbance impacts, and endangered species). The ASA found that there is a mix of Category I and II wetlands and other WOUS. The wetlands are mostly natural with no human disturbance; but are not rare for the region.

AES performed a review of Jurisdictional Determination for the wetlands under the latest regulatory guidance. The entire project area is found to be one large wetland/WOUS complex which is adjacent and neighboring to the Beaufort Sea, a territorial sea considered to be a Traditional Navigable Water (TNW).

2.0 Introduction

AES has been retained by Hilcorp to conduct wetlands delineation and ASA studies necessary for the CWA permitting. AES conducted a wetlands field survey and ASA for the onshore portion of the project July 22 – 23 and 29 – 30, 2015. The project area encompasses a larger study area than the proposed footprint to facilitate wetland avoidance and minimization evaluation during permitting.

Initially, potential wetlands were pre-mapped using aerial photography and past field experience. Field data was collected to confirm aerial signatures and alterations to the preliminary classifications were made. The focus of the 2015 effort was to determine potential jurisdictional wetlands and other WOUS within the study area.

Hilcorp proposes to construct a self-contained offshore drilling and production facility located in the Beaufort Sea Outer Continental Shelf. A 12-inch sales oil pipeline inside a 16-inch outer pipe will transport crude oil from the facility to the onshore Badami Sales Oil Pipeline. The offshore portion of the pipeline will be trenched. The overland portion of the pipeline will be trenched for 350 ft from the shoreline, and then elevated approximately 7 ft high on VSMs for most of the remaining distance to the Badami tie-in. The onshore pipeline will go underneath a newly constructed gravel pad (approximately 50 ft x 35 ft) where it intersects with the Badami ice road. A second gravel pad (approximately 170 ft x 155 ft) will be constructed at the pipeline tie-in point with the Badami Pipeline. Hilcorp also proposes to mine gravel from a selected nearby site.

3.0 Methods

Wetland field determinations were made using the USACE Wetlands Delineation Manual (Environmental Laboratory 1987) and the Regional Supplement to the USACE Wetland Delineation Manual: Alaska Region (Version 2.0) (USACE 2007).

3.1 Literature Review and Desktop Analysis

Prior to the field investigation, existing public information was reviewed to gain specific background knowledge and to identify the potential for wetlands to occur in the study corridor. Documents evaluated as part of the review include, but were not limited to the following:

- U.S. Fish and Wildlife Service (USFWS) (2015) National Wetland Inventory (NWI) maps, digital datasets, and hardcopy maps
- U.S. Geological Survey (USGS) Digital Raster Graphics (i.e., topographic maps)
- Exploratory Soil Survey of Alaska (Rieger et al. 1979)
- Wetland plant lists, including: National List of Vascular Plant Species that Occur in Wetlands, Region A (Reed 1988), the 1997 USFWS update (Reed 1997), and The National Wetland Plant List (Lichvar 2015)
- Wetland Delineation Protocols, including: USACE Wetlands Delineation Manual, Technical Report Y-87-1 (Environmental Laboratory 1987) and the Regional Supplement to the USACE Wetland Delineation Manual: Alaska Region (USACE 2007)
- Existing Geographic Information Services (GIS) layers, including: water bodies, contours, and roads
- Existing Land Status GIS layers, including: State of Alaska, Bureau of Land Management, and Native Allotments.

3.2 Pre-mapping

Scientists pre-mapped the study area based on interpretation of aerial photos. This effort was completed by digitizing wetland boundaries in a GIS geodatabase. Wetland types and boundaries were determined based on the following set of parameters:

- Vegetation patterns: Communities of vegetation display habitat breaks; with wetland communities adapted to saturated conditions generally having low plant height.
- Visual evidence of saturated soils: Surface water is identified directly and darkened areas in the photography strongly indicate saturated conditions. The proximity to open water, streams, and marshes was also used as an indicator.
- Topography: Evidence of depressions, toes of slopes, and relatively flat areas indicate areas of potentially poor drainage of soils.

Determinations of upland areas will be made by scientists when the aerial photography lack evidence of soil saturation, or topographic conditions indicate areas of well-drained soils.

Once pre-mapping of the corridor was completed, AES placed wetland determination points in areas to confirm and modify pre-mapping. Wetland determination points were uploaded to a Global Positioning System (GPS) device for field data collection.

3.3 Field Confirmation Survey

A field study was conducted to confirm and modify the wetland mapping. At each wetland point a detailed assessment of the wetland parameters was conducted and recorded on USACE Wetland Determination Data Forms specific to the Alaska Region. For wetlands, this includes filling out all relevant entries on the Wetland Determination Data Form and the Wetlands Functional Assessment Data Sheet. Soil pits were dug at each wetland determination data point to facilitate soil data collection. AES also documented other WOUS such as streams and deepwater habitats that do not meet the definition of a wetland. Observation points were completed where vegetation, hydrology, and general site characteristics are similar to places where a full point was completed. In large study areas, observation points allow field personnel to use their best professional judgment to extrapolate data from Full Points into other similar areas.

Field determination of wetlands were based on the three-parameter approach using vegetative, hydric soils, and hydrological characteristics, as described in the USACE Wetlands Delineation Manual (Environmental Laboratory 1987) and Alaska Regional Supplement (USACE 2007). Unless a data point is located in an area considered to be atypical, a problem area, or a deep-water or stream habitat, all three field indicators (hydrophytic vegetation, hydric soils, and wetland hydrology) must be present to be defined as a wetland using current approved methodology.

3.3.1 Vegetation

Hydrophytic vegetation includes macrophytic plants adapted to habitats where frequency and duration of inundation or soil saturation exerts strong selective pressures on plant species presence/absence. At each data collection point, plant species were identified using the following reference materials:

- Alaska Trees and Shrubs (Viereck and Little 2007)
- Wetland Sedges of Alaska (Tande and Lipkin 2003)
- Field Guide to Alaskan Wildflowers (Pratt 1989)
- Toolik Field Station Herbarium (Institute of Arctic Biology 2015)

Percent cover of vegetation was estimated within a designated radius of the sample point. A plant indicator status, as designated by the USFWS, was assigned to each plant species from the following categories: Obligate Wetland (OBL), Facultative Wetland (FACW), Facultative (FAC), Facultative Upland (FACU), and Obligate Upland (UPL). The vegetation community was evaluated using the Dominance Test Indicator and the Prevalence Index Indicator method (USACE 2007). The Dominance Test Indicator is more appropriate for plant communities dominated by only a few individuals. The prevalence test is more comprehensive; it accounts for all species present in the plot. Vegetation was considered hydrophytic if either test is satisfied, unless a disturbed or problematic wetland situation exists.

3.3.2 Soils

Hydric soils are generally saturated, flooded, or ponded long enough during the growing season to become anaerobic in the upper soil horizon. Soils were sampled and evaluated for hydric soil indicators at all full points. Primary hydric soil indicators in Alaska include histosols, histic epipedons, hydrogen sulfide, thick dark surface, Alaska gleyed, Alaska Redox, and Alaska gleyed pores (USACE 2007). At wetland determination data points soil pits were excavated using a shovel or soil auger to a depth sufficient to document the presence or absence of hydric soil field indicators. Soil matrix color and redoximorphic features were identified according to Munsell Soil Color Charts (2009). Soil pits are

generally excavated to a minimum of 20 inches below ground surface. However, soil pits may be analyzed to a shallower depth if a restrictive or confining layer is encountered, or deeper than 20 inches if it is required to confirm the presence of a field indicator. The soil profile was described on the USACE data sheet.

3.3.3 Hydrology

Wetland hydrology indicators show that water accumulates at or near the surface for extended periods during the growing season. Direct observations of wetland hydrology are often limited during some portions of the growing season, but typical primary indicators include: surface water, high water table or saturation, water marks, sediment deposits, or drift deposits. These are particularly difficult during 2015, which was a low precipitation year for the area. Typical secondary indicators can include: drainage patterns, oxidized or reduced root channels, stunted or stressed plant cover, water-stained leaves or sediment deposits, and presence of reduced iron. Field indicators of hydrology are satisfied if one primary or two secondary field indicators are observed. Certain indicators present throughout the year can be used to confirm the occurrence of saturation or inundation for periods of time, which satisfy USACE wetland delineation criteria (Environmental Laboratory 1987; USACE 2007).

3.4 Wetland Aquatic Site Assessment (a.k.a. Functions and Values)

Wetland 'aquatic site assessments' and 'functions and values assessments' are different terms for the same regulatory requirements. Our assessment methodology focuses on providing a rapid Level 1 quantitative assessment over the wetland functions and values described by the ANSRAM method (below). Conceptually the wetland is broken into parts, and evaluated on a series of questions about wetland functions and values. These responses determine the relative value of the wetland. Wetlands determined to be 'exceptional habitat' are automatically rated at the highest value. Finally, if necessary, a disturbance shadow is incorporated (similar to the Anchorage Credit and Debit method) to account for impact zones around non-pristine wetlands.

To use this methodology, each wetland parcel is mapped into general Cowardin units following the NWI system and assigned separate hydrogeomorphic (HGM) classifications (Magee 1998). These HGM classes (Riverine, Depressional, Lacustrine Fringe, Tidal Fringe, Slope, and Flat) break wetlands into their broad functional differences. This component of the assessment is important because not all HGM classes perform a particular function to the same level as another HGM class. Grouping wetlands by HGM allows for a consistent approach. It is important to understand that while each wetland was grouped by HGM, they still maintained their Cowardin class (e.g. Flat PSS1C or Depressional PUBH).

Each wetland provides a combination of the following 10 functions and values depending on its specific role in the ecosystem (as described in the ANSRAM):

- Flood flow alteration
- Sediment removal
- Nutrient and toxicant removal
- Erosion control and shoreline stabilization
- Production of organic matter and its export
- General habitat suitability
- General fish habitat
- Native plant richness

- Educational or scientific value
- Uniqueness and heritage

A rapid qualitative assessment is conducted over the 10 standard wetland functions and values to evaluate the level of service the wetland provides to the ecosystem. These yes/no/not-applicable questions evaluate the wetland on basic observable characteristics which are displayed by typical wetlands with high service levels for the particular function or value.

Depending on the individual wetland and/or the HGM classification, some evaluation questions may be determined to be 'Not Applicable' (on a case by case basis). For example, large rivers rarely have >50 percent aerial cover of herbaceous plant coverage. It is important while evaluating a wetland to remember the difference between a wetland poorly providing a function (rating of 'no') and a wetland not naturally providing a function (rating of 'N/A', not applicable). A 'no' rating is an indication of dysfunction.

Once the rapid qualitative assessment is complete, an individual score is calculated for each of the 10 functions. Each functions' evaluation questions are averaged to generate an individual function or value score (Yes = 1, No = 0, N/A = not included in the average). Then all of the wetland functions and value individual scores are averaged over the individual wetland to generate the preliminary Overall Functional Score (OFS). This preliminary OFS combines the 10 standard wetland functions and values. Again, functions and values evaluated as not applicable are not included in the average.

Exceptionally important habitat (Section 3.4.1) or local disturbance category (Section 3.4.2) is also incorporated into the rapid assessment by adjusting the preliminary OFS to generate a final OFS (Section 3.4.3). This ensures accurate representation for these difficult to quantify wetland impacts.

3.4.1 Exceptional Habitat Designation

The analysis can designate wetlands as 'exceptional habitat' (and an automatic full rating) for a variety of reasons. If any agency considers the wetland to be an Aquatic Resource of National Importance (ARNI), the rating is automatically fulfilled. The habitat can also be exceptional if the area is considered irreplaceable or has unique features not found anywhere else on the North Slope. This exceptional designation allows project managers to incorporate these rare habitat designations into the evaluation.

3.4.2 Disturbance Category

The evaluation of existing disturbance impacts near a wetland was based off of the methodology of the Anchorage Debit Credit Method (Dean 2011). First, disturbances are mapped on the project. Then disturbance categories are evaluated from Table 3.4-1, and translated into buffers around the disturbance and the Impact Factor (Table 3.4-2). The preliminary OFS is then adjusted for local disturbance/development (preliminary OFS * Impact Factor = final OFS). These methods incrementally decrease the value of a wetland due to different types of disturbances and their proximity to the wetland.

Table 3.4-1 Disturbance Categories

Type of Activity		Activity Detail	Disturbance Category
None	No activity	N/A	0
Commercial	Motel, office building, restaurant, storage facility, store	N/A	3
Industrial	Heavy equipment parking, repair, storage	N/A	3
	Manufacturing	N/A	
	Material extraction, processing, storage, treatment, disposal	N/A	
	Office building	N/A	
Transportation & Shipping	Automobile	Driveway, non-residential	3
		Parking lot	
		Road, including associated trails	
	Aviation facility	Airport	
	Culverted crossing	Diameter ≥ bankfull width	2
		Diameter < bankfull width	3
	Port facility	Dock	
	Railroad	Loading/unloading, office, storage	
		Track (away from rail facilities)	2
Utilities	Office building	N/A	3
	Substation	N/A	2
	Utility line	≤ 10 feet wide surface disturbance and winter construction (only if new)	1
		> 10 feet wide surface disturbance or non-winter construction (only if new)	2

Notes:
Extend a 300-feet buffer from edge of existing impact zone to see if there is contact with wetland area. Evaluate disturbance impacted polygon separately.
If there is more than one disturbance activity for a polygon (i.e., if there are multiple activities), use the activity with the highest disturbance category score present, the total is not cumulative.

Table 3.4-2 Disturbance Category and Impact Factor

Disturbance Category		Impact Factor
0	=	1
1	=	0.99
2	=	0.95
3	=	0.9

3.4.3 Final OFS

The final OFS provides a simple quartile category (I/II/III/IV) with a point estimate ranging from 0 – 1.00 to provide a repeatable quantitative evaluation for all of the functions and values the wetland provides to the ecosystem (Table 3.4-3).

Table 3.4-3 Final Overall Functional Score (OFS) Scale and Category

OFS	Category	
0.76 - 1.00	I	Highest Value
0.51 - 0.75	II	
0.26 - 0.50	III	
0 - 0.25	IV	Lowest Value

3.5 Post-Field Mapping

Field data was collected using GPS units and hard copy field maps. These locations and wetland data were electronically transferred to the existing geodatabase. The field data was used to update existing wetland mapping with new information (including functional assessment data). These updated data were incorporated into the geodatabase containing all project wetlands data. The wetlands mapping was then used to calculate approximate acreage of wetlands located in the project area.

3.6 Jurisdictional Determination

The USACE regulates wetlands and other WOUS that are under their jurisdiction. The Environmental Protection Agency (EPA) guidance outlines that the USACE has jurisdiction in eight specific cases (CFR 2015):

> "The first three types of jurisdictional waters, traditional navigable waters, interstate waters, and the territorial seas, are jurisdictional by rule in all cases.
>
> The fourth type of water, impoundments of jurisdictional waters, is also jurisdictional by rule in all cases.
>
> The next two types of waters, ''tributaries'' and ''adjacent'' waters, are jurisdictional by rule, as defined, because the science confirms that they have a significant nexus to traditional navigable waters, interstate waters, or territorial seas. For waters that are jurisdictional by rule, no additional analysis is required.
>
> The final two types of jurisdictional waters are those waters found after a case-specific analysis to have a significant nexus to traditional navigable waters, interstate waters, or the territorial seas, either alone or in combination with similarly situated waters in the region."

While in the field, wetland scientists observed jurisdictional relationships, and provided jurisdiction opinions (see Section 4) under agency guidance, which defines (CFR 2015):

- "Adjacent" as: bordering, contiguous, or neighboring, including waters separated from other "waters of the United States" by constructed dikes or barriers, natural river berms, beach dunes and the like.
- "Neighboring" as: (1) Waters located in whole or in part within 100 feet of the ordinary high water mark of a traditional navigable water, tributary, etc. (2) Waters located in the 100-year floodplain and that are within 1,500 feet of the ordinary high water mark of a traditional navigable water, tributary, etc. ("floodplain waters"). (3) Waters located within 1,500 feet of the high tide line of a traditional navigable water or the territorial seas

AES created the Operations and Maintenance Business Information Line Regulatory Module (ORM) spreadsheet for the USACE. AES listed a new line for each polygon delineated in the study. The "Waters_Name" is a concatenation of (Cowardin Code) with (FoggyIslandBay) with (GIS FID Number). If a different ORM input strategy is desired, we can work with the USACE to deliver the needed information.

4.0 Results

Field investigations were conducted on July 22 – 23 and 29 – 30, 2015 at multiple field points. Data was only collected on the second field trip, as fog was too dense to fly on the first field trip. These dates align with the recommended field sampling conditions for the area to observe maximum hydrology (USACE 2007). Field conditions were drier than normal, as yearly precipitation was below usual averages (Table 4.0-1). This dry year was an important consideration while observing wetland soil and hydrology indicators.

Table 4.0-1 Average Total Precipitation (in) for Deadhorse, Alaska (WRCC 2015)

	January	February	March	April	May	June	July
1986-1999	0.2"	0.17"	0.14"	0.08"	0.09"	0.39"	0.68"
2015	0	0	0	0	0.07"	0.27"	0.05"

4.1 Wetlands

Foggy weather limited field efforts, but data was collected at 13 sample points. These points were spaced throughout the project area and are documented in Appendix A and field mapping in Appendix B. Table 4.1-1 is a summary of the wetland determinations made at each of these sites and acreages found over the project. Waters of the United States, including streams, lakes, and ponds were mapped using aerial photography and information gathered from the sites.

Table 4.1-1 Wetlands and Waters of the United States Sample Points

Type	Full Points	Observation Points	Onshore/Nearshore Section 10/404 Acres	Offshore Section 10 Acres
Wetlands				
Emergent:				
PEM1B/C	1, 2, 4, 6, 7, 8, 10	-	1,044.14	
PEM1C	3, 5	-	356.76	
PEM1H	9	-	172.25	
PUBH	Aerial/Satellite observations	-	82.25	
Other Waters of the United States				
Lower Perennial River:R2UB	-	4B	7.73	
Lake: L1UBH	-	5B	179.93	
Marine: M1UB, M2US	-	3B	1,080.81	225.19
Estuarine: E1UB	Aerial/Satellite observations	-	23.95	

PEM1B/C: Palustrine Emergent Persistent Saturated/Seasonally Flooded
PEM1C: Palustrine Emergent Persistent Seasonally Flooded
PEM1H: Palustrine Emergent Persistent Permanently Flooded
PUBH: Palustrine Unconsolidated Bottom Permanently Flooded
R2UB: Riverine Lower Perennial Unconsolidated Bottom
L1UBH: Lacustrine Limnetic Unconsolidated Bottom Permanently Flooded
M1UB: Marine Subtidal Unconsolidated Bottom
M2US: Marine Intertidal Unconsolidated Shore
E1UB: Estuarine Subtidal Unconsolidated Bottom

4.1.1 Emergent Wetlands (PEM1B/C, PEM1C, PEM1H)

Emergent wetlands are dominated by herbaceous angiosperms, and are the primary vegetated ecosystem in the project area. Different types of emergent wetlands were observed due to the interaction of permafrost and variances in hydrologic regime on the landscape.

Wetlands with saturated hydrological regimes (PEM1B/C) are characterized by having soils periodically saturated with water during the growing season. These had the greatest variety in characteristics over the study area. Almost all of these had patterned ground formed from ice wedges being thrust to the surface, creating small rises and depressions throughout the area. We examined the rises and depressions for the possibility of wetland/upland mosaics, but found that the highest, driest rises still had wetland vegetation and soil characteristics. Saturation and/or high water tables were found in the depressions of the patterned ground. These PEM1B/C areas had a variety of vegetation, including very low shrubs such as *Salix* and *Arctous*, and herbs like *Eriophorum* and *Carex*. Soil profiles tended to have shallow permafrost, with organics observed. Hydrology is expected to perch on top of the shallow permafrost during spring snowmelt, flooding, and/or precipitation events to create anoxic conditions during the growing season.

Wetlands with seasonally flooded hydrological regimes (PEM1C) are characterized by having soils seasonally inundated with water during the growing season. These areas had greater high centered polygon topographic relief. We examined the high parts of these polygons for the possibility of upland/wetland mosaics; but found no evidence to support that type of problematic wetland. The depressions indicated evidence of seasonal flooding. PEM1C wetlands had a large number of very small shrubs present including small *Salix* and *Dryas*, along with large amounts of *Carex*. Soil profiles consisted of histic epipedons, with ~8 inches of saturated fibric organic and deeper layers of darker mineral soils. These are due to the colder arctic temperatures and the anaerobic conditions due to the seasonal flooding.

Wetlands with permanently flooded hydrological regimes (PEM1H) are characterized by having soils frequently inundated with water during the growing season. These were low centered polygonal tundra, with large polygons and shallow water tables. These areas have relatively deep permafrost (15 inches) and thick layers of fibric organic material developed from the longer anaerobic conditions caused by permanent flooding. Few shrubs were present and vegetation consisted of *Carex* and *Eriophorum*.

4.1.2 Ponds (PUBH)

Ponds are a special type of wetlands in depressional areas with unconsolidated bottoms and permanently flooded hydrological regimes. When compared to lakes; ponds are shallower, so that air (rather than water) is the principal medium where plants grow in (Cowardin 1979). On the North Slope, ponds are often less than 20 acres large. There are a great number of ponds in the project area. These have a variety of wetland dependent plants supporting waterfowl and other types of wildlife. Observation of ponds are considered evidence enough of wetland presence, and we do not dig soil pits in them. Typically, in winter free water can be present in ponds on the North Slope deeper than 5 ft.

4.1.3 Rivers (R2UB)

Riverine systems are present in the study area, with bed and bank features and ordinary high water lines. These river systems convey waters through the flat topography to the Beaufort Sea. These are low gradient systems, and water velocity is slow. Water may flow throughout the year; but given the harsh conditions of the Arctic, some flow may be seasonal. The substrate was observed to be sand and mud.

No signs of fish were observed, and the Alaska Department of Fish and Game does not list Anadromous Fish Streams in the study area.

4.1.4 Lakes (L1UBH)

Lakes are permanently flooded lands where water (rather than air [in the case of ponds]) is the primary medium plants grow in (Cowardin 1979). Lakes have complicated characteristics on the North Slope, often with very shallow banks, large littoral zones, and polygonal bathymetry due to the underlying permafrost. Some lakes freeze solid during the winter, while others are deep enough to have free water at depths greater than 5 feet. On the North Slope, lakes are often greater than 20 acres. The large littoral zones of lakes were found to often support dense habitats of aquatic vegetation. Aerial observation of lakes was considered evidence to support delineation, and we do not dig soil pits to support their documentation.

4.1.5 Marine (M1UB, M2US)

The northern area of the project is the Beaufort Sea. This saltwater TNW is the dominate habitat for the project. It is fairly shallow, cold, and abuts the shoreline with small (3-5 foot) bluffs where permafrost is eroding into the ocean. Cold arctic winds circulate, keeping vegetation small and stunted, and the majority of the year the ocean is covered in sea ice. The Beaufort Sea was observed to be bordering, contiguous, or neighboring the entire wetland complex that is the project area.

4.1.6 Estuary (E1UB)

On the far western edge of the project area is a small estuary system which appears to hold brackish water, and be the floodplain for some riverine systems. These areas are important transition zones between salt and freshwater environments, and provide a location for turbidity to fall out prior to entering the ocean. These locations can also provide some fish species overwintering habitat. As freshwater areas freeze shut, estuaries can be refuges for typically salt water species.

4.2 *Arctophila fulva*

Arctophila fulva is an herbaceous plant which is of particular interest to conservation agencies due to its importance to waterfowl habitat. This plant has been identified to be important for many species including Endangered Species Act Steller's eiders; which seasonally inhabit the North Slope. Studies near Barrow have found that most (80 percent) Steller's eider broods are in *Arctophila fulva* habitat (Quakenbush et al. 2004).

While conducting our wetland survey we observed and noted the presence/absence of *Arctophila fulva* in the study area (Appendix B). In the study area *Arctophila fulva* is found at the edges between L1UBH-PEM1B/C and R2UB-PEM1B/C wetland areas. It is also found in the non-polygonal M2US-PEM1B/C wetland areas near the northwest of the project area. These are where wetlands border bodies of water that have seasonal periods of surface water. In these locations, *Arctophila fulva* is dense and ubiquitous where it has not been heavily grazed. Many flocks of waterfowl and geese were observed in the *Arctophila fulva* areas.

Arctophila fulva was not found in central region of the study area, where proposed development is planned. These non-*fulva* areas are along the L1UBH-PEM1B/C or L1UBH-PEM1H border areas. These habitats have better banks; without the gently increasing gradient in water depth that *Arctophila fulva* appears to prefer.

The *Arctophila fulva* areas are present on the western half of the study area, with a small presence around the unnamed river on the far eastern edge (Appendix B, Figure 2-23). We hypothesize that this species occupies a specific ecological niche. Areas must not be too dry or too wet for growth. A gradient in water depth appears to be important. Waterfowl and geese were observed only in the *Arctophila fulva* areas, which align with Ducks Unlimited research (Ducks Unlimited Inc 1998).

4.3 Aquatic Site Assessment

The ASA (Table 4.3-1, Appendix C) found that most of the wetlands were pristine and high functioning; but not: rare, unique, being used for science, or under threat from upstream sediments or toxins. All other WOUS (marine, estuaries, lakes, and rivers) in Alaska are automatically rated as Category I.

One disturbance was delineated, the Badami Pipeline, which borders the study area on the southern boundary. No disturbance was observed to wetlands in the area. Wetlands were evaluated with the disturbance buffer; but it was found that they rated the same category as without the disturbance buffer. For simplicity, we propose not to include disturbance buffers on this project.

The wetlands rated highly due to erosion control, flood flow alteration, general habitat, and native plants. All of the categories reflect that the habitats had high densities of vegetation, which was well rooted, pristine, and native. These provide great wildlife habitat, especially for waterfowl and caribou.

Some wetlands were not found to have all the characteristics needed for North Slope Category I classifications. Primarily, these wetlands are not rare for the North Slope, and similar habitats are found over millions of acres in the same Alaskan North Slope wetland complex. The wetland functions provided by these wetlands are not unique, and do not comprise a significant portion of the wetland services provided by the entire North Slope. These wetlands also do not have toxin or sediment threats observed; which are key to being high valued for those two functions. Finally, while mostly pristine, these wetlands have little evidence of being used for science or education. Science or education efforts tend to take place closer to logistic centers; as travel to the study area is difficult and expensive.

Wetlands in the project area are evaluated as Category I or II (Table 4.3-1 and Table 4.3-2). We also mapped the areas of Marine Boulder Patches and *Arctophila fulva* as Category I+, to illustrate their location (Appendix B). According to previous USACE guidance, sample ratios for compensatory mitigation may be (USACE 2015):

- Category I or II:
    - 3:1 for Preservation and
    - 2:1 for Restoration/Enhancement
- Category II or III:
    - 2:1 for Preservation and
    - 1:1 for Restoration/Enhancement

Table 4.3-1 Aquatic Site Assessment: Sample Points

Sample Point	HGM	Cowardin	Flood Flow Alteration	Sediment Removal	Nutrient and Toxicant Removal	Erosion Control and Shoreline Stabilization	Production of Organic Matter and its Export	General Habitat Suitability	General Fish Habitat	Native Plant Richness	Educational or Scientific Value	Uniqueness and Heritage	Final Overall Functional Score	Category
1	Flats	PEM1B/C	0.67	0.60	0.67	1.00	0.75	0.60	N/A	1.00	1.00	0.43	0.746	II
2	Flats	PEM1B/C	0.67	0.60	0.67	1.00	0.75	0.80	N/A	1.00	1.00	0.71	0.800	I
3	Flats	PEM1C	0.80	0.40	0.67	1.00	0.80	1.00	N/A	1.00	1.00	0.71	0.820	I
4	Flats	PEM1B/C	0.43	0.60	0.67	0.33	0.80	0.80	N/A	1.00	1.00	0.71	0.705	II
5	Flats	PEM1C	0.71	0.60	0.67	1.00	0.60	1.00	N/A	1.00	1.00	0.43	0.779	I
6	Flats	PEM1B/C	0.80	0.40	0.67	1.00	0.60	1.00	N/A	1.00	1.00	0.57	0.782	I
7	Flats	PEM1B/C	0.67	0.40	0.33	1.00	0.60	1.00	N/A	1.00	1.00	0.71	0.746	II
8	Flats	PEM1B/C	0.67	0.40	0.67	1.00	0.80	1.00	N/A	1.00	1.00	0.57	0.789	I
9	Flats	PEM1H	0.71	0.60	0.67	1.00	1.00	1.00	N/A	1.00	1.00	0.57	0.839	I
10	Flats	PEM1B/C	0.50	0.20	0.33	1.00	0.40	1.00	N/A	1.00	1.00	0.29	0.635	II

Table 4.3-2 Aquatic Site Assessment: Total Study Area

Type		Acres	Functional Category	Sample Point
Wetlands				
PEM1B/C		619.89	I	2, 6, 8
		424.25	II	1, 4, 7, 10
PEM1C		356.76	I	3, 5
PEM1H		172.25	I	9
PUBH		82.25	I	-
Waters of the United States				
Lower Perennial River:	R2UB	7.73	I	-
Lake:	L1UBH	179.93	I	-
Marine:	M1UB, M2US	1,306.00	I	-
Estuarine:	E1UB	23.95	I	-

4.4 Jurisdictional Determination

The presence of wetlands and other WOUS were analyzed under the USACE/EPA CWA Guidance described in the methods.

The TNW relevant to this study is the Beaufort Sea, which is the northern border of the study area. All wetlands were observed to be adjacent to the Beaufort Sea. All other WOUS were observed to be tributaries to the Beaufort Sea. All other WOUS had bed and bank features and indicators of ordinary high water marks.

The entire project area is found to be one large wetland/WOUS complex which is adjacent and neighboring to the Beaufort Sea, a territorial sea considered to be a TNW.

Due to these findings, our study finds that all wetlands and other WOUS in the study area are jurisdictional and that the USACE will assert jurisdiction under Section 10 of the Rivers and Harbors Act and Section 404 of the CWA. The ORM input datasheet is included as Appendix D.

5.0 Discussion

This report is the result of fieldwork and analysis conducted to support Hilcorp's Liberty Development. The report describes the results of field data collected in the summer of 2015, aerial photography, and many years of experience delineating wetlands and associated habitats on the North Slope. We provide our analysis and results for the wetland delineation, ASA, and jurisdictional status following the latest USACE and EPA guidance. We conducted more detailed analysis for a species of particular conservation concern (*Arctophila fulva*) and describe where the species is located in the project area. At this time proposed development is expected to avoid areas of *Arctophila fulva.* We conclude that there is a mix of Category I and II wetlands and other WOUS in the project area; which are mostly natural with no human disturbance, but are not rare for the region. The USACE appears to have jurisdiction due to all of the wetlands and other WOUS being adjacent and neighboring to the WOUS complex flowing into the Beaufort Sea.

The study area is subject to the jurisdiction of the USACE under Section 10 of the Rivers and Harbors Act and Section 404 of the CWA. The offshore marine waters (>3 nautical miles) are subject to Section 10 of the CWA. The nearshore marine waters (<3 nautical miles) are subject to Section 10 and Section 404 of the CWA. The onshore wetlands and other WOUS are subject to the Section 404 of the CWA.

6.0 References

CFR (Code of Federal Regulations). 2015. 80FR037053. https://federalregister.gov/a/2015-13435

Cowardin, L.M., V. Carter, F.C. Golet, E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service Report No. FWS/OBS/-79/31.Washington, D.C.

Dean, Heather. 2011. Anchorage Debit Credit Method. http://www.muni.org/Departments/OCPD/Planning/Physical/EnvPlanning/Pages/CreditDebitMethod.aspx

Ducks Unlimited Inc. 1998. Waterfowl earth cover selection analysis within the National Petroleum Reserve-Alaska. Prepared by Ducks Unlimited Inc., Rancho Cordova, California for U.S. Department of the Interior, Anchorage Alaska.

Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual: Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

Institute of Arctic Biology. 2015. Toolik Field Station Virtual Herbarium. http://toolik.alaska.edu/edc/biotic_monitoring/virtual_herbarium.php

Lichvar, R.W. 2015. The National Wetland Plant List. U.S. Army Corps of Engineers, Cold Regions Research and Engineering Laboratory, Hanover, NH.

Magee, D. W. 1998. A rapid procedure for assessing wetland functional capacity based on hydrogeomorphic (HGM) classification. Bedford, NH.

Munsell. 2009. Munsell Soil Color Charts.

Pratt, V. E. 1989. Field guide to Alaskan Wildflowers commonly seen along the highways and byways. Alaskarafts Publishing, Anchorage, Alaska.

Quakenbush, L., R. Suydam, R. Obritschkewitsch, M. Deering. 2004. Breeding biology of Steller's Eiders (*Polysticta stelleri*) near Barrow, Alaska, 1991-99. Arctic 57(2)166-182

Reed, P. B., Jr. 1988. National List of Plant Species that Occur in Wetlands: National Summary. U.S. Fish and Wildlife Service. Biological Report 88(24): 244 pp.

Reed, P. B., Jr. 1997. Revision of the National List of Plant Species that Occur in Wetlands. U.S. Fish and Wildlife Service, Department of Interior, Washington, DC.

Rieger, S., D.B. Schoephorster, and Furbush, C.E. 1979. Exploratory soil survey of Alaska. U.S. Department of Agriculture, Soil Conservation Service. Washington, D.C.

Tande, G. and Lipkin, R. 2003. Wetland Sedges of Alaska. Alaska Natural Heritage Program. Prepared for the U.S. Environmental Protection Agency.

U.S. Fish and Wildlife Service (USFWS). 2015. National Wetland Inventory (NWI). http://www.fws.gov/wetlands/data/mapper.HTML

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

U.S. Army Corps of Engineers (USACE). 2015. Ratios for Compensatory Mitigation. http://www.poa.usace.army.mil/Portals/34/docs/regulatory/HOWWetlandCategoriesRatios.pdf

Viereck, L.A. and Little, E.L., Jr. 2007. Alaska Trees and Shrubs. 2nd ed. Snowy Owl-University of Alaska Press, Fairbanks, AK.

WRCC (Western Regional Climate Center). 2015. Prudhoe Bay Alaska. Period of Record Monthly Climate Summary. http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ak7780

Appendix A
Data Points

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WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: Hilcorp Liberty | Borough/City: North Slope Borough | Sampling Date: 7/29/2015

Applicant/Owner: Hilcorp | Sampling Point: 1

Investigator(s): Ryan Cooper, Kiel Kenning | Landform (hillside, terrace, hummocks, etc.): Flat

Local relief (concave, convex, none): Beach | Slope (%): 0

Subregion: Arctic Coastal Plain | Lat: 70.21357 | Long: 147.7293 | Datum: N/A

Soil Map Unit Name: N/A | NWI Classification: PEM1B/C

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? Are "Normal Circumstances" present? Yes x No ____

Are Vegetation ____ Soil ____ or Hydrology ____ significantly problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes x No ____

Hydric Soil Present? Yes x No ____

Wetland Hydrology Present? Yes x No ____

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

Remarks: 835-838 Near beach with primary vegetation

VEGETATION – Use 3/3 abbreviations. List subregion (above) for indicator status. List plants Highest to Lowest % cover.

	Tree Stratum		Absolute % Cover	Dominant Species?	Indicator Status?
1					
2					
3					
4					
		Total Cover	0		
	Sapling/Shrub Stratum	50% of total cover 0		20% of total cover 0	
1					
2					
3					
4					
5					
6					
		Total Cover	0		
	Herb Stratum	50% of total cover 0		20% of total cover 0	
1	arcful	Arctophila fulva	80	YES	OBL
2	erivag	Eriophorum vaginatum	15	NO	FACW
3					
4					
5					
6					
7					
8					
9					
10					
		Total Cover	95		
		50% of total cover 47.5		20% of total cover 19	

Plot size (radius, or length x width): 100ft radius | % Bare Ground: 20

% Cover of Wetland Bryophytes: 0 | Total Cover of Bryophytes: 0

Remarks: Unknown carex with no seed heads (50%)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet

Total % Cover of:		Multiply by:	
OBL species	80	x 1 =	80
FACW species	15	x 2 =	30
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	95 (A)		110 (B)

Prevalence Index = B/A = 1.16

Hydrophytic Vegetation Indicators:

Y Dominance Test is >50%

Y Prevalence Index is ≤3.0

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

____ Problematic Hydrophytic Vegetation (Explain)

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

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

SOIL

Sampling Point: 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
0-17								Fibric Organic

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils: [3]

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

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

[4] Give details of color change in Remarks.

Restrictive Layer (if present):

Types: Permafrost

Depth (inches): 17

Hydric Soil Present? Yes x **No**

Remarks

Saturation inferred from the location, permafrost and all the hydrology indicators. This is a dry summer.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (2 or more required)

- [ ] Water-stained Leaves (B9)
- [x] 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)
- [x] Shallow Aquitard (D3)
- [x] Microtopographic Relief (D4)
- [x] FAC-Neutral Test (D5)

Surface Water Present?	Yes x	No	Depth (inches)	0	
Water Table Present?	Yes x	No	Depth (inches)	0	
Saturation Present? (includes capillary fringe)	Yes x	No	Depth (inches)	0	**Wetland Hydrology Present? Yes** x **No**

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

Remarks

Dry year. Saturation was not observed in the pit; but surface water was observed near the pit in the same habitat.

WETLAND DETERMINATION PHOTO FORM – Alaska Region

Project/Site:	Hilcorp Liberty	Sampling Date:	7/29/2015
Applicant/Owner:	Hilcorp	Sampling Point:	1
Investigator(s):	Ryan Cooper, Kiel Kenning		
Remarks	835-838 Near beach with primary vegetation		

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WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: Hilcorp Liberty | Borough/City: North Slope Borough | Sampling Date: 7/29/2015

Applicant/Owner: Hilcorp | Sampling Point: 2

Investigator(s): Ryan Cooper, Kiel Kenning | Landform (hillside, terrace, hummocks, etc.) Hummocks

Local relief (concave, convex, none) High and low microtopo | Slope (%) 0

Subregion: Arctic Coastal Plain | Lat 70.2064 | Long 147.71385 | Datum N/A

Soil Map Unit Name N/A | NWI Classification PEM1B/C

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? Are "Normal Circumstances" present? Yes x No ____

Are Vegetation ____ Soil ____ or Hydrology ____ significantly problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes x No ____

Hydric Soil Present? Yes x No ____

Wetland Hydrology Present? Yes x No ____

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

Remarks: 839-842. Hummocks near beach. Not a upland/wetland matrix due to wetland plants and soils being everywhere (Alaska Supplement Definition)

VEGETATION – Use 3/3 abbreviations. List subregion (above) for indicator status. List plants Highest to Lowest % cover.

	Tree Stratum		Absolute % Cover	Dominant Species?	Indicator Status?
1					
2					
3					
4					
		Total Cover	0		
	Sapling/Shrub Stratum	50% of total cover 0		20% of total cover 0	
1	dryint	Dryas integrifolia	30	YES	FACU
2	arcrub	Arctous ruber	10	YES	FAC
3	salova	Salix ovalifolia	10	YES	FAC
4					
5					
6					
		Total Cover	50		
	Herb Stratum	50% of total cover 25		20% of total cover 10	
1	equsci	Equisetum scirpoides	10	YES	FACU
2	arcarc	Arctanthemum arcticum	5	YES	FACW
3	erivag	Eriophorum vaginatum	5	YES	FACW
4					
5					
6					
7					
8					
9					
10					
		Total Cover	20		

50% of total cover 10 | 20% of total cover 4

Plot size (radius, or length x width) 100ft raadius | % Bare Ground 20

% Cover of Wetland Bryophytes 0 | Total Cover of Bryophytes 0

Remarks: unknown carex with no seed heads (100%)

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67% (A/B)

Prevalence Index worksheet

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	10	x 2 =	20
FAC species	20	x 3 =	60
FACU species	40	x 4 =	160
UPL species	0	x 5 =	0
Column Totals:	70 (A)		240 (B)

Prevalence Index = B/A = 3.43

Hydrophytic Vegetation Indicators:

Y Dominance Test is >50%

No Prevalence Index is ≤3.0

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

____ Problematic Hydrophytic Vegetation (Explain)

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

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

SOIL

Sampling Point: 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
0-8								Fibric Organic
8-17	10YR3/2							Loamy sand

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils: [3]

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

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

[4] Give details of color change in Remarks.

Restrictive Layer (if present):

Types: Permafrost

Depth (inches): 17

Hydric Soil Present? Yes x **No**

Remarks

Histic epipedon due to dark soil under fibric organic. Saturation inferred from shallow aquitard, dry summer, and microtopo relief. This hole was dug on the highest, dryest site that could be found in the area. Thin layers are expected in cold climates.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (2 or more required)

- [ ] Water-stained Leaves (B9)
- [ ] Drainage Patterns (B10)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Salt Deposits (C5)
- [x] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [x] Shallow Aquitard (D3)
- [x] Microtopographic Relief (D4)
- [ ] FAC-Neutral Test (D5)

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

Wetland Hydrology Present? Yes x **No**

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

Remarks

Dry year. Saturation was not observed in the pit; but surface water was observed near the pit in the same habitat on the low sides of the polygons.

WETLAND DETERMINATION PHOTO FORM – Alaska Region

Project/Site:	Hilcorp Liberty	Sampling Date:	7/29/2015
Applicant/Owner:	Hilcorp	Sampling Point:	2
Investigator(s):	Ryan Cooper, Kiel Kenning		
Remarks	839-842. Hummocks near beach. Not a upland/wetland matrix due to wetland plants and soils being everywhere (Alaska Supplement Definition)		

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WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: Hilcorp Liberty | Borough/City: North Slope Borough | Sampling Date: 7/29/2015

Applicant/Owner: Hilcorp | Sampling Point: 3

Investigator(s): Ryan Cooper, Kiel Kenning | Landform (hillside, terrace, hummocks, etc.) Frost Heaves

Local relief (concave, convex, none) Highs and Lows | Slope (%) 0

Subregion: Arctic Coastal Plain | Lat 70.20286 | Long 147.69737 | Datum N/A

Soil Map Unit Name N/A | NWI Classification PEM1C

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? Are "Normal Circumstances" present? Yes x No ____

Are Vegetation ____ Soil ____ or Hydrology ____ significantly problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes x No ____

Hydric Soil Present? Yes x No ____

Wetland Hydrology Present? Yes x No ____

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

Remarks: 843-846 Wetland frost heaves with low points between. Both highs and lows are wetlands. Point taken on highest, dryest point we could find.

VEGETATION – Use 3/3 abbreviations. List subregion (above) for indicator status. List plants Highest to Lowest % cover.

	Tree Stratum		Absolute % Cover	Dominant Species?	Indicator Status?
1					
2					
3					
4					
		Total Cover	0		
	Sapling/Shrub Stratum	50% of total cover 0		20% of total cover 0	
1	arcrub	Arctous ruber	40	YES	FAC
2	salova	Salix ovalifolia	25	YES	FAC
3	dryint	Dryas integrifolia	10	NO	FACU
4	drydru	Dryas drummondii	2	NO	FACU
5					
6					
		Total Cover	77		
	Herb Stratum	50% of total cover 38.5		20% of total cover 15.4	
1	erivag	Eriophorum vaginatum	3	YES	FACW
2					
3					
4					
5					
6					
7					
8					
9					
10					
		Total Cover	3		
		50% of total cover 1.5		20% of total cover 0.6	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet

Total % Cover of:			Multiply by:	
OBL species	0	x 1 =	0	
FACW species	3	x 2 =	6	
FAC species	65	x 3 =	195	
FACU species	12	x 4 =	48	
UPL species	0	x 5 =	0	
Column Totals:	80	(A)	249	(B)

Prevalence Index = B/A = 3.11

Hydrophytic Vegetation Indicators:

Y Dominance Test is >50%

No Prevalence Index is ≤3.0

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

____ Problematic Hydrophytic Vegetation (Explain)

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

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

Plot size (radius, or length x width) 100ft radius | % Bare Ground 10

% Cover of Wetland Bryophytes 0 | Total Cover of Bryophytes 0

Remarks: Unknown Carex with no seed head (80%)

SOIL

Sampling Point: 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type [1]	Loc [2]	Texture	Remarks
0-9								Fibric Organic
9-15	10YR3/2							Sandy Loam

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils: [3]

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

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

[4] Give details of color change in Remarks.

Restrictive Layer (if present):

Types: Permafrost

Depth (inches): 15

Hydric Soil Present? Yes x **No**

Remarks

Histic epipedon due to top layer of organics and dark sandy loam under. This is a dry year, and we would expect to see saturation at some point during the growing season, expecially during the spring. Permafrost would perch snowmelt. Point taken at highest point we could find. Thin layers are expected from cold climates.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (2 or more required)

- [ ] Water-stained Leaves (B9)
- [ ] Drainage Patterns (B10)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Salt Deposits (C5)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [x] Shallow Aquitard (D3)
- [x] Microtopographic Relief (D4)
- [x] FAC-Neutral Test (D5)

Surface Water Present?	Yes x	No	Depth (inches)	0	
Water Table Present?	Yes x	No	Depth (inches)	0	
Saturation Present? (includes capillary fringe)	Yes x	No	Depth (inches)	0	**Wetland Hydrology Present? Yes** x **No**

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

Remarks

Dry year and we surveyed during a hot and dry month. Saturation was not observed in the pit; but surface water was observed near the pit in the same habitat at the low points.

WETLAND DETERMINATION PHOTO FORM – Alaska Region

Project/Site:	Hilcorp Liberty	Sampling Date:	7/29/2015
Applicant/Owner:	Hilcorp	Sampling Point:	3
Investigator(s):	Ryan Cooper, Kiel Kenning		

Remarks

843-846 Wetland frost heaves with low points between. Both highs and lows are wetlands. Point taken on highest, dryest point we could find.

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WETLAND DETERMINATION PHOTO FORM – Alaska Region

Project/Site:	Hilcorp Liberty	Sampling Date:	7/29/2015
Applicant/Owner:	Hilcorp	Sampling Point:	3B
Investigator(s):	Ryan Cooper, Kiel Kenning		
Remarks	70.20306 147.69678 Eroded Shoreline Photos:847-848 Wet due to permafrost and microtopographic relief		

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WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: Hilcorp Liberty | Borough/City: North Slope Borough | Sampling Date: 7/29/2015

Applicant/Owner: Hilcorp | Sampling Point: 4

Investigator(s): Ryan Cooper, Kiel Kenning | Landform (hillside, terrace, hummocks, etc.): terrace

Local relief (concave, convex, none): Flat area above river | Slope (%): 0

Subregion: Arctic Coastal Plain | Lat: 70.20931 | Long: 147.73663 | Datum: N/A

Soil Map Unit Name: N/A | NWI Classification: PEM1B/C

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? Are "Normal Circumstances" present? Yes x No ____

Are Vegetation ____ Soil ____ or Hydrology ____ significantly problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes x No ____

Hydric Soil Present? Yes x No ____

Wetland Hydrology Present? Yes x No ____

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

Remarks: 849-852 River terrace next to stream

VEGETATION – Use 3/3 abbreviations. List subregion (above) for indicator status. List plants Highest to Lowest % cover.

	Tree Stratum		Absolute % Cover	Dominant Species?	Indicator Status?
1					
2					
3					
4					
		Total Cover	0		
	Sapling/Shrub Stratum	50% of total cover 0		20% of total cover 0	
1	salova	Salix ovalifolia	5	YES	FAC
2					
3					
4					
5					
6					
		Total Cover	5		
	Herb Stratum	50% of total cover 2.5		20% of total cover 1	
1	arcful	Arctophila fulva	40	YES	OBL
2	erivag	Eriophorum vaginatum	10	YES	FACW
3					
4					
5					
6					
7					
8					
9					
10					
		Total Cover	50		
		50% of total cover 25		20% of total cover 10	

Plot size (radius, or length x width): 100ft radius | % Bare Ground: 80

% Cover of Wetland Bryophytes: 0 | Total Cover of Bryophytes: 0

Remarks: Minuartia arctica (60%) is NI

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet

Total % Cover of:		Multiply by:	
OBL species	40	x 1 =	40
FACW species	10	x 2 =	20
FAC species	5	x 3 =	15
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	55 (A)		75 (B)

Prevalence Index = B/A = 1.36

Hydrophytic Vegetation Indicators:

Y Dominance Test is >50%

Y Prevalence Index is ≤3.0

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

Problematic Hydrophytic Vegetation (Explain)

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

Hydrophytic Vegetation Present? Yes x No ____

SOIL

Sampling Point: 4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type [1]	Loc [2]	Texture	Remarks
0-8								Fibric Organic
8-20	10YR5/2							Sand

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils: [3]

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

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

[4] Give details of color change in Remarks.

Restrictive Layer (if present):

Types: none

Depth (inches):

Hydric Soil Present? Yes x **No**

Remarks

Histic epipedon due to organics and dark soils under the top layer. Saturation is inferred from seasonal spring flooding and microtopo relief. Surface soil cracks are also apparent. Sand is possible due to historic streambed wandering.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (2 or more required)

- [ ] Water-stained Leaves (B9)
- [ ] Drainage Patterns (B10)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Salt Deposits (C5)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [x] Microtopographic Relief (D4)
- [x] FAC-Neutral Test (D5)

Surface Water Present?	Yes x	No	Depth (inches)	0	
Water Table Present?	Yes x	No x	Depth (inches)	0	
Saturation Present? (includes capillary fringe)	Yes x	No	Depth (inches)	0	**Wetland Hydrology Present? Yes** x **No**

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

Remarks

Dry year. Saturation was not observed in the pit; but surface water was observed near the pit in the same habitat.

WETLAND DETERMINATION PHOTO FORM – Alaska Region

Project/Site:	Hilcorp Liberty	Sampling Date:	7/29/2015
Applicant/Owner:	Hilcorp	Sampling Point:	4
Investigator(s):	Ryan Cooper, Kiel Kenning		
Remarks	849-852 River terrace next to stream		

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WETLAND DETERMINATION PHOTO FORM – Alaska Region

Project/Site:	Hilcorp Liberty	Sampling Date:	7/29/2015
Applicant/Owner:	Hilcorp	Sampling Point:	4B
Investigator(s):	Ryan Cooper, Kiel Kenning		
Remarks	Lat 70.20919 Long 147.73621 Stream Observation Point, Sand/ Organic bottom, seasonal, 2 feet deep, 10-30 ft wide. Lots of goose sign. Photos 853-854		

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WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: Hilcorp Liberty | Borough/City: North Slope Borough | Sampling Date: 7/29/2015

Applicant/Owner: Hilcorp | Sampling Point: 5

Investigator(s): Ryan Cooper, Kiel Kenning | Landform (hillside, terrace, hummocks, etc.): Flat

Local relief (concave, convex, none): Flat leading into pond | Slope (%): 0

Subregion: Arctic Coastal Plain | Lat: 70.19759 | Long: 147.74272 | Datum: N/A

Soil Map Unit Name: N/A | NWI Classification: PEM1C

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? Are "Normal Circumstances" present? Yes x No ___

Are Vegetation ___ Soil ___ or Hydrology ___ significantly problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes x No ___

Hydric Soil Present? Yes x No ___

Wetland Hydrology Present? Yes x No ___

Is the Sampled Area within a Wetland? **Yes x No ___**

Remarks: 855-858. Point taken next to pond. Lots of waterfowl in the area.

VEGETATION – Use 3/3 abbreviations. List subregion (above) for indicator status. List plants Highest to Lowest % cover.

	Tree Stratum		Absolute % Cover	Dominant Species?	Indicator Status?
1					
2					
3					
4					
		Total Cover	0		

	Sapling/Shrub Stratum	50% of total cover: 0		20% of total cover: 0	
1	salova	Salix ovalifolia	10	YES	FAC
2	drydru	Dryas drummondii	3	YES	FACU
3					
4					
5					
6					
		Total Cover	13		

	Herb Stratum	50% of total cover: 6.5		20% of total cover: 2.6	
1	carful	Carex fuliginosa	100	YES	FAC
2	erivag	Eriophorum vaginatum	20	NO	FACW
3					
4					
5					
6					
7					
8					
9					
10					
		Total Cover	120		

50% of total cover: 60 | 20% of total cover: 24

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67% (A/B)

Prevalence Index worksheet

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	20	x 2 =	40
FAC species	110	x 3 =	330
FACU species	3	x 4 =	12
UPL species	0	x 5 =	0
Column Totals:	133 (A)		382 (B)

Prevalence Index = B/A = 2.87

Hydrophytic Vegetation Indicators:

Y Dominance Test is >50%

Y Prevalence Index is ≤3.0

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

___ Problematic Hydrophytic Vegetation (Explain)

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

Hydrophytic Vegetation Present? **Yes x No ___**

Plot size (radius, or length x width): 100ft radius | % Bare Ground: 0

% Cover of Wetland Bryophytes: 0 | Total Cover of Bryophytes: 0

Remarks: Carex id difficult; so went with most conservative species.

SOIL

Sampling Point: 5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
0-7								Fibric Organic
7-20	10YR4/1							Sand

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils: [3]

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

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

[4] Give details of color change in Remarks.

Restrictive Layer (if present):

Types: None

Depth (inches):

Hydric Soil Present? Yes x **No**

Remarks

Histic epipedon due to saturated fibric organic and dark lower soil. Saturation was present even in this dry year and dry season. Slightly thinner soil layers are too be expected from cold region.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (2 or more required)

- [ ] Water-stained Leaves (B9)
- [ ] Drainage Patterns (B10)
- [ ] Oxidized 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)

Surface Water Present?	Yes		No	x	Depth (inches)	
Water Table Present?	Yes	x	No		Depth (inches)	4
Saturation Present? (includes capillary fringe)	Yes	x	No		Depth (inches)	8

Wetland Hydrology Present? Yes x **No**

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

Remarks

Dry Year

WETLAND DETERMINATION PHOTO FORM – Alaska Region

Project/Site:	Hilcorp Liberty	Sampling Date:	7/29/2015
Applicant/Owner:	Hilcorp	Sampling Point:	5
Investigator(s):	Ryan Cooper, Kiel Kenning		
Remarks	855-858. Point taken next to pond. Lots of waterfowl in the area.		

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WETLAND DETERMINATION PHOTO FORM – Alaska Region

Project/Site:	Hilcorp Liberty	Sampling Date:	7/29/2015
Applicant/Owner:	Hilcorp	Sampling Point:	5B
Investigator(s):	Ryan Cooper, Kiel Kenning		
Remarks	Arctophila fulva in lake/pond. Lots of waterfowl. Photos 859-861		

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WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site:	Hilcorp Liberty	Borough/City:	North Slope Borough	Sampling Date:	7/29/2015
Applicant/Owner:	Hilcorp			Sampling Point:	6
Investigator(s):	Ryan Cooper, Kiel Kenning	Landform (hillside, terrace, hummocks, etc.)			Hummocks
Local relief (concave, convex, none)	highs and low hummocks	Slope (%)	0		
Subregion:	Arctic Coastal Plain	Lat	70.194	Long	147.711
Soil Map Unit Name	N/A			NWI Classification	PEM1B/C

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? Are "Normal Circumstances" present? Yes x No ____

Are Vegetation ____ Soil ____ or Hydrology ____ significantly problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

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

Remarks: No Arctophila fulva. Patterned tundra. 862-865

VEGETATION – Use 3/3 abbreviations. List subregion (above) for indicator status. List plants Highest to Lowest % cover.

	Tree Stratum		Absolute % Cover	Dominant Species?	Indicator Status?
1					
2					
3					
4					
		Total Cover	0		
	Sapling/Shrub Stratum	50% of total cover 0		20% of total cover 0	
1	arcrub	Arctous ruber	40	YES	FAC
2	vacvit	Vaccinium vitis-idaea	20	YES	FAC
3	dryint	Dryas integrifolia	20	YES	FACU
4	salova	Salix ovalifolia	5	NO	FAC
5	castet	Cassiope tetragona	5	NO	FACU
6					
		Total Cover	90		
	Herb Stratum	50% of total cover 45		20% of total cover 18	
1	erivag	Eriophorum vaginatum	20	YES	FACW
2					
3					
4					
5					
6					
7					
8					
9					
10					
		Total Cover	20		
		50% of total cover 10		20% of total cover 4	

Plot size (radius, or length x width): 100ft radius — % Bare Ground: 0

% Cover of Wetland Bryophytes: 0 — Total Cover of Bryophytes: 0

Remarks: Unknown Carex with no seed head (90%)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 75% (A/B)

Prevalence Index worksheet

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	20	x 2 =	40
FAC species	65	x 3 =	195
FACU species	25	x 4 =	100
UPL species	0	x 5 =	0
Column Totals:	110 (A)		335 (B)

Prevalence Index = B/A = 3.05

Hydrophytic Vegetation Indicators:

Y Dominance Test is >50%

No Prevalence Index is ≤3.0

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

____ Problematic Hydrophytic Vegetation (Explain)

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

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

SOIL

Sampling Point: 6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
0-12								Fibric Organic

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils: [3]

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

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

[4] Give details of color change in Remarks.

Restrictive Layer (if present):

Types: Permafrost

Depth (inches): 12

Hydric Soil Present? Yes x **No**

Remarks

Saturation assumed from shallow aquitard; especially in the spring from snow melt. This is the dry month and dry year; so it was not observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (2 or more required)

- [ ] Water-stained Leaves (B9)
- [ ] Drainage Patterns (B10)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Salt Deposits (C5)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [x] Shallow Aquitard (D3)
- [x] Microtopographic Relief (D4)
- [ ] FAC-Neutral Test (D5)

Surface Water Present?	Yes x	No	Depth (inches)	0	
Water Table Present?	Yes x	No	Depth (inches)	0	
Saturation Present? (includes capillary fringe)	Yes x	No	Depth (inches)	0	**Wetland Hydrology Present? Yes** x **No**

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

Remarks

Dry Year. Saturation was not observed in the pit; but surface water was observed near the pit in the same habitat.

WETLAND DETERMINATION PHOTO FORM – Alaska Region

Project/Site:	Hilcorp Liberty	Sampling Date:	7/29/2015
Applicant/Owner:	Hilcorp	Sampling Point:	6
Investigator(s):	Ryan Cooper, Kiel Kenning		
Remarks	No Arctophila fulva. Patterned tundra. 862-865		

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WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: Hilcorp Liberty | Borough/City: North Slope Borough | Sampling Date: 7/29/2015

Applicant/Owner: Hilcorp | Sampling Point: 7

Investigator(s): Ryan Cooper, Kiel Kenning | Landform (hillside, terrace, hummocks, etc.) Frost Heaves

Local relief (concave, convex, none) None | Slope (%) 0

Subregion: Arctic Coastal Plain | Lat 70.19154 | Long 147.69366 | Datum N/A

Soil Map Unit Name N/A | NWI Classification PEM1B/C

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? Are "Normal Circumstances" present? Yes x No ___

Are Vegetation ___ Soil ___ or Hydrology ___ significantly problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes x No ___

Hydric Soil Present? Yes x No ___

Wetland Hydrology Present? Yes x No ___

Is the Sampled Area within a Wetland? **Yes x No ___**

Remarks: 866-869 Large Frost heaves. No Arcful to be seen

VEGETATION – Use 3/3 abbreviations. List subregion (above) for indicator status. List plants Highest to Lowest % cover.

	Tree Stratum		Absolute % Cover	Dominant Species?	Indicator Status?
1					
2					
3					
4					
		Total Cover	0		
	Sapling/Shrub Stratum	50% of total cover 0		20% of total cover 0	
1	castet	Cassiope tetragona	70	YES	FACU
2	rubcha	Rubus chamaemorus	60	YES	FACW
3	salova	Salix ovalifolia	10	NO	FAC
4	vacvit	Vaccinium vitis-idaea	3	NO	FAC
5					
6					
		Total Cover	143		
	Herb Stratum	50% of total cover 71.5		20% of total cover 28.6	
1	erivag	Eriophorum vaginatum	3	YES	FACW
2					
3					
4					
5					
6					
7					
8					
9					
10					
		Total Cover	3		
		50% of total cover 1.5		20% of total cover 0.6	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67% (A/B)

Prevalence Index worksheet

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	63	x 2 =	126
FAC species	13	x 3 =	39
FACU species	70	x 4 =	280
UPL species	0	x 5 =	0
Column Totals:	146 (A)		445 (B)

Prevalence Index = B/A = 3.05

Hydrophytic Vegetation Indicators:

Y Dominance Test is >50%

No Prevalence Index is ≤3.0

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

___ Problematic Hydrophytic Vegetation (Explain)

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

Hydrophytic Vegetation Present? **Yes x No ___**

Plot size (radius, or length x width) 100ft radius | % Bare Ground 0

% Cover of Wetland Bryophytes 0 | Total Cover of Bryophytes 10

Remarks: Unidentified Carex (no seed heads) in low points (80%) shrubs growing on mounds. Polygonum bistorta (1%) is NI.

SOIL

Sampling Point: 7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
0-9								Fibric Organic

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils: [3]

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

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

[4] Give details of color change in Remarks.

Restrictive Layer (if present):

Types: Permafrost

Depth (inches): 9

Hydric Soil Present? Yes x **No**

Remarks

Thick orgs; with permafrost underlying. Assumed saturation, especially after snowmelt and with the shallow aquitard.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (2 or more required)

- [ ] Water-stained Leaves (B9)
- [ ] Drainage Patterns (B10)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Salt Deposits (C5)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [x] Shallow Aquitard (D3)
- [x] Microtopographic Relief (D4)
- [x] FAC-Neutral Test (D5)

Surface Water Present?	Yes x	No	Depth (inches)	0	
Water Table Present?	Yes x	No	Depth (inches)	0	
Saturation Present? (includes capillary fringe)	Yes x	No	Depth (inches)	0	**Wetland Hydrology Present? Yes** x **No**

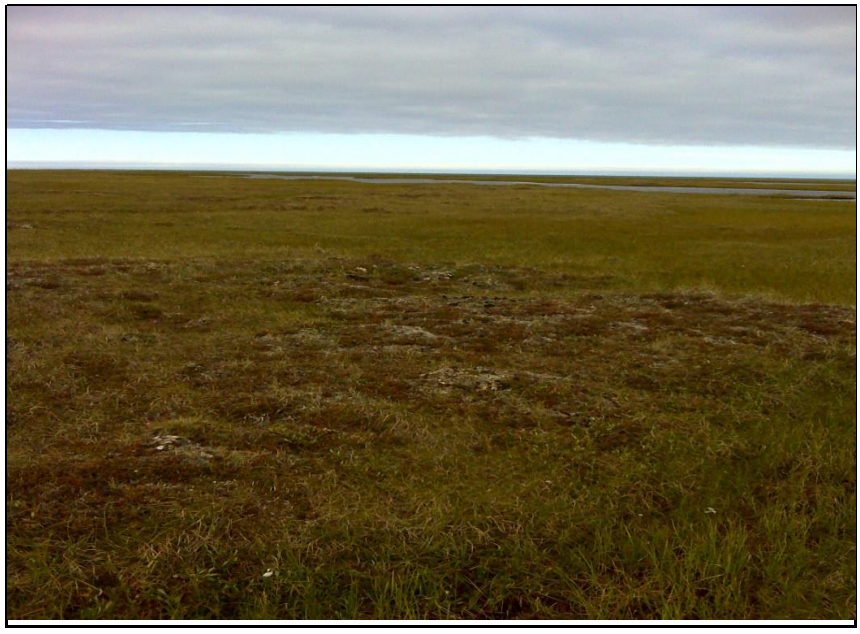
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks

Dry Year. Saturation was not observed in the pit; but surface water was observed near the pit in the same habitat.

WETLAND DETERMINATION PHOTO FORM – Alaska Region

Project/Site:	Hilcorp Liberty	Sampling Date:	7/29/2015
Applicant/Owner:	Hilcorp	Sampling Point:	7
Investigator(s):	Ryan Cooper, Kiel Kenning		
Remarks	866-869 Large Frost heaves. No Arcful to be seen		



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WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: Hilcorp Liberty | Borough/City: North Slope Borough | Sampling Date: 7/29/2015

Applicant/Owner: Hilcorp | Sampling Point: 8

Investigator(s): Ryan Cooper, Kiel Kenning | Landform (hillside, terrace, hummocks, etc.) Hummocks

Local relief (concave, convex, none) polygonal | Slope (%) 0

Subregion: Arctic Coastal Plain | Lat 70.18968 | Long 147.68599 | Datum N/A

Soil Map Unit Name N/A | NWI Classification PEM1B/C

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? Are "Normal Circumstances" present? Yes x No ___

Are Vegetation ___ Soil ___ or Hydrology ___ significantly problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes x No ___

Hydric Soil Present? Yes x No ___

Wetland Hydrology Present? Yes x No ___

Is the Sampled Area within a Wetland? **Yes x No ___**

Remarks: Arctophila fulva in stream next to point (10 feet wide perenial) 870-873

VEGETATION – Use 3/3 abbreviations. List subregion (above) for indicator status. List plants Highest to Lowest % cover.

	Tree Stratum		Absolute % Cover	Dominant Species?	Indicator Status?
1					
2					
3					
4					
		Total Cover	0		
	Sapling/Shrub Stratum	50% of total cover 0		20% of total cover 0	
1	salova	Salix ovalifolia	30	YES	FAC
2	vacvit	Vaccinium vitis-idaea	10	YES	FAC
3	arcrub	Arctous ruber	5	NO	FAC
4	dryint	Dryas integrifolia	5	NO	FACU
5					
6					
		Total Cover	50		
	Herb Stratum	50% of total cover 25		20% of total cover 10	
1	erivag	Eriophorum vaginatum	3	YES	FACW
2	arcarc	Arctanthemum arcticum	3	YES	FACW
3					
4					
5					
6					
7					
8					
9					
10					
		Total Cover	6		
		50% of total cover 3		20% of total cover 1.2	

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	6	x 2 =	12
FAC species	45	x 3 =	135
FACU species	5	x 4 =	20
UPL species	0	x 5 =	0
Column Totals:	56 (A)		167 (B)

Prevalence Index = B/A = 2.98

Hydrophytic Vegetation Indicators:

Y Dominance Test is >50%

Y Prevalence Index is ≤3.0

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

___ Problematic Hydrophytic Vegetation (Explain)

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

Hydrophytic Vegetation Present? **Yes x No ___**

Plot size (radius, or length x width) 100ft radius | % Bare Ground 0

% Cover of Wetland Bryophytes 0 | Total Cover of Bryophytes 0

Remarks: Unknown blue/black grass (10%). Unknown carex (no seed head) (70%). Polygonum bistorta (3%) is NI.

SOIL

Sampling Point: 8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
0-10								Fibric Organic

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils: [3]

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

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

[4] Give details of color change in Remarks.

Restrictive Layer (if present):

Types: Permafrost

Depth (inches): 10

Hydric Soil Present? Yes x **No**

Remarks

Thick organics with permafrost. Assume saturation, especially after snowmelt with the permafrost. This has been a dry year and dry season.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (2 or more required)

- [ ] Water-stained Leaves (B9)
- [ ] Drainage Patterns (B10)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Salt Deposits (C5)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [x] Shallow Aquitard (D3)
- [x] Microtopographic Relief (D4)
- [x] FAC-Neutral Test (D5)

Surface Water Present?	Yes x	No	Depth (inches)	0	
Water Table Present?	Yes x	No	Depth (inches)	0	
Saturation Present? (includes capillary fringe)	Yes x	No	Depth (inches)	0	**Wetland Hydrology Present? Yes** x **No**

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

Remarks

Dry Year. Saturation was not observed in the pit; but surface water was observed near the pit in the same habitat.

WETLAND DETERMINATION PHOTO FORM – Alaska Region

Project/Site:	Hilcorp Liberty	Sampling Date:	7/29/2015
Applicant/Owner:	Hilcorp	Sampling Point:	8
Investigator(s):	Ryan Cooper, Kiel Kenning		
Remarks	Arctophila fulva in stream next to point (10 feet wide perenial) 870-873		

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WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: Hilcorp Liberty | Borough/City: North Slope Borough | Sampling Date: 7/29/2015

Applicant/Owner: Hilcorp | Sampling Point: 9

Investigator(s): Ryan Cooper, Kiel Kenning | Landform (hillside, terrace, hummocks, etc.) Low centered tundra

Local relief (concave, convex, none) low centered tundra | Slope (%) 0

Subregion: Arctic Coastal Plain | Lat 70.18924 | Long 147.71594 | Datum N/A

Soil Map Unit Name N/A | NWI Classification PEM1H

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? Are "Normal Circumstances" present? Yes x No ____

Are Vegetation ____ Soil ____ or Hydrology ____ significantly problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes x No ____

Hydric Soil Present? Yes x No ____

Wetland Hydrology Present? Yes x No ____

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

Remarks: Low centered tundra, Very wet

VEGETATION – Use 3/3 abbreviations. List subregion (above) for indicator status. List plants Highest to Lowest % cover.

	Tree Stratum		Absolute % Cover	Dominant Species?	Indicator Status?
1					
2					
3					
4					
		Total Cover	0		
	Sapling/Shrub Stratum	50% of total cover 0		20% of total cover	0
1	salova	Salix ovalifolia	3	YES	FAC
2					
3					
4					
5					
6					
		Total Cover	3		
	Herb Stratum	50% of total cover 1.5		20% of total cover	0.6
1	carful	Carex fuliginosa	100	YES	FAC
2	erivag	Eriophorum vaginatum	5	NO	FACW
3					
4					
5					
6					
7					
8					
9					
10					
		Total Cover	105		
		50% of total cover 52.5		20% of total cover	21

Plot size (radius, or length x width) 100ft radius | % Bare Ground 0

% Cover of Wetland Bryophytes 0 | Total Cover of Bryophytes 0

Remarks: Carex id difficult; so went with most conservative species.

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	5	x 2 =	10
FAC species	103	x 3 =	309
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	108 (A)		319 (B)

Prevalence Index = B/A = 2.95

Hydrophytic Vegetation Indicators:

Y Dominance Test is >50%

Y Prevalence Index is ≤3.0

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

____ Problematic Hydrophytic Vegetation (Explain)

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

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

SOIL

Sampling Point: 9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
0-15								Fibric Organic

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils: [3]

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

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

[4] Give details of color change in Remarks.

Restrictive Layer (if present):

Types: permafrost

Depth (inches): 15

Hydric Soil Present? Yes x **No**

Remarks

Thick organics, with permafrost. Saturation comes up high, even during this dry month.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (2 or more required)

- [ ] Water-stained Leaves (B9)
- [ ] Drainage Patterns (B10)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Salt Deposits (C5)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [x] Shallow Aquitard (D3)
- [x] Microtopographic Relief (D4)
- [ ] FAC-Neutral Test (D5)

Surface Water Present?	Yes		No	x	Depth (inches)	
Water Table Present?	Yes	x	No		Depth (inches)	9
Saturation Present? (includes capillary fringe)	Yes	x	No		Depth (inches)	3

Wetland Hydrology Present? Yes x **No**

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

Remarks

Dry year

WETLAND DETERMINATION PHOTO FORM – Alaska Region

Project/Site:	Hilcorp Liberty	Sampling Date:	7/29/2015
Applicant/Owner:	Hilcorp	Sampling Point:	9
Investigator(s):	Ryan Cooper, Kiel Kenning		
Remarks	Low centered tundra, Very wet		

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WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: Hilcorp Liberty | Borough/City: North Slope Borough | Sampling Date: 7/29/2015

Applicant/Owner: Hilcorp | Sampling Point: 10

Investigator(s): Ryan Cooper, Kiel Kenning | Landform (hillside, terrace, hummocks, etc.) Terrace

Local relief (concave, convex, none) Convex | Slope (%) 0

Subregion: Arctic Coastal Plain | Lat 70.18433 | Long 147.72433 | Datum N/A

Soil Map Unit Name N/A | NWI Classification PEM1B/C

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? Are "Normal Circumstances" present? Yes x No ____

Are Vegetation ____ Soil ____ or Hydrology ____ significantly problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes x No ____

Hydric Soil Present? Yes x No ____

Wetland Hydrology Present? Yes x No ____

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

Remarks: 874-877 Terrace, Frost heaves running NE/SE near Badami pipeline

VEGETATION – Use 3/3 abbreviations. List subregion (above) for indicator status. List plants Highest to Lowest % cover.

	Tree Stratum		Absolute % Cover	Dominant Species?	Indicator Status?
1					
2					
3					
4					
		Total Cover	0		
	Sapling/Shrub Stratum	50% of total cover 0		20% of total cover 0	
1	arcrub	Arctous ruber	30	YES	FAC
2	dryint	Dryas integrifolia	20	YES	FACU
3	vacvit	Vaccinium vitis-idaea	15	YES	FAC
4	salova	Salix ovalifolia	10	NO	FAC
5					
6					
		Total Cover	75		
	Herb Stratum	50% of total cover 37.5		20% of total cover 15	
1	erivag	Eriophorum vaginatum	5	YES	FACW
2					
3					
4					
5					
6					
7					
8					
9					
10					
		Total Cover	5		
		50% of total cover 2.5		20% of total cover 1	

Plot size (radius, or length x width) 100ft radius | % Bare Ground 0

% Cover of Wetland Bryophytes 0 | Total Cover of Bryophytes 0

Remarks: Unknown grass with no seed heads (80%). erivag on tops of hummocks

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 75% (A/B)

Prevalence Index worksheet

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	5	x 2 =	10
FAC species	55	x 3 =	165
FACU species	20	x 4 =	80
UPL species	0	x 5 =	0
Column Totals:	80 (A)		255 (B)

Prevalence Index = B/A = 3.19

Hydrophytic Vegetation Indicators:

Y Dominance Test is >50%

No Prevalence Index is ≤3.0

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

Problematic Hydrophytic Vegetation (Explain)

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

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

SOIL

Sampling Point: 10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
0-12								Fibric Organic

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils: [3]

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

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

[4] Give details of color change in Remarks.

Restrictive Layer (if present):

Types: Permafrost

Depth (inches): 12

Hydric Soil Present? Yes x **No**

Remarks

Thick layer of organics with permafrost. Expect to have saturation, especially during snowmelt with the permafrost. Point taken in a dry month during a dry year.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (2 or more required)

- [ ] Water-stained Leaves (B9)
- [ ] Drainage Patterns (B10)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Salt Deposits (C5)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [x] Shallow Aquitard (D3)
- [x] Microtopographic Relief (D4)
- [ ] FAC-Neutral Test (D5)

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

Wetland Hydrology Present? Yes x **No**

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

Remarks

Dry Year. Saturation was not observed in the pit; but surface water was observed near the pit in the same habitat.

WETLAND DETERMINATION PHOTO FORM – Alaska Region

Project/Site:	Hilcorp Liberty	Sampling Date:	7/29/2015
Applicant/Owner:	Hilcorp	Sampling Point:	10
Investigator(s):	Ryan Cooper, Kiel Kenning		
Remarks	874-877 Terrace, Frost heaves running NE/SE near Badami pipeline		

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Appendix B
Maps

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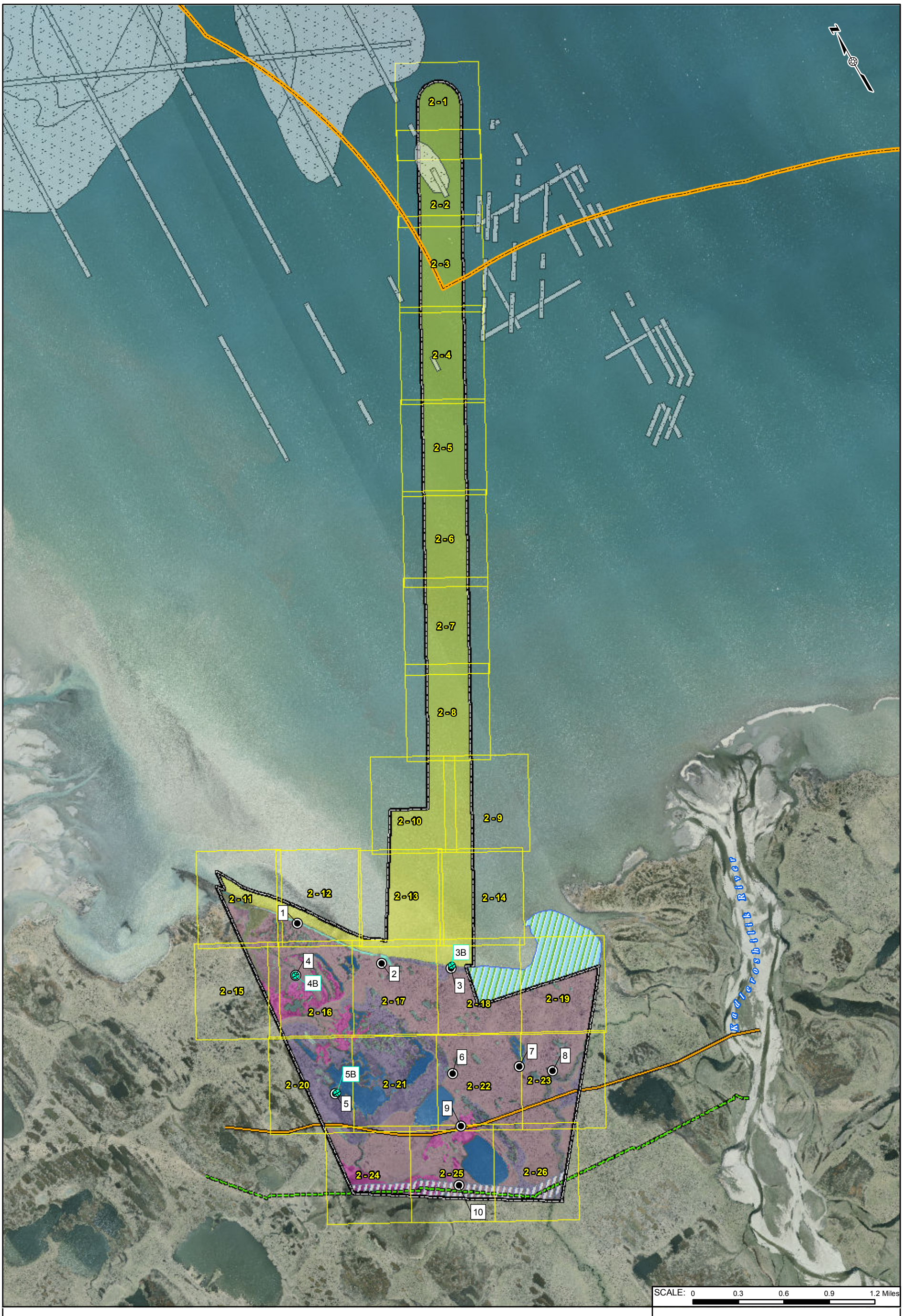

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Wetland Delineation Overview

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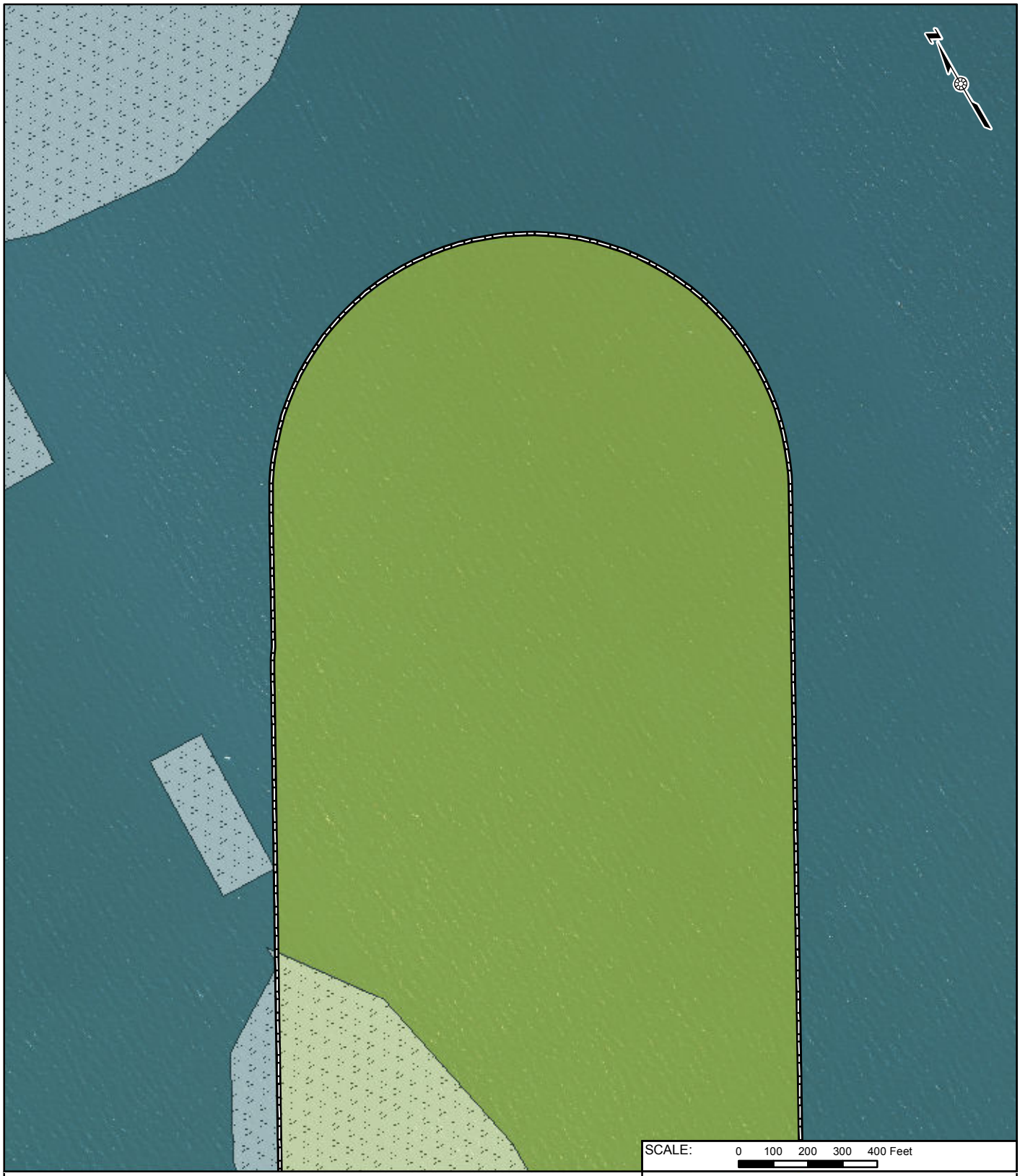
Regulatory and Technical Services

FIGURE: 1

NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet

AES-RTS: 15-106-003a.mxd, 08/18/15



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Wetlands Delineation

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FIGURE:
2 - 1

NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet

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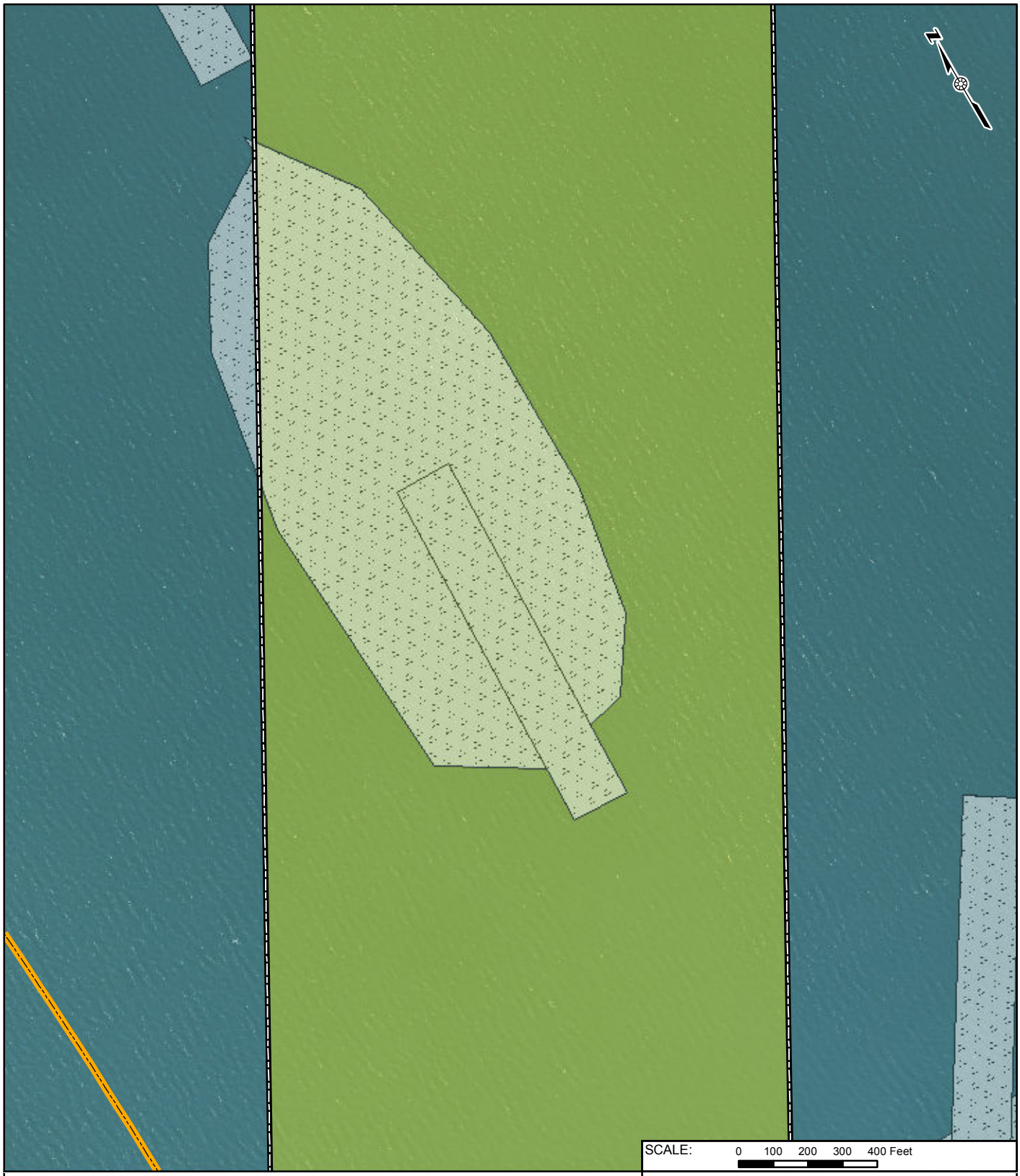

SCALE: 0 100 200 300 400 Feet

2015 Wetland Photo Point
2015 Wetland Sample Point
Badami Pipeline
Badami Seasonal Ice Road
Outer Continental Shelf Buffer
Study Area
Boulder Patch
Disturbed Shadow Effect 300 ft Buffer
Private Land (Native Allotment)

Cowardin

E1UB
L1UBH
M1UB
M2US
PEM1B/C
PEM1C
PEM1H
PUBH
R2UB

Hilcorp

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Wetlands Delineation

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FIGURE:
2 - 2

NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet

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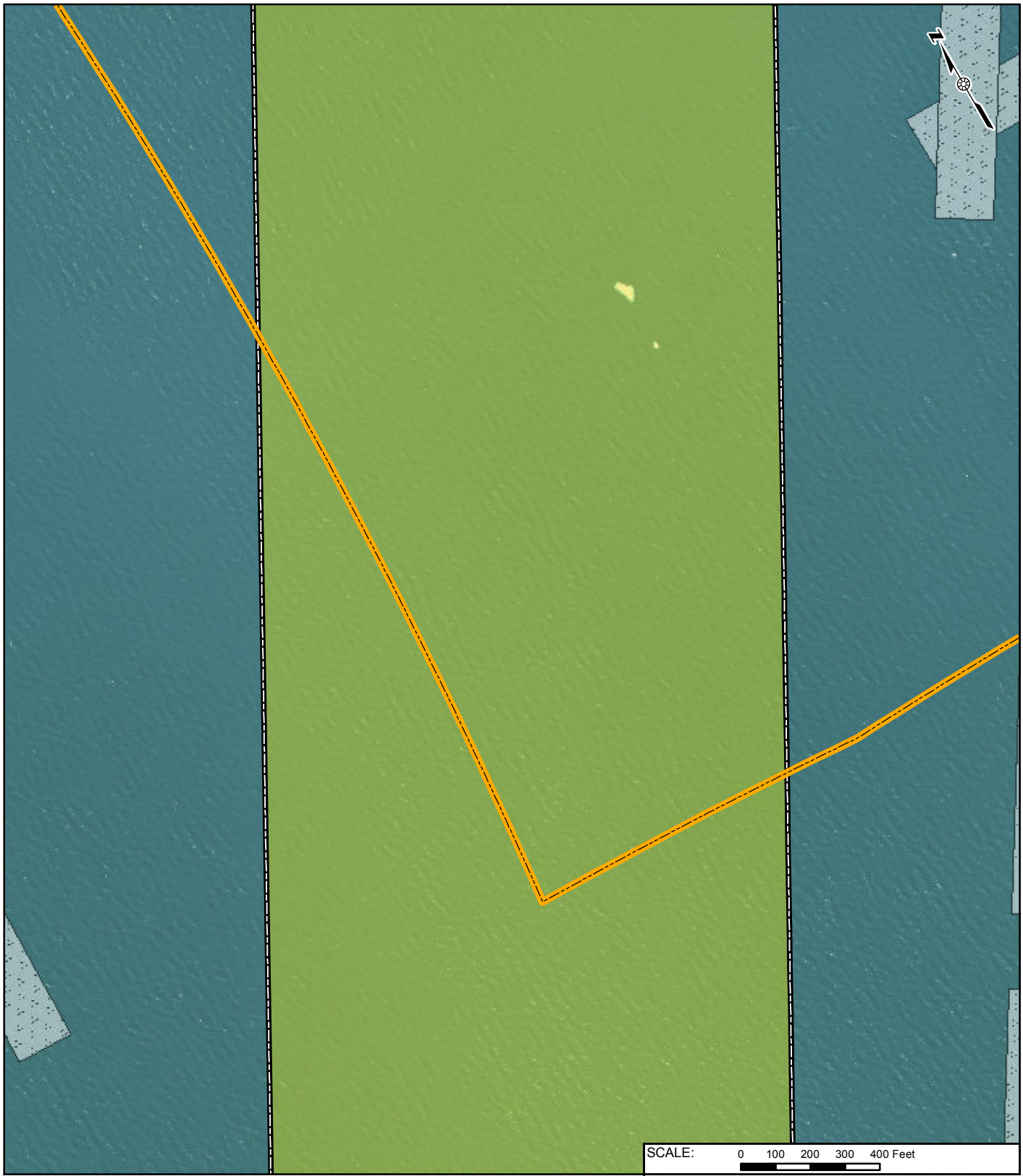

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Wetlands Delineation

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FIGURE:
2 - 3

NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet

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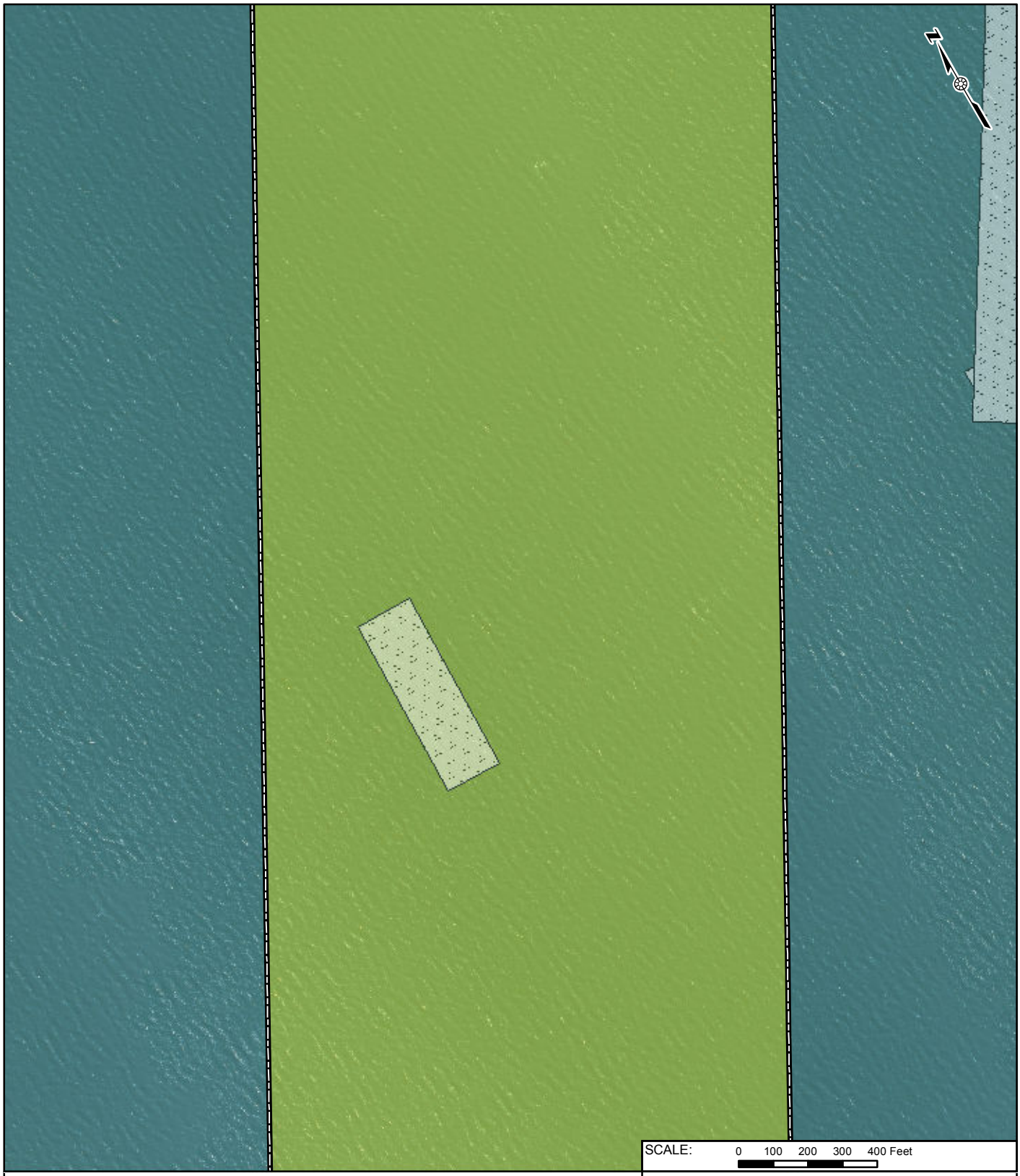

SCALE: 0 100 200 300 400 Feet

2015 Wetland Photo Point
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Cowardin
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FIGURE:
2 - 4

NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet

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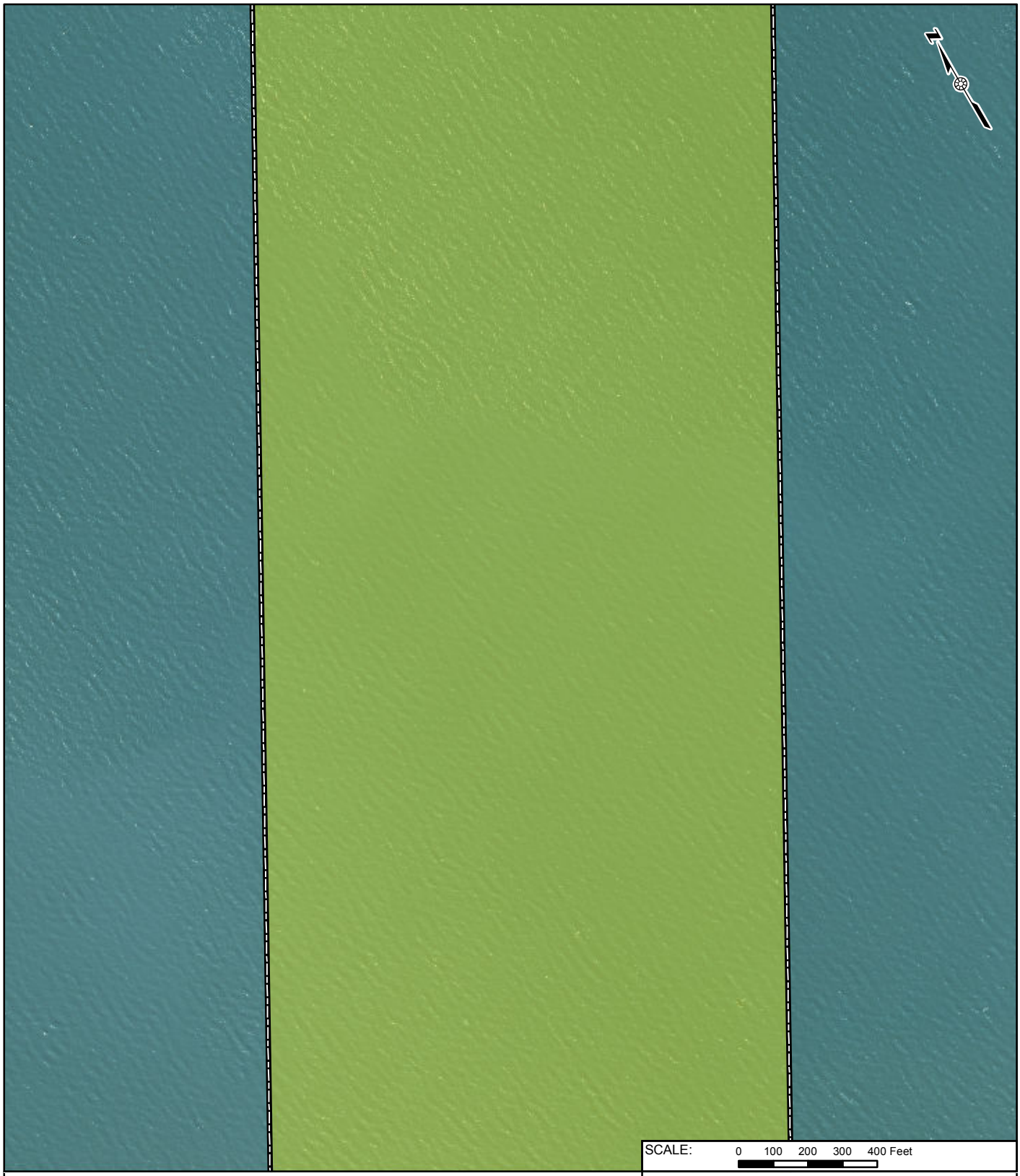

SCALE: 0 100 200 300 400 Feet

2015 Wetland Photo Point
2015 Wetland Sample Point
Badami Pipeline
Badami Seasonal Ice Road
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Cowardin
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FIGURE:
2 - 5

NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet

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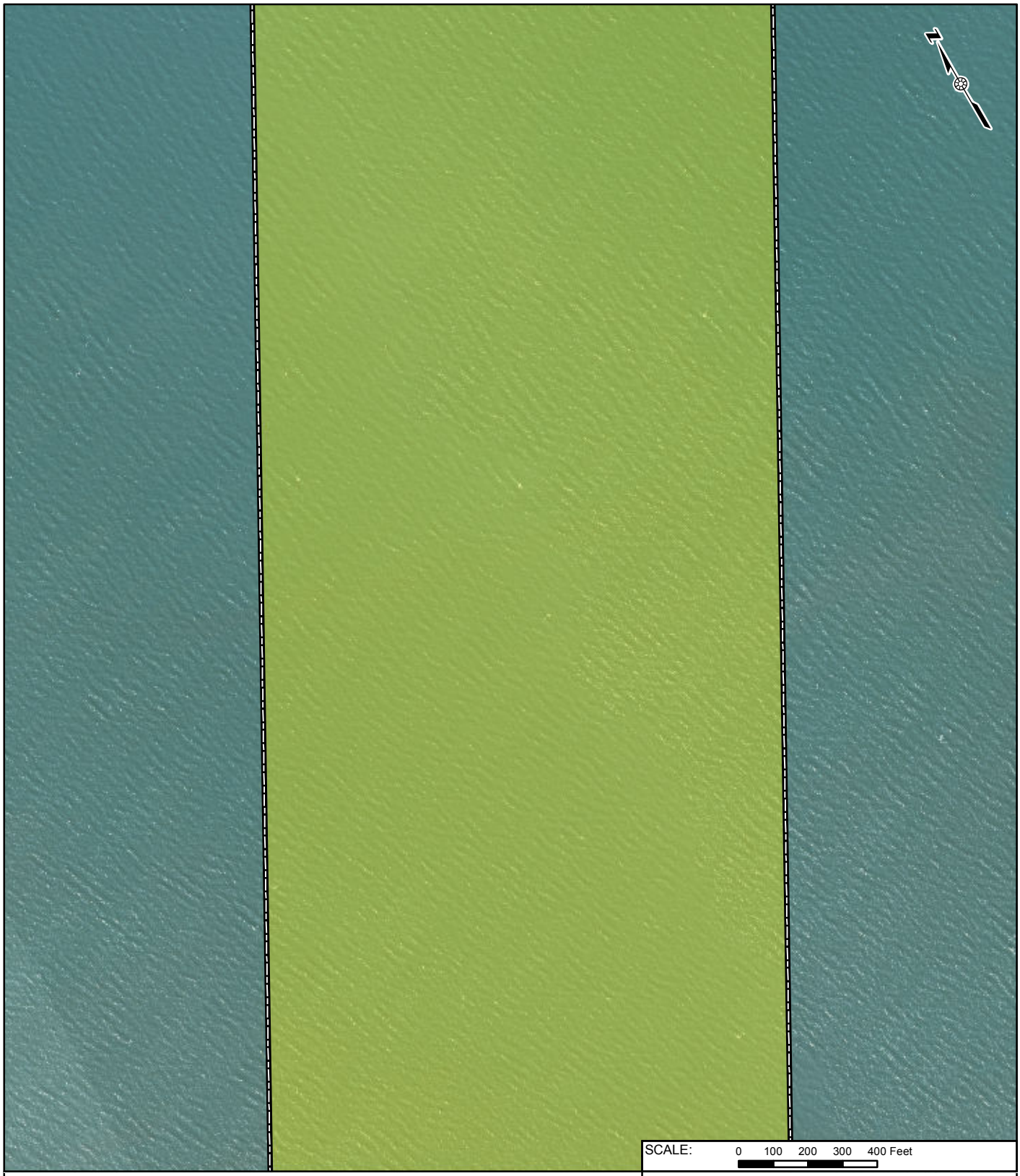

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FIGURE:
2 - 6

NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet

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FIGURE:
2 - 7

NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet

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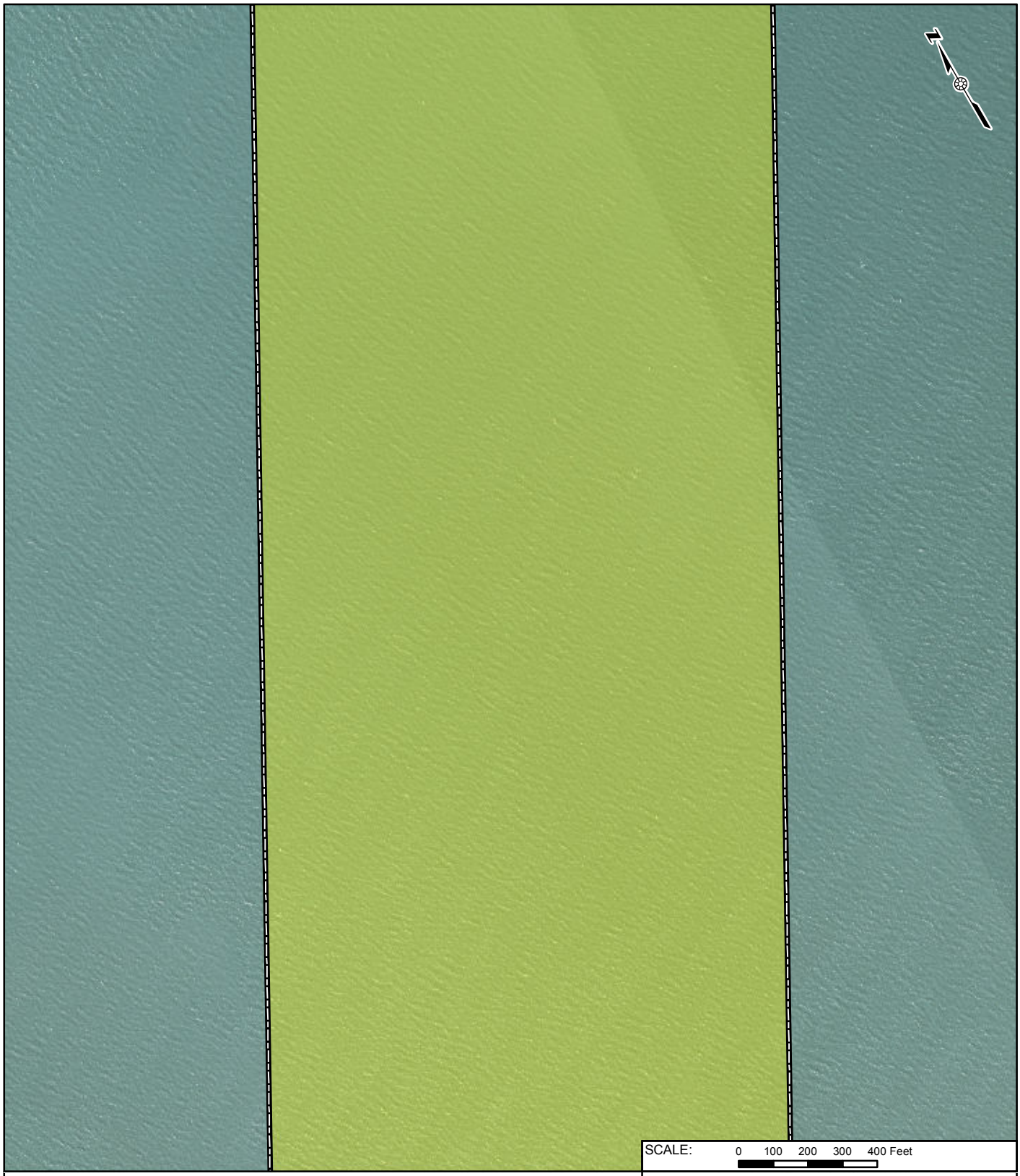

SCALE: 0 100 200 300 400 Feet

2015 Wetland Photo Point
2015 Wetland Sample Point
Badami Pipeline
Badami Seasonal Ice Road
Outer Continental Shelf Buffer
Study Area
Boulder Patch
Disturbed Shadow Effect 300 ft Buffer
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E1UB
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FIGURE:
2 - 8

NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet

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SCALE: 0 100 200 300 400 Feet

2015 Wetland Photo Point
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FIGURE:
2 - 9

NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet

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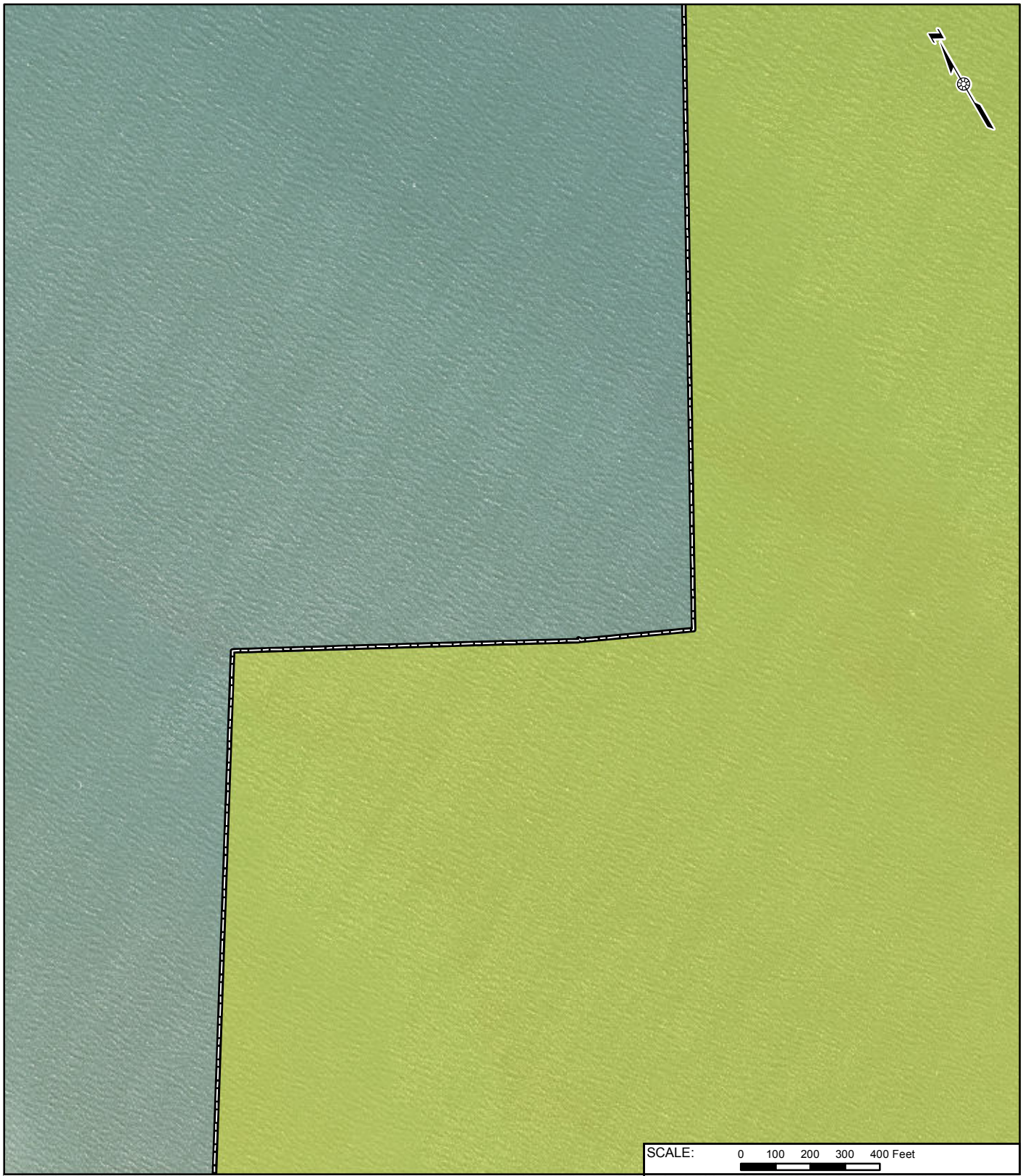

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FIGURE:
2 - 10

NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet

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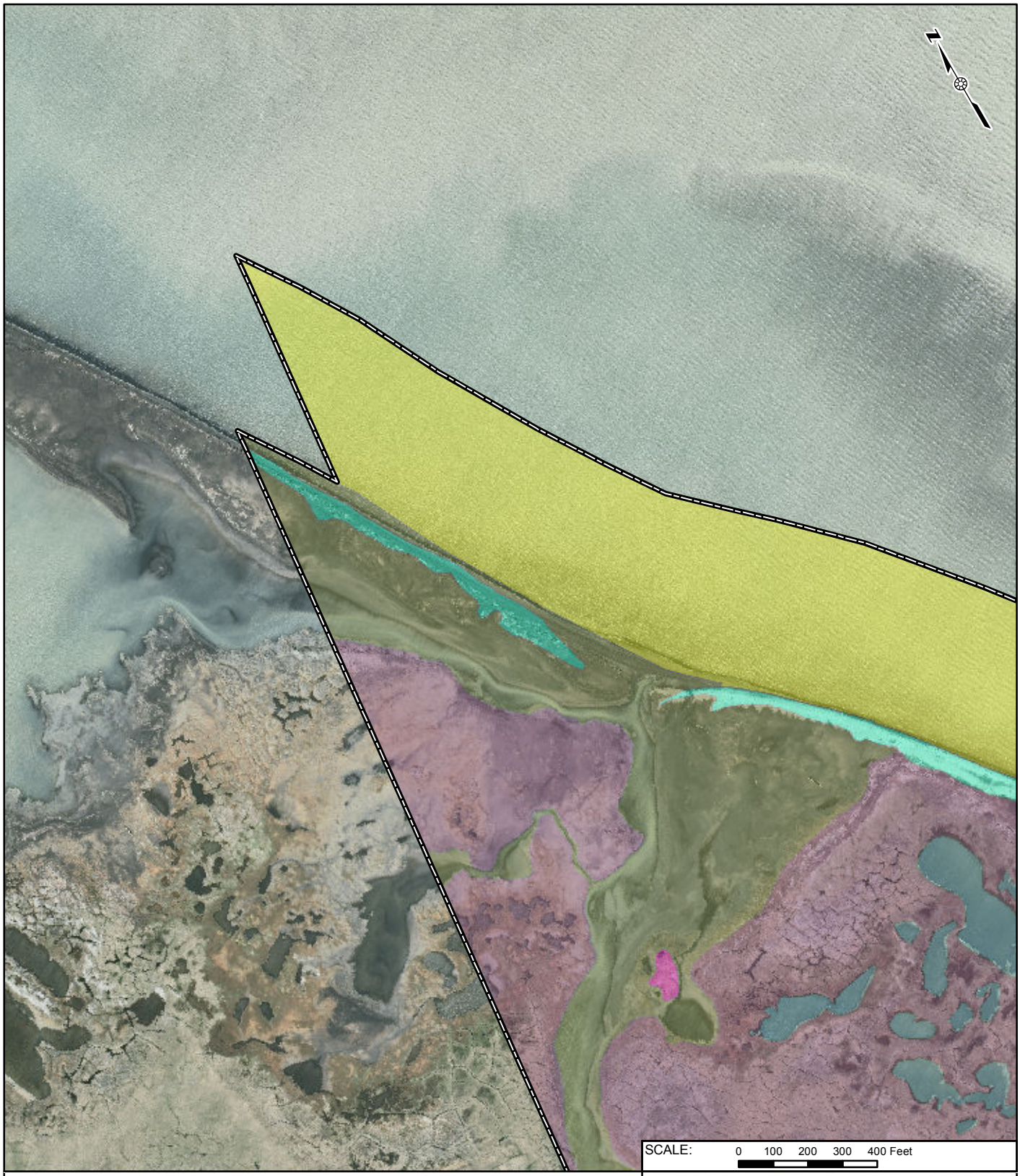

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FIGURE:
2 - 11

NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet

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SCALE: 0 100 200 300 400 Feet

2015 Wetland Photo Point
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L1UBH
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FIGURE:
2 - 12

NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet

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FIGURE:
2 - 13

NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet

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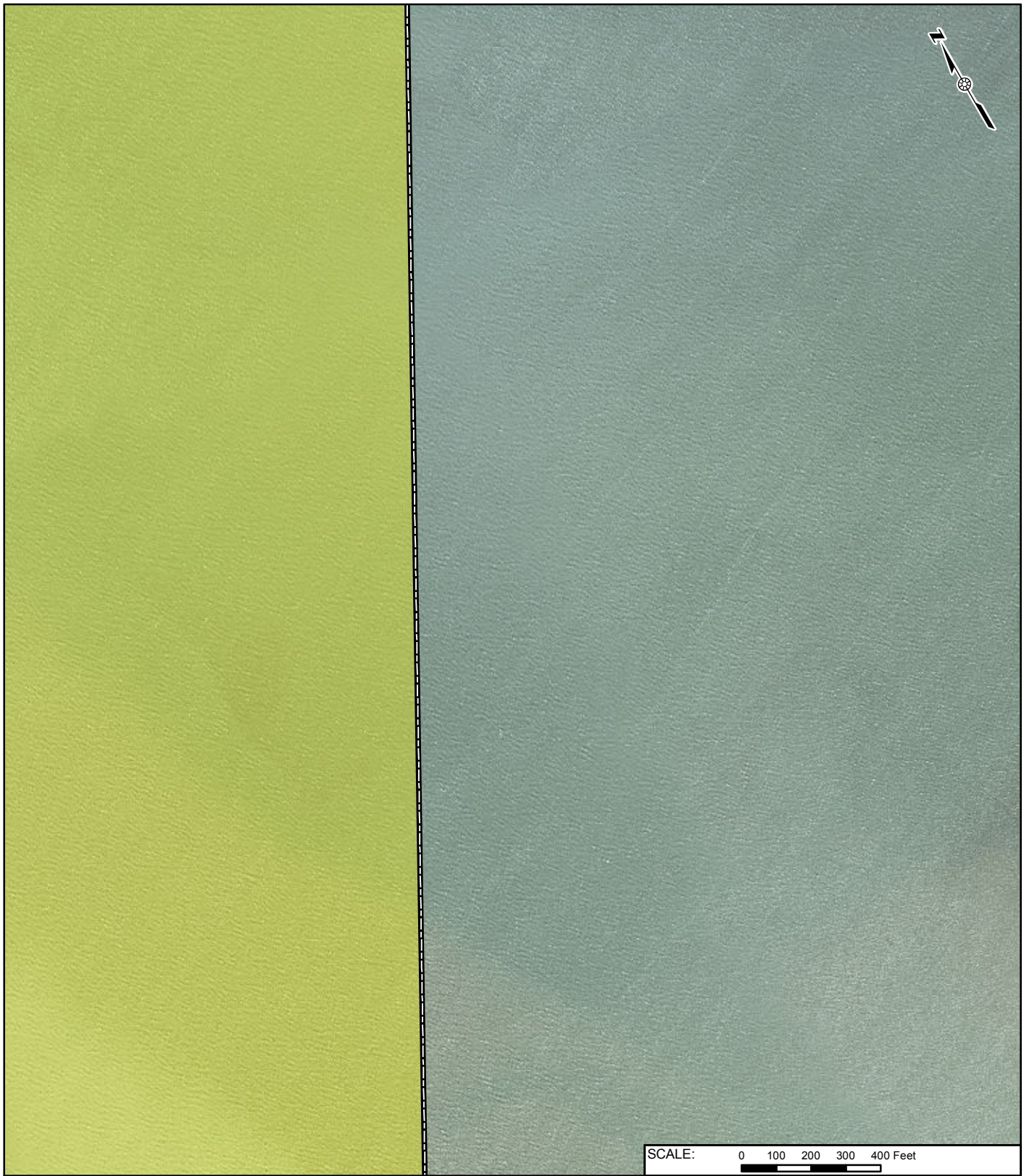

SCALE: 0 100 200 300 400 Feet

2015 Wetland Photo Point
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PEM1H
PUBH
R2UB

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FIGURE:
2 - 14

NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet

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FIGURE:
2 - 15

NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet

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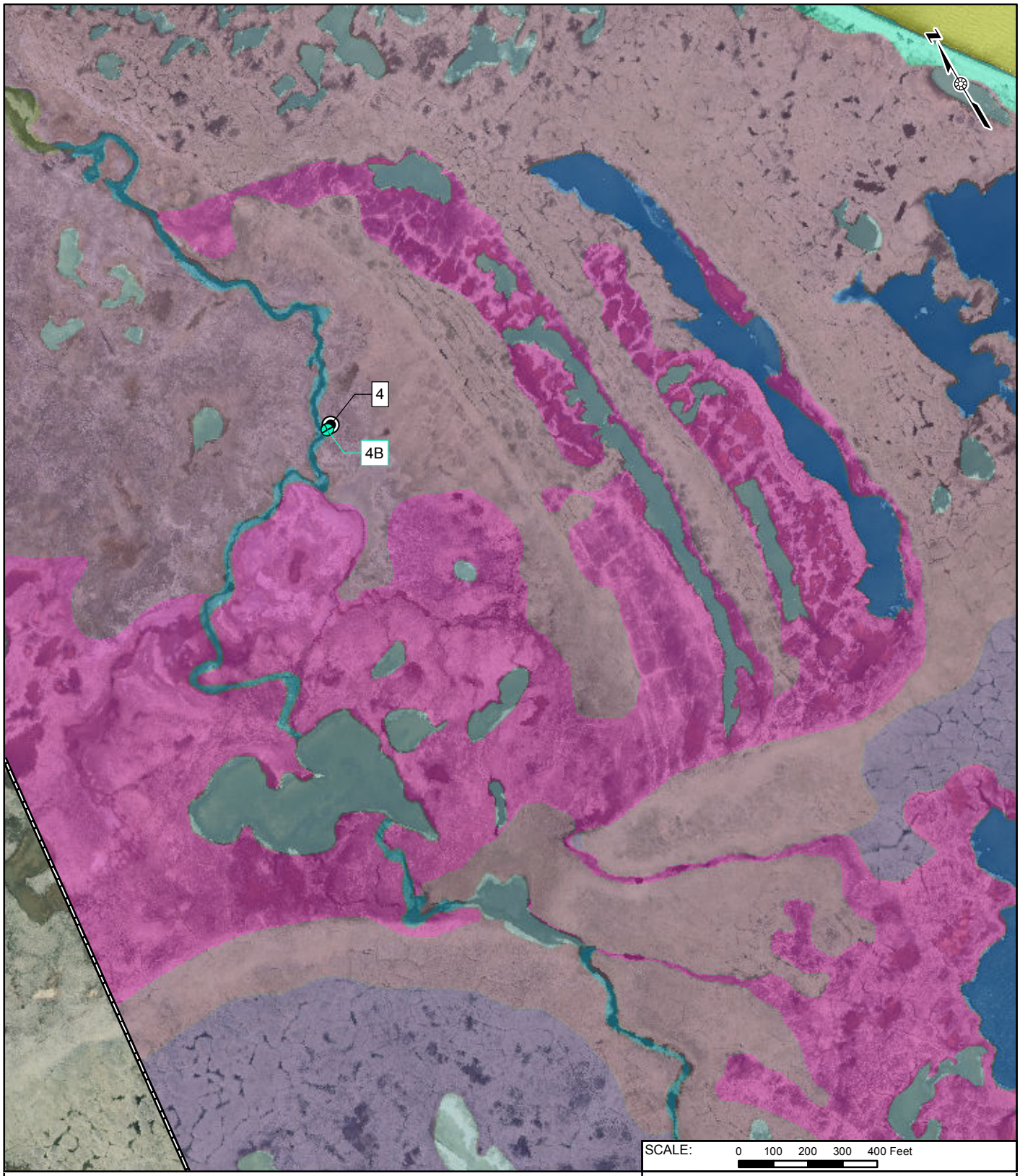

SCALE: 0 100 200 300 400 Feet

2015 Wetland Photo Point
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FIGURE:
2 - 16

NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet

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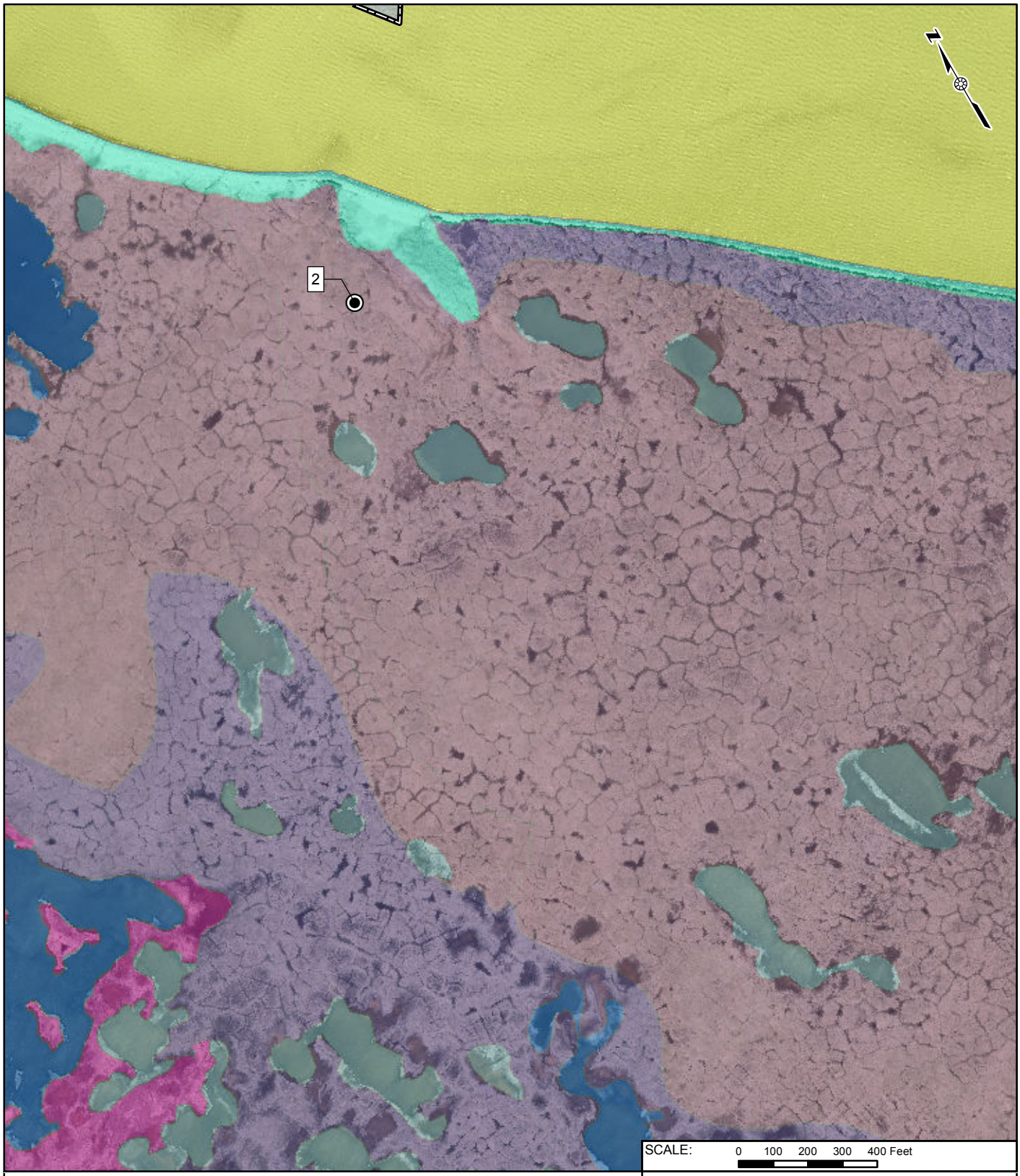

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FIGURE:
2 - 17

NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet

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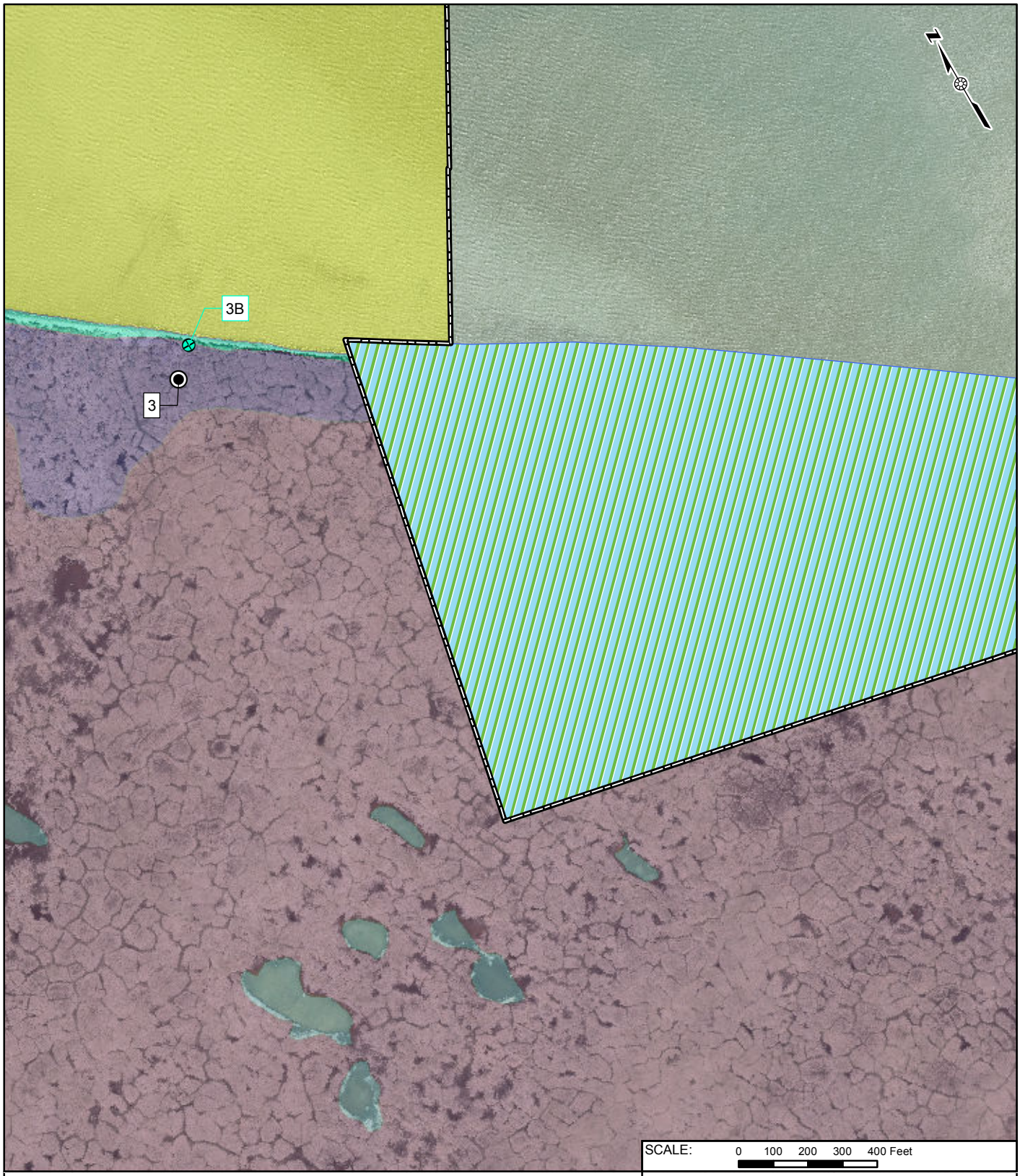

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FIGURE:
2 - 18

NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet

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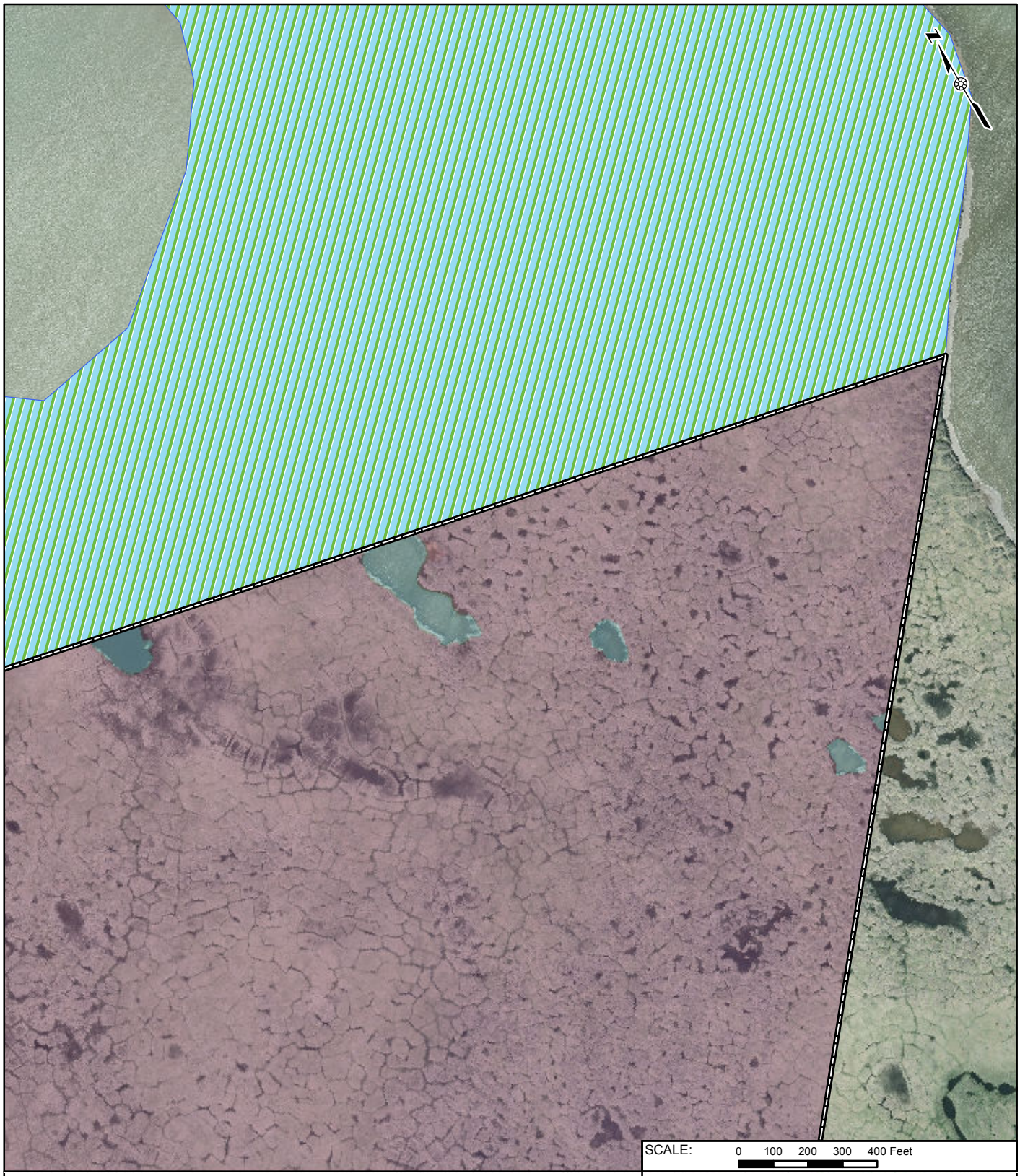

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FIGURE:
2 - 19

NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet

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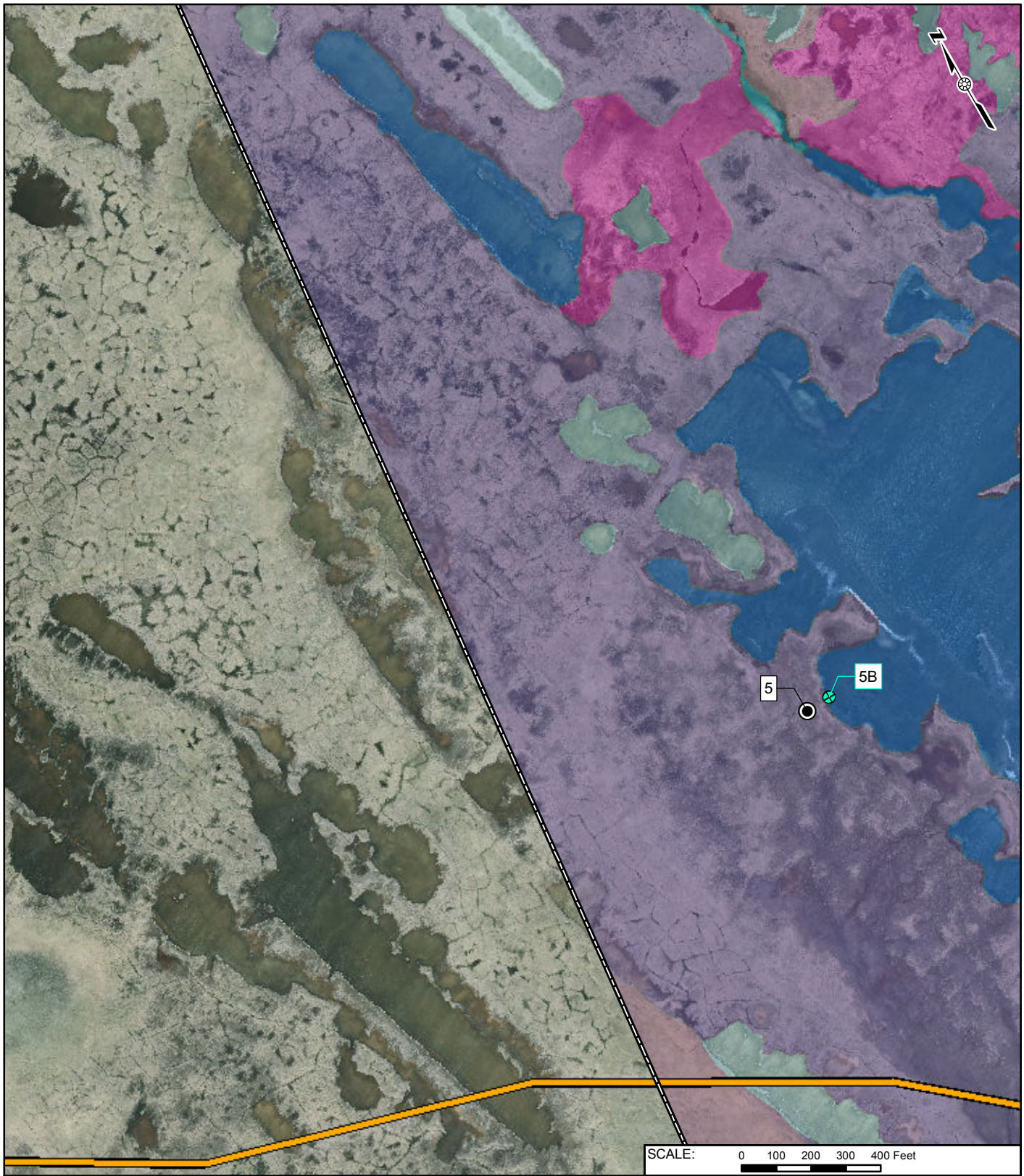

SCALE: 0 100 200 300 400 Feet

2015 Wetland Photo Point
2015 Wetland Sample Point
Badami Pipeline
Badami Seasonal Ice Road
Outer Continental Shelf Buffer
Study Area
Boulder Patch
Disturbed Shadow Effect 300 ft Buffer
Private Land (Native Allotment)

Cowardin
E1UB
L1UBH
M1UB
M2US
PEM1B/C
PEM1C
PEM1H
PUBH
R2UB

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FIGURE:
2 - 20

NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet

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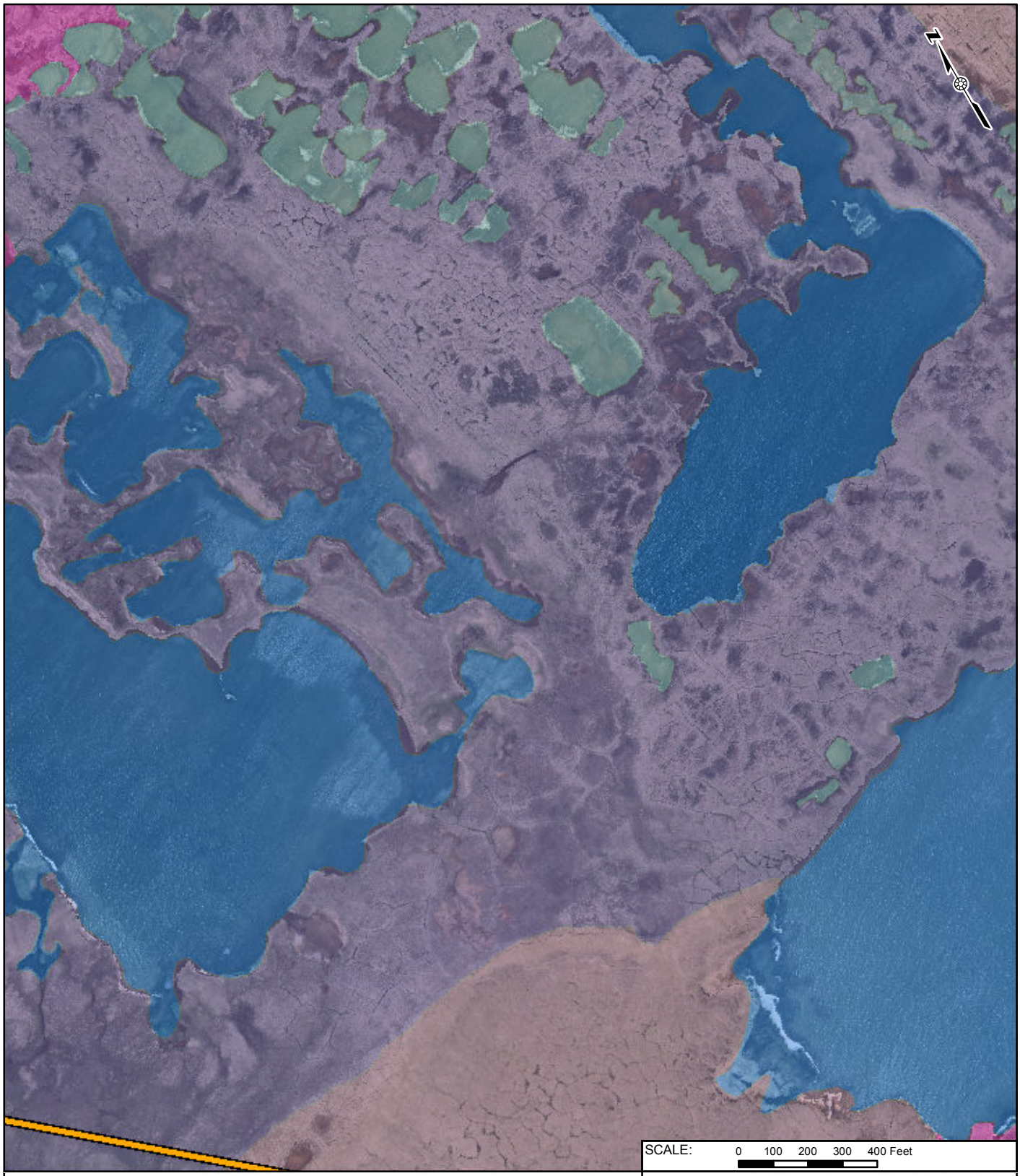

SCALE: 0 100 200 300 400 Feet

2015 Wetland Photo Point
2015 Wetland Sample Point
Badami Pipeline
Badami Seasonal Ice Road
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Boulder Patch
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FIGURE:
2 - 21

NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet

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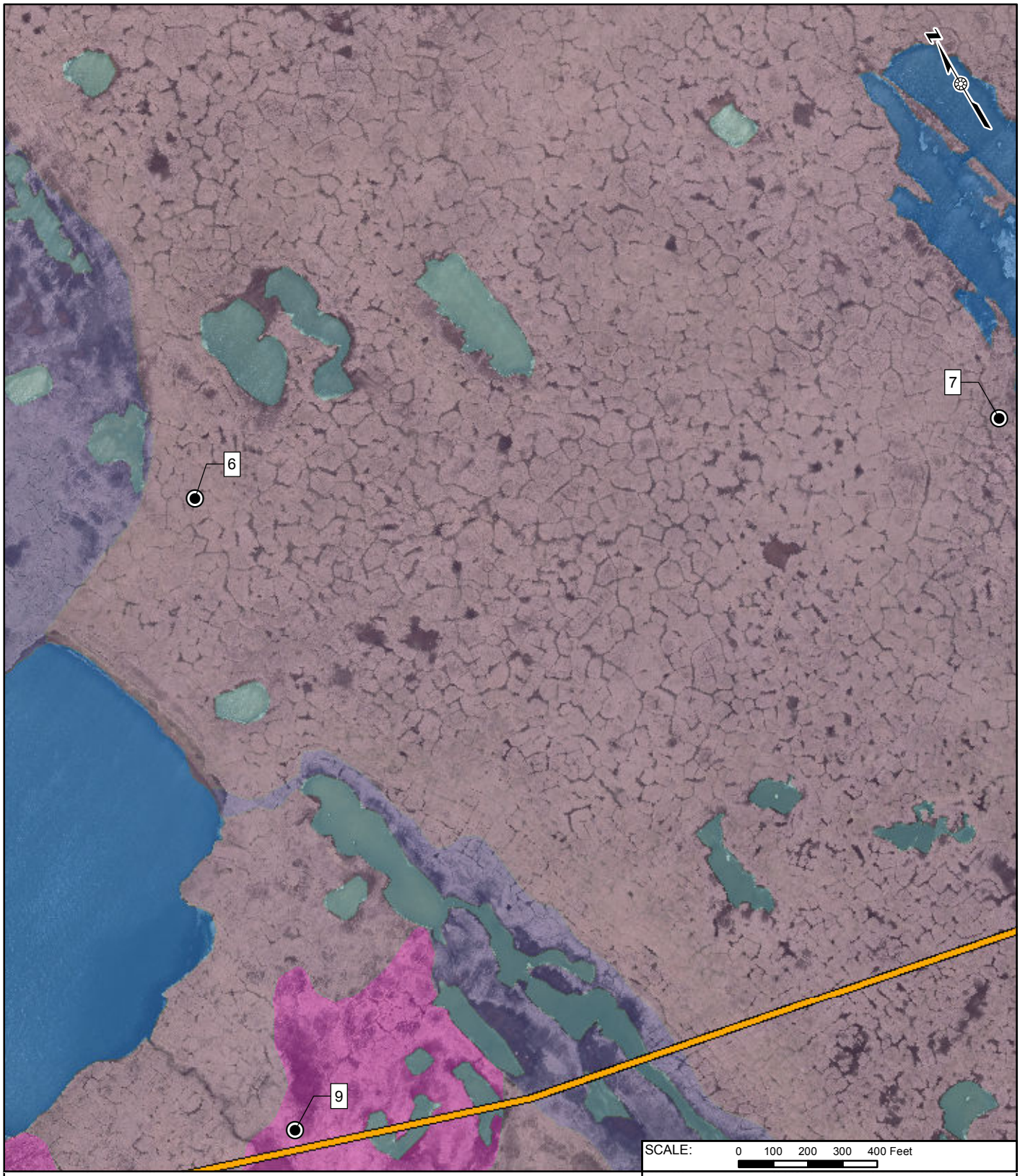

SCALE: 0 100 200 300 400 Feet

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FIGURE:
2 - 22

NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet

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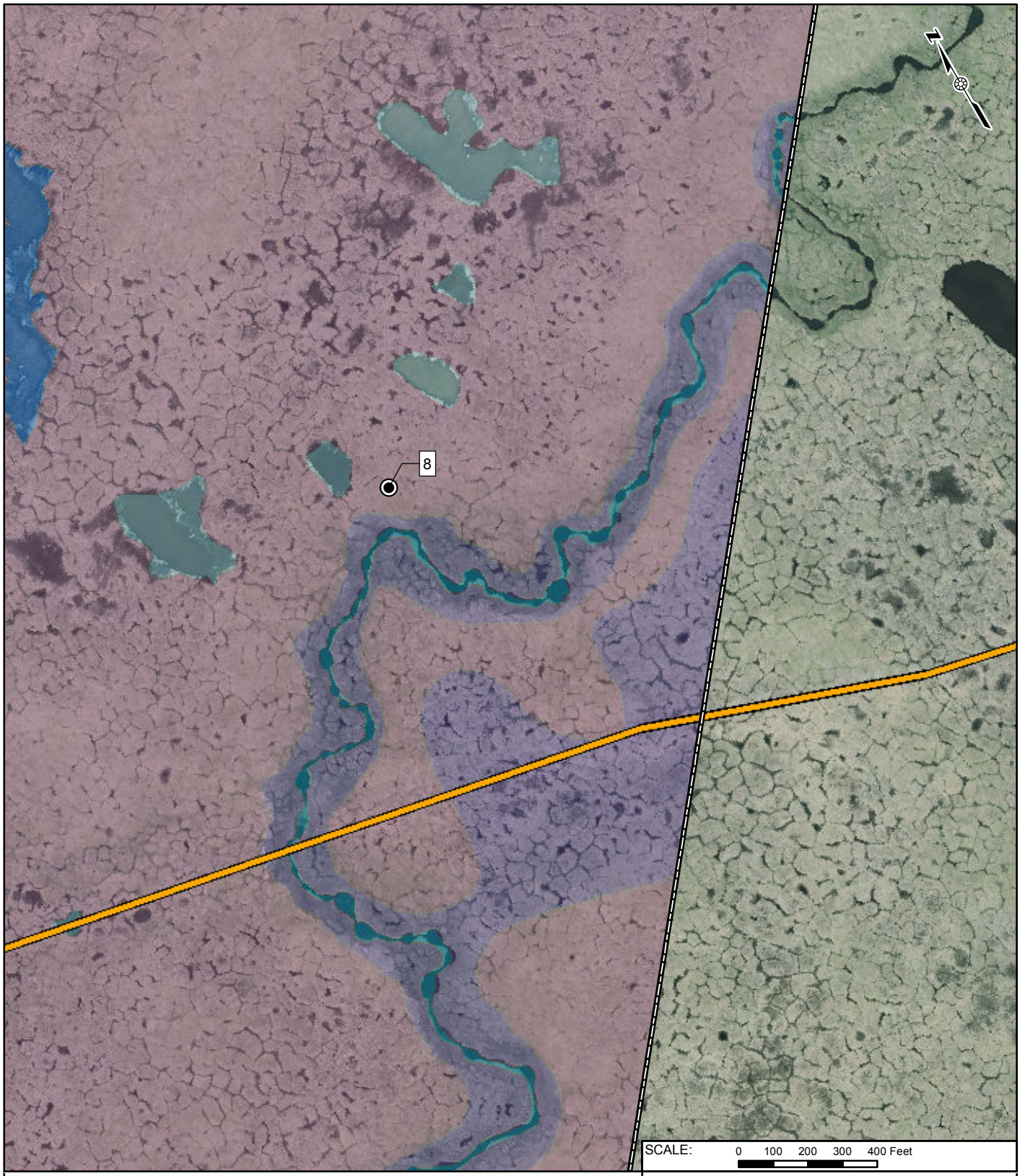

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Hilcorp Liberty Development POA-2015-16
Wetlands Delineation

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FIGURE:
2 - 23

NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet

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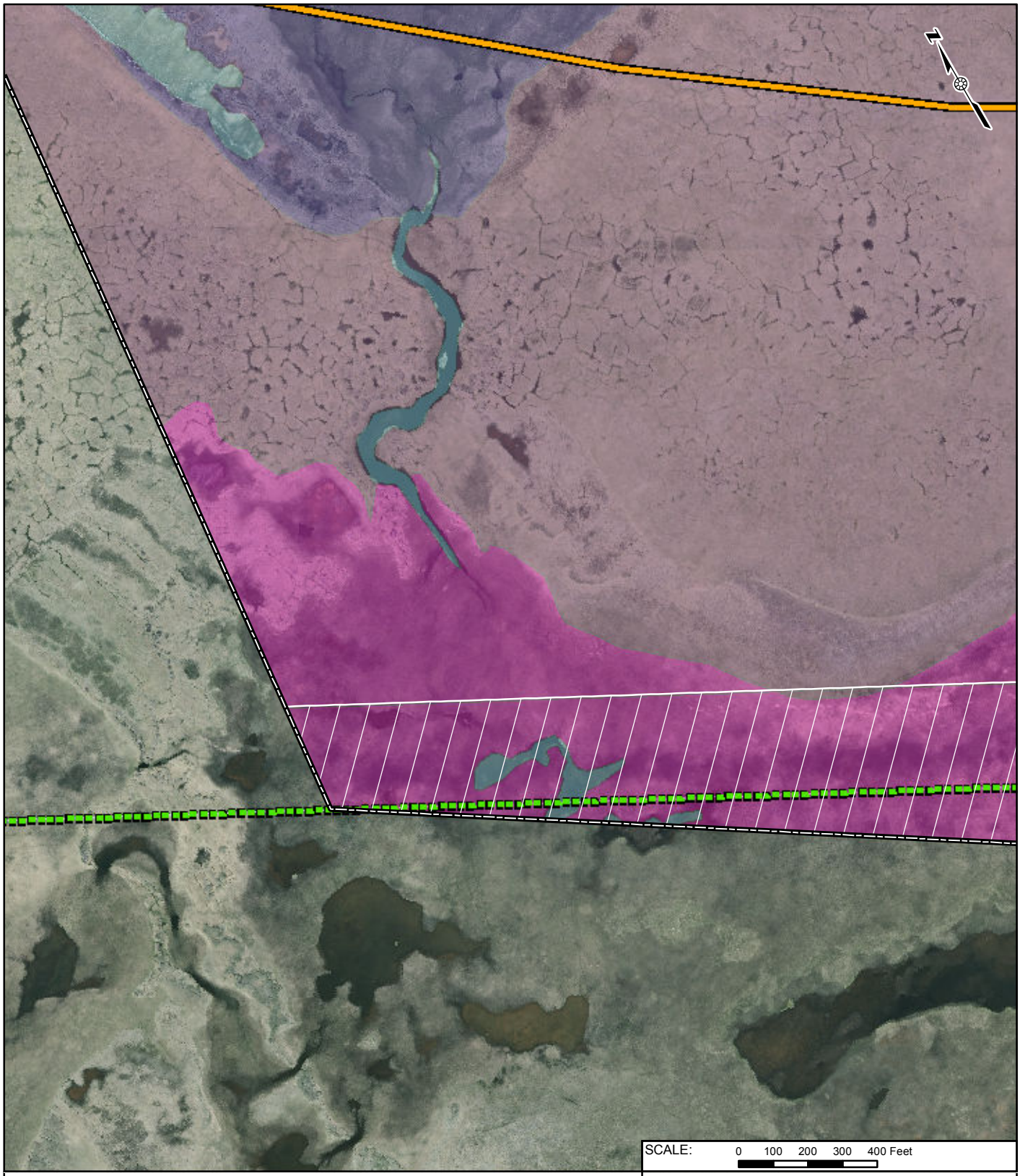

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Hilcorp Liberty Development POA-2015-16
Wetlands Delineation

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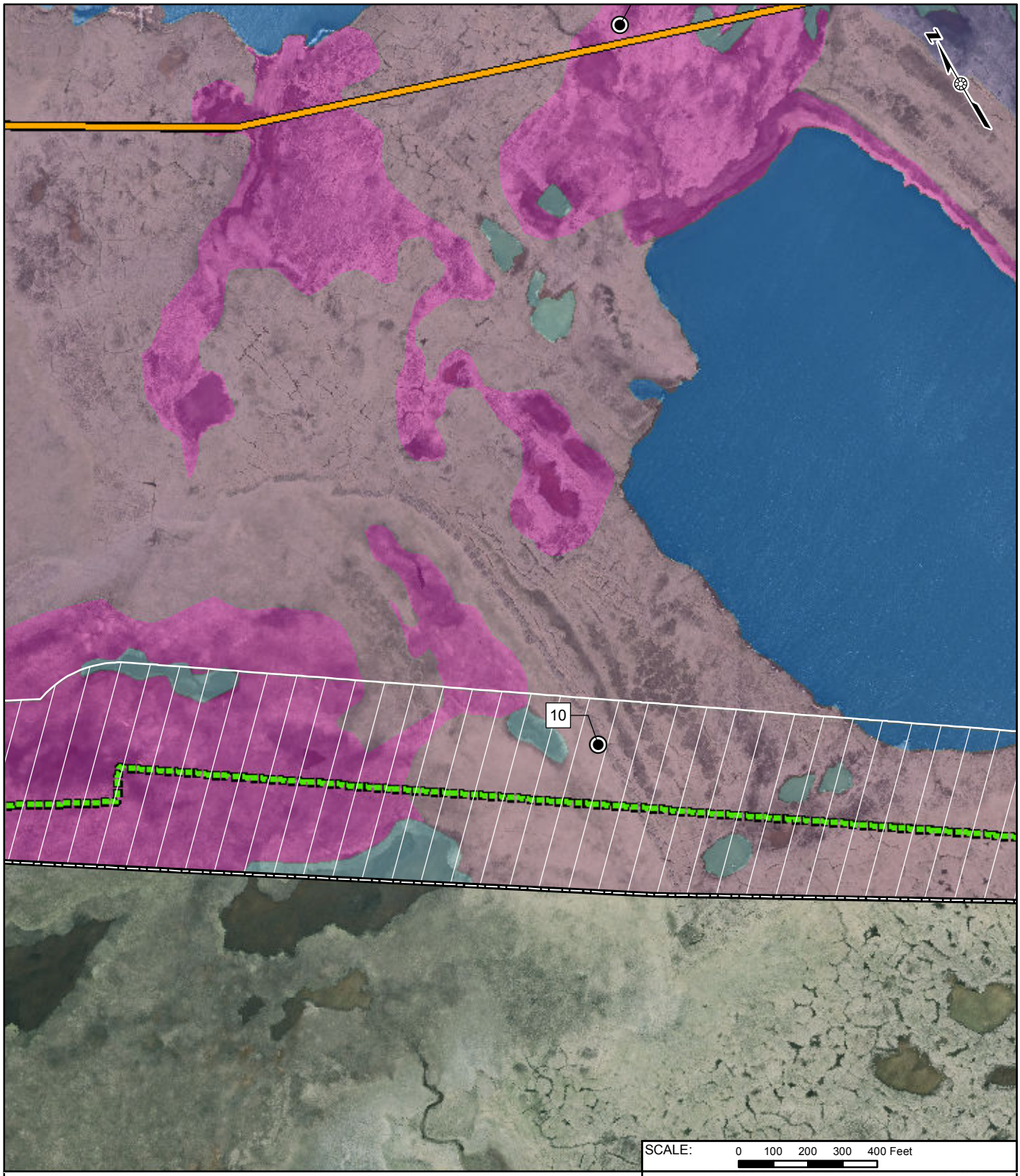
FIGURE:
2 - 24

NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet

AES-RTS: 15-106-001a.mxd, 08/18/15



SCALE: 0 100 200 300 400 Feet

2015 Wetland Photo Point
2015 Wetland Sample Point
Badami Pipeline
Badami Seasonal Ice Road
Outer Continental Shelf Buffer
Study Area
Boulder Patch
Disturbed Shadow Effect 300 ft Buffer
Private Land (Native Allotment)

Cowardin
E1UB
L1UBH
M1UB
M2US
PEM1B/C
PEM1C
PEM1H
PUBH
R2UB

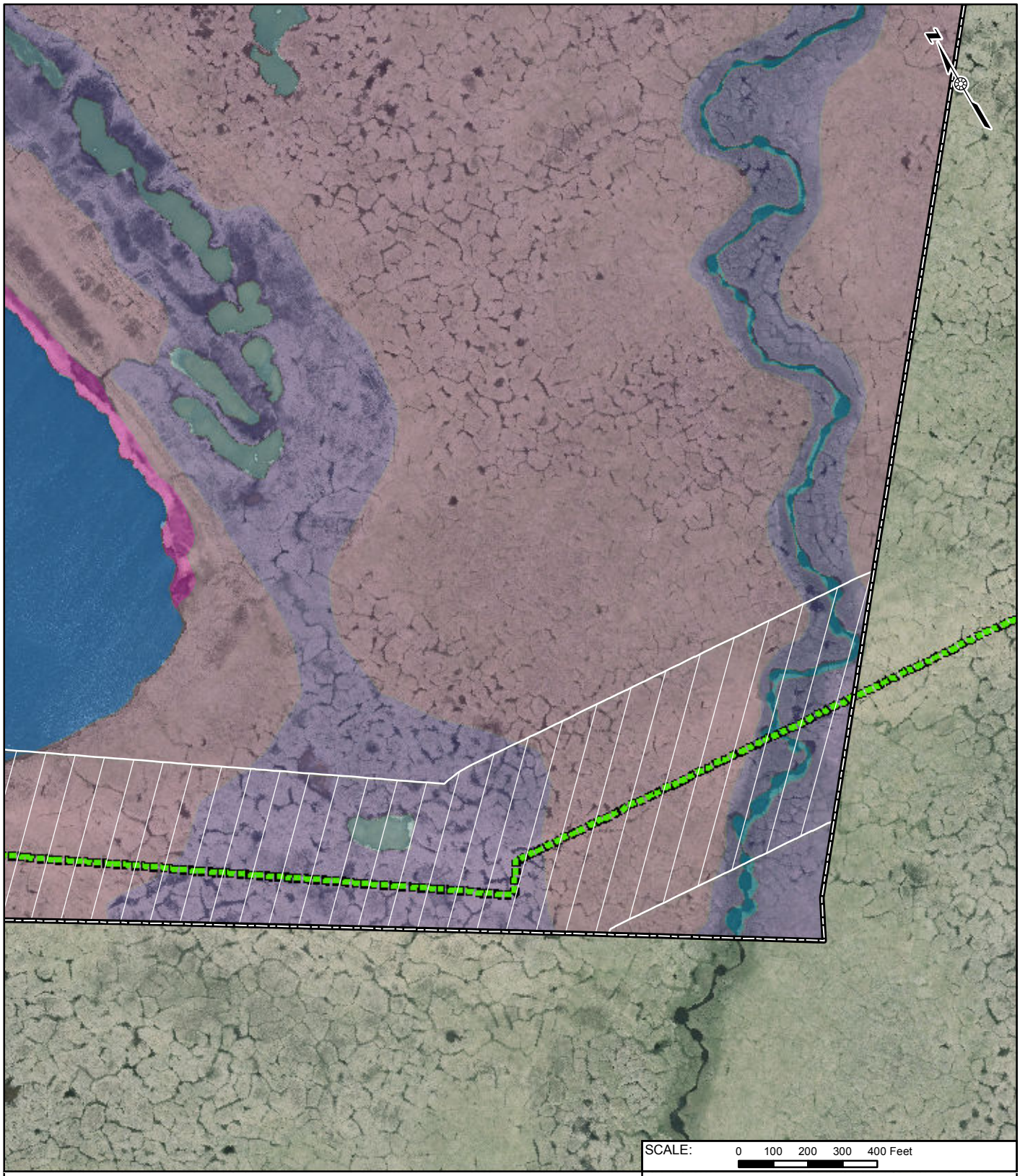
2015 HILCORP WETLANDS REPORT
Hilcorp Liberty Development POA-2015-16
Wetlands Delineation

ASRC Energy Services
a subsidiary of Arctic Slope Regional Corporation
Regulatory and Technical Services

FIGURE:
2 - 25

NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet

AES-RTS: 15-106-001a.mxd, 08/18/15



2015 HILCORP WETLANDS REPORT

Hilcorp Liberty Development POA-2015-16
Wetlands Delineation

ASRC Energy Services
a subsidiary of Arctic Slope Regional Corporation
Regulatory and Technical Services

FIGURE:
2 - 26

NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet

AES-RTS: 15-106-001a.mxd, 08/18/15

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Appendix C
Aquatic Site Assessment

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Aquatic Site Assessment Summary														
Unique ID	HGM	Cowardin	Flood Flow Alteration	Sediment Removal	Nutrient and Toxicant Removal	Erosion Control and Shoreline Stabilization	Production of Organic Matter and its Export	General Habitat Suitability	General Fish Habitat	Native Plant Richness	Educational or Scientific Value	Uniqueness and Heritage	Final Overall Functional Score	Category
1	Flats	PEM1B/C	0.67	0.60	0.67	1.00	0.75	0.60	N/A	1.00	1.00	0.43	0.746	II
2	Flats	PEM1B/C	0.67	0.60	0.67	1.00	0.75	0.80	N/A	1.00	1.00	0.71	0.800	I
3	Flats	PEM1C	0.80	0.40	0.67	1.00	0.80	1.00	N/A	1.00	1.00	0.71	0.820	I
4	Flats	PEM1B/C	0.43	0.60	0.67	0.33	0.80	0.80	N/A	1.00	1.00	0.71	0.705	II
5	Flats	PEM1C	0.71	0.60	0.67	1.00	0.60	1.00	N/A	1.00	1.00	0.43	0.779	I
6	Flats	PEM1B/C	0.80	0.40	0.67	1.00	0.60	1.00	N/A	1.00	1.00	0.57	0.782	I
7	Flats	PEM1B/C	0.67	0.40	0.33	1.00	0.60	1.00	N/A	1.00	1.00	0.71	0.746	II
8	Flats	PEM1B/C	0.67	0.40	0.67	1.00	0.80	1.00	N/A	1.00	1.00	0.57	0.789	I
9	Flats	PEM1H	0.71	0.60	0.67	1.00	1.00	1.00	N/A	1.00	1.00	0.57	0.839	I
10	Flats	PEM1B/C	0.50	0.20	0.33	1.00	0.40	1.00	N/A	1.00	1.00	0.29	0.635	II

Wetland Functions and Values Evaluation Questions	
Unique ID:	1
HGM Class:	Flats
Cowardin Class:	PEM1B/C
Size (acres):	-
Disturbance Category:	0
A. Exceptional Habitat Designation	**Y or N**
1. Is wetland located within an area considered to be irreplaceable, or does it have unique habitat not found anywhere else on the North Slope (i.e., Teshukpuk Lake Surface Protection Area, Colville River Delta, Beaufort Sea Coastal Marsh)	N
2. Is wetland located within an area considered by any regulatory agency to be an Aquatic Resource of National Importance (ARNI)	N
B. Flood Flow Alteration	**Y or N or N/A**
1. Wetland occurs in the upper portion of its watershed	N
2. Wetland is relatively flat area and is capable of retaining higher volumes of water during storm events than under normal rainfall conditions	Y
3. Wetland is a closed system	N
4. If flow through, wetland has constricted outlet with signs of fluctuating water levels, algal mats, and/or lodged debris	N/A
5. Wetland contains a dense herbaceous layer (>70% cover) or woody vegetation	Y
6. Wetland receives floodwater from an adjacent water course at least once every 10 years	Y
7. Floodwaters come as sheet flow rather than channel flow	Y
C. Sediment Removal: If moving waters consider only statements 1 and 2	**Y or N or N/A**
1. Sources of excess sediment are present up gradient of the wetland	N
2. Is wetland influenced by slow-moving water and/or a deepwater habitat	N
3. Is herbaceous vegetation present (>50% cover)	Y
4. Interspersion of vegetation and surface water is moderate in wetland presently or during flooding at least once ever 10 years	Y
5. Sediment deposits are present in wetland (observation or noted in application materials)	Y
D. Nutrient and Toxicant Removal	**Y or N or N/A**
1. Sources of excess nutrients (fertilizers) and toxicants (pesticides and heavy metals) are present up gradient and able to influence the wetland	N
2. Wetland is inundated or has indicators that flooding is a seasonal event during the growing season by visual observation, or indicated by other hydrological data source	Y
3. Wetland has at least 30% aerial cover of live vegetation	Y
E. Erosion Control and Shoreline Stabilization	**Y or N or N/A**
1. Wetland has dense, energy absorbing vegetation (>70%) bordering the water course and no evidence of erosion	Y
2. An herbaceous layer is part of this dense vegetation	Y
3. Shrubs able to withstand erosive flood events	N/A
F. Production of Organic Matter and its Export	**Y or N or N/A**
1. Wetland has at least 30% aerial cover of herbaceous vegetation	Y
2. Woody plants in wetland are mostly deciduous	N/A
3. Interspersion of vegetation and surface water is high in wetland	N
4. Wetland is inundated or has indicators that flooding is a seasonal event during the growing season	Y
5. Wetland has outlet from which organic matter is flushed	Y
G. General Habitat Suitability	**Y or N or N/A**
1. Is wetland located greater than 300-feet from existing development	Y
2. Undeveloped upland buffers abutting wetland	N/A
3. Wetland part of a larger wetland complex, not fragmented	Y
4. Diversity of plant species is apparent (> or = 5 species with at least 10% cover each)	N
5. Evidence of wildlife use	Y
6. Wetland has a moderate degree of cowardin class interspersion	N
H. General Fish Habitat	**Y or N or N/A**
1. Wetland has perennial or intermittent surface-water connection to a fish-bearing water body	N/A
2. Does wetland provide overwintering habitat for fish	N/A
3. Documented presence of fish	N/A
4. Herbaceous and/or woody vegetation is present in wetland and/or buffer to provide cover, shade, and/or detrital matter	N/A
5. Spawning areas are present (aquatic vegetation and/or gravel beds)	N/A
6. Juvenile rest areas	N/A
I. Native Plant Richness	**Y or N or N/A**
1. Dominant and codominant plants are native	Y
2. Wetland contains two or more Cowardin Classes	N/A
3. Wetland has two or more strata of vegetation	N/A
J. Educational or Scientific Value	**Y or N or N/A**
1. Site has scientific or educational use	N/A
2. Wetland is in public ownership	Y
3. Accessible trails available	N/A
4. Is the area a known recreation area	N/A
5. Subsistence (berry picking, fishing, hunting)	N/A
K. Uniqueness and Heritage	**Y or N or N/A**
1. Wetland contains documented occurrence of a state or federally listed threatened or endangered species	Y
2. Wetland contains documented critical habitat, high quality ecosystems, or priority species respectively designated by the U.S. Fish and Wildlife Service	Y
3. Wetland has biological, geological, or other features that are determined rare	N
4. Wetland has been determined significant because it provides functions scarce for the area	N
5. Are there known or reported cultural resources in the area	N
6. Is the area a known subsistence/recreation/living area	N
7. Wetland complex contains one or more of the following habitats: a) Tall shrub habitat (>.5ft in height) dominated by Salix spp. b) Aquatic herb habitat dominated by Arctophila fulva. c) Semi-permanently flooded to permanently flooded vegetated portions of drained lake basins d) Anadromous fish overwintering habitat e) Patterned wet sedge meadow and low center polygons f) High center polygon complex g) Riverine coastal mudflats h) Non-patterned wet meadow adjacent to streams and river bluffs.	Y

Wetland Functions and Values Results	
Unique ID:	1
HGM Class:	Flats
Cowardin Class:	PEM1B/C
Size (acres):	-

	Raw Score	Weighted Score
Flood Flow Alteration		
1	0	
2	1	
3	0	
4	N/A	
5	1	
6	1	
7	1	
	Total	0.667
Sediment Removal		
1	0	
2	0	
3	1	
4	1	
5	1	
	Total	0.600
Nutrient and Toxicant Removal		
1	0	
2	1	
3	1	
	Total	0.667
Erosion Control and Shoreline Stabilization		
1	1	
2	1	
3	N/A	
	Total	1.000
Production of Organic Matter and its Export		
1	1	
2	N/A	
3	0	
4	1	
5	1	
	Total	0.750
General Habitat Suitability		
1	1	
2	N/A	
3	1	
4	0	
5	1	
6	0	
	Total	0.600
General Fish Habitat		
1	N/A	
2	N/A	
3	N/A	
4	N/A	
5	N/A	
6	N/A	
	Total	N/A
Native Plant Richness		
1	1	
2	N/A	
3	N/A	
	Total	1.000
Educational or Scientific Value		
1	N/A	
2	1	
3	N/A	
4	N/A	
5	N/A	
	Total	1.000
Uniqueness and Heritage		
1	1	
2	1	
3	0	
4	0	
5	0	
6	0	
7	1	
	Total	0.429

Disturbance Activities	
Disturbance Category	0

Disturbance Category		Impact Factor
0	=	1
1	=	0.99
2	=	0.95
3	=	0.9

Disturbance Impact Factor	1

Wetland Functions and Values Results (cont.)					
Unique ID	**1**				
Exceptional Habitat Designation				0	

	Weighted Score	
Flood Flow Alteration	0.667	
Sediment Removal	0.600	
Nutrient and Toxicant Removal	0.667	
Erosion Control and Shoreline Stabilization	1.000	
Production of Organic Matter and its Export	0.750	
General Habitat Suitability	0.600	
General Fish Habitat	N/A	
Native Plant Richness	1.000	
Educational or Scientific Value	1.000	
Uniqueness and Heritage	0.429	
	Total	6.712

Standardization		
Total # of functions assessed		9
Standardized Total		0.746

Total (Including Disturbance and Exceptional Habitat)			0.746	
Overall Functional Score (Category)	0.76 - 1.00	I	Highest	II
	0.51 - 0.75	II		
	0.26 - 0.50	III		
	0 - 0.25	IV	Lowest	

Notes:

1) Scores for each category component, 0 = no and 1 = yes.

2) Not all functional categories will be applicable to each wetland functional assessment.
   For example, General Fish Habitat is only applicable to wetlands that are fish-bearing waters.
   Functional categories that are not applicable will be treated as NA (not applicable), which means there is no score for that component. No score is not the same as 0, which would erroneously reduce the total score.
   Accordingly, the maximum total score will be reduced by 1 point for each functional category that is not applicable.
   For example, if General Fish Habitat does not apply, then the Total # of functions assessed is 9.

3) NA = an item that is currently not applicable, but could be applicable at a future time if more data are available.

4) See impacted area assessment worksheet for determination of disturbance activities.
   Apply the correct impact factor to the disturbance category.

Wetland Functions and Values Evaluation Questions	
Unique ID:	2
HGM Class:	Flats
Cowardin Class:	PEM1B/C
Size (acres):	-
Disturbance Category:	0
A. Exceptional Habitat Designation	**Y or N**
1. Is wetland located within an area considered to be irreplaceable, or does it have unique habitat not found anywhere else on the North Slope (i.e., Teshukpuk Lake Surface Protection Area, Colville River Delta, Beaufort Sea Coastal Marsh)	N
2. Is wetland located within an area considered by any regulatory agency to be an Aquatic Resource of National Importance (ARNI)	N
B. Flood Flow Alteration	**Y or N or N/A**
1. Wetland occurs in the upper portion of its watershed	N
2. Wetland is relatively flat area and is capable of retaining higher volumes of water during storm events than under normal rainfall conditions	Y
3. Wetland is a closed system	N
4. If flow through, wetland has constricted outlet with signs of fluctuating water levels, algal mats, and/or lodged debris	N/A
5. Wetland contains a dense herbaceous layer (>70% cover) or woody vegetation	Y
6. Wetland receives floodwater from an adjacent water course at least once every 10 years	Y
7. Floodwaters come as sheet flow rather than channel flow	Y
C. Sediment Removal: If moving waters consider only statements 1 and 2	**Y or N or N/A**
1. Sources of excess sediment are present up gradient of the wetland	N
2. Is wetland influenced by slow-moving water and/or a deepwater habitat	N
3. Is herbaceous vegetation present (>50% cover)	Y
4. Interspersion of vegetation and surface water is moderate in wetland presently or during flooding at least once ever 10 years	Y
5. Sediment deposits are present in wetland (observation or noted in application materials)	Y
D. Nutrient and Toxicant Removal	**Y or N or N/A**
1. Sources of excess nutrients (fertilizers) and toxicants (pesticides and heavy metals) are present up gradient and able to influence the wetland	N
2. Wetland is inundated or has indicators that flooding is a seasonal event during the growing season by visual observation, or indicated by other hydrological data source	Y
3. Wetland has at least 30% aerial cover of live vegetation	Y
E. Erosion Control and Shoreline Stabilization	**Y or N or N/A**
1. Wetland has dense, energy absorbing vegetation (>70%) bordering the water course and no evidence of erosion	Y
2. An herbaceous layer is part of this dense vegetation	Y
3. Shrubs able to withstand erosive flood events	N/A
F. Production of Organic Matter and its Export	**Y or N or N/A**
1. Wetland has at least 30% aerial cover of herbaceous vegetation	Y
2. Woody plants in wetland are mostly deciduous	Y
3. Interspersion of vegetation and surface water is high in wetland	N
4. Wetland is inundated or has indicators that flooding is a seasonal event during the growing season	Y
5. Wetland has outlet from which organic matter is flushed	N/A
G. General Habitat Suitability	**Y or N or N/A**
1. Is wetland located greater than 300-feet from existing development	Y
2. Undeveloped upland buffers abutting wetland	N/A
3. Wetland part of a larger wetland complex, not fragmented	Y
4. Diversity of plant species is apparent (> or = 5 species with at least 10% cover each)	Y
5. Evidence of wildlife use	Y
6. Wetland has a moderate degree of cowardin class interspersion	N
H. General Fish Habitat	**Y or N or N/A**
1. Wetland has perennial or intermittent surface-water connection to a fish-bearing water body	N/A
2. Does wetland provide overwintering habitat for fish	N/A
3. Documented presence of fish	N/A
4. Herbaceous and/or woody vegetation is present in wetland and/or buffer to provide cover, shade, and/or detrital matter	N/A
5. Spawning areas are present (aquatic vegetation and/or gravel beds)	N/A
6. Juvenile rest areas	N/A
I. Native Plant Richness	**Y or N or N/A**
1. Dominant and codominant plants are native	Y
2. Wetland contains two or more Cowardin Classes	Y
3. Wetland has two or more strata of vegetation	Y
J. Educational or Scientific Value	**Y or N or N/A**
1. Site has scientific or educational use	N/A
2. Wetland is in public ownership	Y
3. Accessible trails available	N/A
4. Is the area a known recreation area	N/A
5. Subsistence (berry picking, fishing, hunting)	N/A
K. Uniqueness and Heritage	**Y or N or N/A**
1. Wetland contains documented occurrence of a state or federally listed threatened or endangered species	Y
2. Wetland contains documented critical habitat, high quality ecosystems, or priority species respectively designated by the U.S. Fish and Wildlife Service	Y
3. Wetland has biological, geological, or other features that are determined rare	N
4. Wetland has been determined significant because it provides functions scarce for the area	N
5. Are there known or reported cultural resources in the area	Y
6. Is the area a known subsistence/recreation/living area	Y
7. Wetland complex contains one or more of the following habitats: a) Tall shrub habitat (>.5ft in height) dominated by Salix spp. b) Aquatic herb habitat dominated by Arctophila fulva. c) Semi-permanently flooded to permanently flooded vegetated portions of drained lake basins d) Anadromous fish overwintering habitat e) Patterned wet sedge meadow and low center polygons f) High center polygon complex g) Riverine coastal mudflats h) Non-patterned wet meadow adjacent to streams and river bluffs.	Y

Wetland Functions and Values Results	
Unique ID:	2
HGM Class:	Flats
Cowardin Class:	PEM1B/C
Size (acres):	-

	Raw Score	Weighted Score
Flood Flow Alteration		
1	0	
2	1	
3	0	
4	N/A	
5	1	
6	1	
7	1	
	Total	0.667
Sediment Removal		
1	0	
2	0	
3	1	
4	1	
5	1	
	Total	0.600
Nutrient and Toxicant Removal		
1	0	
2	1	
3	1	
	Total	0.667
Erosion Control and Shoreline Stabilization		
1	1	
2	1	
3	N/A	
	Total	1.000
Production of Organic Matter and its Export		
1	1	
2	1	
3	0	
4	1	
5	N/A	
	Total	0.750
General Habitat Suitability		
1	1	
2	N/A	
3	1	
4	1	
5	1	
6	0	
	Total	0.800
General Fish Habitat		
1	N/A	
2	N/A	
3	N/A	
4	N/A	
5	N/A	
6	N/A	
	Total	N/A
Native Plant Richness		
1	1	
2	1	
3	1	
	Total	1.000
Educational or Scientific Value		
1	N/A	
2	1	
3	N/A	
4	N/A	
5	N/A	
	Total	1.000
Uniqueness and Heritage		
1	1	
2	1	
3	0	
4	0	
5	1	
6	1	
7	1	
	Total	0.714

Disturbance Activities		
Disturbance Category		0
Disturbance Category		Impact Factor
0	=	1
1	=	0.99
2	=	0.95
3	=	0.9
Disturbance Impact Factor		1

Wetland Functions and Values Results (cont.)					
Unique ID	**2**				
Exceptional Habitat Designation				0	
		Weighted Score			
Flood Flow Alteration		0.667			
Sediment Removal		0.600			
Nutrient and Toxicant Removal		0.667			
Erosion Control and Shoreline Stabilization		1.000			
Production of Organic Matter and its Export		0.750			
General Habitat Suitability		0.800			
General Fish Habitat		N/A			
Native Plant Richness		1.000			
Educational or Scientific Value		1.000			
Uniqueness and Heritage		0.714			
		Total	7.198		
Standardization					
Total # of functions assessed			9		
Standardized Total			0.800		
Total (Including Disturbance and Exceptional Habitat)				0.800	
Overall Functional Score (Category)		0.76 - 1.00	I	Highest	I
		0.51 - 0.75	II		
		0.26 - 0.50	III		
		0 - 0.25	IV	Lowest	

Notes:

1) Scores for each category component, 0 = no and 1 = yes.

2) Not all functional categories will be applicable to each wetland functional assessment.
   For example, General Fish Habitat is only applicable to wetlands that are fish-bearing waters.
   Functional categories that are not applicable will be treated as NA (not applicable), which means there is no score for that component. No score is not the same as 0, which would erroneously reduce the total score.
   Accordingly, the maximum total score will be reduced by 1 point for each functional category that is not applicable.
   For example, if General Fish Habitat does not apply, then the Total # of functions assessed is 9.

3) NA = an item that is currently not applicable, but could be applicable at a future time if more data are available.

4) See impacted area assessment worksheet for determination of disturbance activities.
   Apply the correct impact factor to the disturbance category.

Wetland Functions and Values Evaluation Questions	
Unique ID:	3
HGM Class:	Flats
Cowardin Class:	PEM1C
Size (acres):	-
Disturbance Category:	0
A. Exceptional Habitat Designation	**Y or N**
1. Is wetland located within an area considered to be irreplaceable, or does it have unique habitat not found anywhere else on the North Slope (i.e., Teshukpuk Lake Surface Protection Area, Colville River Delta, Beaufort Sea Coastal Marsh)	N
2. Is wetland located within an area considered by any regulatory agency to be an Aquatic Resource of National Importance (ARNI)	N
B. Flood Flow Alteration	**Y or N or N/A**
1. Wetland occurs in the upper portion of its watershed	N
2. Wetland is relatively flat area and is capable of retaining higher volumes of water during storm events than under normal rainfall conditions	Y
3. Wetland is a closed system	N/A
4. If flow through, wetland has constricted outlet with signs of fluctuating water levels, algal mats, and/or lodged debris	N/A
5. Wetland contains a dense herbaceous layer (>70% cover) or woody vegetation	Y
6. Wetland receives floodwater from an adjacent water course at least once every 10 years	Y
7. Floodwaters come as sheet flow rather than channel flow	Y
C. Sediment Removal: If moving waters consider only statements 1 and 2	**Y or N or N/A**
1. Sources of excess sediment are present up gradient of the wetland	N
2. Is wetland influenced by slow-moving water and/or a deepwater habitat	N
3. Is herbaceous vegetation present (>50% cover)	Y
4. Interspersion of vegetation and surface water is moderate in wetland presently or during flooding at least once ever 10 years	Y
5. Sediment deposits are present in wetland (observation or noted in application materials)	N
D. Nutrient and Toxicant Removal	**Y or N or N/A**
1. Sources of excess nutrients (fertilizers) and toxicants (pesticides and heavy metals) are present up gradient and able to influence the wetland	N
2. Wetland is inundated or has indicators that flooding is a seasonal event during the growing season by visual observation, or indicated by other hydrological data source	Y
3. Wetland has at least 30% aerial cover of live vegetation	Y
E. Erosion Control and Shoreline Stabilization	**Y or N or N/A**
1. Wetland has dense, energy absorbing vegetation (>70%) bordering the water course and no evidence of erosion	Y
2. An herbaceous layer is part of this dense vegetation	Y
3. Shrubs able to withstand erosive flood events	Y
F. Production of Organic Matter and its Export	**Y or N or N/A**
1. Wetland has at least 30% aerial cover of herbaceous vegetation	Y
2. Woody plants in wetland are mostly deciduous	Y
3. Interspersion of vegetation and surface water is high in wetland	N
4. Wetland is inundated or has indicators that flooding is a seasonal event during the growing season	Y
5. Wetland has outlet from which organic matter is flushed	Y
G. General Habitat Suitability	**Y or N or N/A**
1. Is wetland located greater than 300-feet from existing development	Y
2. Undeveloped upland buffers abutting wetland	N/A
3. Wetland part of a larger wetland complex, not fragmented	Y
4. Diversity of plant species is apparent (> or = 5 species with at least 10% cover each)	Y
5. Evidence of wildlife use	Y
6. Wetland has a moderate degree of cowardin class interspersion	Y
H. General Fish Habitat	**Y or N or N/A**
1. Wetland has perennial or intermittent surface-water connection to a fish-bearing water body	N/A
2. Does wetland provide overwintering habitat for fish	N/A
3. Documented presence of fish	N/A
4. Herbaceous and/or woody vegetation is present in wetland and/or buffer to provide cover, shade, and/or detrital matter	N/A
5. Spawning areas are present (aquatic vegetation and/or gravel beds)	N/A
6. Juvenile rest areas	N/A
I. Native Plant Richness	**Y or N or N/A**
1. Dominant and codominant plants are native	Y
2. Wetland contains two or more Cowardin Classes	Y
3. Wetland has two or more strata of vegetation	Y
J. Educational or Scientific Value	**Y or N or N/A**
1. Site has scientific or educational use	N/A
2. Wetland is in public ownership	Y
3. Accessible trails available	N/A
4. Is the area a known recreation area	N/A
5. Subsistence (berry picking, fishing, hunting)	N/A
K. Uniqueness and Heritage	**Y or N or N/A**
1. Wetland contains documented occurrence of a state or federally listed threatened or endangered species	Y
2. Wetland contains documented critical habitat, high quality ecosystems, or priority species respectively designated by the U.S. Fish and Wildlife Service	Y
3. Wetland has biological, geological, or other features that are determined rare	N
4. Wetland has been determined significant because it provides functions scarce for the area	N
5. Are there known or reported cultural resources in the area	Y
6. Is the area a known subsistence/recreation/living area	Y
7. Wetland complex contains one or more of the following habitats: a) Tall shrub habitat (>.5ft in height) dominated by Salix spp. b) Aquatic herb habitat dominated by Arctophila fulva. c) Semi-permanently flooded to permanently flooded vegetated portions of drained lake basins d) Anadromous fish overwintering habitat e) Patterned wet sedge meadow and low center polygons f) High center polygon complex g) Riverine coastal mudflats h) Non-patterned wet meadow adjacent to streams and river bluffs.	Y

Wetland Functions and Values Results	
Unique ID:	3
HGM Class:	Flats
Cowardin Class:	PEM1C
Size (acres):	-

	Raw Score	Weighted Score
Flood Flow Alteration		
1	0	
2	1	
3	N/A	
4	N/A	
5	1	
6	1	
7	1	
	Total	0.800
Sediment Removal		
1	0	
2	0	
3	1	
4	1	
5	0	
	Total	0.400
Nutrient and Toxicant Removal		
1	0	
2	1	
3	1	
	Total	0.667
Erosion Control and Shoreline Stabilization		
1	1	
2	1	
3	1	
	Total	1.000
Production of Organic Matter and its Export		
1	1	
2	1	
3	0	
4	1	
5	1	
	Total	0.800
General Habitat Suitability		
1	1	
2	N/A	
3	1	
4	1	
5	1	
6	1	
	Total	1.000
General Fish Habitat		
1	N/A	
2	N/A	
3	N/A	
4	N/A	
5	N/A	
6	N/A	
	Total	N/A
Native Plant Richness		
1	1	
2	1	
3	1	
	Total	1.000
Educational or Scientific Value		
1	N/A	
2	1	
3	N/A	
4	N/A	
5	N/A	
	Total	1.000
Uniqueness and Heritage		
1	1	
2	1	
3	0	
4	0	
5	1	
6	1	
7	1	
	Total	0.714

Disturbance Activities	
Disturbance Category	0

Disturbance Category		Impact Factor
0	=	1
1	=	0.99
2	=	0.95
3	=	0.9

Disturbance Impact Factor	1

Wetland Functions and Values Results (cont.)					
Unique ID	**3**				
Exceptional Habitat Designation				0	
		Weighted Score			
Flood Flow Alteration		0.800			
Sediment Removal		0.400			
Nutrient and Toxicant Removal		0.667			
Erosion Control and Shoreline Stabilization		1.000			
Production of Organic Matter and its Export		0.800			
General Habitat Suitability		1.000			
General Fish Habitat		N/A			
Native Plant Richness		1.000			
Educational or Scientific Value		1.000			
Uniqueness and Heritage		0.714			
		Total	7.381		
Standardization					
Total # of functions assessed			9		
Standardized Total			0.820		
Total (Including Disturbance and Exceptional Habitat)				0.820	
Overall Functional Score (Category)		0.76 - 1.00	I	Highest	I
		0.51 - 0.75	II		
		0.26 - 0.50	III		
		0 - 0.25	IV	Lowest	

Notes:

1) Scores for each category component, 0 = no and 1 = yes.

2) Not all functional categories will be applicable to each wetland functional assessment.
   For example, General Fish Habitat is only applicable to wetlands that are fish-bearing waters.
   Functional categories that are not applicable will be treated as NA (not applicable), which means there is no score for that component. No score is not the same as 0, which would erroneously reduce the total score.
   Accordingly, the maximum total score will be reduced by 1 point for each functional category that is not applicable.
   For example, if General Fish Habitat does not apply, then the Total # of functions assessed is 9.

3) NA = an item that is currently not applicable, but could be applicable at a future time if more data are available.

4) See impacted area assessment worksheet for determination of disturbance activities.
   Apply the correct impact factor to the disturbance category.

Wetland Functions and Values Evaluation Questions	Unique ID:	4
	HGM Class:	Flats
	Cowardin Class:	PEM1B/C
	Size (acres):	-
	Disturbance Category:	0
A. Exceptional Habitat Designation		**Y or N**
1. Is wetland located within an area considered to be irreplaceable, or does it have unique habitat not found anywhere else on the North Slope (i.e., Teshukpuk Lake Surface Protection Area, Colville River Delta, Beaufort Sea Coastal Marsh)		N
2. Is wetland located within an area considered by any regulatory agency to be an Aquatic Resource of National Importance (ARNI)		N
B. Flood Flow Alteration		**Y or N or N/A**
1. Wetland occurs in the upper portion of its watershed		N
2. Wetland is relatively flat area and is capable of retaining higher volumes of water during storm events than under normal rainfall conditions		Y
3. Wetland is a closed system		N
4. If flow through, wetland has constricted outlet with signs of fluctuating water levels, algal mats, and/or lodged debris		N
5. Wetland contains a dense herbaceous layer (>70% cover) or woody vegetation		N
6. Wetland receives floodwater from an adjacent water course at least once every 10 years		Y
7. Floodwaters come as sheet flow rather than channel flow		Y
C. Sediment Removal: If moving waters consider only statements 1 and 2		**Y or N or N/A**
1. Sources of excess sediment are present up gradient of the wetland		N
2. Is wetland influenced by slow-moving water and/or a deepwater habitat		Y
3. Is herbaceous vegetation present (>50% cover)		Y
4. Interspersion of vegetation and surface water is moderate in wetland presently or during flooding at least once ever 10 years		Y
5. Sediment deposits are present in wetland (observation or noted in application materials)		N
D. Nutrient and Toxicant Removal		**Y or N or N/A**
1. Sources of excess nutrients (fertilizers) and toxicants (pesticides and heavy metals) are present up gradient and able to influence the wetland		N
2. Wetland is inundated or has indicators that flooding is a seasonal event during the growing season by visual observation, or indicated by other hydrological data source		Y
3. Wetland has at least 30% aerial cover of live vegetation		Y
E. Erosion Control and Shoreline Stabilization		**Y or N or N/A**
1. Wetland has dense, energy absorbing vegetation (>70%) bordering the water course and no evidence of erosion		N
2. An herbaceous layer is part of this dense vegetation		N
3. Shrubs able to withstand erosive flood events		Y
F. Production of Organic Matter and its Export		**Y or N or N/A**
1. Wetland has at least 30% aerial cover of herbaceous vegetation		Y
2. Woody plants in wetland are mostly deciduous		Y
3. Interspersion of vegetation and surface water is high in wetland		N
4. Wetland is inundated or has indicators that flooding is a seasonal event during the growing season		Y
5. Wetland has outlet from which organic matter is flushed		Y
G. General Habitat Suitability		**Y or N or N/A**
1. Is wetland located greater than 300-feet from existing development		Y
2. Undeveloped upland buffers abutting wetland		N/A
3. Wetland part of a larger wetland complex, not fragmented		Y
4. Diversity of plant species is apparent (> or = 5 species with at least 10% cover each)		N
5. Evidence of wildlife use		Y
6. Wetland has a moderate degree of cowardin class interspersion		Y
H. General Fish Habitat		**Y or N or N/A**
1. Wetland has perennial or intermittent surface-water connection to a fish-bearing water body		N/A
2. Does wetland provide overwintering habitat for fish		N/A
3. Documented presence of fish		N/A
4. Herbaceous and/or woody vegetation is present in wetland and/or buffer to provide cover, shade, and/or detrital matter		N/A
5. Spawning areas are present (aquatic vegetation and/or gravel beds)		N/A
6. Juvenile rest areas		N/A
I. Native Plant Richness		**Y or N or N/A**
1. Dominant and codominant plants are native		Y
2. Wetland contains two or more Cowardin Classes		Y
3. Wetland has two or more strata of vegetation		Y
J. Educational or Scientific Value		**Y or N or N/A**
1. Site has scientific or educational use		N/A
2. Wetland is in public ownership		Y
3. Accessible trails available		N/A
4. Is the area a known recreation area		N/A
5. Subsistence (berry picking, fishing, hunting)		N/A
K. Uniqueness and Heritage		**Y or N or N/A**
1. Wetland contains documented occurrence of a state or federally listed threatened or endangered species		Y
2. Wetland contains documented critical habitat, high quality ecosystems, or priority species respectively designated by the U.S. Fish and Wildlife Service		Y
3. Wetland has biological, geological, or other features that are determined rare		N
4. Wetland has been determined significant because it provides functions scarce for the area		N
5. Are there known or reported cultural resources in the area		Y
6. Is the area a known subsistence/recreation/living area		Y
7. Wetland complex contains one or more of the following habitats: a) Tall shrub habitat (>.5ft in height) dominated by Salix spp. b) Aquatic herb habitat dominated by Arctophila fulva. c) Semi-permanently flooded to permanently flooded vegetated portions of drained lake basins d) Anadromous fish overwintering habitat e) Patterned wet sedge meadow and low center polygons f) High center polygon complex g) Riverine coastal mudflats h) Non-patterned wet meadow adjacent to streams and river bluffs.		Y

Wetland Functions and Values Results	
Unique ID:	4
HGM Class:	Flats
Cowardin Class:	PEM1B/C
Size (acres):	-

	Raw Score	Weighted Score
Flood Flow Alteration		
1	0	
2	1	
3	0	
4	0	
5	0	
6	1	
7	1	
	Total	0.429
Sediment Removal		
1	0	
2	1	
3	1	
4	1	
5	0	
	Total	0.600
Nutrient and Toxicant Removal		
1	0	
2	1	
3	1	
	Total	0.667
Erosion Control and Shoreline Stabilization		
1	0	
2	0	
3	1	
	Total	0.333
Production of Organic Matter and its Export		
1	1	
2	1	
3	0	
4	1	
5	1	
	Total	0.800
General Habitat Suitability		
1	1	
2	N/A	
3	1	
4	0	
5	1	
6	1	
	Total	0.800
General Fish Habitat		
1	N/A	
2	N/A	
3	N/A	
4	N/A	
5	N/A	
6	N/A	
	Total	N/A
Native Plant Richness		
1	1	
2	1	
3	1	
	Total	1.000
Educational or Scientific Value		
1	N/A	
2	1	
3	N/A	
4	N/A	
5	N/A	
	Total	1.000
Uniqueness and Heritage		
1	1	
2	1	
3	0	
4	0	
5	1	
6	1	
7	1	
	Total	0.714

Disturbance Activities	
Disturbance Category	0

Disturbance Category		Impact Factor
0	=	1
1	=	0.99
2	=	0.95
3	=	0.9

Disturbance Impact Factor	1

Wetland Functions and Values Results (cont.)					
Unique ID	**4**				
Exceptional Habitat Designation				0	

	Weighted Score	
Flood Flow Alteration	0.429	
Sediment Removal	0.600	
Nutrient and Toxicant Removal	0.667	
Erosion Control and Shoreline Stabilization	0.333	
Production of Organic Matter and its Export	0.800	
General Habitat Suitability	0.800	
General Fish Habitat	N/A	
Native Plant Richness	1.000	
Educational or Scientific Value	1.000	
Uniqueness and Heritage	0.714	
	Total	6.343

Standardization		
Total # of functions assessed		9
Standardized Total		0.705

Total (Including Disturbance and Exceptional Habitat)			0.705	
Overall Functional Score (Category)	0.76 - 1.00	I	Highest	II
	0.51 - 0.75	II		
	0.26 - 0.50	III		
	0 - 0.25	IV	Lowest	

Notes:

1) Scores for each category component, 0 = no and 1 = yes.

2) Not all functional categories will be applicable to each wetland functional assessment.
   For example, General Fish Habitat is only applicable to wetlands that are fish-bearing waters.
   Functional categories that are not applicable will be treated as NA (not applicable), which means there is no score for that component. No score is not the same as 0, which would erroneously reduce the total score.
   Accordingly, the maximum total score will be reduced by 1 point for each functional category that is not applicable.
   For example, if General Fish Habitat does not apply, then the Total # of functions assessed is 9.

3) NA = an item that is currently not applicable, but could be applicable at a future time if more data are available.

4) See impacted area assessment worksheet for determination of disturbance activities.
   Apply the correct impact factor to the disturbance category.

Wetland Functions and Values Evaluation Questions	Unique ID:	5
	HGM Class:	Flats
	Cowardin Class:	PEM1C
	Size (acres):	-
	Disturbance Category:	0
A. Exceptional Habitat Designation		**Y or N**
1. Is wetland located within an area considered to be irreplaceable, or does it have unique habitat not found anywhere else on the North Slope (i.e., Teshukpuk Lake Surface Protection Area, Colville River Delta, Beaufort Sea Coastal Marsh)		N
2. Is wetland located within an area considered by any regulatory agency to be an Aquatic Resource of National Importance (ARNI)		N
B. Flood Flow Alteration		**Y or N or N/A**
1. Wetland occurs in the upper portion of its watershed		N
2. Wetland is relatively flat area and is capable of retaining higher volumes of water during storm events than under normal rainfall conditions		Y
3. Wetland is a closed system		N
4. If flow through, wetland has constricted outlet with signs of fluctuating water levels, algal mats, and/or lodged debris		Y
5. Wetland contains a dense herbaceous layer (>70% cover) or woody vegetation		Y
6. Wetland receives floodwater from an adjacent water course at least once every 10 years		Y
7. Floodwaters come as sheet flow rather than channel flow		Y
C. Sediment Removal: If moving waters consider only statements 1 and 2		**Y or N or N/A**
1. Sources of excess sediment are present up gradient of the wetland		N
2. Is wetland influenced by slow-moving water and/or a deepwater habitat		Y
3. Is herbaceous vegetation present (>50% cover)		Y
4. Interspersion of vegetation and surface water is moderate in wetland presently or during flooding at least once ever 10 years		Y
5. Sediment deposits are present in wetland (observation or noted in application materials)		N
D. Nutrient and Toxicant Removal		**Y or N or N/A**
1. Sources of excess nutrients (fertilizers) and toxicants (pesticides and heavy metals) are present up gradient and able to influence the wetland		N
2. Wetland is inundated or has indicators that flooding is a seasonal event during the growing season by visual observation, or indicated by other hydrological data source		Y
3. Wetland has at least 30% aerial cover of live vegetation		Y
E. Erosion Control and Shoreline Stabilization		**Y or N or N/A**
1. Wetland has dense, energy absorbing vegetation (>70%) bordering the water course and no evidence of erosion		Y
2. An herbaceous layer is part of this dense vegetation		Y
3. Shrubs able to withstand erosive flood events		Y
F. Production of Organic Matter and its Export		**Y or N or N/A**
1. Wetland has at least 30% aerial cover of herbaceous vegetation		Y
2. Woody plants in wetland are mostly deciduous		Y
3. Interspersion of vegetation and surface water is high in wetland		N
4. Wetland is inundated or has indicators that flooding is a seasonal event during the growing season		Y
5. Wetland has outlet from which organic matter is flushed		N
G. General Habitat Suitability		**Y or N or N/A**
1. Is wetland located greater than 300-feet from existing development		Y
2. Undeveloped upland buffers abutting wetland		N/A
3. Wetland part of a larger wetland complex, not fragmented		Y
4. Diversity of plant species is apparent (> or = 5 species with at least 10% cover each)		Y
5. Evidence of wildlife use		Y
6. Wetland has a moderate degree of cowardin class interspersion		Y
H. General Fish Habitat		**Y or N or N/A**
1. Wetland has perennial or intermittent surface-water connection to a fish-bearing water body		N/A
2. Does wetland provide overwintering habitat for fish		N/A
3. Documented presence of fish		N/A
4. Herbaceous and/or woody vegetation is present in wetland and/or buffer to provide cover, shade, and/or detrital matter		N/A
5. Spawning areas are present (aquatic vegetation and/or gravel beds)		N/A
6. Juvenile rest areas		N/A
I. Native Plant Richness		**Y or N or N/A**
1. Dominant and codominant plants are native		Y
2. Wetland contains two or more Cowardin Classes		Y
3. Wetland has two or more strata of vegetation		Y
J. Educational or Scientific Value		**Y or N or N/A**
1. Site has scientific or educational use		N/A
2. Wetland is in public ownership		Y
3. Accessible trails available		N/A
4. Is the area a known recreation area		N/A
5. Subsistence (berry picking, fishing, hunting)		N/A
K. Uniqueness and Heritage		**Y or N or N/A**
1. Wetland contains documented occurrence of a state or federally listed threatened or endangered species		Y
2. Wetland contains documented critical habitat, high quality ecosystems, or priority species respectively designated by the U.S. Fish and Wildlife Service		Y
3. Wetland has biological, geological, or other features that are determined rare		N
4. Wetland has been determined significant because it provides functions scarce for the area		N
5. Are there known or reported cultural resources in the area		N
6. Is the area a known subsistence/recreation/living area		N
7. Wetland complex contains one or more of the following habitats: a) Tall shrub habitat (>.5ft in height) dominated by Salix spp. b) Aquatic herb habitat dominated by Arctophila fulva. c) Semi-permanently flooded to permanently flooded vegetated portions of drained lake basins d) Anadromous fish overwintering habitat e) Patterned wet sedge meadow and low center polygons f) High center polygon complex g) Riverine coastal mudflats h) Non-patterned wet meadow adjacent to streams and river bluffs.		Y

Wetland Functions and Values Results	
Unique ID:	5
HGM Class:	Flats
Cowardin Class:	PEM1C
Size (acres):	-

	Raw Score	Weighted Score
Flood Flow Alteration		
1	0	
2	1	
3	0	
4	1	
5	1	
6	1	
7	1	
	Total	0.714
Sediment Removal		
1	0	
2	1	
3	1	
4	1	
5	0	
	Total	0.600
Nutrient and Toxicant Removal		
1	0	
2	1	
3	1	
	Total	0.667
Erosion Control and Shoreline Stabilization		
1	1	
2	1	
3	1	
	Total	1.000
Production of Organic Matter and its Export		
1	1	
2	1	
3	0	
4	1	
5	0	
	Total	0.600
General Habitat Suitability		
1	1	
2	N/A	
3	1	
4	1	
5	1	
6	1	
	Total	1.000
General Fish Habitat		
1	N/A	
2	N/A	
3	N/A	
4	N/A	
5	N/A	
6	N/A	
	Total	N/A
Native Plant Richness		
1	1	
2	1	
3	1	
	Total	1.000
Educational or Scientific Value		
1	N/A	
2	1	
3	N/A	
4	N/A	
5	N/A	
	Total	1.000
Uniqueness and Heritage		
1	1	
2	1	
3	0	
4	0	
5	0	
6	0	
7	1	
	Total	0.429

Disturbance Activities		
Disturbance Category		0
Disturbance Category		Impact Factor
0	=	1
1	=	0.99
2	=	0.95
3	=	0.9
Disturbance Impact Factor		1

Wetland Functions and Values Results (cont.)					
Unique ID	**5**				
Exceptional Habitat Designation				0	
		Weighted Score			
Flood Flow Alteration		0.714			
Sediment Removal		0.600			
Nutrient and Toxicant Removal		0.667			
Erosion Control and Shoreline Stabilization		1.000			
Production of Organic Matter and its Export		0.600			
General Habitat Suitability		1.000			
General Fish Habitat		N/A			
Native Plant Richness		1.000			
Educational or Scientific Value		1.000			
Uniqueness and Heritage		0.429			
		Total	7.010		
Standardization					
Total # of functions assessed			9		
Standardized Total			0.779		
Total (Including Disturbance and Exceptional Habitat)				0.779	
Overall Functional Score (Category)		0.76 - 1.00	I	Highest	I
		0.51 - 0.75	II		
		0.26 - 0.50	III		
		0 - 0.25	IV	Lowest	

Notes:

1) Scores for each category component, 0 = no and 1 = yes.

2) Not all functional categories will be applicable to each wetland functional assessment.
   For example, General Fish Habitat is only applicable to wetlands that are fish-bearing waters.
   Functional categories that are not applicable will be treated as NA (not applicable), which means there is no score for that component. No score is not the same as 0, which would erroneously reduce the total score.
   Accordingly, the maximum total score will be reduced by 1 point for each functional category that is not applicable.
   For example, if General Fish Habitat does not apply, then the Total # of functions assessed is 9.

3) NA = an item that is currently not applicable, but could be applicable at a future time if more data are available.

4) See impacted area assessment worksheet for determination of disturbance activities.
   Apply the correct impact factor to the disturbance category.

Wetland Functions and Values Evaluation Questions	Unique ID:	6
	HGM Class:	Flats
	Cowardin Class:	PEM1B/C
	Size (acres):	-
	Disturbance Category:	0
A. Exceptional Habitat Designation		**Y or N**
1. Is wetland located within an area considered to be irreplaceable, or does it have unique habitat not found anywhere else on the North Slope (i.e., Teshukpuk Lake Surface Protection Area, Colville River Delta, Beaufort Sea Coastal Marsh)		N
2. Is wetland located within an area considered by any regulatory agency to be an Aquatic Resource of National Importance (ARNI)		N
B. Flood Flow Alteration		**Y or N or N/A**
1. Wetland occurs in the upper portion of its watershed		N
2. Wetland is relatively flat area and is capable of retaining higher volumes of water during storm events than under normal rainfall conditions		Y
3. Wetland is a closed system		N/A
4. If flow through, wetland has constricted outlet with signs of fluctuating water levels, algal mats, and/or lodged debris		N/A
5. Wetland contains a dense herbaceous layer (>70% cover) or woody vegetation		Y
6. Wetland receives floodwater from an adjacent water course at least once every 10 years		Y
7. Floodwaters come as sheet flow rather than channel flow		Y
C. Sediment Removal: If moving waters consider only statements 1 and 2		**Y or N or N/A**
1. Sources of excess sediment are present up gradient of the wetland		N
2. Is wetland influenced by slow-moving water and/or a deepwater habitat		Y
3. Is herbaceous vegetation present (>50% cover)		Y
4. Interspersion of vegetation and surface water is moderate in wetland presently or during flooding at least once ever 10 years		N
5. Sediment deposits are present in wetland (observation or noted in application materials)		N
D. Nutrient and Toxicant Removal		**Y or N or N/A**
1. Sources of excess nutrients (fertilizers) and toxicants (pesticides and heavy metals) are present up gradient and able to influence the wetland		N
2. Wetland is inundated or has indicators that flooding is a seasonal event during the growing season by visual observation, or indicated by other hydrological data source		Y
3. Wetland has at least 30% aerial cover of live vegetation		Y
E. Erosion Control and Shoreline Stabilization		**Y or N or N/A**
1. Wetland has dense, energy absorbing vegetation (>70%) bordering the water course and no evidence of erosion		Y
2. An herbaceous layer is part of this dense vegetation		Y
3. Shrubs able to withstand erosive flood events		Y
F. Production of Organic Matter and its Export		**Y or N or N/A**
1. Wetland has at least 30% aerial cover of herbaceous vegetation		Y
2. Woody plants in wetland are mostly deciduous		Y
3. Interspersion of vegetation and surface water is high in wetland		N
4. Wetland is inundated or has indicators that flooding is a seasonal event during the growing season		Y
5. Wetland has outlet from which organic matter is flushed		N
G. General Habitat Suitability		**Y or N or N/A**
1. Is wetland located greater than 300-feet from existing development		Y
2. Undeveloped upland buffers abutting wetland		N/A
3. Wetland part of a larger wetland complex, not fragmented		Y
4. Diversity of plant species is apparent (> or = 5 species with at least 10% cover each)		Y
5. Evidence of wildlife use		Y
6. Wetland has a moderate degree of cowardin class interspersion		Y
H. General Fish Habitat		**Y or N or N/A**
1. Wetland has perennial or intermittent surface-water connection to a fish-bearing water body		N/A
2. Does wetland provide overwintering habitat for fish		N/A
3. Documented presence of fish		N/A
4. Herbaceous and/or woody vegetation is present in wetland and/or buffer to provide cover, shade, and/or detrital matter		N/A
5. Spawning areas are present (aquatic vegetation and/or gravel beds)		N/A
6. Juvenile rest areas		N/A
I. Native Plant Richness		**Y or N or N/A**
1. Dominant and codominant plants are native		Y
2. Wetland contains two or more Cowardin Classes		Y
3. Wetland has two or more strata of vegetation		Y
J. Educational or Scientific Value		**Y or N or N/A**
1. Site has scientific or educational use		N/A
2. Wetland is in public ownership		Y
3. Accessible trails available		N/A
4. Is the area a known recreation area		N/A
5. Subsistence (berry picking, fishing, hunting)		N/A
K. Uniqueness and Heritage		**Y or N or N/A**
1. Wetland contains documented occurrence of a state or federally listed threatened or endangered species		Y
2. Wetland contains documented critical habitat, high quality ecosystems, or priority species respectively designated by the U.S. Fish and Wildlife Service		Y
3. Wetland has biological, geological, or other features that are determined rare		N
4. Wetland has been determined significant because it provides functions scarce for the area		N
5. Are there known or reported cultural resources in the area		N
6. Is the area a known subsistence/recreation/living area		Y
7. Wetland complex contains one or more of the following habitats: a) Tall shrub habitat (>.5ft in height) dominated by Salix spp. b) Aquatic herb habitat dominated by Arctophila fulva. c) Semi-permanently flooded to permanently flooded vegetated portions of drained lake basins d) Anadromous fish overwintering habitat e) Patterned wet sedge meadow and low center polygons f) High center polygon complex g) Riverine coastal mudflats h) Non-patterned wet meadow adjacent to streams and river bluffs.		Y

Wetland Functions and Values Results	
Unique ID:	6
HGM Class:	Flats
Cowardin Class:	PEM1B/C
Size (acres):	-

	Raw Score	Weighted Score
Flood Flow Alteration		
1	0	
2	1	
3	N/A	
4	N/A	
5	1	
6	1	
7	1	
	Total	0.800
Sediment Removal		
1	0	
2	1	
3	1	
4	0	
5	0	
	Total	0.400
Nutrient and Toxicant Removal		
1	0	
2	1	
3	1	
	Total	0.667
Erosion Control and Shoreline Stabilization		
1	1	
2	1	
3	1	
	Total	1.000
Production of Organic Matter and its Export		
1	1	
2	1	
3	0	
4	1	
5	0	
	Total	0.600
General Habitat Suitability		
1	1	
2	N/A	
3	1	
4	1	
5	1	
6	1	
	Total	1.000
General Fish Habitat		
1	N/A	
2	N/A	
3	N/A	
4	N/A	
5	N/A	
6	N/A	
	Total	N/A
Native Plant Richness		
1	1	
2	1	
3	1	
	Total	1.000
Educational or Scientific Value		
1	N/A	
2	1	
3	N/A	
4	N/A	
5	N/A	
	Total	1.000
Uniqueness and Heritage		
1	1	
2	1	
3	0	
4	0	
5	0	
6	1	
7	1	
	Total	0.571

Disturbance Activities		
Disturbance Category		0
Disturbance Category		Impact Factor
0	=	1
1	=	0.99
2	=	0.95
3	=	0.9
Disturbance Impact Factor		1

Wetland Functions and Values Results (cont.)					
Unique ID	**6**				
Exceptional Habitat Designation				0	

	Weighted Score	
Flood Flow Alteration	0.800	
Sediment Removal	0.400	
Nutrient and Toxicant Removal	0.667	
Erosion Control and Shoreline Stabilization	1.000	
Production of Organic Matter and its Export	0.600	
General Habitat Suitability	1.000	
General Fish Habitat	N/A	
Native Plant Richness	1.000	
Educational or Scientific Value	1.000	
Uniqueness and Heritage	0.571	
	Total	7.038

Standardization		
Total # of functions assessed		9
Standardized Total		0.782

Total (Including Disturbance and Exceptional Habitat)			0.782	
Overall Functional Score (Category)	0.76 - 1.00	I	Highest	I
	0.51 - 0.75	II		
	0.26 - 0.50	III		
	0 - 0.25	IV	Lowest	

Notes:

1) Scores for each category component, 0 = no and 1 = yes.

2) Not all functional categories will be applicable to each wetland functional assessment.
   For example, General Fish Habitat is only applicable to wetlands that are fish-bearing waters.
   Functional categories that are not applicable will be treated as NA (not applicable), which means there is no score for that component. No score is not the same as 0, which would erroneously reduce the total score.
   Accordingly, the maximum total score will be reduced by 1 point for each functional category that is not applicable.
   For example, if General Fish Habitat does not apply, then the Total # of functions assessed is 9.

3) NA = an item that is currently not applicable, but could be applicable at a future time if more data are available.

4) See impacted area assessment worksheet for determination of disturbance activities.
   Apply the correct impact factor to the disturbance category.

Wetland Functions and Values Evaluation Questions	
Unique ID:	7
HGM Class:	Flats
Cowardin Class:	PEM1B/C
Size (acres):	-
Disturbance Category:	0
A. Exceptional Habitat Designation	**Y or N**
1. Is wetland located within an area considered to be irreplaceable, or does it have unique habitat not found anywhere else on the North Slope (i.e., Teshukpuk Lake Surface Protection Area, Colville River Delta, Beaufort Sea Coastal Marsh)	N
2. Is wetland located within an area considered by any regulatory agency to be an Aquatic Resource of National Importance (ARNI)	N
B. Flood Flow Alteration	**Y or N or N/A**
1. Wetland occurs in the upper portion of its watershed	N
2. Wetland is relatively flat area and is capable of retaining higher volumes of water during storm events than under normal rainfall conditions	Y
3. Wetland is a closed system	N
4. If flow through, wetland has constricted outlet with signs of fluctuating water levels, algal mats, and/or lodged debris	N/A
5. Wetland contains a dense herbaceous layer (>70% cover) or woody vegetation	Y
6. Wetland receives floodwater from an adjacent water course at least once every 10 years	Y
7. Floodwaters come as sheet flow rather than channel flow	Y
C. Sediment Removal: If moving waters consider only statements 1 and 2	**Y or N or N/A**
1. Sources of excess sediment are present up gradient of the wetland	N
2. Is wetland influenced by slow-moving water and/or a deepwater habitat	Y
3. Is herbaceous vegetation present (>50% cover)	Y
4. Interspersion of vegetation and surface water is moderate in wetland presently or during flooding at least once ever 10 years	N
5. Sediment deposits are present in wetland (observation or noted in application materials)	N
D. Nutrient and Toxicant Removal	**Y or N or N/A**
1. Sources of excess nutrients (fertilizers) and toxicants (pesticides and heavy metals) are present up gradient and able to influence the wetland	N
2. Wetland is inundated or has indicators that flooding is a seasonal event during the growing season by visual observation, or indicated by other hydrological data source	N
3. Wetland has at least 30% aerial cover of live vegetation	Y
E. Erosion Control and Shoreline Stabilization	**Y or N or N/A**
1. Wetland has dense, energy absorbing vegetation (>70%) bordering the water course and no evidence of erosion	Y
2. An herbaceous layer is part of this dense vegetation	Y
3. Shrubs able to withstand erosive flood events	Y
F. Production of Organic Matter and its Export	**Y or N or N/A**
1. Wetland has at least 30% aerial cover of herbaceous vegetation	Y
2. Woody plants in wetland are mostly deciduous	Y
3. Interspersion of vegetation and surface water is high in wetland	N
4. Wetland is inundated or has indicators that flooding is a seasonal event during the growing season	Y
5. Wetland has outlet from which organic matter is flushed	N
G. General Habitat Suitability	**Y or N or N/A**
1. Is wetland located greater than 300-feet from existing development	Y
2. Undeveloped upland buffers abutting wetland	N/A
3. Wetland part of a larger wetland complex, not fragmented	Y
4. Diversity of plant species is apparent (> or = 5 species with at least 10% cover each)	Y
5. Evidence of wildlife use	Y
6. Wetland has a moderate degree of cowardin class interspersion	Y
H. General Fish Habitat	**Y or N or N/A**
1. Wetland has perennial or intermittent surface-water connection to a fish-bearing water body	N/A
2. Does wetland provide overwintering habitat for fish	N/A
3. Documented presence of fish	N/A
4. Herbaceous and/or woody vegetation is present in wetland and/or buffer to provide cover, shade, and/or detrital matter	N/A
5. Spawning areas are present (aquatic vegetation and/or gravel beds)	N/A
6. Juvenile rest areas	N/A
I. Native Plant Richness	**Y or N or N/A**
1. Dominant and codominant plants are native	Y
2. Wetland contains two or more Cowardin Classes	Y
3. Wetland has two or more strata of vegetation	Y
J. Educational or Scientific Value	**Y or N or N/A**
1. Site has scientific or educational use	N/A
2. Wetland is in public ownership	Y
3. Accessible trails available	N/A
4. Is the area a known recreation area	N/A
5. Subsistence (berry picking, fishing, hunting)	N/A
K. Uniqueness and Heritage	**Y or N or N/A**
1. Wetland contains documented occurrence of a state or federally listed threatened or endangered species	Y
2. Wetland contains documented critical habitat, high quality ecosystems, or priority species respectively designated by the U.S. Fish and Wildlife Service	Y
3. Wetland has biological, geological, or other features that are determined rare	N
4. Wetland has been determined significant because it provides functions scarce for the area	N
5. Are there known or reported cultural resources in the area	Y
6. Is the area a known subsistence/recreation/living area	Y
7. Wetland complex contains one or more of the following habitats: a) Tall shrub habitat (>.5ft in height) dominated by Salix spp. b) Aquatic herb habitat dominated by Arctophila fulva. c) Semi-permanently flooded to permanently flooded vegetated portions of drained lake basins d) Anadromous fish overwintering habitat e) Patterned wet sedge meadow and low center polygons f) High center polygon complex g) Riverine coastal mudflats h) Non-patterned wet meadow adjacent to streams and river bluffs.	Y

Wetland Functions and Values Results	
Unique ID:	7
HGM Class:	Flats
Cowardin Class:	PEM1B/C
Size (acres):	-

	Raw Score	Weighted Score
Flood Flow Alteration		
1	0	
2	1	
3	0	
4	N/A	
5	1	
6	1	
7	1	
	Total	0.667
Sediment Removal		
1	0	
2	1	
3	1	
4	0	
5	0	
	Total	0.400
Nutrient and Toxicant Removal		
1	0	
2	0	
3	1	
	Total	0.333
Erosion Control and Shoreline Stabilization		
1	1	
2	1	
3	1	
	Total	1.000
Production of Organic Matter and its Export		
1	1	
2	1	
3	0	
4	1	
5	0	
	Total	0.600
General Habitat Suitability		
1	1	
2	N/A	
3	1	
4	1	
5	1	
6	1	
	Total	1.000
General Fish Habitat		
1	N/A	
2	N/A	
3	N/A	
4	N/A	
5	N/A	
6	N/A	
	Total	N/A
Native Plant Richness		
1	1	
2	1	
3	1	
	Total	1.000
Educational or Scientific Value		
1	N/A	
2	1	
3	N/A	
4	N/A	
5	N/A	
	Total	1.000
Uniqueness and Heritage		
1	1	
2	1	
3	0	
4	0	
5	1	
6	1	
7	1	
	Total	0.714

Disturbance Activities		
Disturbance Category		0
Disturbance Category		Impact Factor
0	=	1
1	=	0.99
2	=	0.95
3	=	0.9
Disturbance Impact Factor		1

Wetland Functions and Values Results (cont.)					
Unique ID	**7**				
Exceptional Habitat Designation				0	

	Weighted Score		
Flood Flow Alteration	0.667		
Sediment Removal	0.400		
Nutrient and Toxicant Removal	0.333		
Erosion Control and Shoreline Stabilization	1.000		
Production of Organic Matter and its Export	0.600		
General Habitat Suitability	1.000		
General Fish Habitat	N/A		
Native Plant Richness	1.000		
Educational or Scientific Value	1.000		
Uniqueness and Heritage	0.714		
	Total	6.714	

Standardization		
Total # of functions assessed	9	
Standardized Total	0.746	

Total (Including Disturbance and Exceptional Habitat)			0.746	
Overall Functional Score (Category)	0.76 - 1.00	I	Highest	II
	0.51 - 0.75	II		
	0.26 - 0.50	III		
	0 - 0.25	IV	Lowest	

Notes:

1) Scores for each category component, 0 = no and 1 = yes.

2) Not all functional categories will be applicable to each wetland functional assessment.
   For example, General Fish Habitat is only applicable to wetlands that are fish-bearing waters.
   Functional categories that are not applicable will be treated as NA (not applicable), which means there is no score for that component. No score is not the same as 0, which would erroneously reduce the total score.
   Accordingly, the maximum total score will be reduced by 1 point for each functional category that is not applicable.
   For example, if General Fish Habitat does not apply, then the Total # of functions assessed is 9.

3) NA = an item that is currently not applicable, but could be applicable at a future time if more data are available.

4) See impacted area assessment worksheet for determination of disturbance activities.
   Apply the correct impact factor to the disturbance category.

Wetland Functions and Values Evaluation Questions	Unique ID:	8
	HGM Class:	Flats
	Cowardin Class:	PEM1B/C
	Size (acres):	-
	Disturbance Category:	0
A. Exceptional Habitat Designation		**Y or N**
1. Is wetland located within an area considered to be irreplaceable, or does it have unique habitat not found anywhere else on the North Slope (i.e., Teshukpuk Lake Surface Protection Area, Colville River Delta, Beaufort Sea Coastal Marsh)		N
2. Is wetland located within an area considered by any regulatory agency to be an Aquatic Resource of National Importance (ARNI)		N
B. Flood Flow Alteration		**Y or N or N/A**
1. Wetland occurs in the upper portion of its watershed		N
2. Wetland is relatively flat area and is capable of retaining higher volumes of water during storm events than under normal rainfall conditions		Y
3. Wetland is a closed system		N
4. If flow through, wetland has constricted outlet with signs of fluctuating water levels, algal mats, and/or lodged debris		N/A
5. Wetland contains a dense herbaceous layer (>70% cover) or woody vegetation		Y
6. Wetland receives floodwater from an adjacent water course at least once every 10 years		Y
7. Floodwaters come as sheet flow rather than channel flow		Y
C. Sediment Removal: If moving waters consider only statements 1 and 2		**Y or N or N/A**
1. Sources of excess sediment are present up gradient of the wetland		N
2. Is wetland influenced by slow-moving water and/or a deepwater habitat		Y
3. Is herbaceous vegetation present (>50% cover)		Y
4. Interspersion of vegetation and surface water is moderate in wetland presently or during flooding at least once ever 10 years		N
5. Sediment deposits are present in wetland (observation or noted in application materials)		N
D. Nutrient and Toxicant Removal		**Y or N or N/A**
1. Sources of excess nutrients (fertilizers) and toxicants (pesticides and heavy metals) are present up gradient and able to influence the wetland		N
2. Wetland is inundated or has indicators that flooding is a seasonal event during the growing season by visual observation, or indicated by other hydrological data source		Y
3. Wetland has at least 30% aerial cover of live vegetation		Y
E. Erosion Control and Shoreline Stabilization		**Y or N or N/A**
1. Wetland has dense, energy absorbing vegetation (>70%) bordering the water course and no evidence of erosion		Y
2. An herbaceous layer is part of this dense vegetation		Y
3. Shrubs able to withstand erosive flood events		Y
F. Production of Organic Matter and its Export		**Y or N or N/A**
1. Wetland has at least 30% aerial cover of herbaceous vegetation		Y
2. Woody plants in wetland are mostly deciduous		Y
3. Interspersion of vegetation and surface water is high in wetland		N
4. Wetland is inundated or has indicators that flooding is a seasonal event during the growing season		Y
5. Wetland has outlet from which organic matter is flushed		Y
G. General Habitat Suitability		**Y or N or N/A**
1. Is wetland located greater than 300-feet from existing development		Y
2. Undeveloped upland buffers abutting wetland		N/A
3. Wetland part of a larger wetland complex, not fragmented		Y
4. Diversity of plant species is apparent (> or = 5 species with at least 10% cover each)		Y
5. Evidence of wildlife use		Y
6. Wetland has a moderate degree of cowardin class interspersion		Y
H. General Fish Habitat		**Y or N or N/A**
1. Wetland has perennial or intermittent surface-water connection to a fish-bearing water body		N/A
2. Does wetland provide overwintering habitat for fish		N/A
3. Documented presence of fish		N/A
4. Herbaceous and/or woody vegetation is present in wetland and/or buffer to provide cover, shade, and/or detrital matter		N/A
5. Spawning areas are present (aquatic vegetation and/or gravel beds)		N/A
6. Juvenile rest areas		N/A
I. Native Plant Richness		**Y or N or N/A**
1. Dominant and codominant plants are native		Y
2. Wetland contains two or more Cowardin Classes		Y
3. Wetland has two or more strata of vegetation		Y
J. Educational or Scientific Value		**Y or N or N/A**
1. Site has scientific or educational use		N/A
2. Wetland is in public ownership		Y
3. Accessible trails available		N/A
4. Is the area a known recreation area		N/A
5. Subsistence (berry picking, fishing, hunting)		N/A
K. Uniqueness and Heritage		**Y or N or N/A**
1. Wetland contains documented occurrence of a state or federally listed threatened or endangered species		Y
2. Wetland contains documented critical habitat, high quality ecosystems, or priority species respectively designated by the U.S. Fish and Wildlife Service		Y
3. Wetland has biological, geological, or other features that are determined rare		N
4. Wetland has been determined significant because it provides functions scarce for the area		N
5. Are there known or reported cultural resources in the area		N
6. Is the area a known subsistence/recreation/living area		Y
7. Wetland complex contains one or more of the following habitats: a) Tall shrub habitat (>.5ft in height) dominated by Salix spp. b) Aquatic herb habitat dominated by Arctophila fulva. c) Semi-permanently flooded to permanently flooded vegetated portions of drained lake basins d) Anadromous fish overwintering habitat e) Patterned wet sedge meadow and low center polygons f) High center polygon complex g) Riverine coastal mudflats h) Non-patterned wet meadow adjacent to streams and river bluffs.		Y

Wetland Functions and Values Results	
Unique ID:	8
HGM Class:	Flats
Cowardin Class:	PEM1B/C
Size (acres):	-

	Raw Score	Weighted Score
Flood Flow Alteration		
1	0	
2	1	
3	0	
4	N/A	
5	1	
6	1	
7	1	
	Total	0.667
Sediment Removal		
1	0	
2	1	
3	1	
4	0	
5	0	
	Total	0.400
Nutrient and Toxicant Removal		
1	0	
2	1	
3	1	
	Total	0.667
Erosion Control and Shoreline Stabilization		
1	1	
2	1	
3	1	
	Total	1.000
Production of Organic Matter and its Export		
1	1	
2	1	
3	0	
4	1	
5	1	
	Total	0.800
General Habitat Suitability		
1	1	
2	N/A	
3	1	
4	1	
5	1	
6	1	
	Total	1.000
General Fish Habitat		
1	N/A	
2	N/A	
3	N/A	
4	N/A	
5	N/A	
6	N/A	
	Total	N/A
Native Plant Richness		
1	1	
2	1	
3	1	
	Total	1.000
Educational or Scientific Value		
1	N/A	
2	1	
3	N/A	
4	N/A	
5	N/A	
	Total	1.000
Uniqueness and Heritage		
1	1	
2	1	
3	0	
4	0	
5	0	
6	1	
7	1	
	Total	0.571

Disturbance Activities		
Disturbance Category		0
Disturbance Category		Impact Factor
0	=	1
1	=	0.99
2	=	0.95
3	=	0.9
Disturbance Impact Factor		1

Wetland Functions and Values Results (cont.)					
Unique ID	**8**				
Exceptional Habitat Designation				0	

	Weighted Score			
Flood Flow Alteration	0.667			
Sediment Removal	0.400			
Nutrient and Toxicant Removal	0.667			
Erosion Control and Shoreline Stabilization	1.000			
Production of Organic Matter and its Export	0.800			
General Habitat Suitability	1.000			
General Fish Habitat	N/A			
Native Plant Richness	1.000			
Educational or Scientific Value	1.000			
Uniqueness and Heritage	0.571			
	Total	7.105		
Standardization				
Total # of functions assessed		9		
Standardized Total		0.789		
Total (Including Disturbance and Exceptional Habitat)			0.789	
Overall Functional Score (Category)	0.76 - 1.00	I	Highest	I
	0.51 - 0.75	II		
	0.26 - 0.50	III		
	0 - 0.25	IV	Lowest	

Notes:

1) Scores for each category component, 0 = no and 1 = yes.

2) Not all functional categories will be applicable to each wetland functional assessment.
   For example, General Fish Habitat is only applicable to wetlands that are fish-bearing waters.
   Functional categories that are not applicable will be treated as NA (not applicable), which means there is no score for that component. No score is not the same as 0, which would erroneously reduce the total score.
   Accordingly, the maximum total score will be reduced by 1 point for each functional category that is not applicable.
   For example, if General Fish Habitat does not apply, then the Total # of functions assessed is 9.

3) NA = an item that is currently not applicable, but could be applicable at a future time if more data are available.

4) See impacted area assessment worksheet for determination of disturbance activities.
   Apply the correct impact factor to the disturbance category.

Wetland Functions and Values Evaluation Questions	
Unique ID:	9
HGM Class:	Flats
Cowardin Class:	PEM1H
Size (acres):	-
Disturbance Category:	0
A. Exceptional Habitat Designation	**Y or N**
1. Is wetland located within an area considered to be irreplaceable, or does it have unique habitat not found anywhere else on the North Slope (i.e., Teshukpuk Lake Surface Protection Area, Colville River Delta, Beaufort Sea Coastal Marsh)	N
2. Is wetland located within an area considered by any regulatory agency to be an Aquatic Resource of National Importance (ARNI)	N
B. Flood Flow Alteration	**Y or N or N/A**
1. Wetland occurs in the upper portion of its watershed	N
2. Wetland is relatively flat area and is capable of retaining higher volumes of water during storm events than under normal rainfall conditions	Y
3. Wetland is a closed system	N
4. If flow through, wetland has constricted outlet with signs of fluctuating water levels, algal mats, and/or lodged debris	Y
5. Wetland contains a dense herbaceous layer (>70% cover) or woody vegetation	Y
6. Wetland receives floodwater from an adjacent water course at least once every 10 years	Y
7. Floodwaters come as sheet flow rather than channel flow	Y
C. Sediment Removal: If moving waters consider only statements 1 and 2	**Y or N or N/A**
1. Sources of excess sediment are present up gradient of the wetland	N
2. Is wetland influenced by slow-moving water and/or a deepwater habitat	Y
3. Is herbaceous vegetation present (>50% cover)	Y
4. Interspersion of vegetation and surface water is moderate in wetland presently or during flooding at least once ever 10 years	Y
5. Sediment deposits are present in wetland (observation or noted in application materials)	N
D. Nutrient and Toxicant Removal	**Y or N or N/A**
1. Sources of excess nutrients (fertilizers) and toxicants (pesticides and heavy metals) are present up gradient and able to influence the wetland	N
2. Wetland is inundated or has indicators that flooding is a seasonal event during the growing season by visual observation, or indicated by other hydrological data source	Y
3. Wetland has at least 30% aerial cover of live vegetation	Y
E. Erosion Control and Shoreline Stabilization	**Y or N or N/A**
1. Wetland has dense, energy absorbing vegetation (>70%) bordering the water course and no evidence of erosion	Y
2. An herbaceous layer is part of this dense vegetation	Y
3. Shrubs able to withstand erosive flood events	Y
F. Production of Organic Matter and its Export	**Y or N or N/A**
1. Wetland has at least 30% aerial cover of herbaceous vegetation	Y
2. Woody plants in wetland are mostly deciduous	Y
3. Interspersion of vegetation and surface water is high in wetland	Y
4. Wetland is inundated or has indicators that flooding is a seasonal event during the growing season	Y
5. Wetland has outlet from which organic matter is flushed	Y
G. General Habitat Suitability	**Y or N or N/A**
1. Is wetland located greater than 300-feet from existing development	Y
2. Undeveloped upland buffers abutting wetland	N/A
3. Wetland part of a larger wetland complex, not fragmented	Y
4. Diversity of plant species is apparent (> or = 5 species with at least 10% cover each)	N/A
5. Evidence of wildlife use	Y
6. Wetland has a moderate degree of cowardin class interspersion	N/A
H. General Fish Habitat	**Y or N or N/A**
1. Wetland has perennial or intermittent surface-water connection to a fish-bearing water body	N/A
2. Does wetland provide overwintering habitat for fish	N/A
3. Documented presence of fish	N/A
4. Herbaceous and/or woody vegetation is present in wetland and/or buffer to provide cover, shade, and/or detrital matter	N/A
5. Spawning areas are present (aquatic vegetation and/or gravel beds)	N/A
6. Juvenile rest areas	N/A
I. Native Plant Richness	**Y or N or N/A**
1. Dominant and codominant plants are native	Y
2. Wetland contains two or more Cowardin Classes	N/A
3. Wetland has two or more strata of vegetation	N/A
J. Educational or Scientific Value	**Y or N or N/A**
1. Site has scientific or educational use	N/A
2. Wetland is in public ownership	Y
3. Accessible trails available	N/A
4. Is the area a known recreation area	N/A
5. Subsistence (berry picking, fishing, hunting)	N/A
K. Uniqueness and Heritage	**Y or N or N/A**
1. Wetland contains documented occurrence of a state or federally listed threatened or endangered species	Y
2. Wetland contains documented critical habitat, high quality ecosystems, or priority species respectively designated by the U.S. Fish and Wildlife Service	Y
3. Wetland has biological, geological, or other features that are determined rare	N
4. Wetland has been determined significant because it provides functions scarce for the area	N
5. Are there known or reported cultural resources in the area	N
6. Is the area a known subsistence/recreation/living area	Y
7. Wetland complex contains one or more of the following habitats: a) Tall shrub habitat (>.5ft in height) dominated by Salix spp. b) Aquatic herb habitat dominated by Arctophila fulva. c) Semi-permanently flooded to permanently flooded vegetated portions of drained lake basins d) Anadromous fish overwintering habitat e) Patterned wet sedge meadow and low center polygons f) High center polygon complex g) Riverine coastal mudflats h) Non-patterned wet meadow adjacent to streams and river bluffs.	Y

Wetland Functions and Values Results	
Unique ID:	9
HGM Class:	Flats
Cowardin Class:	PEM1H
Size (acres):	-

	Raw Score	Weighted Score
Flood Flow Alteration		
1	0	
2	1	
3	0	
4	1	
5	1	
6	1	
7	1	
	Total	0.714
Sediment Removal		
1	0	
2	1	
3	1	
4	1	
5	0	
	Total	0.600
Nutrient and Toxicant Removal		
1	0	
2	1	
3	1	
	Total	0.667
Erosion Control and Shoreline Stabilization		
1	1	
2	1	
3	1	
	Total	1.000
Production of Organic Matter and its Export		
1	1	
2	1	
3	1	
4	1	
5	1	
	Total	1.000
General Habitat Suitability		
1	1	
2	N/A	
3	1	
4	N/A	
5	1	
6	N/A	
	Total	1.000
General Fish Habitat		
1	N/A	
2	N/A	
3	N/A	
4	N/A	
5	N/A	
6	N/A	
	Total	N/A
Native Plant Richness		
1	1	
2	N/A	
3	N/A	
	Total	1.000
Educational or Scientific Value		
1	N/A	
2	1	
3	N/A	
4	N/A	
5	N/A	
	Total	1.000
Uniqueness and Heritage		
1	1	
2	1	
3	0	
4	0	
5	0	
6	1	
7	1	
	Total	0.571

Disturbance Activities		
Disturbance Category		0
Disturbance Category		Impact Factor
0	=	1
1	=	0.99
2	=	0.95
3	=	0.9
Disturbance Impact Factor		1

Wetland Functions and Values Results (cont.)					
Unique ID	**9**				
Exceptional Habitat Designation				0	

	Weighted Score	
Flood Flow Alteration	0.714	
Sediment Removal	0.600	
Nutrient and Toxicant Removal	0.667	
Erosion Control and Shoreline Stabilization	1.000	
Production of Organic Matter and its Export	1.000	
General Habitat Suitability	1.000	
General Fish Habitat	N/A	
Native Plant Richness	1.000	
Educational or Scientific Value	1.000	
Uniqueness and Heritage	0.571	
	Total	7.552

Standardization		
Total # of functions assessed		9
Standardized Total		0.839

Total (Including Disturbance and Exceptional Habitat)			0.839	
Overall Functional Score (Category)	0.76 - 1.00	I	Highest	I
	0.51 - 0.75	II		
	0.26 - 0.50	III		
	0 - 0.25	IV	Lowest	

Notes:

1) Scores for each category component, 0 = no and 1 = yes.

2) Not all functional categories will be applicable to each wetland functional assessment.
   For example, General Fish Habitat is only applicable to wetlands that are fish-bearing waters.
   Functional categories that are not applicable will be treated as NA (not applicable), which means there is no score for that component. No score is not the same as 0, which would erroneously reduce the total score.
   Accordingly, the maximum total score will be reduced by 1 point for each functional category that is not applicable.
   For example, if General Fish Habitat does not apply, then the Total # of functions assessed is 9.

3) NA = an item that is currently not applicable, but could be applicable at a future time if more data are available.

4) See impacted area assessment worksheet for determination of disturbance activities.
   Apply the correct impact factor to the disturbance category.

Wetland Functions and Values Evaluation Questions	Unique ID:	10
	HGM Class:	Flats
	Cowardin Class:	PEM1B/C
	Size (acres):	-
	Disturbance Category:	0
A. Exceptional Habitat Designation		**Y or N**
1. Is wetland located within an area considered to be irreplaceable, or does it have unique habitat not found anywhere else on the North Slope (i.e., Teshukpuk Lake Surface Protection Area, Colville River Delta, Beaufort Sea Coastal Marsh)		N
2. Is wetland located within an area considered by any regulatory agency to be an Aquatic Resource of National Importance (ARNI)		N
B. Flood Flow Alteration		**Y or N or N/A**
1. Wetland occurs in the upper portion of its watershed		N
2. Wetland is relatively flat area and is capable of retaining higher volumes of water during storm events than under normal rainfall conditions		Y
3. Wetland is a closed system		Y
4. If flow through, wetland has constricted outlet with signs of fluctuating water levels, algal mats, and/or lodged debris		N
5. Wetland contains a dense herbaceous layer (>70% cover) or woody vegetation		Y
6. Wetland receives floodwater from an adjacent water course at least once every 10 years		N
7. Floodwaters come as sheet flow rather than channel flow		N/A
C. Sediment Removal: If moving waters consider only statements 1 and 2		**Y or N or N/A**
1. Sources of excess sediment are present up gradient of the wetland		N
2. Is wetland influenced by slow-moving water and/or a deepwater habitat		N
3. Is herbaceous vegetation present (>50% cover)		Y
4. Interspersion of vegetation and surface water is moderate in wetland presently or during flooding at least once ever 10 years		N
5. Sediment deposits are present in wetland (observation or noted in application materials)		N
D. Nutrient and Toxicant Removal		**Y or N or N/A**
1. Sources of excess nutrients (fertilizers) and toxicants (pesticides and heavy metals) are present up gradient and able to influence the wetland		N
2. Wetland is inundated or has indicators that flooding is a seasonal event during the growing season by visual observation, or indicated by other hydrological data source		N
3. Wetland has at least 30% aerial cover of live vegetation		Y
E. Erosion Control and Shoreline Stabilization		**Y or N or N/A**
1. Wetland has dense, energy absorbing vegetation (>70%) bordering the water course and no evidence of erosion		Y
2. An herbaceous layer is part of this dense vegetation		Y
3. Shrubs able to withstand erosive flood events		Y
F. Production of Organic Matter and its Export		**Y or N or N/A**
1. Wetland has at least 30% aerial cover of herbaceous vegetation		Y
2. Woody plants in wetland are mostly deciduous		Y
3. Interspersion of vegetation and surface water is high in wetland		N
4. Wetland is inundated or has indicators that flooding is a seasonal event during the growing season		N
5. Wetland has outlet from which organic matter is flushed		N
G. General Habitat Suitability		**Y or N or N/A**
1. Is wetland located greater than 300-feet from existing development		Y
2. Undeveloped upland buffers abutting wetland		N/A
3. Wetland part of a larger wetland complex, not fragmented		Y
4. Diversity of plant species is apparent (> or = 5 species with at least 10% cover each)		Y
5. Evidence of wildlife use		Y
6. Wetland has a moderate degree of cowardin class interspersion		Y
H. General Fish Habitat		**Y or N or N/A**
1. Wetland has perennial or intermittent surface-water connection to a fish-bearing water body		N/A
2. Does wetland provide overwintering habitat for fish		N/A
3. Documented presence of fish		N/A
4. Herbaceous and/or woody vegetation is present in wetland and/or buffer to provide cover, shade, and/or detrital matter		N/A
5. Spawning areas are present (aquatic vegetation and/or gravel beds)		N/A
6. Juvenile rest areas		N/A
I. Native Plant Richness		**Y or N or N/A**
1. Dominant and codominant plants are native		Y
2. Wetland contains two or more Cowardin Classes		Y
3. Wetland has two or more strata of vegetation		Y
J. Educational or Scientific Value		**Y or N or N/A**
1. Site has scientific or educational use		N/A
2. Wetland is in public ownership		Y
3. Accessible trails available		N/A
4. Is the area a known recreation area		N/A
5. Subsistence (berry picking, fishing, hunting)		N/A
K. Uniqueness and Heritage		**Y or N or N/A**
1. Wetland contains documented occurrence of a state or federally listed threatened or endangered species		Y
2. Wetland contains documented critical habitat, high quality ecosystems, or priority species respectively designated by the U.S. Fish and Wildlife Service		Y
3. Wetland has biological, geological, or other features that are determined rare		N
4. Wetland has been determined significant because it provides functions scarce for the area		N
5. Are there known or reported cultural resources in the area		N
6. Is the area a known subsistence/recreation/living area		N
7. Wetland complex contains one or more of the following habitats: a) Tall shrub habitat (>.5ft in height) dominated by Salix spp. b) Aquatic herb habitat dominated by Arctophila fulva. c) Semi-permanently flooded to permanently flooded vegetated portions of drained lake basins d) Anadromous fish overwintering habitat e) Patterned wet sedge meadow and low center polygons f) High center polygon complex g) Riverine coastal mudflats h) Non-patterned wet meadow adjacent to streams and river bluffs.		N

Wetland Functions and Values Results	
Unique ID:	10
HGM Class:	Flats
Cowardin Class:	PEM1B/C
Size (acres):	-

	Raw Score	Weighted Score
Flood Flow Alteration		
1	0	
2	1	
3	1	
4	0	
5	1	
6	0	
7	N/A	
	Total	0.500
Sediment Removal		
1	0	
2	0	
3	1	
4	0	
5	0	
	Total	0.200
Nutrient and Toxicant Removal		
1	0	
2	0	
3	1	
	Total	0.333
Erosion Control and Shoreline Stabilization		
1	1	
2	1	
3	1	
	Total	1.000
Production of Organic Matter and its Export		
1	1	
2	1	
3	0	
4	0	
5	0	
	Total	0.400
General Habitat Suitability		
1	1	
2	N/A	
3	1	
4	1	
5	1	
6	1	
	Total	1.000
General Fish Habitat		
1	N/A	
2	N/A	
3	N/A	
4	N/A	
5	N/A	
6	N/A	
	Total	N/A
Native Plant Richness		
1	1	
2	1	
3	1	
	Total	1.000
Educational or Scientific Value		
1	N/A	
2	1	
3	N/A	
4	N/A	
5	N/A	
	Total	1.000
Uniqueness and Heritage		
1	1	
2	1	
3	0	
4	0	
5	0	
6	0	
7	0	
	Total	0.286

Disturbance Activities	
Disturbance Category	0

Disturbance Category		Impact Factor
0	=	1
1	=	0.99
2	=	0.95
3	=	0.9

Disturbance Impact Factor	1

Wetland Functions and Values Results (cont.)					
Unique ID	**10**				
Exceptional Habitat Designation				0	

	Weighted Score	
Flood Flow Alteration	0.500	
Sediment Removal	0.200	
Nutrient and Toxicant Removal	0.333	
Erosion Control and Shoreline Stabilization	1.000	
Production of Organic Matter and its Export	0.400	
General Habitat Suitability	1.000	
General Fish Habitat	N/A	
Native Plant Richness	1.000	
Educational or Scientific Value	1.000	
Uniqueness and Heritage	0.286	
	Total	5.719

Standardization		
Total # of functions assessed		9
Standardized Total		0.635

Total (Including Disturbance and Exceptional Habitat)			0.635	
Overall Functional Score (Category)	0.76 - 1.00	I	Highest	II
	0.51 - 0.75	II		
	0.26 - 0.50	III		
	0 - 0.25	IV	Lowest	

Notes:

1) Scores for each category component, 0 = no and 1 = yes.

2) Not all functional categories will be applicable to each wetland functional assessment.
   For example, General Fish Habitat is only applicable to wetlands that are fish-bearing waters.
   Functional categories that are not applicable will be treated as NA (not applicable), which means there is no score for that component. No score is not the same as 0, which would erroneously reduce the total score.
   Accordingly, the maximum total score will be reduced by 1 point for each functional category that is not applicable.
   For example, if General Fish Habitat does not apply, then the Total # of functions assessed is 9.

3) NA = an item that is currently not applicable, but could be applicable at a future time if more data are available.

4) See impacted area assessment worksheet for determination of disturbance activities.
   Apply the correct impact factor to the disturbance category.

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Appendix D
ORM Spreadsheet

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Waters_Name	Cowadin	HGM_Code	Measur	Amount	Units	Waters_Types	Latitude	Longitude	Local_Waterway	NIF Justification	Route to Section 10 Navigable Water or to TNW
E1UBFoggyIslandBay79	E1UB	ESTUARINEF	Area	23.955468	Acre	TNW	70.216044	-147.741138	FoggyIslandBay	Subsistance use area for motored boats	Flows into the Arctic Ocean
L1UBHFoggyIslandBay1	L1UBH	DEPRESS	Area	43.778496	Acre	RPW	70.18517	-147.715024	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
L1UBHFoggyIslandBay26	L1UBH	DEPRESS	Area	31.862461	Acre	RPW	70.191907	-147.720023	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
L1UBHFoggyIslandBay27	L1UBH	DEPRESS	Area	17.672715	Acre	RPW	70.196863	-147.717888	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
L1UBHFoggyIslandBay28	L1UBH	DEPRESS	Area	52.560254	Acre	RPW	70.197336	-147.736193	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
L1UBHFoggyIslandBay29	L1UBH	DEPRESS	Area	7.031947	Acre	RPW	70.197139	-147.730328	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
L1UBHFoggyIslandBay60	L1UBH	DEPRESS	Area	3.802657	Acre	RPW	70.202592	-147.743853	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
L1UBHFoggyIslandBay66	L1UBH	DEPRESS	Area	6.185933	Acre	RPW	70.20295	-147.727692	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
L1UBHFoggyIslandBay73	L1UBH	DEPRESS	Area	5.655029	Acre	RPW	70.207759	-147.72155	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
L1UBHFoggyIslandBay74	L1UBH	DEPRESS	Area	4.039176	Acre	RPW	70.208244	-147.727531	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
L1UBHFoggyIslandBay95	L1UBH	DEPRESS	Area	0.654375	Acre	RPW	70.183114	-147.717271	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
L1UBHFoggyIslandBay225	L1UBH	DEPRESS	Area	6.687412	Acre	RPW	70.193103	-147.691672	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
M1UBFoggyIslandBay104	M1UB	DEPRESS	Area	197.215405	Acre	TNW	70.269069	-147.594238	FoggyIslandBay	Subsistance use area for motored boats	N/A
M1UBFoggyIslandBay105	M1UB	DEPRESS	Area	27.97707	Acre	TNW	70.270502	-147.595075	FoggyIslandBay	Subsistance use area for motored boats	N/A
M1UBFoggyIslandBay106	M1UB	DEPRESS	Area	2.111235	Acre	TNW	70.25423	-147.620314	FoggyIslandBay	Subsistance use area for motored boats	N/A
M1UBFoggyIslandBay174	M1UB	DEPRESS	Area	1066.03868	Acre	TNW	70.22777	-147.663798	FoggyIslandBay	Subsistance use area for motored boats	N/A
M2USFoggyIslandBay158	M2US	DEPRESS	Area	1.288656	Acre	TNW	70.218804	-147.741788	FoggyIslandBay	Subsistance use area for motored boats	N/A
M2USFoggyIslandBay159	M2US	DEPRESS	Area	9.611465	Acre	TNW	70.210876	-147.722625	FoggyIslandBay	Subsistance use area for motored boats	N/A
M2USFoggyIslandBay229	M2US	DEPRESS	Area	1.759145	Acre	TNW	70.204531	-147.702326	FoggyIslandBay	Subsistance use area for motored boats	N/A
PEM1B/CFoggyIslandBay85	PEM1B/(	ORGSOILFLT	Area	36.629929	Acre	TNWW	70.211513	-147.741986	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1B/CFoggyIslandBay96	PEM1B/(	ORGSOILFLT	Area	0.780595	Acre	TNWW	70.185356	-147.728247	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1B/CFoggyIslandBay100	PEM1B/(	ORGSOILFLT	Area	8.921422	Acre	TNWW	70.180198	-147.702786	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1B/CFoggyIslandBay102	PEM1B/(	ORGSOILFLT	Area	0.138414	Acre	TNWW	70.187494	-147.739948	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1B/CFoggyIslandBay103	PEM1B/(	ORGSOILFLT	Area	0.032569	Acre	TNWW	70.180787	-147.696105	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1B/CFoggyIslandBay107	PEM1B/(	ORGSOILFLT	Area	15.185062	Acre	TNWW	70.18404	-147.690347	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1B/CFoggyIslandBay108	PEM1B/(	ORGSOILFLT	Area	10.210037	Acre	TNWW	70.187919	-147.685821	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1B/CFoggyIslandBay114	PEM1B/(	ORGSOILFLT	Area	24.130613	Acre	TNWW	70.183132	-147.720838	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1B/CFoggyIslandBay124	PEM1B/(	ORGSOILFLT	Area	6.811746	Acre	TNWW	70.205129	-147.741311	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1B/CFoggyIslandBay126	PEM1B/(	ORGSOILFLT	Area	5.183197	Acre	TNWW	70.203216	-147.735861	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1B/CFoggyIslandBay127	PEM1B/(	ORGSOILFLT	Area	6.415071	Acre	TNWW	70.204747	-147.735036	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1B/CFoggyIslandBay160	PEM1B/(	ORGSOILFLT	Area	14.42963	Acre	TNWW	70.20898	-147.734514	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1B/CFoggyIslandBay162	PEM1B/(	ORGSOILFLT	Area	20.296625	Acre	TNWW	70.192955	-147.747831	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1B/CFoggyIslandBay165	PEM1B/(	ORGSOILFLT	Area	14.958727	Acre	TNWW	70.185141	-147.71018	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1B/CFoggyIslandBay166	PEM1B/(	ORGSOILFLT	Area	147.709233	Acre	TNWW	70.189537	-147.730798	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1B/CFoggyIslandBay168	PEM1B/(	ORGSOILFLT	Area	610.25867	Acre	TNWW	70.194213	-147.695584	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1B/CFoggyIslandBay171	PEM1B/(	ORGSOILFLT	Area	0.551272	Acre	TNWW	70.179195	-147.703834	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1B/CFoggyIslandBay176	PEM1B/(	ORGSOILFLT	Area	7.454627	Acre	TNWW	70.217214	-147.742739	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1B/CFoggyIslandBay226	PEM1B/(	ORGSOILFLT	Area	0.159099	Acre	TNWW	70.193158	-147.69123	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1B/CFoggyIslandBay228	PEM1B/(	ORGSOILFLT	Area	113.887905	Acre	TNWW	70.20963	-147.728097	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1CFoggyIslandBay52	PEM1C	ORGSOILFLT	Area	25.543421	Acre	TNWW	70.186505	-147.68708	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1CFoggyIslandBay59	PEM1C	ORGSOILFLT	Area	27.060657	Acre	TNWW	70.185774	-147.707683	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1CFoggyIslandBay81	PEM1C	ORGSOILFLT	Area	9.697482	Acre	TNWW	70.186537	-147.689379	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1CFoggyIslandBay82	PEM1C	ORGSOILFLT	Area	0.153766	Acre	TNWW	70.190508	-147.67416	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1CFoggyIslandBay83	PEM1C	ORGSOILFLT	Area	0.409467	Acre	TNWW	70.190598	-147.674473	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1CFoggyIslandBay97	PEM1C	ORGSOILFLT	Area	2.410952	Acre	TNWW	70.179891	-147.69895	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1CFoggyIslandBay101	PEM1C	ORGSOILFLT	Area	1.43035	Acre	TNWW	70.180144	-147.699517	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1CFoggyIslandBay125	PEM1C	ORGSOILFLT	Area	0.03076	Acre	TNWW	70.20551	-147.736165	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1CFoggyIslandBay164	PEM1C	ORGSOILFLT	Area	12.631205	Acre	TNWW	70.203774	-147.70143	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1CFoggyIslandBay167	PEM1C	ORGSOILFLT	Area	264.650817	Acre	TNWW	70.198325	-147.731677	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1CFoggyIslandBay170	PEM1C	ORGSOILFLT	Area	1.407881	Acre	TNWW	70.17893	-147.70109	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1CFoggyIslandBay172	PEM1C	ORGSOILFLT	Area	0.344166	Acre	TNWW	70.179083	-147.702693	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1CFoggyIslandBay204	PEM1C	ORGSOILFLT	Area	10.990258	Acre	TNWW	70.180791	-147.70949	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1HFoggyIslandBay40	PEM1H	ORGSOILFLT	Area	17.344912	Acre	TNWW	70.188381	-147.714652	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1HFoggyIslandBay64	PEM1H	ORGSOILFLT	Area	0.34714	Acre	TNWW	70.203108	-147.726799	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1HFoggyIslandBay65	PEM1H	ORGSOILFLT	Area	0.155264	Acre	TNWW	70.202539	-147.728152	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1HFoggyIslandBay91	PEM1H	ORGSOILFLT	Area	5.075193	Acre	TNWW	70.186713	-147.732627	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1HFoggyIslandBay92	PEM1H	ORGSOILFLT	Area	14.763388	Acre	TNWW	70.189816	-147.74775	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1HFoggyIslandBay98	PEM1H	ORGSOILFLT	Area	0.016626	Acre	TNWW	70.186339	-147.731675	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1HFoggyIslandBay99	PEM1H	ORGSOILFLT	Area	30.812866	Acre	TNWW	70.186664	-147.738577	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1HFoggyIslandBay109	PEM1H	ORGSOILFLT	Area	2.102199	Acre	TNWW	70.185746	-147.726102	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1HFoggyIslandBay110	PEM1H	ORGSOILFLT	Area	14.048162	Acre	TNWW	70.188507	-147.724239	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1HFoggyIslandBay115	PEM1H	ORGSOILFLT	Area	6.428164	Acre	TNWW	70.201621	-147.740117	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1HFoggyIslandBay152	PEM1H	ORGSOILFLT	Area	0.367619	Acre	TNWW	70.208831	-147.727128	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1HFoggyIslandBay153	PEM1H	ORGSOILFLT	Area	0.195977	Acre	TNWW	70.215075	-147.741514	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1HFoggyIslandBay161	PEM1H	ORGSOILFLT	Area	19.946857	Acre	TNWW	70.207705	-147.744292	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PEM1HFoggyIslandBay163	PEM1H	ORGSOILFLT	Area	60.642878	Acre	TNWW	70.205627	-147.732754	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay2	PUBH	DEPRESS	Area	3.416352	Acre	TNWW	70.18979	-147.709781	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay3	PUBH	DEPRESS	Area	0.234738	Acre	TNWW	70.190668	-147.712302	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay4	PUBH	DEPRESS	Area	0.332242	Acre	TNWW	70.192407	-147.712269	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay5	PUBH	DEPRESS	Area	1.072029	Acre	TNWW	70.194845	-147.708313	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay6	PUBH	DEPRESS	Area	0.844686	Acre	TNWW	70.194742	-147.706702	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay7	PUBH	DEPRESS	Area	0.316255	Acre	TNWW	70.188775	-147.711794	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay8	PUBH	DEPRESS	Area	0.09234	Acre	TNWW	70.189262	-147.71265	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay9	PUBH	DEPRESS	Area	1.079845	Acre	TNWW	70.186194	-147.706431	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay10	PUBH	DEPRESS	Area	0.380767	Acre	TNWW	70.185008	-147.705939	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay11	PUBH	DEPRESS	Area	0.617417	Acre	TNWW	70.18417	-147.707569	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay12	PUBH	DEPRESS	Area	0.254265	Acre	TNWW	70.184552	-147.706062	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay13	PUBH	DEPRESS	Area	0.383009	Acre	TNWW	70.188867	-147.713761	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay14	PUBH	DEPRESS	Area	0.508551	Acre	TNWW	70.189275	-147.711099	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean

PUBHFoggyIslandBay15	PUBH	DEPRESS	Area	0.242348	Acre	TNWW	70.188313	-147.709314	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay16	PUBH	DEPRESS	Area	0.623918	Acre	TNWW	70.186769	-147.702216	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay17	PUBH	DEPRESS	Area	0.24145	Acre	TNWW	70.189775	-147.702409	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay18	PUBH	DEPRESS	Area	0.403543	Acre	TNWW	70.188973	-147.699777	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay19	PUBH	DEPRESS	Area	0.47243	Acre	TNWW	70.186367	-147.732198	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay20	PUBH	DEPRESS	Area	0.699951	Acre	TNWW	70.187983	-147.746634	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay21	PUBH	DEPRESS	Area	0.134987	Acre	TNWW	70.188264	-147.719241	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay22	PUBH	DEPRESS	Area	0.142177	Acre	TNWW	70.187256	-147.744856	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay23	PUBH	DEPRESS	Area	1.329177	Acre	TNWW	70.191263	-147.744897	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay24	PUBH	DEPRESS	Area	0.375018	Acre	TNWW	70.187525	-147.720526	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay25	PUBH	DEPRESS	Area	0.222146	Acre	TNWW	70.188172	-147.720798	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay30	PUBH	DEPRESS	Area	0.163719	Acre	TNWW	70.204929	-147.710284	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay31	PUBH	DEPRESS	Area	1.414283	Acre	TNWW	70.20045	-147.712172	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay32	PUBH	DEPRESS	Area	1.588116	Acre	TNWW	70.200964	-147.708119	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay33	PUBH	DEPRESS	Area	0.521439	Acre	TNWW	70.200499	-147.705814	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay34	PUBH	DEPRESS	Area	1.155571	Acre	TNWW	70.197249	-147.722093	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay35	PUBH	DEPRESS	Area	1.103831	Acre	TNWW	70.19922	-147.719995	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay36	PUBH	DEPRESS	Area	1.913752	Acre	TNWW	70.199707	-147.725576	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay37	PUBH	DEPRESS	Area	1.662552	Acre	TNWW	70.201081	-147.722106	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay38	PUBH	DEPRESS	Area	1.277252	Acre	TNWW	70.19422	-147.703201	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay39	PUBH	DEPRESS	Area	0.317851	Acre	TNWW	70.197356	-147.708424	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay41	PUBH	DEPRESS	Area	0.969526	Acre	TNWW	70.19811	-147.701855	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay42	PUBH	DEPRESS	Area	0.260326	Acre	TNWW	70.198303	-147.699691	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay43	PUBH	DEPRESS	Area	0.401345	Acre	TNWW	70.197207	-147.701568	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay44	PUBH	DEPRESS	Area	0.582535	Acre	TNWW	70.197706	-147.697672	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay45	PUBH	DEPRESS	Area	1.390727	Acre	TNWW	70.184331	-147.729975	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay46	PUBH	DEPRESS	Area	0.333304	Acre	TNWW	70.184636	-147.725455	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay47	PUBH	DEPRESS	Area	0.451177	Acre	TNWW	70.184615	-147.707301	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay48	PUBH	DEPRESS	Area	0.30793	Acre	TNWW	70.190043	-147.686938	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay49	PUBH	DEPRESS	Area	1.383144	Acre	TNWW	70.190184	-147.690862	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay50	PUBH	DEPRESS	Area	0.250664	Acre	TNWW	70.194568	-147.695888	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay51	PUBH	DEPRESS	Area	0.085056	Acre	TNWW	70.187858	-147.697328	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay54	PUBH	DEPRESS	Area	0.347116	Acre	TNWW	70.197517	-147.680502	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay55	PUBH	DEPRESS	Area	0.628139	Acre	TNWW	70.205468	-147.709982	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay56	PUBH	DEPRESS	Area	0.65687	Acre	TNWW	70.204953	-147.713495	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay57	PUBH	DEPRESS	Area	0.637389	Acre	TNWW	70.20457	-147.707548	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay58	PUBH	DEPRESS	Area	1.971785	Acre	TNWW	70.200113	-147.722855	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay61	PUBH	DEPRESS	Area	1.425047	Acre	TNWW	70.202183	-147.726192	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay62	PUBH	DEPRESS	Area	1.605711	Acre	TNWW	70.200637	-147.728014	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay63	PUBH	DEPRESS	Area	0.775808	Acre	TNWW	70.201343	-147.725912	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay68	PUBH	DEPRESS	Area	3.470674	Acre	TNWW	70.206857	-147.741167	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay69	PUBH	DEPRESS	Area	1.852073	Acre	TNWW	70.19175	-147.680688	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay70	PUBH	DEPRESS	Area	1.01225	Acre	TNWW	70.196842	-147.673875	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay72	PUBH	DEPRESS	Area	0.688484	Acre	TNWW	70.205255	-147.738217	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay75	PUBH	DEPRESS	Area	0.320217	Acre	TNWW	70.211293	-147.726848	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay76	PUBH	DEPRESS	Area	1.519736	Acre	TNWW	70.211769	-147.728888	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay77	PUBH	DEPRESS	Area	1.431562	Acre	TNWW	70.212108	-147.731014	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay78	PUBH	DEPRESS	Area	1.284307	Acre	TNWW	70.214412	-147.734375	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay80	PUBH	DEPRESS	Area	0.591765	Acre	TNWW	70.209138	-147.746253	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay87	PUBH	DEPRESS	Area	0.169956	Acre	TNWW	70.209773	-147.739194	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay88	PUBH	DEPRESS	Area	1.547279	Acre	TNWW	70.203466	-147.741622	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay89	PUBH	DEPRESS	Area	0.467856	Acre	TNWW	70.202585	-147.735662	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay90	PUBH	DEPRESS	Area	1.524207	Acre	TNWW	70.197458	-147.71268	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay93	PUBH	DEPRESS	Area	0.007281	Acre	TNWW	70.186256	-147.731144	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay94	PUBH	DEPRESS	Area	0.130747	Acre	TNWW	70.186672	-147.732972	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay111	PUBH	DEPRESS	Area	0.295542	Acre	TNWW	70.183086	-147.722918	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay112	PUBH	DEPRESS	Area	0.141839	Acre	TNWW	70.183291	-147.720767	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay113	PUBH	DEPRESS	Area	0.13402	Acre	TNWW	70.183205	-147.719864	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay116	PUBH	DEPRESS	Area	0.218956	Acre	TNWW	70.197362	-147.720076	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay117	PUBH	DEPRESS	Area	0.433141	Acre	TNWW	70.197528	-147.719058	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay118	PUBH	DEPRESS	Area	0.314075	Acre	TNWW	70.199092	-147.722405	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay119	PUBH	DEPRESS	Area	0.331423	Acre	TNWW	70.200563	-147.719437	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay120	PUBH	DEPRESS	Area	0.22566	Acre	TNWW	70.202275	-147.71849	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay121	PUBH	DEPRESS	Area	0.172325	Acre	TNWW	70.202864	-147.719682	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay122	PUBH	DEPRESS	Area	0.305978	Acre	TNWW	70.203248	-147.721618	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay123	PUBH	DEPRESS	Area	1.017211	Acre	TNWW	70.20437	-147.719822	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay128	PUBH	DEPRESS	Area	0.535808	Acre	TNWW	70.206809	-147.728977	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay129	PUBH	DEPRESS	Area	0.15367	Acre	TNWW	70.208123	-147.728867	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay130	PUBH	DEPRESS	Area	0.093494	Acre	TNWW	70.208367	-147.729087	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay131	PUBH	DEPRESS	Area	0.149166	Acre	TNWW	70.209732	-147.731541	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay132	PUBH	DEPRESS	Area	0.442565	Acre	TNWW	70.210728	-147.732199	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay133	PUBH	DEPRESS	Area	0.084102	Acre	TNWW	70.206519	-147.724986	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay134	PUBH	DEPRESS	Area	0.219478	Acre	TNWW	70.20666	-147.723829	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay135	PUBH	DEPRESS	Area	0.211296	Acre	TNWW	70.208697	-147.723691	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay136	PUBH	DEPRESS	Area	0.328983	Acre	TNWW	70.209219	-147.719913	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay137	PUBH	DEPRESS	Area	0.258191	Acre	TNWW	70.2118	-147.733271	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay138	PUBH	DEPRESS	Area	0.133295	Acre	TNWW	70.212301	-147.734033	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay139	PUBH	DEPRESS	Area	0.116038	Acre	TNWW	70.212911	-147.730434	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay140	PUBH	DEPRESS	Area	0.263443	Acre	TNWW	70.212918	-147.731593	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay141	PUBH	DEPRESS	Area	0.248052	Acre	TNWW	70.212803	-147.732954	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean

PUBHFoggyIslandBay142	PUBH	DEPRESS	Area	0.724207	Acre	TNWW	70.213189	-147.736672	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay143	PUBH	DEPRESS	Area	0.095706	Acre	TNWW	70.213559	-147.731335	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay144	PUBH	DEPRESS	Area	0.168606	Acre	TNWW	70.213797	-147.737059	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay145	PUBH	DEPRESS	Area	0.273561	Acre	TNWW	70.214165	-147.735787	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay146	PUBH	DEPRESS	Area	0.58524	Acre	TNWW	70.214301	-147.738882	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay147	PUBH	DEPRESS	Area	0.094687	Acre	TNWW	70.206068	-147.73737	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay148	PUBH	DEPRESS	Area	0.348259	Acre	TNWW	70.20675	-147.736286	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay149	PUBH	DEPRESS	Area	0.315649	Acre	TNWW	70.206922	-147.738397	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay150	PUBH	DEPRESS	Area	0.071502	Acre	TNWW	70.207804	-147.735501	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay151	PUBH	DEPRESS	Area	1.731356	Acre	TNWW	70.207679	-147.731023	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay154	PUBH	DEPRESS	Area	0.517429	Acre	TNWW	70.189419	-147.704115	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay155	PUBH	DEPRESS	Area	0.147786	Acre	TNWW	70.197795	-147.693369	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay156	PUBH	DEPRESS	Area	0.194634	Acre	TNWW	70.198952	-147.697786	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay157	PUBH	DEPRESS	Area	0.32256	Acre	TNWW	70.205393	-147.715458	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay175	PUBH	DEPRESS	Area	0.60562	Acre	TNWW	70.213694	-147.733206	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay177	PUBH	DEPRESS	Area	0.072872	Acre	TNWW	70.214486	-147.736067	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay178	PUBH	DEPRESS	Area	0.126545	Acre	TNWW	70.212744	-147.729337	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay179	PUBH	DEPRESS	Area	0.209943	Acre	TNWW	70.195766	-147.670515	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay180	PUBH	DEPRESS	Area	0.042825	Acre	TNWW	70.194187	-147.665841	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay181	PUBH	DEPRESS	Area	0.166149	Acre	TNWW	70.194071	-147.666976	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay182	PUBH	DEPRESS	Area	0.204339	Acre	TNWW	70.190831	-147.682333	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay183	PUBH	DEPRESS	Area	0.422331	Acre	TNWW	70.190298	-147.683938	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay184	PUBH	DEPRESS	Area	0.18601	Acre	TNWW	70.211469	-147.740095	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay185	PUBH	DEPRESS	Area	0.040119	Acre	TNWW	70.210681	-147.73965	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay186	PUBH	DEPRESS	Area	0.151977	Acre	TNWW	70.211034	-147.739335	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay187	PUBH	DEPRESS	Area	0.143112	Acre	TNWW	70.210974	-147.741159	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay188	PUBH	DEPRESS	Area	0.129643	Acre	TNWW	70.207459	-147.738031	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay189	PUBH	DEPRESS	Area	0.881982	Acre	TNWW	70.202281	-147.732012	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay190	PUBH	DEPRESS	Area	0.498097	Acre	TNWW	70.20115	-147.729123	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay191	PUBH	DEPRESS	Area	0.467496	Acre	TNWW	70.201323	-147.731829	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay192	PUBH	DEPRESS	Area	0.158329	Acre	TNWW	70.20113	-147.730233	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay193	PUBH	DEPRESS	Area	0.115203	Acre	TNWW	70.200754	-147.73171	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay194	PUBH	DEPRESS	Area	0.299845	Acre	TNWW	70.204377	-147.746377	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay195	PUBH	DEPRESS	Area	0.344213	Acre	TNWW	70.201605	-147.740734	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay196	PUBH	DEPRESS	Area	0.929333	Acre	TNWW	70.199246	-147.742676	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay197	PUBH	DEPRESS	Area	0.843655	Acre	TNWW	70.200256	-147.743733	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay198	PUBH	DEPRESS	Area	0.163321	Acre	TNWW	70.199579	-147.74507	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay199	PUBH	DEPRESS	Area	0.284824	Acre	TNWW	70.194897	-147.724322	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay200	PUBH	DEPRESS	Area	0.183998	Acre	TNWW	70.193926	-147.719966	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay201	PUBH	DEPRESS	Area	0.103972	Acre	TNWW	70.193499	-147.721582	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay202	PUBH	DEPRESS	Area	0.069341	Acre	TNWW	70.193292	-147.722365	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay203	PUBH	DEPRESS	Area	0.373447	Acre	TNWW	70.180872	-147.708785	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay205	PUBH	DEPRESS	Area	0.126969	Acre	TNWW	70.21438	-147.73327	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay206	PUBH	DEPRESS	Area	0.124467	Acre	TNWW	70.213691	-147.735171	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay207	PUBH	DEPRESS	Area	0.078029	Acre	TNWW	70.213676	-147.735933	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay208	PUBH	DEPRESS	Area	0.039428	Acre	TNWW	70.212913	-147.737025	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay209	PUBH	DEPRESS	Area	0.103551	Acre	TNWW	70.212638	-147.737189	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay210	PUBH	DEPRESS	Area	0.10897	Acre	TNWW	70.212483	-147.735456	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay211	PUBH	DEPRESS	Area	0.169394	Acre	TNWW	70.212652	-147.734175	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay212	PUBH	DEPRESS	Area	0.094813	Acre	TNWW	70.212432	-147.732875	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay213	PUBH	DEPRESS	Area	0.061746	Acre	TNWW	70.211849	-147.733845	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay214	PUBH	DEPRESS	Area	0.086072	Acre	TNWW	70.212892	-147.735015	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay215	PUBH	DEPRESS	Area	0.051585	Acre	TNWW	70.213303	-147.73117	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay216	PUBH	DEPRESS	Area	0.152231	Acre	TNWW	70.210811	-147.723747	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay217	PUBH	DEPRESS	Area	0.170808	Acre	TNWW	70.208025	-147.718265	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay218	PUBH	DEPRESS	Area	0.268659	Acre	TNWW	70.195423	-147.71316	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay219	PUBH	DEPRESS	Area	0.551446	Acre	TNWW	70.194679	-147.711873	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay220	PUBH	DEPRESS	Area	0.193771	Acre	TNWW	70.198457	-147.722886	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay221	PUBH	DEPRESS	Area	0.168017	Acre	TNWW	70.198721	-147.723191	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay222	PUBH	DEPRESS	Area	0.193285	Acre	TNWW	70.19897	-147.72406	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay223	PUBH	DEPRESS	Area	0.123459	Acre	TNWW	70.198635	-147.719506	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay224	PUBH	DEPRESS	Area	2.694604	Acre	TNWW	70.19465	-147.746817	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
PUBHFoggyIslandBay227	PUBH	DEPRESS	Area	0.029232	Acre	TNWW	70.208615	-147.723331	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
R2UBFoggyIslandBay53	R2UB	RIVERINE	Area	3.539842	Acre	RPW	70.186439	-147.688828	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
R2UBFoggyIslandBay67	R2UB	RIVERINE	Area	0.764069	Acre	RPW	70.20312	-147.737061	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
R2UBFoggyIslandBay71	R2UB	RIVERINE	Area	0.329566	Acre	RPW	70.205819	-147.740065	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
R2UBFoggyIslandBay84	R2UB	RIVERINE	Area	0.150683	Acre	RPW	70.190553	-147.674286	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
R2UBFoggyIslandBay86	R2UB	RIVERINE	Area	1.973114	Acre	RPW	70.209803	-147.738503	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
R2UBFoggyIslandBay169	R2UB	RIVERINE	Area	0.225393	Acre	RPW	70.179039	-147.702192	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean
R2UBFoggyIslandBay173	R2UB	RIVERINE	Area	0.747623	Acre	RPW	70.180071	-147.699266	FoggyIslandBay	N/A	Adjacent and Neighboring to the wetland complex flowing into the Arctic Ocean

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