

# Wetland and Waterbody Jurisdictional Determination Report

## Palmer VMS Project Haines, Alaska

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## 1.0 INTRODUCTION AND PURPOSE

Constantine Metal Resources Ltd. (Constantine) has contracted HDR Alaska, Inc. (HDR) to prepare baseline wetland mapping for future access road construction in support of the Palmer Volcanogenic Massive Sulphide (VMS) mineral exploration project located north of Haines, Alaska (Figure 1). Baseline wetland mapping was completed for an approximate 5.4 mile linear corridor that ranged from approximately 300 feet to 950 feet wide (project area). The majority of the corridor is centered on a pre-existing overgrown bulldozer trail installed in the 1970s. The project area is generally linear in shape and encompasses approximately 233 acres (Figure 2).

The project area is located in Township 28 South, Range 53 East, Sections 25, 35, and 36; Township 28 South, Range 54 East, Section 30; and Township 29 South, Range 54 East, Sections 5 and 6, Copper River Meridian. Approximate coordinates of the corridor centroid are latitude 59.4024° North and longitude -136.3352° West (NAD 83).

The purpose of this Jurisdictional Determination Report (JDR) is to identify locations within the project area that are subject to the jurisdiction of the U.S. Army Corps of Engineers (USACE) under authority of Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act of 1899. By federal law and associated policy, it is necessary to avoid project impacts to wetlands wherever practicable, minimize impacts that cannot be avoided, and in some cases compensate for unavoidable impacts. The focus of this JDR is on identification of wetlands and other regulated waters; project design and impacts are not discussed in this report. Wetlands, waters of the U.S., and uplands (non-wetlands), as referenced in this report, are defined as:

Wetlands: “Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (33 Code of Federal Regulations [CFR] Part 328.3(b)). Wetlands are a subset of “waters of the U.S.” Note that the “wetlands” definition does not include unvegetated areas such as streams and ponds.

As described in the 1987 USACE *Wetlands Delineation Manual* (USACE 1987) and in the 2007 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual, Alaska Region* (USACE 2007), wetlands must possess the following three characteristics: (1) a vegetation community dominated by plant species that are typically adapted for life in saturated soils, (2) inundation or saturation of the soil during the growing season, and (3) soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions.

Waters of the U.S.: Waters of the U.S. include other waterbodies regulated by the USACE, including navigable waters, lakes, ponds, and streams, in addition to wetlands.

Uplands: Non-water and non-wetland areas are called uplands.

In addition to a site being wetland, it can also be classified as either a jurisdictional or non-jurisdictional wetland depending on its connectivity to other regulated waters. Recent court decisions have attempted to clarify the USACE regulatory authority over wetlands without a direct surface water connection or significant nexus to other regulated waters. As stated in recent 2011 draft guidance, the USACE will assert jurisdiction, without the need for a significant nexus finding, over all traditional navigable waters (TNW), wetlands adjacent to a TNW, non-navigable tributaries to a TNW that are relatively permanent, and wetlands that directly abut such tributaries. The USACE will also assert jurisdiction over non-navigable, not relatively permanent tributaries and their adjacent wetlands where such tributaries and wetlands have a significant nexus to a TNW. These include the following types of waters when they have a significant nexus with a traditional navigable water: (1) non-navigable tributaries that are not relatively

permanent, (2) wetlands adjacent to non-navigable tributaries that are not relatively permanent, and (3) wetlands adjacent to, but not directly abutting, a relatively permanent tributary (e.g., separated from it by uplands, a berm, dike or similar feature). The USACE will assess the flow characteristics and functions of the tributary itself, together with the functions performed by any wetlands adjacent to that tributary, to determine whether collectively they have a significant nexus with traditional navigable waters (Environmental Protection Agency and USACE 2011). Wetlands without a significant nexus to a TNW would be classified as non-jurisdictional.

## 2.0 METHODS

### 2.1 Review of Existing Data

Prior to fieldwork, scientists reviewed the following information to help in determining the presence of wetlands in the study area:

- Topography: U.S. Geological Survey Quadrangle Map, Skagway B-4; 50 foot contour mapping supplied by Constantine
- Wetland Mapping: U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) Mapping (USFWS 2013), Skagway B-4
- Soil Survey: *Soil Survey for the Haines Area, Alaska* (Natural Resource Conservation Service 1998) and Alaska Hydric Soils List
- Aerial Imagery: 2006 orthorectified color aerial imagery from U.S. Department of Commerce (USDC), Bureau of the Census, unlimited rights, pixel resolution = 1 meter (USDC 2006); 2003 Digital Globe satellite imagery, pixel resolution = 2 feet (Digital Globe 2003)

### 2.2 Preliminary Wetland Mapping

Initial delineation of wetland and waterbody boundaries in the vicinity of the project area was conducted by interpreting aerial imagery through the use of a Geographic Information System (GIS). The existing data described above was used to preliminarily map wetland boundaries. The NWI wetland mapping did not identify wetlands or waters of the U.S. within the project area except for Glacier Creek. Wetland and waterbody types were coded using the NWI classification system derived from Cowardin et al. (1979). The process of delineating wetlands from aerial photography included the following methods:

- **Vegetation clues:** On aerial photography, scientists looked for scrub/shrub or stunted trees and emergent vegetation communities adapted to saturation.
- **Evidence of soil saturation and nearby hydrologic features:** Darker areas on the photos indicated potential wetland hydrology and surface saturation. A site's proximity to streams, open water habitats, and marshes can be indicative of shallow subsurface water.
- **Topography:** Landform positions were also analyzed with respect to whether the site might be receiving or draining water. Topographic depressions, toes of slopes, and flat topography served as indicators of potentially poor soil drainage.

Other "waters of the U.S." such as streams were also identified based on aerial photo interpretation and topographic mapping. Prior to conducting fieldwork, waypoints for field target sites were uploaded into a handheld global positioning system (GPS) unit. The points were used during the field effort to navigate

to point locations that appeared to be representative of wetland or upland sites in different landform positions, as well as questionable areas difficult to distinguish on aerial photography.

### 2.3 Field Verification

A site visit was conducted by Zachary Halstead (Professional Wetland Scientist #2046), and Doug Jewell (Environmental Scientist), both of HDR Alaska, Inc., on July 1, 2, and 3, 2013, to verify the preliminary mapping. Site access was by helicopter and motor vehicle. In the field, characteristic wetland and upland areas were studied using the three-parameter method of determining an area’s wetland status outlined in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual, Alaska Region* (USACE 2007). Standard USACE data forms were completed at sampling points and photographs were taken to document the vegetation, soil profile, and hydrology, and are included in Appendix A. Observation points, where only photographs and notes were taken versus a complete data set, are included in Appendix B. Each sampling point and observation point visited during the field work was logged into a handheld GPS unit. Data was collected at a total of 72 points within the project area.

## 3.0 RESULTS

### 3.1 Final Wetland Mapping

Preliminary mapping, other existing mapping and documentation, and field-derived data were reviewed to complete digitizing of wetland/upland and wetland type boundaries and waterbody locations using GIS. A map of wetland and waterbody locations and field data points overlaid on an aerial photograph base is shown on Figures 2 through 6.

### 3.2 Summary of Wetland Indicators

The vegetation, hydrology, and soil conditions described below are based on the July 2013 fieldwork conducted by HDR Alaska, Inc. Table 1 summarizes the parameters that met wetland criteria at each sampling point.

**Table 1. Summary of Wetland Parameters**

Plot #	Wetland Status	Hydrophytic Vegetation	Hydric Soil	Hydrology	Plot #	Wetland Status	Hydrophytic Vegetation	Hydric Soil	Hydrology
1	Upland				40	Wetland	X	X	X
3	Upland				42	Upland	X		
10	Upland				43	Upland	X		
18	Wetland	X	X	X	52	Upland			
20	Upland	X			53	Upland	X		
26	Upland				60	Upland	X		
29	Wetland	X	X	X	62	Upland			
31	Wetland	X	X	X	64	Upland			
33	Upland	X			68	Upland	X		
37	Wetland	X	X	X					

A total of 19 USACE wetland determination forms were completed throughout the project area. Of those 19 sites, five met the criteria for all three parameters required to be determined wetland.

### 3.2.1 Vegetation

A list of the dominant vascular plant species observed in the project area during the field investigation and their respective wetland indicator status is provided in Table 1. Dominant species were calculated by using the “50/20 Rule” from the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual, Alaska Region* (USACE 2007).

**Table 2. Wetland Indicator Status of Dominant Vascular Plant Species**

Scientific Name	Common Name	Indicator Status	Scientific Name	Common Name	Indicator Status
<i>Alnus sinuata</i>	Sitka alder	FAC	<i>Populus balsamifera</i>	balsam poplar	FACU
<i>Aruncus dioicus</i>	goat's beard	UPL	<i>Rubus pedatus</i>	strawberry-leaf raspberry	FAC
<i>Athyrium filix-femina</i>	subarctic lady fern	FAC	<i>Rubus spectabilis</i>	salmon raspberry	FACU
<i>Cinna latifolia</i>	slender wood-reed	FACW	<i>Salix barclayi</i>	Barclay's willow	FAC
<i>Cornus canadensis</i>	Canadian bunchberry	FACU	<i>Stellaria longipes</i>	long-stalk starwort	FAC
<i>Equisetum arvense</i>	field horsetail	FAC	<i>Streptopus amplexifolius</i>	clasping twistedstalk	FACU
<i>Gymnocarpium dryopteris</i>	northern oak fern	FACU	<i>Tellima grandiflora</i>	fragrant fringe-cup	FACU
<i>Menziesia ferruginea</i>	fool's huckleberry	FACU	<i>Tsuga heterophylla</i>	Western hemlock	FAC
<i>Oplopanax horridus</i>	devil's club	FACU	<i>Vaccinium alaskaense</i>	Alaska blueberry	FAC
<i>Picea sitchensis</i>	Sitka spruce	FACU	<i>Veronica americana</i>	American brooklime	OBL

**1) Wetland Indicator Status Region A (Lichvar 2013):**

- FAC:** Facultative: species equally likely to occur in wetlands and non-wetlands
- FACU:** Facultative Upland: species usually occurs in non-wetlands
- FACW:** Facultative Wetland: species usually occurs in wetlands
- OBL:** species almost always occurs under natural conditions in wetlands

All five plots that were determined to be wetland met the criteria for hydrophytic vegetation, either through the dominance test or the prevalence index, except for Plots 18 and 40 which were determined to meet the criteria through the problematic hydrophytic vegetation procedure (USACE 2007). At both locations, the presence of devil’s club (*Oplopanax horridus* - FACU) caused the plots to fail the dominance test and the prevalence index. Both plots exhibited strong hydric soil indicators and primary wetland hydrology indicators and were located in landscape positions likely to collect or concentrate water. Devil’s club is listed as a FACU species that may dominate in certain wetland situations (USACE 2007). Seven upland plots typically dominated by Sitka alder (*Alnus sinuata* – FAC) met the criteria for hydrophytic vegetation but lacked indicators of hydric soils and wetland hydrology.

### 3.2.2 Soils

The *Soil Survey of the Haines Area, Alaska* mapped four soil series units in the northeast half of the project area (NRCS 1998) described below in Table 2. The southwest half of the project area is located outside of the soil survey mapping boundaries.

**Table 3. Haines Area Soil Series Units Located in Study Area**

Soil Map Unit ID#	Soil Name/Drainage Class	Percent Hydric Composition	Hydric Composition Landform
115	Kupreanof-Foad complex, 2-20 % slopes/well-drained	4	Depressions
117	Kupreanof-Foad complex, 40-70 % slopes/well-drained	4	Depressions
121	Lutak-Kupreanof association, 0-20% slopes/well-drained	5	Depressions
147	Water, fresh	N/A	N/A

Complete descriptions of the mapped soil types and soil types of the surrounding area can be found in the soil survey (NRCS 1998). In general there was good correlation between the mapped soil types and the soils observed during the field visit. A summary of the hydric soil indicators observed in the field is provided below in Table 3.

**Table 4: Summary of Hydric Soil Indicators**

Plot #	Wetland Status	Hydric Soil Indicators	Plot #	Wetland Status	Hydric Soil Indicators
01	Upland	None	40	Wetland	Alaska Gleyed Pores
03	Upland	None	42	Upland	None
10	Upland	None	43	Upland	None
18	Wetland	Histosol, Hydrogen Sulfide	52	Upland	None
20	Upland	None	53	Upland	None
26	Upland	None	60	Upland	None
29	Wetland	Histosol, Hydrogen Sulfide	62	Upland	None
31	Wetland	Histosol, Hydrogen Sulfide, AK Redox	64	Upland	None
33	Upland	None	68	Upland	None
37	Wetland	Other			

All wetland plots had clear hydric soil indicators except for Plot 37. Plot 37 was located on a narrow floodplain adjacent to a creek and had a soil texture of sands, gravels, and cobbles (low organic content). Primary hydrology indicators and a hydrophytic vegetation community were present which resulted in a hydric soil determination. Hydric soil indicators were not observed at any of the upland plots. The presence or absence of hydric soil can be considered a good indicator of wetland status within the project area.

### 3.2.3 Hydrology

Precipitation data for the three-month period prior to the field investigation (April through June, 2013) was reviewed to determine the degree to which any recent climatic events (i.e., abnormal wet or dry conditions) may have influenced field hydrology. The method for comparing precipitation in the three months preceding the field work to historical averages using WETS tables prepared by the NRCS National Water and Climate Center (NRCS 2013) is described in the *NRCS Engineering Field Handbook* (NRCS 1997).

Precipitation data for Haines, Alaska was obtained from the National Weather Service Alaska Regional Headquarters (NOAA 2013). The total monthly precipitation was compared to the normal range of precipitation for those months from the 1961 to 1987 period listed in WETS Tables. These values are shown below in Table 4.

**Table 5. 2013 Precipitation Compared to Normal Precipitation**

Month	Normal Precipitation Range 1961-1987 (in.) (NRCS 2011)	Actual 2013 Precipitation (in.) (NWS 2013)
April	1.58 - 3.53	4.01
May	1.21 - 2.52	3.04
June	0.90 - 1.86	1.52

The precipitation data indicated that April and May were wetter than the normal range of precipitation, while June was within the normal range of precipitation; an additional 0.21 inches of total precipitation

occurred from July 1<sup>st</sup> through July 3<sup>rd</sup>, 2013 during the field work. Using the NRCS method, it was determined that antecedent precipitation for the three months prior to the field investigation was wetter than the range of normal; however no primary indicators of wetland hydrology were observed in upland plots. A summary of wetland hydrology indicators observed during field work are provided in Table 5.

**Table 6: Summary of Wetland Hydrology Indicators**

Plot #	Wetland Status	Wetland Hydrology Indicators
01	Upland	Geomorphic Position
03	Upland	None
10	Upland	None
18	Wetland	High Water Table, Saturation, Hydrogen Sulfide, Drainage Patterns, Geomorphic Position
20	Upland	None
26	Upland	None
29	Wetland	Surface Water, High Water Table, Saturation, Hydrogen Sulfide, Drainage Patterns, Geomorphic Position, FAC Neutral
31	Wetland	Surface Water, High Water Table, Saturation, Iron Deposits, Hydrogen Sulfide, Drainage Patterns, Ox. Rhizospheres, Presence of Reduced Iron, Geomorphic Position
33	Upland	None
37	Wetland	Sediment Deposits, Drift Deposits, Drainage Patterns, Geomorphic Position
40	Wetland	High Water Table, Saturation, Drainage Patterns, Presence of Reduced Iron, Geomorphic Position,
42	Upland	None
43	Upland	None
52	Upland	None
53	Upland	None
60	Upland	None
62	Upland	Geomorphic Position
64	Upland	None
68	Upland	None

All wetland plots had one or more primary indicator of wetland hydrology. Primary wetland hydrology indicators were lacking at all upland plots. One secondary hydrology indicator was observed at two upland plots (Plots 1 and 62); two secondary hydrology indicators are required to meet the criteria for wetland hydrology. In general, the presence of primary wetland hydrology indicators can be considered a good indicator of wetland status within the project area.

### **3.3 Wetland and Waterbody Classes Observed in Project Area**

Wetlands were identified where HDR scientists observed indicators of hydrophytic vegetation, wetland hydrology, and hydric soils. Approximately 4.84 acres of wetlands and 2.85 acres of waterbodies (streams and ponds) were mapped within the project area. Additionally, 34 small streams were identified that were too small to be mapped as polygons. Approximately 7.69 acres (3.3 percent) of the 233.01-acre area have been identified as wetlands or other waters. The remaining 225.32 acres (96.7 percent) are upland. Wetland and waterbody classes observed on the project area and approximate total acreages of each are listed below in Table 6.

**Table 7. Wetland/Waterbody and Upland Mapping Summary**

Mapping Code	Description	Acreage within Project Area
PEM1C	Persistent Emergent Seasonally Inundated Wetland	0.52
PEM1F	Persistent Emergent Semi-permanently Flooded Wetland	1.03
PSS1B	Palustrine Deciduous Scrub Shrub Wetland	0.39
PSS1/EM1B	Palustrine Deciduous Scrub Shrub/Persistent Emergent Saturated Wetland	2.78
PEM1/SS1B	Persistent Emergent/Palustrine Deciduous Scrub Shrub Saturated Wetland	0.12
PUBH	Palustrine Unconsolidated Bottom Permanently Flooded (Ponds)	0.35
R3UBH	Upper Perennial Stream (Glacier Creek)	0.81
R3USA	Gravel Bars (Glacier Creek)	1.69
<b>Total Wetlands and Waterbodies:</b>		<b>7.69</b>
U	Upland	225.32
<b>Total Area:</b>		<b>233.01</b>

***Persistent Emergent Wetlands***

Persistent emergent wetlands (PEM1) were observed on toe slopes or ravine bottoms. Vegetation was dominated by subarctic lady fern and slender wood reed in the herbaceous stratum. Trees were generally absent and salmon raspberry was sometimes observed in the shrub stratum (Inset 1). Hydrologic regimes ranged from seasonally flooded to semi-permanently flooded. Hydric soil characteristics observed include the presence of a histosol, hydrogen sulfide odor, and redox concentrations.



Inset 1. Persistent Emergent Wetland

***Deciduous Scrub-Shrub/Emergent Wetlands***

Deciduous scrub-shrub/persistent emergent wetlands (PSS1/EM1) were observed in shallow linear depressions supported by groundwater discharge (Inset 2). Vegetation was dominated by devil’s club and salmon raspberry in the shrub stratum, and by subarctic lady fern in the herbaceous stratum. The problematic vegetation procedure (USACE 2007) was used for this wetland type. Trees were generally absent. Sitka spruce and Western hemlock trees were present on the drier margins. The hydrologic regime was saturated with some pockets of standing water in low-lying depressions. Hydric soil characteristics observed include the presence of a histosol, hydrogen sulfide, and gleyed pores along root channels and pore linings in the soil.



Inset 2. Deciduous Scrub-Shrub/Emergent Wetland

***Persistent Emergent/Deciduous Scrub-Shrub Wetlands***

Persistent emergent/deciduous scrub-shrub wetlands (PEM1/SS1) were observed in a groundwater discharge depressional area (Inset 3). Vegetation was dominated by slender wood reed and American brooklime in the herbaceous stratum and devil’s club in the shrub stratum. The hydrologic regime is saturated with some standing water in the deepest part of the depression. Hydric soil characteristics observed include the presence of a histosol and hydrogen sulfide.



Inset 3. Emergent/Deciduous Scrub-Shrub Wetland

***Deciduous Palustrine Scrub-Shrub Wetlands***

Deciduous scrub-shrub wetlands (PSS1) were mapped in deep depressions on alder slopes (not pictured). This wetland type was not visited in the field; however based on aerial interpretation the vegetation community likely consists of Sitka alder in the shrub stratum with subarctic lady fern occurring as a subdominant in the herbaceous stratum. The hydrologic regime is likely saturated as opposed to flooded due to the relatively well drained soils observed in surrounding upland plots.



Inset 4. Forested Upland

***Uplands***

Uplands were prevalent throughout the project area. Uplands on the northeast half of the project area were generally characterized as moderately sloped mature and second growth evergreen forests with Western hemlock and Sitka spruce dominant in the tree stratum (Inset 4). Uplands on the southwest half of the project area were characterized as moderately to steeply sloped, dense alder thickets. Primary hydrology indicators were lacking in all upland plots and soils were typically well drained silt loam and gravelly sandy loam with cobbles.



Inset 5. Palustrine Pond

***Ponds***

Three ponds (PUBH) were observed in the project area (Inset 5). Ponds in the project area occur as depressional areas fed by groundwater discharge or overland flow from small streams or seeps.

***Non-Navigable Tributary Waters of the United States***

One upper perennial stream (R3UBH) and associated gravel bars (R3USA) were able to be mapped as polygons on the aerial imagery. Glacier Creek (Inset 6) is considered a relatively permanent water (RPW) and is a direct tributary to the Klehini River. The Klehini River flows into the Chilkat River which is a direct tributary to the Chilkat Inlet, a Section 10 Water subject to the ebb and flow of the tide.



Inset 6. Upper Perennial Stream (Glacier Creek)

Streams that were too small to be mapped as polygons on the aerial photography were mapped using line features.

These line features generally represent streams less than 10 feet wide and were divided into perennial (R3UBH) and intermittent (R4SBC) streams. Of the 34 small streams mapped, 19 are mapped as perennial and 15 are mapped as intermittent. A total of 17,940 linear feet of small streams were mapped.

Wetland scientists determined the perennial or intermittent status of streams in the field. Teams considered recent precipitation and assessed the presence or absence of indicators such as flowing surface water, bed and banks, sediment or debris lines, and aquatic vegetation. Upon returning from the field, scientists verified the status of all the mapped streams based on examination of aerial photography, landform position, size, catchment area, and existing GIS stream layers.

### **3.4 Jurisdictional Status**

This wetland delineation was prepared in compliance with the *USACE Wetlands Delineation Manual* (USACE 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual, Alaska Region* (USACE 2007). The on-site determination conducted by HDR Alaska, Inc. on July 1, 2, and 3, 2013, indicates that of the total 233.01 acres in the project area, there are approximately 7.69 acres of wetlands or waterbodies, with an additional 17,940 linear feet of small streams.

Glacier Creek is considered a relatively permanent water (RPW) subject to USACE jurisdiction under Section 404 of the Clean Water Act. The remainder of the perennial streams (also considered RPW's) and the intermittent streams (seasonal RPW's) in the project area are interpreted as tributaries to Glacier Creek, or waters that would be considered adjacent to Glacier Creek. The wetlands and ponds in the project area would be considered adjacent to or abutting the streams in the project area. Based on the most recent USACE guidance on jurisdiction, all mapped wetlands and waterbodies within the project area would be considered subject USACE jurisdiction under Section 404 of the Clean Water Act due to their surface water connections and or adjacency to Glacier Creek.

### **4.0 COMPENSATORY MITIGATION**

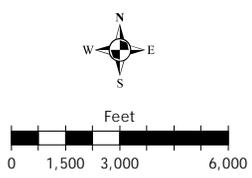
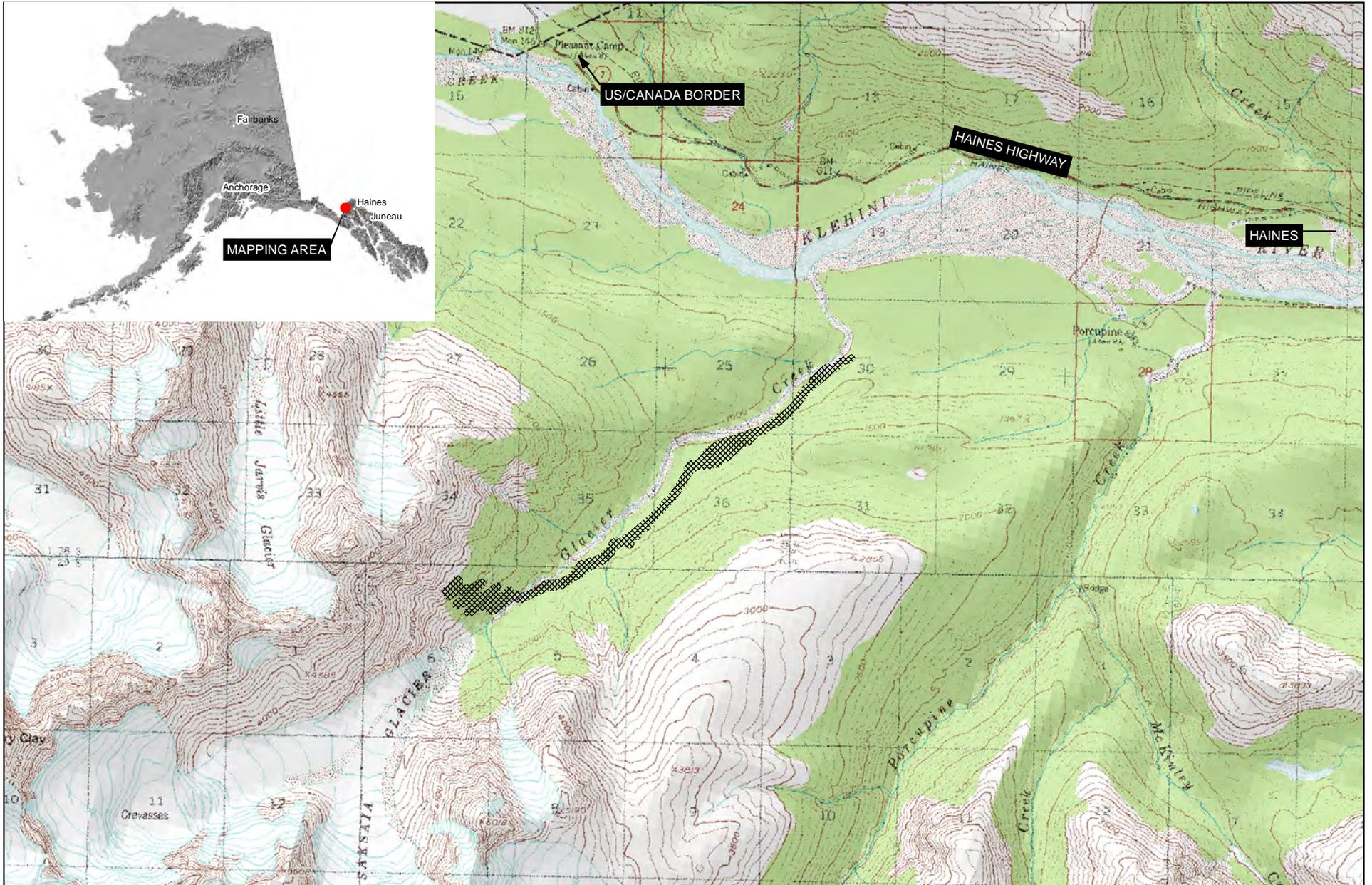
In 2008 the Federal Register for EPA 40 CFR 230 and USACE 33 CFR 332 published a final rule that addresses compensatory mitigation for unavoidable losses of aquatic resources. Consequently, compensatory mitigation is expected to be required for most projects involving wetland impacts. Furthermore, USACE Alaska Regulatory Guidance Letter 09-01 (RGL 09-01) requires that Section 404 permit applicants submit a compensatory mitigation plan with permit applications (USACE 2009). This report does not address mitigation ratios or impacts to wetlands or other waters of the U.S. from the project; however the results of this report may be used to assist resource personnel in categorizing wetlands for the purpose of identifying mitigation ratios.

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- U.S. Fish and Wildlife Service (USFWS). 2013. National Wetland Inventory Map Skagway B-4, accessed at: <http://www.fws.gov/wetlands/Wetlands-Mapper.html> on June 25, 2013.

**FIGURES**

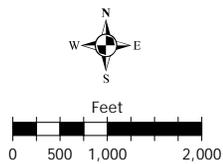
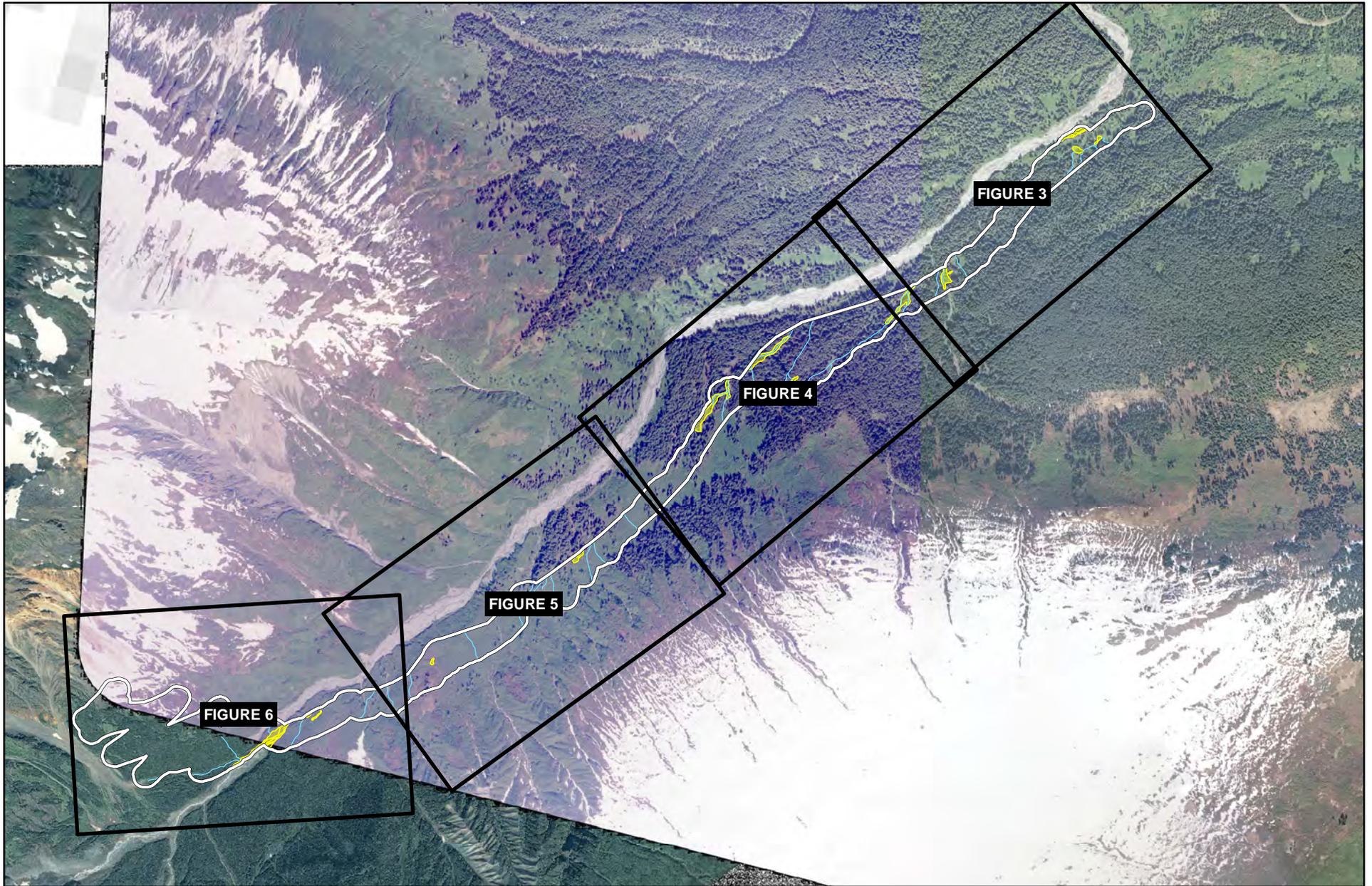




LEGEND  
 Mapping Area

Vicinity Map  
 Palmer VMS Project  
 Constantine Metals Resources Ltd.  
 August 2013

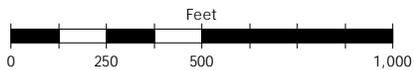
FIGURE 1



- LEGEND
-  Figure Extents
  -  Mapping Area
  -  Streams
  -  Wetlands

Figure Extents  
*Palmer VMS Project*  
*Constantine Metals Resources Ltd.*  
*August 2013*

FIGURE 2



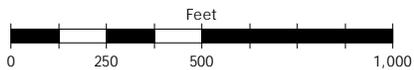
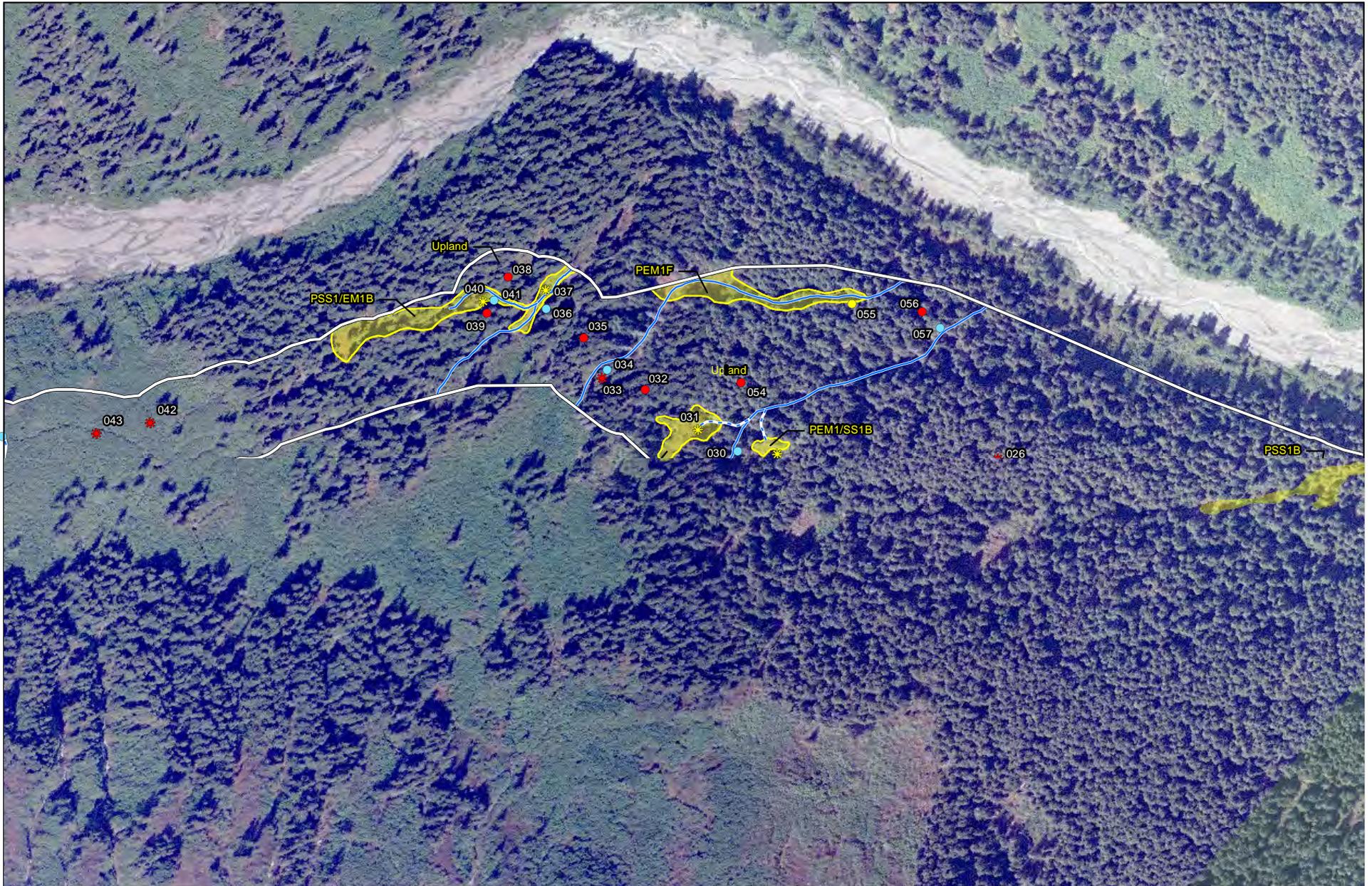
LEGEND

Mapping Area	Data Form - Wetland
Perennial Stream	Data Form - Upland
Intermittent Stream	Photo Point - Wetland
Wetlands	Photo Point - Waterbody
	Photo Point - Upland

### Wetland and Waterbody Mapping Figure Extents

*Palmer VMS Project  
Constantine Metals Resources Ltd.  
August 2013*

FIGURE 3



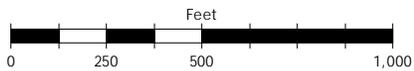
**LEGEND**

Mapping Area	Data Form - Wetland
Perennial Stream	Data Form - Upland
Intermittent Stream	Photo Point - Wetland
Wetlands	Photo Point - Waterbody
	Photo Point - Upland

## Wetland and Waterbody Mapping Figure Extents

*Palmer VMS Project  
Constantine Metals Resources Ltd.  
August 2013*

**FIGURE 4**



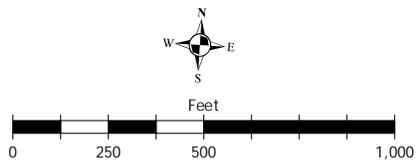
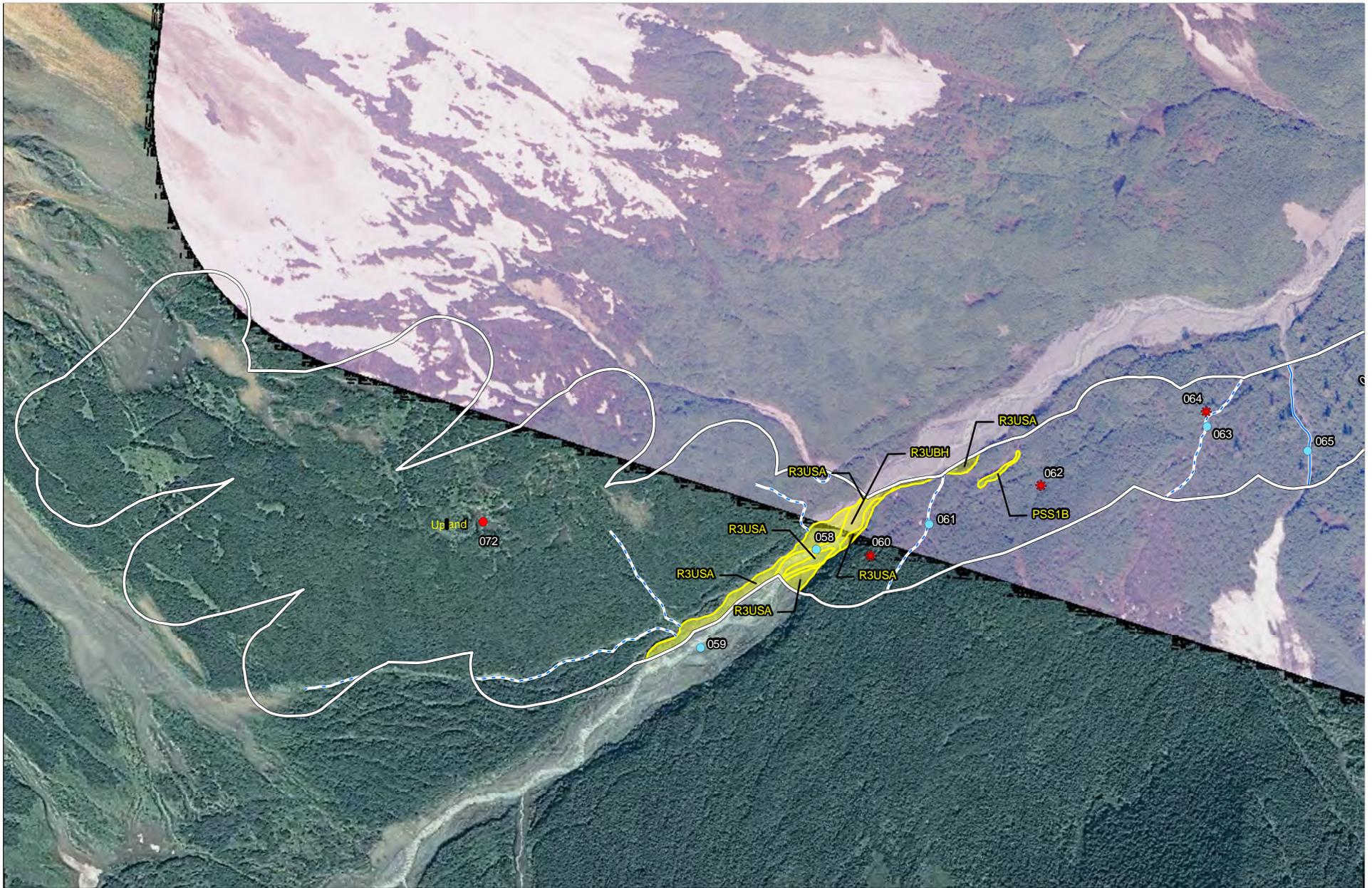
LEGEND

Mapping Area	Data Form - Wetland
Perennial Stream	Data Form - Upland
Intermittent Stream	Photo Point - Wetland
Wetlands	Photo Point - Waterbody
	Photo Point - Upland

## Wetland and Waterbody Mapping Figure Extents

*Palmer VMS Project  
Constantine Metals Resources Ltd.  
August 2013*

FIGURE 5



LEGEND

Mapping Area	Data Form - Wetland
Perennial Stream	Data Form - Upland
Intermittent Stream	Photo Point - Wetland
Wetlands	Photo Point - Waterbody
	Photo Point - Upland

## Wetland and Waterbody Mapping Figure Extents

*Palmer VMS Project  
Constantine Metals Resources Ltd.  
August 2013*

FIGURE 6

**APPENDIX A**

**WETLAND DETERMINATION DATA FORMS  
AND PHOTOGRAPHS**



WETLAND DETERMINATION DATA FORM – Alaska Region

Project: Palmer VMS Borough/City: Haines Date: 7/1/2013  
 Applicant/Owner: Constantine Sampling Point #: 01  
 Investigator(s): Z. Halstead, D. Jewell Firm: HDR Alaska, Inc.  
 Lat. (dec.°) 59.41668 Long. 136.30075 ± ' NAD 83 Recorded on GPS #: X Marked on map? X Field Map #: 1  
 Subregion (circle one): SE Southcentral Western Aleutian Interior Northern Landform: Toe slope / High Terrace Slope (%): 0 Aspect: -  
 Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: 2  
 Photo nos./descriptions: 0186, 187 - Soil 188, 189 - Veg. Camera #:      Veg Type (Viereck Level 4 or other):       
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes: X No:      HGM type: N/A  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No       
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	Yes <u>    </u>	No <u>X</u>	Is the sampled area within a wetland?	Yes <u>    </u>	No <u>X</u>
Hydric Soil Present?	Yes <u>    </u>	No <u>X</u>		Remarks (e.g., marginal?):	
Wetland Hydrology Present?	Yes <u>    </u>	No <u>X</u>			

VEGETATION (Use scientific names.)

Tree Stratum (dbh ≥ 3")								Dominance Test worksheet:		
Sp.	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.	Number of Dominant Species That are OBL, FACW, or FAC:		
1. <u>Pop. bal.</u>	<u>10</u>	<u>Y</u>	<u>FACU</u>	5.				<u>3</u>	(A)	
2. <u>Pic. sit.</u>	<u>5</u>	<u>Y</u>	<u>FACU</u>	6.				<u>7</u>	(B)	
3.				7.						
4.				8.						
Total Tree Cover: <u>15</u>								Percent of Dominant Species That are OBL, FACW, or FAC:	<u>43.9</u>	(A/B)
50% of total cover: <u>7.5</u>								Prevalence Index worksheet:		
20% of total cover: <u>3.0</u>								Total % Cover of:	Multiply by:	
Sapling/Shrub Stratum (woody plants < 3" dbh)								OBL species	<u>0</u>	X1= <u>0</u>
	Abs.Cov.%	Dom?	Ind.		Abs.Cov.%	Dom?	Ind.	FACW species	<u>2</u>	X2= <u>4</u>
1. <u>Sal. bar.</u>	<u>10</u>	<u>Y</u>	<u>FAC</u>	7.				FAC species	<u>57</u>	X3= <u>171</u>
2. <u>Pic. sit.</u>	<u>1</u>	<u>N</u>	<u>FACU</u>	8.				FACU species	<u>49</u>	X4= <u>196</u>
3. <u>Aln. sin.</u>	<u>5</u>	<u>Y</u>	<u>FAC</u>	9.				UPL + NL species	<u>15</u>	X5= <u>75</u>
4. <u>Rub. spec.</u>	<u>1</u>	<u>N</u>	<u>FACU</u>	10.				Column Totals:	<u>123</u>	(A) <u>446</u>
5. <u>Opl. hor.</u>	<u>5</u>	<u>Y</u>	<u>FACU</u>	11.				Prevalence Index = B/A =	<u>3.63</u>	
6.				12.						
Total Sapling/Shrub Cover: <u>22</u>										
50% of total cover: <u>11</u>										
20% of total cover: <u>4.4</u>										
Herb Stratum								Hydrophytic Vegetation Indicators:		
	Abs.Cov.%	Dom?	Ind.		Abs.Cov.%	Dom?	Ind.	<u>N</u> Dominance Test is >50%		
1. <u>Aru. dio.</u>	<u>15</u>	<u>Y</u>	<u>UPL</u>	12. <u>Circ. alp.</u>	<u>2</u>	<u>N</u>	<u>FACW</u>	<u>N</u> Prevalence Index is ≤3.0		
2. <u>Ath. fil.</u>	<u>30</u>	<u>Y</u>	<u>FAC</u>	13.				<u>N</u> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)		
3. <u>Epi. ang.</u>	<u>10</u>	<u>N</u>	<u>FACU</u>	14.				<u>N</u> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)		
4. <u>Eru. rev.</u>	<u>5</u>	<u>N</u>	<u>FAC</u>	15.						
5. <u>Her. lan.</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	16.						
6. <u>Str. amp.</u>	<u>2</u>	<u>N</u>	<u>FACU</u>	17.						
7. <u>Urt. dio.</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	18.						
8. <u>Gym. dry.</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	19.						
9. <u>Gal. can.</u>	<u>5</u>	<u>N</u>	<u>FAC</u>	20.						
10. <u>Gal. trifl.</u>	<u>1</u>	<u>N</u>	<u>FAC</u>	21.						
11. <u>Ger. mac.</u>	<u>1</u>	<u>N</u>	<u>FAC</u>	22.						
Total Herb Cover: <u>86</u>								Hydrophytic Vegetation Present?		
50% of total cover: <u>43</u>								Yes <u>    </u>	No <u>X</u>	
20% of total cover: <u>17.2</u>										
Circular 1/10-ac plot <u>X</u> or other plot dimension: <u>    </u> % of bare ground: <u>0</u>										
% Cover of Wetland Bryophytes <u>    </u> % Total Cover of Bryophytes <u>0</u> % (where applicable)										
Remarks:										

**SOIL**

Sampling Point #: 07

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

Depth (in.)	Horizon Name	Soil Matrix		Redox Features				Texture	α,α dip. (pos/ neg)	Remarks (or use comment number)
		Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>			
0-3	O <sub>i</sub>	2.5Y 2/2	30	7.5YR 2.5/3	10	C	M	SILTY	N	
3-20	B	2.5Y 3/2	90	7.5YR 2.5/3	10	C	M	SILTY	N	

<sup>1</sup>Type: C = Concentration, D = Depletion, RM = Reduced Matrix, CS=Coated Sand Grains <sup>2</sup>Location: PL = Pore Lining, RC = Root Channel, M = Matrix

**Hydric Soil Indicators** (check ones that apply, msr from top of mineral layers unless otherwise noted):

<input checked="" type="checkbox"/> Histosol or Histel (A1) (≥16" organic surface, sat'd during wet period of growing season) <input checked="" type="checkbox"/> Histic Epipedon (A2) (8-16" organics, sat'd, underlain by mineral soil with chroma ≤2) <input checked="" type="checkbox"/> Hydrogen Sulfide (A4) (w/in 12" of ground surface; @ _____" in this pit) <input checked="" type="checkbox"/> Thick Dark Surface (A12) <input checked="" type="checkbox"/> Alaska Gleyed (A13) <input checked="" type="checkbox"/> Alaska Redox (A14) <input checked="" type="checkbox"/> Alaska Gleyed Pores (A15)	<b>Indicators for Problematic Hydric Soils<sup>3</sup>:</b> <input checked="" type="checkbox"/> Alaska Color Change <sup>4</sup> (TA4) <input checked="" type="checkbox"/> Alaska Alpine Swales (TA5) <input checked="" type="checkbox"/> Alaska Redox with 2.5Y Hue <input checked="" type="checkbox"/> Alaska Gleyed without Hue 5Y or Redder Underlying Layer <input checked="" type="checkbox"/> Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)	<sup>3</sup> One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. <sup>4</sup> Give details of color change in Remarks.
---	---	---

Restrictive Layer (if present) Type: <u>None</u> Depth (inches) <u>N/A</u>	Drainage Class: <u>W/D</u> Soil Map Unit Name: _____	Hydric Soil Present? Yes ___ No <u>N</u>
--	---	--

Comments:  
1.  
2.  
3.

**HYDROLOGY**

<p><b>Wetland Hydrology Indicators</b> (check ones that apply, msr from soil surface):</p> <p><u>Primary Indicators</u> (any one indicator is sufficient)</p> <input checked="" type="checkbox"/> Surface Water (A1) <input checked="" type="checkbox"/> High Water Table (A2) (w/in 12") <input checked="" type="checkbox"/> Saturation (A3) (w/in 12") <input checked="" type="checkbox"/> Water Marks (B1) <input checked="" type="checkbox"/> Sediment Deposits (B2) <input checked="" type="checkbox"/> Drift Deposits (B3) <input checked="" type="checkbox"/> Algal Mat or Crust (B4) <input checked="" type="checkbox"/> Iron Deposits (B5)	<input checked="" type="checkbox"/> Surface Soil Cracks (B6) <input checked="" type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Marl Deposits (B15) <input checked="" type="checkbox"/> Hydrogen Sulfide Odor (C1) (w/in 12") <input checked="" type="checkbox"/> Dry-Season Water Table (C2) (w/in 24") <input checked="" type="checkbox"/> Other (explain) <u>tree slope</u>	<p><u>Secondary Indicators</u> (at least 2 are required)</p> <input checked="" type="checkbox"/> Water-Stained Leaves (B9) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input checked="" type="checkbox"/> Oxid'd Rhizospheres on Living Roots (C3) (w/in 12") <input checked="" type="checkbox"/> Presence of Reduced Iron (C4) (pos. α,α or soil color change w/in 12") <input checked="" type="checkbox"/> Salt Deposits (C5) <input checked="" type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input checked="" type="checkbox"/> Shallow Aquitard (D3) (w/in 24", can perch H2O w/in 12") <input checked="" type="checkbox"/> Microtopographic Relief (D4) (caused by water) <input checked="" type="checkbox"/> FAC Neutral Test (D5) (# OBL+FACW dominants > # FACU+UPL dominants)
--	---	--

<p>Field Observations (in. from ground surface):</p> <p>Surface Water Present? Yes ___ No <u>X</u> Depth of water (in.) _____</p> <p>Water Table Present? Yes ___ No <u>X</u> Depth to water (in.) _____</p> <p>Seeping in at that depth but not yet filled: _____</p> <p>Saturation Present? Yes ___ No <u>X</u> Depth to sat. (in.) _____</p> <p>(includes capillary fringe) Epi Endo Unknown</p>	<p><b>Wetland Hydrology Present?</b> Yes ___ No <u>X</u></p>
---	--

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

Remarks:



**Site 01.** Soil - Upland



**Site 01.** Soil - Upland

---



**Site 01.** Vegetation - Upland



**Site 01.** Vegetation - Upland

---

WETLAND DETERMINATION DATA FORM - Alaska Region

Project: Constantine Palmer UMS Borough/City: Haines Date: 7/1/2013  
 Applicant/Owner: Constantine Sampling Point #: 03  
 Investigator(s): Z. Halstead, D. Jewell Firm: HDR Alaska, Inc.  
 Lat. (dec.) 59.41666 Long. 136.30199 ± ' NAD 83 Recorded on GPS #:  Marked on map?  Field Map #: 1  
 Subregion (circle one):  SE Southcentral Western Aleutian Interior Northern Landform: Low Terrace Slope (%): 0 Aspect: -  
 Shape across slope: linear / convex  concave Shape up/downslope: linear / convex  concave NWI classification: 2  
 Photo nos./descriptions: 194, 195 - Soil, 196, 197 - Veg Camera #: \_\_\_\_\_ Veg Type (Viereck Level 4 or other): \_\_\_\_\_  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes:  No: \_\_\_\_\_ HGM type: N/A  
 Are Vegetation N Soil N or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes  No \_\_\_\_\_  
 Are Vegetation N Soil N or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	Yes _____	No <input checked="" type="checkbox"/>	Is the sampled area within a wetland?	Yes _____	No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes _____	No <input checked="" type="checkbox"/>		Remarks (e.g., marginal?):	
Wetland Hydrology Present?	Yes _____	No <input checked="" type="checkbox"/>			

VEGETATION (Use scientific names.)

Tree Stratum (dbh ≥ 3")								Dominance Test worksheet:		
Sp.	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.	Number of Dominant Species That are OBL, FACW, or FAC:		
1. <u>Pic. Sit.</u>	<u>10</u>	<u>Y</u>	<u>FACU</u>	5. _____	_____	_____	_____	<u>2</u>	(A)	
2. _____	_____	_____	_____	6. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata:	<u>4</u> (B)	
3. _____	_____	_____	_____	7. _____	_____	_____	_____	Percent of Dominant Species That are OBL, FACW, or FAC:	<u>50</u> (A/B)	
4. _____	_____	_____	_____	8. _____	_____	_____	_____	Prevalence Index worksheet:		
Total Tree Cover: <u>10</u>								Total % Cover of:		Multiply by:
50% of total cover: <u>5</u>								OBL species	<u>0</u>	X1= <u>0</u>
20% of total cover: <u>2</u>								FACW species	<u>0</u>	X2= <u>0</u>
Sapling/Shrub Stratum (woody plants < 3" dbh)								FAC species	<u>87</u>	X3= <u>261</u>
	Abs.Cov.%	Dom?	Ind.		Abs.Cov.%	Dom?	Ind.	FACU species	<u>37</u>	X4= <u>148</u>
1. <u>Aln. sin.</u>	<u>60</u>	<u>Y</u>	<u>FAC</u>	7. _____	_____	_____	_____	UPL + NL species	<u>0</u>	X5= <u>0</u>
2. <u>Opl. hor.</u>	<u>10</u>	<u>N</u>	<u>FACU</u>	8. _____	_____	_____	_____	Column Totals:	<u>124</u> (A)	<u>409</u> (B)
3. <u>Sam. rac.</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	9. _____	_____	_____	_____	Prevalence Index = B/A = <u>3.30</u>		
4. <u>Vac. ala.</u>	<u>1</u>	<u>N</u>	<u>FAC</u>	10. _____	_____	_____	_____	Hydrophytic Vegetation Indicators:		
5. <u>Tsu. bet.</u>	<u>1</u>	<u>N</u>	<u>FAC</u>	11. _____	_____	_____	_____	<input checked="" type="checkbox"/> Dominance Test is >50%		
6. _____	_____	_____	_____	12. _____	_____	_____	_____	<input checked="" type="checkbox"/> Prevalence Index is ≤3.0		
Total Sapling/Shrub Cover: <u>77</u>								<input checked="" type="checkbox"/> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)		
50% of total cover: <u>38.5</u>								<input checked="" type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)		
20% of total cover: <u>15.4</u>								<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.		
Herb Stratum								Hydrophytic Vegetation Present?		
	Abs.Cov.%	Dom?	Ind.		Abs.Cov.%	Dom?	Ind.	Yes _____	No <input checked="" type="checkbox"/>	
1. <u>Ach. sil.</u>	<u>25</u>	<u>Y</u>	<u>FAC</u>	12. _____	_____	_____	_____	Remarks: <u>Remnant side channel of Glacier Creek.</u>		
2. <u>Gym. dry.</u>	<u>10</u>	<u>Y</u>	<u>FACU</u>	13. _____	_____	_____	_____			
3. <u>Str. amp.</u>	<u>2</u>	<u>N</u>	<u>FACU</u>	14. _____	_____	_____	_____			
4. _____	_____	_____	_____	15. _____	_____	_____	_____			
5. _____	_____	_____	_____	16. _____	_____	_____	_____			
6. _____	_____	_____	_____	17. _____	_____	_____	_____			
7. _____	_____	_____	_____	18. _____	_____	_____	_____			
8. _____	_____	_____	_____	19. _____	_____	_____	_____			
9. _____	_____	_____	_____	20. _____	_____	_____	_____			
10. _____	_____	_____	_____	21. _____	_____	_____	_____			
11. _____	_____	_____	_____	22. _____	_____	_____	_____			
Total Herb Cover: <u>37</u>								Circular 1/10-ac plot <input checked="" type="checkbox"/> or other plot dimension: _____ % of bare ground: <u>0</u>		
50% of total cover: <u>18.5</u>								% Cover of Wetland Bryophytes _____ % Total Cover of Bryophytes <u>0</u> % (where applicable)		
20% of total cover: <u>7.4</u>										

**SOIL**

Sampling Point #: 03

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

Depth (in.)	Horizon Name	Soil Matrix		Redox Features				Texture	α, α dip. (pos/ neg)	Remarks (or use comment number)
		Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>			
0-3	O <sub>i</sub>									
3-5	A <sub>1</sub>	7.5YR 2.5/1	100					GRS1L0	N	
5-20	A <sub>2</sub>	7.5YR 2.5/1	50					GRS1L0	N	10% rubble
		7.5YR 2.5/2	50					↓	↓	

<sup>1</sup>Type: C = Concentration, D = Depletion, RM = Reduced Matrix, CS=Coated Sand Grains <sup>2</sup>Location: PL = Pore Lining, RC = Root Channel, M = Matrix

Hydric Soil Indicators (check ones that apply, msr from top of mineral layers unless otherwise noted):

<p><input checked="" type="checkbox"/> Histosol or Histel (A1) (≥16" organic surface, sat'd during wet period of growing season)</p> <p><input checked="" type="checkbox"/> Histic Epipedon (A2)(8-16" organics, sat'd, underlain by mineral soil with chroma ≤2)</p> <p><input checked="" type="checkbox"/> Hydrogen Sulfide (A4) (w/in 12" of ground surface; @ ___" in this pit)</p> <p><input checked="" type="checkbox"/> Thick Dark Surface (A12)</p> <p><input checked="" type="checkbox"/> Alaska Gleyed (A13)</p> <p><input checked="" type="checkbox"/> Alaska Redox (A14)</p> <p><input checked="" type="checkbox"/> Alaska Gleyed Pores (A15)</p>	<p><b>Indicators for Problematic Hydric Soils<sup>3</sup>:</b></p> <p><input checked="" type="checkbox"/> Alaska Color Change<sup>4</sup> (TA4)</p> <p><input checked="" type="checkbox"/> Alaska Alpine Swales (TA5)</p> <p><input checked="" type="checkbox"/> Alaska Redox with 2.5Y Hue</p> <p><input checked="" type="checkbox"/> Alaska Gleyed without Hue 5Y or Redder Underlying Layer</p> <p><input checked="" type="checkbox"/> Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)</p>	<p><sup>3</sup>One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.</p> <p><sup>4</sup>Give details of color change in Remarks.</p>
---	---	--

Restrictive Layer (if present) Type: <u>None</u>	Drainage Class: <u>WD</u>	Hydric Soil Present? Yes ___ No <u>X</u>
Depth (inches) <u>N/A</u>	Soil Map Unit Name: _____	

Comments:  
1.  
2.  
3.

**HYDROLOGY**

<p><b>Wetland Hydrology Indicators (check ones that apply, msr from soil surface):</b></p> <p><u>Primary Indicators (any one indicator is sufficient)</u></p> <p><input checked="" type="checkbox"/> Surface Water (A1)      <input checked="" type="checkbox"/> Surface Soil Cracks (B6)</p> <p><input checked="" type="checkbox"/> High Water Table (A2) (w/in 12")      <input checked="" type="checkbox"/> Inundation Visible on Aerial Imagery (B7)</p> <p><input checked="" type="checkbox"/> Saturation (A3) (w/in 12")      <input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8)</p> <p><input checked="" type="checkbox"/> Water Marks (B1)      <input checked="" type="checkbox"/> Marl Deposits (B15)</p> <p><input checked="" type="checkbox"/> Sediment Deposits (B2)      <input checked="" type="checkbox"/> Hydrogen Sulfide Odor (C1) (w/in 12")</p> <p><input checked="" type="checkbox"/> Drift Deposits (B3)      <input checked="" type="checkbox"/> Dry-Season Water Table (C2) (w/in 24")</p> <p><input checked="" type="checkbox"/> Algal Mat or Crust (B4)      <input checked="" type="checkbox"/> Other (explain)</p> <p><input checked="" type="checkbox"/> Iron Deposits (B5)</p>		<p><u>Secondary Indicators (at least 2 are required)</u></p> <p><input checked="" type="checkbox"/> Water-Stained Leaves (B9)</p> <p><input checked="" type="checkbox"/> Drainage Patterns (B10)</p> <p><input checked="" type="checkbox"/> Oxid'd Rhizospheres on Living Roots (C3) (w/in 12")</p> <p><input checked="" type="checkbox"/> Presence of Reduced Iron (C4) (pos. α.α or soil color change w/in 12")</p> <p><input checked="" type="checkbox"/> Salt Deposits (C5)</p> <p><input checked="" type="checkbox"/> Stunted or Stressed Plants (D1)</p> <p><input checked="" type="checkbox"/> Geomorphic Position (D2)</p> <p><input checked="" type="checkbox"/> Shallow Aquitard (D3) (w/in 24", can perch H2O w/in 12")</p> <p><input checked="" type="checkbox"/> Microtopographic Relief (D4) (caused by water)</p> <p><input checked="" type="checkbox"/> FAC Neutral Test (D5) (# OBL+FACW dominants &gt; # FACU+UPL dominants)</p>
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<p>Field Observations (in. from ground surface):</p> <p>Surface Water Present? Yes ___ No <u>X</u>      Depth of water (in.) _____</p> <p>Water Table Present? Yes ___ No <u>X</u>      Depth to water (in.) _____</p> <p>Seeping in at that depth but not yet filled: _____</p> <p>Saturation Present? Yes ___ No <u>X</u>      Depth to sat. (in.) _____</p> <p>(includes capillary fringe)      Epi Endo Unknown</p>	<p><b>Wetland Hydrology Present?</b> Yes ___ No <u>X</u></p>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:



**Site 03.** Soil - Upland



**Site 03.** Soil - Upland

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**Site 03.** Vegetation - Upland



**Site 03.** Vegetation - Upland

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WETLAND DETERMINATION DATA FORM - Alaska Region

Project: Palmer VMS Borough/City: Haines Date: 7/1/2013  
 Applicant/Owner: Constantine Sampling Point #: 10  
 Investigator(s): Z. Halstead, D. Jewell Firm: HDR Alaska, Inc.  
 Lat. (dec.): 59.41523 Long. 136.30408 ± NAD 83 Recorded on GPS #: X Marked on map? X Field Map #: 1  
 Subregion (circle one): SE Southcentral Western Aleutian Interior Northern Landform: Slope Slope (%): 4 Aspect: 158  
 Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: v  
 Photo nos./descriptions: 214, 215 - Soil 216, 217 - Veg Camera #: \_\_\_\_\_ Veg Type (Viereck Level 4 or other): \_\_\_\_\_  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes: X No: \_\_\_\_\_ HGM type: N/A  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_  
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	Yes _____	No <u>X</u>	Is the sampled area within a wetland?	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>		Remarks (e.g., marginal?):	
Wetland Hydrology Present?	Yes _____	No <u>X</u>			

VEGETATION (Use scientific names.)

Tree Stratum (dbh ≥ 3")								Dominance Test worksheet:			
Sp.	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.	Number of Dominant Species That are OBL, FACW, or FAC:			
1. <u>Tsu. het.</u>	<u>70</u>	<u>Y</u>	<u>FAC</u>	5. _____				<u>2</u>	(A)		
2. _____				6. _____				Total Number of Dominant Species Across All Strata:	<u>5</u> (B)		
3. _____				7. _____				Percent of Dominant Species That are OBL, FACW, or FAC:	<u>40</u> (A/B)		
4. _____				8. _____				Prevalence Index worksheet:			
Total Tree Cover: <u>70</u>								Total % Cover of:		Multiply by:	
50% of total cover: <u>35</u>				20% of total cover: <u>14</u>				OBL species	<u>0</u>	X1=	<u>0</u>
Sapling/Shrub Stratum (woody plants < 3" dbh)								FACW species	<u>0</u>	X2=	<u>0</u>
Abs.Cov.%	Dom?	Ind.		Abs.Cov.%	Dom?	Ind.		FAC species	<u>93</u>	X3=	<u>279</u>
1. <u>Vac. ala.</u>	<u>20</u>	<u>Y</u>	<u>FAC</u>	7. _____				FACU species	<u>28</u>	X4=	<u>112</u>
2. <u>Cor. can.</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	8. _____				UPL + NL species	<u>0</u>	X5=	<u>0</u>
3. <u>Tsu. het.</u>	<u>1</u>	<u>N</u>	<u>FAC</u>	9. _____				Column Totals:	<u>121</u> (A)		<u>391</u> (B)
4. <u>Men. fer.</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	10. _____				Prevalence Index = B/A = <u>3.23</u>			
5. <u>Opl. hor.</u>	<u>10</u>	<u>Y</u>	<u>FACU</u>	11. _____				Hydrophytic Vegetation Indicators:			
6. _____				12. _____				<u>N</u> Dominance Test is >50%			
Total Sapling/Shrub Cover: <u>36</u>								<u>N</u> Prevalence Index is ≤3.0			
50% of total cover: <u>18</u>								<u>N</u> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)			
20% of total cover: <u>7.2</u>								<u>N</u> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)			
Herb Stratum								<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.			
Abs.Cov.%	Dom?	Ind.		Abs.Cov.%	Dom?	Ind.		Hydrophytic Vegetation Present? Yes _____ No <u>X</u>			
1. <u>Brt. sec.</u>	<u>1</u>	<u>N</u>	<u>FACU</u>	12. _____							
2. <u>Rub. ped.</u>	<u>2</u>	<u>N</u>	<u>FAC</u>	13. _____							
3. <u>Str. amp.</u>	<u>2</u>	<u>N</u>	<u>FACU</u>	14. _____							
4. <u>Gym. dly.</u>	<u>5</u>	<u>Y</u>	<u>FACU</u>	15. _____							
5. <u>Cor. can.</u>	<u>5</u>	<u>Y</u>	<u>FACU</u>	16. _____							
6. _____				17. _____							
7. _____				18. _____							
8. _____				19. _____							
9. _____				20. _____							
10. _____				21. _____							
11. _____				22. _____							
Total Herb Cover: <u>15</u>											
50% of total cover: <u>7.5</u>											
20% of total cover: <u>3</u>											
Circular 1/10-ac plot <u>X</u> or other plot dimension: _____ % of bare ground: <u>50-like</u>											
% Cover of Wetland Bryophytes _____ % Total Cover of Bryophytes <u>10</u> % (where applicable)											

Remarks: Plot located adjacent to R3UBH (Plot 9),  
Second growth forest, cut stumps (historic) present. Not recent.

**SOIL**

Sampling Point #: 10

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

Depth (in.)	Horizon Name	Soil Matrix		Redox Features				Texture	a, a dip. (pos/ neg)	Remarks (or use comment number)
		Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>			
0-5	O <sub>i</sub>	-	-	-	-	-	-	-	-	
5-8	E	5Y 5/1	100	-	-	-	-	SIL0	N	
8-16	B	10YR 5/8	100	-	-	-	-	SALO	N	10% large cobbles

<sup>1</sup>Type: C = Concentration, D = Depletion, RM = Reduced Matrix, CS=Coated Sand Grains <sup>2</sup>Location: PL = Pore Lining, RC = Root Channel, M = Matrix

**Hydric Soil Indicators** (check ones that apply, msr from top of mineral layers unless otherwise noted):

<input checked="" type="checkbox"/> Histosol or Histel (A1) (≥16" organic surface, sat'd during wet period of growing season)	<input checked="" type="checkbox"/> Alaska Color Change <sup>4</sup> (TA4)	<sup>3</sup> One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. <sup>4</sup> Give details of color change in Remarks.
<input checked="" type="checkbox"/> Histic Epipedon (A2)(8-16" organics, sat'd, underlain by mineral soil with chroma ≤2)	<input checked="" type="checkbox"/> Alaska Alpine Swales (TA5)	
<input checked="" type="checkbox"/> Hydrogen Sulfide (A4) (w/in 12" of ground surface; @ _____" in this pit)	<input checked="" type="checkbox"/> Alaska Redox with 2.5Y Hue	
<input checked="" type="checkbox"/> Thick Dark Surface (A12)	<input checked="" type="checkbox"/> Alaska Gleyed without Hue 5Y or Redder Underlying Layer	
<input checked="" type="checkbox"/> Alaska Gleyed (A13)	<input checked="" type="checkbox"/> Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)	
<input checked="" type="checkbox"/> Alaska Redox (A14)		
<input checked="" type="checkbox"/> Alaska Gleyed Pores (A15)		

Restrictive Layer (if present) Type: <u>None</u> Depth (inches) <u>N/A</u>	Drainage Class: <u>WD</u> Soil Map Unit Name: _____	Hydric Soil Present? Yes ___ No <u>X</u>
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Comments:  
 1. Large cobbles, well drained soil.  
 2.  
 3.

**HYDROLOGY**

<p><b>Wetland Hydrology Indicators</b> (check ones that apply, msr from soil surface):</p> <p><u>Primary Indicators</u> (any one indicator is sufficient)</p> <input checked="" type="checkbox"/> Surface Water (A1) <input checked="" type="checkbox"/> Surface Soil Cracks (B6) <input checked="" type="checkbox"/> High Water Table (A2) (w/in 12") <input checked="" type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input checked="" type="checkbox"/> Saturation (A3) (w/in 12") <input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Water Marks (B1) <input checked="" type="checkbox"/> Marl Deposits (B15) <input checked="" type="checkbox"/> Sediment Deposits (B2) <input checked="" type="checkbox"/> Hydrogen Sulfide Odor (C1) (w/in 12") <input checked="" type="checkbox"/> Drift Deposits (B3) <input checked="" type="checkbox"/> Dry-Season Water Table (C2) (w/in 24") <input checked="" type="checkbox"/> Algal Mat or Crust (B4) <input checked="" type="checkbox"/> Other (explain) <input checked="" type="checkbox"/> Iron Deposits (B5)	<p><u>Secondary Indicators</u> (at least 2 are required)</p> <input checked="" type="checkbox"/> Water-Stained Leaves (B9) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input checked="" type="checkbox"/> Oxid'd Rhizospheres on Living Roots (C3) (w/in 12") <input checked="" type="checkbox"/> Presence of Reduced Iron (C4) (pos. α, α or soil color change w/in 12") <input checked="" type="checkbox"/> Salt Deposits (C5) <input checked="" type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input checked="" type="checkbox"/> Shallow Aquitard (D3) (w/in 24", can perch H2O w/in 12") <input checked="" type="checkbox"/> Microtopographic Relief (D4) (caused by water) <input checked="" type="checkbox"/> FAC Neutral Test (D5) (# OBL+FACW dominants > # FACU+UPL dominants)
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<p>Field Observations (in. from ground surface):</p> <p>Surface Water Present? Yes ___ No <u>X</u>      Depth of water (in.) _____</p> <p>Water Table Present? Yes ___ No <u>X</u>      Depth to water (in.) _____</p> <p>Seeping in at that depth but not yet filled: _____</p> <p>Saturation Present? Yes ___ No <u>X</u>      Depth to sat. (in.) _____</p> <p>(includes capillary fringe)      Epi Endo Unknown</p>	<p>Wetland Hydrology Present? Yes ___ No <u>X</u></p>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:



**Site 10.** Soil - Upland



**Site 10.** Soil - Upland

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**Site 10.** Vegetation - Upland



**Site 10.** Vegetation - Upland

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WETLAND DETERMINATION DATA FORM - Alaska Region

Project: Palmer VMS Borough/City: Heines Date: 7/1/2013  
 Applicant/Owner: Constantine Sampling Point #: 18  
 Investigator(s): Z. Hulstead, D. Sewell Firm: HDR Alaska, Inc.  
 Lat. (dec.) 59.41040 Long. 136.31367 ± ' NAD 83 Recorded on GPS #: X Marked on map? X Field Map #: \_\_\_\_\_  
 Subregion (circle one): (SE) Southcentral Western Aleutian Interior Northern Landform: Slope, swale Slope (%): 4 Aspect: 340  
 Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: PSS1/EM1B  
 Photo nos./descriptions: 243, 244 - Soil 245, 246 - Veg Camera #: \_\_\_\_\_ Veg Type (Viereck Level 4 or other): \_\_\_\_\_  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes: X No: \_\_\_\_\_ HGM type: Slope  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_  
 Are Vegetation X, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? * Yes <u>X</u> No _____	Is the sampled area within a wetland? Yes <u>X</u> No _____
Hydric Soil Present? Yes <u>X</u> No _____	Remarks (e.g., marginal?):
Wetland Hydrology Present? Yes <u>X</u> No _____	

VEGETATION (Use scientific names.)

Tree Stratum (dbh ≥ 3")								Dominance Test worksheet:		
Sp.	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.	Number of Dominant Species That are OBL, FACW, or FAC:		
1. <u>None</u>				5. _____				<u>1</u>	(A)	
2. _____				6. _____				Total Number of Dominant Species Across All Strata:	<u>2</u> (B)	
3. _____				7. _____				Percent of Dominant Species That are OBL, FACW, or FAC:	<u>50</u> (A/B)	
4. _____				8. _____				Prevalence Index worksheet:		
Total Tree Cover: _____								Total % Cover of:		
50% of total cover: _____				20% of total cover: _____				OBL species	<u>0</u>	X1= <u>0</u>
Sapling/Shrub Stratum (woody plants < 3" dbh)								FACW species	<u>0</u>	X2= <u>0</u>
Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.		FAC species	<u>76</u>	X3= <u>228</u>
1. <u>Opl. hor.</u>	<u>40</u>	<u>Y</u>	<u>FACU</u>	7. _____				FACU species	<u>50</u>	X4= <u>200</u>
2. <u>Tsu. het.</u>	<u>1</u>	<u>N</u>	<u>FAC</u>	8. _____				UPL + NL species	<u>0</u>	X5= <u>0</u>
3. _____				9. _____				Column Totals:	<u>126</u> (A)	<u>428</u> (B)
4. _____				10. _____				Prevalence Index = B/A = <u>3.40</u>		
5. _____				11. _____				Hydrophytic Vegetation Indicators:		
6. _____				12. _____				<u>N</u> Dominance Test is >50%		
Total Sapling/Shrub Cover: <u>41</u>								<u>N</u> Prevalence Index is ≤3.0		
50% of total cover: <u>20.5</u>				20% of total cover: <u>8.2</u>				<u>N</u> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)		
Herb Stratum								<u>X</u> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)		
Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.		<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.		
1. <u>Ath. fil.</u>	<u>60</u>	<u>Y</u>	<u>FAC</u>	12. _____				Hydrophytic Vegetation Present? Yes <u>X</u> No _____		
2. <u>Rib. ped.</u>	<u>2</u>	<u>N</u>	<u>FAC</u>	13. _____						
3. <u>Str. amp.</u>	<u>10</u>	<u>N</u>	<u>FACU</u>	14. _____						
4. <u>Gal. trifl.</u>	<u>2</u>	<u>N</u>	<u>FAC</u>	15. _____						
5. <u>Eg. orb.</u>	<u>10</u>	<u>N</u>	<u>FAC</u>	16. _____						
6. <u>Cat. can.</u>	<u>1</u>	<u>N</u>	<u>FAC</u>	17. _____						
7. _____				18. _____						
8. _____				19. _____						
9. _____				20. _____						
10. _____				21. _____						
11. _____				22. _____						
Total Herb Cover: <u>85</u>										
50% of total cover: <u>42.5</u>				20% of total cover: <u>17</u>						
Circular 1/10-ac plot <u>X</u> or other plot dimension: _____ % of bare ground: <u>0</u>										
% Cover of Wetland Bryophytes _____ % Total Cover of Bryophytes _____ %										

Remarks: Linear depression from E. w. associated with ground water seep/small stream. Plot on edge of Tsu. het. forest in Opl. hor. Ath. fil. dominated community. Few Tsu. ner. Present outside of plot to east. Spot checked soil to find boundary up slope.

**SOIL**

Sampling Point #: 18

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

Depth (in.)	Horizon Name	Soil Matrix		Redox Features				α, α dip. (pos/ neg)	Remarks (or use comment number)
		Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-24	Oe								

<sup>1</sup>Type: C = Concentration, D = Depletion, RM = Reduced Matrix, CS=Coated Sand Grains <sup>2</sup>Location: PL = Pore Lining, RC = Root Channel, M = Matrix

**Hydric Soil Indicators** (check ones that apply, msr from top of mineral layers unless otherwise noted):

<p><input checked="" type="checkbox"/> Histosol or Histel (A1) (≥16" organic surface, sat'd during wet period of growing season)</p> <p><input checked="" type="checkbox"/> Histic Epipedon (A2)(8-16" organics, sat'd, underlain by mineral soil with chroma ≤2)</p> <p><input checked="" type="checkbox"/> Hydrogen Sulfide (A4) (w/in 12" of ground surface; @ <u>2</u>" in this pit)</p> <p><input checked="" type="checkbox"/> Thick Dark Surface (A12)</p> <p><input checked="" type="checkbox"/> Alaska Gleyed (A13)</p> <p><input checked="" type="checkbox"/> Alaska Redox (A14)</p> <p><input checked="" type="checkbox"/> Alaska Gleyed Pores (A15)</p>	<p><b>Indicators for Problematic Hydric Soils<sup>3</sup>:</b></p> <p><input checked="" type="checkbox"/> Alaska Color Change<sup>4</sup> (TA4)</p> <p><input checked="" type="checkbox"/> Alaska Alpine Swales (TA5)</p> <p><input checked="" type="checkbox"/> Alaska Redox with 2.5Y Hue</p> <p><input checked="" type="checkbox"/> Alaska Gleyed without Hue 5Y or Redder Underlying Layer</p> <p><input checked="" type="checkbox"/> Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)</p>	<p><sup>3</sup>One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.</p> <p><sup>4</sup>Give details of color change in Remarks.</p>
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Restrictive Layer (if present) Type: <u>None</u> Depth (inches) <u>N/A</u>	Drainage Class: <u>PD</u> Soil Map Unit Name:	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
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Comments:  
1. Strong hydric soil indicators.  
2.  
3.

**HYDROLOGY**

**Wetland Hydrology Indicators** (check ones that apply, msr from soil surface):

<b>Primary Indicators (any one indicator is sufficient)</b>	
<input checked="" type="checkbox"/> Surface Water (A1)	<input checked="" type="checkbox"/> Surface Soil Cracks (B6)
<input checked="" type="checkbox"/> High Water Table (A2) (w/in 12")	<input checked="" type="checkbox"/> Inundation Visible on Aerial Imagery (B7)
<input checked="" type="checkbox"/> Saturation (A3) (w/in 12")	<input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input checked="" type="checkbox"/> Water Marks (B1)	<input checked="" type="checkbox"/> Marl Deposits (B15)
<input checked="" type="checkbox"/> Sediment Deposits (B2)	<input checked="" type="checkbox"/> Hydrogen Sulfide Odor (C1) (w/in 12")
<input checked="" type="checkbox"/> Drift Deposits (B3)	<input checked="" type="checkbox"/> Dry-Season Water Table (C2) (w/in 24")
<input checked="" type="checkbox"/> Algal Mat or Crust (B4)	<input checked="" type="checkbox"/> Other (explain)
<input checked="" type="checkbox"/> Iron Deposits (B5)	

**Secondary Indicators (at least 2 are required)**

<input checked="" type="checkbox"/> Water-Stained Leaves (B9)
<input checked="" type="checkbox"/> Drainage Patterns (B10) <u>Swale</u>
<input checked="" type="checkbox"/> Oxid'd Rhizospheres on Living Roots (C3) (w/in 12")
<input checked="" type="checkbox"/> Presence of Reduced Iron (C4) (pos. α,α or soil color change w/in 12")
<input checked="" type="checkbox"/> Salt Deposits (C5)
<input checked="" type="checkbox"/> Stunted or Stressed Plants (D1)
<input checked="" type="checkbox"/> Geomorphic Position (D2)
<input checked="" type="checkbox"/> Shallow Aquitard (D3) (w/in 24", can perch H2O w/in 12")
<input checked="" type="checkbox"/> Microtopographic Relief (D4) (caused by water)
<input checked="" type="checkbox"/> FAC Neutral Test (D5) (# OBL+FACW dominants > # FACU+UPL dominants)

**Field Observations (in. from ground surface):**

Surface Water Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth of water (in.) _____
Water Table Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Depth to water (in.) <u>6"±</u>
Seeping in at that depth but not yet filled: <u>6"±</u>		
Saturation Present? (includes capillary fringe)	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Depth to sat. (in.) <u>Surface</u>
Epi <input checked="" type="checkbox"/> Endo <input type="checkbox"/> Unknown		

Wetland Hydrology Present? Yes  No

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

Remarks:  
Strong hydro, strong soil = Problematic Veg. Opt. hor. known to occupy groundwater discharge areas.



**Site 18.** Soil – PSS1/EM1B



**Site 18.** Soil – PSS1/EM1B

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**Site 18.** Vegetation – PSS1/EM1B



**Site 18.** Vegetation – PSS1/EM1B

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WETLAND DETERMINATION DATA FORM - Alaska Region

Project: Palmer VMS Borough/City: Haines Date: 7/1/2013  
 Applicant/Owner: Constantine Sampling Point #: 20  
 Investigator(s): Z. Halstead, D. Jewell Firm: HDR Alaska, Inc.  
 Lat. (dec.) 59.41053 Long. 136.31319 ±     NAD 83 Recorded on GPS #: X Marked on map? X Field Map #:      
 Subregion (circle one): (SE) Southcentral Western Aleutian Interior Northern Landform: Slope Slope (%): 8 Aspect: 320  
 Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: N  
 Photo nos./descriptions: 251, 252 - Soil, 253, 254 - Veg. Camera #:     Veg Type (Viereck Level 4 or other):      
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes: X No:     HGM type:      
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No      
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	Yes <u>X</u>	No <u>   </u>	Is the sampled area within a wetland? Yes <u>   </u> No <u>X</u>	Remarks (e.g., marginal?):
Hydric Soil Present?	Yes <u>   </u>	No <u>X</u>		
Wetland Hydrology Present?	Yes <u>   </u>	No <u>X</u>		

VEGETATION (Use scientific names.)

Tree Stratum (dbh ≥ 3")								Dominance Test worksheet:			
Sp.	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.	Number of Dominant Species That are OBL, FACW, or FAC:			
1. <u>Ts. het.</u>	<u>35</u>	<u>Y</u>	<u>FAC</u>	5. <u>   </u>	<u>   </u>	<u>   </u>	<u>   </u>	<u>4</u>	(A)		
2. <u>   </u>	<u>   </u>	<u>   </u>	<u>   </u>	6. <u>   </u>	<u>   </u>	<u>   </u>	<u>   </u>	Total Number of Dominant Species Across All Strata:	<u>5</u> (B)		
3. <u>   </u>	<u>   </u>	<u>   </u>	<u>   </u>	7. <u>   </u>	<u>   </u>	<u>   </u>	<u>   </u>	Percent of Dominant Species That are OBL, FACW, or FAC:	<u>80</u> (A/B)		
4. <u>   </u>	<u>   </u>	<u>   </u>	<u>   </u>	8. <u>   </u>	<u>   </u>	<u>   </u>	<u>   </u>	Prevalence Index worksheet:			
Total Tree Cover: <u>35</u>								Total % Cover of:		Multiply by:	
50% of total cover: <u>17.5</u> 20% of total cover: <u>7</u>								OBL species	<u>0</u>	X1=	<u>0</u>
Sapling/Shrub Stratum (woody plants < 3" dbh)								FACW species	<u>0</u>	X2=	<u>0</u>
Sp.	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.	FAC species	<u>77</u>	X3=	<u>281</u>
1. <u>Vac. ala.</u>	<u>20</u>	<u>Y</u>	<u>FAC</u>	7. <u>   </u>	<u>   </u>	<u>   </u>	<u>   </u>	FACU species	<u>29</u>	X4=	<u>116</u>
2. <u>Cor. can.</u>	<u>10</u>	<u>   </u>	<u>FACU</u>	8. <u>   </u>	<u>   </u>	<u>   </u>	<u>   </u>	UPL + NL species	<u>0</u>	X5=	<u>0</u>
3. <u>Ts. het.</u>	<u>2</u>	<u>N</u>	<u>FAC</u>	9. <u>   </u>	<u>   </u>	<u>   </u>	<u>   </u>	Column Totals:	<u>100</u> (A)	<u>347</u> (B)	
4. <u>Man. ser.</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	10. <u>   </u>	<u>   </u>	<u>   </u>	<u>   </u>	Prevalence Index = B/A = <u>3.27</u>			
5. <u>Saur. rec.</u>	<u>2</u>	<u>N</u>	<u>FACU</u>	11. <u>   </u>	<u>   </u>	<u>   </u>	<u>   </u>	Hydrophytic Vegetation Indicators:			
6. <u>Op. hor.</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	12. <u>   </u>	<u>   </u>	<u>   </u>	<u>   </u>	<u>Y</u> Dominance Test is >50%			
Total Sapling/Shrub Cover: <u>34</u>								<u>N</u> Prevalence Index is ≤3.0			
50% of total cover: <u>17</u> 20% of total cover: <u>6.8</u>								<u>N</u> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)			
Herb Stratum								<u>N</u> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)			
Sp.	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.			
1. <u>R. rep.</u>	<u>10</u>	<u>Y</u>	<u>FAC</u>	12. <u>   </u>	<u>   </u>	<u>   </u>	<u>   </u>	Hydrophytic Vegetation Present? Yes <u>X</u> No <u>   </u>			
2. <u>Sfr. amp.</u>	<u>2</u>	<u>N</u>	<u>FACU</u>	13. <u>   </u>	<u>   </u>	<u>   </u>	<u>   </u>				
3. <u>Gum. dry.</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	14. <u>   </u>	<u>   </u>	<u>   </u>	<u>   </u>				
4. <u>Ath. S'l.</u>	<u>10</u>	<u>Y</u>	<u>FAC</u>	15. <u>   </u>	<u>   </u>	<u>   </u>	<u>   </u>				
5. <u>Cor. can.</u>	<u>10</u>	<u>Y</u>	<u>FACU</u>	16. <u>   </u>	<u>   </u>	<u>   </u>	<u>   </u>				
6. <u>   </u>	<u>   </u>	<u>   </u>	<u>   </u>	17. <u>   </u>	<u>   </u>	<u>   </u>	<u>   </u>				
7. <u>   </u>	<u>   </u>	<u>   </u>	<u>   </u>	18. <u>   </u>	<u>   </u>	<u>   </u>	<u>   </u>				
8. <u>   </u>	<u>   </u>	<u>   </u>	<u>   </u>	19. <u>   </u>	<u>   </u>	<u>   </u>	<u>   </u>				
9. <u>   </u>	<u>   </u>	<u>   </u>	<u>   </u>	20. <u>   </u>	<u>   </u>	<u>   </u>	<u>   </u>				
10. <u>   </u>	<u>   </u>	<u>   </u>	<u>   </u>	21. <u>   </u>	<u>   </u>	<u>   </u>	<u>   </u>				
11. <u>   </u>	<u>   </u>	<u>   </u>	<u>   </u>	22. <u>   </u>	<u>   </u>	<u>   </u>	<u>   </u>				
Total Herb Cover: <u>37</u>											
50% of total cover: <u>18.5</u> 20% of total cover: <u>7.4</u>											
Circular 1/10-ac plot <u>X</u> or other plot dimension: <u>   </u> % of bare ground: <u>15-11%</u>											
% Cover of Wetland Bryophytes <u>   </u> % Total Cover of Bryophytes <u>50</u> %											
Remarks:											

**SOIL**

Sampling Point #: 20

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

Depth (in.)	Horizon Name	Soil Matrix		Redox Features				Texture	α, α dip. (pos/ neg)	Remarks (or use comment number)
		Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>			
0-5	O <sub>1</sub>	-	-	-	-	-	-	-	-	
5-6	E	10YR 3/1	-	-	-	-	-	SILLO	-	
7-6	A <sub>1</sub>	7.5YR 2.5/3	-	-	-	-	-	SILLO	-	
6-18	B <sub>1</sub>	2.5YR 2.5/4	70	-	-	-	-	SALO	-	
		2.5YR 2.5/1	30	-	-	-	-	SALO	-	
18-20	B <sub>2</sub>	5Y 4/1	60	-	-	-	-	SALO	-	
		2.5YR 2.5/4	40	-	-	-	-	SALO	-	

<sup>1</sup>Type: C = Concentration, D = Depletion, RM = Reduced Matrix, CS=Coated Sand Grains <sup>2</sup>Location: PL = Pore Lining, RC = Root Channel, M = Matrix

Hydric Soil Indicators (check ones that apply, msr from top of mineral layers unless otherwise noted):

<p><input checked="" type="checkbox"/> Histosol or Histel (A1) (≥16" organic surface, sat'd during wet period of growing season)</p> <p><input checked="" type="checkbox"/> Histic Epipedon (A2)(8-16" organics, sat'd, underlain by mineral soil with chroma ≤2)</p> <p><input checked="" type="checkbox"/> Hydrogen Sulfide (A4) (w/in 12" of ground surface; @ _____" in this pit)</p> <p><input checked="" type="checkbox"/> Thick Dark Surface (A12)</p> <p><input checked="" type="checkbox"/> Alaska Gleyed (A13)</p> <p><input checked="" type="checkbox"/> Alaska Redox (A14)</p> <p><input checked="" type="checkbox"/> Alaska Gleyed Pores (A15)</p>	<p><b>Indicators for Problematic Hydric Soils<sup>3</sup>:</b></p> <p><input checked="" type="checkbox"/> Alaska Color Change<sup>4</sup> (TA4)</p> <p><input checked="" type="checkbox"/> Alaska Alpine Swales (TA5)</p> <p><input checked="" type="checkbox"/> Alaska Redox with 2.5Y Hue</p> <p><input checked="" type="checkbox"/> Alaska Gleyed without Hue 5Y or Redder Underlying Layer</p> <p><input checked="" type="checkbox"/> Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)</p>	<p><sup>3</sup>One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.</p> <p><sup>4</sup>Give details of color change in Remarks.</p>
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Restrictive Layer (if present) Type: <u>None</u> Depth (inches) <u>N/A</u>	Drainage Class: <u>UD</u> Soil Map Unit Name: _____	Hydric Soil Present? Yes ___ No <u>X</u>
--	--	--

Comments:

- 1.
- 2.
- 3.

**HYDROLOGY**

Wetland Hydrology Indicators (check ones that apply, msr from soil surface):

Primary Indicators (any one indicator is sufficient)

<input checked="" type="checkbox"/> Surface Water (A1)	<input checked="" type="checkbox"/> Surface Soil Cracks (B6)
<input checked="" type="checkbox"/> High Water Table (A2) (w/in 12")	<input checked="" type="checkbox"/> Inundation Visible on Aerial Imagery (B7)
<input checked="" type="checkbox"/> Saturation (A3) (w/in 12")	<input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input checked="" type="checkbox"/> Water Marks (B1)	<input checked="" type="checkbox"/> Marl Deposits (B15)
<input checked="" type="checkbox"/> Sediment Deposits (B2)	<input checked="" type="checkbox"/> Hydrogen Sulfide Odor (C1) (w/in 12")
<input checked="" type="checkbox"/> Drift Deposits (B3)	<input checked="" type="checkbox"/> Dry-Season Water Table (C2) (w/in 24")
<input checked="" type="checkbox"/> Algal Mat or Crust (B4)	<input checked="" type="checkbox"/> Other (explain)
<input checked="" type="checkbox"/> Iron Deposits (B5)	

Secondary Indicators (at least 2 are required)

<input checked="" type="checkbox"/> Water-Stained Leaves (B9)
<input checked="" type="checkbox"/> Drainage Patterns (B10)
<input checked="" type="checkbox"/> Oxid'd Rhizospheres on Living Roots (C3) (w/in 12")
<input checked="" type="checkbox"/> Presence of Reduced Iron (C4) (pos. α, α or soil color change w/in 12")
<input checked="" type="checkbox"/> Salt Deposits (C5)
<input checked="" type="checkbox"/> Stunted or Stressed Plants (D1)
<input checked="" type="checkbox"/> Geomorphic Position (D2)
<input checked="" type="checkbox"/> Shallow Aquitard (D3) (w/in 24", can perch H2O w/in 12")
<input checked="" type="checkbox"/> Microtopographic Relief (D4) (caused by water)
<input checked="" type="checkbox"/> FAC Neutral Test (D5) (# OBL+FACW dominants > # FACU+UPL dominants)

Field Observations (in. from ground surface):

Surface Water Present?	Yes ___ No <u>X</u>	Depth of water (in.) _____
Water Table Present?	Yes ___ No <u>X</u>	Depth to water (in.) _____
Seeping in at that depth but not yet filled: _____		
Saturation Present?	Yes ___ No <u>X</u>	Depth to sat. (in.) _____
(includes capillary fringe)		Epi Endo Unknown

Wetland Hydrology Present? Yes \_\_\_ No X

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

Remarks:



**Site 20.** Soil - Upland



**Site 20.** Soil - Upland

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**Site 20.** Vegetation - Upland



**Site 20.** Vegetation - Upland

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WETLAND DETERMINATION DATA FORM – Alaska Region

Project: Palmer VMS Borough/City: Haines Date: 2/1/10  
 Applicant/Owner: Carabattino Sampling Point #: 026  
 Investigator(s): Zach Halstead, Doug Jewell Firm: HDR Alaska, Inc.  
 Lat. (dec.) 59.40773 Long. 136.32210 ± ' NAD 83 Recorded on GPS #: Y Marked on map?    Field Map #: 2  
 Subregion (circle one): (SE) Southcentral Western Aleutian Interior Northern Landform: Ridge top Slope (%): 4 Aspect: 20°  
 Shape across slope: linear / (convex) / concave Shape up/downslope: (linear) / convex / concave NWI classification: U  
 Photo nos./descriptions: Sat: 267, 268 Veg: 269, 270 Camera #:    Veg Type (Viereck Level 4 or other): U  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes: X No:    HGM type: N/A  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No     
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	Yes <u>  </u>	No <u>X</u>	Is the sampled area within a wetland?	Yes <u>  </u>	No <u>X</u>
Hydric Soil Present?	Yes <u>  </u>	No <u>X</u>		Remarks (e.g., marginal?):	
Wetland Hydrology Present?	Yes <u>  </u>	No <u>X</u>			

VEGETATION (Use scientific names.)

Tree Stratum (dbh ≥ 3")								Dominance Test worksheet:																																																																																																																																																				
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**SOIL**

Sampling Point #: 022

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

Depth (in.)	Horizon Name	Soil Matrix		Redox Features				Texture	α, α dip. (pos/ neg)	Remarks (or use comment number)
		Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>			
0-5	O <sub>1</sub>	-	-	-	-	-	-	-	-	
5-7	OCE	2.5Y 4/1	100	-	-	-	-	SIL	-	
7-13	B <sub>1</sub>	7.5YR 2.5/3	100	-	-	-	-	SIL	-	
13-20	B <sub>2</sub>	7.5YR 3/2	50	-	-	-	-	SIL	-	
		7.5YR 2.5/3	50	-	-	-	-	SIL	-	

<sup>1</sup>Type: C = Concentration, D = Depletion, RM = Reduced Matrix, CS=Coated Sand Grains <sup>2</sup>Location: PL = Pore Lining, RC = Root Channel, M = Matrix

Hydric Soil Indicators (check ones that apply, msr from top of mineral layers unless otherwise noted):

<input checked="" type="checkbox"/> Histosol or Histel (A1) (≥16" organic surface, sat'd during wet period of growing season) <input checked="" type="checkbox"/> Histic Epipedon (A2)(8-16" organics, sat'd, underlain by mineral soil with chroma ≤2) <input checked="" type="checkbox"/> Hydrogen Sulfide (A4) (w/in 12" of ground surface; @ _____" in this pit) <input checked="" type="checkbox"/> Thick Dark Surface (A12) <input checked="" type="checkbox"/> Alaska Gleyed (A13) <input checked="" type="checkbox"/> Alaska Redox (A14) <input checked="" type="checkbox"/> Alaska Gleyed Pores (A15)	<b>Indicators for Problematic Hydric Soils<sup>3</sup>:</b>	<input checked="" type="checkbox"/> Alaska Color Change <sup>4</sup> (TA4) <input checked="" type="checkbox"/> Alaska Alpine Swales (TA5) <input checked="" type="checkbox"/> Alaska Redox with 2.5Y Hue <input checked="" type="checkbox"/> Alaska Gleyed without Hue 5Y or Redder Underlying Layer <input checked="" type="checkbox"/> Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)	<sup>3</sup> One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. <sup>4</sup> Give details of color change in Remarks.
--	---	--	---

Restrictive Layer (if present) Type: <u>N/A</u> Depth (inches) _____	Drainage Class: <u>WD</u> Soil Map Unit Name: _____	Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/>
--	--	---

Comments:

- 1.
- 2.
- 3.

**HYDROLOGY**

Wetland Hydrology Indicators (check ones that apply, msr from soil surface):

Primary Indicators (any one indicator is sufficient)

- |  |   |
|--|---|
| <input checked="" type="checkbox"/> Surface Water (A1)               | <input checked="" type="checkbox"/> Surface Soil Cracks (B6)                  |
| <input checked="" type="checkbox"/> High Water Table (A2) (w/in 12") | <input checked="" type="checkbox"/> Inundation Visible on Aerial Imagery (B7) |
| <input checked="" type="checkbox"/> Saturation (A3) (w/in 12")       | <input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8)   |
| <input checked="" type="checkbox"/> Water Marks (B1)                 | <input checked="" type="checkbox"/> Marl Deposits (B15)                       |
| <input checked="" type="checkbox"/> Sediment Deposits (B2)           | <input checked="" type="checkbox"/> Hydrogen Sulfide Odor (C1) (w/in 12")     |
| <input checked="" type="checkbox"/> Drift Deposits (B3)              | <input checked="" type="checkbox"/> Dry-Season Water Table (C2) (w/in 24")    |
| <input checked="" type="checkbox"/> Algal Mat or Crust (B4)          | <input checked="" type="checkbox"/> Other (explain)                           |
| <input checked="" type="checkbox"/> Iron Deposits (B5)               |   |

Secondary Indicators (at least 2 are required)

- |  |
|--|
| <input checked="" type="checkbox"/> Water-Stained Leaves (B9)  |
| <input checked="" type="checkbox"/> Drainage Patterns (B10)  |
| <input checked="" type="checkbox"/> Oxid'd Rhizospheres on Living Roots (C3) (w/in 12")                    |
| <input checked="" type="checkbox"/> Presence of Reduced Iron (C4) (pos. α,α or soil color change w/in 12") |
| <input checked="" type="checkbox"/> Salt Deposits (C5)   |
| <input checked="" type="checkbox"/> Stunted or Stressed Plants (D1)  |
| <input checked="" type="checkbox"/> Geomorphic Position (D2)   |
| <input checked="" type="checkbox"/> Shallow Aquitard (D3) (w/in 24", can perch H2O w/in 12")               |
| <input checked="" type="checkbox"/> Microtopographic Relief (D4) (caused by water)                         |
| <input checked="" type="checkbox"/> FAC Neutral Test (D5) (# OBL+FACW dominants > # FACU+UPL dominants)    |

Field Observations (in. from ground surface):

Surface Water Present?	Yes _____ No <input checked="" type="checkbox"/>	Depth of water (in.) _____
Water Table Present?	Yes _____ No <input checked="" type="checkbox"/>	Depth to water (in.) _____
Seeping in at that depth but not yet filled: _____		
Saturation Present? (includes capillary fringe)	Yes _____ No <input checked="" type="checkbox"/>	Depth to sat. (in.) _____
Epi Endo Unknown		

Wetland Hydrology Present? Yes \_\_\_\_\_ No

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

Remarks: Low ridge top



**Site 26.** Soil - Upland



**Site 26.** Soil - Upland

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**Site 26.** Vegetation – Upland



**Site 26.** Vegetation - Upland

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WETLAND DETERMINATION DATA FORM - Alaska Region

Project: Palmer VMS Borough/City: Haines Date: 7/1/2013  
 Applicant/Owner: Constantine Sampling Point #: 030029  
 Investigator(s): Z. Halstead, D. Jewell Firm: HDR Alaska, Inc.  
 Lat. (dec.) 59.40630 Long. 136.32544 ± ' NAD 83 Recorded on GPS #: X Marked on map? X Field Map #: 2  
 Subregion (circle one): SE Southcentral Western Aleutian Interior Northern Landform: Depression Slope (%): \_\_\_\_\_ Aspect: \_\_\_\_\_  
 Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: DEM1/SS1B  
 Photo nos./descriptions: 279, 280-51, 275-278 - Veg. Camera #: \_\_\_\_\_ Veg Type (Viereck Level 4 or other): \_\_\_\_\_  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes: X No: \_\_\_\_\_ HGM type: Depressional  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_  
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is the sampled area within a wetland?	Yes <u>X</u>	No _____
Hydric Soil Present?	Yes <u>X</u>	No _____		Remarks (e.g., marginal?):	
Wetland Hydrology Present?	Yes <u>X</u>	No _____			

VEGETATION (Use scientific names.)

Tree Stratum (dbh ≥ 3")								Dominance Test worksheet:		
Sp.	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.	Number of Dominant Species That are OBL, FACW, or FAC:		
1. <u>None</u>				5. _____				<u>2</u>	(A)	
2. _____				6. _____						
3. _____				7. _____				<u>3</u>	(B)	
4. _____				8. _____						
Total Tree Cover: _____								Percent of Dominant Species That are OBL, FACW, or FAC:	<u>66.7</u>	(A/B)
50% of total cover: _____				20% of total cover: _____				Prevalence Index worksheet:		
Sapling/Shrub Stratum (woody plants < 3" dbh)								Total % Cover of:		
	Abs.Cov.%	Dom?	Ind.		Abs.Cov.%	Dom?	Ind.	OBL species	Multiply by:	
1. <u>Vacc. ab.</u>	<u>2</u>	<u>N</u>	<u>FAC</u>	7. _____				<u>15</u>	X1= <u>15</u>	
2. <u>Opl. hor.</u>	<u>10</u>	<u>Y</u>	<u>FACU</u>	8. _____				<u>40</u>	X2= <u>80</u>	
3. _____				9. _____				<u>4</u>	X3= <u>12</u>	
4. _____				10. _____				<u>17</u>	X4= <u>68</u>	
5. _____				11. _____				<u>0</u>	X5= <u>0</u>	
6. _____				12. _____				Column Totals: <u>76</u>	(A) <u>175</u>	
Total Sapling/Shrub Cover: <u>12</u>								Prevalence Index = B/A = <u>2.30</u>		
50% of total cover: <u>6</u>				20% of total cover: <u>2.4</u>						
Herb Stratum								Hydrophytic Vegetation Indicators:		
	Abs.Cov.%	Dom?	Ind.		Abs. Cov.%	Dom?	Ind.			
1. <u>Ver. name</u>	<u>15</u>	<u>Y</u>	<u>OBL</u>	12. _____				<u>Y</u>	Dominance Test is >50%	
2. <u>Cin. lat.</u>	<u>40</u>	<u>Y</u>	<u>FACW</u>	13. _____				<u>Y</u>	Prevalence Index is ≤3.0	
3. <u>Str. amp.</u>	<u>2</u>	<u>N</u>	<u>FACU</u>	14. _____				<u>N</u>	Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)	
4. <u>Tel. sp.</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	15. _____				<u>N</u>	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
5. <u>Tra. tri.</u>	<u>2</u>	<u>N</u>	<u>FAC</u>	16. _____				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.		
6. _____				17. _____						
7. _____				18. _____						
8. _____				19. _____						
9. _____				20. _____						
10. _____				21. _____						
11. _____				22. _____						
Total Herb Cover: <u>64</u>								Hydrophytic Vegetation Present?		
50% of total cover: <u>32</u>				20% of total cover: <u>12.8</u>				Yes <u>X</u> No _____		
Circular 1/10-ac plot _____ or other plot dimension: <u>10'x10'</u> % of bare ground: <u>0</u>										
% Cover of Wetland Bryophytes _____ % Total Cover of Bryophytes <u>50</u> % (where applicable)										

Remarks: Gym. dry, growing on fringe. Opl. hor. growing in inundated area. Small plot to characterize vegetated area, over open water, ~4' lower than surrounding upland. Outlet on west side. Potential wetland down slope to west.

20' x 30' in size

SOIL

Sampling Point #: 029

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

Depth (in.)	Horizon Name	Soil Matrix		Redox Features				Texture	α, α dip. (pos/ neg)	Remarks (or use comment number)
		Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>			
0-20	0e									

<sup>1</sup>Type: C = Concentration, D = Depletion, RM = Reduced Matrix, CS=Coated Sand Grains <sup>2</sup>Location: PL = Pore Lining, RC = Root Channel, M = Matrix

Hydric Soil Indicators (check ones that apply, msr from top of mineral layers unless otherwise noted):

Y Histosol or Histel (A1) (≥16" organic surface, sat'd during wet period of growing season)

N Histic Epipedon (A2)(8-16" organics, sat'd, underlain by mineral soil with chroma ≤2)

Y Hydrogen Sulfide (A4) (w/in 12" of ground surface; @ 0" in this pit)

N Thick Dark Surface (A12)

N Alaska Gleyed (A13)

N Alaska Redox (A14)

N Alaska Gleyed Pores (A15)

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

N Alaska Color Change<sup>4</sup> (TA4)

N Alaska Alpine Swales (TA5)

N Alaska Redox with 2.5Y Hue

N Alaska Gleyed without Hue 5Y or Redder Underlying Layer

N Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)

<sup>3</sup>One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.  
<sup>4</sup>Give details of color change in Remarks.

Restrictive Layer (if present) Type: <u>None</u> Depth (inches): <u>N/A</u>	Drainage Class: <u>VPD</u> Soil Map Unit Name:	Hydric Soil Present? Yes <u>X</u> No <u>    </u>
---	---	--

Comments:

- 
- 
- 

HYDROLOGY

Wetland Hydrology Indicators (check ones that apply, msr from soil surface):

**Primary Indicators (any one indicator is sufficient)**

Y Surface Water (A1)      N Surface Soil Cracks (B6)

Y High Water Table (A2) (w/in 12")      N Inundation Visible on Aerial Imagery (B7)

Y Saturation (A3) (w/in 12")      N Sparsely Vegetated Concave Surface (B8)

N Water Marks (B1)      N Marl Deposits (B15)

N Sediment Deposits (B2)      Y Hydrogen Sulfide Odor (C1) (w/in 12")

N Drift Deposits (B3)      N Dry-Season Water Table (C2) (w/in 24")

N Algal Mat or Crust (B4)      N Other (explain)

N Iron Deposits (B5)

**Secondary Indicators (at least 2 are required)**

N Water-Stained Leaves (B9)

Y Drainage Patterns (B10) Depression Marked

N Oxid'd Rhizospheres on Living Roots (C3) (w/in 12")

N Presence of Reduced Iron (C4) (pos. α,α or soil color change w/in 12")

N Salt Deposits (C5)

N Stunted or Stressed Plants (D1)

Y Geomorphic Position (D2) Depression

N Shallow Aquitard (D3) (w/in 24", can perch H2O w/in 12")

N Microtopographic Relief (D4) (caused by water)

Y FAC Neutral Test (D5) (# OBL+FACW dominants > # FACU+UPL dominants)

Field Observations (in. from ground surface):

Surface Water Present? Yes X No      Depth of water (in.) 3" adj. to plot

Water Table Present? Yes X No      Depth to water (in.) 1"

Seeping in at that depth but not yet filled:     

Saturation Present? Yes X No      Depth to sat. (in.) Surface

(includes capillary fringe) Epi Endo Unknown

Wetland Hydrology Present? Yes X No     

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

Remarks: Depressional wetland that ponds water, narrow outlet on down hill side



**Site 29.** Soil – PEM1/SS1B



**Site 29.** Soil – PEM1/SS1B

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**Site 29.** Vegetation – PEM1/SS1B



**Site 29.** Vegetation – PEM1/SS1B

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WETLAND DETERMINATION DATA FORM – Alaska Region

Project: Palmer UMS Borough/City: Haines Date: 7/1/2013  
 Applicant/Owner: Constellation Sampling Point #: 031  
 Investigator(s): Z. Halstead, D. Jewell Firm: HDR Alaska, Inc.  
 Lat. (dec.) 59.40596 Long. 136.32693 ± ' NAD 83 Recorded on GPS #:  Marked on map?  Field Map #: \_\_\_\_\_  
 Subregion (circle one): SE Southcentral Western Aleutian Interior Northern Landform: Toeslope Slope (%): 2 Aspect: 22  
 Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: PEMIC  
 Photo nos./descriptions: 283-284-Soil, 285-286-Veg. Camera #: \_\_\_\_\_ Veg Type (Viereck Level 4 or other): \_\_\_\_\_  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes:  No: \_\_\_\_\_ HGM type: Slope  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes  No \_\_\_\_\_  
 Are Vegetation D, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No _____	Is the sampled area within a wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No _____	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No _____	
			Remarks (e.g., marginal?):

VEGETATION (Use scientific names.)

Tree Stratum (dbh ≥ 3")							
Sp.	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.
1. <u>None</u>				5. _____			
2. _____				6. _____			
3. _____				7. _____			
4. _____				8. _____			
Total Tree Cover: _____							
50% of total cover: _____				20% of total cover: _____			
Sapling/Shrub Stratum (woody plants < 3" dbh)							
	Abs.Cov.%	Dom?	Ind.		Abs.Cov.%	Dom?	Ind.
1. <u>Rub. spec.</u>	<u>10</u>	<u>Y</u>	<u>FACU</u>	7. _____			
2. _____				8. _____			
3. _____				9. _____			
4. _____				10. _____			
5. _____				11. _____			
6. _____				12. _____			
Total Sapling/Shrub Cover: <u>10</u>							
50% of total cover: <u>5</u>				20% of total cover: <u>2</u>			
Herb Stratum							
	Abs.Cov.%	Dom?	Ind.		Abs.Cov.%	Dom?	Ind.
1. <u>Anth. Sl</u>	<u>35</u>	<u>Y</u>	<u>FAC</u>	12. _____			
2. <u>Cin. lat</u>	<u>35</u>	<u>Y</u>	<u>FACW</u>	13. _____			
3. <u>Vernonia</u>	<u>10</u>	<u>N</u>	<u>OBL</u>	14. _____			
4. <u>Gym. dry</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	15. _____			
5. <u>Str. amp.</u>	<u>2</u>	<u>N</u>	<u>FACU</u>	16. _____			
6. <u>Veg. vir.</u>	<u>5</u>	<u>N</u>	<u>FAC</u>	17. _____			
7. _____				18. _____			
8. _____				19. _____			
9. _____				20. _____			
10. _____				21. _____			
11. _____				22. _____			
Total Herb Cover: <u>92</u>							
50% of total cover: <u>46</u>				20% of total cover: <u>18.4</u>			
Circular 1/10-ac plot _____ or other plot dimension: <u>20x20</u> % of bare ground: <u>0</u>							
% Cover of Wetland Bryophytes _____ % Total Cover of Bryophytes <u>70</u> %							
Remarks: <u>At toeslope, discharge, Dry forest upslope.</u>							

**Dominance Test worksheet:**

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

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

Percent of Dominant Species That are OBL, FACW, or FAC: 66.7 (A/B)

**Prevalence Index worksheet:**

Total % Cover of:	Multiply by:
OBL species <u>10</u>	X1= <u>10</u>
FACW species <u>35</u>	X2= <u>70</u>
FAC species <u>40</u>	X3= <u>120</u>
FACU species <u>17</u>	X4= <u>68</u>
UPL + NL species <u>0</u>	X5= <u>0</u>
Column Totals: <u>102</u> (A)	<u>268</u> (B)

Prevalence Index = B/A = 2.63

**Hydrophytic Vegetation Indicators:**

Dominance Test is >50%

Prevalence Index is ≤3.0

Morphological Adaptations<sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)

<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes  No \_\_\_\_\_

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

Depth (in.)	Horizon Name	Soil Matrix		Redox Features				Texture	α,α dip. (pos/ neg)	Remarks (or use comment number)
		Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>			
0-5	O <sub>c</sub>	-	-	-	-	-	-	-	-	-
5-9	A <sub>b</sub>	5Y 3/1	90	7.5YR 4/4	10	C	RC	SALO	+	-
9-22	O <sub>e</sub>	-	-	-	-	-	-	-	-	-

<sup>1</sup>Type: C = Concentration, D = Depletion, RM = Reduced Matrix, CS=Coated Sand Grains <sup>2</sup>Location: PL = Pore Lining, RC = Root Channel, M = Matrix

Hydric Soil Indicators (check ones that apply, msr from top of mineral layers unless otherwise noted):

<p><u>Y</u> <sup>w/which A layer.</sup> Histosol or Histel (A1) (≥16" organic surface, sat'd during wet period of growing season)</p> <p><u>N</u> Histic Epipedon (A2)(8-16" organics, sat'd, underlain by mineral soil with chroma ≤2)</p> <p><u>Y</u> Hydrogen Sulfide (A4) (w/in 12" of ground surface; @ <u>5</u>" in this pit)</p> <p><u>N</u> Thick Dark Surface (A12)</p> <p><u>N</u> Alaska Gleyed (A13)</p> <p><u>Y</u> Alaska Redox (A14)</p> <p><u>N</u> Alaska Gleyed Pores (A15)</p>	<p><b>Indicators for Problematic Hydric Soils<sup>3</sup>:</b></p> <p><u>N</u> Alaska Color Change<sup>4</sup> (TA4)</p> <p><u>N</u> Alaska Alpine Swales (TA5)</p> <p><u>N</u> Alaska Redox with 2.5Y Hue</p> <p><u>N</u> Alaska Gleyed without Hue 5Y or Redder Underlying Layer</p> <p><u>N</u> Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)</p>	<p><sup>3</sup>One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.</p> <p><sup>4</sup>Give details of color change in Remarks.</p>
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Restrictive Layer (if present) Type: <u>None</u> Depth (inches) <u>N/A</u>	Drainage Class: <u>PD</u> Soil Map Unit Name:	Hydric Soil Present? Yes <u>X</u> No <u>    </u>
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Comments:  
1.  
2.  
3.

**HYDROLOGY**

<p><b>Wetland Hydrology Indicators (check ones that apply, msr from soil surface):</b></p> <p><u>Primary Indicators (any one indicator is sufficient)</u></p> <p><u>Y</u> Surface Water (A1)      <u>N</u> Surface Soil Cracks (B6)</p> <p><u>Y</u> High Water Table (A2) (w/in 12")      <u>N</u> Inundation Visible on Aerial Imagery (B7)</p> <p><u>Y</u> Saturation (A3) (w/in 12")      <u>N</u> Sparsely Vegetated Concave Surface (B8)</p> <p><u>N</u> Water Marks (B1)      <u>N</u> Marl Deposits (B15)</p> <p><u>N</u> Sediment Deposits (B2)      <u>Y</u> Hydrogen Sulfide Odor (C1) (w/in 12")</p> <p><u>N</u> Drift Deposits (B3)      <u>N</u> Dry-Season Water Table (C2) (w/in 24")</p> <p><u>N</u> Algal Mat or Crust (B4)      <u>N</u> Other (explain)</p> <p><u>Y</u> Iron Deposits (B5)</p>	<p><u>Secondary Indicators (at least 2 are required)</u></p> <p><u>N</u> Water-Stained Leaves (B9)</p> <p><u>Y</u> Drainage Patterns (B10) <u>Surface water drains through</u></p> <p><u>Y</u> Oxid'd Rhizospheres on Living Roots (C3) (w/in 12")</p> <p><u>Y</u> Presence of Reduced Iron (C4) (pos. α,α or soil color change w/in 12")</p> <p><u>N</u> Salt Deposits (C5)</p> <p><u>N</u> Stunted or Stressed Plants (D1)</p> <p><u>Y</u> Geomorphic Position (D2) <u>freshly</u></p> <p><u>N</u> Shallow Aquitard (D3) (w/in 24", can perch H2O w/in 12")</p> <p><u>N</u> Microtopographic Relief (D4) (caused by water)</p> <p><u>N</u> FAC Neutral Test (D5) (# OBL+FACW dominants &gt; # FACU+UPL dominants)</p>
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<p>Field Observations (in. from ground surface):</p> <p>Surface Water Present? Yes <u>X</u> No <u>    </u> Depth of water (in.) <u>2-adj. to pit</u></p> <p>Water Table Present? Yes <u>X</u> No <u>    </u> Depth to water (in.) <u>1"</u></p> <p>Seeping in at that depth but not yet filled: <u>    </u></p> <p>Saturation Present? Yes <u>X</u> No <u>    </u> Depth to sat. (in.) <u>Surface</u></p> <p>(includes capillary fringe) Epi <u>Endo</u> Unknown</p>	<p>Wetland Hydrology Present? Yes <u>X</u> No <u>    </u></p>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:  
Strong hydrology & soil indicators present



**Site 31.** Soil – PEM1C



**Site 31.** Soil – PEM1C

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**Site 31.** Vegetation – PEM1C



**Site 31.** Vegetation – PEM1C

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WETLAND DETERMINATION DATA FORM - Alaska Region

Project: Palmer VMS Borough/City: Kenai Date: 7/2/13  
 Applicant/Owner: Condor Line Sampling Point #: 33  
 Investigator(s): Z. Habstead, D. Jewell Firm: HDR Alaska, Inc.  
 Lat. (dec.) 59.70572 Long. 136.32983 ± ' NAD-83 Recorded on GPS #: X Marked on map? X Field Map #:       
 Subregion (circle one): SE Southcentral Western Aleutian Interior Northern Landform: Slope Slope (%): 4 Aspect: 0  
 Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: 1  
 Photo nos./descriptions: Sail: 290, 291 Veg 292-293 Camera #:      Veg Type (Viereck Level 4 or other):       
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes: X No:      HGM type: N/A  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No       
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	Yes <u>X</u>	No <u>    </u>	Is the sampled area within a wetland?	Yes <u>    </u>	No <u>X</u>
Hydric Soil Present?	Yes <u>    </u>	No <u>X</u>		Remarks (e.g., marginal?):	
Wetland Hydrology Present?	Yes <u>    </u>	No <u>X</u>			

VEGETATION (Use scientific names.)

Tree Stratum (dbh ≥ 3")								Dominance Test worksheet:					
Sp.	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.						
1. <u>Tsu lat (eds)</u>	<u>5</u>	<u>Y</u>	<u>FAC</u>	5. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	Number of Dominant Species That are OBL, FACW, or FAC:	<u>2</u>	(A)			
2. <u>Picea (eds)</u>	<u>1</u>	<u>N</u>	<u>FACU</u>	6. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	Total Number of Dominant Species Across All Strata:	<u>3</u>	(B)			
3. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	7. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	Percent of Dominant Species That are OBL, FACW, or FAC:	<u>66.7</u>	(A/B)			
4. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	8. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	Prevalence Index worksheet:					
Total Tree Cover: <u>6</u>								Total % Cover of:		Multiply by:			
50% of total cover: <u>3</u>								OBL species	<u>0</u>	X1=	<u>0</u>		
20% of total cover: <u>1.2</u>								FACW species	<u>0</u>	X2=	<u>0</u>		
Sapling/Shrub Stratum (woody plants < 3" dbh)								FAC species	<u>74</u>	X3=	<u>222</u>		
	Abs.Cov.%	Dom?	Ind.		Abs.Cov.%	Dom?	Ind.	FACU species	<u>84</u>	X4=	<u>336</u>		
1. <u>Opul hor</u>	<u>70</u>	<u>Y</u>	<u>FACU</u>	7. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	UPL + NL species	<u>1</u>	X5=	<u>5</u>		
2. <u>Aln sin.</u>	<u>20</u>	<u>N</u>	<u>FAC</u>	8. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	Column Totals:	<u>159</u>	(A)	<u>563</u>	(B)	
3. <u>Tsu lat</u>	<u>1</u>	<u>N</u>	<u>FAC</u>	9. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	Prevalence Index = B/A = <u>3.54</u>					
4. <u>Vac ala</u>	<u>20</u>	<u>N</u>	<u>FAC</u>	10. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	Hydrophytic Vegetation Indicators:					
5. <u>Her lon</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	11. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	<u>Y</u> Dominance Test is >50%					
6. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	12. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	<u>N</u> Prevalence Index is ≤3.0					
Total Sapling/Shrub Cover: <u>116</u>								<u>N</u> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)					
50% of total cover: <u>58</u>								<u>N</u> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)					
20% of total cover: <u>23.2</u>								<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.					
Herb Stratum								Hydrophytic Vegetation Present?					
	Abs.Cov.%	Dom?	Ind.		Abs.Cov.%	Dom?	Ind.	Yes <u>X</u> No <u>    </u>					
1. <u>Ath fil</u>	<u>25</u>	<u>Y</u>	<u>FAC</u>	12. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	Circular 1/10-ac plot <u>X</u> or other plot dimension: <u>    </u> % of bare ground: <u>    </u>					
2. <u>Gym dry</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	13. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	% Cover of Wetland Bryophytes <u>    </u> % Total Cover of Bryophytes <u>    </u> % (where applicable)					
3. <u>Rub. pad.</u>	<u>1</u>	<u>N</u>	<u>FAC</u>	14. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	Remarks:					
4. <u>Tia. tri.</u>	<u>1</u>	<u>N</u>	<u>FAC</u>	15. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>						
5. <u>Arn. dio.</u>	<u>1</u>	<u>N</u>	<u>UPL</u>	16. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>						
6. <u>Fgs. arv.</u>	<u>1</u>	<u>N</u>	<u>FAC</u>	17. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>						
7. <u>Urt. dio.</u>	<u>3</u>	<u>N</u>	<u>FACU</u>	18. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>						
8. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	19. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>						
9. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	20. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>						
10. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	21. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>						
11. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	22. <u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>						
Total Herb Cover: <u>37</u>													
50% of total cover: <u>18.5</u>													
20% of total cover: <u>7.4</u>													

SOIL

Sampling Point #: 33

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

Depth (in.)	Horizon Name	Soil Matrix		Redox Features				a, α dip. (pos/ neg)	Remarks (or use comment number)
		Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-3	O <sub>1</sub>	-	-	-	-	-	-	-	
3-8	A <sub>1</sub>	2.5Y 3/2	100	-	-	-	-	SFL	
8-10	A <sub>2</sub>	10YR 2/1	100	-	-	-	-	GR SAL	
10-14	A <sub>2</sub>	2.5Y 3/2	100	-	-	-	-	SFL	

<sup>1</sup>Type: C = Concentration, D = Depletion, RM = Reduced Matrix, CS=Coated Sand Grains <sup>2</sup>Location: PL = Pore Lining, RC = Root Channel, M = Matrix

Hydric Soil Indicators (check ones that apply, msr from top of mineral layers unless otherwise noted):

<input checked="" type="checkbox"/> Histosol or Histel (A1) (≥16" organic surface, sat'd during wet period of growing season) <input type="checkbox"/> Histic Epipedon (A2)(8-16" organics, sat'd, underlain by mineral soil with chroma ≤2) <input checked="" type="checkbox"/> Hydrogen Sulfide (A4) (w/in 12" of ground surface; @ _____" in this pit) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Alaska Gleyed (A13) <input type="checkbox"/> Alaska Redox (A14) <input type="checkbox"/> Alaska Gleyed Pores (A15)	<b>Indicators for Problematic Hydric Soils<sup>3</sup>:</b> <input type="checkbox"/> Alaska Color Change <sup>4</sup> (TA4) <input type="checkbox"/> Alaska Alpine Swales (TA5) <input type="checkbox"/> Alaska Redox with 2.5Y Hue <input type="checkbox"/> Alaska Gleyed without Hue 5Y or Redder Underlying Layer <input type="checkbox"/> Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)	<p><sup>3</sup>One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.</p> <p><sup>4</sup>Give details of color change in Remarks.</p>
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Restrictive Layer (if present) Type: <u>n/a</u> Depth (inches) _____	Drainage Class: <u>MUD</u> Soil Map Unit Name: _____	Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/>
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Comments:  
1.  
2.  
3.

HYDROLOGY

<p><b>Wetland Hydrology Indicators (check ones that apply, msr from soil surface):</b></p> <p><u>Primary Indicators (any one indicator is sufficient)</u></p> <input checked="" type="checkbox"/> Surface Water (A1) <input checked="" type="checkbox"/> High Water Table (A2) (w/in 12") <input type="checkbox"/> Saturation (A3) (w/in 12") <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Marl Deposits (B15) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) (w/in 12") <input type="checkbox"/> Dry-Season Water Table (C2) (w/in 24") <input type="checkbox"/> Other (explain)	<p><u>Secondary Indicators (at least 2 are required)</u></p> <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Oxid'd Rhizospheres on Living Roots (C3) (w/in 12") <input type="checkbox"/> Presence of Reduced Iron (C4) (pos. α,α or soil color change w/in 12") <input type="checkbox"/> Salt Deposits (C5) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) (w/in 24", can perch H2O w/in 12") <input type="checkbox"/> Microtopographic Relief (D4) (caused by water) <input checked="" type="checkbox"/> FAC Neutral Test (D5) (# OBL+FACW dominants > # FACU+UPL dominants)
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<p>Field Observations (in. from ground surface):</p> <p>Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth of water (in.) _____</p> <p>Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth to water (in.) _____</p> <p style="text-align: center;">Seeping in at that depth but not yet filled: _____</p> <p>Saturation Present? Yes _____ No <input checked="" type="checkbox"/> Depth to sat. (in.) _____</p> <p>(includes capillary fringe) Epi Endo Unknown</p>	<p>Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/></p>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:



Site 33. Soil - Upland



Site 33. Soil - Upland

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**Site 33.** Vegetation - Upland



**Site 33.** Vegetation - Upland

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WETLAND DETERMINATION DATA FORM - Alaska Region

Project: Palmer VMS Borough/City: Haines Date: 7/2/2013  
 Applicant/Owner: Constantine Sampling Point #: 37  
 Investigator(s): Z. Halstead, D. Jewell Firm: HDR Alaska, Inc.  
 Lat. (dec.) 59.40601 Long. 136.33101 ± ' NAD 83 Recorded on GPS #:  Marked on map?  Field Map #: 2  
 Subregion (circle one): (SE) Southcentral Western Aleutian Interior Northern Landform: Low Terrace Slope (%): 3 Aspect: 0  
 Shape across slope: (linear) convex / concave Shape up/downslope: (linear) convex / concave NWI classification: PSS1/EmB  
 Photo nos./descriptions: 302-303-Soil; 304, 305 Veg/Hydro Camera #: \_\_\_\_\_ Veg Type (Viereck Level 4 or other): \_\_\_\_\_  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes:  No: \_\_\_\_\_ HGM type: Rivine  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes  No \_\_\_\_\_  
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No _____	Is the sampled area within a wetland?	Yes <input checked="" type="checkbox"/>	No _____
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No _____		Remarks (e.g., marginal?):	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No _____			

VEGETATION (Use scientific names.)

Tree Stratum (dbh ≥ 3")								Dominance Test worksheet:	
Sp.	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.	Number of Dominant Species That are OBL, FACW, or FAC:	
1. <u>None</u>				5.				<u>3</u>	(A)
2.				6.					
3.				7.				<u>5</u>	(B)
4.				8.					
Total Tree Cover: _____								Percent of Dominant Species That are OBL, FACW, or FAC:	<u>60</u> (A/B)
50% of total cover: _____								20% of total cover: _____	
Sapling/Shrub Stratum (woody plants < 3" dbh)								Prevalence Index worksheet:	
	Abs.Cov.%	Dom?	Ind.		Abs.Cov.%	Dom?	Ind.	Total % Cover of:	Multiply by:
1. <u>Aln. sin.</u>	<u>10</u>	<u>Y</u>	<u>FAC</u>	7.				OBL species <u>5</u>	X1= <u>5</u>
2. <u>Rub. spe.</u>	<u>20</u>	<u>Y</u>	<u>FACU</u>	8.				FACW species <u>0</u>	X2= <u>0</u>
3. <u>Sal. bar.</u>	<u>1</u>	<u>N</u>	<u>FAC</u>	9.				FAC species <u>51</u>	X3= <u>153</u>
4.				10.				FACU species <u>35</u>	X4= <u>140</u>
5.				11.				UPL + NL species <u>1</u>	X5= <u>5</u>
6.				12.				Column Totals: <u>92</u> (A)	<u>303</u> (B)
Total Sapling/Shrub Cover: <u>31</u>								Prevalence Index = B/A = <u>3.29</u>	
50% of total cover: <u>15.5</u>								20% of total cover: <u>6.2</u>	
Herb Stratum								Hydrophytic Vegetation Indicators:	
	Abs.Cov.%	Dom?	Ind.		Abs. Cov.%	Dom?	Ind.		
1. <u>Tel. gran.</u>	<u>10</u>	<u>Y</u>	<u>FACU</u>	12.				<input checked="" type="checkbox"/> Dominance Test is >50%	
2. <u>Ver. amo.</u>	<u>5</u>	<u>N</u>	<u>OBL</u>	13.				<input checked="" type="checkbox"/> Prevalence Index is ≤3.0	
3. <u>Tia. tri.</u>	<u>5</u>	<u>N</u>	<u>FAC</u>	14.				<input checked="" type="checkbox"/> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)	
4. <u>Ste. lon.</u>	<u>20</u>	<u>Y</u>	<u>FAC</u>	15.				<input checked="" type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
5. <u>Egu. arv.</u>	<u>10</u>	<u>Y</u>	<u>FAC</u>	16.					
6. <u>Gym. dry.</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	17.					
7. <u>Gal. trifl.</u>	<u>2</u>	<u>N</u>	<u>FAC</u>	18.					
8. <u>Sax. nels.</u>	<u>2</u>	<u>N</u>	<u>FAC</u>	19.					
9. <u>Luzula per.</u>	<u>1</u>	<u>N</u>	<u>FAC</u>	20.					
10. <u>Aris. dio.</u>	<u>1</u>	<u>N</u>	<u>UPL</u>	21.					
11.				22.					
Total Herb Cover: <u>61</u>								Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	
50% of total cover: <u>30.5</u>								20% of total cover: <u>12.2</u>	
Circular 1/10-ac plot _____ or other plot dimension: <u>20x10</u> % of bare ground: <u>10</u>									
% Cover of Wetland Bryophytes _____ % Total Cover of Bryophytes <u>0</u> % (where applicable)									
Remarks: <u>Oplabor. on fringe. Narrow low terrace adjacent to stream, ≈ 35' wide.</u>									

SOIL

Sampling Point #: 37

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

Depth (in.)	Horizon Name	Soil Matrix		Redox Features				Texture	a,a dip. (pos/ neg)	Remarks (or use comment number)
		Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>			
0-20	C	5Y 2.5/1	100	-	-	-	-	SA		40% gravel/cobble

<sup>1</sup>Type: C = Concentration, D = Depletion, RM = Reduced Matrix, CS=Coated Sand Grains <sup>2</sup>Location: PL = Pore Lining, RC = Root Channel, M = Matrix

Hydric Soil Indicators (check ones that apply, msr from top of mineral layers unless otherwise noted):

- |   |   |  |
|---|---|--|
| <p><input checked="" type="checkbox"/> Histosol or Histel (A1) (≥16" organic surface, sat'd during wet period of growing season)</p> <p><input checked="" type="checkbox"/> Histic Epipedon (A2)(8-16" organics, sat'd, underlain by mineral soil with chroma ≤2)</p> <p><input checked="" type="checkbox"/> Hydrogen Sulfide (A4) (w/in 12" of ground surface; @ _____" in this pit)</p> <p><input checked="" type="checkbox"/> Thick Dark Surface (A12)</p> <p><input checked="" type="checkbox"/> Alaska Gleyed (A13)</p> <p><input checked="" type="checkbox"/> Alaska Redox (A14)</p> <p><input checked="" type="checkbox"/> Alaska Gleyed Pores (A15)</p> | <p><b>Indicators for Problematic Hydric Soils<sup>3</sup>:</b></p> <p><input checked="" type="checkbox"/> Alaska Color Change<sup>4</sup> (TA4)</p> <p><input checked="" type="checkbox"/> Alaska Alpine Swales (TA5)</p> <p><input checked="" type="checkbox"/> Alaska Redox with 2.5Y Hue</p> <p><input checked="" type="checkbox"/> Alaska Gleyed without Hue 5Y or Redder Underlying Layer</p> <p><input checked="" type="checkbox"/> Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)</p> | <p><sup>3</sup>One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.</p> <p><sup>4</sup>Give details of color change in Remarks.</p> |
|---|---|--|

Restrictive Layer (if present) Type: <u>None</u> Depth (inches) <u>N/A</u>	Drainage Class: <u>MWD</u> Soil Map Unit Name: _____	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
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Comments:  
1. Floodplain soil comprised of sands, gravels, and cobbles, on narrow flood plain.  
2.  
3.

HYDROLOGY

Wetland Hydrology Indicators (check ones that apply, msr from soil surface):

- Primary Indicators (any one indicator is sufficient)
- |   |   |
|---|---|
| <input checked="" type="checkbox"/> Surface Water (A1)                            | <input checked="" type="checkbox"/> Surface Soil Cracks (B6)                  |
| <input checked="" type="checkbox"/> High Water Table (A2) (w/in 12")              | <input checked="" type="checkbox"/> Inundation Visible on Aerial Imagery (B7) |
| <input checked="" type="checkbox"/> Saturation (A3) (w/in 12")                    | <input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8)   |
| <input checked="" type="checkbox"/> Water Marks (B1)                              | <input checked="" type="checkbox"/> Marl Deposits (B15)                       |
| <input checked="" type="checkbox"/> Sediment Deposits (B2) <i>gravels cobbles</i> | <input checked="" type="checkbox"/> Hydrogen Sulfide Odor (C1) (w/in 12")     |
| <input checked="" type="checkbox"/> Drift Deposits (B3)                           | <input checked="" type="checkbox"/> Dry-Season Water Table (C2) (w/in 24")    |
| <input checked="" type="checkbox"/> Algal Mat or Crust (B4)                       | <input checked="" type="checkbox"/> Other (explain)                           |
| <input checked="" type="checkbox"/> Iron Deposits (B5)                            |   |

Secondary Indicators (at least 2 are required)

- |  |
|--|
| <input checked="" type="checkbox"/> Water-Stained Leaves (B9)  |
| <input checked="" type="checkbox"/> Drainage Patterns (B10)  |
| <input checked="" type="checkbox"/> Oxid'd Rhizospheres on Living Roots (C3) (w/in 12")                    |
| <input checked="" type="checkbox"/> Presence of Reduced Iron (C4) (pos. a.a or soil color change w/in 12") |
| <input checked="" type="checkbox"/> Salt Deposits (C5)   |
| <input checked="" type="checkbox"/> Stunted or Stressed Plants (D1)  |
| <input checked="" type="checkbox"/> Geomorphic Position (D2)   |
| <input checked="" type="checkbox"/> Shallow Aquitard (D3) (w/in 24", can perch H2O w/in 12")               |
| <input checked="" type="checkbox"/> Microtopographic Relief (D4) (caused by water)                         |
| <input checked="" type="checkbox"/> FAC Neutral Test (D5) (# OBL+FACW dominants > # FACU+UPL dominants)    |

Field Observations (in. from ground surface):

Surface Water Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth of water (in.) _____
Water Table Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth to water (in.) _____
Seeping in at that depth but not yet filled: _____		
Saturation Present? (includes capillary fringe)	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth to sat. (in.) _____ Epi Endo Unknown

Wetland Hydrology Present? Yes  No

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

Remarks:  
Ground surface ~ 2' higher than current surface water level. Water level interpreted to rise sufficiently to result in saturation in pit. Drift lens and recent deposits observed near channel @ elevation of pit ground surface.



**Site 37.** Soil – PSS1/EM1B



**Site 37.** Soil – PSS1/EM1B

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**Site 37.** Vegetation – PSS1/EM1B



**Site 37.** Vegetation – PSS1/EM1B

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WETLAND DETERMINATION DATA FORM - Alaska Region

Project: Palmer VMS Borough/City: Haines Date: 7/2/2013  
 Applicant/Owner: Constellation Sampling Point #: 40  
 Investigator(s): Z. Halstern, D. Jewell Firm: HDR Alaska, Inc.  
 Lat. (dec.) S9.40552 Long. 136.33180 ± ' NAD 83 Recorded on GPS #: X Marked on map? X Field Map #: 2  
 Subregion (circle one): SE Southcentral Western Aleutian Interior Northern Landform: Swale Slope (%): 2 Aspect: 75  
 Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: PSS1/EM1B  
 Photo nos./descriptions: 310, 311 - soil 312, 313 - Veg. Camera #: \_\_\_\_\_ Veg Type (Viereck Level 4 or other): \_\_\_\_\_  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes: X No: \_\_\_\_\_ HGM type: Slope  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_  
 Are Vegetation Y, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is the sampled area within a wetland?	Yes <u>X</u>	No _____
Hydric Soil Present?	Yes <u>X</u>	No _____		Remarks (e.g., marginal?):	
Wetland Hydrology Present?	Yes <u>X</u>	No _____			

VEGETATION (Use scientific names.)

Tree Stratum (dbh ≥ 3")								Dominance Test worksheet:		
Sp.	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.	Number of Dominant Species That are OBL, FACW, or FAC:	_____ (A)	
1. <u>None</u>				5.				Total Number of Dominant Species Across All Strata:	<u>3</u> (B)	
2.				6.				Percent of Dominant Species That are OBL, FACW, or FAC:	<u>33.3</u> (A/B)	
3.				7.				Prevalence Index worksheet:		
4.				8.				Total % Cover of:	Multiply by:	
Total Tree Cover: _____								OBL species	<u>0</u>	X1= <u>0</u>
50% of total cover: _____ 20% of total cover: _____								FACW species	<u>0</u>	X2= <u>0</u>
Sapling/Shrub Stratum (woody plants < 3" dbh)								FAC species	<u>77</u>	X3= <u>231</u>
Abs.Cov.%	Dom?	Ind.			Abs.Cov.%	Dom?	Ind.	FACU species	<u>34</u>	X4= <u>136</u>
1. <u>Aln. sin.</u>	<u>5</u>	<u>N</u>	<u>FAC</u>	7.				UPL + NL species	<u>0</u>	X5= <u>0</u>
2. <u>Opl. lar.</u>	<u>20</u>	<u>Y</u>	<u>FACU</u>	8.				Column Totals:	<u>111</u> (A)	<u>367</u> (B)
3. <u>Rub. spe.</u>	<u>10</u>	<u>Y</u>	<u>FACU</u>	9.				Prevalence Index = B/A = <u>3.31</u>		
4.				10.				Hydrophytic Vegetation Indicators:		
5.				11.				<u>N</u> Dominance Test is >50%		
6.				12.				<u>N</u> Prevalence Index is ≤3.0		
Total Sapling/Shrub Cover: <u>35</u>								<u>N</u> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)		
50% of total cover: <u>17.5</u> 20% of total cover: <u>7.0</u>								<u>Y</u> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)		
Herb Stratum								<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.		
Abs.Cov.%	Dom?	Ind.			Abs.Cov.%	Dom?	Ind.	Hydrophytic Vegetation Present? Yes <u>X</u> No _____		
1. <u>Ath. fil.</u>	<u>60</u>	<u>Y</u>	<u>FAC</u>	12.				↳ Problematic.		
2. <u>Rub. ped.</u>	<u>5</u>	<u>N</u>	<u>FAC</u>	13.						
3. <u>Str. amp.</u>	<u>2</u>	<u>N</u>	<u>FACU</u>	14.						
4. <u>Eg. acc.</u>	<u>5</u>	<u>N</u>	<u>FAC</u>	15.						
5. <u>Th. tri.</u>	<u>2</u>	<u>N</u>	<u>FAC</u>	16.						
6. <u>Gym. dry.</u>	<u>2</u>	<u>N</u>	<u>FACU</u>	17.						
7.				18.						
8.				19.						
9.				20.						
10.				21.						
11.				22.						
Total Herb Cover: <u>76</u>										
50% of total cover: <u>38</u> 20% of total cover: <u>15.2</u>										
Circular 1/10-ac plot _____ or other plot dimension: <u>20x20</u> % of bare ground: _____										
% Cover of Wetland Bryophytes _____ % Total Cover of Bryophytes <u>10</u> % (where applicable)										

Remarks: Low open swale, with surface water discharge/stream, Pic. site. & Tsu. ment. located on edge of swale.

**SOIL**

Sampling Point #: 40

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

Depth (in.)	Horizon Name	Soil Matrix		Redox Features				Texture	a,a dip. (pos/ neg)	Remarks (or use comment number)
		Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>			
0-1	Oe	-	-	-	-	-	-	-	-	
1-5	A	10YR 2/2	100	-	-	-	-	S140	+	
5-22	B	2.5Y 3/3	85	415GY	15	D	RC	S140	+	

<sup>1</sup>Type: C = Concentration, D = Depletion, RM = Reduced Matrix, CS=Coated Sand Grains <sup>2</sup>Location: PL = Pore Lining, RC = Root Channel, M = Matrix

Hydric Soil Indicators (check ones that apply, msr from top of mineral layers unless otherwise noted):

<input checked="" type="checkbox"/> Histosol or Histel (A1) (≥16" organic surface, sat'd during wet period of growing season) <input checked="" type="checkbox"/> Histic Epipedon (A2)(8-16" organics, sat'd, underlain by mineral soil with chroma ≤2) <input checked="" type="checkbox"/> Hydrogen Sulfide (A4) (w/in 12" of ground surface; @ ___" in this pit) <input checked="" type="checkbox"/> Thick Dark Surface (A12) <input checked="" type="checkbox"/> Alaska Gleyed (A13) <input checked="" type="checkbox"/> Alaska Redox (A14) <input checked="" type="checkbox"/> Alaska Gleyed Pores (A15)	<p><b>Indicators for Problematic Hydric Soils<sup>3</sup>:</b></p> <input checked="" type="checkbox"/> Alaska Color Change <sup>4</sup> (TA4) <input checked="" type="checkbox"/> Alaska Alpine Swales (TA5) <input checked="" type="checkbox"/> Alaska Redox with 2.5Y Hue <input checked="" type="checkbox"/> Alaska Gleyed without Hue 5Y or Redder Underlying Layer <input checked="" type="checkbox"/> Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)	<p><sup>3</sup>One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.  <sup>4</sup>Give details of color change in Remarks.</p>
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Restrictive Layer (if present) Type: <u>None</u> Depth (inches) <u>N/A</u>	Drainage Class: <u>PD</u> Soil Map Unit Name: _____	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
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Comments:  
 1.  
 2.  
 3.

**HYDROLOGY**

<p><b>Wetland Hydrology Indicators (check ones that apply, msr from soil surface):</b></p> <p><u>Primary Indicators (any one indicator is sufficient)</u></p> <input checked="" type="checkbox"/> Surface Water (A1) <input checked="" type="checkbox"/> Surface Soil Cracks (B6) <input checked="" type="checkbox"/> High Water Table (A2) (w/in 12") <input checked="" type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input checked="" type="checkbox"/> Saturation (A3) (w/in 12") <input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Water Marks (B1) <input checked="" type="checkbox"/> Marl Deposits (B15) <input checked="" type="checkbox"/> Sediment Deposits (B2) <input checked="" type="checkbox"/> Hydrogen Sulfide Odor (C1) (w/in 12") <input checked="" type="checkbox"/> Drift Deposits (B3) <input checked="" type="checkbox"/> Dry-Season Water Table (C2) (w/in 24") <input checked="" type="checkbox"/> Algal Mat or Crust (B4) <input checked="" type="checkbox"/> Other (explain) <input checked="" type="checkbox"/> Iron Deposits (B5)		<p><u>Secondary Indicators (at least 2 are required)</u></p> <input checked="" type="checkbox"/> Water-Stained Leaves (B9) <input checked="" type="checkbox"/> Drainage Patterns (B10) <u>-swale</u> <input checked="" type="checkbox"/> Oxid'd Rhizospheres on Living Roots (C3) (w/in 12") <input checked="" type="checkbox"/> Presence of Reduced Iron (C4) (pos. a.a or soil color change w/in 12") <input checked="" type="checkbox"/> Salt Deposits (C5) <input checked="" type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <u>-swale</u> <input checked="" type="checkbox"/> Shallow Aquitard (D3) (w/in 24", can perch H2O w/in 12") <input checked="" type="checkbox"/> Microtopographic Relief (D4) (caused by water) <input checked="" type="checkbox"/> FAC Neutral Test (D5) (# OBL+FACW dominants > # FACU+UPL dominants)
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<p>Field Observations (in. from ground surface):</p> Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth of water (in.) _____ Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth to water (in.) <u>17</u> Seeping in at that depth but not yet filled: <u>7</u> Saturation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth to sat. (in.) <u>Surface</u> (includes capillary fringe) Epi <input checked="" type="checkbox"/> Endo <input type="checkbox"/> Unknown	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:



**Site 40.** Soil – PSS1/EM1B



**Site 40.** Soil – PSS1/EM1B

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**Site 40.** Vegetation – PSS1/EM1B



**Site 40.** Vegetation – PSS1/EM1B

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WETLAND DETERMINATION DATA FORM – Alaska Region

Project: Palmer VMS Borough/City: Haines Date: 7/2/2013  
 Applicant/Owner: Constantine Sampling Point #: 42  
 Investigator(s): Z. Halstead, D. Sewell Firm: HDR Alaska, Inc.  
 Lat. (dec.) 59.46240 Long. 136.33517 ±     NAD 83 Recorded on GPS #:  Marked on map?  Field Map #: 2  
 Subregion (circle one): SE Southcentral Western Aleutian Interior Northern Landform: Slope Slope (%): 4 Aspect: 0  
 Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: W  
 Photo nos./descriptions: 318-319-Soil; 320-321 Veg. Camera #:     Veg Type (Viereck Level 4 or other):      
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes:  No:     HGM type: N/A  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes  No      
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <u>   </u>	Is the sampled area within a wetland?	Yes <u>   </u>	No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes <u>   </u>	No <input checked="" type="checkbox"/>		Remarks (e.g., marginal?):	
Wetland Hydrology Present?	Yes <u>   </u>	No <input checked="" type="checkbox"/>			

VEGETATION (Use scientific names.)

Tree Stratum (dbh ≥ 3")								Dominance Test worksheet:						
Sp.	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.	Number of Dominant Species That are OBL, FACW, or FAC:						
1. <u>None</u>				5. <u>   </u>				Total Number of Dominant Species Across All Strata:		<u>2</u> (A)				
2. <u>   </u>				6. <u>   </u>				Percent of Dominant Species That are OBL, FACW, or FAC:		<u>100</u> (A/B)				
3. <u>   </u>				7. <u>   </u>				Prevalence Index worksheet:						
4. <u>   </u>				8. <u>   </u>				Total % Cover of:		Multiply by:				
Total Tree Cover: <u>   </u>				50% of total cover: <u>   </u> 20% of total cover: <u>   </u>				OBL species	<u>0</u>	X1=	<u>0</u>			
Sapling/Shrub Stratum (woody plants < 3" dbh)								FACW species	<u>0</u>	X2=	<u>0</u>			
Sp.	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.	FAC species	<u>160</u>	X3=	<u>480</u>			
1. <u>Aln. sin.</u>	<u>85</u>	<u>Y</u>	<u>FAC</u>	7. <u>   </u>				FACU species	<u>10</u>	X4=	<u>40</u>			
2. <u>Opt. hor.</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	8. <u>   </u>				UPL + NL species	<u>0</u>	X5=	<u>0</u>			
3. <u>   </u>				9. <u>   </u>				Column Totals:	<u>170</u> (A)		<u>520</u> (B)			
4. <u>   </u>				10. <u>   </u>				Prevalence Index = B/A = <u>3.06</u>						
5. <u>   </u>				11. <u>   </u>				Hydrophytic Vegetation Indicators:						
6. <u>   </u>				12. <u>   </u>				<input checked="" type="checkbox"/> Dominance Test is >50%						
Total Sapling/Shrub Cover: <u>90</u>				50% of total cover: <u>45</u> 20% of total cover: <u>18</u>				<input checked="" type="checkbox"/> Prevalence Index is ≤3.0						
Herb Stratum								<input checked="" type="checkbox"/> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)						
Sp.	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.	<input checked="" type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)						
1. <u>Alh. sil.</u>	<u>75</u>	<u>Y</u>	<u>FAC</u>	12. <u>   </u>				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.						
2. <u>Stramp.</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	13. <u>   </u>				<table border="1"> <tr> <td>Hydrophytic Vegetation Present?</td> <td>Yes <input checked="" type="checkbox"/></td> <td>No <u>   </u></td> </tr> </table>				Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <u>   </u>
Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <u>   </u>												
3. <u>   </u>				14. <u>   </u>										
4. <u>   </u>				15. <u>   </u>										
5. <u>   </u>				16. <u>   </u>										
6. <u>   </u>				17. <u>   </u>										
7. <u>   </u>				18. <u>   </u>										
8. <u>   </u>				19. <u>   </u>										
9. <u>   </u>				20. <u>   </u>										
10. <u>   </u>				21. <u>   </u>										
11. <u>   </u>				22. <u>   </u>										
Total Herb Cover: <u>80</u>				50% of total cover: <u>40</u> 20% of total cover: <u>16</u>										
Circular 1/10-ac plot <input checked="" type="checkbox"/> or other plot dimension: <u>   </u> % of bare ground: <u>0</u>														
% Cover of Wetland Bryophytes <u>   </u> % Total Cover of Bryophytes <u>0</u> % (where applicable)														

Remarks:

SOIL

Sampling Point #: 42

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

Depth (in.)	Horizon Name	Soil Matrix		Redox Features				Texture	a,a dip. (pos/ neg)	Remarks (or use comment number)
		Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>			
0-3	O <sub>i</sub>	-	-	-	-	-	-	-	-	
3-6	O <sub>e</sub>	-	-	-	-	-	-	-	-	
6-7	A	10YR 2/1	100					SIL0	N	
7-8	B <sub>1</sub>	5Y 3/1	60					SIL0	N	
		2.5Y 4/2	40					SIL0	N	
8-20	B <sub>2</sub>	7.5YR 3/3	100					GR	N	Variegated gravels w/ very little silt

<sup>1</sup>Type: C = Concentration, D = Depletion, RM = Reduced Matrix, CS=Coated Sand Grains <sup>2</sup>Location: PL = Pore Lining, RC = Root Channel, M = Matrix

Hydric Soil Indicators (check ones that apply, msr from top of mineral layers unless otherwise noted):

- |   |   |  |
|---|---|--|
| <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Histosol or Histel (A1) (≥16" organic surface, sat'd during wet period of growing season)</li> <li><input checked="" type="checkbox"/> Histic Epipedon (A2) (8-16" organics, sat'd, underlain by mineral soil with chroma ≤2)</li> <li><input checked="" type="checkbox"/> Hydrogen Sulfide (A4) (w/in 12" of ground surface; @ _____" in this pit)</li> <li><input checked="" type="checkbox"/> Thick Dark Surface (A12)</li> <li><input checked="" type="checkbox"/> Alaska Gleyed (A13)</li> <li><input checked="" type="checkbox"/> Alaska Redox (A14)</li> <li><input checked="" type="checkbox"/> Alaska Gleyed Pores (A15)</li> </ul> | <p><b>Indicators for Problematic Soils<sup>3</sup>:</b></p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Alaska Color Change<sup>4</sup> (TA4)</li> <li><input checked="" type="checkbox"/> Alaska Alpine Swales (TA5)</li> <li><input checked="" type="checkbox"/> Alaska Redox with 2.5Y Hue</li> <li><input checked="" type="checkbox"/> Alaska Gleyed without Hue 5Y or Redder Underlying Layer</li> <li><input checked="" type="checkbox"/> Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)</li> </ul> | <p><sup>3</sup>One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.</p> <p><sup>4</sup>Give details of color change in Remarks.</p> |
|---|---|--|

Restrictive Layer (if present) Type: <u>None</u> Depth (inches) <u>N/A</u>	Drainage Class: <u>WD</u> Soil Map Unit Name: _____	Hydric Soil Present? Yes ___ No <u>X</u>
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Comments:  
 1. Well drained soil.  
 2. Color recorded for 1/2 of pit from 8-20". Other 1/2: 2.5Y 3/1. SIL w/ variegated gravels  
 3. Spot checked soil in vicinity, 3 times, ranged from 1" organics - 6" organics.

HYDROLOGY

<p><b>Wetland Hydrology Indicators (check ones that apply, msr from soil surface):</b></p> <p><u>Primary Indicators (any one indicator is sufficient)</u></p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Surface Water (A1)</li> <li><input checked="" type="checkbox"/> High Water Table (A2) (w/in 12")</li> <li><input checked="" type="checkbox"/> Saturation (A3) (w/in 12")</li> <li><input checked="" type="checkbox"/> Water Marks (B1)</li> <li><input checked="" type="checkbox"/> Sediment Deposits (B2)</li> <li><input checked="" type="checkbox"/> Drift Deposits (B3)</li> <li><input checked="" type="checkbox"/> Algal Mat or Crust (B4)</li> <li><input checked="" type="checkbox"/> Iron Deposits (B5)</li> <li><input checked="" type="checkbox"/> Surface Soil Cracks (B6)</li> <li><input checked="" type="checkbox"/> Inundation Visible on Aerial Imagery (B7)</li> <li><input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8)</li> <li><input checked="" type="checkbox"/> Marl Deposits (B15)</li> <li><input checked="" type="checkbox"/> Hydrogen Sulfide Odor (C1) (w/in 12")</li> <li><input checked="" type="checkbox"/> Dry-Season Water Table (C2) (w/in 24")</li> <li><input checked="" type="checkbox"/> Other (explain)</li> </ul>		<p><u>Secondary Indicators (at least 2 are required)</u></p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Water-Stained Leaves (B9)</li> <li><input checked="" type="checkbox"/> Drainage Patterns (B10)</li> <li><input checked="" type="checkbox"/> Oxid'd Rhizospheres on Living Roots (C3) (w/in 12")</li> <li><input checked="" type="checkbox"/> Presence of Reduced Iron (C4) (pos. a,a or soil color change w/in 12")</li> <li><input checked="" type="checkbox"/> Salt Deposits (C5)</li> <li><input checked="" type="checkbox"/> Stunted or Stressed Plants (D1)</li> <li><input checked="" type="checkbox"/> Geomorphic Position (D2)</li> <li><input checked="" type="checkbox"/> Shallow Aquitard (D3) (w/in 24", can perch H2O w/in 12")</li> <li><input checked="" type="checkbox"/> Microtopographic Relief (D4) (caused by water)</li> <li><input checked="" type="checkbox"/> FAC Neutral Test (D5) (# OBL+FACW dominants &gt; # FACU+UPL dominants)</li> </ul>
<p>Field Observations (in. from ground surface):</p> <p>Surface Water Present? Yes ___ No <u>X</u> Depth of water (in.) _____</p> <p>Water Table Present? Yes ___ No <u>X</u> Depth to water (in.) _____</p> <p style="padding-left: 40px;">Seeping in at that depth but not yet filled: _____</p> <p>Saturation Present? Yes ___ No <u>X</u> Depth to sat. (in.) _____</p> <p>(includes capillary fringe) Epi Endo Unknown</p>		<p>Wetland Hydrology Present? Yes ___ No <u>X</u></p>

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

Remarks:  
 No hydrology indicators present.



Site 42. Soil - Upland



Site 42. Soil - Upland

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**Site 42.** Vegetation - Upland



**Site 42.** Vegetation - Upland

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**WETLAND DETERMINATION DATA FORM – Alaska Region**

Project: Palmer VMS Borough/City: Uaines Date: 7/2/13  
 Applicant/Owner: Constantine Sampling Point #: 43  
 Investigator(s): Jack Halstead, Doug Small Firm: HDR Alaska, Inc.  
 Lat. (dec.) 59.40195 Long. 136.33583 ± ' NAD 83 Recorded on GPS #: \_\_\_\_\_ Marked on map? \_\_\_\_\_ Field Map #: \_\_\_\_\_  
 Subregion (circle one): (SE) Southcentral Western Aleutian Interior Northern Landform: Slope Slope (%): 2 Aspect: 0  
 Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: 4  
 Photo nos./descriptions: Soil: 322, 323 Veg: 324, 325 Camera #: \_\_\_\_\_ Veg Type (Viereck Level 4 or other): \_\_\_\_\_  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes: X No: \_\_\_\_\_ HGM type: N/A  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_  
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

**SUMMARY OF FINDINGS**

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is the sampled area within a wetland?	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>		Remarks (e.g., marginal?):	
Wetland Hydrology Present?	Yes _____	No <u>X</u>			

**VEGETATION (Use scientific names.)**

<p><b>Tree Stratum (dbh ≥ 3")</b></p> <table border="1"> <thead> <tr> <th>Sp.</th> <th>Abs.Cov.%</th> <th>Dom?</th> <th>Ind.</th> <th>Species</th> <th>Abs.Cov.%</th> <th>Dom?</th> <th>Ind.</th> </tr> </thead> <tbody> <tr><td>1. <u>None</u></td><td></td><td></td><td></td><td>5. _____</td><td></td><td></td><td></td></tr> <tr><td>2. _____</td><td></td><td></td><td></td><td>6. _____</td><td></td><td></td><td></td></tr> <tr><td>3. _____</td><td></td><td></td><td></td><td>7. _____</td><td></td><td></td><td></td></tr> <tr><td>4. _____</td><td></td><td></td><td></td><td>8. _____</td><td></td><td></td><td></td></tr> </tbody> </table> <p>Total Tree Cover: _____                      50% of total cover: _____ 20% of total cover: _____</p>								Sp.	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.	1. <u>None</u>				5. _____				2. _____				6. _____				3. _____				7. _____				4. _____				8. _____				<p><b>Dominance Test worksheet:</b></p> <p>Number of Dominant Species That are OBL, FACW, or FAC: <u>2</u> (A)</p> <p>Total Number of Dominant Species Across All Strata: <u>2</u> (B)</p> <p>Percent of Dominant Species That are OBL, FACW, or FAC: <u>100</u> (A/B)</p>																																																									
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<p><b>Herb Stratum</b></p> <table border="1"> <thead> <tr> <th></th> <th>Abs.Cov.%</th> <th>Dom?</th> <th>Ind.</th> <th></th> <th>Abs.Cov.%</th> <th>Dom?</th> <th>Ind.</th> </tr> </thead> <tbody> <tr><td>1. <u>All. Cl.</u></td><td><u>40</u></td><td><u>Y</u></td><td><u>FAC</u></td><td>12. _____</td><td></td><td></td><td></td></tr> <tr><td>2. <u>Sto. emp.</u></td><td><u>5</u></td><td><u>N</u></td><td><u>FACU</u></td><td>13. _____</td><td></td><td></td><td></td></tr> <tr><td>3. <u>Gyn. dry.</u></td><td><u>5</u></td><td><u>N</u></td><td><u>FACU</u></td><td>14. _____</td><td></td><td></td><td></td></tr> <tr><td>4. _____</td><td></td><td></td><td></td><td>15. _____</td><td></td><td></td><td></td></tr> <tr><td>5. _____</td><td></td><td></td><td></td><td>16. _____</td><td></td><td></td><td></td></tr> <tr><td>6. _____</td><td></td><td></td><td></td><td>17. _____</td><td></td><td></td><td></td></tr> <tr><td>7. _____</td><td></td><td></td><td></td><td>18. _____</td><td></td><td></td><td></td></tr> <tr><td>8. _____</td><td></td><td></td><td></td><td>19. _____</td><td></td><td></td><td></td></tr> <tr><td>9. _____</td><td></td><td></td><td></td><td>20. _____</td><td></td><td></td><td></td></tr> <tr><td>10. _____</td><td></td><td></td><td></td><td>21. _____</td><td></td><td></td><td></td></tr> <tr><td>11. _____</td><td></td><td></td><td></td><td>22. _____</td><td></td><td></td><td></td></tr> </tbody> </table> <p>Total Herb Cover: <u>50</u>                      50% of total cover: <u>25</u> 20% of total cover: <u>10</u></p>									Abs.Cov.%	Dom?	Ind.		Abs.Cov.%	Dom?	Ind.	1. <u>All. Cl.</u>	<u>40</u>	<u>Y</u>	<u>FAC</u>	12. _____				2. <u>Sto. emp.</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	13. _____				3. <u>Gyn. dry.</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	14. _____				4. _____				15. _____				5. _____				16. _____				6. _____				17. _____				7. _____				18. _____				8. _____				19. _____				9. _____				20. _____				10. _____				21. _____				11. _____				22. _____				<p><b>Hydrophytic Vegetation Indicators:</b></p> <p><u>Y</u> Dominance Test is &gt;50%  <u>N</u> Prevalence Index is ≤3.0</p> <p><u>N</u> Morphological Adaptations<sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)</p> <p><u>N</u> Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)</p> <p><sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.</p>	
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<p>Circular 1/10-ac plot <u>X</u> or other plot dimension: _____ % of bare ground: _____                      % Cover of Wetland Bryophytes _____ % Total Cover of Bryophytes _____ %                      (where applicable)</p>								<p><b>Hydrophytic Vegetation Present?</b></p> <p>Yes <u>X</u> No _____</p>																																																																																																	
<p>Remarks:</p>																																																																																																									

SOIL

Sampling Point #: 43

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

Depth (in.)	Horizon Name	Soil Matrix		Redox Features				Texture	α,α dip. (pos/ neg)	Remarks (or use comment number)
		Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>			
0-6	O <sub>e</sub>	-	-	-	-	-	-	-	-	-
6-19	C	10 YR 2/1	100	-	-	-	-	GR loam	N	Angular gravel

<sup>1</sup>Type: C = Concentration, D = Depletion, RM = Reduced Matrix, CS=Coated Sand Grains <sup>2</sup>Location: PL = Pore Lining, RC = Root Channel, M = Matrix

Hydric Soil Indicators (check ones that apply, msr from top of mineral layers unless otherwise noted):

<input checked="" type="checkbox"/> Histosol or Histel (A1) (≥16" organic surface, sat'd during wet period of growing season) <input checked="" type="checkbox"/> Histic Epipedon (A2)(8-16" organics, sat'd, underlain by mineral soil with chroma ≤2) <input checked="" type="checkbox"/> Hydrogen Sulfide (A4) (w/in 12" of ground surface; @ _____" in this pit) <input checked="" type="checkbox"/> Thick Dark Surface (A12) <input checked="" type="checkbox"/> Alaska Gleyed (A13) <input checked="" type="checkbox"/> Alaska Redox (A14) <input checked="" type="checkbox"/> Alaska Gleyed Pores (A15)	<b>Indicators for Problematic Hydric Soils<sup>3</sup>:</b> <input checked="" type="checkbox"/> Alaska Color Change <sup>4</sup> (TA4) <input checked="" type="checkbox"/> Alaska Alpine Swales (TA5) <input checked="" type="checkbox"/> Alaska Redox with 2.5Y Hue <input checked="" type="checkbox"/> Alaska Gleyed without Hue 5Y or Redder Underlying Layer <input checked="" type="checkbox"/> Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)	<sup>3</sup> One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. <sup>4</sup> Give details of color change in Remarks.
--	---	---

Restrictive Layer (if present) Type: <u>no</u> Depth (inches) _____	Drainage Class: <u>MWD</u> Soil Map Unit Name: _____	Hydric Soil Present? Yes ___ No <input checked="" type="checkbox"/>
---	---	---

Comments:  
 1. Profile moist throughout but not saturated.  
 2.  
 3.

HYDROLOGY

Wetland Hydrology Indicators (check ones that apply, msr from soil surface):

<u>Primary Indicators (any one indicator is sufficient)</u>	
<input checked="" type="checkbox"/> Surface Water (A1)	<input checked="" type="checkbox"/> Surface Soil Cracks (B6)
<input checked="" type="checkbox"/> High Water Table (A2) (w/in 12")	<input checked="" type="checkbox"/> Inundation Visible on Aerial Imagery (B7)
<input checked="" type="checkbox"/> Saturation (A3) (w/in 12")	<input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input checked="" type="checkbox"/> Water Marks (B1)	<input checked="" type="checkbox"/> Marl Deposits (B15)
<input checked="" type="checkbox"/> Sediment Deposits (B2)	<input checked="" type="checkbox"/> Hydrogen Sulfide Odor (C1) (w/in 12")
<input checked="" type="checkbox"/> Drift Deposits (B3)	<input checked="" type="checkbox"/> Dry-Season Water Table (C2) (w/in 24")
<input checked="" type="checkbox"/> Algal Mat or Crust (B4)	<input checked="" type="checkbox"/> Other (explain)
<input checked="" type="checkbox"/> Iron Deposits (B5)	

Secondary Indicators (at least 2 are required)

<input checked="" type="checkbox"/> Water-Stained Leaves (B9)
<input checked="" type="checkbox"/> Drainage Patterns (B10)
<input checked="" type="checkbox"/> Oxid'd Rhizospheres on Living Roots (C3) (w/in 12")
<input checked="" type="checkbox"/> Presence of Reduced Iron (C4) (pos. α,α or soil color change w/in 12")
<input checked="" type="checkbox"/> Salt Deposits (C5)
<input checked="" type="checkbox"/> Stunted or Stressed Plants (D1)
<input checked="" type="checkbox"/> Geomorphic Position (D2)
<input checked="" type="checkbox"/> Shallow Aquitard (D3) (w/in 24", can perch H <sub>2</sub> O w/in 12")
<input checked="" type="checkbox"/> Microtopographic Relief (D4) (caused by water)
<input checked="" type="checkbox"/> FAC Neutral Test (D5) (# OBL+FACW dominants > # FACU+UPL dominants)

Field Observations (in. from ground surface):			
Surface Water Present?	Yes ___	No <input checked="" type="checkbox"/>	Depth of water (in.) _____
Water Table Present?	Yes ___	No <input checked="" type="checkbox"/>	Depth to water (in.) _____
Seeping in at that depth but not yet filled: _____			
Saturation Present? (includes capillary fringe)	Yes ___	No <input checked="" type="checkbox"/>	Depth to sat. (in.) _____ Epi Endo Unknown

Wetland Hydrology Present? Yes \_\_\_ No

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

Remarks: No hydrology indicators observed.



**Site 43.** Soil - Upland



**Site 43.** Soil - Upland

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**Site 43.** Vegetation - Upland



**Site 43.** Vegetation - Upland

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WETLAND DETERMINATION DATA FORM - Alaska Region

Project: Palmer VMS Borough/City: Haines Date: 7/2/2013  
 Applicant/Owner: Constantine Sampling Point #: 52  
 Investigator(s): Z. Helstead, D. Sewell Firm: HDR Alaska, Inc.  
 Lat. (dec.) 59.39743 Long. 136.34340 ± ' NAD 83 Recorded on GPS #:  Marked on map?  Field Map #: 3  
 Subregion (circle one): (SE) Southcentral Western Aleutian Interior Northern Landform: Slope Slope (%): 10 Aspect: 340  
 Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: V  
 Photo nos./descriptions: 342, 343-Soil 344, 345-Veg Camera #: \_\_\_\_\_ Veg Type (Viereck Level 4 or other): \_\_\_\_\_  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes:  No: \_\_\_\_\_ HGM type: N/A  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes  No \_\_\_\_\_  
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	Yes _____	No <input checked="" type="checkbox"/>	Is the sampled area within a wetland?	Yes _____	No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes _____	No <input checked="" type="checkbox"/>		Remarks (e.g., marginal?):	
Wetland Hydrology Present?	Yes _____	No <input checked="" type="checkbox"/>			

VEGETATION (Use scientific names.)

Tree Stratum (dbh ≥ 3")								Dominance Test worksheet:			
Sp.	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.	Number of Dominant Species That are OBL, FACW, or FAC:			
1. <u>Pop. bal.</u>	<u>10</u>	<u>Y</u>	<u>FACU</u>	5. _____	_____	_____	_____	_____		<u>2</u> (A)	
2. _____	_____	_____	_____	6. _____	_____	_____	_____	_____		<u>4</u> (B)	
3. _____	_____	_____	_____	7. _____	_____	_____	_____	_____		Percent of Dominant Species That are OBL, FACW, or FAC: <u>50</u> (AB)	
4. _____	_____	_____	_____	8. _____	_____	_____	_____	_____		Prevalence Index worksheet:	
Total Tree Cover: <u>10</u>								Total % Cover of:		Multiply by:	
50% of total cover: <u>5</u>								OBL species <u>0</u>		X1= <u>0</u>	
20% of total cover: <u>4</u>								FACW species <u>0</u>		X2= <u>0</u>	
Sapling/Shrub Stratum (woody plants < 3" dbh)								FAC species <u>71</u>		X3= <u>213</u>	
Sp.	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.	FACU species <u>44</u>		X4= <u>176</u>	
1. <u>Aln. sin.</u>	<u>60</u>	<u>Y</u>	<u>FAC</u>	7. _____	_____	_____	_____	UPL + NL species <u>20</u>		X5= <u>100</u>	
2. <u>Sam. rac.</u>	<u>10</u>	<u>N</u>	<u>FACU</u>	8. _____	_____	_____	_____	Column Totals: <u>135</u> (A)		<u>489</u> (B)	
3. <u>Opul. hor.</u>	<u>10</u>	<u>N</u>	<u>FACU</u>	9. _____	_____	_____	_____	Prevalence Index = B/A = <u>3.62</u>			
4. <u>Rub. spe.</u>	<u>2</u>	<u>N</u>	<u>FACU</u>	10. _____	_____	_____	_____				
5. _____	_____	_____	_____	11. _____	_____	_____	_____				
6. _____	_____	_____	_____	12. _____	_____	_____	_____				
Total Sapling/Shrub Cover: <u>82</u>											
50% of total cover: <u>41</u>											
20% of total cover: <u>16.4</u>											
Herb Stratum								Hydrophytic Vegetation Indicators:			
Sp.	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.	<input checked="" type="checkbox"/> Dominance Test is >50%			
1. <u>Arn. dio.</u>	<u>20</u>	<u>Y</u>	<u>UPL</u>	12. _____	_____	_____	_____	<input checked="" type="checkbox"/> Prevalence Index is ≤3.0			
2. <u>Ath. fil.</u>	<u>10</u>	<u>Y</u>	<u>FAC</u>	13. _____	_____	_____	_____	<input checked="" type="checkbox"/> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)			
3. <u>Gym. dry.</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	14. _____	_____	_____	_____	<input checked="" type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)			
4. <u>Urt. dio.</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	15. _____	_____	_____	_____	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.			
5. <u>Tel. gla.</u>	<u>2</u>	<u>N</u>	<u>FACU</u>	16. _____	_____	_____	_____				
6. <u>Equis. ar.</u>	<u>1</u>	<u>N</u>	<u>FAC</u>	17. _____	_____	_____	_____				
7. _____	_____	_____	_____	18. _____	_____	_____	_____				
8. _____	_____	_____	_____	19. _____	_____	_____	_____				
9. _____	_____	_____	_____	20. _____	_____	_____	_____				
10. _____	_____	_____	_____	21. _____	_____	_____	_____				
11. _____	_____	_____	_____	22. _____	_____	_____	_____				
Total Herb Cover: <u>43</u>								Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>			
50% of total cover: <u>21.5</u>											
20% of total cover: <u>8.6</u>											
Circular 1/10-ac plot <input checked="" type="checkbox"/> or other plot dimension: _____ % of bare ground: <u>30-100</u>											
% Cover of Wetland Bryophytes _____ % Total Cover of Bryophytes <u>0</u> %											
(where applicable)											
Remarks:											

SOIL

Sampling Point #: 52

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

Depth (in.)	Horizon Name	Soil Matrix		Redox Features				Texture	α, α dip. (pos/ neg)	Remarks (or use comment number)
		Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>			
0-7	B <sub>1</sub>	2.5YR 3/1	100	-	-	-	-	GRLO	N	
7-9	A <sub>1</sub>	5Y 2.5/1	100	-	-	-	-	SILO	N	
9-10	E	5Y 4/1	100	-	-	-	-	SILO	N	
10-11	B <sub>2</sub>	7.5YR 2.5/2	100	-	-	-	-	SILO	N	
11-20	B <sub>3</sub>	10YR 3/3	100	-	-	-	-	SILO	N	

<sup>1</sup>Type: C = Concentration, D = Depletion, RM = Reduced Matrix, CS=Coated Sand Grains <sup>2</sup>Location: PL = Pore Lining, RC = Root Channel, M = Matrix

Hydric Soil Indicators (check ones that apply, msr from top of mineral layers unless otherwise noted):

<p><input checked="" type="checkbox"/> Histosol or Histel (A1) (≥16" organic surface, sat'd during wet period of growing season)</p> <p><input checked="" type="checkbox"/> Histic Epipedon (A2) (8-16" organics, sat'd, underlain by mineral soil with chroma ≤2)</p> <p><input checked="" type="checkbox"/> Hydrogen Sulfide (A4) (w/in 12" of ground surface; @ ____" in this pit)</p> <p><input checked="" type="checkbox"/> Thick Dark Surface (A12)</p> <p><input checked="" type="checkbox"/> Alaska Gleyed (A13)</p> <p><input checked="" type="checkbox"/> Alaska Redox (A14)</p> <p><input checked="" type="checkbox"/> Alaska Gleyed Pores (A15)</p>	<p><b>Indicators for Problematic Hydric Soils<sup>3</sup>:</b></p> <p><input checked="" type="checkbox"/> Alaska Color Change<sup>4</sup> (TA4)</p> <p><input checked="" type="checkbox"/> Alaska Alpine Swales (TA5)</p> <p><input checked="" type="checkbox"/> Alaska Redox with 2.5Y Hue</p> <p><input checked="" type="checkbox"/> Alaska Gleyed without Hue 5Y or Redder Underlying Layer</p> <p><input checked="" type="checkbox"/> Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)</p>	<p><sup>3</sup>One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.</p> <p><sup>4</sup>Give details of color change in Remarks.</p>
---	---	--

Restrictive Layer (if present) Type: <u>None</u> Depth (inches) <u>N/A</u>	Drainage Class: <u>WD</u> Soil Map Unit Name: _____	Hydric Soil Present? Yes ___ No <u>X</u>
--	--	--

Comments:  
1. Well drained soil  
2.  
3.

HYDROLOGY

<p><b>Wetland Hydrology Indicators</b> (check ones that apply, msr from soil surface):</p> <p><u>Primary Indicators</u> (any one indicator is sufficient)</p> <p><input checked="" type="checkbox"/> Surface Water (A1)      <input checked="" type="checkbox"/> Surface Soil Cracks (B6)</p> <p><input checked="" type="checkbox"/> High Water Table (A2) (w/in 12")      <input checked="" type="checkbox"/> Inundation Visible on Aerial Imagery (B7)</p> <p><input checked="" type="checkbox"/> Saturation (A3) (w/in 12")      <input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8)</p> <p><input checked="" type="checkbox"/> Water Marks (B1)      <input checked="" type="checkbox"/> Marl Deposits (B15)</p> <p><input checked="" type="checkbox"/> Sediment Deposits (B2)      <input checked="" type="checkbox"/> Hydrogen Sulfide Odor (C1) (w/in 12")</p> <p><input checked="" type="checkbox"/> Drift Deposits (B3)      <input checked="" type="checkbox"/> Dry-Season Water Table (C2) (w/in 24")</p> <p><input checked="" type="checkbox"/> Algal Mat or Crust (B4)      <input checked="" type="checkbox"/> Other (explain)</p> <p><input checked="" type="checkbox"/> Iron Deposits (B5)</p>	<p><u>Secondary Indicators</u> (at least 2 are required)</p> <p><input checked="" type="checkbox"/> Water-Stained Leaves (B9)</p> <p><input checked="" type="checkbox"/> Drainage Patterns (B10)</p> <p><input checked="" type="checkbox"/> Oxid'd Rhizospheres on Living Roots (C3) (w/in 12")</p> <p><input checked="" type="checkbox"/> Presence of Reduced Iron (C4) (pos. α, α or soil color change w/in 12")</p> <p><input checked="" type="checkbox"/> Salt Deposits (C5)</p> <p><input checked="" type="checkbox"/> Stunted or Stressed Plants (D1)</p> <p><input checked="" type="checkbox"/> Geomorphic Position (D2)</p> <p><input checked="" type="checkbox"/> Shallow Aquitard (D3) (w/in 24", can perch H2O w/in 12")</p> <p><input checked="" type="checkbox"/> Microtopographic Relief (D4) (caused by water)</p> <p><input checked="" type="checkbox"/> FAC Neutral Test (D5) (# OBL+FACW dominants &gt; # FACU+UPL dominants)</p>
--	---

<p>Field Observations (in. from ground surface):</p> <p>Surface Water Present? Yes ___ No <u>X</u>      Depth of water (in.) _____</p> <p>Water Table Present? Yes ___ No <u>X</u>      Depth to water (in.) _____</p> <p>Seeping in at that depth but not yet filled: _____</p> <p>Saturation Present? Yes ___ No <u>X</u>      Depth to sat. (in.) _____</p> <p>(includes capillary fringe)      Epi Endo Unknown</p>	<p>Wetland Hydrology Present? Yes ___ No <u>X</u></p>
---	---

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

Remarks:  
No hydrology indicators observed.



**Site 52.** Soil - Upland



**Site 52.** Soil - Upland

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**Site 52.** Vegetation - Upland



**Site 52.** Vegetation - Upland

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**WETLAND DETERMINATION DATA FORM – Alaska Region**

Project: Palmer VMS Borough/City: Haines Date: 7/2/13  
 Applicant/Owner: Castalian Sampling Point #: 53  
 Investigator(s):  Zach Halstead, Dave Jewell  Firm: HDR Alaska, Inc.  
 Lat. (dec.) 59.39988 Long. 136.33955 ± ' NAD 83 Recorded on GPS #: \_\_\_\_\_ Marked on map?  Field Map #: \_\_\_\_\_  
 Subregion (circle one): SE Southcentral Western Aleutian Interior Northern Landform: Slope Slope (%): 3 Aspect: 0  
 Shape across slope: (linear) / convex / concave Shape up/downslope: linear / (convex) / concave NWI classification: 4  
 Photo nos./descriptions: Soil: 346-347 Veg: 348-349 Camera #: \_\_\_\_\_ Veg Type (Viereck Level 4 or other): \_\_\_\_\_  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes:  No: \_\_\_\_\_ HGM type: N/A 1  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes  No \_\_\_\_\_  
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

**SUMMARY OF FINDINGS**

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No _____	Is the sampled area within a wetland?	Yes _____	No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes _____	No <input checked="" type="checkbox"/>		Remarks (e.g., marginal?): _____	
Wetland Hydrology Present?	Yes _____	No <input checked="" type="checkbox"/>			

**VEGETATION (Use scientific names.)**

<p><b>Tree Stratum (dbh ≥ 3")</b></p> <table border="1"> <thead> <tr> <th>Sp.</th> <th>Abs.Cov.%</th> <th>Dom?</th> <th>Ind.</th> <th>Species</th> <th>Abs.Cov.%</th> <th>Dom?</th> <th>Ind.</th> </tr> </thead> <tbody> <tr><td>1. <u>None</u></td><td></td><td></td><td></td><td>5. _____</td><td></td><td></td><td></td></tr> <tr><td>2. _____</td><td></td><td></td><td></td><td>6. _____</td><td></td><td></td><td></td></tr> <tr><td>3. _____</td><td></td><td></td><td></td><td>7. _____</td><td></td><td></td><td></td></tr> <tr><td>4. _____</td><td></td><td></td><td></td><td>8. _____</td><td></td><td></td><td></td></tr> <tr> <td align="center" colspan="4">Total Tree Cover: _____</td> <td colspan="4"></td> </tr> <tr> <td align="center" colspan="4">50% of total cover: _____</td> <td align="center" colspan="4">20% of total cover: _____</td> </tr> </tbody> </table> <p><b>Sapling/Shrub Stratum (woody plants &lt; 3" dbh)</b></p> <table border="1"> <thead> <tr> <th></th> <th>Abs.Cov.%</th> <th>Dom?</th> <th>Ind.</th> <th></th> <th>Abs.Cov.%</th> <th>Dom?</th> <th>Ind.</th> </tr> </thead> <tbody> <tr><td>1. <u>Ab. sin.</u></td><td><u>85</u></td><td><u>Y</u></td><td><u>FAC</u></td><td>7. _____</td><td></td><td></td><td></td></tr> <tr><td>2. <u>Op. hor.</u></td><td><u>50</u></td><td><u>Y</u></td><td><u>FACU</u></td><td>8. _____</td><td></td><td></td><td></td></tr> <tr><td>3. _____</td><td></td><td></td><td></td><td>9. _____</td><td></td><td></td><td></td></tr> <tr><td>4. _____</td><td></td><td></td><td></td><td>10. _____</td><td></td><td></td><td></td></tr> <tr><td>5. _____</td><td></td><td></td><td></td><td>11. _____</td><td></td><td></td><td></td></tr> <tr><td>6. _____</td><td></td><td></td><td></td><td>12. _____</td><td></td><td></td><td></td></tr> <tr> <td align="center" colspan="4">Total Sapling/Shrub Cover: <u>135</u></td> <td colspan="4"></td> </tr> <tr> <td align="center" colspan="4">50% of total cover: <u>67.5</u></td> <td align="center" colspan="4">20% of total cover: <u>27</u></td> </tr> </tbody> </table> <p><b>Herb Stratum</b></p> <table border="1"> <thead> <tr> <th></th> <th>Abs.Cov.%</th> <th>Dom?</th> <th>Ind.</th> <th></th> <th>Abs. 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Remarks: \_\_\_\_\_





Site 53. Soil - Upland



Site 53. Soil - Upland

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**Site 53.** Vegetation - Upland



**Site 53.** Vegetation - Upland

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WETLAND DETERMINATION DATA FORM – Alaska Region

Project: Palmer VMS Borough/City: Haines Date: 7/13/2013  
 Applicant/Owner: Constantine Sampling Point #: 60  
 Investigator(s): Z. Halstead, D. Jewell Firm: HDR Alaska, Inc.  
 Lat. (dec.) 59.39130 Long. 136.36562 ± ' NAD 83 Recorded on GPS #: 4 Marked on map?  Field Map #: 4  
 Subregion (circle one): (SE) Southcentral Western Aleutian Interior Northern Landform: Toe Slope Slope (%): 2 Aspect: 10  
 Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: 2  
 Photo nos./descriptions: 365, 366 - Soil; 367, 368 - Veg. Camera #: \_\_\_\_\_ Veg Type (Viereck Level 4 or other): \_\_\_\_\_  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes:  No: \_\_\_\_\_ HGM type: N/A  
 Are Vegetation , Soil , or Hydrology  significantly disturbed? Are "Normal Circumstances" present? Yes  No \_\_\_\_\_  
 Are Vegetation , Soil , or Hydrology  naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No _____	Is the sampled area within a wetland?	Yes _____	No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes _____	No <input checked="" type="checkbox"/>		Remarks (e.g., marginal?):	
Wetland Hydrology Present?	Yes _____	No <input checked="" type="checkbox"/>			

VEGETATION (Use scientific names.)

Tree Stratum (dbh ≥ 3")								Dominance Test worksheet:		
Sp.	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.	Number of Dominant Species That are OBL, FACW, or FAC:	_____ (A)	
1. <u>None</u>				5. _____				Total Number of Dominant Species Across All Strata: _____ (B)	_____ (B)	
2. _____				6. _____			Percent of Dominant Species That are OBL, FACW, or FAC: _____ (A/B)			_____ (A/B)
3. _____				7. _____						
4. _____				8. _____						
Total Tree Cover: _____								Prevalence Index worksheet:		
50% of total cover: _____ 20% of total cover: _____								Total % Cover of:		
Sapling/Shrub Stratum (woody plants < 3" dbh)								Multiply by:		
Sp.	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.	OBL species	_____ X1= _____	
1. <u>Aln. sin.</u>	<u>60</u>	<u>Y</u>	<u>FAC</u>	7. _____				FACW species	<u>0</u> X2= <u>0</u>	
2. <u>Opt. hor.</u>	<u>15</u>	<u>N</u>	<u>FACU</u>	8. _____				FAC species	<u>86</u> X3= <u>258</u>	
3. <u>Sam. rac.</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	9. _____				FACU species	<u>27</u> X4= <u>108</u>	
4. <u>Rub. spe.</u>	<u>1</u>	<u>N</u>	<u>FACU</u>	10. _____				UPL + NL species	<u>10</u> X5= <u>50</u>	
5. _____				11. _____				Column Totals:	<u>123</u> (A) <u>416</u> (B)	
6. _____				12. _____				Prevalence Index = B/A = <u>3.38</u>		
Total Sapling/Shrub Cover: <u>81</u>										
50% of total cover: <u>40.5</u> 20% of total cover: <u>16.2</u>										
Herb Stratum								Hydrophytic Vegetation Indicators:		
Sp.	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.	<input checked="" type="checkbox"/> Dominance Test is >50%		
1. <u>Ath. fil.</u>	<u>25</u>	<u>Y</u>	<u>FAC</u>	12. _____				<input checked="" type="checkbox"/> Prevalence Index is ≤3.0		
2. <u>Arund. dia.</u>	<u>10</u>	<u>Y</u>	<u>UPL</u>	13. _____				<input checked="" type="checkbox"/> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)		
3. <u>Eq. arv.</u>	<u>1</u>	<u>N</u>	<u>FAC</u>	14. _____				<input checked="" type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)		
4. <u>Tel. gla.</u>	<u>1</u>	<u>N</u>	<u>FACU</u>	15. _____				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.		
5. <u>Gym. dry.</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	16. _____						
6. _____				17. _____						
7. _____				18. _____						
8. _____				19. _____						
9. _____				20. _____						
10. _____				21. _____						
11. _____				22. _____						
Total Herb Cover: <u>42</u>								Hydrophytic Vegetation Present?		
50% of total cover: <u>21</u> 20% of total cover: <u>8.4</u>								Yes <input checked="" type="checkbox"/> No _____		
Circular 1/10-ac plot <input checked="" type="checkbox"/> or other plot dimension: _____ % of bare ground: <u>40-1.1%</u>										
% Cover of Wetland Bryophytes _____ % Total Cover of Bryophytes <u>0</u>										
(where applicable)										
Remarks:										

SOIL

Sampling Point #: 60

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

Depth (in.)	Horizon Name	Soil Matrix		Redox Features				Texture	a,a dip. (pos/ neg)	Remarks (or use comment number)
		Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>			
0-5	Oe	-	-	-	-	-	-	-	-	
5-6	A	10YR 2/1	100	-	-	-	-	SILD	-	
6-20	B	10YR 3/1	100	-	-	-	-	GRSALO	-	

<sup>1</sup>Type: C = Concentration, D = Depletion, RM = Reduced Matrix, CS=Coated Sand Grains <sup>2</sup>Location: PL = Pore Lining, RC = Root Channel, M = Matrix

Hydric Soil Indicators (check ones that apply, msr from top of mineral layers unless otherwise noted):

<p><input checked="" type="checkbox"/> Histosol or Histel (A1) (≥16" organic surface, sat'd during wet period of growing season)</p> <p><input checked="" type="checkbox"/> Histic Epipedon (A2) (8-16" organics, sat'd, underlain by mineral soil with chroma ≤2)</p> <p><input checked="" type="checkbox"/> Hydrogen Sulfide (A4) (w/in 12" of ground surface; @ _____" in this pit)</p> <p><input checked="" type="checkbox"/> Thick Dark Surface (A12)</p> <p><input checked="" type="checkbox"/> Alaska Gleyed (A13)</p> <p><input checked="" type="checkbox"/> Alaska Redox (A14)</p> <p><input checked="" type="checkbox"/> Alaska Gleyed Pores (A15)</p>	<p><b>Indicators for Problematic Soils<sup>3</sup>:</b></p> <p><input checked="" type="checkbox"/> Alaska Color Change<sup>4</sup> (TA4)</p> <p><input checked="" type="checkbox"/> Alaska Alpine Swales (TA5)</p> <p><input checked="" type="checkbox"/> Alaska Redox with 2.5Y Hue</p> <p><input checked="" type="checkbox"/> Alaska Gleyed without Hue 5Y or Redder Underlying Layer</p> <p><input checked="" type="checkbox"/> Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)</p>	<p><sup>3</sup>One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.</p> <p><sup>4</sup>Give details of color change in Remarks.</p>
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Restrictive Layer (if present) Type: <u>None</u> Depth (inches) <u>N/A</u>	Drainage Class: <u>WD</u> Soil Map Unit Name: _____	Hydric Soil Present? Yes ___ No <u>X</u>
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Comments:  
1. Profile dry throughout.  
2.  
3.

HYDROLOGY

Wetland Hydrology Indicators (check ones that apply, msr from soil surface):

<u>Primary Indicators (any one indicator is sufficient)</u>	
<input checked="" type="checkbox"/> Surface Water (A1)	<input checked="" type="checkbox"/> Surface Soil Cracks (B6)
<input checked="" type="checkbox"/> High Water Table (A2) (w/in 12")	<input checked="" type="checkbox"/> Inundation Visible on Aerial Imagery (B7)
<input checked="" type="checkbox"/> Saturation (A3) (w/in 12")	<input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input checked="" type="checkbox"/> Water Marks (B1)	<input checked="" type="checkbox"/> Marl Deposits (B15)
<input checked="" type="checkbox"/> Sediment Deposits (B2)	<input checked="" type="checkbox"/> Hydrogen Sulfide Odor (C1) (w/in 12")
<input checked="" type="checkbox"/> Drift Deposits (B3)	<input checked="" type="checkbox"/> Dry-Season Water Table (C2) (w/in 24")
<input checked="" type="checkbox"/> Algal Mat or Crust (B4)	<input checked="" type="checkbox"/> Other (explain)
<input checked="" type="checkbox"/> Iron Deposits (B5)	

Secondary Indicators (at least 2 are required)

<input checked="" type="checkbox"/> Water-Stained Leaves (B9)
<input checked="" type="checkbox"/> Drainage Patterns (B10)
<input checked="" type="checkbox"/> Oxid'd Rhizospheres on Living Roots (C3) (w/in 12")
<input checked="" type="checkbox"/> Presence of Reduced Iron (C4) (pos. a.a or soil color change w/in 12")
<input checked="" type="checkbox"/> Salt Deposits (C5)
<input checked="" type="checkbox"/> Stunted or Stressed Plants (D1)
<input checked="" type="checkbox"/> Geomorphic Position (D2) - <u>Ac slope</u>
<input checked="" type="checkbox"/> Shallow Aquitard (D3) (w/in 24", can perch H2O w/in 12")
<input checked="" type="checkbox"/> Microtopographic Relief (D4) (caused by water)
<input checked="" type="checkbox"/> FAC Neutral Test (D5) (# OBL+FACW dominants > # FACU+UPL dominants)

Field Observations (in. from ground surface):			
Surface Water Present?	Yes ___ No <u>X</u>	Depth of water (in.)	_____
Water Table Present?	Yes ___ No <u>X</u>	Depth to water (in.)	_____
Seeping in at that depth but not yet filled: _____			
Saturation Present? (includes capillary fringe)	Yes ___ No <u>X</u>	Depth to sat. (in.)	_____
		Epi Endo Unknown	

Wetland Hydrology Present? Yes \_\_\_ No X

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

Remarks:  
Plot located ~30' higher than elevation of creek.



**Site 60.** Soil - Upland



**Site 60.** Soil - Upland

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**Site 60.** Vegetation - Upland



**Site 60.** Vegetation - Upland

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WETLAND DETERMINATION DATA FORM - Alaska Region

Project: Palmer VMS Borough/City: Haines Date: 7/3/2013  
 Applicant/Owner: Constantine Sampling Point #: 62  
 Investigator(s): Z. Halstead; D. Jewell Firm: HDR Alaska, Inc.  
 Lat. (dec.) 59.39215 Long. 136.36238 ± ' NAD 83 Recorded on GPS #:  Marked on map?  Field Map #: 4  
 Subregion (circle one): (SE) Southcentral Western Aleutian Interior Northern Landform: Gully Slope (%): 4 Aspect: 45  
 Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: V  
 Photo nos./descriptions: 371, 372 - Soil, 373, 374 - Veg. Camera #: \_\_\_\_\_ Veg Type (Viereck Level 4 or other): \_\_\_\_\_  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes:  No: \_\_\_\_\_ HGM type: N/A  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes  No \_\_\_\_\_  
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	Yes _____	No <input checked="" type="checkbox"/>	Is the sampled area within a wetland?	Yes _____	No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes _____	No <input checked="" type="checkbox"/>		Remarks (e.g., marginal?):	
Wetland Hydrology Present?	Yes _____	No <input checked="" type="checkbox"/>			

VEGETATION (Use scientific names.)

Tree Stratum (dbh ≥ 3")								Dominance Test worksheet:	
Sp.	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.	Number of Dominant Species That are OBL, FACW, or FAC:	
1. <u>None.</u>				5.				<u>1</u>	(A)
2.				6.				<u>2</u>	(B)
3.				7.					
4.				8.					
Total Tree Cover: <u>—</u>								Percent of Dominant Species That are OBL, FACW, or FAC:	<u>50</u> (A/B)
50% of total cover: <u>—</u> 20% of total cover: <u>—</u>								Prevalence Index worksheet:	
Sapling/Shrub Stratum (woody plants < 3" dbh)								Total % Cover of:	Multiply by:
Sp.	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.	OBL species	X1=
1. <u>Opl. hor.</u>	<u>20</u>	<u>Y</u>	<u>FACU</u>	7.				<u>0</u>	<u>0</u>
2.				8.				<u>0</u>	<u>0</u>
3.				9.				<u>40</u>	<u>120</u>
4.				10.				<u>24</u>	<u>96</u>
5.				11.				<u>0</u>	<u>0</u>
6.				12.				<u>64</u> (A)	<u>216</u> (B)
Total Sapling/Shrub Cover: <u>20</u>								Prevalence Index = B/A = <u>3.38</u>	
50% of total cover: <u>10</u> 20% of total cover: <u>4</u>								Hydrophytic Vegetation Indicators:	
Herb Stratum								<input checked="" type="checkbox"/> Dominance Test is >50%	
Sp.	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.	<input checked="" type="checkbox"/> Prevalence Index is ≤3.0	
1. <u>Ant. S.l.</u>	<u>40</u>	<u>Y</u>	<u>FAC</u>	12.				<input checked="" type="checkbox"/> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)	
2. <u>Str. amfr.</u>	<u>2</u>	<u>N</u>	<u>FACU</u>	13.				<input checked="" type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
3. <u>Gym. dry.</u>	<u>2</u>	<u>N</u>	<u>FACU</u>	14.					
4.				15.					
5.				16.					
6.				17.					
7.				18.					
8.				19.					
9.				20.					
10.				21.					
11.				22.					
Total Herb Cover: <u>44</u>								Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>	
50% of total cover: <u>22</u> 20% of total cover: <u>8.8</u>									
Circular 1/10-ac plot _____ or other plot dimension: <u>30'x10'</u> % of bare ground: _____									
% Cover of Wetland Bryophytes _____ % Total Cover of Bryophytes _____ (where applicable)									

Remarks: Plot characterizes bottom of gully, No indications of surface water flow, Aln. sin. growing on sides of gully not included in plot.

SOIL

Sampling Point #: 62

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

Depth (in.)	Horizon Name	Soil Matrix		Redox Features				Texture	a, a dip. (pos/ neg)	Remarks (or use comment number)
		Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>			
0-5	O <sub>e</sub>	-	-	-	-	-	-	-	-	
5-6	B <sub>1</sub>	2.5Y 4/1	60	-	-	-	-	SILLO	-	Few gray granules; any for
6-10	B <sub>1</sub>	7.5YR 3/3	60	-	-	-	-	SALLO	-	
10-16	J	7.5YR 3/2	40	-	-	-	-	↓	-	
10-16	B <sub>2</sub>	7.5YR 3/2	70	-	-	-	-	GRLO	-	30% gravel/cobble.

<sup>1</sup>Type: C = Concentration, D = Depletion, RM = Reduced Matrix, CS=Coated Sand Grains <sup>2</sup>Location: PL = Pore Lining, RC = Root Channel, M = Matrix

Hydric Soil Indicators (check ones that apply, msr from top of mineral layers unless otherwise noted):

- |   |  |   |
|---|--|---|
| <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Histosol or Histel (A1) (≥16" organic surface, sat'd during wet period of growing season)</li> <li><input checked="" type="checkbox"/> Histic Epipedon (A2) (8-16" organics, sat'd, underlain by mineral soil with chroma ≤2)</li> <li><input checked="" type="checkbox"/> Hydrogen Sulfide (A4) (w/in 12" of ground surface; @ _____" in this pit)</li> <li><input checked="" type="checkbox"/> Thick Dark Surface (A12)</li> <li><input checked="" type="checkbox"/> Alaska Gleyed (A13)</li> <li><input checked="" type="checkbox"/> Alaska Redox (A14)</li> <li><input checked="" type="checkbox"/> Alaska Gleyed Pores (A15)</li> </ul> | <p><b>Indicators for Problematic Hydric Soils<sup>3</sup>:</b></p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Alaska Color Change<sup>4</sup> (TA4)</li> <li><input checked="" type="checkbox"/> Alaska Alpine Swales (TA5)</li> <li><input checked="" type="checkbox"/> Alaska Redox with 2.5Y Hue</li> <li><input checked="" type="checkbox"/> Alaska Gleyed without Hue 5Y or Redder Underlying Layer</li> <li><input checked="" type="checkbox"/> Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)</li> </ul> | <p><sup>3</sup>One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.<br/><sup>4</sup>Give details of color change in Remarks.</p> |
|---|--|---|

Restrictive Layer (if present)	Drainage Class: <u>uWD</u>	Hydric Soil Present?    Yes ___ No <u>X</u>
Type: <u>None</u>	Soil Map Unit Name: _____	
Depth (inches) <u>N/A</u>		

Comments:  
 1. Boulder in bottom of pit, 1/2 inch saturated soil on top of boulder in 1/2 of pit. ReSatur @ 16.  
 2.  
 3.

HYDROLOGY

<p><b>Wetland Hydrology Indicators</b> (check ones that apply, msr from soil surface):</p> <p><u>Primary Indicators</u> (any one indicator is sufficient)</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Surface Water (A1)</li> <li><input checked="" type="checkbox"/> High Water Table (A2) (w/in 12")</li> <li><input checked="" type="checkbox"/> Saturation (A3) (w/in 12")</li> <li><input checked="" type="checkbox"/> Water Marks (B1)</li> <li><input checked="" type="checkbox"/> Sediment Deposits (B2)</li> <li><input checked="" type="checkbox"/> Drift Deposits (B3)</li> <li><input checked="" type="checkbox"/> Algal Mat or Crust (B4)</li> <li><input checked="" type="checkbox"/> Iron Deposits (B5)</li> <li><input checked="" type="checkbox"/> Surface Soil Cracks (B6)</li> <li><input checked="" type="checkbox"/> Inundation Visible on Aerial Imagery (B7)</li> <li><input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8)</li> <li><input checked="" type="checkbox"/> Marl Deposits (B15)</li> <li><input checked="" type="checkbox"/> Hydrogen Sulfide Odor (C1) (w/in 12")</li> <li><input checked="" type="checkbox"/> Dry-Season Water Table (C2) (w/in 24")</li> <li><input checked="" type="checkbox"/> Other (explain)</li> </ul>	<p><u>Secondary Indicators</u> (at least 2 are required)</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Water-Stained Leaves (B9)</li> <li><input checked="" type="checkbox"/> Drainage Patterns (B10) <u>gully</u></li> <li><input checked="" type="checkbox"/> Oxid'd Rhizospheres on Living Roots (C3) (w/in 12")</li> <li><input checked="" type="checkbox"/> Presence of Reduced Iron (C4) (pos. a.a or soil color change w/in 12")</li> <li><input checked="" type="checkbox"/> Salt Deposits (C5)</li> <li><input checked="" type="checkbox"/> Stunted or Stressed Plants (D1)</li> <li><input checked="" type="checkbox"/> Geomorphic Position (D2) - <u>Gully</u></li> <li><input checked="" type="checkbox"/> Shallow Aquitard (D3) (w/in 24", can perch H2O w/in 12")</li> <li><input checked="" type="checkbox"/> Microtopographic Relief (D4) (caused by water)</li> <li><input checked="" type="checkbox"/> FAC Neutral Test (D5) (# OBL+FACW dominants &gt; # FACU+UPL dominants)</li> </ul>
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<p>Field Observations (in. from ground surface):</p> <p>Surface Water Present?    Yes ___ No <u>X</u>    Depth of water (in.) _____</p> <p>Water Table Present?    Yes ___ No <u>X</u>    Depth to water (in.) _____</p> <p>Seeping in at that depth but not yet filled: _____</p> <p>Saturation Present?    Yes <u>X</u>    No ___    Depth to sat. (in.) <u>16</u> - <u>reduced on boulder.</u></p> <p>(includes capillary fringe)    Epi    Endo    Unknown</p>	<p>Wetland Hydrology Present?    Yes ___ No <u>X</u></p>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:



**Site 62.** Soil - Upland



**Site 62.** Soil - Upland

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**Site 62.** Vegetation - Upland



**Site 62.** Vegetation - Upland

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**WETLAND DETERMINATION DATA FORM – Alaska Region**

Project: Palmer VMS Borough/City: Haines Date: 7/3/13

Applicant/Owner: Constantine Sampling Point #: 064

Investigator(s): Zach Halstead, Doug Jewell Firm: HDR Alaska, Inc.

Lat. (dec.) 59.39303 Long. 136.35925 ± ' NAD 83 Recorded on GPS #: \_\_\_\_\_ Marked on map? \_\_\_\_\_ Field Map #: \_\_\_\_\_

Subregion (circle one): SE Southcentral Western Aleutian Interior Northern Landform: Slope Slope (%): 2 Aspect: \_\_\_\_\_

Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: 4

Photo nos./descriptions: Soil: 377, 378 Veg: 379, 380 Camera #: \_\_\_\_\_ Veg Type (Viereck Level 4 or other): \_\_\_\_\_

Are climatic / hydrologic conditions on the site typical for this time of year? Yes: X No: \_\_\_\_\_ HGM type: N/A

Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_

Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

**SUMMARY OF FINDINGS**

Hydrophytic Vegetation Present?	Yes _____	No <u>X</u>	Is the sampled area within a wetland?	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>		Remarks (e.g., marginal?):	
Wetland Hydrology Present?	Yes _____	No <u>X</u>			

**VEGETATION (Use scientific names.)**

<p><b>Tree Stratum (dbh ≥ 3")</b></p> <table border="1"> <thead> <tr> <th>Sp.</th> <th>Abs.Cov.%</th> <th>Dom?</th> <th>Ind.</th> <th>Species</th> <th>Abs.Cov.%</th> <th>Dom?</th> <th>Ind.</th> </tr> </thead> <tbody> <tr> <td>1. <u>Pop. btl.</u></td> <td><u>70</u></td> <td><u>Y</u></td> <td><u>FACU</u></td> <td>5. _____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>2. _____</td> <td>_____</td> <td>_____</td> <td>_____</td> <td>6. _____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>3. _____</td> <td>_____</td> <td>_____</td> <td>_____</td> <td>7. _____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>4. _____</td> <td>_____</td> <td>_____</td> <td>_____</td> <td>8. _____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td colspan="4">Total Tree Cover: <u>70</u></td> <td colspan="4"></td> </tr> <tr> <td colspan="4">50% of total cover: <u>35</u></td> <td colspan="4">20% of total cover: <u>14</u></td> </tr> </tbody> </table>								Sp.	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.	1. <u>Pop. btl.</u>	<u>70</u>	<u>Y</u>	<u>FACU</u>	5. _____	_____	_____	_____	2. _____	_____	_____	_____	6. _____	_____	_____	_____	3. _____	_____	_____	_____	7. _____	_____	_____	_____	4. _____	_____	_____	_____	8. _____	_____	_____	_____	Total Tree Cover: <u>70</u>								50% of total cover: <u>35</u>				20% of total cover: <u>14</u>				<p><b>Dominance Test worksheet:</b></p> <p>Number of Dominant Species That are OBL, FACW, or FAC: <u>1</u> (A)</p> <p>Total Number of Dominant Species Across All Strata: <u>3</u> (B)</p> <p>Percent of Dominant Species That are OBL, FACW, or FAC: <u>33.3</u> (A/B)</p>																																																									
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<p><b>Herb Stratum</b></p> <table border="1"> <thead> <tr> <th></th> <th>Abs.Cov.%</th> <th>Dom?</th> <th>Ind.</th> <th></th> <th>Abs. Cov.%</th> <th>Dom?</th> <th>Ind.</th> </tr> </thead> <tbody> <tr> <td>1. <u>Val. sit.</u></td> <td><u>2</u></td> <td><u>N</u></td> <td><u>FAC</u></td> <td>12. _____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>2. <u>Arn. dio.</u></td> <td><u>65</u></td> <td><u>Y</u></td> <td><u>UPL</u></td> <td>13. _____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>3. <u>Aln. fil.</u></td> <td><u>5</u></td> <td><u>N</u></td> <td><u>FAC</u></td> <td>14. _____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>4. <u>Gym. dry.</u></td> <td><u>7</u></td> <td><u>N</u></td> <td><u>FACU</u></td> <td>15. _____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>5. <u>Equiar.</u></td> <td><u>2</u></td> <td><u>N</u></td> <td><u>FAC</u></td> <td>16. _____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>6. <u>Bar. lan.</u></td> <td><u>7</u></td> <td><u>N</u></td> <td><u>FACU</u></td> <td>17. _____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>7. <u>Tet. gra.</u></td> <td><u>1</u></td> <td><u>N</u></td> <td><u>FACU</u></td> <td>18. _____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>8. _____</td> <td>_____</td> <td>_____</td> <td>_____</td> <td>19. _____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>9. _____</td> <td>_____</td> <td>_____</td> <td>_____</td> <td>20. _____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>10. _____</td> <td>_____</td> <td>_____</td> <td>_____</td> <td>21. _____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>11. _____</td> <td>_____</td> <td>_____</td> <td>_____</td> <td>22. _____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td colspan="4">Total Herb Cover: <u>89</u></td> <td colspan="4"></td> </tr> <tr> <td colspan="4">50% of total cover: <u>44.5</u></td> <td colspan="4">20% of total cover: <u>17.8</u></td> </tr> </tbody> </table>									Abs.Cov.%	Dom?	Ind.		Abs. Cov.%	Dom?	Ind.	1. <u>Val. sit.</u>	<u>2</u>	<u>N</u>	<u>FAC</u>	12. _____	_____	_____	_____	2. <u>Arn. dio.</u>	<u>65</u>	<u>Y</u>	<u>UPL</u>	13. _____	_____	_____	_____	3. <u>Aln. fil.</u>	<u>5</u>	<u>N</u>	<u>FAC</u>	14. _____	_____	_____	_____	4. <u>Gym. dry.</u>	<u>7</u>	<u>N</u>	<u>FACU</u>	15. _____	_____	_____	_____	5. <u>Equiar.</u>	<u>2</u>	<u>N</u>	<u>FAC</u>	16. _____	_____	_____	_____	6. <u>Bar. lan.</u>	<u>7</u>	<u>N</u>	<u>FACU</u>	17. _____	_____	_____	_____	7. <u>Tet. gra.</u>	<u>1</u>	<u>N</u>	<u>FACU</u>	18. _____	_____	_____	_____	8. _____	_____	_____	_____	19. _____	_____	_____	_____	9. _____	_____	_____	_____	20. _____	_____	_____	_____	10. _____	_____	_____	_____	21. _____	_____	_____	_____	11. _____	_____	_____	_____	22. _____	_____	_____	_____	Total Herb Cover: <u>89</u>								50% of total cover: <u>44.5</u>				20% of total cover: <u>17.8</u>				<p><b>Hydrophytic Vegetation Indicators:</b></p> <p><u>N</u> Dominance Test is &gt;50%</p> <p><u>N</u> Prevalence Index is ≤3.0</p> <p><u>N</u> Morphological Adaptations<sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)</p> <p><u>N</u> Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)</p> <p><sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.</p>	
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<p>Remarks:</p>																																																																																																																									

**SOIL**

Sampling Point #: 044

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

Depth (in.)	Horizon Name	Soil Matrix		Redox Features				Texture	a, a dip. (pos/ neg)	Remarks (or use comment number)
		Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>			
0-1	O <sub>e</sub>	-	-	-	-	-	-	-	-	
1-4	B <sub>1</sub>	2.5Y 2/1	100					GRLL	N	Small cobbles - 30%
4-6	B <sub>2</sub>	2.5Y 4/1	80					SEL	N	↓
		2.5Y 3/2	20					SEL	N	
6-16	B <sub>3</sub>	2.5Y 3/1	100					GRLL	N	

<sup>1</sup>Type: C = Concentration, D = Depletion, RM = Reduced Matrix, CS=Coated Sand Grains <sup>2</sup>Location: PL = Pore Lining, RC = Root Channel, M = Matrix

**Hydric Soil Indicators** (check ones that apply, msr from top of mineral layers unless otherwise noted):

<input type="checkbox"/> Histosol or Histel (A1) (≥16" organic surface, sat'd during wet period of growing season) <input type="checkbox"/> Histic Epipedon (A2) (8-16" organics, sat'd, underlain by mineral soil with chroma ≤2) <input type="checkbox"/> Hydrogen Sulfide (A4) (w/in 12" of ground surface; @ _____" in this pit) <input type="checkbox"/> Thick Dark Surface (A12) <input checked="" type="checkbox"/> Alaska Gleyed (A13) <input type="checkbox"/> Alaska Redox (A14) <input type="checkbox"/> Alaska Gleyed Pores (A15)	<b>Indicators for Problematic Hydric Soils<sup>3</sup>:</b> <input type="checkbox"/> Alaska Color Change <sup>4</sup> (TA4) <input type="checkbox"/> Alaska Alpine Swales (TA5) <input type="checkbox"/> Alaska Redox with 2.5Y Hue <input type="checkbox"/> Alaska Gleyed without Hue 5Y or Redder Underlying Layer <input type="checkbox"/> Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)	<sup>3</sup> One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. <sup>4</sup> Give details of color change in Remarks.
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Restrictive Layer (if present) Type: _____ Depth (inches) _____	Drainage Class: <u>WD</u> Soil Map Unit Name: _____	Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/>
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Comments:  
 1.  
 2.  
 3.

**HYDROLOGY**

<p><b>Wetland Hydrology Indicators</b> (check ones that apply, msr from soil surface):</p> <p><u>Primary Indicators</u> (any one indicator is sufficient)</p> <input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> High Water Table (A2) (w/in 12") <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Saturation (A3) (w/in 12") <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Marl Deposits (B15) <input checked="" type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) (w/in 12") <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Dry-Season Water Table (C2) (w/in 24") <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (explain) <input type="checkbox"/> Iron Deposits (B5)	<p><u>Secondary Indicators</u> (at least 2 are required)</p> <input checked="" type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Oxid'd Rhizospheres on Living Roots (C3) (w/in 12") <input type="checkbox"/> Presence of Reduced Iron (C4) (pos. a,a or soil color change w/in 12") <input type="checkbox"/> Salt Deposits (C5) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) (w/in 24", can perch H2O w/in 12") <input type="checkbox"/> Microtopographic Relief (D4) (caused by water) <input type="checkbox"/> FAC Neutral Test (D5) (# OBL+FACW dominants > # FACU+UPL dominants)
<p>Field Observations (in. from ground surface):</p> Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth of water (in.) _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth to water (in.) _____ Seeping in at that depth but not yet filled: _____ Saturation Present? Yes _____ No <input checked="" type="checkbox"/> Depth to sat. (in.) _____ (includes capillary fringe)      Epi Endo Unknown	<p><b>Wetland Hydrology Present?</b> Yes _____ No <input checked="" type="checkbox"/></p>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks:	



**Site 64.** Soil - Upland



**Site 64.** Soil - Upland

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**Site 64.** Vegetation - Upland



**Site 64.** Vegetation - Upland

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WETLAND DETERMINATION DATA FORM - Alaska Region

Project: Palmer UMS Borough/City: Haines Date: 7/3/2013  
 Applicant/Owner: Constantine Sampling Point #: 68  
 Investigator(s): Z. Halstead, D. Sewell Firm: HDR Alaska, Inc.  
 Lat. (dec.) 59.39383 Long. 136.35379 ± ' NAD 83 Recorded on GPS #: X Marked on map? X Field Map #: 3  
 Subregion (circle one): (SE) Southcentral Western Aleutian Interior Northern Landform: Gully Slope (%): 2 Aspect: 19  
 Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: W  
 Photo nos./descriptions: 387, 388 - Soil; 389, 390 Veg. Camera #: \_\_\_\_\_ Veg Type (Viereck Level 4 or other): \_\_\_\_\_  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes: X No: \_\_\_\_\_ HGM type: N/A  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_  
 Are Vegetation N, Soil A, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is the sampled area within a wetland?	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>		Remarks (e.g., marginal?):	
Wetland Hydrology Present?	Yes _____	No <u>X</u>			

VEGETATION (Use scientific names.)

Tree Stratum (dbh ≥ 3")								Dominance Test worksheet:		
Sp.	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.	Number of Dominant Species That are OBL, FACW, or FAC:		
1. <u>None</u>				5.				<u>2</u>	(A)	
2.				6.				<u>2</u>	(B)	
3.				7.						
4.				8.						
Total Tree Cover: _____								Percent of Dominant Species That are OBL, FACW, or FAC:	<u>100</u>	(A/B)
50% of total cover: _____				20% of total cover: _____				Prevalence Index worksheet:		
Sapling/Shrub Stratum (woody plants < 3" dbh)								Total % Cover of:		
Sp.	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.	OBL species	Multiply by:	
1. <u>Aln. sin.</u>	<u>50</u>	<u>Y</u>	<u>FAC</u>	7.				<u>0</u>	X1= <u>0</u>	
2.				8.				<u>0</u>	X2= <u>0</u>	
3.				9.				<u>110</u>	X3= <u>330</u>	
4.				10.				<u>6</u>	X4= <u>24</u>	
5.				11.				<u>0</u>	X5= <u>0</u>	
6.				12.						
Total Sapling/Shrub Cover: <u>50</u>								Column Totals:	<u>116</u> (A) <u>354</u> (B)	
50% of total cover: <u>25</u>				20% of total cover: <u>10</u>				Prevalence Index = B/A = <u>3.05</u>		
Herb Stratum								Hydrophytic Vegetation Indicators:		
Sp.	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.	<u>Y</u> Dominance Test is >50%		
1. <u>Ath. fil.</u>	<u>60</u>	<u>Y</u>	<u>FAC</u>	12.				<u>N</u> Prevalence Index is ≤3.0		
2. <u>Gym. dip.</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	13.				<u>N</u> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)		
3. <u>Str. amp.</u>	<u>1</u>	<u>N</u>	<u>FACU</u>	14.				<u>N</u> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)		
4.				15.				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.		
5.				16.				Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	
6.				17.						
7.				18.						
8.				19.						
9.				20.						
10.				21.						
11.				22.						
Total Herb Cover: <u>66</u>										
50% of total cover: <u>33</u>				20% of total cover: <u>13.2</u>						
Circular 1/10-ac plot _____ or other plot dimension: <u>10x10</u> % of bare ground: <u>40-litter</u>										
% Cover of Wetland Bryophytes _____ % Total Cover of Bryophytes <u>0</u> % (where applicable)										

Remarks: Plot located on flat bench in bottom of gully.

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

Depth (in.)	Horizon Name	Soil Matrix		Redox Features				Texture	a, α dip. (pos/ neg)	Remarks (or use comment number)
		Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>			
0-4	O <sub>e</sub>	-	-	-	-	-	-	-	-	-
4-5	B <sub>1</sub>	2.5 Y 2.5/1	100	-	-	-	-	G-RLL	N	
5-8	B <sub>2</sub>	3.5 Y 2.5/1	100	-	-	-	-	G-RLL	N	
8-19	B <sub>3</sub>	5 YR 3/2	100	-	-	-	-	G-RLL	N	

<sup>1</sup>Type: C = Concentration, D = Depletion, RM = Reduced Matrix, CS=Coated Sand Grains <sup>2</sup>Location: PL = Pore Lining, RC = Root Channel, M = Matrix

Hydric Soil Indicators (check ones that apply, msr from top of mineral layers unless otherwise noted):

- |   |   |  |
|---|---|--|
| <p><input checked="" type="checkbox"/> Histosol or Histel (A1) (≥16" organic surface, sat'd during wet period of growing season)</p> <p><input checked="" type="checkbox"/> Histic Epipedon (A2)(8-16" organics, sat'd, underlain by mineral soil with chroma ≤2)</p> <p><input checked="" type="checkbox"/> Hydrogen Sulfide (A4) (w/in 12" of ground surface; @ ___" in this pit)</p> <p><input checked="" type="checkbox"/> Thick Dark Surface (A12)</p> <p><input checked="" type="checkbox"/> Alaska Gleyed (A13)</p> <p><input checked="" type="checkbox"/> Alaska Redox (A14)</p> <p><input checked="" type="checkbox"/> Alaska Gleyed Pores (A15)</p> | <p><b>Indicators for Problematic Hydric Soils<sup>3</sup>:</b></p> <p><input checked="" type="checkbox"/> Alaska Color Change<sup>4</sup> (TA4)</p> <p><input checked="" type="checkbox"/> Alaska Alpine Swales (TA5)</p> <p><input checked="" type="checkbox"/> Alaska Redox with 2.5Y Hue</p> <p><input checked="" type="checkbox"/> Alaska Gleyed without Hue 5Y or Redder Underlying Layer</p> <p><input checked="" type="checkbox"/> Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)</p> | <p><sup>3</sup>One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.</p> <p><sup>4</sup>Give details of color change in Remarks.</p> |
|---|---|--|

Restrictive Layer (if present) Type: <u>None</u> Depth (inches): <u>N/A</u>	Drainage Class: <u>MWD</u> Soil Map Unit Name: _____	Hydric Soil Present? Yes ___ No <input checked="" type="checkbox"/>
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Comments:  
1.  
2.  
3.

HYDROLOGY

<p><b>Wetland Hydrology Indicators (check ones that apply, msr from soil surface):</b></p> <p><u>Primary Indicators (any one indicator is sufficient)</u></p> <p><input checked="" type="checkbox"/> Surface Water (A1)      <input checked="" type="checkbox"/> Surface Soil Cracks (B6)</p> <p><input checked="" type="checkbox"/> High Water Table (A2) (w/in 12")      <input checked="" type="checkbox"/> Inundation Visible on Aerial Imagery (B7)</p> <p><input checked="" type="checkbox"/> Saturation (A3) (w/in 12")      <input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8)</p> <p><input checked="" type="checkbox"/> Water Marks (B1)      <input checked="" type="checkbox"/> Marl Deposits (B15)</p> <p><input checked="" type="checkbox"/> Sediment Deposits (B2)      <input checked="" type="checkbox"/> Hydrogen Sulfide Odor (C1) (w/in 12")</p> <p><input checked="" type="checkbox"/> Drift Deposits (B3)      <input checked="" type="checkbox"/> Dry-Season Water Table (C2) (w/in 24")</p> <p><input checked="" type="checkbox"/> Algal Mat or Crust (B4)      <input checked="" type="checkbox"/> Other (explain)</p> <p><input checked="" type="checkbox"/> Iron Deposits (B5)</p>		<p><u>Secondary Indicators (at least 2 are required)</u></p> <p><input checked="" type="checkbox"/> Water-Stained Leaves (B9)</p> <p><input checked="" type="checkbox"/> Drainage Patterns (B10)</p> <p><input checked="" type="checkbox"/> Oxid'd Rhizospheres on Living Roots (C3) (w/in 12")</p> <p><input checked="" type="checkbox"/> Presence of Reduced Iron (C4) (pos. α,α or soil color change w/in 12")</p> <p><input checked="" type="checkbox"/> Salt Deposits (C5)</p> <p><input checked="" type="checkbox"/> Stunted or Stressed Plants (D1)</p> <p><input checked="" type="checkbox"/> Geomorphic Position (D2) - <u>gully bottom</u></p> <p><input checked="" type="checkbox"/> Shallow Aquitard (D3) (w/in 24", can perch H2O w/in 12")</p> <p><input checked="" type="checkbox"/> Microtopographic Relief (D4) (caused by water)</p> <p><input checked="" type="checkbox"/> FAC Neutral Test (D5) (# OBL+FACW dominants &gt; # FACU+UPL dominants)</p>
--	--	--

<p>Field Observations (in. from ground surface):</p> <p>Surface Water Present? Yes ___ No <input checked="" type="checkbox"/> Depth of water (in.) _____</p> <p>Water Table Present? Yes ___ No <input checked="" type="checkbox"/> Depth to water (in.) _____</p> <p>Seeping in at that depth but not yet filled: _____</p> <p>Saturation Present? Yes ___ No <input checked="" type="checkbox"/> Depth to sat. (in.) _____</p> <p>(includes capillary fringe) Epi Endo Unknown</p>	<p>Wetland Hydrology Present? Yes ___ No <input checked="" type="checkbox"/></p>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:



**Site 68.** Soil - Upland



**Site 68.** Soil - Upland

---



**Site 68.** Vegetation - Upland



**Site 68.** Vegetation - Upland

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**APPENDIX B**

**OBSERVATION POINT PHOTOGRAPHS**





**Site 02.** Waterbody – PUBH



**Site 02.** Waterbody - PUBH

---



**Site 04.** Waterbody - PUBH



**Site 04.** Vegetation adjacent to waterbody

---



**Site 05.** Waterbody - PUBH



**Site 05.** Waterbody - PUBH

---



**Site 06.** Waterbody – R3UBH



**Site 06.** Waterbody – R3UBH

---



**Site 07.** Waterbody – R3UBH



**Site 07.** Waterbody – R3UBH

---



**Site 07A.** Waterbody – R3UBH



**Site 07A.** Waterbody – R3UBH

---



**Site 08.** Waterbody - PUBH



**Site 08.** Waterbody - PUBH

---



**Site 09.** Waterbody – R3UBH



**Site 09.** Waterbody – R3UBH

---



**Site 11.** Upland



**Site 11.** Upland

---



**Site 12.** Upland



**Site 12.** Upland

---



**Site 13.** Upland



**Site 13.** Upland

---



**Site 14.** Upland



**Site 14.** Upland

---



**Site 15.** Waterbody – R3UBH



**Site 15.** Waterbody – R3UBH

---



**Site 16.** Waterbody - PUBH



**Site 16.** Waterbody - PUBH

---



**Site 17.** Waterbody – R4SBC



**Site 17.** Waterbody – R4SBC

---



**Site 19.** Upland



**Site 19.** Upland

---



**Site 21.** Wetland – PSS1B



**Site 21.** Wetland – PSS1B

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**Site 22.** Waterbody – R3UBH



**Site 22.** Waterbody – R3UBH

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**Site 23.** Waterbody – R3UBH



**Site 23.** Waterbody – R3UBH

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**Site 24.** Waterbody – R4SBC



**Site 24.** Vegetation adjacent to waterbody – R4SBC

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**Site 25.** Upland



**Site 25.** Upland

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**Site 27.** Waterbody – R3UBH



**Site 27.** Waterbody – R3UBH

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**Site 28.** Waterbody – R3UBH



**Site 28.** Waterbody – R3UBH

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**Site 30.** Waterbody – R3UBH



**Site 30.** Waterbody – R3UBH

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**Site 32.** Upland



**Site 32.** Upland

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**Site 34.** Waterbody – R3UBH



**Site 34.** Waterbody – R3UBH

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**Site 35.** Upland



**Site 35.** Upland

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**Site 36.** Waterbody – R3UBH



**Site 36.** Waterbody – R3UBH

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**Site 38.** Upland



**Site 38.** Upland

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**Site 39.** Waterbody – R3UBH



**Site 39.** Waterbody – R3UBH

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**Site 41.** Upland



**Site 41.** Upland

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**Site 44.** Waterbody – R4SBC



**Site 44.** Waterbody – R4SBC

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**Site 45.** Waterbody – R4SBC



**Site 45.** Waterbody – R4SBC

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**Site 46.** Waterbody – R3UBH



**Site 46.** Waterbody – R3UBH

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**Site 47.** Waterbody – R3UBH



**Site 47.** Waterbody – R3UBH

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**Site 48.** Waterbody – R3UBH



**Site 48.** Waterbody – R3UBH

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**Site 49.** Waterbody – Seep - R3UBH



**Site 49.** Waterbody – Seep - R3UBH

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**Site 50.** Waterbody – R3UBH



**Site 50.** Waterbody – R3UBH

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**Site 51.** Waterbody – R3UBH



**Site 51.** Waterbody – R3UBH

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**Site 54.** Upland



**Site 54.** Upland

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**Site 55.** Wetland – PEM1F



**Site 55.** Wetland – PEM1F with outlet

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**Site 56.** Upland



**Site 56.** Upland

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**Site 57.** Waterbody – R3UBH



**Site 57.** Waterbody – R3UBH

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**Site 58.** Waterbody – Glacier Creek – R3UBH with R4SBC and steep upland alder slope across creek



**Site 58.** Waterbody – Glacier Creek – R3UBH with steep upland alder slope in background

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**Site 59.** Waterbody – Glacier Creek – R3UBH in foreground and R4SBC in background



**Site 59.** Waterbody – Glacier Creek – R3UBH in foreground and R4SBC in background

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**Site 61.** Waterbody – R4SBC



**Site 61.** Waterbody – R4SBC

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**Site 63.** Waterbody – R4SBC



**Site 63.** Waterbody – R4SBC

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**Site 65.** Waterbody – R3UBH



**Site 65.** Waterbody – R3UBH

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**Site 66.** Waterbody – R4SBC



**Site 66.** Waterbody – R4SBC

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**Site 67.** Upland



**Site 67.** Upland

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**Site 69.** Upland



**Site 69.** Upland

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**Site 70.** Waterbody – R4SBC



**Site 70.** Waterbody – R4SBC

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**Site 71.** Upland



**Site 71.** Upland

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**Site 72.** Upland – Steep alder slope with exposed rock and mesic herb communities (photo from helicopter)



**Site 72.** Upland – Steep alder slope with exposed rock and mesic herb communities (photo from helicopter)

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