WETLAND DELINEATION AND PROPOSED JURISDICTIONAL DETERMINATION FOR PROPOSED AKIAK INFRASTRUCTURE PROJECT, AKIAK, ALASKA

Prepared for

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INTRODUCTION

Solstice Alaska Consulting, Inc. (Solstice), on behalf of the Akiak Native Community, requested that ABR, Inc.—Environmental Research & Services (ABR) perform a fine-scale wetland delineation for various components of a proposed infrastructure project in the village of Akiak, within the Bethel Census Area, Alaska. The goals of the infrastructure project include relocating the village landfill and sewage lagoon, and to install a gravel pad for broadband internet facilities. In this study, field efforts were focused on documenting the types and boundaries of all wetlands within the study area. This delineation is suitable for supporting wetland permitting under Section 404 of the Clean Water Act (CWA) and includes an assessment of the proposed jurisdictional status of wetlands and waters identified at the site.

STUDY AREA

The study area comprises four discrete areas in Akiak, Alaska (Figure 1), located along the Kuskokwim River within the Bethel Census Area. The 83-acre study area is centered at latitude 60.910887 and longitude -161.239623 (NAD83 projection), within Section 31 of Range 67W and Section 36 of Range 68W, in Township 10N, Seward Meridian.

The majority of the study area is undeveloped and dominated by closed tall shrub. No National Wetlands Inventory (NWI) mapping is available for the study area (USFWS 2021). Existing wetlands mapping is available in the vicinity of the airport (Three Parameters Plus 1996) and indicates the presence of seasonally flooded-saturated shrub-scrub and forested wetlands, surrounded by deciduous forest uplands. No soils mapping is available through the Web Soil Survey (USDA NRCS 2021).

METHODS

DATA SOURCES

The following data sources were used to facilitate the wetland field survey and mapping efforts:

- High-resolution satellite imagery (Maxar, 0.5-meter resolution, acquired 20 July 2017).
- Interferometric Synthetic Aperture Radar (IFSAR) digital elevation model (DEM) (USGS 2019a), 5-meter resolution
- National Hydrography Dataset (NHD) lines and polygons (USGS

2019b). FIELD SURVEY

During the field survey, a set of wetland determination plots representative of the wetland and upland photosignatures visible on the satellite imagery for the study area were sampled.

Wetland determination plots were sampled following the U.S. Army Corps of Engineers (USACE) 3-parameter approach for defining wetlands (Environmental Laboratory 1987) and the methodology described in the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Alaska Region (USACE 2007). At each wetland determination plot, the USACE-required data to determine the presence of hydrophytic vegetation, hydric soils, and wetland hydrology were recorded. The absolute cover of each vascular plant species at each plot was visually estimated and the presence of hydrophytic vegetation was determined using the Dominance Test (ratio of wetland versus upland dominant plants) and/or the Prevalence Index (weighted average of all species present) using the wetland indicator status per the 2018 National Wetland Plant List v.3.4: Alaska (USACE 2018). Plot dimensions were modified to linear oblong areas when sampling along small drainages so as to properly characterize the plant communities in those areas. At each sample plot, photographs of the area, ground surface and vegetation present, and soil pit soil profile were taken, and GPS location coordinates were recorded. In addition to wetland determination plots, map verification plots were also sampled, at which a subset of wetland data were collected to verify the wetland or upland status for photosignatures that had been previously sampled with full wetland determination plots.

All field data were recorded on customized, ABR-prepared applications, running on Android tablet computers. Navigation at the site was done using ArcGIS Collector (accessed through ArcGIS Online), which allowed real-time depictions of plot locations in the field over the same satellite imagery used in the wetland mapping. Upon completion of field work, the data were uploaded to a wetland-specific relational database maintained on ABR servers and were subjected to a set of sequential data QA/QC procedures. This ensured data accuracy before using them to prepare the wetland map for the project. The ABR wetland database facilitates preparation of the required wetland data forms for each wetland determination plot following USACE guidelines (USACE 2007). Wetland data forms and representative photos are included in Appendices A and B.

WETLAND CLASSIFICATION AND MAPPING

Wetland boundaries were delineated using ArcGIS desktop software. As noted above, the primary imagery used for mapping was high-resolution (0.5-meter pixel resolution) satellite imagery obtained 20 July 2017 and available as part of ESRI's World Imagery basemap. Wetland boundaries were identified using the field ground-reference data collected for this project in combination with the interpretation of satellite photosignatures and the assessment of ancillary GIS data layers (see Data Sources above). Wetland types were mapped at a scale of 1:2,000 and each mapped polygon was assigned a wetland type using NWI notation (FGDC 2013), which is typically used by the U.S. Fish and Wildlife Service's NWI

program (Dahl et al. 2015). Each mapped polygon was also assigned a hydrogeomorphic class (USDA NRCS 2008).

ESTABLISHING JURISDICTIONAL STATUS

Wetlands and waters within the study area were assessed to determine if they met the definition of a water of the U.S.(WOTUS), subject to jurisdiction under Section 404 of the Clean Water Act, and/or a navigable water of the U.S., subject to jurisdiction under Section 10 of the Rivers and Harbors Act. The Navigable Waters Protection Rule (NWPR), defining WOTUS for the Clean Water Act (Clean Water Act 33 CFR Part 328) was published in the Federal Register on 21 April 2020 and became effective on 22 June 2020. On 30 August 2021, however, the U.S. District Court for the District of Arizona vacated and remanded this rule in *Pascua Yaqui Tribe v. U.S. Environmental Protection Agency*. The Environmental Protection Agency (EPA) and the Alaska USACE regulatory division are interpreting WOTUS under the pre-2015 regulatory regime until further notice (EPA 2021). Thus, the proposed jurisdictional status of the wetlands mapped in this study uses the EPA and USACE's current interpretation following *Rapanos v. U.S.* (Rapanos) and *Solid Waste Agency of Northern Cook County v. U.S.* (SWANCC). Information presented in this report is intended to assist the USACE in their final decision on the jurisdictional status of wetlands and waters within the study area.

The characteristics of wetlands and waters within the study area were assessed to determine if they met the criteria for jurisdiction under Section 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act. In this study, the USACE navigable waters list (USACE 2021) was used to determine navigability. Field data and aerial imagery were used to determine connections and proximity of wetlands in the study area to navigable waterways and their tributaries.

RESULTS AND DISCUSSION

FIELD SURVEYS AND HYDROLOGICAL CONDITIONS

Field surveys were conducted 16–17 July 2021 by Sue Ives (PWS #2623) and Robert McNown of ABR. Standard USACE 3-parameter wetland determinations were completed at 16 field plots; 9 were classified as uplands and 7 were classified as wetlands (Figure 2, Appendix A). In addition, a map verification plot was completed at 8 locations (Figure 2, Appendix B). GPS accuracy ranged from 1 to 4 meters, with a median accuracy of 4 meters. Characteristics of each mapped wetland and water are listed in Appendix C, including the NWI code, HGM class, jurisdictional status, size (acres), and centroid latitude and longitude of each map polygon.

The meteorological station nearest to the study area with both long-term averages and daily precipitation values for the current season is the Bethel Airport (station USW00026615) located



approximately 20 miles from the study area (see Arguez et al. [2012] and Menne et al. [2012]). Compared to long-term averages for the Bethel Airport, May 2021 was warmer and drier than normal (Table 1). June through August had temperatures closer to normal. July precipitation was well above normal.

To place the hydrological conditions in the study area at the time of sampling in mid-August 2021 in context, a precipitation analysis similar to the USACE's Antecedent Precipitation Tool (APT) was performed, which involves summarizing precipitation data from the nearest meteorological stations and filling any missing records with data from the next nearest station. Current year 30-day rolling precipitation sums were compared with 30 years of 30-day rolling precipitation sums at the 30th and 70th percentiles, which are a reasonable interpretation of normal conditions (Figure 3). The Bethel Airport provided all long-term and current year precipitation data. for the APT. Figure 3 suggests that hydrologic conditions were normal immediately preceding and during the field visit on 16–17 August 2021. Thus, hydrologic conditions were within typical range and are not believed to have influenced the results of the field survey.

WETLAND CLASSIFICATION AND MAPPING

WATERS

Palustrine Permanently Flooded Unconsolidated Bottom (PUBH) waters were documented in three locations in the vicinity of the sewage lagoon (Figure 2). Encompassing 0.3 acres (0.3% of the study area, Table 2), PUBH waters in the study area are relatively small and shallow, and distinguished from the surrounding vegetated wetlands through aerial imagery interpretation and field notes. PUBH waters mapped within the study area include the sewage lagoon itself and two small natural ponds (Figure 2).

WETLANDS

Palustrine Semipermanently Flooded Persistent Emergent (PEM1F) wetlands were documented in the western end of the study area (Figure 2). Encompassing 2.1 acres (2.5% of the study area, Table 2), PEM1F wetlands are characterized by the wetland determination plots aw-15, aw-16, and aw-18 (Appendix A). The PEM1F wetlands in the study area are dominated by the herbs *Calamagrostis canadensis* (bluejoint, FAC) growing in large loose tussocks, *Carex utriculata* (Northwest Territory sedge, OBL), and *Comarum palustre* (purple marshlocks, OBL). Shallow surface water, 3-7 inches deep, was observed in each of these wetlands meeting wetland hydrology indicator Surface Water (A1). Hydrogen sulfide odor was detected when walking through each of these wetlands, meeting the primary wetland hydrology indicator C1 (Hydrogen Sulfide Odor) and the hydric soil indicator A4 (Hydrogen Sulfide). Palustrine Seasonally Flooded-Saturated Persistent Emergent (PEM1E) wetlands were documented in three locations in the vicinity of the sewage lagoon (Figure 2), and cover 1.4 acres (1.7% of the study area, Table 2). Two of the PEM1E wetlands surround the small natural PUBH ponds described above. As characterized by the wetland determination plots aw-06 and aw-08, these wetlands were dominated by the herb *Carex utriculata* (OBL). Soils were either thick surface organic horizons meeting the hydric soil indicator Histosol or Histel (A1), or loamy fine sands meeting the hydric soil indicator Alaska Redox (A14). Soils were saturated at the surface with a water table at or near the surface, meeting the primary wetland hydrology indicators High Water Table (A2) and Saturation (A1). The third PEM1E wetland observed in the area is characterized by verification plot aw-02 (Appendix B). This is a small wetland whose hydrology is driven by a leak from the sewage lagoon. This small wetland contained surface water and purple algae, smelled strongly of sewage, and was surrounded by *Calamagrostis canadensis* dominated uplands.

Palustrine Seasonally Flooded-Saturated Broad-leaved Deciduous Scrub-Shrub (PSS1E) wetlands were documented in the western portion of the study area (Figure 2). Encompassing 0.6 acres (0.7% of the study area), PSS1E wetlands occupied mid-elevation portions of low-lying, concave linear features that may correspond to abandoned riverine channel features. As characterized by wetland determination plot aw-19, PSS1E wetlands were dominated by the shrubs *Alnus viridis* (Sitka alder, FAC) and *Salix arbusculoides* (little-tree willow, FACW), and the herbs *Calamagrostis canadensis* (FAC) and *Comarum palustre* (OBL). The silt loam soils met the hydric soil indicator Alaska Redox (A14), and the problematic hydric soil indicator Alaska Redox (A14), expression and the saturated near the surface, meeting the primary wetland hydrology indicator Saturation (A3).

Palustrine Seasonally Saturated Broad-leaved Deciduous Scrub-Shrub (PSS1B) wetlands were documented in the western portion of the study area, adjacent to and slightly upslope of the PSS1E wetlands described above (Figure 2). PSS1B wetlands cover 1.0 acres, or 1.2% of the study area (Table 2). As characterized by verification plot aw-20 (Appendix B), PSS1B wetlands were dominated by the shrubs *Salix arbusculoides* (FACW) and *S. bebbiana* (gray willow, FAC), and the herbs *Calamagrostis canadensis* (FAC) and *Comarum palustre* (OBL). While a full soil profile was not described, probing showed mineral soils with a gleyed matrix and high value, chroma concentrations as pore linings, similar to soils observed at aw-19 (Appendix A).

Palustrine Seasonally Flooded Persistent Emergent (PEM1C) wetlands were documented in an inactive riverine channel that was mapped as a perennial stream by NHD (USGS 2019a, Figure 2). PEM1C wetlands encompass 0.9 acres, or 1.1% of the study area (Table 2). This wetland was 8–10 feet lower in elevation than the surrounding upland forest, with rafted debris



indicating regular flooding from the Kuskokwim River. Vegetation was dominated by the shrub *Ribes hudsonianum* (northern black currant, FAC) and the herb *Calamagrostis canadensis* (FAC). Silt loam soils met the hydric soil indicator Alaska Redox (A14), and multiple primary wetland hydrology indicators were observed: Saturation (A3), Drift Deposits (B3), and Sparsely Vegetated Concave Surface (B8).

UPLANDS

The remaining 76.7 acres (92.5%) of the study area were mapped as non-wetland uplands, either Uplands (U) or Upland (fill) (Us, Figure 2). Uplands in the study area are either tall closedcanopy alder willow shrub or balsam poplar woodlands. Dominant species include the tree *Populus balsamifera* (balsam poplar, FACU); the shrubs *Alnus viridis* (FAC), *Salix alaxensis* (felt-leaf willow, FAC), *S. arbusculoides* (FACW), and *S. bebbiana* (FAC); and the herbs *Calamagrostis canadensis* (FAC), *Equisetum sylvaticum* (woodland horsetail, FAC), and *Rubus arcticus* (northern blackberry, FAC). All plots in the study area met the secondary wetland hydrology indicator Geomorphic Position (D2) because of the study area's location in the Kuskokwim River floodplain, and many U plots also met the secondary wetland hydrology indicators or problematic hydric soil indicators. Although soil profiles at several U plots did have redoximorphic concentrations, the value and/or chroma of the concentrations was too low to meet a hydric soil indicator (e.g., aw-21 in Appendix A).

JURISDICTIONAL STATUS

The study area is in the Kuskokuak Slough-Kuskokwim River subwatershed (HUC 190305021904, USGS 2019b). The nearest TNW to the study area is the Kuskokwim River (Figure 1), which is navigable for 400 miles to McGrath, (USACE 2021), and is located less than one straight-line mile from the study area centroid. With the exception of the sewage lagoon and associated leak (W-01 and W-02, Appendix C), all wetlands within the study area are believed to be jurisdictional under Section 404 of the CWA as wetlands adjacent to TNWs. Wetlands with a reasonably close physical proximity to a jurisdictional water are considered neighboring and thus adjacent. While no FEMA flood maps are available for Akiak, a review of current aerial imagery, soil profiles, and observations of drift deposits in the field indicate that the entire study area is within the floodplain of the Kuskokwim River, a TNW, and thus all study area wetlands are likely to be considered jurisdictional under Section 404 of the CWA.

The sewage lagoon (W-01) and a small leak identified in the field (W-02) are not believed to be jurisdictional under Section 404 of the CWA. The sewage lagoon is an effluent pond constructed so as to not flood by the Kuskokwim River. The small leak from the sewage lagoon



is a relatively new and presumably ephemeral feature, which will be repaired during the village's proposed infrastructure improvement project.

SUMMARY OF FINDINGS

The findings of this study identify wetlands in the study area, generally limited to low lying relict channels in the floodplain of the Kuskokwim River. Wetlands within the study area adjacent to the Kuskokwim River, a TNW, and thus are believed to be jurisdictional under Section 404 of the CWA as wetlands adjacent to Traditional Navigable Waters. This report and wetlands mapping is sufficient to obtain an Approved Jurisdictional Determination from the USACE, which will formally establish the jurisdictional wetland boundaries on the property.

LITERATURE CITED

- Arguez, A., I. Durre, S. Applequist, R. Vose, M. Squires, X. Yin, R. Heim, and T. Owen, 2012: NOAA's 1981–2010 climate normals: An overview. Bull. Amer. Meteor. Soc., 93, 1687-1697.
- Brinson, M. M. 1993. A hydrogeomorphic classification for wetlands. Technical Report WRP-DE-4, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.
- Dahl, T. E., J. Dick, J. Swords, and B. O. Wilen. 2015. Data Collection Requirements and Procedures for Mapping Wetland, Deepwater and Related Habitats of the United States. Division of Habitat and Resource Conservation (version 2), National Standards and Support Team, Madison, WI. 92 pp.
- Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. Vicksburg, MS: U.S. Army Engineer Waterways Experiment Station. [Online]
 <u>https://www.lrh.usace.army.mil/Portals/38/docs/USACE%2087%20Wetland%20Delineation%20Manual.pdf</u> (Accessed October 15, 2020).
- Environmental Protection Agency (EPA). 2021. Current Implementation of Waters of the United States. <u>https://www.epa.gov/wotus/current-implementation-waters-united-states</u>. Accessed September 2021.
- Federal Geographic Data Committee (FGDC). 2013. Classification of Wetlands and Deepwater Habitats of the United States. FGDC-STD-004-2013. Second Edition. Wetlands Subcommittee, Federal Geographic Data Committee and U.S. Fish and Wildlife Service, Washington, DC.
- Menne, M.J., I. Durre, B. Korzeniewski, S. McNeal, K. Thomas, X. Yin, S. Anthony, R. Ray, R.S. Vose, B.E. Gleason, and T.G. Houston. 2012. Global Historical Climatology Network - Daily (GHCN-Daily), Version 3. NOAA National Climatic Data Center. doi:10.7289/V5D21VHZ.
- Three Parameters Plus Natural Resource Consulting. 1996. Wetlands Analysis, Alaska Department of Transportation & Public Facilities, Airport Improvement Project, Akiak, Alaska. Draft Report. 79pp.



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

. 2021. Web Soil Survey [online] <u>https://websoilsurvey.sc.egov.usda.gov/ (</u>Accessed 27 May 2021).

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

. 2018. National Wetland Plant List. Version 3.4. [online] <u>http://wetland-plants.usace.army.mil/nwpl_static/v34/home/home.html</u> (Accessed October 15, 2020).

. 2021. Navigable Waters of Alaska. [online] <u>https://www.poa.usace.army.mil/Missions/Regulatory/Recognizing-Wetlands/Navigable-</u> <u>Waters/</u> (Accessed 28 May 2021).

- U.S. Fish and Wildlife Service (USFWS). 2021. National Wetlands Inventory website. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. Available online at http://www.fws.gov/wetlands/.
- U.S. Geological Survey (USGS). 2019a. Interferometric Synthetic Aperture Radar (IFSAR) Alaska, 2019-05-30. U.S. Geological Survey Earth Resources Observation and Science Center (EROS), Sioux Falls, South Dakota. Accessed 14 August 2019. https://doi.org/10.5066/P9C064CO

. 2019b. National Hydrography Dataset [online] <u>https://www.usgs.gov/core-science-systems/ngp/national-hydrography/access-national-hydrography-products</u> (Accessed October 14, 2020).

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



		Temperat	ure	Pı	ecipitation	(mm)	
Month	2021	1991– 2020	Difference from Normal	2021	1991– 2020	% of Normal	n
May	7.6	6.1	1.5	13.1	30.7	42	31
June	11.1	11.8	-0.7	37.4	45.0	83	30
July	12.5	13.5	-1.0	107.6	65.3	164	31
August	11.5	12.2	-0.6	62.5	85.3	73	31

Table 1. Monthly mean (May 1–August 31, 2021) and long-term normal (1991–2020) values for air temperature (°C) and total monthly precipitation (mm) for the Bethel Airport weather station, Bethel, Alaska (station id USW00026615).

NWI Code	NWI Descriptions	Area (Acres)	% of Study Area
Waters			
PUBH	Palustrine Permanently Flooded Unconsolidated Bottom	.3	0.3
	Total Waters:	0.3	0.3
Wetlands			
PEM1F	Palustrine Semipermanently Flooded Persistent Emergent	2.1	2.5
PEM1E	Palustrine Seasonally Flooded-Saturated Persistent Emergent	1.4	1.7
PSS1E	Palustrine Seasonally Flooded-Saturated Broad-leaved Deciduous Scrub-Shrub	0.6	0.7
PEM1C	Palustrine Seasonally Flooded Persistent Emergent	0.9	1.1
PSS1B	Palustrine Seasonally Saturated Broad-leaved Deciduous Scrub-Shrub	1.0	1.2
	Total Wetlands	6.0	7.2
Uplands			
U	Upland	74.1	89.3
Us	Upland (fill)	2.6	3.2
	Total Uplands	76.7	92.5
Grand Total		83.0	100.0

Table 2.Areal extent (acres and percent of study area) of waters, wetlands, and uplands in the
Akiak Infrastructure Project study area, Akiak, Alaska, 2021.





Figure 1. Akiak Infrastructure Project wetlands study area, Alaska, 2021.



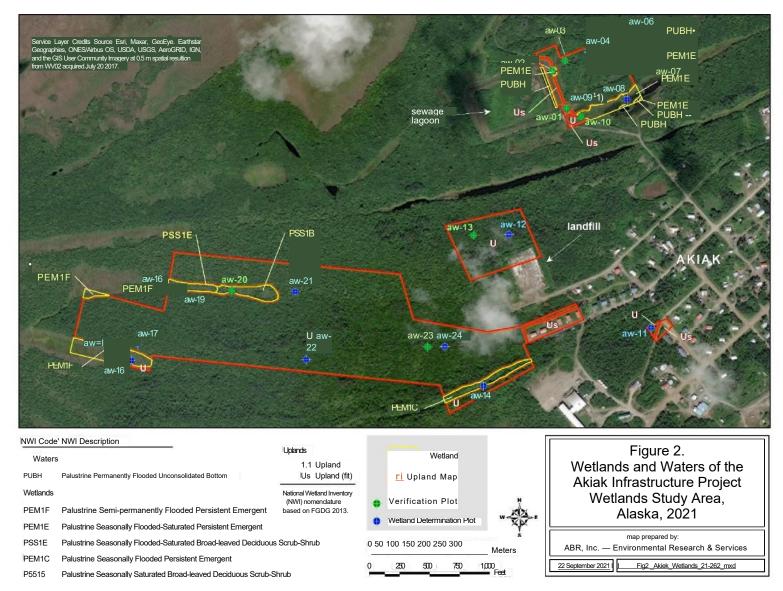


Figure 2. Wetlands and waters of the Akiak Infrastructure Project wetlands study area, Alaska, 2021.



Daily Precipitation, BETHEL_AP station

2021 spring and summer

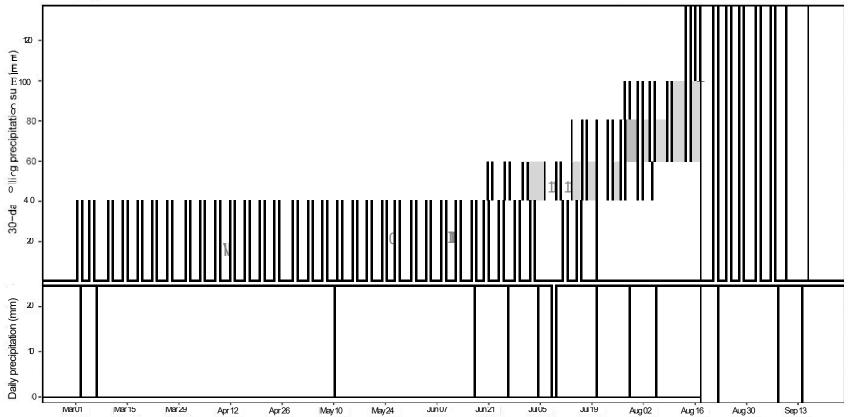


Figure 3. Antecedent Precipitation for the Akiak Infrastructure Project wetlands study area, Alaska, 2021.



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Appendix A. Wetland Determination Data Forms



Project/Site: Akiak Wetland Delineation	Borough/City: <u>Bethel Census Area</u>	Sampling Date: <u>2021-08-16</u>
Applicant/Owner: Solstice		Sampling Point: <u>aw-04</u>
Investigator(s): <u>RWM, SLI</u>	Landform (hillside, terrace,	hummocks, etc.): Flat or fluvial related
Local relief (concave, convex, none): none	Slope: <u>0.0</u> % / <u>0.0</u> °	Elevation: <u>92</u>
Subregion: Alaska Lat.: 60.9152	2Long.: <u>-161.2290</u>	Datum: WGS84
Soil Map Unit Name:		NWI classification: U
Are climatic/hydrologic conditions on the site typica	l for this time of year? Yes <u>√</u> No	(If no, explain in Remarks)
Are Vegetation,Soil,or Hydrology	significantly disturbed? Are "Normal C	ircumstances" present? Yes <u>√</u> No
Are Vegetation, Soil, or Hydrology	naturally problematic? (If needed,	, explain any answers in Remarks.)
SUMMARY OF FINDINGS - Attach site map show	wing sampling point locations, transects	, important features, etc.

Hydrophytic Vegetation Present?	Yes √	No	Is the Sampled Area		
Hydric Soil Present?	Yes	No √	within a Wetland?	Yes	No √
Wetland Hydrology Present?	Yes 🗸	No		165	

Remarks: Site on an inactive floodplain. There is level topography in plot, but nearby are what may be small excavations and spoils. The excavated area was probed and displayed non-hydric soils.

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

	Absolute	Dominant	Indicator	Dominance Test worksheet:
Tree Stratum	% Cover	Species?	Status	Number of Dominant Species That are OBL,
Total Cover:	0.0			FACW, or FAC: 4 (A)
50% of total cover:	0.0	20% of total	cover: 0.0	Total Numberof Dominant SpeciesAcross all
Sapling/Shrub Stratum				Strata: 4
Salix bebbiana	35.0	\checkmark	FAC	(B)
Salix arbusculoides	25.0	\checkmark	FACW	Percent of Dominant Species That are OBL,
Alnus viridis	15.0		FAC	
Betula neoalaskana	5.0		FACU	Prevalence Index worksheet:
Total Cover:	80.0			Total % Cover of: Multiply by:
50% of total cover:	40.0	20%oftotalcover:	16.0	OBL Species $0.0 \times 1 = 0.0$
Herb Stratum				FACW Species $25.0 \times 2 = 50.0$
Calamagrostis canadensis	10.0	\checkmark	FAC	FAC Species 74.0 × 3 = 222.0
Equisetum arvense	10.0	\checkmark	FAC	FACU Species $5.2 \times 4 = 20.8$
Polemonium acutiflorum	3.0		FAC	UPL Species $0.0 \times 5 = 0.0$
Viola sp.	3.0			Column Totals: 104.2 (A) 292.8 (B)
Rubus arcticus	1.0		FAC	Prevalence Index = $B/A = 2.810$
Thalictrum sparsiflorum	0.1		FACU	
Chamaenerion angustifolium	0.1		FACU	Hydrophytic Vegetation Indicators:
Total Cover:	27.2			✓ Dominance Test is > 50%
50% of total cover:	13.6	20% of total	cover: 5.4	✓ Prevalence Index is ≤ 3.0
				Morphological Adaptations ¹ (Provide supporting data
				in Remarks or on a separate sheet)
				Problematic Hydrophytic Vegetation ¹ (Explain)
				¹ Indicators or hydricsoil and wetland hydrology must be
				present, unless disturbed or problematic.
				Plot size (radius, or length × width) 10m rad
				% Cover of Wetland Bryophytes (Where applicable)
				% Bare Ground 90.0
				Total Cover of Bryophytes 7.0
				Hydrophytic
				Vegetation
				Present? Yes √ No

Remarks:

	Dep	th (Redo	x Feat	ures									
inches)	Color (m	noist) 🤉	⁄₀ Co	lor (mo	oist) %	% Type	¹ Loc ² Te	exture		Mod		Ren	narks			
)-2		/ 1	00	/		А		fibric								
2-12	10yr	2/2 1	00	/		А		silt loa	am							
12-18	10yr	3/2	80 10	yr 3/	32	0 C	PL	silt loa	am							
¹ Type: C	C=Concentration	n, D=De	pletion	, RM=R	educed	d Matrix, <i>I</i>	A=Absent		² Locatio	n: PL=P	ore Linin	lg, RC∶	=Root C	hannel		
Hydric So	il Indicato	rs:		I	ndic	ators f	or Prol	blema	ntic Hyd	ric So	ls³:					
	sol or Histel (A						or Change		4					out Hu	ue 5Y or l	ledd€
Histic	Epipedon (A2))			Ala	aska Alpin	e Swales ((TA5)			Under	, ,	,			
	gen Sulfide (A				Ala	iska Redox	x With 2.5	Y Hue			Other	(Expl	ain in R	emark	s)	
	Dark Surface	· /														
	a Gleyed (A13			3			, ,		egetation,	•						,
	a Redox (A14)					••••		• •	sition must	be prese	nt unless	s distu	rbed or p	roblem	atic.	
Alaska	a Gleyed Pores	s (A15)		40	Give de	tails of col	or change	in Rema	arks.							
Restrictive	e Layer (if p	resent	:):													
Type: None	:								Hydric S	Soil Pr	esent	?	Yes		No 🗸	,
Depth (inch	ies):															
	La la calcha a still															
Remarks [.] N	in nvaric soli	indicato	nrs													
Remarks: N		indicato	ors													
IYDROLOG	Y			5:					S	econda	arv Ind	icator	s (2 or	more r	required)	
IYDROLOG Wetland		/ Indic	ators						S						required)	
IYDROLOG Wetland Primary I	Y Hydrology ndicators (any	/ Indic	ators		Ir	nundatior	ר Visible מ	- on Aeria		Wa	ter Stai	ined L	eaves (B9 <u>)</u>	required)	
IYDROLOG Wetland Primary In Surface	Y Hydrology ndicators (any Water (A1)	one is	ators						al Imagery	Wa ⁄ (B7)Dr	ter Stai ainage	ined L Patte	eaves (rns (B10	B9 <u>)</u> D)		s (C
HYDROLOG Wetland Primary In Surface High Wa	Y Hydrology ndicators (any Water (A1) ater Table (A2)	one is	ators		S	parsely V	egetated	Concav		Wa y (B7)Dr (B8) Ox	ter Stai ainage kidized R	ined L Patter Rizosp	eaves (rns (B10 heres al	<u>B9)</u> D) ong Li [,]	ving Roo	s (C
IYDROLOG Wetland Primary In Surface High Wa Saturat	Y Hydrology ndicators (any Water (A1) ater Table (A2) ion (A3)	one is	ators		Si M	parsely V arl Depo	'egetated sits (B15	Concav)	al Imagery ve Surface	Wa y (B7)Dr (B8) Ox	ter Stai ainage kidized R resence	ined L Patter Rizospl of Re	eaves (rns (B10 heres al duced I	<u>B9)</u> D) ong Li [,]	ving Roo	:s (C
IYDROLOG Wetland Primary In Surface High Wa Saturat Water N	Y Hydrology ndicators (any Water (A1) ater Table (A2)	one is	ators		Sj M H'	parsely V arl Depo ydrogen	egetated	<u>Concav</u>))dor (C1	al Imagery ve Surface 1)	Wa ∕ (B7)Dr (B8) O> Pr	ter Stai ainage kidized R esence Salt De	ined L Patter Rizospl of Re eposit	eaves (rns (B10 heres al duced I s (C5)	<u>B9)</u> 0) ong Li ⁱ ron (C	ving Roo (4)	s (C
IYDROLOG Wetland Primary In Surface High Wa Saturat Water N Sedime	Y Hydrology ndicators (any Water (A1) ater Table (A2) ion (A3) Marks (B1)	one is	ators		SI M H ⁱ D	parsely V arl Depo ydrogen ry-Seaso	'egetated sits (B15 Sulfide O	<u>Concav</u>)))dor (C1 Table ((al Imagery ve Surface 1)	Wa ∕ (B7)Dr (B8) O> Pr	ter Stai ainage didized R resence Salt De unted or	ined L Patter Rizospl of Re eposit r Stre	eaves (rns (B10 heres al duced I s (C5)	<u>B9)</u> 0) ong Li ^r ron (C	ving Roo (4)	:s (C
IYDROLOG Wetland Primary In Surface High Wa Saturat Water N Sedime Drift De	Y Hydrology ndicators (any Water (A1) ater Table (A2) ion (A3) Marks (B1) nt Deposits (B posits (B3)	y India one is	ators		SI M H ⁱ D	parsely V arl Depo ydrogen ry-Seaso	'egetated sits (B15 Sulfide O on Water	<u>Concav</u>)))dor (C1 Table ((al Imagery ve Surface 1)	Wa <u>((B7)Dr</u> (<u>B8) Ox</u> Pr Stu	ter Stai ainage cidized R esence Salt De unted or Geo	ined L Patter Rizosp of Re eposit r Stree	eaves (rns (B10 heres al duced I s (C5) ssed Pla hic Posit	B9) O) rong Li ^r ron (C ants (C	ving Roo (4)	:s (C
IYDROLOG Wetland Primary In Surface High Wa Saturat Water N Sedime Drift De Algal Ma	Y Hydrology ndicators (any Water (A1) ater Table (A2) ion (A3) Marks (B1) nt Deposits (B	y India one is	ators		SI M H ⁱ D	parsely V arl Depo ydrogen ry-Seaso	'egetated sits (B15 Sulfide O on Water	<u>Concav</u>)))dor (C1 Table ((al Imagery ve Surface 1)	Wa ((B7)Dr (B8) O> Pr Stu .1	ter Stai ainage didized R esence Salt De Salt De Geo Shallov	ined L Patter Rizosp of Re eposit r Stres omorp w Aqu	eaves (rns (B10 heres al duced I s (C5) ssed Pla hic Posit itard (D	<u>B9)</u> ong Li [.] ron (C ants (C tion 23)	ving Roo (4)	:s (C
IYDROLOG Wetland Primary In Surface High Wa Saturat Water N Sedime Drift De Algal Ma Iron De	Y Hydrology ndicators (any Water (A1) ater Table (A2) ion (A3) Marks (B1) nt Deposits (B posits (B3) at or Crust (B4	y India one is 32) 4)	ators		SI M H ⁱ D	parsely V arl Depo ydrogen ry-Seaso	'egetated sits (B15 Sulfide O on Water	<u>Concav</u>)))dor (C1 Table ((al Imagery ve Surface 1)	Wa (B7)Dr (B8) O> Pr Stu .1	ter Stai ainage cidized R esence Salt De unted or Geo	ined L Patter Rizosp of Re eposit r Stres omorp w Aqu raphic	eaves (rns (B1(heres al duced I s (C5) ssed Pla hic Posit itard (D Relief(B9) ong Lir ron (C ants (C tion)3) D4)	ving Roo (4)	:s (C
IYDROLOG Wetland Primary In Surface High Wa Saturat Water N Sedime Drift De Algal Ma Iron De Surface	Y Hydrology ndicators (any Water (A1) ater Table (A2) ion (A3) Marks (B1) nt Deposits (B1) nt Deposits (B3) at or Crust (B4) posits (B5)	y India one is 32) 4)	ators		SI M H ⁱ D	parsely V arl Depo ydrogen ry-Seaso	'egetated sits (B15 Sulfide O on Water	<u>Concav</u>)))dor (C1 Table ((al Imagery ve Surface 1)	Wa (B7)Dr (B8) O> Pr Stu .1	ter Stai ainage didized R esence Salt De Salt De unted or Geo Shallov otopogr	ined L Patter Rizosp of Re eposit r Stres omorp w Aqu raphic	eaves (rns (B1(heres al duced I s (C5) ssed Pla hic Posit itard (D Relief(B9) ong Lir ron (C ants (C tion)3) D4)	ving Roo (4)	:s (C
IYDROLOG Wetland Primary In Surface High Wa Saturat Water N Sedime Drift De Algal Ma Iron De Surface	Y Hydrology ndicators (any Water (A1) ater Table (A2) ion (A3) Marks (B1) nt Deposits (B1) nt Deposits (B3) at or Crust (B4 posits (B5) Soil Cracks (B4)	y India one is 32) 4) 36)	ators		SJ M H' D O'	parsely V arl Depo ydrogen ry-Seaso ther (Exp	'egetated sits (B15 Sulfide O on Water	Concav) odor (C1 Table ((marks)	al Imagery ve Surface 1)	Wa (B7)Dr (B8) O> Pr Stu .1	ter Stai ainage didized R esence Salt De Salt De unted or Geo Shallov otopogr	ined L Patter Rizosp of Re eposit r Stres omorp w Aqu raphic	eaves (rns (B1(heres al duced I s (C5) ssed Pla hic Posit itard (D Relief(B9) ong Lir ron (C ants (C tion)3) D4)	ving Roo (4)	:s (C
HYDROLOG Wetland Primary In Surface High Wa Saturat Water N Sedime Drift De Algal Ma Iron De Surface	Y Hydrology ndicators (any Water (A1) ater Table (A2) ion (A3) Marks (B1) nt Deposits (B1) nt Deposits (B3) at or Crust (B4 posits (B5) Soil Cracks (B4 ervations:	y India one is 32) 4) 36)	ators	ent)	SI 	parsely V arl Depo ydrogen ry-Seaso ther (Exp	regetated sits (B15 Sulfide O on Water blain in Re	Concav) odor (C1 Table ((marks)	al Imagery ve Surface 1)	Wa (B7)Dr (B8) O> Pr Stu .1	ter Stai ainage didized R esence Salt De Salt De unted or Geo Shallov otopogr	ined L Patter Rizosp of Re eposit r Stres omorp w Aqu raphic	eaves (rns (B1(heres al duced I s (C5) ssed Pla hic Posit itard (D Relief(B9) ong Lir ron (C ants (C tion)3) D4)	ving Roo (4)	:s (C
HYDROLOG Wetland Primary In Surface High Wa Saturat Water N Sedime Drift De Algal Ma Iron De Surface Field Obs Surface W Water Tal	Y Hydrology ndicators (any Water (A1) ater Table (A2) ion (A3) Marks (B1) nt Deposits (B1) nt Deposits (B3) at or Crust (B4 posits (B5) Soil Cracks (B5) Soil Cracks (B5) Vater Present?	y India one is 32) 4) 36)	ators	No.	SI 	parsely V arl Depo ydrogen ry-Seaso ther (Exp	regetated sits (B15 Sulfide O on Water blain in Re	Concav) Odor (C1 Table ((marks)	al Imagery /e Surface 1) C2)	Wa (B7)Dr (B8) O> Pr Stu .1 Micr .1	ter Stai ainage idized R resence Salt De Inted or Geo Shallov otopogr FAC-ne	ined L Patter Rizosp of Re eposit r Stres omorp w Aqu raphic eutral	eaves (rns (B10 heres al duced I s (C5) ssed Pla ssed Pla hic Posit itard (D Relief(I Test (D	<u>B9)</u> ong Li ^r ron (C ants (C tion 03) D4) 25)	ving Roo 24) 01)	:s (C
IYDROLOG Wetland Primary In Surface High Wa Saturat Water N Sedime Drift De Algal Ma Iron De Surface Field Obs Surface W Water Tal Saturatio	Y Hydrology ndicators (any Water (A1) ater Table (A2) ion (A3) Marks (B1) nt Deposits (B1) nt Deposits (B3) at or Crust (B4 posits (B5) Soil Cracks (B5) Soil Cracks (B5) ervations: Vater Present?	2) 32) 4) 36) Yes	ators	No.	S 	parsely V arl Depo ydrogen ry-Seaso ther (Exp	regetated sits (B15 Sulfide O on Water blain in Re	Concav) Odor (C1 Table ((marks)	al Imagery ve Surface 1)	Wa (B7)Dr (B8) O> Pr Stu .1 Micr .1	ter Stai ainage idized R resence Salt De Inted or Geo Shallov otopogr FAC-ne	ined L Patter Rizosp of Re eposit r Stres omorp w Aqu raphic eutral	eaves (rns (B10 heres al duced I s (C5) ssed Pla ssed Pla hic Posit itard (D Relief(I Test (D	<u>B9)</u> ong Li ^r ron (C ants (C tion 03) D4) 25)	ving Roo 24) 01)	
IYDROLOG Wetland Primary In Surface High Wa Saturat Water N Sedime Drift De Algal Ma Iron De Surface W Water Tal Saturatio	Y Hydrology ndicators (any Water (A1) ater Table (A2) ion (A3) Marks (B1) nt Deposits (B1) nt Deposits (B3) at or Crust (B4 posits (B5) Soil Cracks (F ervations: Vater Present? In Present?	2) 32) 4) 36) Yes	ators	No	S 	parsely V arl Depo ydrogen ry-Seaso ther (Exp Depth (i Depth (i	egetated sits (B15 Sulfide O on Water blain in Re nches): 0 nches):	Concav) Odor (C1 Table ((marks)	al Imagery /e Surface 1) C2)	Wa (B7)Dr (B8) O> Pr Stu .1 Micr .1	ter Stai ainage idized R resence Salt De Inted or Geo Shallov otopogr FAC-ne	ined L Patter Rizosp of Re eposit r Stres omorp w Aqu raphic eutral	eaves (rns (B10 heres al duced I s (C5) ssed Pla ssed Pla hic Posit itard (D Relief(I Test (D	<u>B9)</u> ong Li ^r ron (C ants (C tion 03) D4) 25)	ving Roo 24) 01)	



Hydric Soil Indicators: None Wetland Hydrology Indicators: Geomorphic Position (D2), FAC-Neutral Test (D5)



Applicant, Investigat Local re Subregior Soil Map Are climat Are Veget Are Veget SUMMAI Hydrop Hydrop	ite: <u>Akiak Wetland Delineation</u> /Owner: <u>Solstice</u> tor(s): <u>SLI, RWM</u> lief (concave, convex, none n: <u>Alaska</u> La Unit Name:	t.: <u>60.9156</u> site typical gyr pgy r e map show \sqrt{No}	Slop for this time _ significan naturally pro ving samplir	Lar be: <u>0.0</u> Lo e of year? ` tly disturbe oblematic? ng point loo Is the	Yes <u>√</u> No d? Are "Normal Circums (If needed, explai cations, transects, impor Sampled Area	hummocks, etc. Elevation: Date NWI class (If no, exp tances" present? in any answers in	ing Poin): <u>Nonp</u> <u>62</u> um: <u>WG</u> sification lain in R Yes \checkmark n Reman	t: <u>aw-05</u> <u>patterned</u> 5 <u>S84</u> n: <u>U</u> Remarks) _ No
Remar	rks: A previously cleared area, w	ith shrubs	now 5-7ft ta	all. The plot	t center in the low point	of clearing.		
VEGETA	TION - Use scientific names of	plants. List	t all species	in the plot	t.			
Absolute			Dominant	Indicator	Dominance Test works			
Tree Stra	atum	% Cover	Species?	Status	Number of Dominant Spe	ecies That are OBL,		
Total Cov	er:	0.0			FACW, or FAC:			(A)
50% of to	tal cover: 0.0		20% of total	cover: 0.0	Total Numberof Dominar	it SpeciesAcross all		
	Sapling/Shrub Stratum	45.0	,	=	Strata:		4	
1.	Alnus viridis	15.0		FAC	-		(B)	
2.	Salix alaxensis	10.0	\checkmark	FAC	Percent of Dominant Specie	es That are OBL,		
3.	Salix arbusculoides	5.0		FACW				
		al Cover:			Prevalence Index wor			
50% of to	tal cover: 15.0		20% of total	cover: 6.0		Multiply by:		
	Herb Stratum	20.0	,	540		× 1 = 3.2		
1.	Calamagrostis canadensis	30.0		FAC		× 2 = 10.4		
2.	Agrostis scabra	20.0	\checkmark	FAC		× 3 = 225.0		
3. 4.	Carex utriculata	3.0 0.1		OBL		$\times 4 = 0.0$		
5.	Sium suave Comarum palustre	0.1		OBL OBL		$\times 5 = 0.0$		
6.	Galium trifidum	0.1		FACW	Column Totals: 83.4	(A) 238.6 (B)		
7.	Ranunculus pensylvanicus	0.1		FACW	Prevalence Index = B/A	= 2.001		
8.	Rorippa sp.	0.1		TACI	Hydrophytic Vegetatio	n Indicators:		
0.	11 1	al Cover:			 ✓ Dominance Test is 			
50% of tot	tal cover: 26.8		20% of total o	over: 10 7	✓ Prevalence Index i			
50 /0 01 00						laptations ¹ (Provide	e suppor	ting data
						n a separate sheet)		
					Problematic Hyd	rophytic Vegetatior	1 ¹ (Expla	in)
					¹ Indicators or hydricsoil			
					present, unless distur			
					Plot size (radius, or lengt	h x width)	1	10m radius
					% Cover of Wetland Bry			.om radius
					% Bare Ground		5	70.0
					Total Cover of Bryophyte	S		25.0
					Hydrophytic	-		
					Vegetation			
					Present?	Yes √	r	No
								-
	s: This plot would be closed tall ub canopy which suggests the ar				-			-

but no soil or hydrology indicators.

Depth	Mat	rix	Red	ox Feat	ures		
(inches)	Color (moist)) % (Color (moist)	% Type ¹	Loc ² Texture	Mod Remarks	
0-0	/		/	А	fibric		
0-4	10yr 3/3	100	/	А	silt loa	m	
4-17	Variegated /		/	А	loamy	fine sand	
¹ Type: C	=Concentration, D=	=Depletic	on, RM=Reduce	ed Matrix, A	A=Absent ² Lo	ocation: PL=Pore Lining, RC=Root Channel,	
Hydric So	il Indicators:		Indie	cators fo	or Problema	itic Hydric Soils ³ :	
	sol or Histel (A1)				r Change (TA4)		Redd
Histic	Epipedon (A2)				e Swales (TA5)	Underlying Layer	
Hydro	gen Sulfide (A4)		A	laska Redox	With 2.5Y Hue	Other (Explain in Remarks)	
Thick	Dark Surface (A12	2)					
Alaska	a Gleyed (A13)		₃One ii	ndicator o	r hydrophytic ve	egetation, one primary indicator of wetland hydrology	/,
Alaska	a Redox (A14)		and	an appropr	iate landscape po	sition must be present unless disturbed or problematic.	
Alaska	a Gleyed Pores (A	15)	Give	details of co	lor change in Ren	narks.	
Restrictive	e Layer (if pres	ent):					
Type: None						Hvdric Soil Present? Yes No	/
Depth (inch					_		
YDROLOG	Y						
Wetland	Y Hydrology In ndicators (any one				-	Secondary Indicators (2 or more required Water Stained Leaves (B9))
Wetland Primary I	Hydrology In		cient)	Inundation	Visible on Aeri)
Primary In Surface	Hydrology In ndicators (any one		cient)			Water Stained Leaves (B9)	
Wetland Primary In Surface High Wa	Hydrology In ndicators (any one Water (A1)		cient)		egetated Concave	Water Stained Leaves (B9) al Imagery (B7) Drainage Patterns (B10)	
Wetland Primary In Surface High Wa Saturat	Hydrology In Indicators (any one Water (A1) Inter Table (A2)		cient)	Sparsely Ve Marl Depos	egetated Concave	Water Stained Leaves (B9) al Imagery (B7) Drainage Patterns (B10) e Surface (B8)Oxidized Rizospheres along Living Roots Presence of Reduced Iron (C4)	
Wetland Primary In Surface High Wa Saturat Water N	Hydrology In ndicators (any one Water (A1) ater Table (A2) ion (A3)		cient)	Sparsely Ve Marl Depos Hydrogen	egetated Concave sits (B15)	Water Stained Leaves (B9) al Imagery (B7) Drainage Patterns (B10) e Surface (B8)Oxidized Rizospheres along Living Roots Presence of Reduced Iron (C4) 1) Salt Deposits (C5) Salt Deposits (C5)	
Wetland Primary In Surface High Wa Saturat Water N Sedime	Hydrology In ndicators (any one Water (A1) ater Table (A2) ion (A3) Marks (B1)		cient)	Sparsely Ve Marl Depos Hydrogen Dry-Seaso	egetated Concave sits (B15) Sulfide Odor (C	Water Stained Leaves (B9) al Imagery (B7) Drainage Patterns (B10) e Surface (B8)Oxidized Rizospheres along Living Roots Presence of Reduced Iron (C4) 1) Salt Deposits (C5) Stunted or Stressed Plants (D1)	
Wetland Primary In Surface High Wa Saturat Water N Sedime Drift De	Hydrology In ndicators (any one Water (A1) ater Table (A2) ion (A3) Marks (B1) nt Deposits (B2)		cient)	Sparsely Ve Marl Depos Hydrogen Dry-Seaso	egetated Concave sits (B15) Sulfide Odor (C n Water Table (Water Stained Leaves (B9) al Imagery (B7) Drainage Patterns (B10) e Surface (B8)Oxidized Rizospheres along Living Roots Presence of Reduced Iron (C4) 1) Salt Deposits (C5) Stunted or Stressed Plants (D1)	
Wetland Primary II Surface High Wa Saturat Water N Sedime Drift De Algal M	Hydrology In ndicators (any one Water (A1) ater Table (A2) ion (A3) Marks (B1) nt Deposits (B2) eposits (B3)		cient)	Sparsely Ve Marl Depos Hydrogen Dry-Seaso	egetated Concave sits (B15) Sulfide Odor (C n Water Table (Water Stained Leaves (B9) al Imagery (B7) Drainage Patterns (B10) e Surface (B8)Oxidized Rizospheres along Living Roots Presence of Reduced Iron (C4) 1) Salt Deposits (C5) C2) Stunted or Stressed Plants (D1) s) .1Geomorphic Position (D2)	
Wetland Primary In Surface High Wa Saturat Water N Sedime Drift De Algal M Iron De	Hydrology In mdicators (any one Water (A1) Mater Table (A2) ion (A3) Marks (B1) nt Deposits (B2) eposits (B3) at or Crust (B4)		cient)	Sparsely Ve Marl Depos Hydrogen Dry-Seaso	egetated Concave sits (B15) Sulfide Odor (C n Water Table (Water Stained Leaves (B9) al Imagery (B7) Drainage Patterns (B10) e Surface (B8)Oxidized Rizospheres along Living Roots Presence of Reduced Iron (C4) 1) Salt Deposits (C5) Stunted or Stressed Plants (D1) (S) .1Geomorphic Position (D2) Shallow Aquitard (D3) State (D3)	
Wetland Primary In Surface High Wa Saturat Water N Sedime Drift De Algal M. Iron De Surface	Hydrology In ndicators (any one Water (A1) iter Table (A2) ion (A3) Marks (B1) nt Deposits (B2) eposits (B3) at or Crust (B4) posits (B5)		cient)	Sparsely Ve Marl Depos Hydrogen Dry-Seaso	egetated Concave sits (B15) Sulfide Odor (C n Water Table (Water Stained Leaves (B9)al Imagery (B7)Drainage Patterns (B10)al Imagery (B7)Drainage Patterns (B10)as Surface (B8)Oxidized Rizospheres along LivingRootsPresence of Reduced Iron (C4)Presence of Reduced Iron (C4)1)Salt Deposits (C5)(C2)Stunted or Stressed Plants (D1)(b).1Geomorphic Position (D2)Shallow Aquitard (D3)Microtopographic Relief(D4)	
Wetland Primary II Surface High Wa Saturat Water N Sedime Drift De Algal M Iron De Surface	Hydrology In ndicators (any one Water (A1) ater Table (A2) ion (A3) Marks (B1) nt Deposits (B2) eposits (B3) at or Crust (B4) posits (B5) Soil Cracks (B6)	e is suffi	cient)	Sparsely Ve Marl Depo: Hydrogen Dry-Seaso Dther (Exp	egetated Concave sits (B15) Sulfide Odor (C n Water Table (Water Stained Leaves (B9)al Imagery (B7)Drainage Patterns (B10)al Imagery (B7)Drainage Patterns (B10)as Surface (B8)Oxidized Rizospheres along LivingRootsPresence of Reduced Iron (C4)Presence of Reduced Iron (C4)1)Salt Deposits (C5)(C2)Stunted or Stressed Plants (D1)(b).1Geomorphic Position (D2)Shallow Aquitard (D3)Microtopographic Relief(D4)	
Wetland Primary II Surface High Wa Saturat Water N Sedime Drift De Algal M Iron De Surface Field Obs	Hydrology In ndicators (any one Water (A1) ater Table (A2) ion (A3) Marks (B1) nt Deposits (B2) eposits (B3) at or Crust (B4) posits (B5) Soil Cracks (B6) ervations:	e is suffi	cient)	Sparsely Ve Marl Depo: Hydrogen Dry-Seaso Dther (Exp	egetated Concave sits (B15) Sulfide Odor (C n Water Table (plain in Remarks	Water Stained Leaves (B9)al Imagery (B7)Drainage Patterns (B10)al Imagery (B7)Drainage Patterns (B10)as Surface (B8)Oxidized Rizospheres along LivingRootsPresence of Reduced Iron (C4)Presence of Reduced Iron (C4)1)Salt Deposits (C5)(C2)Stunted or Stressed Plants (D1)(b).1Geomorphic Position (D2)Shallow Aquitard (D3)Microtopographic Relief(D4)	
Wetland Primary In Surface High Wa Saturat Water N Sedime Drift De Algal M. Iron De Surface Field Obs Surface V Water Ta	Hydrology In ndicators (any one Water (A1) ater Table (A2) ion (A3) Marks (B1) nt Deposits (B2) eposits (B3) at or Crust (B4) posits (B5) Soil Cracks (B6) ervations: Vater Present? Ye	e is suffi	cient)	Sparsely Ve Marl Depos Hydrogen Dry-Seaso Dther (Exp Dther (Exp	egetated Concave sits (B15) Sulfide Odor (C n Water Table (plain in Remarks	Water Stained Leaves (B9)al Imagery (B7)Drainage Patterns (B10)al Imagery (B7)Drainage Patterns (B10)as Surface (B8)Oxidized Rizospheres along LivingRootsPresence of Reduced Iron (C4)Presence of Reduced Iron (C4)1)Salt Deposits (C5)(C2)Stunted or Stressed Plants (D1)(b).1Geomorphic Position (D2)Shallow Aquitard (D3)Microtopographic Relief(D4)	(C3)
Wetland Primary In Surface High Wa Saturat Water N Sedime Drift De Algal M Iron De Surface Field Obs Surface V Water Tal Saturatio	Hydrology In ndicators (any one Water (A1) inter Table (A2) ion (A3) Marks (B1) nt Deposits (B2) eposits (B3) at or Crust (B4) posits (B5) Soil Cracks (B6) ervations: Vater Present? Ye ble Present? Ye	e is suffi	cient)	Sparsely Ve Marl Depos Hydrogen Dry-Seaso Dther (Exp Dther (Exp	egetated Concave sits (B15) Sulfide Odor (C n Water Table (plain in Remarks	Water Stained Leaves (B9) al Imagery (B7) Drainage Patterns (B10) e Surface (B8)Oxidized Rizospheres along Living Roots Presence of Reduced Iron (C4) 1) Salt Deposits (C5) C2) Stunted or Stressed Plants (D1) Shallow Aquitard (D3) Microtopographic Relief(D4) FAC-neutral Test (D5)	(C3)
Wetland Primary In Surface High Wa Saturat Water N Sedime Drift De Algal M Iron De Surface Field Obs Surface V Water Tal Saturatio (includes	Hydrology In ndicators (any one Water (A1) ater Table (A2) ion (A3) Marks (B1) nt Deposits (B2) eposits (B3) at or Crust (B4) posits (B5) Soil Cracks (B6) ervations: Vater Present? Ye ble Present? Ye on Present? Ye capillary fringe)	s s	cient)	Sparsely Ve Marl Depos Hydrogen Dry-Seaso Other (Exp Depth (in Depth (in .1	egetated Concave sits (B15) Sulfide Odor (C n Water Table (olain in Remarks nches): 0 nches): Depth	Water Stained Leaves (B9) al Imagery (B7) Drainage Patterns (B10) e Surface (B8)Oxidized Rizospheres along Living Roots Presence of Reduced Iron (C4) 1) Salt Deposits (C5) C2) Stunted or Stressed Plants (D1) Shallow Aquitard (D3) Microtopographic Relief(D4) FAC-neutral Test (D5)	(C3)



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



Project/Site: Akiak Wetland Delineation	Borough/City: Bethel Census Area	Sampling Date: 2021-08-16
Applicant/Owner: <u>Solstice</u>		Sampling Point: <u>aw-06</u>
Investigator(s): <u>RWM, SLI</u>	Landform (hillside, terrace,	hummocks, etc.): Basins Or Depressions
Local relief (concave, convex, none): concave	Slope: <u>0.0</u> % / <u>0.0</u> °	Elevation: 51
Subregion: Alaska Lat.: 60.9157	Long.: <u>-161.2270</u>	Datum: WGS84
Soil Map Unit Name:		NWI classification: <u>PEM1E</u>
Are climatic/hydrologic conditions on the site typical for	r this time of year? Yes 🗹 No 🛛	(If no, explain in Remarks)
Are Vegetation,Soil,or Hydrology s	significantly disturbed? Are "Normal	Circumstances" present? Yes <u>√</u> No
Are Vegetation, Soil, or Hydrology nat	urally problematic? (If neede	d, explain any answers in Remarks.)
SUMMARY OF FINDINGS - Attach site map showing	g sampling point locations, transect	s, important features, etc.

Hydrophytic Vegetation Present?	Yes √	No	Is the Sampled Area			
Hydric Soil Present?	Yes √	No	within a Wetland?	Yes	f	No
Wetland Hydrology Present?	Yes √	No		105	<i>,</i> .	

Remarks: The plot center is in the sedge fringe surrounding a small body of water. There is a relatively steep rising step to uplands at the wetland boundary. Uplands are tall willow-alder as at aw-03. The boundary is visible in imagery. A small finger of wetland extends west towards aw-05. Map based on photo-signature. There is a shallow waterbody in the center of basin, <u>approximately 2-4ft deep</u>, and unvegetated in center.

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

Absolute			Dominant	Indicator	Dominance Test worksheet:
Tree Stratu	m	% Cover	Species?	Status	Number of Dominant Species That are OBL,
Total Cover:		0.0			FACW, or FAC: 1 (A)
50% of total c	over: 0.0		20% of tota	l cover: 0.0	Total Numberof Dominant SpeciesAcross all
Sa	apling/Shrub Stratum				Strata: 1
1.	Salix arbusculoides	0.1		FACW	(B)
Total Cover:		0.1			Percent of Dominant Species That are OBL,
50% of total c	over: 0.0		20% of tota	l cover: 0.0	
	Herb Stratum				Prevalence Index worksheet:
1. Car	ex utriculata	70.0	\checkmark	OBL	Total % Cover of: Multiply by:
2. Ele	ocharis palustris	5.0		OBL	OBL Species 76.3 × 1 = 76.3
	unculus gmelinii	2.0		FACW	FACW Species $2.1 \times 2 = 4.2$
4. Pot	amogeton epihydrus	1.0		OBL	FAC Species $0.0 \times 3 = 0.0$
	uta bulbifera	0.1		OBL	FACU Species $0.0 \times 4 = 0.0$
	isetum fluviatile	0.1		OBL	UPL Species $0.0 \times 5 = 0.0$
7. Siu	m suave	0.1		OBL	Column Totals: 78.4 (A) 80.5 (B)
Total Cover:		78.3			Prevalence Index = $B/A = 1.027$
50% of to	otal cover: 39.2		20% of	total cover:	
					Hydrophytic Vegetation Indicators:
					✓ Dominance Test is > 50%
					✓ Prevalence Index is ≤ 3.0
					Morphological Adaptations ¹ (Provide supporting d
					in Remarks or on a separate sheet)
					Problematic Hydrophytic Vegetation ¹ (Explain)
					¹ Indicators or hydricsoil and wetland hydrology must be
					present, unless disturbed or problematic.
					Plot size (radius, or length × width) 5m ra
					% Cover of Wetland Bryophytes (Where applicable)
					% Bare Ground 95.
					Total Cover of Bryophytes 5.
					Hydrophytic
					Vegetation
					Present? Yes ,f No

Remarks: This plot is centered in the wet sedge fringe surrounding small body of water.

Depth	Mat	trix	Redox F	eatures			
inches)	Color(moist) %	o Color (moi	st) %Type ¹	Loc ² Textu	e	Mod	Remarks
0-2	/	/	A	peat			
					Po	ositive alpha al	oha at 10 inches. Alaska re-
2-10	5y 2.5/1 90	7.5yr 4/4	10 C	PL loamy	fine sand	dox	
10-16	2.5y 3/2	90 7.5yr	3/3 10	C PL lo	amy fine		
Type: 0	C=Concentration, D	=Depletion,	RM=Reduced	Matrix, A=Abse	ent ² Loc	ation: PL=Pore	Lining, RC=Root Channel,
Hydric Soil	Indicators:		Indicator	s for Proble	matic Hyd	ric Soils ³ :	
	l or Histel (A1)			Color Change (1	A4) ⁴		Gleved Without Hue 5Y or Redde
	pipedon (A2)			e Swales (TA5)		•	ing Layer
	en Sulfide (A4)		Alaska Redo	x With 2.5Y Hue	.1	Other	(Explain in Remarks)
	ark Surface (A12)	20 1 1			_		
	Gleyed (A13)			phytic vegetatio	<i>,</i> .	•	f wetland hydrology, must
	edox (A14)			andscape positi	_ ·	sent uniess aistui	bed or problematic.
Alaska	Gleyed Pores (A15)	"Give detai	is of color ch	ange in Remark	<u>s.</u>		
Restrictive	Layer (if pres	ent):					
Type: None						Hvdric Soil F	Present? Yes √
Depth (inches	s):						
		action to alph	na alpha dip	yridol at 10 ind	hes indicatin	ig the presenc	e of reduced iron.
IYDROLOGY Wetland H	lydrology Indi	cators:	na alpha dip	yridol at 10 ind			e of reduced iron. (2 or more required)
HYDROLOGY Wetland H Primary Ind	lydrology India	cators:			Seconda	ary Indicators Water Sta	
IYDROLOGY Wetland H Primary Ind Surface V	lydrology India licators (any one is Vater (A1)	cators:	Inundat	ion Visible on A	Seconda	ary Indicators Water Sta (B7) Draina	(2 or more required) ained Leaves (B9) ge Patterns (B10)
IYDROLOGY Wetland H Primary Ind Surface V .1 High Wat	lydrology Indi licators (any one is Vater (A1) ter Table (A2)	cators:	Inundat	ion Visible on A vVegetated Con	Seconda	ary Indicators Water Sta (B7) Draina B8) Oxidize	(2 or more required) ained Leaves (B9) ge Patterns (B10) d Rizospheres along Living Roots
IYDROLOGY Wetland H Primary Ind Surface V .1 High Wat .1 Saturatio	lydrology Indi licators (any one is Vater (A1) eer Table (A2) on (A3)	cators:	Inundat Sparsely Marl De	ion Visible on A v Vegetated Con posits (B15)	Seconda erial Imagery ave Surface (1	ary Indicators Water Sta (B7) Draina B8) Oxidize .1 Presen	(2 or more required) ained Leaves (B9) ge Patterns (B10) d Rizospheres along Living Roots ce of Reduced Iron (C4)
IYDROLOGY Wetland H Primary Ind Surface V .1 High Wat .1 Saturatio Water Ma	lydrology Indi licators (any one is Vater (A1) ter Table (A2) on (A3) rks (B1)	cators:	Inundat Sparsely Marl De Hydroge	ion Visible on A Vegetated Con posits (B15) en Sulfide Odor	Seconda erial Imagery ave Surface (1 (C1)	Ary Indicators Water Sta (B7) Draina B8) Oxidize .1 Presen Salt De	(2 or more required) ained Leaves (B9) ge Patterns (B10) d Rizospheres along Living Roots ce of Reduced Iron (C4) eposits (C5)
IYDROLOGY Wetland H Primary Ind Surface V .1 High Wat .1 Saturatio Water Ma Sediment	lydrology Indi licators (any one is Vater (A1) ter Table (A2) on (A3) rks (B1) : Deposits (B2)	cators:	Inundat Sparsely Marl De Hydroge Dry-Sea	tion Visible on A Vegetated Con posits (B15) en Sulfide Odor ason Water Tab	Seconda erial Imagery cave Surface (i (C1) e (C2)	Ary Indicators Water Sta (B7) Draina B8) Oxidize .1 Presen Salt De Stunte	(2 or more required) ained Leaves (B9) ge Patterns (B10) d Rizospheres along Living Roots ce of Reduced Iron (C4) eposits (C5) d or Stressed Plants (D1)
HYDROLOGY Wetland H Primary Ind Surface V .1 High Wat .1 Saturatio Water Ma Sediment Drift Dep	licators (any one is Vater (A1) er Table (A2) on (A3) rks (B1) Deposits (B2) osits (B3)	cators:	Inundat Sparsely Marl De Hydroge Dry-Sea	ion Visible on A Vegetated Con posits (B15) en Sulfide Odor	Seconda erial Imagery cave Surface (i (C1) e (C2)	Ary Indicators Water Sta (B7) Draina B8) Oxidize .1 Presen Salt De Stunte .1 Geomo	(2 or more required) ained Leaves (B9) ge Patterns (B10) d Rizospheres along Living Roots ce of Reduced Iron (C4) eposits (C5) d or Stressed Plants (D1) orphic Position (D2)
HYDROLOGY Wetland H Primary Ind Surface V .1 High Wat .1 Saturatio Water Ma Sediment Drift Depo Algal Mat	lydrology Indie licators (any one is Vater (A1) ter Table (A2) on (A3) rks (B1) Deposits (B2) osits (B3) or Crust (B4)	cators:	Inundat Sparsely Marl De Hydroge Dry-Sea	tion Visible on A Vegetated Con posits (B15) en Sulfide Odor ason Water Tab	Seconda erial Imagery cave Surface (i (C1) e (C2)	Ary Indicators Water Sta (B7) Draina B8) Oxidize .1 Presen Salt De Stunte .1 Geomo Shallov	(2 or more required) ained Leaves (B9) ge Patterns (B10) d Rizospheres along Living Roots ce of Reduced Iron (C4) eposits (C5) d or Stressed Plants (D1) rphic Position (D2) v Aquitard (D3)
HYDROLOGY Wetland H Primary Ind Surface V .1 High Wat .1 Saturatio Water Ma Sediment Drift Depo Algal Mat .1 Iron Dep	Aydrology India licators (any one is Vater (A1) er Table (A2) on (A3) rks (B1) Deposits (B2) osits (B3) or Crust (B4) posits (B5)	cators:	Inundat Sparsely Marl De Hydroge Dry-Sea	tion Visible on A Vegetated Con posits (B15) en Sulfide Odor ason Water Tab	Seconda erial Imagery cave Surface (i (C1) e (C2)	Ary Indicators Water Sta (B7) Draina B8) Oxidize .1 Presen Salt De Stunte .1 Geomo Shallow Microto	(2 or more required) ained Leaves (B9) ge Patterns (B10) d Rizospheres along Living Roots ce of Reduced Iron (C4) eposits (C5) d or Stressed Plants (D1) rphic Position (D2) v Aquitard (D3) pographic Relief(D4)
HYDROLOGY Wetland H Primary Ind Surface V .1 High Wat .1 Saturatio Water Ma Sediment Drift Depo Algal Mat .1 Iron Dep	lydrology Indie licators (any one is Vater (A1) ter Table (A2) on (A3) rks (B1) Deposits (B2) osits (B3) or Crust (B4)	cators:	Inundat Sparsely Marl De Hydroge Dry-Sea	tion Visible on A Vegetated Con posits (B15) en Sulfide Odor ason Water Tab	Seconda erial Imagery cave Surface (i (C1) e (C2)	Ary Indicators Water Sta (B7) Draina B8) Oxidize .1 Presen Salt De Stunte .1 Geomo Shallow Microto	(2 or more required) ained Leaves (B9) ge Patterns (B10) d Rizospheres along Living Roots ce of Reduced Iron (C4) eposits (C5) d or Stressed Plants (D1) rphic Position (D2) v Aquitard (D3)
IYDROLOGY Wetland H Primary Ind Surface V .1 High Wat .1 Saturatio Water Ma Sediment Drift Depo Algal Mat .1 Iron Dep	licators (any one is Vater (A1) ter Table (A2) on (A3) rks (B1) Deposits (B2) osits (B3) or Crust (B4) posits (B5) coil Cracks (B6)	cators:	Inundat Sparsely Marl De Hydroge Dry-Sea	tion Visible on A Vegetated Con posits (B15) en Sulfide Odor ason Water Tab	Seconda erial Imagery cave Surface (i (C1) e (C2)	Ary Indicators Water Sta (B7) Draina B8) Oxidize .1 Presen Salt De Stunte .1 Geomo Shallow Microto	(2 or more required) ained Leaves (B9) ge Patterns (B10) d Rizospheres along Living Roots ce of Reduced Iron (C4) eposits (C5) d or Stressed Plants (D1) rphic Position (D2) v Aquitard (D3) pographic Relief(D4)
HYDROLOGY Wetland H Primary Ind Surface V .1 High Wat .1 Saturatio Water Ma Sediment Drift Dep Algal Mat .1 Iron Dep Surface S Field Observ Surface Wa	Aydrology India licators (any one is Vater (A1) ter Table (A2) on (A3) rks (B1) to Deposits (B2) osits (B3) or Crust (B4) osits (B5) soil Cracks (B6) vations: ter Present? Yes	cators: sufficient)	Inundat Sparsely Marl De Hydroge Dry-Sea Other (f	ion Visible on A vegetated Com posits (B15) en Sulfide Odor ason Water Tab Explain in Rema	Seconda erial Imagery cave Surface (i (C1) e (C2)	Ary Indicators Water Sta (B7) Draina B8) Oxidize .1 Presen Salt De Stunte .1 Geomo Shallow Microto	(2 or more required) ained Leaves (B9) ge Patterns (B10) d Rizospheres along Living Roots ce of Reduced Iron (C4) eposits (C5) d or Stressed Plants (D1) rphic Position (D2) v Aquitard (D3) pographic Relief(D4)
HYDROLOGY Wetland H Primary Ind Surface V .1 High Wat .1 Saturatio Water Ma Sediment Drift Depo Algal Mat .1 Iron Dep Surface S Field Observ Surface Wa Water Table	Aydrology India licators (any one is Vater (A1) ter Table (A2) on (A3) rks (B1) Deposits (B2) osits (B3) or Crust (B4) osits (B5) soil Cracks (B6) vations: ter Present? Yes e Present? Yes	cators: sufficient)	Inundat Sparsely Marl De Hydroge Dry-Sea Other (f	ion Visible on A v Vegetated Con posits (B15) en Sulfide Odor ason Water Tab Explain in Rema	Seconda erial Imagery cave Surface (i (C1) e (C2)	Ary Indicators Water Sta (B7) Draina B8) Oxidize .1 Presen Salt De Stunte .1 Geomo Shallow Microto	(2 or more required) ained Leaves (B9) ge Patterns (B10) d Rizospheres along Living Roots ce of Reduced Iron (C4) eposits (C5) d or Stressed Plants (D1) rphic Position (D2) v Aquitard (D3) pographic Relief(D4)
HYDROLOGY Wetland H Primary Ind Surface V .1 High Wat .1 Saturatio Water Ma Sediment Drift Depo Algal Mat .1 Iron Dep Surface S Field Observ Surface Wa Water Table Saturation	Aydrology India licators (any one is Vater (A1) ter Table (A2) on (A3) rrks (B1) Deposits (B2) osits (B3) or Crust (B4) osits (B5) soil Cracks (B6) vations: ter Present? Yes Present? Yes	cators: sufficient)	Inundat Sparsely Marl De Hydroge Dry-Sea Other (I	ion Visible on A vegetated Com- posits (B15) en Sulfide Odor ason Water Tab Explain in Rema (inches): 0	Seconda erial Imagery cave Surface (i (C1) e (C2) rks)	Ary Indicators Water Sta (B7) Draina B8) Oxidize .1 Presen Salt De Stunte .1 Geomo Shallov Microto .1 FAC-ne	(2 or more required) ained Leaves (B9) ge Patterns (B10) d Rizospheres along Living Roots ce of Reduced Iron (C4) eposits (C5) d or Stressed Plants (D1) rphic Position (D2) v Aquitard (D3) pographic Relief(D4)
HYDROLOGY Wetland H Primary Ind Surface V .1 High Wat .1 Saturatio Water Ma Sediment Drift Depo Algal Mat .1 Iron Dep Surface S Field Observ Surface Wa Water Table	Aydrology India licators (any one is Vater (A1) ter Table (A2) on (A3) rrks (B1) Deposits (B2) osits (B3) or Crust (B4) osits (B5) soil Cracks (B6) vations: ter Present? Yes Present? Yes	cators: sufficient)	Inundat Sparsely Marl De Hydroge Dry-Sea Other (I	ion Visible on A vegetated Com posits (B15) en Sulfide Odor ason Water Tab Explain in Rema	Seconda erial Imagery cave Surface (i (C1) e (C2) rks)	Ary Indicators Water Sta (B7) Draina B8) Oxidize .1 Presen Salt De Stunte .1 Geomo Shallov Microto .1 FAC-ne	(2 or more required) ained Leaves (B9) ge Patterns (B10) d Rizospheres along Living Roots ce of Reduced Iron (C4) eposits (C5) d or Stressed Plants (D1) rphic Position (D2) v Aquitard (D3) opographic Relief(D4) eutral Test (D5)
HYDROLOGY Wetland H Primary Ind Surface V .1 High Wat .1 Saturatio Water Ma Sediment Drift Depo Algal Mat .1 Iron Dep Surface S Field Observ Surface Wa Water Table Saturation (indudes capil	Aydrology India licators (any one is Vater (A1) ter Table (A2) on (A3) rrks (B1) Deposits (B2) osits (B3) or Crust (B4) osits (B5) soil Cracks (B6) vations: ter Present? Yes Present? Yes	cators: sufficient)	Inundat Sparsely Marl De Hydroge Dry-Sea Other (I	ion Visible on A vegetated Com- posits (B15) en Sulfide Odor ason Water Tab Explain in Rema (inches): (inches): 0 (inches): 0	Seconda erial Imagery cave Surface (i (C1) e (C2) rks)	Ary Indicators Water Sta (B7) Draina B8) Oxidize .1 Presen Salt De Stunte .1 Geomo Shallov Microto .1 FAC-ne	(2 or more required) ained Leaves (B9) ge Patterns (B10) d Rizospheres along Living Roots ce of Reduced Iron (C4) eposits (C5) d or Stressed Plants (D1) rphic Position (D2) v Aquitard (D3) opographic Relief(D4) eutral Test (D5)

by its location in a small depression and Kuskokwim River floodplain).



Hydric Soil Indicators: Other (explain in remarks), Alaska Redox (A14)

Wetland Hydrology Indicators: Saturation (A3), FAC-Neutral Test (D5), Presence of Reduced Iron (C4), Iron Deposits (B5), High Water Table (A2), Geomorphic Position (D2)



Project/Site: Akiak Wetland Delineation	Borough/City: Bethel Census Area	Sampling Date: <u>2021-08-16</u>
Applicant/Owner: <u>Solstice</u>		Sampling Point: <u>aw-08</u>
Investigator(s): <u>RWM, SLI</u>	Landform (hillside, terrace,	hummocks, etc.): Basins Or Depressions
Local relief (concave, convex, none): concave	Slope: <u>0.0</u> % / <u>0.0</u> °	Elevation: 70
Subregion: Alaska Lat.: 60.9143	Long.: <u>-161.2274</u>	Datum: <u>WGS84</u>
Soil Map Unit Name:		NWI classification: <u>PEM1E</u>
Are climatic/hydrologic conditions on the site typical fo	r this time of year? Yes 🗹 No 🛛	(If no, explain in Remarks)
Are Vegetation,Soil,or Hydrology	significantly disturbed? Are "Normal	Circumstances" present? Yes <u>√</u> No
Are Vegetation, Soil, or Hydrology nat	turally problematic? (If neede	d, explain any answers in Remarks.)
SUMMARY OF FINDINGS - Attach site map showin	g sampling point locations, transect	s, important features, etc.

Hydrophytic Vegetation Present?	Yes √	No	Is the Sampled Area			
Hydric Soil Present?	Yes √	No	within a Wetland?	Yes	f	No
Wetland Hydrology Present?	Yes √	No		103	/•	

Remarks: Plot in wet sedge fringe of shallow waterbody. Topography rises to the adjacent shrub uplands, with a thin band of Calamagrostic canadensis before the shrubs. Observed a small wood frog in plot, 3 ducks (Northern Shovelers), and multiple shorebirds in adjacent waterbody.

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

Absolute		Dominant	Indicator	Dominance Test worksheet:
Tree Stratum	% Cover	Species?	Status	Number of Dominant Species That are OBL,
Total Cover:	0.0			FACW, or FAC: 1 (A)
50% of total cover: 0.0		20% of tota	al cover: 0.0	Total Numberof Dominant SpeciesAcross all
Sapling/Shrub Stratum				Strata: 1
Total Cover:	0.0			(B)
50% of total cover: 0.0		20% of tota	al cover: 0.0	Percent of Dominant Species That are OBL,
Herb Stratum				
1. Carex utriculata	60.0	\checkmark	OBL	Prevalence Index worksheet:
2. Comarum palustre	5.0		OBL	Total % Cover of: Multiply by:
3. Galium trifidum	5.0		FACW	OBL Species 75.3 × 1 = 75.3
4. Epilobium palustre	5.0		OBL	FACW Species $7.0 \times 2 = 14.0$
5. Calamagrostis canadensis	3.0		FAC	FAC Species $3.0 \times 3 = 9.0$
6. Ranunculus gmelinii	2.0		FACW	FACU Species $0.0 \times 4 = 0.0$
7. Utricularia macrorhiza	2.0		OBL	UPL Species $0.0 \times 5 = 0.0$
8. Sium suave	1.0		OBL	Column Totals: 85.3 (A) 98.3 (B)
9. Glyceria grandis	1.0		OBL	Prevalence Index = $B/A = 1.152$
0. Cicuta virosa	1.0		OBL	
11. Calamagrostis purpurascens	1.0		U	Hydrophytic Vegetation Indicators:
1. Beckmannia syzigachne	0.1		OBL	✓ Dominance Test is > 50%
2. Unknown Crucifer	0.1			✓ Prevalence Index is ≤ 3.0
14. Equisetum fluviatile	0.1		OBL	Morphological Adaptations ¹ (Provide supporting data
15. Lemna minor	0.1		OBL	in Remarks or on a separate sheet)
Total Cover:	86.4			Problematic Hydrophytic Vegetation ¹ (Explain)
50% of total cover: 43.2		20% of total	cover: 17.3	¹ Indicators or hydricsoil and wetland hydrology must be
				present, unless disturbed or problematic.
				Plot size (radius, or length × width) 5m radius
				% Cover of Wetland Bryophytes (Where applicable)
				% Bare Ground 95.0
				Total Cover of Bryophytes 0.1
				Hydrophytic
				Vegetation
				Present? Yes ,f No

Remarks: A wet sedge fringe, with grasses in microtopographic highs and scattered calamagrostis canadensis pedestals.

	Mat	_	Redox Fe			
inches)	Color (moist)	%Color (moist) %Type¹	Loc ² Texture	Мос	l Remarks
0-3	/	/	А	peat		
					Silt layers	from flooding but still organic. Al-
3-12	/	/	А	mucky p	eat pha	alpha positive at 5
12-1	8 /	/	А	muck	Histo	osol
¹ Type: C=0	Concentration, D=Dep	oletion, RM=Redu	ced Matrix, A	=Absent	² Location: PL=P	ore Lining, RC=Root Channel,
Hydric Soil	Indicators:	Inc	dicators f	or Problema	atic Hydric S	oils ³ :
	tosol or Histel (A1)			a Color Change ((TA4) ⁴	Alaska Gleved Without Hue 5Y or
	pipedon (A2)			wales (TA5)		Underlying Layer
	en Sulfide (A4)	Alas	ska Redox V	/ith 2.5Y Hue	.1	Other (Explain in Remarks)
	ark Surface (A12)	30				indicator of watland budralagy, must
	Gleyed (A13)	³ One indicator				indicator of wetland hydrology, must nless disturbed or problematic.
	Redox (A14)			scape position	be present u	niess distai bed or problematic.
Alaska	Gleyed Pores (A15)	⁴ Give details of	color chang	je in Remarks.		
	Layer (if prese	ent):				
Type: None					Hvdr	ic Soil Present? Yes √
Depth (inches	5):					
	lydrology Indic				Secondary Ir	dicators (2 or more required)
Primary Ind	icators (any one is s	sufficient)				Water Stained Leaves (B9)
Surface W	/ater (A1)		Inundation	Visible on Aeria	al Imagery (B7)	Drainage Patterns (B10)
	- T-1-1- (AO)		C	getated Concave	e Surface (B8)	Oxidized Rizospheres along Living Root
.1 High Wat	er Table (AZ)		Sparsely ve	getatea contar		J
.1 High Wat .1 Saturatio			Marl Depos			1 Presence of Reduced Iron (C4)
	on (A3)		Marl Depos			
.1 Saturatio Water Ma	on (A3)		Marl Depos Hydrogen S Dry-Season	iits (B15) Sulfide Odor (C1 n Water Table ((1) C2)	1 Presence of Reduced Iron (C4)
.1 Saturatio Water Ma Sediment Drift Depo	on (A3) rks (B1) Deposits (B2) osits (B3)		Marl Depos Hydrogen S Dry-Season	iits (B15) Sulfide Odor (C1	1) C2)	1 Presence of Reduced Iron (C4) Salt Deposits (C5) Stunted or Stressed Plants (D1) 1 Geomorphic Position (D2)
.1 Saturatio Water Ma Sediment Drift Depo	on (A3) rks (B1) Deposits (B2)		Marl Depos Hydrogen S Dry-Season	iits (B15) Sulfide Odor (C1 n Water Table ((1) C2)	1 Presence of Reduced Iron (C4) Salt Deposits (C5) Stunted or Stressed Plants (D1) 1 Geomorphic Position (D2) Shallow Aquitard (D3)
.1 Saturatio Water Ma Sediment Drift Depo Algal Mat Iron Depo	on (A3) rks (B1) Deposits (B2) osits (B3) or Crust (B4) osits (B5)		Marl Depos Hydrogen S Dry-Season	iits (B15) Sulfide Odor (C1 n Water Table ((1) C2)) .	1 Presence of Reduced Iron (C4) Salt Deposits (C5) Stunted or Stressed Plants (D1) 1 Geomorphic Position (D2) Shallow Aquitard (D3) Microtopographic Relief(D4)
.1 Saturatio Water Ma Sediment Drift Depo Algal Mat Iron Depo	on (A3) rks (B1) Deposits (B2) osits (B3) or Crust (B4)		Marl Depos Hydrogen S Dry-Season	iits (B15) Sulfide Odor (C1 n Water Table ((1) C2)) .	1 Presence of Reduced Iron (C4) Salt Deposits (C5) Stunted or Stressed Plants (D1) 1 Geomorphic Position (D2) Shallow Aquitard (D3)
.1 Saturatio Water Ma Sediment Drift Depo Algal Mat Iron Depo	on (A3) rks (B1) Deposits (B2) osits (B3) or Crust (B4) osits (B5) oil Cracks (B6)		Marl Depos Hydrogen S Dry-Season	iits (B15) Sulfide Odor (C1 n Water Table ((1) C2)) .	1 Presence of Reduced Iron (C4) Salt Deposits (C5) Stunted or Stressed Plants (D1) 1 Geomorphic Position (D2) Shallow Aquitard (D3) Microtopographic Relief(D4)
.1 Saturatio Water Ma Sediment Drift Depo Algal Mat Iron Depo Surface S	on (A3) rks (B1) Deposits (B2) osits (B3) or Crust (B4) osits (B5) oil Cracks (B6)	No .1	Marl Depos Hydrogen S Dry-Season	its (B15) Sulfide Odor (C1 n Water Table (lain in Remarks	1) C2)) .	1 Presence of Reduced Iron (C4) Salt Deposits (C5) Stunted or Stressed Plants (D1) 1 Geomorphic Position (D2) Shallow Aquitard (D3) Microtopographic Relief(D4)
.1 Saturatio Water Ma Sediment Drift Depo Algal Mat Iron Depo Surface S	on (A3) rks (B1) Deposits (B2) osits (B3) or Crust (B4) osits (B5) oil Cracks (B6) rations: ter Present? Yes	No .1 .1 No	Marl Depos Hydrogen S Dry-Season Other (Exp	its (B15) Sulfide Odor (C1 n Water Table (lain in Remarks	1) C2)) .	1 Presence of Reduced Iron (C4) Salt Deposits (C5) Stunted or Stressed Plants (D1) 1 Geomorphic Position (D2) Shallow Aquitard (D3) Microtopographic Relief(D4)
.1 Saturatio Water Ma Sediment Drift Depo Algal Mat Iron Depo Surface S Field Observ Surface Wa	on (A3) rks (B1) Deposits (B2) osits (B3) or Crust (B4) osits (B5) oil Cracks (B6) vations: ter Present? Yes e Present? Yes		Marl Depos Hydrogen S Dry-Season Other (Exp Depth (ir	its (B15) Sulfide Odor (C1 n Water Table (lain in Remarks	1) (C2)) .	1 Presence of Reduced Iron (C4) Salt Deposits (C5) Stunted or Stressed Plants (D1) 1 Geomorphic Position (D2) Shallow Aquitard (D3) Microtopographic Relief(D4) 1 FAC-neutral Test (D5)
.1 Saturatic Water Ma Sediment Drift Depo Algal Mat Iron Depo Surface S Field Observ Surface Wa Water Table	on (A3) rks (B1) Deposits (B2) osits (B3) or Crust (B4) osits (B5) oil Cracks (B6) vations: ter Present? Yes Present? Yes		Marl Depos Hydrogen S Dry-Season Other (Exp Depth (ir	its (B15) Sulfide Odor (C1 n Water Table (lain in Remarks iches): 0 iches): 2	1) (C2)) .	1 Presence of Reduced Iron (C4) Salt Deposits (C5) Stunted or Stressed Plants (D1) 1 Geomorphic Position (D2) Shallow Aquitard (D3) Microtopographic Relief(D4)
.1 Saturatio Water Ma Sediment Drift Depo Algal Mat Iron Depo Surface S Field Observ Surface Wa Water Table Saturation I (includes capill	on (A3) rks (B1) Deposits (B2) osits (B3) or Crust (B4) osits (B5) oil Cracks (B6) vations: ter Present? Yes Present? Yes Present? any fringe) Yes	.1 No .1 No	Marl Depos Hydrogen S Dry-Season Other (Exp Depth (ir Depth (ir Depth (ind	its (B15) Sulfide Odor (C1 n Water Table (lain in Remarks iches): 0 iches): 2 nes): 0	.) (2) () () () () () () () () () () () () ()	1 Presence of Reduced Iron (C4) Salt Deposits (C5) Stunted or Stressed Plants (D1) 1 Geomorphic Position (D2) Shallow Aquitard (D3) Microtopographic Relief(D4) 1 FAC-neutral Test (D5)
.1 Saturatio Water Ma Sediment Drift Depo Algal Mat Iron Depo Surface S Field Observ Surface Wa Water Table Saturation I (indudes capill Recorded Da	on (A3) rks (B1) Deposits (B2) osits (B3) or Crust (B4) osits (B5) oil Cracks (B6) vations: ter Present? Yes Present? Yes Present? ary fringe) Yes ta (stream gauge	.1 No .1 No e, monitor we	Marl Depos Hydrogen S Dry-Season Other (Exp Depth (irr Depth (irr Depth (ind II, aerial p	its (B15) Sulfide Odor (C1 n Water Table (lain in Remarks iches): 0 iches): 2 mes): 0 hoto, previou	.) C2))	1 Presence of Reduced Iron (C4) Salt Deposits (C5) Stunted or Stressed Plants (D1) 1 Geomorphic Position (D2) Shallow Aquitard (D3) Microtopographic Relief(D4) 1 FAC-neutral Test (D5) I Hvdrology Present? Yes √
.1 Saturatio Water Ma Sediment Drift Depo Algal Mat Iron Depo Surface S Field Observ Surface Wa Water Table Saturation I (includes capill Recorded Da Remarks: This	on (A3) rks (B1) Deposits (B2) osits (B3) or Crust (B4) osits (B5) oil Cracks (B6) vations: ter Present? Yes Present? Yes Present? any fringe) Yes ta (stream gauge s plot is in a wet se	.1 No .1 No e, monitor we edge fringe adj	Marl Depos Hydrogen S Dry-Season Other (Exp Depth (ir Depth (ir Depth (ind II, aerial p acent to a	its (B15) Sulfide Odor (C1 n Water Table (lain in Remarks aches): 0 aches): 2 hes): 0 hoto, previou waterbody. Hy	Wetland (1) (22) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1	1 Presence of Reduced Iron (C4) Salt Deposits (C5) Stunted or Stressed Plants (D1) 1 Geomorphic Position (D2) Shallow Aquitard (D3) Microtopographic Relief(D4) 1 FAC-neutral Test (D5)



Hydric Soil Indicators: Histosol or Histel (A1), Other (explain in remarks)

Wetland Hydrology Indicators: FAC-Neutral Test (D5), Presence of Reduced Iron (C4), Saturation (A3), Geomorphic Position (D2), High Water Table (A2)



Project/Site: Akiak Wetland Delineatio	<u>n</u> Borough	/City: <u>Bethel Cens</u>	sus Area	Sampling Date: 2021-08-16
Applicant/Owner: Solstice				Sampling Point: <u>aw-09</u>
Investigator(s): <u>RWM, SLI</u>		Landform (hillsid	e, terrace, hummocks	, etc.): Flat or fluvial related
Local relief (concave, convex, no	one): <u>none</u> Slor	be: <u>0.0</u> %/ <u>0</u>	<u>.0</u> °	Elevation: <u>82</u>
Subregion: <u>Alaska</u>	Lat.: <u>60.9144</u>	Long.: <u>-1</u>	<u>61.2285</u>	Datum: WGS84
Soil Map Unit Name:				NWI classification: <u>U</u>
Are climatic/hydrologic conditions on t	he site typical for this time	e of year? Yes 🗸	No	(If no, explain in Remarks)
Are Vegetation,Soil,or Hydr	ology significant	tly disturbed? Are	"Normal Circumstanc	es" present? Yes 🗸 No
Are Vegetation, Soil, or Hyd	rology naturally pro	blematic?	(If needed, explain ar	y answers in Remarks.)
SUMMARY OF FINDINGS - Attach	site map showing samplir	ng point locations,	transects, important	features, etc.

Hydrophytic Vegetation Present? Yes	√ N	lo	Is the Sampled Area			
Hydric Soil Present? Yes	; N	lo √	within a Wetland?	Yes	No	./
Wetland Hydrology Present? Yes	N	>_√_		163	NO	v

Remarks: Site is tall closed alder, about 5-7ft higher than the adjacent wetland characterized by aw-08.

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

	Absolute	Dominant	Indicator	Dominance Test worksheet:
Tree Stratum	% Cover	Species?	Status	Number of Dominant Species That are OBL,
Total Cover:	0.0			FACW, or FAC: 3 (A)
50% of total cover:	0.0	20% of total	over: 0.0	Total Numberof Dominant SpeciesAcross all
Sapling/Shrub Stratum				Strata: 3
Alnus viridis	85.0	\checkmark	FAC	(B)
Ribes triste	7.0		FAC	Percent of Dominant Species That are OBL,
Viburnum edule	2.0		FACU	
Total Cover:	94.0			Prevalence Index worksheet:
	47.0	20%oftotalcover:	18.8	Total % Cover of: Multiply by:
– Herb Stratum		_		OBL Species $0.0 \times 1 = 0.0$
Equisetum sylvaticum	20.0	\checkmark	FAC	FACW Species $0.0 \times 2 = 0.0$
Calamagrostis canadensis	15.0	\checkmark	FAC	FAC Species 132.1 × 3 = 396.3
Rubus arcticus	5.0		FAC	FACU Species $7.0 \times 4 = 28.0$
Thalictrum sparsiflorum	3.0		FACU	UPL Species $0.0 \times 5 = 0.0$
Trientalis europaea	1.0		FACU	Column Totals: 139.1 (A) 424.3 (B)
Mertensia paniculata	1.0		FACU	Prevalence Index = $B/A = 3.050$
Sanguisorba sp.	0.1			
Aconitum delphiniifolium	0.1		FAC	Hydrophytic Vegetation Indicators:
Total Cover:	45.2			✓ Dominance Test is > 50%
50% of total cover:		20% of total	over: 9.0	Prevalence Index is ≤ 3.0
				Morphological Adaptations ¹ (Provide supporting d
				in Remarks or on a separate sheet)
				Problematic Hydrophytic Vegetation ¹ (Explain)
			ľ	Indicators or hydricsoil and wetland hydrology must be
				present, unless disturbed or problematic.
			-	Plot size (radius, or length × width) 5m ra
				% Cover of Wetland Bryophytes (Where applicable)
				% Bare Ground 90.
				Total Cover of Bryophytes 5.
				Hydrophytic
				Vegetation
				Present? Yes √ No

	Depth		Redox	Featu	ures						
inches)	Color (moist) %	Color (moist) %	Type ¹	Loc ² Te	exture		Mod	Rer	marks	
)-5	/	/		A		fibric					
5-17	10yr 3/2 60) 10yr	3/3 40	С	PL	silt loa	am				
¹ Type: C=	=Concentration, D=Deple	tion, RM	=Reduced N	latrix, A	=Absent		² Locatio	on: PL=Po	ore Lining, R	C=Root Chann	el,
Hydric So	il Indicators:		Indica	ntors f	for Pro	blem	atic Hyd	lric So	ils³:		
Histos	ol or Histel (A1)		Ala	ska Col	or Chana	e (TA4	1) ⁴		Alaska Gle	ved Without F	lue 5Y or Red
Histic I	Epipedon (A2)		Alas	ska Alpin	ie Swales ((TA5)			Underlying	g Layer	
Hydrog	gen Sulfide (A4)		Alas	ka Redo	x With 2.5	Y Hue			Other (Exp	olain in Remar	rks)
Thick [Dark Surface (A12)										
Alaska	a Gleyed (A13)		³ One inc	licator o	or hydrop	hytic v	vegetation,	, one pri	mary indica	ntor of wetland	d hydrology,
Alaska	a Redox (A14)		and ar	appropr	riate landso	cape po	osition must	be preser	nt unless dist	urbed or problei	matic.
Alaska	a Gleyed Pores (A15)	_	Give det	ails of co	olor change	e in Ren	narks.				
Restrictive	Layer (if present):										
Type: None							Hydric 9	Soil Dr	ocont?	Yes	No √
Depth (inche							nvuncs		CSCIIL!	165	
YDROLOG Wetland	Hydrology Indica	tors:					S	econda	ary Indicato	ors (2 or more	e required)
						-	5		,		e required)
,	ndicators (any one is su	mcient)	T					wa	ter Stained	Leaves (B9)	
	Water (A1)									()	<u> </u>
							ial Imagery	y (B7)	Drainage P	Patterns (B10)	
	ter Table (A2)		Spa	arsely Ve	egetated C	Concav		y (B7) B8)Oxidiz	Drainage P zed Rizosphe	Patterns (B10) eres along Livin	g Roots (C3
Saturati	ion (A3)		Spa Ma	arsely Ve rl Depos	egetated C sits (B15)	Concavo)	e Surface (I	y (B7) B8)Oxidiz	Drainage P zed Rizosphe ence of Red	Patterns (B10) Patterns along Livin luced Iron (C4	g Roots (C3
Saturati Water M	ion (A3) 1arks (B1)		Spa Ma Hyo	arsely Ve rl Depos drogen S	egetated C sits (B15) Sulfide O	Concav) dor (C	e Surface (I	y (B7) B8)Oxidiz Prese	Drainage P zed Rizosphe ence of Red Salt Depos	Patterns (B10) eres along Livin luced Iron (C4 sits (C5)	g Roots (C3 }
Saturatio Water M Sedimer	ion (A3) 1arks (B1) nt Deposits (B2)		Spa Ma Hyo Dry	arsely Ve rl Depos drogen S v-Seaso	egetated (sits (B15) Sulfide O n Water ⁻	Concave) dor (C Table (e Surface (I :1) (C2)	y (B7) B8)Oxidiz Prese Stunte	Drainage P zed Rizosphe ence of Red Salt Depos ed or Stress	Patterns (B10) Pares along Livin luced Iron (C4 sits (C5) Seed Plants (D1	 _g Roots (C3 <u>})</u> _ <u>)</u>
Saturati Water M Sedimer Drift De	on (A3) 1arks (B1) nt Deposits (B2) posits (B3)		Spa Ma Hyo Dry	arsely Ve rl Depos drogen S v-Seaso	egetated (sits (B15) Sulfide O	Concave) dor (C Table (e Surface (I :1) (C2)	y (B7) B8)Oxidiz Prese Stunte	Drainage P zed Rizosphe ence of Red Salt Depos ed or Stress	Patterns (B10) eres along Livin luced Iron (C4 sits (C5)	 _g Roots (C3 <u>})</u> _ <u>)</u>
Saturati Water M Sedimer Drift De	ion (A3) 1arks (B1) nt Deposits (B2)		Spa Ma Hyo Dry	arsely Ve rl Depos drogen S v-Seaso	egetated (sits (B15) Sulfide O n Water ⁻	Concave) dor (C Table (e Surface (I :1) (C2)	y (B7) B8)Oxidiz Prese Stunte	Drainage P zed Rizosphe ence of Red Salt Depos ed or Stress Geomorphic	Patterns (B10) Pares along Livin luced Iron (C4 sits (C5) Seed Plants (D1	 _g Roots (C3 <u>})</u> _ <u>)</u>
Saturati Water M Sedimer Drift Dej Algal Ma	on (A3) 1arks (B1) nt Deposits (B2) posits (B3)		Spa Ma Hyo Dry	arsely Ve rl Depos drogen S v-Seaso	egetated (sits (B15) Sulfide O n Water ⁻	Concave) dor (C Table (e Surface (I :1) (C2)	y (B7) B8)Oxidiz Prese Stunte .1	Drainage P zed Rizosphe ence of Red Salt Depos ed or Stress Geomorphic Shallow Ac	Patterns (B10) eres along Livin luced Iron (C4 sits (C5) sed Plants (D1 c Position (D2)	— Roots (C3 +) — -) —
Saturati Water M Sedimer Drift Dej Algal Ma Iron Dep	ion (A3) larks (B1) nt Deposits (B2) posits (B3) at or Crust (B4)		Spa Ma Hyo Dry	arsely Ve rl Depos drogen S v-Seaso	egetated (sits (B15) Sulfide O n Water ⁻	Concave) dor (C Table (e Surface (I :1) (C2)	y (B7) B8)Oxidiz Prese Stunte .1	Drainage P zed Rizosphe ence of Red Salt Depos ed or Stress Geomorphic Shallow Ac icrotopogra	Patterns (B10) eres along Livin luced Iron (C4 sits (C5) sed Plants (D1 c Position (D2) quitard (D3)	— Roots (C3 +) — -) —
Saturati Water M Sedimer Drift De Algal Ma Iron Dep Surface	on (A3) Iarks (B1) Int Deposits (B2) posits (B3) at or Crust (B4) posits (B5)		Spa Ma Hyo Dry	arsely Ve rl Depos drogen S v-Seaso	egetated (sits (B15) Sulfide O n Water ⁻	Concave) dor (C Table (e Surface (I :1) (C2)	y (B7) B8)Oxidiz Prese Stunte .1	Drainage P zed Rizosphe ence of Red Salt Depos ed or Stress Geomorphic Shallow Ac icrotopogra	Patterns (B10) Pares along Livin luced Iron (C4 sits (C5) Sed Plants (D1 C Position (D2 quitard (D3) phic Relief(D4	— Roots (C3 +) — -) —
Saturati Water M Sedimer Drift Dej Algal Ma Iron Dep Surface	on (A3) larks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) posits (B5) Soil Cracks (B6)	No	Spa Ma Hyr Dry Oth	arsely Ve rl Depos drogen S r-Seaso her (Exp	egetated (sits (B15) Sulfide O n Water ⁻	Concave) dor (C Table (emarks	e Surface (I :1) (C2)	y (B7) B8)Oxidiz Prese Stunte .1	Drainage P zed Rizosphe ence of Red Salt Depos ed or Stress Geomorphic Shallow Ac icrotopogra	Patterns (B10) Pares along Livin luced Iron (C4 sits (C5) Sed Plants (D1 C Position (D2 quitard (D3) phic Relief(D4	— Roots (C3 +) — -) —
Saturati Water M Sedimer Drift Dej Algal Ma Iron Dep Surface Field Obse Surface W	on (A3) Marks (B1) Int Deposits (B2) posits (B3) at or Crust (B4) posits (B5) Soil Cracks (B6) ervations:	No	Spz Ma Hyr Dry Oth	arsely Ve rl Depos drogen S r-Seaso her (Exp	egetated (sits (B15) Sulfide O n Water ⁻ olain in Re olain in Re	Concave) dor (C Table (emarks	e Surface (I :1) (C2)	y (B7) B8)Oxidiz Prese Stunte .1	Drainage P zed Rizosphe ence of Red Salt Depos ed or Stress Geomorphic Shallow Ac icrotopogra	Patterns (B10) Pares along Livin luced Iron (C4 sits (C5) Sed Plants (D1 C Position (D2 quitard (D3) phic Relief(D4	— Roots (C3 +) — -) —
Saturati Water M Sedimer Drift Dej Algal Ma Iron Dep Surface Field Obse Surface W	on (A3) Marks (B1) Int Deposits (B2) posits (B3) at or Crust (B4) posits (B5) Soil Cracks (B6) ervations: /ater Present? Yes ple Present? Yes		Spz Ma Hyr Dry Oth	rsely Vé rl Depos drogen S Seaso her (Exp epth (ir	egetated (sits (B15) Sulfide O n Water ⁻ olain in Re olain in Re	Concave) dor (C Table (emarks	e Surface (1 :1) (C2) s)	y (B7) B8)Oxidiz Prese Stunte .1 M	Drainage P zed Rizosphe ance of Red Salt Depos ed or Stress Geomorphic Shallow Ac icrotopogra FAC-neutra	Patterns (B10) Peres along Livin luced Iron (C4 Sed Plants (D1 C Position (D2 Quitard (D3) phic Relief(D4 al Test (D5)	— Roots (C3 +) — -) —
Saturatia Water M Sedimer Drift Dej Algal Ma Iron Dep Surface Field Obse Surface W Water Tab Saturation	on (A3) Marks (B1) Int Deposits (B2) posits (B3) at or Crust (B4) posits (B5) Soil Cracks (B6) ervations: /ater Present? Yes ple Present? Yes		Spa Ma Hyu Dry Oth	ersely Ve rl Depos drogen s Seaso her (Exp her (Exp hepth (ir repth (ir	egetated (sits (B15) Sulfide O n Water ⁻ olain in Re olain in Re	Concave) dor (C Table (emarks	e Surface (1 :1) (C2) s)	y (B7) B8)Oxidiz Prese Stunte .1 M	Drainage P zed Rizosphe ance of Red Salt Depos ed or Stress Geomorphic Shallow Ac icrotopogra FAC-neutra	Patterns (B10) Pares along Livin luced Iron (C4 sits (C5) Sed Plants (D1 C Position (D2 quitard (D3) phic Relief(D4	

Remarks: D2--Kuskokwim River floodplain



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



Project/Site: Akiak Wetland Delineation	Borough/City: <u>Bethel Census Area</u>	Sampling Date: <u>2021-08-16</u>							
Applicant/Owner: Solstice		Sampling Point: <u>aw-11</u>							
Investigator(s): <u>SLI, RWM</u>	Landform (hillside, terrace, hum	mocks, etc.): Flat or fluvial related							
Local relief (concave, convex, none): none	Slope: <u>0.0</u> % / <u>0.0</u> °	Elevation: <u>91</u>							
Subregion: Alaska Lat.: 60.9091	Long.: <u>-161.2264</u>	Datum: WGS84							
Soil Map Unit Name:		NWI classification: U							
Are climatic/hydrologic conditions on the site typical for	or this time of year? Yes \checkmark No $_$	(If no, explain in Remarks)							
Are Vegetation,Soil,or Hydrology	significantly disturbed? Are "Normal Circum	stances" present? Yes <u>√</u> No							
Are Vegetation, Soil, or Hydrology na	turally problematic? (If needed, expl	ain any answers in Remarks.)							
SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.									
Hydrophytic Vegetation Present? Yes 🗸 No									

Wetland Hydrology Present? YesNo ✓	Hydric Soil Present?	Yes	No	\checkmark	Is the Sampled Area within a Wetland?	Yes	No √
	Wetland Hydrology Present?	Yes	No	\checkmark		105	

Remarks: This plot is representative of the potential LEO footprint. All adjacent cleared areas were walked and observed similar elevation and level terrain.

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

		Absolute	Dominant	Indicator	Dominance Test worksheet:			
-	Tree Stratum	% Cover	Species?	Status	Number of Dominant Species That are OBL,			
1	Populus balsamifera	5.0		FACU	FACW, or FAC: 3 (A)			
	Total Cover:	5.0			Total Numberof Dominant SpeciesAcross all			
	50% of total cove	er: 2.5	20% of total	cover: 1.0	Strata: 4			
_	Sapling/Shrub Stratum				(B)			
	Alnus viridis	60.0	\checkmark	FAC	Percent of Dominant Species That are OBL,			
	Viburnum edule	30.0	\checkmark	FACU				
-	Rubus idaeus	20.0		FACU	Prevalence Index worksheet:			
_	Salix bebbiana	15.0		FAC	Total % Cover of: Multiply by:			
-	Rosa acicularis	10.0		FACU	OBL Species $0.0 \times 1 = 0.0$			
_	Total Cover:	135.0			FACW Species $0.0 \times 2 = 0.0$			
	50% of total cove	er: <u>67.5 20% (</u>	of total cover:	27.0	FAC Species 101.0 × 3 = 303.0			
	Herb Stratum			-	FACU Species 68.1 × 4 = 272.4			
_	Calamagrostis canadensis	15.0	\checkmark	FAC	UPL Species $0.0 \times 5 = 0.0$			
_	Equisetum sylvaticum	7.0	\checkmark	FAC	Column Totals: 169.1 (A) 575.4 (B)			
=	Actaea rubra	3.0		FAC	Prevalence Index= $B/A = 3.403$			
	Thalictrum sparsiflorum	2.0		FACU				
	Aconitum delphiniifolium	1.0		FAC	Hydrophytic Vegetation Indicators:			
-	Athyrium filix-femina	1.0			✓ Dominance Test is > 50%			
_	Mertensia paniculata	1.0		FACU	Prevalence Index is ≤ 3.0			
_	Trientalis europaea	0.1		FACU	Morphological Adaptations ¹ (Provide supporting o	lata		
_	Total Cover:	30.1			in Remarks or on a separate sheet)			
	50% of total cove	er: <u>15.0</u>	20% of total	cover: 6.0	Problematic Hydrophytic Vegetation ¹ (Explain)			
					¹ Indicators or hydricsoil and wetland hydrology must be			
					present, unless disturbed or problematic.			
					Plot size (radius, or length × width) 10m	radiı		
					% Cover of Wetland Bryophytes (Where applicable)			
					% Bare Ground 9	0.0		
					Total Cover of Bryophytes	5.0		
					Hydrophytic			
					Vegetation			
					Present? Yes √ No			

Remarks: Representative of adjacent cleared areas

Depth		Ma	atri	x	Re	edox	Feat	ures						
(inches)	Color	(moist	:) %	Color	(moist)% '	Type ¹	Loc ²	Те	xture	Mod		Re	marks
0-4		/			/		А		fibric					
4-18	10yr	3/2	80	10yr	3/4	20	С	PL	very	fine sa	andy loam			
¹ Type: C	=Concer	ntration,	, D=[Depletic	on, RM=	Reduc	ed Mat	trix, A=A	Absent	² L	ocation: PL=Por	e Lining, RC=R	oot Channel,	
Hydric So	il Indi	icator	rs:			Ind	icato	rs for	Prob	lema	atic Hydric	Soils ³ :		
Histos	sol or Hi	stel (A	1)				Alaska	Color (Change	(TA4)4	Alaska Gl	eved Without Hi	ue 5Y or Redde
Histic	Epipedo	n (A2)					Alaska	Alpine S	wales (TA5)		Underlyin	5 .	
	gen Sulf	•					Alaska I	Redox W	/ith 2.5Y	Hue		Other (E>	oplain in Remark	(s)
	Dark Su				-									
	a Gleyec				-				• •	-	· ·	•	wetland hydrology	
	a Redox	• •			-					• •		resent unless dis	turbed or problem	natic.
Alaska	a Gleyec	l Pores	(A15	5)	-	₄Giv	ve detai	ils of colo	or chang	je in Re	emarks.			
Restrictive	e Laye	r (if p	rese	ent):										
Type: None	: -	• •		-							Hvdric Soil	Present?	Yes	No √
Depth (inch	ies):													
Remarks: N	o hvdri	c soil i	indic	ators										
HYDROLOG														
Wetland		vpolo	Ind	licato	ors:						Seco	ndary Indica	tors (2 or more	required)
Primary In	-									-	5000		d Leaves (B9)	requiredy
Surface		· /	0.10				Inund	lation V	isihle o	n Aer	al Imagery (B		Patterns (B10)	
High Wa													eres along Living	Roots (C3)
Saturat		. /						Deposit					duced Iron (C4)	
Water N								ogen Su	· · ·			Salt Depo		
Sedime			2)					eason V				•	sed Plants (D1)	
Drift De	posits (B3)					Other	(Expla	in in Re	emark	s)	.1Geomorph	ic Position (D2)	
Algal Ma			.)					<u> </u>					quitard (D3)	
Iron De	posits (I	B5)										Microtopogra	aphic Relief(D4)	
Surface	Soil Cra	acks (B	6)									FAC-neut	ral Test (D5)	
Field Obs	onvoti													
Surface W			Voc		No	.1	Don	th (incl). O					
Water Tal			Yes		No	.1		th (incl						
Saturatio			100				Dep				Wallawd II	-dual a ma D		
(includes			2)		Yes	No	.1		Depth	ŀ	wetiand Hy	<mark>vdroloav Pre</mark>	esent? Yes	No √
(includes	capillary	, ninge	-1		103	NO	. 4		Deptil					
Recorded D	Data (s	<u>tre</u> am	gau	uge, n	nonito	r wel	ll <u>, a</u> er	ial ph	oto, p	revio	us inspection	n) if availabl	e:	
Remarks: [ייא	skoku	vim	River	floodr	lain								
L		2110111												



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



Project/Site: Akiak Wetland Delineation	Borough/City: <u>Bethel Census Area</u>	Sampling Date: <u>2021-08-17</u>
Applicant/Owner: Solstice		Sampling Point: <u>aw-12</u>
Investigator(s): <u>SLI, RWM</u>	Landform (hillside, terrae	ce, hummocks, etc.): <u>Nonpatterned</u>
Local relief (concave, convex, none): none	Slope: <u>0.0</u> % / <u>0.0</u> °	Elevation: <u>62</u>
Subregion: Alaska Lat.: 60.9113	Long.: <u>-161.2330</u>	Datum: WGS84
Soil Map Unit Name:		NWI classification: U
Are climatic/hydrologic conditions on the site typical for	or this time of year? Yes \checkmark No	(If no, explain in Remarks)
Are Vegetation,Soil,or Hydrology	significantly disturbed? Are "Normal Circu	umstances" present? Yes 🗸 No
Are Vegetation, Soil, or Hydrology na	aturally problematic? (If needed, ex	plain any answers in Remarks.)
SUMMARY OF FINDINGS - Attach site map show	ing sampling point locations, transects, in	nportant features, etc.

Hydrophytic Vegetation Present?	Yes √	′ No		Is the Sampled Area		
Hydric Soil Present?	Yes	No	\checkmark	within a Wetland?	Yes	No √
Wetland Hydrology Present?	Yes	No	\checkmark		105	

Remarks: The perimeter of landfill has been brushed, and then a steep berm separates the brushed clearing from adjacent undisturbed lands as characterized by this plot.

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

		Absolute	Dominant	Indicator	Dominance Test worksheet:
	Tree Stratum	% Cover	Species?	Status	Number of Dominant Species That are OBL,
1.	Populus balsamifera	15.0	\checkmark	FACU	FACW, or FAC: 5 (A)
	Total Cover:	15.0	_		Total Numberof Dominant SpeciesAcross all
	50% of total cover:	7.5	20% of total	over: 3.0	Strata: 6
	Sapling/Shrub Stratum				(B)
	Alnus viridis	50.0	\checkmark	FAC	Percent of Dominant Species That are OBL,
	Salix bebbiana	30.0	\checkmark	FAC	
	Ribes triste	30.0	\checkmark	FAC	Prevalence Index worksheet:
	Viburnum edule	5.0		FACU	Total % Cover of: Multiply by:
	Rosa acicularis	1.0		FACU	OBL Species $0.0 \times 1 = 0.0$
	Rubus idaeus	1.0		FACU	FACW Species $0.0 \times 2 = 0.0$
	Total Cover:	117.0	_		FAC Species $137.3 \times 3 = 411.9$
	50% of total cover:	58.5	20% oftotal cover:	23.4	FACU Species 25.3 × 4 = 101.2
	Herb Stratum				UPL Species $0.0 \times 5 = 0.0$
	Calamagrostis canadensis	15.0	\checkmark	FAC	Column Totals: 162.6 (A) 513.1 (B)
	Rubus arcticus	7.0	\checkmark	FAC	Prevalence Index = $B/A = 3.156$
	Thalictrum sparsiflorum	3.0		FACU	
	Equisetum sylvaticum	3.0		FAC	Hydrophytic Vegetation Indicators:
	Athyrium filix-femina	2.0			✓ Dominance Test is > 50%
	Equisetum arvense	2.0		FAC	Prevalence Index is ≤ 3.0
	Trientalis europaea	0.1		FACU	Morphological Adaptations ¹ (Provide supporting data
	Polemonium acutiflorum	0.1		FAC	in Remarks or on a separate sheet)
	Mertensia paniculata	0.1		FACU	Problematic Hydrophytic Vegetation ¹ (Explain)
	Angelica lucida	0.1		FACU	¹ Indicators or hydricsoil and wetland hydrology must be
	Actaea rubra	0.1		FAC	present, unless disturbed or problematic.
	Aconitum delphiniifolium	0.1		FAC	
	Total Cover:	32.6	_		Plot size (radius, or length × width) 10m radius
	50% of total cover:	16.3	20% of total	over: 6.5	% Cover of Wetland Bryophytes (Where applicable)
					% Bare Ground 75.0
					Total Cover of Bryophytes 20.0
					Hydrophytic
					Vegetation
					Present? Yes √ No

Remarks:

Depth		Ma	atrix	c	R	edox	Feat	ures								
inches)	Color			-			Type ¹		Texture	e Mo	od				Rem	arks
0-4		/			/		A		fibric	-						
4-10	2.5y	3/1	95	10yr	3/2	5	С	PL	very fine s	andy loam						
LO-19	10yr	3/3			/		А		very fine s	andy loam						
¹ Type: C	=Concer	tration,	D=D	epletio	n, RM=	=Reduc	ed Mati	ix, A=A	Absent ²	Location: PL=	Pore Li	ning, RC=	Root Cł	nannel,		
Hydric So	il Indi	cator	s:			Indi	cator	s for	Problem	atic Hydr	ic So	ls³:				
Histos	ol or Hi	stel (A1	1)				Alaska	Color (Change (TA4	4) ⁴		Alaska (Gleved	Witho	ut Hue	5Y or Redo
Histic	Epipedo	n (A2)				ŀ	Alaska A	Alpine S	wales (TA5)	_		Underly	ing Lay	/er		
Hydro	gen Sulf	ide (A4	1)			A	Alaska R	edox W	ith 2.5Y Hue			Other (Explain	in Rei	marks)
Thick	Dark Su	rface (A12)													
Alaska	a Gleyed	(A13)				₃One	indicato	or or hy	drophytic veg	etation, one p	orimary	indicator o	f wetlan	ld hydr	ology,	
Alaska	a Redox	(A14)				and	an app	ropriate	e landscape p	osition must b	e prese	nt unless o	listurbe	d or pro	oblemat	tic.
Alaska	a Gleyed	Pores	(A15)		₄Giv	e detail	s of colo	or change in F	Remarks.						
Restrictive	e Lave	· (if p	rese	nt):												
Type: None	-	1 F		,-						Hvdric S	oil Pr	esent?	Y	'es		No √
Depth (inch											•		-			
			1.													
Remarks: N	o hydri	c soil i	ndic	ators						J						
IYDROLOG	Y															
IYDROLOG Wetland	Y Hydro	logy	Ind	icato						Se		ary Indic	,			equired)
Primary Ir	Y Hydro ndicators	logy s (any	Ind	icato							Wa	ter Stain	ed Lea	ves (B	9)	equired)
IYDROLOG Wetland Primary Ir Surface	Y Hydro ndicators Water (logy s (any A1)	Ind	icato						rial Imagery	Wa (B7)	ater Stain Drainag	ed Lea e Patte	ves (B rns (B	9) 10)	
IYDROLOG Wetland Primary Ir Surface High Wa	Y Hydro ndicators Water (ter Table	logy s (any A1)	Ind	icato			Sparse	ly Vege	tated Conca		Wa (B7) 8)Oxidi	ater Stain Drainag zed Rizosj	ed Lea e Patte oheres a	ves (B rns (B along L	9) 10) iving	equired) Roots (C3)
IYDROLOG Wetland Primary Ir Surface High Wa Saturati	Y Hydro ndicators Water (ter Table ion (A3)	logy s (any A1) e (A2)	Ind	icato			Sparse Marl D	ly Vege eposite	etated Conca 6 (B15)	rial Imagery ve Surface (B	Wa (B7) 8)Oxidi	ater Stain Drainag zed Rizosj ence of R	ed Lea e Patte oheres a educeo	ves (B rns (B along L d Iron	9) 10) iving	
IYDROLOG Wetland Primary Ir Surface High Wa Saturati Water M	Y Hydro Mater (Mater (Mater Table ion (A3) Marks (B	logy s (any A1) : (A2) 1)	Ind one i	icato			Sparse Marl D Hydrog	ly Vege eposits gen Su	tated Conca 6 (B15) Ifide Odor (1	rial Imagery ve Surface (B C1)	Wa (B7) 8)Oxidi Pres	ater Stain Drainag zed Rizosj ence of R Salt Dep	ed Lea e Patte oheres a educed posits (ves (B rns (B along L d Iron C5)	9) 10) iving (C4)	
IYDROLOG Wetland Primary Ir Surface High Wa Saturati Water M Sedimen	Y Hydro Mater (ter Table ion (A3) Marks (B nt Depo	logy s (any A1) e (A2) 1) sits (B2	Ind one i	icato			Sparse Marl D Hydrog Dry-Se	ly Vege eposits gen Su eason V	etated Conca s (B15) Ifide Odor (Water Table	rial Imagery ve Surface (B C1) (C2)	Wa (B7) 8)Oxidi Pres Stunt	ater Stain Drainag zed Rizosj ence of R Salt Dep ed or Str	ed Lea e Patte oheres a educed oosits (essed F	ves (B rns (B along L d Iron C5) Plants	9) 10) iving (C4) (D1)	
IYDROLOG Wetland Primary Ir Surface High Wa Saturati Water M Sedimer Drift De	Y Hydro Mater (ter Table ion (A3) Marks (B nt Deposits ((A1) (A2) (A2) (A2) (A2) (A2) (A2) (A2) (A2	Ind one i	icato			Sparse Marl D Hydrog Dry-Se	ly Vege eposits gen Su eason V	tated Conca 6 (B15) Ifide Odor (1	rial Imagery ve Surface (B C1) (C2)	Wa (B7) 8)Oxidi Pres Stunt	ater Stain Drainag zed Rizosy ence of R Salt Dep ed or Str Geomorp	ed Lea e Patte oheres a educed oosits (essed F ohic Pos	ves (B rns (B along L d Iron C5) Plants sition (9) 10) iving (C4) (D1) (D2)	
IYDROLOG Wetland Primary Ir Surface High Wa Saturati Water M Sedimen	Y Hydro Mater (ter Table ion (A3) Marks (B nt Deposits ((A1) (A2) (A2) (A2) (A2) (A2) (A2) (A2) (A2	Ind one i	icato			Sparse Marl D Hydrog Dry-Se	ly Vege eposits gen Su eason V	etated Conca s (B15) Ifide Odor (Water Table	rial Imagery ve Surface (B C1) (C2)	Wa (B7) 8)Oxidi Pres Stunt	ater Stain Drainag zed Rizosj ence of R Salt Dep ed or Str	ed Lea e Patte oheres a educed oosits (essed F ohic Pos	ves (B rns (B along L d Iron C5) Plants sition (9) 10) iving (C4) (D1) (D2)	
IYDROLOG Wetland Primary Ir Surface High Wa Saturati Water M Sedimer Drift De	Y Hydro ndicators Water (ter Table ion (A3) Marks (B nt Deposits (M at or Cru	logy s (any A1) : (A2) 1) sits (B2 33) ust (B4	Ind one i	icato			Sparse Marl D Hydrog Dry-Se	ly Vege eposits gen Su eason V	etated Conca s (B15) Ifide Odor (Water Table	rial Imagery ve Surface (B C1) (C2)	Wa (B7) 8)Oxidi Pres Stunt	ater Stain Drainag zed Rizosy ence of R Salt Dep ed or Str Geomorp	ed Lea e Patte oheres a educed oosits (essed F ohic Pos Aquita	ves (B rns (B along L d Iron C5) Plants sition (rd (D3	9) 10) iving (C4) (D1) (D2) 3)	
IYDROLOG Wetland Primary Ir Surface High Wa Saturati Water M Sedimer Drift De Algal Ma	Y Hydro ndicators Water (ter Table ion (A3) farks (B nt Deposits (f posits (f posits (f	logy s (any A1) e (A2) 1) sits (B2 33) ist (B4 35)	Ind one i: 2)	icato			Sparse Marl D Hydrog Dry-Se	ly Vege eposits gen Su eason V	etated Conca s (B15) Ifide Odor (Water Table	rial Imagery ve Surface (B C1) (C2)	Wa (B7) 8)Oxidi Pres Stunt	ater Stain Drainag zed Rizosj ence of R Salt Dep ed or Str Geomorp Shallow	ed Lea e Patte oheres a educed posits (essed F hic Pos Aquita graphic	ves (B rns (B along L d Iron C5) Plants sition (rd (D3 Relief	9) 10) iving (C4) (D1) D2) 3) (D4)	
IYDROLOG Wetland Primary Ir Surface High Wa Saturati Water M Sedimer Drift De Algal Ma Iron De	Y Hydro Mater (ter Table ion (A3) Marks (B nt Deposits (M posits (M posits (M Soil Cra	(A1) (A1) (A2) (A2) (A2) (A3) (A3) (A4) (A4) (A4) (A4) (A4) (A4) (A4) (A4	Ind one i: 2)	icato			Sparse Marl D Hydrog Dry-Se	ly Vege eposits gen Su eason V	etated Conca s (B15) Ifide Odor (Water Table	rial Imagery ve Surface (B C1) (C2)	Wa (B7) 8)Oxidi Pres Stunt	ter Stain Drainag zed Rizosj ence of R Salt Deg ed or Str Geomorp Shallow licrotopog	ed Lea e Patte oheres a educed posits (essed F hic Pos Aquita graphic	ves (B rns (B along L d Iron C5) Plants sition (rd (D3 Relief	9) 10) iving (C4) (D1) D2) 3) (D4)	
IYDROLOG Wetland Primary Ir Surface High Wa Saturati Water M Sedimer Drift De Algal Ma Iron De Surface	Y Hydro Mater (ter Table ion (A3) Marks (B nt Deposits (M posits (M Soil Cra Soil Cra	(A1) (A2) (A2) (A2) (A2) (A2) (A2) (A2) (A2	Ind one i: 2))	icato			Sparse Marl D Hydrog Dry-Se Other	ly Vege eposits gen Su eason V (Expla	etated Conca s (B15) Ifide Odor (Water Table	rial Imagery ve Surface (B C1) (C2)	Wa (B7) 8)Oxidi Pres Stunt	ter Stain Drainag zed Rizosj ence of R Salt Deg ed or Str Geomorp Shallow licrotopog	ed Lea e Patte oheres a educed posits (essed F hic Pos Aquita graphic	ves (B rns (B along L d Iron C5) Plants sition (rd (D3 Relief	9) 10) iving (C4) (D1) D2) 3) (D4)	
HYDROLOG Wetland Primary Ir Surface High Wa Saturati Water M Sedimer Drift De Algal Ma Iron De Surface	Y Hydro Mater (ter Table ion (A3) Marks (B nt Deposits (M posits (M posits (M Soil Cra ervati /ater Pre	(A1) (A2) (A2) (A2) (A2) (A2) (A2) (A2) (A2	Ind one i: 2))	icato	cient)		Sparse Marl D Hydrog Dry-Se Other Dept	ly Vege eposits gen Su eason V (Expla	tated Concar s (B15) Ifide Odor (Water Table in in Remark nes): 0	rial Imagery ve Surface (B C1) (C2)	Wa (B7) 8)Oxidi Pres Stunt	ter Stain Drainag zed Rizosj ence of R Salt Deg ed or Str Geomorp Shallow licrotopog	ed Lea e Patte oheres a educed posits (essed F hic Pos Aquita graphic	ves (B rns (B along L d Iron C5) Plants sition (rd (D3 Relief	9) 10) iving (C4) (D1) D2) 3) (D4)	
IYDROLOG Wetland Primary Ir Surface High Wa Saturati Water M Sedimer Drift De Algal Ma Iron De Surface W	Y Hydro dicators Water (ter Table ion (A3) Marks (B nt Deposits (H at or Cru posits (H Soil Cra Soil Cra ervati dater Pre-	(A1) (A2) (A2) (A2) (A2) (A2) (A2) (A2) (A2	Ind one i: 2)) 6)	icato	No.		Sparse Marl D Hydrog Dry-Se Other Dept	ly Vege eposite gen Su eason V (Expla ch (incl	tated Concar s (B15) Ifide Odor (Water Table in in Remark nes): 0	rial Imagery ve Surface (B C1) (C2)	Wa (B7) 8)Oxidi Pres Stunt .1	ater Stain Drainag zed Rizosj ence of R Salt Dep ed or Str Geomorp Shallow icrotopog FAC-neu	ed Lea e Patte pheres a educed posits (essed F hic Pos Aquita graphic itral Te	ves (B rns (B along L d Iron C5) Plants sition (rd (D3 Relief est (D5	9) 10) iving (C4) (D1) (D2) (D4) () ()	
IYDROLOG Wetland Primary Ir Surface High Wa Saturati Water M Sedimer Drift De Algal Ma Iron De Surface W Water Tab	Y Hydro ndicators Water (ter Table ion (A3) Marks (B nt Deposits (H at or Cru posits (I soil Cra soil Cra ervati Mater Pre- ole Presen	logy (any A1) (A2) (A2) (A2) (A2) (A2) (A2) (A2) (A2) (A2) (A2) (A2) (A2) (A2) (A2) (A2) (A2) (A2) (A2) (A2) (A3) (Ind one i: 2)) () () () () () () () () () () () ()	icato	No.		Sparse Marl D Hydrog Dry-Se Other Dept	ly Vege eposite gen Su eason V (Expla ch (incl	tated Concar s (B15) Ifide Odor (Water Table in in Remark nes): 0	rial Imagery ve Surface (B C1) (C2) (C2) (C2)	Wa (B7) 8)Oxidi Pres Stunt .1	ater Stain Drainag zed Rizosj ence of R Salt Dep ed or Str Geomorp Shallow icrotopog FAC-neu	ed Lea e Patte pheres a educed posits (essed F hic Pos Aquita graphic itral Te	ves (B rns (B along L d Iron C5) Plants sition (rd (D3 Relief est (D5	9) 10) iving (C4) (D1) (D2) (D4) () ()	Roots (C3)
IYDROLOG Wetland Primary Ir Surface High Wa Saturati Water M Sedimer Drift De Algal Ma Iron De Surface W Water Tat Saturation	Y Hydro ndicators Water (ter Table ion (A3) Marks (B nt Deposits (I posits (I at or Cru posits (I soil Cra biole Presen capillary	logy (any A1) (A2) (Ind one i: 2)) 6) Yes :)	icato s suffic	No Yes	.1 .1 .1 No	Sparse Marl D Hydrog Dry-Se Other Other	ly Vege eposits gen Su eason \ (Expla th (inch th (inch	tated Concar s (B15) Ifide Odor (Water Table in in Remarl nes): 0 nes): Depth	rial Imagery ve Surface (Bi (C1) (C2) (S) Wetland	Wa (B7) 8)Oxidi Pres Stunt .1	ter Stain Drainag zed Rizosj ence of R Salt Deg ed or Str Geomorp Shallow icrotopog FAC-neu	ed Lea e Patte pheres a educed posits (essed F hic Pos Aquita graphic itral Te	ves (B rns (B along L d Iron C5) Plants sition (rd (D3 Relief est (D5	9) 10) iving (C4) (D1) (D2) (D4) () ()	Roots (C3)



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



Project/Site: Akiak Wetland Delineation	Borough/City: <u>Bethel Census Area</u>	Sampling Date: <u>2021-08-17</u>
Applicant/Owner: Solstice		Sampling Point: <u>aw-14</u>
Investigator(s): <u>RWM, SLI</u>	Landform (hillside,	, terrace, hummocks, etc.): Channel
Local relief (concave, convex, none): concave	eSlope: <u>_0.0</u> % / <u>_0.0</u> °	Elevation: <u>65</u>
Subregion: Alaska Lat.: 60.9079	Long.: <u>-161.2342</u>	Datum: WGS84
Soil Map Unit Name:		NWI classification: <u>PEM1C</u>
Are climatic/hydrologic conditions on the site typical	for this time of ye ar? <u>Ye√s</u> No	(If no, explain in Remarks)
Are Vegetation,Soil,or Hydrologysi	ignificantly disturbed? Are "Normal Circu	ımstances" present? Yes <u>√</u> No
Are Vegetation, Soil, or Hydrology na	turally problematic? (If needed, ex	plain any answers in Remarks.)
CUMMARY OF FINDINCS Attach site man showi	ing compling point locations, transacts, i	important fasturas, ata

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

Hydrophytic Vegetation Present?	Yes √	No	Is the Sampled Area		
Hydric Soil Present?	Yes √	No	within a Wetland?	Yes√	No
Wetland Hydrology Present?	Yes √	No		103 1	<u> </u>

Remarks: An inactive/abandoned channel, mapped as perennial stream by NHD. 8-10ft lower than adjacent forest. There was no surface water at time of site visit, but unvegetated low points suggest this feature receives and retains flood waters from the Kuskokwim. Bounds are visible in imagery as a transition from graminoid channel (wetland) to Populus balsamifera woodland (upland).

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

Absolute			Domina	nt Indicator	Dominance Test worksheet:	
	Tree Stratum	% Cover	Species?	Status	Number of Dominant Species That are OBL,	
Fotal Cover	r:	0.0			FACW, or FAC:	2 (A)
50% of tota	al cover: 0.0		20% of total	cover: 0.0	Total Numberof DominantSpeciesAcross all	
	Sapling/Shrub Stratum				Strata:	2 (B)
1.	Ribes hudsonianum	5.0	\checkmark	FAC	Percent of Dominant Species That are OBL,	
2.	Salix bebbiana	1.0		FAC	FACW, or FAC: 10	0.0% (A/B)
otal Cove	r:	6.0				
0% of tota	al cover: 3.0		20% of total	cover: 1.2	Prevalence Index worksheet:	
	Herb Stratum				Total % Cover of: Multiply by:	
1.	Calamagrostis canadensis	70.0	\checkmark	FAC	OBL Species 20.1 × 1 = 20.1	
2.	Comarum palustre	15.0		OBL	FACW Species $0.0 \times 2 = 0.0$	
3.	Carex utriculata	5.0		OBL	FAC Species 79.0 × 3 = 237.0	
0.	Galium trifidum ssp. trifidum	3.0			FACU Species $0.0 \times 4 = 0.0$	
4.	Rubus arcticus	3.0		FAC	UPL Species $0.0 \times 5 = 0.0$	
5.	Unknown Crucifer	2.0			Column Totals: 99.1 (A) 257.1 (B)	
6.	Sium suave	0.1		OBL	Prevalence Index = $B/A = 2.594$	
otal Cover:	:	98.1		_		
50% of tota	al cover: 49.0		20% of total of	cover: 19.6	Hydrophytic Vegetation Indicators:	
					✓ Dominance Test is > 50%	
					✓ Prevalence Index is ≤ 3.0	
					Morphological Adaptations ¹ (Provide s	supporting da
					in Remarks or on a separate sheet)	
					Problematic Hydrophytic Vegetation ¹	(Explain)
					¹ Indicators or hydricsoil and wetland hydrolo	gy must be
					present, unless disturbed or problematic.	
					Plot size (radius, or length \times width)	2x10m
					% Cover of Wetland Bryophytes (Where appli	icable)
					% Bare Ground	25.0
					Total Cover of Bryophytes	60.0
					Hydrophytic	
					Vegetation	
					Present? Yes √	No

adjacent higher forest. Salix and Ribes rooted atop dead downed wood.

Depth	Mat	rix	Re	dox Fe	atures			
inches)	Color (moist)	% Color (moist) 9	∕₀ Type¹	Loc ² Texture	e Mod	Remarks	
0-3	/		/	А	fibrio			
3-19	5y 3/1 8	5 7.5yr 4	4/4 15	С	PL silt le	bam		
¹ Type: C=Co	ncentration, D=Depl	etion, RM=F	Reduced I	Matrix, A=	Absent	² Location: PL=F	Pore Lining, RC=Root C	hannel,
Hydric Soil	Indicators:		Indic	ators fo	or Problem	natic Hydric So	oils³:	
Histosol	or Histel (A1)		Ala	aska Colo	r Change (TA	4) ⁴	Alaska Gleved With	out Hue 5Y or Redd
Histic Epi	pedon (A2)		Alaska	Alpine Sv	vales (TA5)	=	Underlying Layer	
Hydrogei	n Sulfide (A4)		Alaska	Redox Wi	ith 2.5Y Hue		Other (Explain in R	emarks)
Thick Da	rk Surface (A12)					-		
Alaska G	leyed (A13)	³ One indic	ator or h	ydrophyti	ic vegetation	, one primary i	indicator of wetland hydr	ology, must
1 Alaska Re	dox (A14)	and an	appropr	iate lands	cape position	be present ur	nless disturbed or probler	natic.
Alaska G	leyed Pores (A15)	⁴ Give deta	ails of col	or change	e in Remarks	<u>.</u>		
Restrictive	Layer (if prese	ent):						
								Yes √
						Hydri	ic Soil Present?	
Type: None Depth (inches) Remarks: Horiz chroma 4 c							ic Soil Present?	
Type: None Depth (inches) Remarks: Horiz chroma 4 c HYDROLOGY Wetland Hy	on 2 meets Alaska or greater, and a 5 /drology Indic	Y matrix w ators:				e redoximorphic f	eatures as pore linin	gs with value and equired)
Type: None Depth (inches) Remarks: Horiz chroma 4 c HYDROLOGY Wetland Hy Primary Indic	on 2 meets Alaska or greater, and a 5 ydrology Indica cators (any one is s	Y matrix w ators:	vith a ch	roma of (3 or less.	e redoximorphic f	eatures as pore linin dicators (2 or more r Water Stained Leaves	gs with value and equired) (B9)
Type: None Depth (inches) Remarks: Horiz chroma 4 c HYDROLOGY Wetland Hy Primary India Surface Wa	on 2 meets Alaska or greater, and a 5 /drology Indic a cators (any one is s ater (A1)	Y matrix w ators:	vith a ch	roma of C	3 or less. Visible on Ae	e redoximorphic f Secondary In V rial Imagery (B7)	eatures as pore linin dicators (2 or more r Water Stained Leaves Drainage Patterns (gs with value and equired) (B9) B10)
Type: None Depth (inches) Remarks: Horiz chroma 4 c HYDROLOGY Wetland Hy Primary India Surface Wa High Water	on 2 meets Alaska or greater, and a 5 /drology Indic a cators (any one is s ater (A1) Table (A2)	Y matrix w ators:	vith a ch In .1 Sp	roma of 3 undation V arsely Veg	3 or less. Visible on Ae getated Conca	e redoximorphic f	eatures as pore linin dicators (2 or more re Water Stained Leaves Drainage Patterns (Oxidized Rizosphere	gs with value and equired) (B9) B10) s along Living Roots
Type: None Depth (inches) Remarks: Horiz chroma 4 c HYDROLOGY Wetland Hy Primary India Surface Wa	on 2 meets Alaska or greater, and a 5 /drology Indic a cators (any one is s ater (A1) Table (A2)	Y matrix w ators:	vith a ch In .1 Sp Ma	undation V arsely Vec	3 or less. Visible on Ae getated Conca ts (B15)	e redoximorphic f	eatures as pore linin dicators (2 or more r Water Stained Leaves Drainage Patterns (gs with value and equired) (B9) B10) s along Living Roots
Type: None Depth (inches) Remarks: Horiz chroma 4 c HyDROLOGY Wetland Hy Primary Indio Surface Wa High Water .1 Saturation Water Mar	on 2 meets Alaska or greater, and a 5 ydrology Indica cators (any one is s ater (A1) Table (A2) n (A3) ks (B1)	Y matrix w ators:	Information Information	undation V arsely Veg Irl Depositi drogen S	3 or less. Visible on Ae getated Conca ts (B15) ulfide Odor (e redoximorphic f Secondary In 	eatures as pore linin dicators (2 or more re Water Stained Leaves Drainage Patterns (Oxidized Rizosphere Presence of Reduce Salt Deposits (C5)	gs with value and equired) (B9) B10) s along Living Roots d Iron (C4)
Type: None Depth (inches) Remarks: Horiz chroma 4 c HyDROLOGY Wetland Hy Primary Indio Surface Wa High Water .1 Saturation Water Mar	on 2 meets Alaska or greater, and a 5 /drology Indic a cators (any one is s ater (A1) Table (A2) n (A3)	Y matrix w ators:	In In .1 Sp Ma Hy Dr	undation V arsely Veg arl Deposi drogen S y-Season	3 or less. Visible on Ae getated Conca ts (B15) ulfide Odor (Water Table	e redoximorphic f	eatures as pore linin dicators (2 or more re Water Stained Leaves Drainage Patterns (Oxidized Rizosphere Presence of Reduce Salt Deposits (C5) Stunted or Stressed	gs with value and equired) (B9) B10) s along Living Roots d Iron (C4) d Plants (D1)
Type: None Depth (inches) Remarks: Horiz chroma 4 c HyDROLOGY Wetland Hy Primary Indio Surface Wa High Water .1 Saturation Water Mar	on 2 meets Alaska or greater, and a 5 ydrology Indica cators (any one is s ater (A1) Table (A2) n (A3) (s (B1) Deposits (B2)	Y matrix w ators:	In In .1 Sp Ma Hy Dr	undation V arsely Veg arl Deposi drogen S y-Season	3 or less. Visible on Ae getated Conca ts (B15) ulfide Odor (e redoximorphic f	eatures as pore linin dicators (2 or more re Water Stained Leaves Drainage Patterns (Oxidized Rizosphere Presence of Reduce Salt Deposits (C5)	gs with value and equired) (B9) B10) s along Living Roots d Iron (C4) d Plants (D1)
Type: None Depth (inches) Remarks: Horiz chroma 4 c HYDROLOGY Wetland Hy Primary India Surface Wa High Water .1 Saturation Water Mar Sediment I .1 Drift Depo	on 2 meets Alaska or greater, and a 5 ydrology Indica cators (any one is s ater (A1) Table (A2) n (A3) (s (B1) Deposits (B2)	Y matrix w ators:	In In .1 Sp Ma Hy Dr	undation V arsely Veg arl Deposi drogen S y-Season	3 or less. Visible on Ae getated Conca ts (B15) ulfide Odor (Water Table	e redoximorphic f	eatures as pore linin dicators (2 or more re Water Stained Leaves Drainage Patterns (Oxidized Rizosphere Presence of Reduce Salt Deposits (C5) Stunted or Stressed	gs with value and equired) (B9) B10) s along Living Roots d Iron (C4) d Plants (D1) n (D2)
Type: None Depth (inches) Remarks: Horiz chroma 4 c HYDROLOGY Wetland Hy Primary India Surface Wa High Water .1 Saturation Water Mari Sediment I .1 Drift Depo	on 2 meets Alaska or greater, and a 5 /drology Indic a cators (any one is s ater (A1) Table (A2) n (A3) ks (B1) Deposits (B2) osits (B3) or Crust (B4)	Y matrix w ators:	In In .1 Sp Ma Hy Dr	undation V arsely Veg arl Deposi drogen S y-Season	3 or less. Visible on Ae getated Conca ts (B15) ulfide Odor (Water Table	e redoximorphic f	eatures as pore linin dicators (2 or more re Water Stained Leaves Drainage Patterns (Oxidized Rizosphere Presence of Reduce Salt Deposits (C5) Stunted or Stressed 1 Geomorphic Positio	gs with value and equired) (B9) B10) s along Living Roots d Iron (C4) d Plants (D1) n (D2) D3)
Type: None Depth (inches) Remarks: Horiz chroma 4 c HYDROLOGY Wetland Hy Primary Indio Surface Wa High Water .1 Saturation Water Mart Sediment I .1 Drift Depos	on 2 meets Alaska or greater, and a 5 /drology Indic a cators (any one is s ater (A1) Table (A2) n (A3) ks (B1) Deposits (B2) osits (B3) or Crust (B4)	Y matrix w ators:	In In .1 Sp Ma Hy Dr	undation V arsely Veg arl Deposi drogen S y-Season	3 or less. Visible on Ae getated Conca ts (B15) ulfide Odor (Water Table	e redoximorphic f	eatures as pore linin dicators (2 or more re Water Stained Leaves Drainage Patterns (Oxidized Rizosphere Presence of Reduce Salt Deposits (C5) Stunted or Stressed 1 Geomorphic Positio Shallow Aquitard (I	gs with value and equired) (B9) B10) s along Living Roots d Iron (C4) d Plants (D1) n (D2) D3) elief(D4)
Type: None Depth (inches) Remarks: Horiz chroma 4 c HYDROLOGY Wetland Hy Primary Indio Surface Wa High Water .1 Saturation Water Mart Sediment I .1 Drift Depos	on 2 meets Alaska or greater, and a 5 /drology Indic a cators (any one is s ater (A1) Table (A2) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3	Y matrix w ators:	In In .1 Sp Ma Hy Dr	undation V arsely Veg arl Deposi drogen S y-Season	3 or less. Visible on Ae getated Conca ts (B15) ulfide Odor (Water Table	e redoximorphic f	eatures as pore linin dicators (2 or more re Water Stained Leaves Drainage Patterns (Oxidized Rizosphere Presence of Reduce Salt Deposits (C5) Stunted or Stressed 1 Geomorphic Positio Shallow Aquitard (I Microtopographic R	gs with value and equired) (B9) B10) s along Living Roots d Iron (C4) d Plants (D1) n (D2) D3) elief(D4)
Type: None Depth (inches) Remarks: Horiz chroma 4 of HYDROLOGY Wetland Hy Primary Indio Surface Wa High Water .1 Saturation Water Mari Sediment I .1 Drift Depos Surface So Field Observa	on 2 meets Alaska or greater, and a 5 /drology Indic a cators (any one is s ater (A1) Table (A2) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3	Y matrix w ators:	Inn .1 Sp Ma Hy Ot	undation V arsely Veg arl Deposi drogen S y-Season	3 or less. Visible on Ae getated Conca ts (B15) ulfide Odor (Water Table ain in Remar	e redoximorphic f	eatures as pore linin dicators (2 or more re Water Stained Leaves Drainage Patterns (Oxidized Rizosphere Presence of Reduce Salt Deposits (C5) Stunted or Stressed 1 Geomorphic Positio Shallow Aquitard (I Microtopographic R	gs with value and equired) (B9) B10) s along Living Roots d Iron (C4) d Plants (D1) n (D2) D3) elief(D4)
Type: None Depth (inches) Remarks: Horiz chroma 4 of HYDROLOGY Wetland Hy Primary Indio Surface Wa High Water .1 Saturation Water Mari Sediment I .1 Drift Depos Surface So Field Observa	on 2 meets Alaska or greater, and a 5 ydrology Indica cators (any one is s ater (A1) Table (A2) n (A3) ks (B1) Deposits (B2) osits (B3) or Crust (B4) sits (B5) il Cracks (B6) ations: er Present? Yes	Y matrix w ators: ufficient)	Inn .1 Sp Ma Hy Ot	undation ¹ arsely Veg irl Deposi drogen S y-Season her (Expla	3 or less. Visible on Ae getated Conca ts (B15) ulfide Odor (Water Table ain in Remar	e redoximorphic f	eatures as pore linin dicators (2 or more re Water Stained Leaves Drainage Patterns (Oxidized Rizosphere Presence of Reduce Salt Deposits (C5) Stunted or Stressed 1 Geomorphic Positio Shallow Aquitard (I Microtopographic R	gs with value and equired) (B9) B10) s along Living Roots d Iron (C4) d Plants (D1) n (D2) D3) elief(D4)
Type: None Depth (inches) Remarks: Horiz chroma 4 of HYDROLOGY Wetland Hy Primary Indio Surface Wa High Water .1 Saturation Water Mari Sediment I .1 Drift Depos Surface So Field Observa Surface Water	on 2 meets Alaska or greater, and a 5 ydrology Indica cators (any one is s ater (A1) Table (A2) n (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3)	Y matrix w ators: ufficient)	Inn .1 Sp Ma Hy Ot	undation V arsely Veg Irl Deposi drogen S y-Season her (Expla Depth (inc	3 or less. Visible on Ae getated Conca ts (B15) ulfide Odor (Water Table ain in Remar	e redoximorphic f	eatures as pore linin dicators (2 or more re Water Stained Leaves Drainage Patterns (Oxidized Rizosphere Presence of Reduce Salt Deposits (C5) Stunted or Stressed 1 Geomorphic Positio Shallow Aquitard (I Microtopographic R	gs with value and equired) (B9) B10) s along Living Roots d Iron (C4) d Plants (D1) n (D2) D3) elief(D4) D5)

Remarks: Meets primary hydrology indicators B3 (Drift Deposits) with litter and woody litter entrained in overhanging willows and B8(Sparsely Vegetated Concave Surface) with concave low areas at edge of relictchannel. This site also meets secondary wetland hydrology indicator D2(Geomorphic Position) as it is a relict channel feature in close proximity to the Kuskokwim River.



Hydric Soil Indicators: Alaska Redox (A14)

Wetland Hydrology Indicators: Drift Deposits (B3), Saturation (A3), Geomorphic Position (D2), Sparsely Vegetated Concave Surface (B8)



Project/Site: Akiak Wetland Delineation	Borough/City: <u>Bethel Census Area</u>	Sampling Date: <u>2021-08-17</u>
Applicant/Owner: <u>Solstice</u>		Sampling Point: <u>aw-15</u>
Investigator(s): <u>SLI</u>	Landform (hillside, terrace, h	ummocks, etc.): <u>Flat or fluvial related</u>
Local relief (concave, convex, none): concave	Slope: <u>0.0_</u> % / <u>0.0_</u> °	Elevation: <u>58</u>
Subregion: Alaska Lat.: 60.9087	Long.: <u>-161.2517</u>	Datum: WGS84
Soil Map Unit Name:		NWI classification: <u>PEM1F</u>
Are climatic/hydrologic conditions on the site typical t	for this time of year? Yes <u>√</u> No	(If no, explain in Remarks)
Are Vegetation,Soil,or Hydrology	_ significantly disturbed? Are "Normal Circ	cumstances" present? Yes 🗹 No
Are Vegetation, Soil, or Hydrology n	aturally problematic? (If needed, e	explain any answers in Remarks.)
SUMMARY OF FINDINGS - Attach site map show	ing sampling point locations, transects, i	mportant features, etc.

Hydrophytic Vegetation Present?	Yes	✓	No	Is the Sampled Area			
Hydric Soil Present?	Yes	✓	No	within a Wetland?	Yes	f	No
Wetland Hydrology Present?	Yes	✓	No		165	,1	NO

Remarks: This characterizes the darker photo-signature in the center of the wetland. Deep water precludes sampling in center.

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

		Absolute	Dominant	Indicator	Dominance Test worksheet:	
Tree Stratum	l	% Cover	Species?	Status	Number of Dominant Species That are OBL,	
Total Cover:		0.0	_		FACW, or FAC: 1 (A)
	50% of total	cover: 0.0	20% of tota	l cover: 0.0	Total Numberof Dominant SpeciesAcross all	
Sapling/Shru	ıb Stratum		_		Strata: 1	
Total Cover:		0.0	_		(B)	
	50% of total	cover: 0.0	20% of tota	l cover: 0.0	Percent of Dominant Species That are OBL,	
Herb Stratum			_			
Carex utricula	ata	60.0	\checkmark	OBL	Prevalence Index worksheet:	
Calamagrostis	s canadensis	3.0		FAC	Total % Cover of: Multiply by:	
Equisetum flu	iviatile	0.1		OBL	OBL Species $60.1 \times 1 = 60.1$	
Total Cover:		63.1			FACW Species $0.0 \times 2 = 0.0$	
	50% of total co	over: 31.6	20% of tota	al cover: 12.6	FAC Species $3.0 \times 3 = 9.0$	
					FACU Species $0.0 \times 4 = 0.0$	
					UPL Species $0.0 \times 5 = 0.0$	
					Column Totals: 63.1 (A) 69.1 (B)	
					Prevalence Index= $B/A = 1.095$	
					Hydrophytic Vegetation Indicators:	
					✓ Dominance Test is > 50%	
					✓ Prevalence Index is ≤ 3.0	
					Morphological Adaptations ¹ (Provide supporting	g data
					in Remarks or on a separate sheet)	
					Problematic Hydrophytic Vegetation ¹ (Explain)	
					Indicators or hydricsoil and wetland hydrology must b	
					present, unless disturbed or problematic.	
					Plot size (radius, or length × width) 10n	n radiu
					% Cover of Wetland Bryophytes (Where applicable)	
					% Bare Ground	0.0
					Total Cover of Bryophytes	0.0
					Hydrophytic	
					Vegetation	
					Present? Yes ,f No	

Depth Matrix **Redox Features** Color (moist) % Color (moist) % Type¹ Loc² (inches) Mod Remarks ¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, A=Absent ²Location: PL=Pore Lining, RC=Root Channel, **Hydric Soil Indicators:** Indicators for Problematic Hydric Soils³: Histosol or Histel (A1) Alaska Color Change (TA4)⁴ Alaska Gleved Without Hue 5Y or Redder Histic Epipedon (A2) Alaska Alpine Swales (TA5) Underlying Layer .1 Alaska Redox With 2.5Y Hue Other (Explain in Remarks) Hydrogen Sulfide (A4) Thick Dark Surface (A12) Alaska Gleyed (A13) ³One indicator or hydrophytic vegetation, one primary indicator of wetland hydrology, must Alaska Redox (A14) and an appropriate landscape position be present unless disturbed or problematic. Alaska Gleyed Pores (A15) ⁴Give details of color change in Remarks. **Restrictive Layer (if present):** Type: None Hvdric Soil Present? Yes √ Depth (inches): Remarks: Hydrogen sulfide (H2S) odor was present when walking through wetland (wetland soil indicator A4). Soils inundated. **HYDROLOGY** Wetland Hydrology Indicators: Secondary Indicators (2 or more required) Primary Indicators (any one is sufficient) Water Stained Leaves (B9) Aerial Imagery .1 Surface Water (A1) Inundation Visible on Drainage Patterns (B10) Sparsely Vegetated Concave Surface (B8) .1 High Water Table (A2) Oxidized Rizospheres along Living Roots (C3) .1 Saturation (A3) Marl Deposits (B15) Presence of Reduced Iron (C4) Water Marks (B1) .1 Hydrogen Sulfide Odor(C1) Salt Deposits (C5) Sediment Deposits (B2) Dry-Season Water Table(C0) Stunted or Stressed Plants (D1) Drift Deposits (B3) Other (Explain in Remarks) .1 Geomorphic Position (D2) Algal Mat or Crust (B4) Shallow Aquitard (D3) Microtopographic Relief(D4) Iron Deposits (B5) Surface Soil Cracks (B6) .1 FAC-neutral Test (D5) **Field Observations:** Surface Water Present? Yes .1 No Depth (inches): 7 Yes .1 No Depth (inches): Water Table Present? 0 Saturation Present? Wetland Hydrology Present? Yes 🗸 No No Depth (inches): (includes capillary fringe)Yes .1 ٥ Recorded Data (stream gauge, monitor well, aerial photo, previous inspection) if available:

Remarks: H2S odor (Primary wetland hydrology indicator C1) detected when walking through wetland. Secondary hydrology indicator D2 is met due to close proximity to the Kuskokwim river

Sampling Point: aw-15



Hydric Soil Indicators: Hydrogen Sulfide (A4)

Wetland Hydrology Indicators: Geomorphic Position (D2), High WaterTable (A2), FAC-Neutral Test (D5), Hydrogen Sulfide Odor (C1), Surface Water (A1), Saturation (A3)

NO LANDSCAPE PHOTO TAKEN

	Slope: <u>0.0</u> Lor r this time of year? Y significantly disturber turally problematic?	Sampling Point: aw-16 (hillside, terrace, hummocks, etc.): Flat or fluvial related _ % / 0.0 ° Elevation: 72 ng.: -161.2507 Datum: WGS84 _ NWI classification: PEM1F (es √ No (If no, explain in Remarks)) d? Are "Normal Circumstances" present? Yes √ No (If needed, explain any answers in Remarks.)
Hydrophytic Vegetation Present? Yes 🖌 No		
Hydric Soil Present? Yes ✓ No		Sampled Area a Wetland? Yes ,f No
Wetland Hydrology Present? Yes ✓ No	within	
Remarks: This plot is sampled between Carex utri	culata wet sedge ma	rsh (aw-15) and alder-willow uplands (aw-17).
VEGETATION - Use scientific names of plants. List a		
	ominant Indicator	Dominance Test worksheet:
	pecies? Status	Number of Dominant Species That are OBL,
Total Cover: 0.0		FACW, or FAC: 2 (A)
50% of total cover: 0.0 200	% of total cover: 0.0	Total Numberof Dominant SpeciesAcross all
Sapling/Shrub Stratum		Strata: 2
1.Salix pulchra3.0	FACW	(B)
Total Cover: 3.0		Percent of Dominant Species That are OBL,
50% of total cover: 1.5 200	% of total cover: 0.6	
Herb Stratum		Prevalence Index worksheet:
1. Calamagrostis canadensis 60.0	✓ FAC	Total % Cover of: Multiply by:
2. Comarum palustre 20.0	✓ OBL	OBL Species 25.1 × 1 = 25.1
3.Glyceria grandis5.04.Sium suave0.1	OBL	FACW Species $3.0 \times 2 = 6.0$
1. Sluin suave 0.1 0. Galium trifidum ssp. trifidum 0.1	UDL	FAC Species $60.0 \times 3 = 180.0$
		FACU Species 0.0 \times 4 = 0.0 UPL Species 0.0 \times 5 = 0.0
Total Cover: 85.2 50% of total cover: 42.6 20% of to	tal cover: 17.0	Column Totals: 88.1 (A) 211.1 (B)
		Prevalence Index= $B/A = 2.396$
		Hydrophytic Vegetation Indicators:
		✓ Dominance Test is > 50%
		✓ Prevalence Index is ≤ 3.0
		Morphological Adaptations ¹ (Provide supporting data
		in Remarks or on a separate sheet)
		Problematic Hydrophytic Vegetation ¹ (Explain)
		¹ Indicators or hydricsoil and wetland hydrology must be
		present, unless disturbed or problematic.
		Plot size (radius, or length × width) 5m radius
		% Cover of Wetland Bryophytes (Where applicable)
		% Bare Ground 95.0
		Total Cover of Bryophytes 0.0
		Hydrophytic
		Vegetation
		Present? Yes ,f No

Remarks: Calamagrostis canadensis growing in large pedestals.

SOIL Sampling Point: aw-16 Depth Matrix **Redox Features** Color (moist) % Color (moist) % Type¹ Loc² Remarks (inches) Mod ¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, A=Absent ²Location: PL=Pore Lining, RC=Root Channel, **Hydric Soil Indicators:** Indicators for Problematic Hydric Soils³: Histosol or Histel (A1) Alaska Color Change (TA4)⁴ Alaska Gleved Without Hue 5Y or Redder Histic Epipedon (A2) Alaska Alpine Swales (TA5) Underlying Layer .1 Alaska Redox With 2.5Y Hue Other (Explain in Remarks) Hydrogen Sulfide (A4) Thick Dark Surface (A12) Alaska Gleyed (A13) ³One indicator or hydrophytic vegetation, one primary indicator of wetland hydrology, must Alaska Redox (A14) and an appropriate landscape position be present unless disturbed or problematic. Alaska Gleyed Pores (A15) ⁴Give details of color change in Remarks. **Restrictive Layer (if present):** Type: None Hvdric Soil Present? Yes √ Depth (inches): Remarks: H2S odor detected when walking through wetland (Hydric soil indicator A4) **HYDROLOGY** Wetland Hydrology Indicators: Secondary Indicators (2 or more required) Primary Indicators (any one is sufficient) Water Stained Leaves (B9) .1 Surface Water (A1) Inundation Visible on Actimages (B7) Drainage Patterns (B10) .1 High Water Table (A2) Sparsely Vegetated Conae Surface (B8) Oxidized Rizospheres along Living Roots .1 Saturation (A3) Marl Deposits (B15) Presence of Reduced Iron (C4) Water Marks (B1) .1 Hydrogen Sulfide Odor(C1) Salt Deposits (C5) Sediment Deposits (B2) Dry-Season Water Table(C1) Stunted or Stressed Plants (D1) Drift Deposits (B3) Other (Explain in Remarks) .1 Geomorphic Position (D2) Algal Mat or Crust (B4) Shallow Aquitard (D3) Microtopographic Relief(D4) Iron Deposits (B5) Surface Soil Cracks (B6) .1 FAC-neutral Test (D5) **Field Observations:** Surface Water Present? Yes .1 No Depth (inches): 5 Yes <u>.1</u> No Depth (inches): Water Table Present? 0 Saturation Present? Wetland Hydrology Present? Yes 🗸 No No Depth (inches): (includes capillary fringe)Yes .1 Recorded Data (stream gauge, monitor well, aerial photo, previous inspection) if available:

Remarks: Water surrounding Calamagrostis canadensis pedestals is generally 5-6in deep, with scattered deeper pits. H2s odor detected while walking through the plot. D2--Kuskokwim River floodplain



Hydric Soil Indicators: Hydrogen Sulfide (A4)

Wetland Hydrology Indicators: High Water Table (A2), Geomorphic Position (D2), Saturation (A3), FAC-Neutral Test (D5), Hydrogen Sulfide Odor (C1), Surface Water (A1)

NO LANDSCAPE PHOTO TAKEN

Project/Site: Akiak Wetland Delineation	Borough/City: <u>Bethel Census Area</u>	Sampling Date: <u>2021-08-17</u>
Applicant/Owner: Solstice		Sampling Point: <u>aw-17</u>
Investigator(s): <u>RWM, SLI</u>	Landform (hillside, terrace,	hummocks, etc.): Flat or fluvial related
Local relief (concave, convex, none): none_	Slope: <u>0.0</u> % / <u>0.0</u> °	Elevation: 73
Subregion: Alaska Lat.: 60.9089	Long.: <u>-161.2504</u>	Datum: <u>WGS84</u>
Soil Map Unit Name:		NWI classification: <u>U</u>
Are climatic/hydrologic conditions on the site typical fo	r this time of year? Yes 🗸 No 🔜	(If no, explain in Remarks)
Are Vegetation,Soil,or Hydrology	significantly disturbed? Are "Normal Ci	rcumstances" present? Yes 🗸 No
Are Vegetation, Soil, or Hydrology nat	turally problematic? (If needed,	explain any answers in Remarks.)
SUMMARY OF FINDINGS - Attach site map showin	g sampling point locations, transects,	important features, etc.

Hydrophytic Vegetation Present?	Yes 、	∕ No	Is the Sampled Area			
Hydric Soil Present?	Yes	No 🗸	within a Wetland?	Yes	No	./
Wetland Hydrology Present?	Yes	No		163	NO	v

Remarks: tall alder-willow with scattered popbal, typical for the area

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

	Absolute	Dominant	Indicator	Dominance Test worksheet:
Tree Stratum	% Cover	Species?	Status	Number of Dominant Species That are OBL,
Total Cover:	0.0	_		FACW, or FAC: 3 (A)
50% of total cover:	0.0	20% of total	over: 0.0	Total Numberof Dominant SpeciesAcross all
Sapling/Shrub Stratum				Strata: 3
Salix bebbiana	40.0	\checkmark	FAC	(B)
Alnus viridis	30.0	\checkmark	FAC	Percent of Dominant Species That are OBL,
Alnus viridis	15.0		FAC	
Viburnum edule	7.0		FACU	Prevalence Index worksheet:
Salix arctica	5.0		FACU	Total % Cover of: Multiply by:
Total Cover:	97.0	_		OBL Species $0.0 \times 1 = 0.0$
50% of total cover:	48.5	20% oftotal cover:	19.4	FACW Species $0.0 \times 2 = 0.0$
Herb Stratum				FAC Species 116.0 × 3 = 348.0
Calamagrostis canadensis	20.0	\checkmark	FAC	FACU Species $16.2 \times 4 = 64.8$
Rubus arcticus	7.0		FAC	UPL Species $0.0 \times 5 = 0.0$
Equisetum arvense	3.0		FAC	Column Totals: 132.2 (A) 412.8 (B)
Thalictrum sparsiflorum	3.0		FACU	Prevalence Index= B/A = 3.123
Angelica lucida	1.0		FACU	
Athyrium filix-femina	1.0			Hydrophytic Vegetation Indicators:
Polemonium acutiflorum	1.0		FAC	✓ Dominance Test is > 50%
Viola sp.	1.0			Prevalence Index is ≤ 3.0
Trientalis europaea	0.1		FACU	Morphological Adaptations ¹ (Provide supporting data
Mertensia paniculata	0.1		FACU	in Remarks or on a separate sheet)
Total Cover:	37.2			Problematic Hydrophytic Vegetation ¹ (Explain)
50% of total cover:	18.6	20% of total	over: 7.4	¹ Indicators or hydricsoil and wetland hydrology must be
-				present, unless disturbed or problematic.
			1	
				Plot size (radius, or length × width) 10m radius
				% Cover of Wetland Bryophytes (Where applicable)
				% Bare Ground 0.0
				Total Cover of Bryophytes 50.0
				Hydrophytic
				Vegetation
				Present? Yes √ No

	Dedh		Redo	x Feat	ures				
inches)	Color (moist) %	6 Color (r				Mod	Rem	arks	
0-4	/	/	1	A	fibric				
1-15	10yr 3/3	/		А	silt la	am			
15-18	10yr 3/2	95 10yr	3/3 5	С	PL silt lo	am			
¹ Type: C	=Concentration, D=Dep	oletion, RM=	Reduced	Matrix, A	=Absent	² Location: PL=F	Pore Lining, RC	=Root Channel	,
Hydric So	oil Indicators:		Indic	ators f	for Problem	atic Hydric So	oils³:		
	sol or Histel (A1)				or Change (TA	4) ⁴			ie 5Y or Redde
	Epipedon (A2)				e Swales (TA5)		Underlying		
	gen Sulfide (A4)		Ala	aska Redo	x With 2.5Y Hue		Other (Expl	ain in Remark	s)
	Dark Surface (A12)								
	a Gleyed (A13)				, , ,	vegetation, one pr	•		
	a Redox (A14)			•••••		osition must be prese	ent unless distur	bed or problem	atic.
Alask	a Gleyed Pores (A15)		«Give de	tails of co	lor change in Rer	marks.			
Restrictive	e Layer (if present):							
Type: None	2					Hydric Soil P	resent?	Yes	No √
Depth (inch	nes):								
	o hydric soil indicato Y	rs							
IYDROLOG Wetland	Y Hydrology Indic	ators:					ary Indicator		required)
Wetland Primary I	Y Hydrology Indic ndicators (any one is s	ators:				W	ater Stained L	eaves (B9)	required)
IYDROLOG Wetland Primary I Surface	Y Hydrology Indic ndicators (any one is s Water (A1)	ators:				W ial Imagery (B7)	ater Stained L Drainage Pa	eaves (B9) tterns (B10)	
IYDROLOG Wetland Primary I Surface High Wa	Y Hydrology Indic ndicators (any one is s Water (A1) ater Table (A2)	ators:	Sp	arsely Ve	egetated Concav	W ial Imagery (B7) re Surface (B8)Oxid	ater Stained L Drainage Pa lized Rizosphere	eaves (B9) tterns (B10) es along Living	
IYDROLOG Wetland Primary I Surface High Wa Saturat	Y Hydrology Indic ndicators (any one is s water (A1) ater Table (A2) tion (A3)	ators:	Sp Ma	arsely Ve arl Depos	egetated Concav sits (B15)	W ial Imagery (B7) re Surface (B8)Oxid Pre:	ater Stained L Drainage Pa lized Rizosphere sence of Redu	eaves (B9) tterns (B10) es along Living ced Iron (C4)	
IYDROLOG Wetland Primary I Surface High Wa Saturat Water I	Y Hydrology Indic ndicators (any one is s water (A1) ater Table (A2) tion (A3) Marks (B1)	ators:	Sp Ma Hy	arsely Ve arl Depos drogen	egetated Concav sits (B15) Sulfide Odor (C	W ial Imagery (B7) re Surface (B8)Oxid Pre: C1)	ater Stained L Drainage Pa lized Rizosphere sence of Redu Salt Deposit	eaves (B9) Itterns (B10) es along Living ced Iron (C4) is (C5)	
YDROLOG Wetland Primary I Surface High Wa Saturat Water I Sedime	Hydrology Indic ndicators (any one is s water (A1) ater Table (A2) tion (A3) Marks (B1) ent Deposits (B2)	ators:	Sp Ma Hy Dr	oarsely Ve arl Depos vdrogen Ty-Seaso	egetated Concav sits (B15) Sulfide Odor (C n Water Table	W ial Imagery (B7) re Surface (B8)Oxid Pres C1) (C2) Stun	ater Stained L Drainage Pa lized Rizosphere sence of Redu Salt Deposit ted or Stresse	Leaves (B9) tterns (B10) es along Living ced Iron (C4) is (C5) id Plants (D1)	
IYDROLOG Wetland Primary I Surface High Wa Saturat Water I Sedime Drift De	Y Hydrology Indic ndicators (any one is s water (A1) ater Table (A2) tion (A3) Marks (B1) ent Deposits (B2) eposits (B3)	ators:	Sp Ma Hy Dr	oarsely Ve arl Depos vdrogen Ty-Seaso	egetated Concav sits (B15) Sulfide Odor (C	W ial Imagery (B7) re Surface (B8)Oxid Pres C1) (C2) Stun	ater Stained L Drainage Pa lized Rizosphere sence of Redu Salt Deposit ted or Stresse 1Geomorphic I	Leaves (B9) tterns (B10) es along Living ced Iron (C4) ts (C5) ed Plants (D1) Position (D2)	
IYDROLOG Wetland Primary I Surface High Wa Saturat Water I Sedime Drift De Algal M	Y Hydrology Indic ndicators (any one is see Water (A1) ater Table (A2) cion (A3) Marks (B1) ent Deposits (B2) eposits (B3) at or Crust (B4)	ators:	Sp Ma Hy Dr	oarsely Ve arl Depos vdrogen Ty-Seaso	egetated Concav sits (B15) Sulfide Odor (C n Water Table	W rial Imagery (B7) re Surface (B8)Oxid Pres C1) (C2) Stun rs) .	ater Stained L Drainage Pa lized Rizosphere sence of Redu Salt Deposit ted or Stresse 1Geomorphic I Shallow Aqu	eaves (B9) tterns (B10) es along Living ced Iron (C4) is (C5) ed Plants (D1) Position (D2) iitard (D3)	
IYDROLOG Wetland Primary I Surface High Wa Saturat Water I Sedime Drift De Algal M Iron De	Y Hydrology Indic ndicators (any one is see Water (A1) ater Table (A2) cion (A3) Marks (B1) ent Deposits (B2) eposits (B3) at or Crust (B4) eposits (B5)	ators:	Sp Ma Hy Dr	oarsely Ve arl Depos vdrogen Ty-Seaso	egetated Concav sits (B15) Sulfide Odor (C n Water Table	W rial Imagery (B7) re Surface (B8)Oxid Pres C1) (C2) Stun rs) .	ater Stained L Drainage Pa lized Rizosphere sence of Redu Salt Deposit ted or Stresse 1Geomorphic I Shallow Aqu Vicrotopograp	Leaves (B9) tterns (B10) es along Living ced Iron (C4) es (C5) ed Plants (D1) Position (D2) uitard (D3) hic Relief(D4)	
YDROLOG Wetland Primary I Surface High Wa Saturat Water I Sedime Drift De Algal M Iron De	Y Hydrology Indic ndicators (any one is see Water (A1) ater Table (A2) cion (A3) Marks (B1) ent Deposits (B2) eposits (B3) at or Crust (B4)	ators:	Sp Ma Hy Dr	oarsely Ve arl Depos vdrogen Ty-Seaso	egetated Concav sits (B15) Sulfide Odor (C n Water Table	W rial Imagery (B7) re Surface (B8)Oxid Pres C1) (C2) Stun rs) .	ater Stained L Drainage Pa lized Rizosphere sence of Redu Salt Deposit ted or Stresse 1Geomorphic I Shallow Aqu	Leaves (B9) tterns (B10) es along Living ced Iron (C4) es (C5) ed Plants (D1) Position (D2) uitard (D3) hic Relief(D4)	
IYDROLOG Wetland Primary I Surface High Wa Saturat Water I Sedime Drift De Algal M Iron De Surface Field Obs	Y Hydrology Indic ndicators (any one is s water (A1) ater Table (A2) tion (A3) Marks (B1) ent Deposits (B2) eposits (B3) at or Crust (B4) eposits (B5) e Soil Cracks (B6) servations:	sufficient)	Sp Ma Hy Dr Ot	arsely Ve arl Depos /drogen -y-Seaso :her (Exp	egetated Concav sits (B15) Sulfide Odor (C n Water Table blain in Remark	W rial Imagery (B7) re Surface (B8)Oxid Pres C1) (C2) Stun rs) .	ater Stained L Drainage Pa lized Rizosphere sence of Redu Salt Deposit ted or Stresse 1Geomorphic I Shallow Aqu Vicrotopograp	Leaves (B9) tterns (B10) es along Living ced Iron (C4) es (C5) ed Plants (D1) Position (D2) uitard (D3) hic Relief(D4)	
IYDROLOG Wetland Primary I Surface High Wa Saturat Water I Sedime Drift De Algal M Iron De Surface Field Obs	Y Hydrology Indic ndicators (any one is see water (A1) ater Table (A2) tion (A3) Marks (B1) ent Deposits (B2) eposits (B3) at or Crust (B4) eposits (B5) e Soil Cracks (B6) servations: Water Present? Yes	sufficient)	Sp Ma Hy Dr Ot	arsely Ve arl Depos vdrogen y-Seaso ther (Exp ther (Exp Depth (ii	egetated Concav sits (B15) Sulfide Odor (C n Water Table plain in Remark	W rial Imagery (B7) re Surface (B8)Oxid Pres C1) (C2) Stun rs) .	ater Stained L Drainage Pa lized Rizosphere sence of Redu Salt Deposit ted or Stresse 1Geomorphic I Shallow Aqu Vicrotopograp	Leaves (B9) tterns (B10) es along Living ced Iron (C4) es (C5) ed Plants (D1) Position (D2) uitard (D3) hic Relief(D4)	
IYDROLOG Wetland Primary I Surface High Wa Saturat Water I Sedime Drift De Algal M Iron De Surface Surface Water Ta	Y Hydrology Indic ndicators (any one is s water (A1) ater Table (A2) fion (A3) Marks (B1) ent Deposits (B2) eposits (B3) at or Crust (B4) eposits (B5) e Soil Cracks (B6) servations: Nater Present? Yes ble Present? Yes	sufficient)	Sp Ma Hy Dr Ot	arsely Ve arl Depos /drogen -y-Seaso :her (Exp	egetated Concav sits (B15) Sulfide Odor (C n Water Table plain in Remark	W rial Imagery (B7) re Surface (B8)Oxid Pres C1) (C2) Stun rs) N	ater Stained L Drainage Pa lized Rizosphere sence of Redu Salt Deposit ted or Stresse 1Geomorphic I Shallow Aqu 4icrotopograpi FAC-neutral	Leaves (B9) tterns (B10) es along Living ced Iron (C4) es (C5) ed Plants (D1) Position (D2) hitard (D3) hic Relief(D4) Test (D5)	
IYDROLOG Wetland Primary I Surface High Wa Saturat Water I Sedime Drift De Algal M Iron De Surface W Water Ta Saturatio	Y Hydrology Indic ndicators (any one is s a Water (A1) ater Table (A2) fion (A3) Marks (B1) ent Deposits (B2) eposits (B3) at or Crust (B4) eposits (B5) at or Crusts (B6) servations: Water Present? Yes ble Present? Yes n Present?	sufficient)		arsely Ve arl Depos rdrogen ry-Seaso ther (Exp Depth (in Depth (in	egetated Concav sits (B15) Sulfide Odor (C n Water Table plain in Remark	W rial Imagery (B7) re Surface (B8)Oxid Pres C1) (C2) Stun rs) .	ater Stained L Drainage Pa lized Rizosphere sence of Redu Salt Deposit ted or Stresse 1Geomorphic I Shallow Aqu 4icrotopograpi FAC-neutral	Leaves (B9) tterns (B10) es along Living ced Iron (C4) es (C5) ed Plants (D1) Position (D2) hitard (D3) hic Relief(D4) Test (D5)	
YDROLOG Wetland Primary I Surface High Wa Saturat Water I Sedime Drift De Algal M Iron De Surface W Water Ta Surface W	Y Hydrology Indic ndicators (any one is s water (A1) ater Table (A2) fion (A3) Marks (B1) ent Deposits (B2) eposits (B3) at or Crust (B4) eposits (B5) e Soil Cracks (B6) servations: Nater Present? Yes ble Present? Yes	sufficient)		arsely Ve arl Depos vdrogen y-Seaso ther (Exp ther (Exp Depth (ii	egetated Concav sits (B15) Sulfide Odor (C n Water Table plain in Remark	W rial Imagery (B7) re Surface (B8)Oxid Pres C1) (C2) Stun rs) N	ater Stained L Drainage Pa lized Rizosphere sence of Redu Salt Deposit ted or Stresse 1Geomorphic I Shallow Aqu 4icrotopograpi FAC-neutral	Leaves (B9) tterns (B10) es along Living ced Iron (C4) es (C5) ed Plants (D1) Position (D2) hitard (D3) hic Relief(D4) Test (D5)	Roots (C3)
YDROLOG Wetland Primary I Surface High Wa Saturat Water I Sedime Drift De Algal M Iron De Surface V Water Ta Saturatio (includes	Y Hydrology Indic ndicators (any one is s a Water (A1) ater Table (A2) fion (A3) Marks (B1) ent Deposits (B2) eposits (B3) at or Crust (B4) eposits (B5) at or Crusts (B6) servations: Water Present? Yes ble Present? Yes n Present?	sufficient)		arsely Ve arl Depos vdrogen y-Seaso ther (Exp Depth (in Depth (in	egetated Concav sits (B15) Sulfide Odor (C n Water Table plain in Remark nches): 0 nches): Depth	W rial Imagery (B7) re Surface (B8)Oxid Pres (C2) Stun (C2) Stun (C2) N M Wetland Hvdi	ater Stained L Drainage Pa lized Rizosphere sence of Redu Salt Deposit ted or Stresse 1Geomorphic I Shallow Aqu dicrotopograpi FAC-neutral	eaves (B9) tterns (B10) es along Living ced Iron (C4) is (C5) ed Plants (D1) Position (D2) itard (D3) hic Relief(D4) Test (D5)	Roots (C3)



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



Project/Site: <u>Akiak Wetland Delineation</u> Applicant/Owner: <u>Solstice</u> Investigator(s): <u>SLI</u> Local relief (concave, convex, none): <u>conca</u> Subregion: <u>Alaska</u> Lat.: <u>60.910</u> Soil Map Unit Name: Are climatic/hydrologic conditions on the site typica Are Vegetation, Soil, or Hydrology Are Vegetation, Soil, or Hydrology SUMMARY OF FINDINGS - Attach site map sho Hydrophytic Vegetation Present? Yes ✓ No	veSI 2significant significant naturally pro pwing samplin	Landform lope: <u>0.0</u> Lo e of year? \ ly disturbe blematic? <u>g point loc</u>	(hillside, terrace, hummocks, etc.): <u>Flat or f</u> <u>0</u> % / <u>0.0</u> ° Elevation: <u>62</u> ng.: <u>-161.2489</u> Datum: NWI classification Yes <u>√</u> No (If no, explain ed? Are "Normal Circumstances" present? Yes (If needed, explain any answers in Re	Point: <u>aw-18</u> <u>luvial related</u> <u>WGS84</u> : <u>PEM1F</u> in Remarks) s √ No
Hydric Soil Present?Yes ✓ NoWetland Hydrology Present?Yes ✓ No		within	a Wetland? Yes ,f No	
Remarks: This plot is the easternmost extent		d that run	a through the parthern partian of the proper	od landfill
VEGETATION - Use scientific names of plants. L				
Absolute	Dominant I		Dominance Test worksheet: Number of Dominant Species That are OBL,	
	Species?	Status		2 (A)
Total Cover: 0.0				2 (A)
50% of total cover: 0.0	20% of total	cover: 0.0	Total Numberof Dominant SpeciesAcross all Strata:	2
Sapling/Shrub Stratum1.Salix pulchra5.0		FACW		2 (B)
		FACW	Percent of Dominant Species That are OBL,	в
Total Cover: 5.0 50% of total cover: 2.5	20% of total	covor: 1.0	reitent of Dominant Species mat are OBL,	
Herb Stratum	2070 01 10141		Prevalence Index worksheet:	
I.Carex utriculata40.0	\checkmark	OBL	Total % Cover of: Multiply by:	
1.Concernment10.02.Comarum palustre25.0		OBL	OBL Species $65.1 \times 1 = 65.1$	
2.Communication20103.Calamagrostis canadensis10.0	•	FAC	FACW Species $5.1 \times 2 = 10.2$	
4.Galium trifidum0.1		FACW	FAC Species $10.0 \times 3 = 30.0$	
5. Equisetum fluviatile 0.1		OBL	FACU Species $0.0 \times 4 = 0.0$	
Total Cover: 75.2			UPL Species $0.0 \times 5 = 0.0$	
50% of total cover: 37.6	20% of total co	over: 15.0	Column Totals: 80.2 (A) 105.3 (B)	
	20 /0 01 10101 00	57611 1510	Prevalence Index= $B/A = 1.313$	
			Hydrophytic Vegetation Indicators:	
			✓ Dominance Test is > 50%	
			✓ Prevalence Index is ≤ 3.0	
			Morphological Adaptations ¹ (Provide su	pporting data
			in Remarks or on a separate sheet)	
			Problematic Hydrophytic Vegetation ¹ (E	xplain)
			¹ Indicators or hydricsoil and wetland hydrology	must be
			present, unless disturbed or problematic.	
			Plot size (radius, or length × width)	2x10m
			% Cover of Wetland Bryophytes (Where applica	
			% Bare Ground	0.0
			Total Cover of Bryophytes	10.0
			Hydrophytic	-
			Vegetation	
			Present? Yes ,f	Νο
			·····	-

Remarks: Calamagrostis canadensis pedestals are surrounded by standing water with Carex utriculata and Comarum palustre.

SOIL Sampling Point: aw-18 Depth Matrix **Redox Features** Color (moist) % Color (moist) % Type¹ Loc² Remarks (inches) Mod ¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, A=Absent ²Location: PL=Pore Lining, RC=Root Channel, **Hydric Soil Indicators:** Indicators for Problematic Hydric Soils³: Histosol or Histel (A1) Alaska Color Change (TA4)⁴ Alaska Gleved Without Hue 5Y or Redder Histic Epipedon (A2) Alaska Alpine Swales (TA5) Underlying Layer .1 Alaska Redox With 2.5Y Hue Other (Explain in Remarks) Hydrogen Sulfide (A4) Thick Dark Surface (A12) Alaska Gleyed (A13) ³One indicator or hydrophytic vegetation, one primary indicator of wetland hydrology, must Alaska Redox (A14) and an appropriate landscape position be present unless disturbed or problematic. Alaska Gleyed Pores (A15) ⁴Give details of color change in Remarks. **Restrictive Layer (if present):** Type: None Hvdric Soil Present? Yes √ Depth (inches): Remarks: H2S detected when probing with shovel (hydric soil indicator A4) **HYDROLOGY** Wetland Hydrology Indicators: Secondary Indicators (2 or more required) Primary Indicators (any one is sufficient) Water Stained Leaves (B9) .1 Surface Water (A1) Inundation Visible on Acting (B7) Drainage Patterns (B10) .1 High Water Table (A2) Sparsely Vegetated Conae Surface (B8) Oxidized Rizospheres along Living Roots .1 Saturation (A3) Marl Deposits (B15) Presence of Reduced Iron (C4) Water Marks (B1) .1 Hydrogen Sulfide Odor(C1) Salt Deposits (C5) Sediment Deposits (B2) Dry-Season Water Table(C2) Stunted or Stressed Plants (D1) Drift Deposits (B3) Other (Explain in Remarks) .1 Geomorphic Position (D2) Algal Mat or Crust (B4) Shallow Aquitard (D3) Microtopographic Relief(D4) Iron Deposits (B5) Surface Soil Cracks (B6) .1 FAC-neutral Test (D5) **Field Observations:** Surface Water Present? Yes .1 No Depth (inches): 3 Yes .1 No Depth (inches): Water Table Present? 0 Saturation Present? Wetland Hydrology Present? Yes 🗸 No No Depth (inches): (includes capillary fringe)Yes .1 Recorded Data (stream gauge, monitor well, aerial photo, previous inspection) if available:

Remarks: Calamagrostis canadensis pedestals in standing water. Primary hydrology indicator C1 detected (H2S odor) when probing with shovel. D2--Kuskokwim River floodplain



Hydric Soil Indicators: Hydrogen Sulfide (A4)

Wetland Hydrology Indicators: Saturation (A3), FAC-Neutral Test (D5), Hydrogen Sulfide Odor (C1), Surface Water (A1), High Water Table (A2), Geomorphic Position (D2)

NO LANDSCAPE PHOTO TAKEN

Project/Site: Akiak Wetland Delineation	Borough/City: Bethel Census Area	Sampling Date: 2021-08-17
Applicant/Owner: Solstice		Sampling Point: <u>aw-19</u>
Investigator(s): <u>RWM, SLI</u>	Landform (hillside, terrace,	hummocks, etc.): Flat or fluvial related
Local relief (concave, convex, none): concave	Slope: <u>0.0</u> % / <u>0.0</u> °	Elevation: <u>61</u>
Subregion: Alaska Lat.: 60.9101	Long.: <u>-161.2482</u>	Datum: <u>WGS84</u>
Soil Map Unit Name:		NWI classification: <u>PSS1E</u>
Are climatic/hydrologic conditions on the site typical f	or this time of year? Yes \checkmark No	(If no, explain in Remarks)
Are Vegetation,Soil,or Hydrology	significantly disturbed? Are "Normal	Circumstances" present? Yes 🗸 No
Are Vegetation, Soil, or Hydrology na	aturally problematic? (If neede	d, explain any answers in Remarks.)
SUMMARY OF FINDINGS - Attach site map show	ing sampling point locations, transec	ts, important features, etc.

Г	Liberture lead in Management 2 March (NI-		-	
	Hydrophytic Vegetation Present? Yes \checkmark	No	Is the Sampled Area		
	Hydric Soil Present? Yes √	No	within a Wetland?	Yes <i>,</i> f	No
	Wetland Hydrology Present? Yes <a>	No			NO

Remarks: This wetland extends up a swale. It is surrounded by alder-willow uplands to the North and South.

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

	Absolute	Dominant	Indicator	Dominance Test worksheet:
Tree Stratum	% Cover	Species?	Status	Number of Dominant Species That are OBL,
Total Cover:	0.0			FACW, or FAC: 4 (A)
50% of total cover:	0.0	20% of total	cover: 0.0	Total Numberof Dominant SpeciesAcross all
Sapling/Shrub Stratum				Strata: 4
Salix arbusculoides	15.0	\checkmark	FACW	(B)
Alnus viridis	7.0	\checkmark	FAC	Percent of Dominant Species That are OBL,
Salix richardsonii	5.0		FACW	
Total Cover:	27.0			Prevalence Index worksheet:
50% of total cover:	13.5	20% of total	cover: 5.4	Total % Cover of: Multiply by:
Herb Stratum				OBL Species 49.2 × 1 = 49.2
Comarum palustre	35.0	\checkmark	OBL	FACW Species $20.0 \times 2 = 40.0$
Calamagrostis canadensis	30.0	\checkmark	FAC	FAC Species 37.1 × 3 = 111.3
Carex utriculata	10.0		OBL	FACU Species $1.0 \times 4 = 4.0$
Carex aquatilis	2.0		OBL	UPL Species $0.0 \times 5 = 0.0$
Equisetum fluviatile	2.0		OBL	Column Totals: 107.3 (A) 204.5 (B)
Poa pratensis	1.0		FACU	Prevalence Index= $B/A = 1.906$
Sium suave	0.1		OBL	
Polemonium acutiflorum	0.1		FAC	Hydrophytic Vegetation Indicators:
Glyceria grandis	0.1		OBL	✓ Dominance Test is > 50%
Total Cover:	80.3			✓ Prevalence Index is \leq 3.0
50% of total cover:	40.2	20% oftotal cover:	16.1	Morphological Adaptations ¹ (Provide supporting da
				in Remarks or on a separate sheet)
				Problematic Hydrophytic Vegetation ¹ (Explain)
				¹ Indicators or hydricsoil and wetland hydrology must be present, unless disturbed or problematic.
				Plot size (radius, or length × width) 2x10
				% Cover of Wetland Bryophytes (Where applicable)
				% Bare Ground 0.0
				Total Cover of Bryophytes 0.0
				Hydrophytic
				Vegetation
				Present? Yes ,f No

Remarks:

Depth		Mat	rix	R	edox F	eatures						
inches)	Color(mois	t) %	Color (moist) 9	% Type ¹	Loc ² Texture		Mod		Rema	irks	
0-2				/	А	peat						
2-4	10yr 3/2			/	А	mucky	' peat					
4-10	5y 2.5/	2 90	7.5yr	3/4 10) С	PL silt loa	im	Posit	ive alp	ha alpha		
								Alaska red	lox, and	d Alaska g	gleyed w	rithout un-
10-17	n	90	10yr	4/6 10) C	PL silt loa	m	derlyi	ng red	der layer		
¹ Type: C=Cond	entration, [D=Depl	letion, RM	I=Reduc	ed Matrix,	A=Absent	² Loc	ation: PL=Poi	re Linin	g, RC=Roo	ot Channe	el,
Hydric Soil In	dicators	:		Ind	icators	for Problem	atic	Hydric So	ils³:			
Histosol or	Histel (A1)					olor Change (TA	1)4					Hue 5Y or Re
Histic Epipe				Alas	ka Alpine	Swales (TA5)				ying Laye		
Hydrogen S				Alasl	ka Redox	With 2.5Y Hue	.1		Othe	r (Explain ir	n Remarks	5)
Thick Dark												
Alaska Gley						ytic vegetation,		one primary in				
1 Alaska Redo	. ,					dscape position		be present unl	ess disti	urbed or pr	oblematio	2.
Alaska Gley	ed Pores (415)	⁴ Give de	tails of	color char	nge in Remarks.						
Type: None Depth (inches):			nt):							Presen		
Depth (inches): Remarks: other-				lpha al	pha dipy	ridol at 9 inche	s indic					
Depth (inches): Remarks: other- IYDROLOGY Wetland Hyd	-A positive	e read ndica	tion to a	lpha al	pha dipy	ridol at 9 inche			resenc	e of redu	uced iro	n.
Depth (inches): Remarks: other-	-A positive	e read ndica	tion to a	lpha alı	pha dipyi	ridol at 9 inche		ating the p ondary Ind	resenc	e of redu	uced iro	n. red)
Depth (inches): Remarks: other- IYDROLOGY Wetland Hyd	-A positive rology I	e read ndica	tion to a			ridol at 9 inche on Visible on Aer	Sec	ating the p ondary Ind W	resenc licators /ater S	e of redu (2 or mo	uced iro pre requi aves (BS	n. red)
Depth (inches): Remarks: other- HYDROLOGY Wetland Hyd Primary Indicat Surface Wate High Water Ta	-A positive rology I ors (any or r (A1) ble (A2)	e read ndica	tion to a		Inundatic Sparsely \	on Visible on Aer Vegetated Conca	Sec	ating the p ondary Ind M agery (B7) Face (B8)	resenc licators /ater S Draina Oxidiz	e of redu (2 or mo tained Le age Patte ed Rizosp	uced iro pre requi aves (B9 rns (B10 heres alo	n. red))))) ng Living Roo
Depth (inches): Remarks: other- IYDROLOGY Wetland Hyd Primary Indicat Surface Wate High Water Ta .1 Saturation (<i>i</i>	-A positive rology I ors (any or r (A1) ble (A2) A3)	e read ndica	tion to a		Inundatic Sparsely \ Marl Depo	on Visible on Aer Vegetated Conca osits (B15)	Sec ial Ima ve Surf	ating the p ondary Ind M agery (B7) Face (B8)	resenc licators /ater S Draina Oxidiz . Prese	e of redu (2 or mo tained Le age Patte ed Rizosp nce of Re	uced iro pre requi aves (B9 rns (B10 heres alo duced Ir	n. red))))) ng Living Roo
Depth (inches): Remarks: other- IYDROLOGY Wetland Hyd Primary Indicat Surface Wate High Water Ta .1 Saturation (A Water Marks	-A positive rology I ors (any or r (A1) ble (A2) A3) (B1)	e read ndica	tion to a		Inundatio Sparsely \ Marl Depo Hydroger	on Visible on Aer Vegetated Conca osits (B15) o Sulfide Odor (C	Sec ial Ima ve Surf	ating the p ondary Ind M agery (B7) Face (B8)	licators /ater S Draina Oxidiz Prese Salt D	e of redu (2 or mo tained Le age Patte ed Rizosp nce of Re Peposits (uced iro pre requi aves (B9 rns (B10 heres ald duced Ir C5)	n. red))))))) ong Living Roo on (C4)
Depth (inches): Remarks: other- IYDROLOGY Wetland Hyd Primary Indicat Surface Wate High Water Ta .1 Saturation (Water Marks Sediment Dep	-A positive rology I prs (any or r (A1) ble (A2) A3) (B1) posits (B2)	e read ndica	tion to a		Inundatic Sparsely V Marl Depo Hydroger Dry-Seas	on Visible on Aer Vegetated Conca osits (B15) n Sulfide Odor (C on Water Table	Sec ial Ima ve Surf C1) (C2)	ating the p ondary Ind M agery (B7) face (B8) .1	iicators /ater S /ater S Draina Oxidiz Prese Salt D Stunt	e of redu age Patte ed Rizosp nce of Re Deposits (ed or Stre	uced iro pre requi aves (BS rns (B1C heres ald duced Ir C5) essed Pla	n. red))))) ong Living Roo on (C4) ants (D1)
Depth (inches): Remarks: other- IYDROLOGY Wetland Hyd Primary Indicat Surface Water High Water Ta .1 Saturation (A Water Marks Sediment Dep Drift Deposite	-A positive rology I prs (any or r (A1) ble (A2) A3) (B1) posits (B2) (B3)	e read ndica	tion to a		Inundatic Sparsely V Marl Depo Hydroger Dry-Seas	on Visible on Aer Vegetated Conca osits (B15) o Sulfide Odor (C	Sec ial Ima ve Surf C1) (C2)	ating the p ondary Ind M agery (B7) face (B8) .1	resence licators /ater S Draina Oxidiz Oxidiz Prese Salt D Stunta	e of redu tained Le age Patte ed Rizosp nce of Re Deposits (ed or Stre orphic Po	uced iro pre requi aves (BS rns (B1C heres ald duced Ir C5) essed Pla sition (E	n. red))))) ong Living Roo on (C4) ants (D1)
Depth (inches): Remarks: other- HYDROLOGY Wetland Hyd Primary Indicat Surface Wate High Water Ta .1 Saturation (A Water Marks Sediment Deposits Algal Mat or (A)	-A positive rology I ors (any or r (A1) ble (A2) A3) (B1) (B1) (B3) (B3) Crust (B4)	e read ndica	tion to a		Inundatic Sparsely V Marl Depo Hydroger Dry-Seas	on Visible on Aer Vegetated Conca osits (B15) n Sulfide Odor (C on Water Table	Sec ial Ima ve Surf C1) (C2)	ating the p ondary Ind M agery (B7) face (B8) .1	licators /ater S Draina Oxidiz Prese Salt D Sturto Geom Shallo	e of redu tained Le age Patte ed Rizosp nce of Re Deposits (ed or Stre orphic Po ow Aquita	uced iro pre requi aves (BS rns (B1C heres ald duced Ir C5) essed Pla sition (C rd (D3)	n. red))) ong Living Roo on (C4) ants (D1))2)
Depth (inches): Remarks: other- 1YDROLOGY Wetland Hyd Primary Indicat Surface Wate High Water Ta .1 Saturation (<i>i</i> Water Marks Sediment Deposits Algal Mat or (i Iron Deposits)	-A positive rology I ors (any or r (A1) ble (A2) A3) (B1) (B1) (B1) (B3) (Crust (B4) (B5)	e reac	tion to a		Inundatic Sparsely V Marl Depo Hydroger Dry-Seas	on Visible on Aer Vegetated Conca osits (B15) n Sulfide Odor (C on Water Table	Sec ial Ima ve Surf C1) (C2)	ating the p ondary Ind Magery (B7) Face (B8) .1	licators /ater S Draina Oxidiz Prese Salt D Stunto Geom Shallo Microl	e of redu (2 or mo tained Le age Patte ed Rizosp nce of Re peposits (ed or Stre orphic Po ow Aquita topograph	uced iro pre requi aves (B9 rns (B10 heres ald duced Ir C5) essed Pla sition (D rd (D3) nic Relief	n. red))) ong Living Roo on (C4) ants (D1))2)
Depth (inches): Remarks: other- HYDROLOGY Wetland Hyd Primary Indicat Surface Wate High Water Ta .1 Saturation (A Water Marks Sediment Deposits Algal Mat or (A)	-A positive rology I ors (any or r (A1) ble (A2) A3) (B1) (B1) (B1) (B3) (Crust (B4) (B5)	e reac	tion to a		Inundatic Sparsely V Marl Depo Hydroger Dry-Seas	on Visible on Aer Vegetated Conca osits (B15) n Sulfide Odor (C on Water Table	Sec ial Ima ve Surf C1) (C2)	ating the p ondary Ind Magery (B7) Face (B8) .1	licators /ater S Draina Oxidiz Prese Salt D Stunto Geom Shallo Microl	e of redu tained Le age Patte ed Rizosp nce of Re Deposits (ed or Stre orphic Po ow Aquita	uced iro pre requi aves (B9 rns (B10 heres ald duced Ir C5) essed Pla sition (D rd (D3) nic Relief	n. red))) ong Living Roo on (C4) ants (D1))2)
Depth (inches): Remarks: other- IYDROLOGY Wetland Hyd Primary Indicat Surface Wate High Water Ta .1 Saturation (a Water Marks Sediment De Drift Deposits Algal Mat or (C Iron Deposits Surface Soil (C Field Observati	-A positive rology I ors (any or r (A1) ble (A2) A3) (B1) oosits (B2) (B3) (B3) (Crust (B4) (B5) Cracks (B6) Ons:	e read	tion to a		Inundatic Sparsely \ Marl Depo Hydroger Dry-Seas Other (Ex	on Visible on Aer Vegetated Conca osits (B15) n Sulfide Odor (C on Water Table splain in Remark	Sec ial Ima ve Surf C1) (C2)	ating the p ondary Ind Magery (B7) Face (B8) .1	licators /ater S Draina Oxidiz Prese Salt D Stunto Geom Shallo Microl	e of redu (2 or mo tained Le age Patte ed Rizosp nce of Re peposits (ed or Stre orphic Po ow Aquita topograph	uced iro pre requi aves (B9 rns (B10 heres ald duced Ir C5) essed Pla sition (D rd (D3) nic Relief	n. red))) ong Living Roo on (C4) ants (D1))2)
Depth (inches): Remarks: other- IYDROLOGY Wetland Hyd Primary Indicat Surface Wate High Water Ta .1 Saturation (Water Marks Sediment De Drift Deposits Algal Mat or (Iron Deposits Surface Soil (Field Observati Surface Water	-A positive rology I ors (any or r (A1) ble (A2) A3) (B1) oosits (B2) (B3) (B3) Crust (B4) (B5) Cracks (B6) Ons: Present? Y	es reac	tion to a ators: ufficient)		Inundatic Sparsely \ Marl Depo Hydroger Dry-Seas Other (Ex Depth (on Visible on Aer Vegetated Conca osits (B15) n Sulfide Odor (C on Water Table splain in Remark	Sec ial Ima ve Surf C1) (C2)	ating the p ondary Ind Magery (B7) Face (B8) .1	licators /ater S Draina Oxidiz Prese Salt D Stunto Geom Shallo Microl	e of redu (2 or mo tained Le age Patte ed Rizosp nce of Re peposits (ed or Stre orphic Po ow Aquita topograph	uced iro pre requi aves (B9 rns (B10 heres ald duced Ir C5) essed Pla sition (D rd (D3) nic Relief	n. red))) ong Living Roo on (C4) ants (D1))2)
Depth (inches): Remarks: other- IYDROLOGY Wetland Hyd Primary Indicat Surface Water High Water Ta .1 Saturation (A Water Marks Sediment Dep Drift Deposits Algal Mat or (C Iron Deposits Surface Soil (C Field Observati Surface Water Water Table Pre	-A positive rology I ors (any or r (A1) ble (A2) (A3) (B1) bosits (B2) (B3) Crust (B4) (B5) Cracks (B6) Cracks (B6) Cracks (B6) Cracks (B6)	e read	tion to a ators: ufficient)		Inundatic Sparsely \ Marl Depo Hydroger Dry-Seas Other (Ex Depth (on Visible on Aer Vegetated Conca osits (B15) n Sulfide Odor (C on Water Table splain in Remark	Sec ial Ima ve Surf C1) (C2)	ating the p ondary Ind W agery (B7) face (B8) .1	licators /ater S Draina Oxidiz Prese Salt D Stunt Geom Shallo Microl	e of redu tained Lea age Patte ed Rizosp nce of Re peposits (ed or Stre orphic Po ow Aquita topograph teutral Te	uced iro pre requi aves (BS rns (B1C heres ald duced Ir C5) essed Pla sition (C rd (D3) hic Relief st (D5)	n. red))))) ong Living Roo on (C4) ants (D1))2) (D4)
Depth (inches): Remarks: other- IYDROLOGY Wetland Hyd Primary Indicat Surface Wate High Water Ta .1 Saturation (A Water Marks Sediment De Drift Deposits Algal Mat or (C Iron Deposits Surface Soil (C) Field Observati Surface Water L Water Table Pro Saturation Pres	-A positive rology I prs (any or r (A1) ble (A2) (A3) (B1) posits (B2) (B3) Crust (B4) (B5) Cracks (B6) present? Y esent? Y ent?	e reac ndica ne is su es es	tion to a ators: ufficient)		Inundatic Sparsely \ Marl Depo Hydroger Dry-Seas Other (Ex Other (Ex Depth (Depth (on Visible on Aer Vegetated Concar osits (B15) in Sulfide Odor (C on Water Table on Water Table plain in Remark	Sec ial Ima ve Surf C1) (C2)	ating the p ondary Ind Magery (B7) Face (B8) .1	licators /ater S Draina Oxidiz Prese Salt D Stunt Geom Shallo Microl	e of redu tained Lea age Patte ed Rizosp nce of Re peposits (ed or Stre orphic Po ow Aquita topograph teutral Te	uced iro pre requi aves (BS rns (B1C heres ald duced Ir C5) essed Pla sition (C rd (D3) hic Relief st (D5)	n. red))))) ong Living Roo on (C4) ants (D1))2) (D4)
Depth (inches): Remarks: other- IYDROLOGY Wetland Hyd Primary Indicat Surface Water High Water Ta .1 Saturation (A Water Marks Sediment Dep Drift Deposits Algal Mat or (C Iron Deposits Surface Soil (C Field Observati Surface Water Water Table Pre	-A positive rology I prs (any or r (A1) ble (A2) (A3) (B1) posits (B2) (B3) Crust (B4) (B5) Cracks (B6) present? Y esent? Y ent?	es reac	tion to a ators: ufficient)		Inundatic Sparsely \ Marl Depo Hydroger Dry-Seas Other (Ex Depth (on Visible on Aer Vegetated Concar osits (B15) in Sulfide Odor (C on Water Table on Water Table plain in Remark	Sec ial Ima ve Surf C1) (C2)	ating the p ondary Ind W agery (B7) face (B8) .1	licators /ater S Draina Oxidiz Prese Salt D Stunt Geom Shallo Microl	e of redu tained Lea age Patte ed Rizosp nce of Re peposits (ed or Stre orphic Po ow Aquita topograph teutral Te	uced iro pre requi aves (BS rns (B1C heres ald duced Ir C5) essed Pla sition (C rd (D3) hic Relief st (D5)	n. red))))) ong Living Roo on (C4) ants (D1))2) (D4)

Kuskokwim River floodplain



Hydric Soil Indicators: Alaska Redox (A14), Other (explain in remarks), Alaska Gleyed without Hue 5Y or Redder Underlaying Layer

Wetland Hydrology Indicators: Geomorphic Position (D2), Presence of Reduced Iron (C4), FAC-Neutral Test (D5), Saturation (A3)



Project/Site: Akiak Wetland Delineation	Borough/City: <u>Bethel Census Area</u>	Sampling Date: <u>2021-08-17</u>
Applicant/Owner: Solstice		Sampling Point: <u>aw-21</u>
Investigator(s): <u>SLI, RWM</u>	Landform (hillside, te	rrace, hummocks, etc.): Nonpatterned
Local relief (concave, convex, none): none	Slope: <u>0.0</u> % / <u>0.0</u> °	Elevation: <u>65</u>
Subregion: Alaska Lat.: 60.9101	Long.: <u>-161.2430</u>	Datum: WGS84
Soil Map Unit Name:		NWI classification: U
Are climatic/hydrologic conditions on the site typical f	or this time of year? Yes <u>√</u> No	(If no, explain in Remarks)
Are Vegetation,Soil,or Hydrology	significantly disturbed? Are "Normal C	ircumstances" present? Yes 🗹 No
Are Vegetation, Soil, or Hydrology n	aturally problematic? (If needed	, explain any answers in Remarks.)
SUMMARY OF FINDINGS - Attach site map show	ing sampling point locations, transects	, important features, etc.

Hydrophytic Vegetation Present?	Yes √	No		Is the Sampled Area		
Hydric Soil Present?	Yes	No	\checkmark	within a Wetland?	Yes	No √
Wetland Hydrology Present?	Yes 🗸	No_			163	

Remarks: The shallow swale from aw-20 was followed to this plot. It appears to be at a slightly higher elevation. See the marked map for the boundary location, where tall shrub canopy cover increases.

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

	Absolute	Dominant	Indicator	Dominance Test worksheet:
Tree Stratum	% Cover	Species?	Status	Number of Dominant Species That are OBL,
Total Cover:	0.0			FACW, or FAC: 4 (A)
50% of total cover:	0.0	20% of total	over: 0.0	Total Numberof Dominant SpeciesAcross all
Sapling/Shrub Stratum				Strata: 4
Salix arbusculoides	40.0	\checkmark	FACW	(B)
Salix alaxensis	20.0	\checkmark	FAC	Percent of Dominant Species That are OBL,
Alnus viridis	7.0		FAC	
Salix richardsonii	3.0		FACW	Prevalence Index worksheet:
Viburnum edule	3.0		FACU	Total % Cover of: Multiply by:
Total Cover:	73.0			OBL Species 20.0 × 1 = 20.0
50% of total cover:	36.5	20% of total cover:	14.6	FACW Species $44.1 \times 2 = 88.2$
Herb Stratum				FAC Species 86.0 × 3 = 258.0
Calamagrostis canadensis	50.0	\checkmark	FAC	FACU Species $6.0 \times 4 = 24.0$
Comarum palustre	20.0	\checkmark	OBL	UPL Species $0.0 \times 5 = 0.0$
Rubus arcticus	7.0		FAC	Column Totals: 156.1 (A) 390.2 (B)
Polemonium acutiflorum	2.0		FAC	Prevalence Index = $B/A = 2.500$
Angelica genuflexa	1.0		FACW	
Thalictrum sparsiflorum	1.0		FACU	Hydrophytic Vegetation Indicators:
Trientalis europaea	1.0		FACU	✓ Dominance Test is > 50%
Urtica dioica	1.0		FACU	✓ Prevalence Index is ≤ 3.0
Impatiens noli-tangere	0.1		FACW	Morphological Adaptations ¹ (Provide supporting data
Total Cover:	83.1			in Remarks or on a separate sheet)
50% of total cover:	41.6	20% of total cover:	16.6	Problematic Hydrophytic Vegetation ¹ (Explain)
				 Indicators or hydricsoil and wetland hydrology must be present, unless disturbed or problematic.
				Plot size (radius, or length × width) 10m radi
				% Cover of Wetland Bryophytes (Where applicable)
				% Bare Ground 0.0
				Total Cover of Bryophytes 0.0
				Hydrophytic
				Vegetation
				Present? Yes √ No

Remarks:

Depth		Μ	latr	ix	Redo	ox Fe	eatur	res											
inches)	Color	(mois	t) %	Color (moist)	% Т	ype ¹	Loc ² T	exture		Mod	l	I	Rema	arks				
1-3		/			/		А		fibric										
-16	2.5y	3/1	60	10yr3/3	4	0	С	PL	silt loa	am									
6-19	2.5y	3/2	70	10yr3/3	3	0	С	PL	silt loa	am									
¹ Type: C=Conc	entration	, D=De	epletio	on, RM=F	educe	d Matr	ix, A=	Absent	:	² Loc	ation: P	L=Pore	e Lining	, RC=	=Root	Chann	el,		
Hydric Soil In	dicato	rs:			Indi	cato	rs fo	r Pro	blema	atic H	ydric	Soils	³ :						
Histosol or	Histel (A	1)			A	laska	Color	Chano	ae (TA4)4		A	laska (Gleve	ed Wit	hout	Hue 5	Y or Re	dde
Histic Epipe	don (A2)			A	laska	Alpine	Swales	5 (TA5)			ι	Jnderly	/ing L	_ayer				
Hydrogen S	Sulfide (A	4)			A	laska F	Redox	With 2.5	5Y Hue			(Other (Expla	ain in	Rema	rks)		
Thick Dark	Surface	(A12)																	
Alaska Gley	/ed (A13)			³ One i	ndicat	or or h	ydrophy	ytic vege	etation, o	one prim	ary inc	licator c	of wet	land h	ydrolog	ду,		
Alaska Red	ox (A14)				and	an app	oropria	te lands	scape po	sition m	iust be pi	resent	unless o	disturl	bed or	proble	ematic		
Alaska Gley	ed Pore	s (A15)		Give	e detail	ls of co	olor char	nge in Re	emarks.									
Restrictive La	ver (if	pres	sent	:):															_
Type: None	, ,	•								Hvdr	ic Soil	Pre	sent?	,	Yes		1	No √	
Depth (inches):																			
Remarks: No hyd	dric soil i	ndicat	ors a	are met															
Remarks: No hyd IYDROLOGY Wetland Hyd	Irology	Indi	icat	ors:							Seco		y India				e requ	uired)	
Remarks: No hyd IYDROLOGY Wetland Hyd Primary Indicat	l rology cors (any	Indi	icat	ors:		[nund	otion)/isible		ial Ima		Wate	r Stain	ed Le	eaves	(B9)	e requ	uired)	
Remarks: No hyd IYDROLOGY Wetland Hyd Primary Indicat Surface Wate	I rology cors (any er (A1)	one is	icat	ors:]						gery (B	Wate 7)Drai	r Stain nage P	ied Le atter	eaves ns (B	(B9) 10)		- E	
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Remarks: No hyd IYDROLOGY Wetland Hyd Primary Indicat Surface Water High Water T. Saturation (A Water Marks Sediment De Drift Deposits Algal Mat or Iron Deposits	lrology cors (any er (A1) able (A2) (3) (B1) posits (E (B3) Crust (B- s (B5)	2)	icat	ors:		Sparse Marl D Hydro Dry-Se	ely Veg Deposi gen S eason	getatec its (B15 iulfide (Water	d Conca 5) Odor (C ⁻ Table	ve Surf C1) (C2)	gery (B3 ace (B8)	Wate 7)Drai) Oxid Pres Stun .1 Stun .1 S	r Stain nage P ized Ri sence c alt Dej ted or Geor shallow opogra	ed Le atter zosph of Rec posite Stres morph Aqui aphic	eaves ns (B neres duced s (C5) ssed P hic Pos itard (Relief	(B9) 10) along Iron lants sition (D3) f(D4)	Living (C4)	- E	(C.
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Remarks: No hyd IYDROLOGY Wetland Hyd Primary Indicat Surface Water High Water Tr Saturation (A Water Marks Sediment De Drift Deposits Algal Mat or Iron Deposits Surface Soil Field Observa Surface Water	Irology cors (any er (A1) able (A2) (B1) posits (E (B3) Crust (B- s (B5) Crust (B- s (B5) Cracks (I tions: Present?	2) 2) 4) Yes	icat	Drs: icient)		Sparse Marl D Hydro Dry-S Other Dther	ely Veg Deposi gen S eason (Expla th (ind	getatec its (B15 iulfide (Water ain in R ain in R ches):	d Conca 5) Odor (C Table emarks	ve Surf C1) (C2)	gery (B3 ace (B8)	Wate 7)Drai) Oxid Pres Stun .1 Stun .1 S	r Stain nage P ized Ri sence c alt Dej ted or Geor shallow opogra	ed Le atter zosph of Rec posite Stres morph Aqui aphic	eaves ns (B neres duced s (C5) ssed P hic Pos itard (Relief	(B9) 10) along Iron lants sition (D3) f(D4)	Living (C4)	- E	(C:
Remarks: No hyd IYDROLOGY Wetland Hyd Primary Indicat Surface Water High Water T. Saturation (A Water Marks Sediment De Drift Deposits Algal Mat or Iron Deposits Surface Soil Field Observa Surface Water Water Table Pr	Irology cors (any er (A1) able (A2) (B1) posits (E (B3) Crust (B- 5 (B5) Cracks (I Present?	2) 4) 2)	icat	ors: icient)		Sparse Marl D Hydro Dry-S Other Dther	ely Veg Deposi gen S eason (Expla th (ind	getatec its (B15 Gulfide (Water ain in Re	d Conca 5) Odor (C Table emarks	ve Surf. C1) (C2))	gery (B3	Wate 7)Drai 0 Oxid Pres Stun .1 S Microt .1 F	r Stain nage P ized Ri sence c alt Deg ted or Geor challow opogra AC-net	ed Le atter zosph of Rec posits Stres Morph Aqui aphic utral	eaves rns (B heres duced s (C5) ssed P hic Pos itard (Relief Test ((B9) 10) along Iron lants sition (D3) f(D4) (D5)	Living (C4) (D1)	g Roots	(C.
Remarks: No hyd IYDROLOGY Wetland Hyd Primary Indicat Surface Water High Water T. Saturation (A Water Marks Sediment De Drift Deposits Algal Mat or Iron Deposits Surface Soil Field Observa Surface Water Water Table Pr Saturation Press	Irology cors (any er (A1) able (A2) (B1) posits (E (B3) Crust (B- 5 (B5) Cracks (I Present? sent?	2) 2) 4) Yes Yes	icat	Drs: icient)		Sparse Marl D Hydro Dry-S Dther Dther Den Den	ely Veg Deposi gen S eason (Expla th (ind	getatec isulfide (Water ain in Re ches): ches):	1 Conca 5) Odor (C - Table emarks)	ve Surf. C1) (C2))	gery (B3 ace (B8)	Wate 7)Drai 0 Oxid Pres Stun .1 S Microt .1 F	r Stain nage P ized Ri sence c alt Deg ted or Geor challow opogra AC-net	ed Le atter zosph of Rec posits Stres Morph Aqui aphic utral	eaves rns (B heres duced s (C5) ssed P hic Pos itard (Relief Test ((B9) 10) along Iron lants sition (D3) f(D4) (D5)	Living (C4) (D1)	g Roots	(C
Remarks: No hyd IYDROLOGY Wetland Hyd Primary Indicat Surface Wate High Water T. Saturation (A Water Marks Sediment De Drift Deposits Algal Mat or Iron Deposits Surface Soil Field Observa Surface Water Water Table Pr	Irology cors (any er (A1) able (A2) (B1) posits (E (B3) Crust (B- 5 (B5) Cracks (I Present? sent?	2) 2) 4) Yes Yes	icat	Drs: icient)		Sparse Marl D Hydro Dry-S Other Dther	ely Veg Deposi gen S eason (Expla th (ind	getatec its (B15 iulfide (Water ain in R ain in R ches):	1 Conca 5) Odor (C - Table emarks)	ve Surf. C1) (C2))	gery (B3	Wate 7)Drai 0 Oxid Pres Stun .1 S Microt .1 F	r Stain nage P ized Ri sence c alt Deg ted or Geor challow opogra AC-net	ed Le atter zosph of Rec posits Stres Morph Aqui aphic utral	eaves rns (B heres duced s (C5) ssed P hic Pos itard (Relief Test ((B9) 10) along Iron lants sition (D3) f(D4) (D5)	Living (C4) (D1)	g Roots	(C



Hydric Soil Indicators: None Wetland Hydrology Indicators: Geomorphic Position (D2), FAC-Neutral Test (D5)



Project/Site: Akiak Wetland Delineation	Borough/City: <u>Bethel Census Area</u>	Sampling Date: <u>2021-08-17</u>
Applicant/Owner: Solstice		Sampling Point: <u>aw-22</u>
Investigator(s): <u>SLI, RWM</u>	Landform (hillside, terrace, hum	mocks, etc.): Flat or fluvial related
Local relief (concave, convex, none): none_	Slope: <u>0.0</u> % / <u>0.0</u> °	Elevation: <u>64</u>
Subregion: Alaska Lat.: 60.9085	Long.: <u>-161.2425</u>	Datum: WGS84
Soil Map Unit Name:		NWI classification: <u>U</u>
Are climatic/hydrologic conditions on the site typical fo	r this time of year? Yes \checkmark No	(If no, explain in Remarks)
Are Vegetation,Soil,or Hydrology	significantly disturbed? Are "Normal Circun	nstances" present? Yes 🗸 No
Are Vegetation, Soil, or Hydrology nat	turally problematic? (If needed, exp	lain any answers in Remarks.)
SUMMARY OF FINDINGS - Attach site map showin	ig sampling point locations, transects, imp	ortant features, etc.
Hydrophytic Vegetation Present? Voc / No		

Hydrophytic Vegetation Present?	Yes √	No		Is the Sampled Area			
Hydric Soil Present?	Yes	No	\checkmark	within a Wetland?	Yes	No	./
Wetland Hydrology Present?	Yes	No	\checkmark		165	No	v

Remarks:

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

	Absolute	Dominant	Indicator	Dominance Test worksheet:
Tree Stratum	% Cover	Species?	Status	Number of Dominant Species That are OBL,
Total Cover:	0.0			FACW, or FAC: 4 (A)
50% of total cover:	0.0	20% of total	over: 0.0	Total Numberof Dominant SpeciesAcross all
Sapling/Shrub Stratum				Strata: 4
Alnus viridis	35.0	\checkmark	FAC	(B)
Alnus viridis	20.0	\checkmark	FAC	Percent of Dominant Species That are OBL,
Salix alaxensis	10.0		FAC	
Viburnum edule	7.0		FACU	Prevalence Index worksheet:
Salix richardsonii	5.0		FACW	Total % Cover of: Multiply by:
Rosa acicularis	5.0		FACU	OBL Species $0.0 \times 1 = 0.0$
Ribes triste	1.0		FAC	FACW Species $5.0 \times 2 = 10.0$
Total Cover:	83.0		_	FAC Species 121.2 × 3 = 363.6
50% of total cover:	41.5	20% of total cover:	16.6	FACU Species 22.2 × 4 = 88.8
Herb Stratum			_	UPL Species $0.0 \times 5 = 0.0$
Calamagrostis canadensis	30.0	\checkmark	FAC	Column Totals: 148.4 (A) 462.4 (B)
Rubus arcticus	15.0	\checkmark	FAC	Prevalence Index = $B/A = 3.116$
Equisetum arvense	10.0		FAC	
Mertensia paniculata	3.0		FACU	Hydrophytic Vegetation Indicators:
Dryopteris expansa	3.0		FACU	✓ Dominance Test is > 50%
Thalictrum sparsiflorum	2.0		FACU	Prevalence Index is ≤ 3.0
Galium boreale	1.0		FACU	Morphological Adaptations ¹ (Provide supporting data
Trientalis europaea	1.0		FACU	in Remarks or on a separate sheet)
Viola sp.	1.0			Problematic Hydrophytic Vegetation ¹ (Explain)
Aconitum delphiniifolium	0.1		FAC	Indicatorsorhydricsoilandwetlandhydrologymustbepresent,
Artemisia tilesii	0.1		FACU	unless disturbed or problematic.
Chamaenerion angustifolium	0.1		FACU	
Polemonium acutiflorum	0.1		FAC	Plot size (radius, or length × width) 10m radi
Total Cover:	66.4			% Cover of Wetland Bryophytes (Where applicable)
50% of total cover:	33.2	20% oftotal cover:	13.3	% Bare Ground 0.0
				Total Cover of Bryophytes 0.0
				Hydrophytic
				Vegetation
				Present? Yes √ No

Depth		Matrix		Redox	k Feati	ures			
nches)	Color (mo	ist) %	o Color (m	10ist) %	Type ¹	Loc ² Texture	Mod	F	Remarks
0-4		/	/		А	fibric			
4-8	7.5yr	2.5/2	/		А	silt loa	am		
8-13	10yr	3/2	/		А				
13-17	Variegated	/	/		А	loamy	fine sand		
¹ Type:	C=Concentrat	tion, D=Dep	oletion, RM=	Reduced	Matrix, A	A=Absent ² Lo	ocation: PL=Po	ore Lining, RC=Root Channel,	
Hydric So	oil Indicat	ors:		Indica	ators f	or Problem	atic Hydri	c Soils³:	
Histoso	l or Histel (A	.1)		Ala	aska Col	or Change (TA4)4	Alaska Gleved Without F	Hue 5Y or Red
Histic I	Epipedon (A2	2)		Ala	ska Alpin	e Swales (TA5)		Underlying Layer	
Hydrog	en Sulfide (<i>I</i>	44)		Ala	ska Redox	x With 2.5Y Hue		Other (Explain in Rema	rks)
Thick E	ark Surface	(A12)							
Alaska	Gleyed (A13)				, , ,		ne primary indicator of wetland	
Alaska	Redox (A14)			and a	n appropr	iate landscape po	sition must be	present unless disturbed or proble	matic.
Alaska	Gleyed Pores	s (A15)		Give de	tails of co	lor change in Rem	narks.		
	a Laver (if	present)	:						
Restrictiv									
Type: None		. ,					Hvdric So	il Present? Yes	No√
Type: None Depth (incl emarks: n YDROLOG	e nes): o hydric soi Y	lindicator	rs					il Present? Yes	
Type: None Depth (inch emarks: n YDROLOG Wetland Primary I Surface High Wa	e nes): o hydric soi	l indicator 39 Indica 19 one is s	rs ators:	Sp	arsely Ve	Nisible on Aeri	Sec al Imagery (I	il Present? Yes condary Indicators (2 or more Water Stained Leaves (B9) 37) Drainage Patterns (B10) Oxidized Rizospheres along Livir Presence of Reduced Iron (C4	e required)
Type: None Depth (incl emarks: no YDROLOG Wetland Primary I Surface High Wa Saturat Water I	hes): b hydric soi Y Hydrolog ndicators (ar Water (A1) ater Table (A2 ion (A3) Marks (B1)	l indicator 1 jy Indica ny one is s 2)	rs ators:	Sp Ma Hy	arsely Ve arl Depos drogen	NVisible on Aeri egetated Concave sits (B15) Sulfide Odor (C	Sec al Imagery (f e Surface (B8) 1)	condary Indicators (2 or mor Water Stained Leaves (B9) 37) Drainage Patterns (B10) Oxidized Rizospheres along Livir Presence of Reduced Iron (C4 Salt Deposits (C5)	e required) ng Roots (C: 4)
Type: None Depth (incl emarks: no PROLOG Wetland Primary I Surface High Wa Saturat Water I Sedime	hes): b hydric soi Y Hydrolog ndicators (ar Water (A1) ater Table (A2 ion (A3) Marks (B1) nt Deposits	l indicator 1 jy Indica ny one is s 2)	rs ators:	Sp Ma Hy Dr	arsely Ve arl Depos drogen y-Seaso	n Visible on Aeri egetated Concave sits (B15) Sulfide Odor (C n Water Table (Sec al Imagery (f e Surface (B8) 1) (C2) S	Condary Indicators (2 or more Water Stained Leaves (B9) 37) Drainage Patterns (B10) Oxidized Rizospheres along Livir Presence of Reduced Iron (Ca Salt Deposits (C5) Stunted or Stressed Plants (D:	e required) ng Roots (C: 4) 1)
Type: None Depth (inch emarks: no PROLOG Wetland Primary I Surface High Wa Saturat Water I Sedime Drift De	e hes): b hydric soi Y Hydrolog ndicators (ar Water (A1) ater Table (A2 ion (A3) Marks (B1) nt Deposits eposits (B3)	l indicator 39 Indica ny one is s 2) (B2)	rs ators:	Sp Ma Hy Dr	arsely Ve arl Depos drogen y-Seaso	NVisible on Aeri egetated Concave sits (B15) Sulfide Odor (C	Sec al Imagery (f e Surface (B8) 1) (C2) S	20ndary Indicators (2 or mor Water Stained Leaves (B9) 37) Drainage Patterns (B10) Oxidized Rizospheres along Livir Presence of Reduced Iron (C4 Salt Deposits (C5) Stunted or Stressed Plants (D2 .1Geomorphic Position (D2	e required) ng Roots (C: 4) 1)
Type: None Depth (inch iemarks: n YDROLOG Wetland Primary I Surface High Wa Saturat Water I Sedime Drift De Algal M	e hes): D hydric soi Y Hydrolog ndicators (ar Water (A1) ater Table (A2 ion (A3) Marks (B1) nt Deposits eposits (B3) at or Crust (l indicator 39 Indica ny one is s 2) (B2)	rs ators:	Sp Ma Hy Dr	arsely Ve arl Depos drogen y-Seaso	n Visible on Aeri egetated Concave sits (B15) Sulfide Odor (C n Water Table (Sec al Imagery (f e Surface (B8) 1) (C2) S	20ndary Indicators (2 or mor Water Stained Leaves (B9) 37) Drainage Patterns (B10) Oxidized Rizospheres along Livir Presence of Reduced Iron (C4 Salt Deposits (C5) Stunted or Stressed Plants (D2 .1Geomorphic Position (D2 Shallow Aquitard (D3)	e required) ng Roots (C3 4) 1)
Type: None Depth (incl Remarks: no YDROLOG Wetland Primary I Surface High Wa Saturat Water I Sedime Drift De Algal M Iron De	hes): b hydric soi Y Hydrolog ndicators (ar Water (A1) ater Table (A2 ion (A3) Marks (B1) nt Deposits eposits (B3) at or Crust (posits (B5)	l indicator Jy Indica ny one is s 2) (B2) B4)	rs ators:	Sp Ma Hy Dr	arsely Ve arl Depos drogen y-Seaso	n Visible on Aeri egetated Concave sits (B15) Sulfide Odor (C n Water Table (Sec al Imagery (f e Surface (B8) 1) (C2) S	condary Indicators (2 or more Water Stained Leaves (B9) 37) Drainage Patterns (B10) Oxidized Rizospheres along Livir Presence of Reduced Iron (C4 Salt Deposits (C5) Stunted or Stressed Plants (D2 .1Geomorphic Position (D2 Shallow Aquitard (D3) Microtopographic Relief(D4	e required) ng Roots (C3 4) 1)
Type: None Depth (incl Remarks: no YDROLOG Wetland Primary I Surface High Wa Saturat Water I Sedime Drift De Algal M Iron De	e hes): D hydric soi Y Hydrolog ndicators (ar Water (A1) ater Table (A2 ion (A3) Marks (B1) nt Deposits eposits (B3) at or Crust (l indicator Jy Indica ny one is s 2) (B2) B4)	rs ators:	Sp Ma Hy Dr	arsely Ve arl Depos drogen y-Seaso	n Visible on Aeri egetated Concave sits (B15) Sulfide Odor (C n Water Table (Sec al Imagery (f e Surface (B8) 1) (C2) S	20ndary Indicators (2 or mor Water Stained Leaves (B9) 37) Drainage Patterns (B10) Oxidized Rizospheres along Livir Presence of Reduced Iron (C4 Salt Deposits (C5) Stunted or Stressed Plants (D2 .1Geomorphic Position (D2 Shallow Aquitard (D3)	e required) ng Roots (C: 4) 1)
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Type: None Depth (incl Remarks: no YDROLOG Wetland Primary I Surface High Wa Saturat Water I Sedime Drift De Algal M Iron De Surface Field Obs Surface V	hes): b hydric soi Y Hydrolog ndicators (ar Water (A1) ater Table (A2 ion (A3) Marks (B1) nt Deposits eposits (B3) at or Crust (eposits (B5) Soil Cracks Fervations Vater Presen	I indicator Jy Indica ny one is s 2) (B2) (B2) B4) (B6) :: t? Yes	rs ators:	Sp Ma Hy Dr Ot	arsely Vé arl Depos vdrogen y-Seaso her (Exp	n Visible on Aeri egetated Concave sits (B15) Sulfide Odor (C n Water Table (Sec al Imagery (f e Surface (B8) 1) (C2) S	condary Indicators (2 or more Water Stained Leaves (B9) 37) Drainage Patterns (B10) Oxidized Rizospheres along Livir Presence of Reduced Iron (C4 Salt Deposits (C5) Stunted or Stressed Plants (D2 .1Geomorphic Position (D2 Shallow Aquitard (D3) Microtopographic Relief(D4	e required) ng Roots (C3 4) 1)
Type: None Depth (incl Remarks: no YDROLOG Wetland Primary I Surface High Wa Saturat Water I Sedime Drift De Algal M Iron De Surface Field Obs Surface V	hes): b hydric soi Y Hydrolog ndicators (ar Water (A1) ater Table (A2 ion (A3) Marks (B1) nt Deposits eposits (B3) at or Crust (eposits (B5) Soil Cracks pervations	I indicator Jy Indica ny one is s 2) (B2) (B2) B4) (B6) :: t? Yes	rs ators: ufficient)	Sp Ma Hy Dr Ot	arsely Vé arl Depos vdrogen y-Seaso her (Exp	N Visible on Aeri egetated Concave sits (B15) Sulfide Odor (C n Water Table (plain in Remarks	Sec al Imagery (f e Surface (B8) 1) (C2) S	condary Indicators (2 or more Water Stained Leaves (B9) 37) Drainage Patterns (B10) Oxidized Rizospheres along Livir Presence of Reduced Iron (C4 Salt Deposits (C5) Stunted or Stressed Plants (D2 .1Geomorphic Position (D2 Shallow Aquitard (D3) Microtopographic Relief(D4	e required) ng Roots (C3 4) 1)
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Remarks: D2--Kuskokwim River floodplain



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



	WETLAND	DETERM	INATION I	DATA FOR	RM - ALASKA RE	GION		
Project/Site:	Akiak Wetland Delineation		Borouah	/Citv: Bethe	el Census Area	Sam	pling Date: 2	2021-08-17
-	wner: <u>Solstice</u>						Sampling Po	
	(s): <u>RWM, SLI</u>			Landform	(hillside, terrace,	hummocks, etc.		
-	f (concave, convex, none)	: none			% / <u>0.0</u> °		ation: <u>69</u>	
Subregion: A		.: <u>60.9088</u>	•		ng.: <u>-161.2360</u>			
-	it Name:		_	201	.gn <u>-10112000</u>	N	WI classificat	
	hydrologic conditions on the s	site typical	for this time	of vear? Y	es V No			
	on,Soil,or Hydrolog							
	on, Soil, or Hydrolo					explain any an		
	OF FINDINGS - Attach site							
	ic Vegetation Present? Yes		ang samping					
Hydric Soi	-	No	\checkmark		Sampled Area			_
	Hydrology Present? Yes			WITHIN	a Wetland?	Yes	No	\checkmark
		110	•					
Remarks:								
VEGETATIO	DN - Use scientific names of	-	-	-				
		Absolute	Dominant	Indicator	Dominance Test		0.51	
-	Tree Stratum	% Cover	Species?	Status	Number of Domina	ant Species That		
	Total Cover:	0.0			FACW, or FAC:		3	(A)
	50% of total cover:	0.0	20% of totalc	over: 0.0	Total Numberof D	ominant SpeciesA		
	Sapling/Shrub Stratum	-			Strata:		3	
1	Alnus viridis	60.0		FAC			(B))
2.	Alnus viridis	25.0	\checkmark	FAC	Percent of Dominar	nt Species That are	OBL,	
3.	Viburnum edule	15.0		FACU				
4.	Rosa acicularis	10.0		FACU	Prevalence Inde	ex worksheet:		
	Total Cover:	110.0			Total % Cover of:	Multiply b	y:	
	50% of total cover:	55.0	20% oftotal cover:	22.0	OBL Species	$0.0 \times 1 = 0$	0.0	
-	Herb Stratum	-		-			0.0	
1	Calamagrostis canadensis	35.0	\checkmark	FAC	•	$127.2 \times 3 = 3$		
2.	Rubus arcticus	7.0		FAC	· · · · · · · · · · · · · · · · · · ·	$27.4 \times 4 = 1$		
2. 3. 4.	Gymnocarpium dryopteris	1.0		FACU	UPL Species		0.0	
4.	Mertensia paniculata	1.0		FACU	Column Totals:		91.2 (B)	
5. 6.	Trientalis europaea	0.1		FACU	Prevalence Index	= B/A = 3.177		
	Polemonium acutiflorum	0.1		FAC				
7.	Thalictrum sparsiflorum	0.1		FACU	Hydrophytic Veg	-	ors:	
8.	Aconitum delphiniifolium	0.1		FAC	✓ Dominance			
9.	Chamaenerion angustifolium	0.1		FACU		the Index is ≤ 3.0	(Durida and	
10. <u> </u>	Galium boreale	0.1		FACU	1 -	gical Adaptations ¹	\ 11	orting data
	Total Cover:	44.6				ks or on a separat	,	
	50% of total cover:	22.3	20% of total <u>c</u>	over: 8.9		tic Hydrophytic Ve		-
					¹ Indicators or hyd		, 5,	iust be
				-	present, unless	s disturbed or pro	blematic.	
					Plot size (radius, o	or length × width)	10m radius
				Ī	% Cover of Wetla	nd Bryophytes (W	/here applicabl	e)
				Ē	% Bare Ground			0.0
				Ī	Total Cover of Bry	ophytes		30.0
				Ī	Hydrophytic			
					Vegetation			
					Present?	•	Yes √	No

Remarks:

Depth	Ma	trix	Red	ox Featu	ires				
(inches)	Color (moist	:) % C	color (moist)	% Type ¹	Loc ² Texture	Mod		Rem	narks
0-1	/		/	А	fibric				
1-4	/		/	А	hemic				
-14	10yr 3/3	100	/	А	silt loam				
4-17	Variegated /	100	/	А	loamy fi	ne sand			
¹ Type: C	=Concentration, D	=Depletio	n, RM=Reduce	d Matrix, A	=Absent ² Loc	ation: PL=Por	e Lining, RC=Root Ch	nannel,	
Hydric So	oil Indicators	:	Indic	ators fo	or Problemat	ic Hydric S	Soils³:		
Histo	sol or Histel (A1)		A	laska Color	Change (TA4) ⁴	_	Alaska Gleved	Without Hue	5Y or Redd
Histic	Epipedon (A2)		A	laska Alpine	e Swales (TA5)		Underlying Lay	yer	
Hydro	gen Sulfide (A4)		A	laska Redox	With 2.5Y Hue		Other (Explain	n in Remarks	5)
Thick	Dark Surface (A1	L2)							
Alask	a Gleyed (A13)		₃One ir	ndicator or	hydrophytic veg	etation, one	primary indicator of	f wetland hy	drology,
	a Redox (A14)			••••		•	esent unless disturbed	d or problema	tic.
Alask	a Gleyed Pores (A	415)	^₄ Give o	details of col	or change in Rema	rks.			
Depth (inch	ies):								
Remarks: N	o hydric soil ind	icators							
YDROLOG	Y								
IYDROLOG Wetland	Y Hydrology I	ndicato				Seco	ndary Indicators (equired)
IYDROLOG Wetland	Y	ndicato	cient)				Water Stained Lea	ives (B9)	equired)
IYDROLOG Wetland Primary I Surface	Y Hydrology I ndicators (any or Water (A1)	ndicato	cient)			Imagery (B	Water Stained Lea 7) Drainage Patte	ives (B9) erns (B10)	
IYDROLOG Wetland Primary I Surface High Wa	Y Hydrology I ndicators (any or Water (A1) ater Table (A2)	ndicato	cient)	Sparsely Ve	getated Concave	Imagery (B Surface (B8)C	Water Stained Lea 7) Drainage Patte xidized Rizospheres	ives (B9) erns (B10) along Living	
IYDROLOG Wetland Primary I Surface High Wa Saturat	Y Hydrology I Indicators (any or Water (A1) ater Table (A2) ion (A3)	ndicato	cient)	Sparsely Ve Marl Depos	getated Concave sits (B15)	l Imagery (B7 Surface (B8)C F	Water Stained Lea) Drainage Patter xidized Rizospheres a Presence of Reduced	ives (B9) erns (B10) along Living d Iron (C4)	
IYDROLOG Wetland Primary I Surface High Wa Saturat Water N	Y Hydrology I ndicators (any or Water (A1) ater Table (A2) ion (A3) Marks (B1)	ndicato	cient)	Sparsely Ve Marl Depos Hydrogen S	getated Concave sits (B15) Sulfide Odor (C1	l Imagery (B7 Surface (B8)C F	Water Stained Lea) Drainage Patte xidized Rizospheres a Presence of Reduced Salt Deposits (ives (B9) erns (B10) along Living d Iron (C4) (C5)	
YDROLOG Wetland Primary I Surface High Wa Saturat Water N Sedime	Y Hydrology I Indicators (any or Water (A1) Ater Table (A2) ion (A3) Marks (B1) nt Deposits (B2)	ndicato	cient) 3 5 7 1 1 1	Sparsely Ve Marl Depos Hydrogen S Dry-Seasor	getated Concave its (B15) Sulfide Odor (C1) n Water Table (C	l Imagery (B7 Surface (B8)C F) 2) St	Water Stained Lea ') Drainage Patter ixidized Rizospheres a Presence of Reduced Salt Deposits (unted or Stressed F	ves (B9) erns (B10) along Living d Iron (C4) (C5) Plants (D1)	
YDROLOG Wetland Primary I Surface High Wa Saturat Water N Sedime Drift De	Y Hydrology I Indicators (any or Water (A1) Ater Table (A2) ion (A3) Marks (B1) nt Deposits (B2) eposits (B3)	ndicato	cient) 3 5 7 1 1 1	Sparsely Ve Marl Depos Hydrogen S Dry-Seasor	getated Concave sits (B15) Sulfide Odor (C1	l Imagery (B7 Surface (B8)C F) 2) St	Water Stained Lea) Drainage Patter xidized Rizospheres a Presence of Reduced Salt Deposits (unted or Stressed F .1Geomorphic Pos	ves (B9) erns (B10) along Living d Iron (C4) (C5) Plants (D1) sition (D2)	equired) Roots (C3
IYDROLOG Wetland Primary I Surface High Wa Saturat Water N Sedime Drift De Algal M	Y Hydrology I ndicators (any or water (A1) ater Table (A2) ion (A3) Marks (B1) nt Deposits (B2) eposits (B3) at or Crust (B4)	ndicato	cient) 3 5 7 1 1 1	Sparsely Ve Marl Depos Hydrogen S Dry-Seasor	getated Concave its (B15) Sulfide Odor (C1) n Water Table (C	l Imagery (B7 Surface (B8)C F) 2) St	Water Stained Lea ') Drainage Patter xidized Rizospheres a Presence of Reduced Salt Deposits (unted or Stressed F .1Geomorphic Pos Shallow Aquita	ves (B9) erns (B10) along Living d Iron (C4) (C5) Plants (D1) sition (D2) ard (D3)	
IYDROLOG Wetland Primary I Surface High Wa Saturat Water N Sedime Drift De Algal M Iron De	Y Hydrology I ndicators (any or water (A1) ater Table (A2) ion (A3) Marks (B1) nt Deposits (B2) eposits (B3) at or Crust (B4) posits (B5)	ndicato ne is suffic	cient) 3 5 7 1 1 1	Sparsely Ve Marl Depos Hydrogen S Dry-Seasor	getated Concave its (B15) Sulfide Odor (C1) n Water Table (C	l Imagery (B7 Surface (B8)C F) 2) St	Water Stained Lea ') Drainage Patter xidized Rizospheres a Presence of Reduced Salt Deposits (unted or Stressed F .1Geomorphic Pos Shallow Aquita Microtopographic	ves (B9) erns (B10) along Living d Iron (C4) (C5) Plants (D1) sition (D2) ard (D3) : Relief(D4)	
IYDROLOG Wetland Primary I Surface High Wa Saturat Water N Sedime Drift De Algal M Iron De	Y Hydrology I ndicators (any or water (A1) ater Table (A2) ion (A3) Marks (B1) nt Deposits (B2) eposits (B3) at or Crust (B4)	ndicato ne is suffic	cient) 3 5 7 1 1 1	Sparsely Ve Marl Depos Hydrogen S Dry-Seasor	getated Concave its (B15) Sulfide Odor (C1) n Water Table (C	l Imagery (B7 Surface (B8)C F) 2) St	Water Stained Lea ') Drainage Patter xidized Rizospheres a Presence of Reduced Salt Deposits (unted or Stressed F .1Geomorphic Pos Shallow Aquita	ves (B9) erns (B10) along Living d Iron (C4) (C5) Plants (D1) sition (D2) ard (D3) : Relief(D4)	
IYDROLOG Wetland Primary I Surface High Wa Saturat Water N Sedime Drift De Algal M Iron De Surface	Y Hydrology I ndicators (any or water (A1) ater Table (A2) ion (A3) Marks (B1) nt Deposits (B2) eposits (B3) at or Crust (B4) posits (B5)	ndicato ne is suffic	cient) 3 5 7 1 1 1	Sparsely Ve Marl Depos Hydrogen S Dry-Seasor	getated Concave its (B15) Sulfide Odor (C1) n Water Table (C	l Imagery (B7 Surface (B8)C F) 2) St	Water Stained Lea ') Drainage Patter xidized Rizospheres a Presence of Reduced Salt Deposits (unted or Stressed F .1Geomorphic Pos Shallow Aquita Microtopographic	ves (B9) erns (B10) along Living d Iron (C4) (C5) Plants (D1) sition (D2) ard (D3) : Relief(D4)	
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IYDROLOG Wetland Primary I Surface High Wa Saturat Water N Sedime Drift De Algal M Iron De Surface	Y Hydrology I ndicators (any or water (A1) ater Table (A2) ion (A3) Marks (B1) nt Deposits (B2) eposits (B3) at or Crust (B4) eposits (B5) soil Cracks (B6) ervations: Vater Present? Y	ndicato ne is suffic	cient)	Sparsely Ve Marl Depos Hydrogen S Dry-Seasor Other (Exp	getated Concave sits (B15) Sulfide Odor (C1 n Water Table (C lain in Remarks)	l Imagery (B7 Surface (B8)C F) 2) St	Water Stained Lea ') Drainage Patter xidized Rizospheres a Presence of Reduced Salt Deposits (unted or Stressed F .1Geomorphic Pos Shallow Aquita Microtopographic	ves (B9) erns (B10) along Living d Iron (C4) (C5) Plants (D1) sition (D2) ard (D3) : Relief(D4)	
IYDROLOG Wetland Primary I Surface High Wa Saturat Water N Sedime Drift De Algal M Iron De Surface Field Obs Surface V Water Ta	Y Hydrology I ndicators (any or water (A1) ater Table (A2) ion (A3) Marks (B1) nt Deposits (B2) eposits (B3) at or Crust (B4) eposits (B5) Soil Cracks (B6) ervations: Vater Present? Y	ndicato ne is suffic	cient)	Sparsely Ve Marl Depos Hydrogen S Dry-Seasor Other (Exp	getated Concave its (B15) Sulfide Odor (C1 n Water Table (C lain in Remarks) Inches): 0 Inches): 0	I Imagery (B3 Surface (B8)C F) 2) St	Water Stained Lea ') Drainage Patter xidized Rizospheres a Presence of Reduced Salt Deposits (unted or Stressed F .1Geomorphic Pos Shallow Aquita Microtopographic	ves (B9) erns (B10) along Living d Iron (C4) (C5) Plants (D1) sition (D2) ard (D3) c Relief(D4) est (D5)	
YDROLOG Wetland Primary I Surface High Wa Saturat Water N Sedime Drift De Algal M Iron De Surface Field Obs Surface V Water Ta Saturatio	Y Hydrology I ndicators (any or water (A1) ater Table (A2) ion (A3) Marks (B1) nt Deposits (B2) eposits (B3) at or Crust (B4) eposits (B5) soil Cracks (B6) ervations: Vater Present? Ye ble Present? Ye	ndicato ne is suffic	cient)	Sparsely Ve Marl Depos Hydrogen S Dry-Seasor Other (Exp	getated Concave its (B15) Sulfide Odor (C1 n Water Table (C lain in Remarks) Inches): 0 Inches): 0	I Imagery (B3 Surface (B8)C F) 2) St	Water Stained Lea 'Drainage Patter xidized Rizospheres a Presence of Reduced Salt Deposits (unted or Stressed F .1Geomorphic Pos Shallow Aquita Microtopographic FAC-neutral Te	ves (B9) erns (B10) along Living d Iron (C4) (C5) Plants (D1) sition (D2) ard (D3) c Relief(D4) est (D5)	Roots (C3
YDROLOG Wetland Primary I Surface High Wa Saturat Water N Sedime Drift De Algal M Iron De Surface Field Obs Surface V Water Ta Saturatio (includes	Y Hydrology In ndicators (any or Water (A1) ater Table (A2) ion (A3) Marks (B1) nt Deposits (B2) eposits (B3) at or Crust (B4) eposits (B5) e Soil Cracks (B6) ervations: Vater Present? Yo ble Present? Yo n Present?	es es	cient)	Sparsely Ve Marl Depos Hydrogen S Dry-Seasor Other (Exp Depth (ir Depth (ir .1	getated Concave its (B15) Sulfide Odor (C1 n Water Table (C lain in Remarks) nches): 0 nches): 0 Depth	I Imagery (B3 Surface (B8)C F) 2) St 2) St	Water Stained Lea violation of the stain of	ves (B9) erns (B10) along Living d Iron (C4) (C5) Plants (D1) sition (D2) ard (D3) c Relief(D4) est (D5)	Roots (C3



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



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Appendix B. Map Verification Plots



Sampling Point: aw-01

Site: Akiak Wetland Delineation Date: 2021-08-16

NWI classification: ∪

Viereck code:

Species: Alnus viridis, Salix arbusculoides, Salix alaxen-

sis, Calamagrostis canadensis, Deschampsia caespitosa **Notes:** Upland trail and adjacent clearing along the side of sewage lagoon.



Sampling Point: aw-02

Site: Akiak Wetland Delineation Date: 2021-08-16 NWI classification: PEM1E

Viereck code:

Species: Calamagrostis canadensis, Glyceriasp., Beckmannia syzigachne

Notes: Wet area along trail, with some leaking from sewage lagoon. Bright purple algae observed in standing water, and a strong odorwas present. Wet area is fairly localized, 15-20ft in diameter, before transitioning to Calamagrostis canadensis with no obvious surface water.



Sampling Point: aw-03 Site: Akiak Wetland Delineation

Date: 2021-08-16

NWI classification: U

Viereck code:

Species: Equisetum arvense, Calamagrostis canadensis, Deschampsia caespitosa, Arctagrostis latifolia

Notes: Agraminoid meadow with a relatively dark photosignature. Probing with a shovel shows moist mineral soils with no redox features. This site is too near to the leaking sewage lagoon to safely characterize soils.



Sampling Point: aw-07

Site: Akiak Wetland Delineation Date: 2021-08-16 NWI classification: U

Viereck code: Closed Tall Alder-Willow

Species: Salixarbusculoides, Salixbebbiana, Alnus viridis

Notes: Border of small depression characterized by aw-06. Uplands are about 8-10ft higher than wetlands. There are no channelized connections to otherwetlands/waters. Based on topographic position, this would flood from the Kuskokwim river through overbank flooding.



Sampling Point: aw-10

Site: Akiak Wetland Delineation

Date: 2021-08-16

NWI classification: PEM1B

Viereck code: Subarctic Lowland Sedge Wet Meadow

Species: Carex utriculata

Notes: This wetland extends to a small trail visible in imagery. The trail is several feet higher in elevation than the wetland. The graminoid photosignature on the other side of trail is upland. It loses hydric soils and wetland hydrology.



Sampling Point: aw-13

Site: Akiak Wetland Delineation Date: 2021-08-17

NWI classification: U

Viereck code: Closed Tall Alder-Willow

Species: *Populus balsamifera, Salixbebbiana, Ribes triste, Alnus viridis, Calamagrostis canadensis*

Notes: This plot characterizes part of the study area near the landfill as characterized by aw-12 and aw-13. Populus balsamifera cover varies, but has a consistent tall alderwillow canopy with well drained alluvial soils. There are no relict channels or depressions in this portion of the study area.



Sampling Point: aw-20

Site: Akiak Wetland Delineation

Date: 2021-08-17

NWI classification: PSS1B

Viereck code: Open Tall Alder-Willow

Species: Salix bebbiana, Salix arbusculoides, Comarum palustre, Calamagrostis canadensis

Notes: Probing shows mineral soils with a gleyed matrix and high value/chroma redoximorphic feature concentrations as pore linings, as at aw-19.



Sampling Point: aw-23 Site: Akiak Wetland Delineation Date: 2021-08-17 NWI classification: U Viereck code:

Species: Alnus viridis, Rosa acicularis, Populus balsamifera, Calamagrostis canadensis

Notes: A wide trail cleared through uplands, It is visible in google earth imagery. No fill is placed, only cleared. All cleared trails are level and dry uplands without depressions or inactive riverine channels.



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Appendix C. Characteristics of wetlands and waters mapped in the Akiak Infrastructure Project wetlands study area, Alaska, 2021



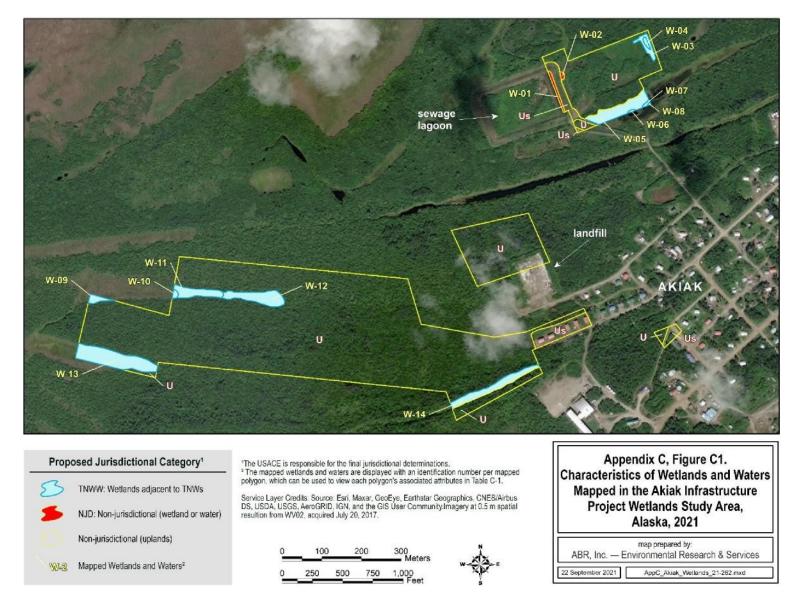


Figure C1. Characteristics of wetlands and waters mapped in the Lakefront Drive wetlands study area, Alaska, 2021



Wetland Number	NWI Codeª	HGM Class ^b	Vegetation Class ^c	Proposed Jurisdictional Category	Area (acres)	Longitude (NAD83)	Latitude (NAD83)
W-01	PUBH	Depressional	Water	Non-jurisdictional	0.1	-161.2310	60.9146
W-02	PEM1E	Depressional	Subarctic Lowland Grass Wet Meadow	Non-jurisdictional	< 0.1	-161.2307	60.9150
W-03	PEM1E	Depressional	Subarctic Lowland Sedge Wet Meadow	Wetlands adjacent to TNWs	0.3	-161.2268	60.9156
W-04	PUBH	Depressional	Water	Wetlands adjacent to TNWs	0.1	-161.2268	60.9157
W-05	PEM1E	Depressional	Subarctic Lowland Sedge Wet Meadow	Wetlands adjacent to TNWs	1.1	-161.2282	60.9142
W-06	PUBH	Depressional	Water	Wetlands adjacent to TNWs	< 0.1	-161.2275	60.9142
W-07	PUBH	Depressional	Water	Wetlands adjacent to TNWs	< 0.1	-161.2268	60.9143
W-08	PEM1E	Depressional	Subarctic Lowland Sedge Wet Meadow	Wetlands adjacent to TNWs	< 0.1	-161.2267	60.9143
W-09	PEM1F	Depressional	Subarctic Lowland Grass Wet Meadow	Wetlands adjacent to TNWs	0.2	-161.2524	60.9101
W-10	PEM1F	Depressional	Subarctic Lowland Grass Wet Meadow	Wetlands adjacent to TNWs	0.1	-161.2489	60.9102
W-11	PSS1E	Depressional	Open Low Alder-Willow	Wetlands adjacent to TNWs	0.6	-161.2478	60.9102
W-12	PSS1B	Depressional	Open Tall Alder-Willow	Wetlands adjacent to TNWs	1.0	-161.2451	60.9100
W-13	PEM1F	Depressional	Fresh Sedge Marsh	Wetlands adjacent to TNWs	1.8	-161.2517	60.9087
W-14	PEM1C	Riverine	Subarctic Lowland Grass Wet Meadow	Wetlands adjacent to TNWs	0.9	-161.2341	60.9080

Table C1. Characteristics of wetlands and waters mapped in the Akiak Infrastructure Project wetlands study area, Alaska, 2021.

a National Wetland Inventory (NWI) code derived from FGDC (2013)

b Hydrogeomorphic (HGM) class derived from Brinson (1993)

c Vegetation class from Viereck et al. (1992)

