Appendix B – Wetlands Technical Reports

WETLAND AND STREAM DELINEATION FOR THE TANANA RIVER RECREATION ACCESS IMPROVEMENTS PROJECT, FAIRBANKS, ALASKA, 2020: AK FNSB TANANA(1)

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INTRODUCTION

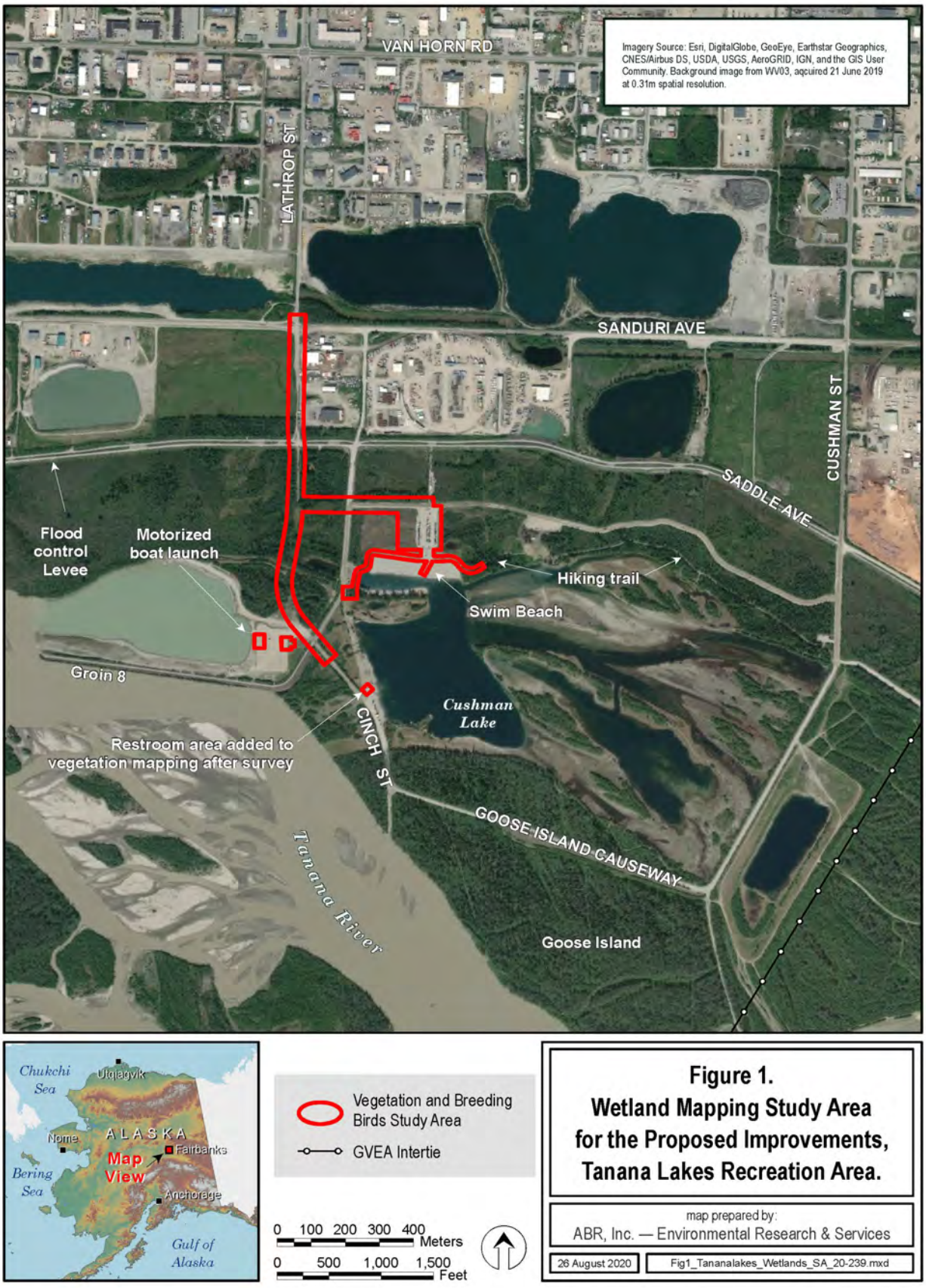
The Tanana River Recreation Access Improvements Project is managed by the Federal Highway Administration, Western Federal Lands Highway Division (WFLHD). The project is intended to improve access to the Tanana Lakes Recreation Area (TLRA; managed by Fairbanks North Star Borough) and NEPA documentation is required. PND Engineers Inc. (PND) is the engineering and environmental contractor to WFLHD for the project and ABR, Inc.—Environmental Research & Services (ABR) is the subcontractor providing wetland information. A Clean Water Act (CWA) Section 404 wetland permit will be required for the project if there are direct impacts to wetlands (gravel fill) within the project area. To assist in the assessment of impacts to wetlands and possible design alterations for avoidance and minimization in the project area, this report presents the results of the field wetland determinations, the mapping of wetlands in the proposed development area, a proposed jurisdictional determination for the wetland types identified, and an assessment of functional values for the wetland types occurring in the project area.

PROJECT LOCATION

The project area is located immediately south of the city of Fairbanks within the Fairbanks North Star Borough (Figure 1). The coordinates for the center point of the main portion of the project are: 64.800963°,-147.741609° and the legal land description is: Sections 21-22, and 27-28, Township 1South, Range 1West, Fairbanks Meridian, Alaska.

STUDY AREA

The TLRA is located on the south (river) side of the Tanana Flood Control levee in south Fairbanks, and the majority of the proposed access improvements would occur within the TLRA. The portion of the study area north of the levee is outside of the TLRA boundary. The recreation area has been established around Cushman Lake, which was formed by the impounded waters of an active slough of the Tanana River (Figure 1). The Goose Island Causeway (a groin extension of South Cushman Street) and Groin 8 (an extension of Cinch Street) were constructed to create the freshwater Cushman Lake, which is suitable for recreation activities and habitat conservation. Groin 8 also protects the motorized boat launch area. The area was developed after 2012 to


Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community. Background image from WV03, aqcuired 21 June 2019 at 0.31m spatial resolution.
VAN HORN RD
LATHROP ST
SANDURI AVE
CUSHMAN ST
SADDLE AVE
Flood control Levee
Motorized boat launch
Hiking trail
Swim Beach
Groin 8
Cushman Lake
Restroom area added to vegetation mapping after survey
CINCH ST
GOOSE ISLAND CAUSEWAY
Tanana River
Goose Island
Chukchi Sea
Utqiagvik
ALASKA
Nome
Fairbanks
Map View
Bering Sea
Anchorage
Gulf of Alaska
Vegetation and Breeding Birds Study Area
GVEA Intertie
0 100 200 300 400 Meters
0 500 1,000 1,500 Feet
Figure 1.
Wetland Mapping Study Area for the Proposed Improvements, Tanana Lakes Recreation Area.
map prepared by:
ABR, Inc. — Environmental Research & Services
26 August 2020
Fig1_Tananalakes_Wetlands_SA_20-239.mxd

include a swimming beach on Cushman Lake, hiking trails, the motorized boat launch that connects with the active channel of the Tanana River, and the non-motorized boat launch on the shore of Cushman Lake (FNSB 2007).

The wetland study area encompasses a total of 23 acres, and includes the areas for the proposed extension of South Lathrop Street, a spur road from South Lathrop Street to access the existing swim beach, as well as the areas of proposed improvements to the motorized boat launch facilities on the Tanana River, the non-motorized boat launch facilities on the southwest side of Cushman Lake, and the facilities at the swim beach on the north side of Cushman Lake. With the exception of a short section of South Lathrop Street north of the Tanana Flood Control levee, the majority of the study area is on the Tanana River side of the levee, and occurs on both the east and west sides of Groin 8. The wetland study area was defined in the FHWA Statement of Work as specific buffer zones surrounding areas of proposed infrastructure improvements. This included a buffer of 75 feet of either side of the proposed road centerlines, a buffer of 25 feet on either side of the proposed trail centerlines, a buffer of 25 feet around the proposed parking areas, and a buffer of 50 feet around the proposed restroom locations (Figure 1).

The entire TLRA area is located within the active floodplain of the large, braided Tanana River, but the hydrology has been substantially altered by the construction of the levee system and the creation of Cushman Lake. Surface water levels in the area are driven by water levels in the Tanana River and rainfall, but frequent flood events typical of undisturbed floodplains are moderated in the TLRA by the groins. Waters in the area have been formed by the impoundment of active sloughs of the Tanana River, the filling of gravel excavation depressions, and there is one flowing slough crossing the study area north of the motorized boat launch area. Overall, the terrain is characterized by flat, riverine-influenced lowlands, with small variations in elevation along the edges of abandoned river channels and depressions. North of the levee along South Lathrop Street, the study area is composed of a fallow field and an industrial park. According to the 2007 TLRA Master Plan, historically the area was composed of over 80% jurisdictional wetlands prior to any facility development (FNSB 2007). Surficial deposits are composed of alluvial sands and silts, with shallow organic layers developing in wetland areas. The geomorphology of the area consists of fluvial landscape features. As is much of Interior Alaska, the TLRA is located in a discontinuous permafrost zone. A variety of wetland types are present

in the study area, including forested wetlands, low and tall shrub wetlands, semipermanently flooded emergent wetlands, and both lotic (active sloughs) and lentic (impoundments) waters. Upland portions of the study area support both needleleaf and mixed needleleaf-broadleaf forests.

METHODS

FIELD SURVEY

The field wetland determination survey was conducted from 7–8 July 2020 by Julie Parrett and Wendy Davis of ABR. Routine wetland determinations were performed at 19 plots, using the U.S. Army Corp of Engineers (USACE) three-parameter approach (USACE 2007). Field plot locations were selected within uniquely identifiable photo-signatures, with replication, to adequately describe characteristics of naturally occurring wetlands and uplands in the study area. In cases in which photo-signatures were ambiguous or the wetland boundary was not identifiable by delineating the plant community boundary, additional plots were added to confirm the wetland boundary. Boundaries confirmed by wetland determination plots were delineated in the field using a global positioning system (GPS) tracking feature in ArcGIS Collector. Identified boundaries were confirmed directly in the field by comparison with the imagery used for the wetland mapping and were used as a preliminary mapping layer for further editing in the office (see Wetland Classification and Mapping below).

To be classified as a wetland, this approach requires that wetlands be dominated by hydrophytic plants, have hydric soils, and show evidence of a wetland hydrologic regime. In addition to full wetland determination plots, field verification plots were sampled at 10 locations. Field verification plots involve rapid assessments to document photo-signatures and improve mapping accuracy (see below).

At each wetland determination plot the following variables were recorded: National Wetland (NWI) type, physiographic type, hydrogeomorphic (HGM) type, and Level IV vegetation class (Viereck et al. (1992), as well as the required USACE data on plant cover by vegetation strata, wetland hydrology, and hydric soils. Observations of wildlife use (e.g., browse, scat) or human activity (e.g., foot trails) were also recorded to support the wetland mapping and functional assessment. GPS coordinates were recorded at each plot along with photos of site characteristics,

vegetation, and soils. Wetland plant taxonomy and indicator status were recorded per the *2018 National Wetland Plant List: Alaska* (Lichvar et al. 2018). At verification plots, a subset of the data collected at wetland determination plots was collected, including GPS coordinates, NWI type, plant cover data (for dominant species only), and site photographs.

Navigation in the study area was accomplished using ESRI's *ArcGIS Online Collector* program, running on Android tablet computers. *ArcGIS Collector* allows point-location data to be recorded using a geographically referenced image background (in this case the same imagery that was used in the wetland mapping process, see Wetland Classification and Mapping below). Wetland data were recorded electronically in the field using an Android tablet app developed by ABR specifically for collecting USACE-required wetlands data. The supplementary field data collected for the wetland functional assessment were recorded using a separate ABR-developed Android app. In addition to storing data in a relational database, these apps will produce USACE standard data forms (USACE 2007) in a PDF format for each wetland determination plot (see Appendix A). Verification plot information and documentary photographs are presented in Appendix B.

Wetland determination plots were named according to the wetland number assigned to each wetland within the final mapping as follows: W(wetland number)-SP(soil pit number within the wetland). Examples plot names are W1-SP1, W1-SP2, W2-SP1, W2-SP2, etc. Upland polygons were not numbered and naming conventions for wetland determination plots within those polygons were named sequentially (TL-01, TL-02, etc.). Wetland determination plots describing lotic waters were named sequentially (STREAM-1, STREAM-2, etc.) and Ordinary High Water Mark boundaries were labeled (OHWM 1-1, OHWM 1-2, etc.) depending on the stream number and the number of edges delineated along each stream.

WETLAND CLASSIFICATION AND MAPPING

The wetland mapping strategy is based on a combination of aerial photo interpretation and ground-truth data. Field data are collected for identifiable photo signatures where the wetland boundaries coincide with the plant community boundaries or topographic features visible in aerial imagery. The U.S. Fish and Wildlife Services NWI program methodology for remotely mapping wetland boundaries is described in Dahl et al (2015). In cases where boundaries were

not visible in the imagery additional field plot data within the same photo signature were used to define the boundaries. This combined approach of photo interpretation and detailed field collection is well suited to Alaska where wetlands often extend widely, mapping areas are often very large with relatively little previous disturbance.

As noted above, wetland boundaries were identified in the field and recorded with GPS coordinates and were then delineated on-screen for the wetland map using ArcGIS software. Boundaries were identified using the field ground-reference data collected for this project (see above) in combination with existing wetland mapping data and interpretation of aerial photo-signatures. Wetland types were mapped at a scale of 1:1,000 and each mapped polygon was assigned a wetland class using NWI notation (FGDC 2013; Dahl et al. 2015). High-resolution, digital, ortho-corrected photography and satellite imagery for the study area were obtained through ESRI's "World Imagery" database. The best data layer was selected as the basemap for this study (WorldView-3 satellite imagery acquired 21 June 2019, with 0.31 m pixel resolution). Additional data sources used during the mapping phase included existing NWI mapping (USFWS 2020), existing wetland mapping and field data (USKH 2007, HDR 2013), a vegetation mapping layer prepared for the biological resources survey report for this project (ABR 2020), soil survey data (NRCS 2020), fish presence or absence data (ADF&G 2020), Alaska Department of Natural Resources (ADNR) navigable waters web map (ADNR 2020), weather data (NOAA 2020), and the Tanana River hydrograph (USGS 2020).

WETLAND FUNCTIONAL ASSESSMENT

Under the current USACE procedures for Alaska, a site-specific assessment of wetland function is used with the wetland debit-credit calculation protocol (USACE 2016) to establish debits for a proposed project and to determine the extent of mitigation that may be necessary. Mitigation is not required for all projects. For the Tanana River Recreation Access Improvements Project, ABR used a rapid wetland functional assessment method that the company has developed over the past 8 years specifically for use in Alaska. This approach has been successfully used for wetland permitting in several recent highway improvement projects in Interior Alaska, because it provides numerical functional capacity index scores required to calculate project debits and credits.

The rapid functional assessment method involves a flexible scoring system that relies on available site-specific literature and quantitative data (when available) to determine the presence or absence of specific wetland function indicators. The functional indicators are developed specifically to address the wetland functions known or expected to occur in a given region in Alaska. For this study, site-specific field data, satellite imagery interpretation, and review of the scientific literature on wetland functions were used to evaluate the presence or absence of wetland function indicators.

WETLAND FUNCTIONS

To reduce duplication and complexity, prior to the ranking of wetland functions, the NWI wetland types mapped in the study area that share the same wetland functions were aggregated into a smaller set of wetland functional classes. This reduces the number of wetland classes to be assessed. For each wetland functional class, the functional indicators applicable to each wetland function were ranked as present (1) or absent (0). The Functional Capacity Index (FCI) score for each wetland function for each wetland functional class was then calculated as a proportion of the total possible score (e.g., 3 of 4 possible functional indicators present results in an FCI score of 0.75). This protocol satisfies the requirement of the current USACE wetland mitigation methods (USACE 2016) that wetland functions be numerically scored between 0 and 1. For the proposed project, 8 wetland functions were evaluated as described below. Details on the scoring of wetland functions for the wetland functional classes present in the study area are provided in Appendix C.

Flood flow regulation (storage) is the capacity of a wetland to control surface-water flow and subsequently moderate downstream flooding. Waters below ordinary high water and wetlands that do not flood at least seasonally were not considered to perform this function. Indicators of flood flow regulation function include a high degree of surface roughness, a depressional HGM class conducive to storage, visible signs of variable water level (and thus storage), and the likelihood that flooding will occur.

Sediment, nutrient, and toxicant removal is the capacity of a wetland to retain suspended sediment and nutrients and/or toxicants adsorbed to inorganic sediments. The indicators of floodwater storage, as described above, are important indicators of this function as well.

Erosion control and shoreline stabilization is the degree to which a wetland reduces erosion at the edges of relatively permanent flowing waters. There are no flowing waters in the project footprint; therefore this function was not assessed.

Organic matter production and export is the capacity of a wetland to make organic matter contributions to the ecosystem through primary production. Field data for the project footprint were used to assess production of organic matter through the occurrence of herbaceous or deciduous woody vegetation, and the potential export of organic matter contributions was assessed by evaluating surface-water connections and flooding.

Threatened and endangered species (TES) support is the capacity of a wetland or water to support federal or state listed threatened or endangered species. No threatened or endangered species are known to occur in the study area, and their occurrence is extremely unlikely given the known ranges of TES species in Alaska. For these reasons, this function was not assessed for any wetland type and is not included in the analyses presented in Appendix C.

Avian/mammal habitat suitability is the capacity of a wetland to support a diversity of wildlife species. This function was assessed from a local-scale understanding of the habitat characteristics of the wetlands, waters, and landscape features in the project footprint. This is a general habitat suitability assessment and does not account for actual or expected species richness within a given functional class or species-specific habitat preferences. The functional indicators considered important for a wide variety of avian and mammal species include level of human disturbance at the site, recorded use of the wetland type by wildlife, interspersion of open water and vegetation, and stratification (complexity) of vegetation.

Fish habitat suitability was evaluated by assessing the degree to which a wetland or water directly supports fish. Only those wetlands and waters with at least a seasonal, intermittent connection to known or likely fish-bearing waters have the potential to perform this function.

Educational, scientific, recreational, or subsistence use reflects the degree to which a wetland provides direct support of hunting and gathering activities, local travel, and/or education. The criteria used to determine if the study area is important for educational or scientific use include whether long term research sites or permanent sample plots are present and

could be directly affected by the proposed project. Established trails visible on aerial photos or documented in field data are considered indicative of local travel.

PROPOSED 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., subject to jurisdiction under Section 404 of the CWA, 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, Clean Water Act 33 CFR Part 328), which recently came into effect, clarifies the scope of jurisdictional waters of the U.S. in light of three U.S. Supreme Court cases: *U.S. v. Riverside Bayview Homes* (*Bayview*), *Solid Waste Agency of Northern Cook County v. U.S.* (*SWANCC*), and *Rapanos v. U.S.* (*Rapanos*).

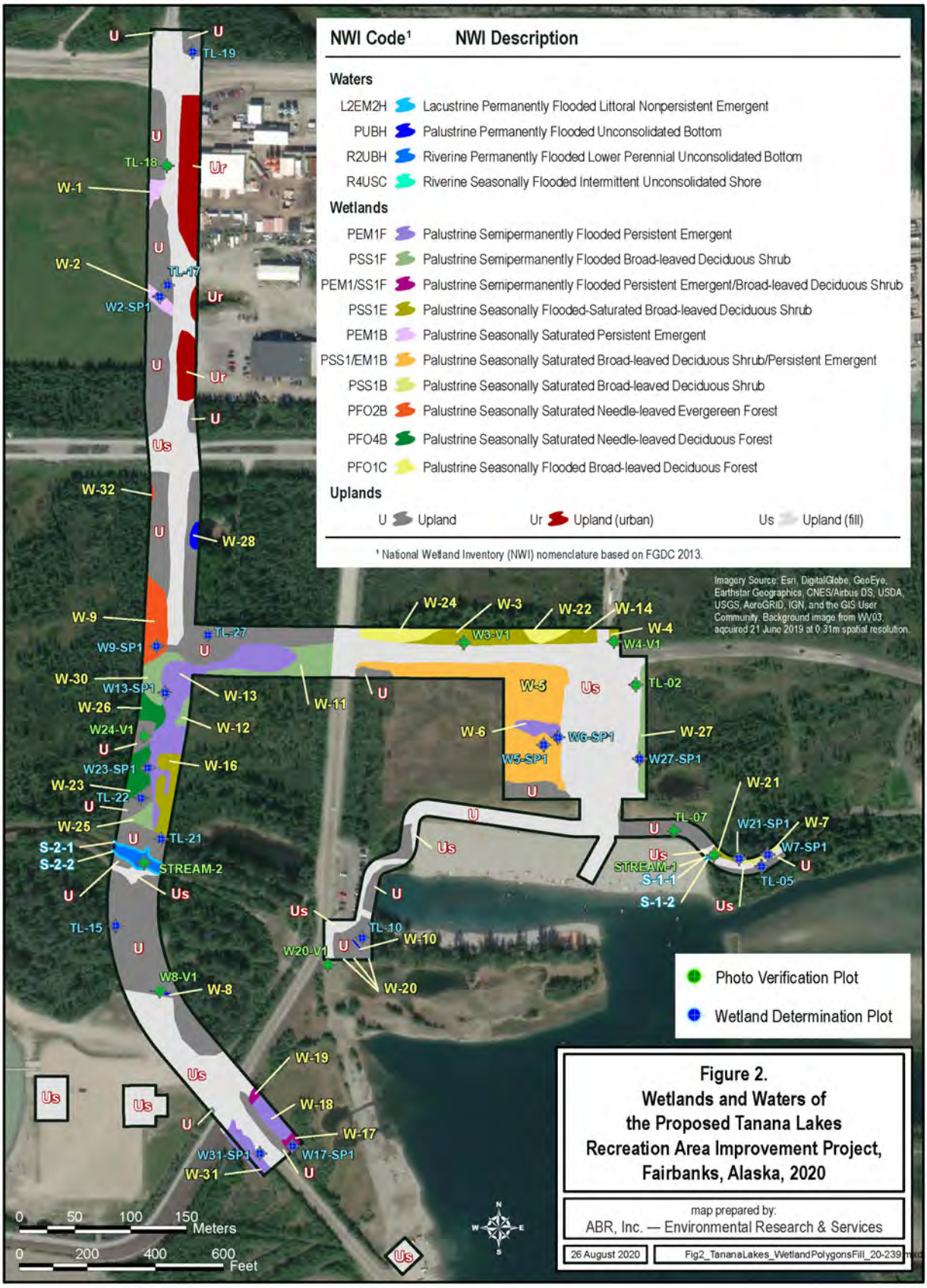
Under the new NWPR, jurisdiction is applied to four categories of waters of the U.S.: (1) the territorial seas and traditional navigable waters (TNW)s; (2) perennial and intermittent tributaries to those waters; (3) certain lakes, ponds, and impoundments; and (4) adjacent wetlands as defined by 33 CFR Parts 328 and 120—Definition of Waters of the United States. To classify wetlands and waters within the study area into jurisdictional categories and to establish connectivity to TNWs, the EPA Training and Implementation Materials were also consulted (EPA 2020). TNWs are defined as "all waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide" [33 C.F.R. Section 328 3(a)]. For the purposes of this survey the USACE navigable waters list was used to determine navigability (USACE 2020).

RESULTS AND DISCUSSION

FIELD SURVEY AND HYDROLOGICAL CONDITIONS

Standard USACE three-parameter wetland determinations were completed at 19 field plots; 11 were classified as wetlands or waters and 8 as uplands (Figure 2, Appendix A). In addition, field verification plots were completed at 10 locations (Appendix B).

Two meteorological stations are in operation near the study area: the Fairbanks Airport located 4.9 miles west of the study area, and Aurora located 4.0 miles north of the study area. Compared to long-term averages for National Climatic Data Center normal mean air


NWI Code[1]
NWI Description
Waters
L2EM2H Lacustrine Permanently Flooded Littoral Nonpersistent Emergent
PUBH Palustrine Permanently Flooded Unconsolidated Bottom
R2UBH Riverine Permanently Flooded Lower Perennial Unconsolidated Bottom
R4USC Riverine Seasonally Flooded Intermittent Unconsolidated Shore
Wetlands
PEM1F Palustrine Semipermanently Flooded Persistent Emergent
PSS1F Palustrine Semipermanently Flooded Broad-leaved Deciduous Shrub
PEM1/SS1F Palustrine Semipermanently Flooded Persistent Emergent/Broad-leaved Deciduous Shrub
PSS1E Palustrine Seasonally Flooded-Saturated Broad-leaved Deciduous Shrub
PEM1B Palustrine Seasonally Saturated Persistent Emergent
PSS1/EM1B Palustrine Seasonally Saturated Broad-leaved Deciduous Shrub/Persistent Emergent
PSS1B Palustrine Seasonally Saturated Broad-leaved Deciduous Shrub
PFO2B Palustrine Seasonally Saturated Needle-leaved Evergreen Forest
PFO4B Palustrine Seasonally Saturated Needle-leaved Deciduous Forest
PFO1C Palustrine Seasonally Flooded Broad-leaved Deciduous Forest
Uplands
U Upland
Ur Upland (urban)
Us Upland (fill)
[1] National Wetland Inventory (NWI) nomenclature based on FGDC 2013.
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community. Background image from WV03, acquired 21 June 2019 at 0.31m spatial resolution.
Photo Verification Plot
Wetland Determination Plot
0 50 100 150 Meters
0 200 400 600 Feet
Figure 2.
Wetlands and Waters of
the Proposed Tanana Lakes
Recreation Area Improvement Project,
Fairbanks, Alaska, 2020
map prepared by:
ABR, Inc. — Environmental Research & Services
26 August 2020
Fig2_TananaLakes_WetlandPolygonsFill_20-239.mxd

temperatures and total monthly precipitation, May 2020 was slightly warmer and drier than normal, while April and June 2020 were characterized by normal air temperatures but two to three times the normal precipitation (Table 1). Heavy precipitation in June 2020 was apparent in local rivers and streams. Although flows were close to the daily median in early July, the Tanana River gage at Fairbanks (15485500) recorded an approximate 25-year flow event in late June (USGS 2020).

Table 1. Monthly mean and long-term normal values for air temperature (°C) and total monthly precipitation (mm) at two meteorological stations within 5 miles of the study area.

	Aurora				Fairbanks Airport			
	Temperature (°C)		Precipitation (mm)		Temperature (°C)		Precipitation (mm)	
Month	1981–2010	2020	1981–2010	2020	1981–2010	2020	1981–2010	2020
April	0.3	0	8.1	28.1	0.3	-0.8	7.9	32.3
May	9.6	11.6	19.8	10.8	9.7	11.8	15.2	13.2
June	15.6	15	42.4	110.3	15.8	15.4	34.8	79.7

The higher than average precipitation for the months preceding the field survey in July 2020 and the high water table, which is assumed to be associated with high water in the Tanana River, likely accounted for the higher water line in Cushman Lake and flooding of saturated wetlands upslope of the existing site access roads. In this situation, surface runoff from precipitation is essentially perched on a high groundwater level causing flooding in wetland communities that are typically only saturated during the growing season.

WETLAND CLASSIFICATION AND MAPPING

WETLANDS

Ten wetland classes were mapped within the study area, including forested, shrub, and emergent wetlands, with hydrology ranging from seasonally saturated to semipermanently flooded. Their combined total area encompassed approximately 6.09 acres, or 26 percent of the study area (Table 2).

Table 2. Acreages of wetlands, waters by wetland type and name, and acreages of uplands within the mapping area for planned improvements, Tanana River Recreation Access Improvements Project, Fairbanks, AK, 2020.

NWI_Code[a]	NWI Description[a]	Wetland Name	Acres[b]	Percent of Study Area
Waters		**Total**	**0.22**	**0.96**
PUBH	Palustrine Permanently Flooded Unconsolidated Bottom	Subtotal	0.07	0.30
		W-10	0.01	0.04
		W-28	0.04	0.17
		W-8	0.01	0.04
R2UBH	Riverine Permanently Flooded Lower Perennial Unconsolidated Bottom	Stream-2	0.14	0.61
R4USC	Riverine Seasonally Flooded Intermittent Unconsolidated Shore	Stream-1	0.01	0.04
L2EM2H	Lacustrine Permanently Flooded Littoral Nonpersistent	W-20	0.01	0.04
Wetlands		**Total**	**6.09**	**26.47**
PEM1F	Palustrine Semipermanently Flooded Persistent Emergent	Subtotal	1.43	6.21
		W-13	0.99	4.30
		W-18	0.14	0.61
		W-31	0.18	0.78
		W-6	0.13	0.56
PEM1/SS1F	Palustrine Semipermanently Flooded Persistent Emergent/Broad-leaved Deciduous Shrub	Subtotal	0.07	0.30
		W-17	0.04	0.17
		W-19	0.02	0.09
PSS1F	Palustrine Semipermanently Flooded Broad-leaved Deciduous Shrub	Subtotal	0.85	3.69
		W-11	0.37	1.61
		W-12	0.04	0.17
		W-25	0.08	0.35
		W-27	0.16	0.70
		W-30	0.20	0.87
PSS1E	Palustrine Seasonally Flooded-Saturated Broad-leaved Deciduous Shrub	Subtotal	0.78	3.39
		W-14	0.12	0.52
		W-16	0.24	1.04
		W-21	0.03	0.13
		W-3	0.35	1.52
		W-4	0.04	0.17
PEM1B	Palustrine Seasonally Saturated Persistent Emergent	Subtotal	0.16	0.70
		W-1	0.07	0.30
		W-2	0.09	0.39

Table 2. Continued.

NWI_Code[a]	NWI Description[a]	Wetland Name	Acres[b]	Percent of Study Area
Wetlands (cont.)				
PSS1/EM1B	Palustrine Seasonally Saturated Broad-leaved Deciduous Shrub/Persistent Emergent	W-5	1.71	7.43
PSS1B	Palustrine Seasonally Saturated Broad-leaved Deciduous Shrub	W-7	0.05	0.22
PFO2B	Palustrine Seasonally Saturated Needle-leaved Deciduous Forest	Subtotal	0.40	1.74
		W-9	0.21	0.91
		W-32	0.02	0.09
PFO4B	Palustrine Seasonally Saturated Needle-leaved Evergreen Forest	Subtotal	0.34	1.48
PFO1C	Palustrine Seasonally Flooded Broad-leaved Deciduous Forest	Subtotal	0.32	1.39
		W-22	0.11	0.48
		W-24	0.21	0.91
Uplands		**Total**	**16.70**	**72.58**
U	Uplands	n/a	6.38	27.73
Ur	Uplands (urban)	n/a	0.86	3.74
Us	Uplands (fill)	n/a	9.46	41.11

[a] National Wetland Inventory (NWI) annotation based on FGDC (2013) classification system.
[b] All values rounded to the nearest 0.01 acre.

Palustrine Seasonally Saturated Broad-leaved Deciduous Shrub/Persistent Emergent (PSS1/EM1B) is the wetland type with the greatest mapped extent (1.71 acres) within the study area (Table 2). The dominant shrub species include *Betula nana* (dwarf birch), *Salix pulchra* (diamondleaf willow), *Myrica gale* (sweetgale), and *Chamaedaphne calyculata* (leatherleaf). The herb layer is dominated by *Equisetum arvense* (field horsetail) and *Calamagrostis canadensis* (bluejoint). Soils met the histic epipedon hydric criteria and were saturated to the surface at the time of sampling. This wetland type is located in a cleared area surrounded by roads and berms, to the west of the swim beach parking lot (see plot W5-SP1 in Appendix A and Figure 2). Hydrology in this type may be affected by the surrounding roadways, but vegetation and soils clearly indicate that wetland conditions were present prior to disturbance.

Palustrine Semipermanently Flooded Persistent Emergent (PEM1F) wetlands are nearly as abundant in the study area as PSS1/EM1B wetlands (above), with a total mapped area of 1.43 acres (Table 2). This wetland type occurs in wet sedge meadows along the proposed new road alignment (see plot W13-SP1 in Appendix A), near the non-motorized boat launch (see plot W31-SP1 in Appendix A), and in an inundated swale within the shrubby area adjacent to the swim beach parking lot (see plot W6-SP1 in Appendix A and Figure 2). Dominant species include *Carex aquatilis* (water sedge), *C. utriculata* (Northwest Territory sedge), *Calamagrostis canadensis*, *Comarum palustre* (marsh cinquefoil), and *Equisetum fluviatile* (water horsetail). All plots of this type were inundated at the time of sampling and hence no soil pits were dug. Deep surface water (>12 inches in depth) was present in some areas.

Palustrine Semipermanently Flooded Broad-leaved Deciduous Shrub (PSS1F) encompasses a total of 0.85 acre within the study area (Table 2). This wetland type occurs mainly at locations where water has been impounded, for example in the area adjacent to the swim beach parking lot (see plot W27-SP1 in Appendix A). The dominant shrub species is *M. gale*. These wetlands were flooded at the time of sampling and soil pits were not dug. Based on the prevalence of obligate wetland species, it is assumed that soils are hydric.

Palustrine Seasonally Saturated Needle-leaved Deciduous Forest (PFO2B) was mapped at 2 locations, with a total area of 0.40 acre (Table 2). The dominant tree species is *Larix laricina* (tamarack), with a shrub understory consisting primarily of *Rhododendron groenlandicum* (bog Labrador tea), *Betula glandulosa* (resin birch), and *Chamaedaphne calyculata*. Soils were histic epipedons, saturated to the surface.

Palustrine Seasonally Saturated Needle-leaved Evergreen Forest (PFO4B) occupies 0.34 acre within the study area (Table 2). This forested wetland type is part of the undisturbed riverine wetland complex along the proposed new road alignment and is dominated by *P. mariana* with an understory of *Ledum groenlandicum*. Soils were saturated histic epipedons with seasonal frost reached at 17 inches (see plot W23-SP1 in Appendix A).

Palustrine Seasonally Flooded Broad-leaved Deciduous Shrub (PSS1E) was mapped at several locations, with a total area of 0.78 acre (Table 2). This wetland type appears to occur within the study area mainly as a result of recent flooding; the areas do not appear inundated in

2019 imagery. In the area described at plot W21-SP1 (Appendix A), the vegetation was dominated by the non-native, invasive *Prunus padus* (European bird cherry), the remaining co-dominant shrub types did not constitute hydrophytic vegetation but the bare soil surface indicates flooding has been present long enough to modify the original plant community, with non-native species recolonizing. The verification plots W3-V1 and W4-V1 describe a similar situation with vegetation dominated by *Salix alaxensis* (feltleaf willow), *Populus balsamifera* (balsam poplar), *B. glandulosa*, *Alnus incana* (gray alder), *Rosa acicularis* (prickly rose), and *Chamaedaphne calyculata*. All sites were inundated at the time of sampling so no pits were dug. The flooding appears to be extensive and is at least frequent enough to impact the emergent plant stratum. For the purposes of the current field investigation these areas were determined to be wetlands with problematic vegetation. Further investigation may be required to determine the cause and frequency of the flooding.

Palustrine Seasonally Flooded Broad-leaved Deciduous Forest (PFO1C) was mapped at 2 locations along the road near the swim beach parking lot, with a combined area of 0.32 acres in the study area (Table 2). These areas are birch forests that are apparently usually uplands, but were flooded during the field survey and thus no soil pits were dug. This wetland type was classified on the basis of extensive flooding present at the time of the field survey. Additional data may be required to determine how often this site is inundated and if the hydrology of the area is altered permanently.

Palustrine Seasonally Saturated Persistent Emergent (PEM1B) wetlands in the study area (0.16 acre; Table 2) consisted of small drainage features in a fallow field along the west side of South Lathrop Avenue (see plot W2-SP1 in Appendix A). The presence of non-native plant species and vehicle tracks, as well as altered drainage due to the road, indicates that vegetation, soils, and hydrology are significantly disturbed. The vegetation is dominated by *Calamagrostis canadensis* and *E. arvense*. Non-native species recorded included *Sonchus arvensis* (sow thistle), *Hordeum jubatum* (foxtail barley), *Trifolium hybridum* (Alsike clover), and *Plantago major* (broadleaf plantain). The site has a thick organic layer underlain by a silt loam mineral layer with Alaska Redox hydric soil characteristics. At the time of sampling. the soil pit lacked primary hydrology indicators but met wetland criteria with secondary characteristics.

Palustrine Semipermanently Flooded Persistent Emergent/Broad-leaved Deciduous Shrub (PEM1/SS1F) occupies 0.07 acre in the study area (Table 2). This wetland type consists of a wet sedge meadow with interspersed sparse tall shrubs; it occurs adjacent to the Cushman Lake shoreline and along the edge of a PEM1F wetland (see plot W17-SP1 in Appendix A and Figure 2). Co-dominant shrub species are *Salix lasiandra* (Pacific willow), *S. interior* (sandbar willow), and *S. alaxensis*. Important herbaceous species include *Equisetum palustre* (marsh horsetail) and *Calamagrostis canadensis*. The site was inundated at the time of sampling with approximately 5 inches of surface water.

Palustrine Seasonally Saturated Broad-leaved Deciduous Shrub (PSS1B) encompasses 0.05 acre in the study area, at a single site adjacent to a recently constructed walking trail. The water table at the site was much higher than would be indicated by the vegetation composition. Water may be originating from flooded wetlands upslope, possibly impounded by the trail. High water levels in the Tanana River may also have been a contributing factor at the time of the field survey. The dominant shrub species is *Rosa acicularis*, with lower cover of *S. alaxensis*, *A. incana*, and *Ribes hudsonianum* (northern black currant). Sparse tree cover consisting of *Populus balsamifera* and *Picea glauca* is also present. The understory consists primarily of *E. arvense* and *Cornus canadensis* (dwarf dogwood).

STREAMS AND WATERS OF THE U.S.

Four water classes were mapped in the study area, including 2 riverine, 1 lacustrine, and 1 palustrine. Their combined total area was approximately 0.22 acres, or 0.96 percent of the study area.

Riverine Permanently Flooded Lower Perennial Unconsolidated Bottom (R2UBH) occupies 0.14 acre within the study area (Table 2). This actively flowing slough drains Cushman Lake to the west via a culvert under the boat launch access road. Water depth was approximatley 6 inches at the time of the field survey. Emergent vegetation includes *Hippuris vulgaris* (common mare's-tail), *Schoenoplectus pungens* (common threesquare), and *E. palustre*.

Palustrine Permanently Flooded Unconsolidated Bottom (PUBH) encompasses 0.07 acre in the study area (Table 2). This class includes a ditch that is likely flooded throughout the growing season in most years, and supports obligate wetland plants such as *Schoenoplectus*

tabernaemontani (softstem bulrush), *E. palustre*, and *Juncus alpinoarticulatus* (northern green rush). Several small isolated depressional features within upland forest types were also classified as PUBH. They lack inflow or outflow, have poor littoral development, and are unvegetated.

Riverine Seasonally Flooded Intermittent Unconsolidated Shore (R4USC) occupies 0.01 acre in the study area (Table 2). This small channel was constructed with landscaping fabric within the sand of the swim beach to drain the upslope wetland across the beach to Cushman Lake. At the time of the field survey, the landscaping fabric was torn and degraded. No flow was occurring, but stagnant water was present.

Lacustrine Permanently Flooded Littoral Nonpersistent Emergent (L2EM2H) encompasses 0.01 acre in the study area (Table 2) along the shoreline of Cushman Lake. This is a very well developed littoral area with both persistent emergent vegetation and rooted aquatic plants. The shoreline at the time of the field survey was much higher than in the June 2019 aerial photograph used for mapping the site. However, the presence of obligate wetland plant species such as *S. tabernaemontani* and *Typha latifolia* indicate that the area is typically flooded.

UPLANDS

Uplands occupied a total of 16.7 acres, or 73% of the study area (Table 2). Uplands (fill; Us) constituted the largest portion of the acreage (approximately 9.5 acres). Natural Uplands (U) included mature black spruce, poplar, birch, and mixed forests, as well as fallow fields and dry roadsides; these areas combined occupy approximately 6.4 acres. The industrial area along South Lathrop Avenue north of the levee was classified as Uplands (urban; Ur) and occupies approximately 0.9 acre in the study area.

WETLAND FUNCTIONAL ASSESSMENT

The 14 mapped NWI wetlands and waters types were aggregated into 8 wetland functional classes for analysis (Table 3, Appendix C). Of the 8 wetland functional classes, 4 are waters and 4 are wetlands. NWI wetland types with similar functions were grouped first according to HGM class, then NWI classification system and subsystem breaks, and finally by water regime (see Table 3 for NWI groupings within wetland functional classes).

Table 3. Functional Capacity Index (FCI) scores for wetlands and waters functional classes within the mapping area for planned improvements, Tanana River Recreation Access Improvements Project, Fairbanks, AK, 2020.

Wetland Functional Class	Flood Flow Regulation	Sediment/ Nutrient/ Toxicant Removal	Erosion Control & Shoreline Stabilization	Organic Matter Production and Export	Avian and Mammal Habitat Suitability	Fish Habitat Suitability	Education/ Science/ Rec/ Subsist Use
Waters							
Lower Perennial Stream R2UBH	0.25	1.00	0.33	1.00	0.33	0.80	1.00
Intermittent Stream R4USC	0.25	0.75	0.00	0.50	0.00	0.00	1.00
Lacustrine Lentic Waters L2EM2H	0.75	1.00	0.00	1.00	0.33	1.00	1.00
Palustrine Lentic Waters PUBH	0.50	0.50	N/A	0.00	0.00	0.20	1.00
Wetlands							
Semipermanently Flooded Wetlands PEM1F, PEM1/SS1F, PSS1F	0.75	0.66	N/A	1.00	0.75	N/A	1.00
Seasonally Flooded Wetlands PSS1E, PFO1C	0.75	0.66	N/A	1.00	0.50	N/A	1.00
Seasonally Saturated Emergent and Shrub Scrub PEM1B, PSS1/EM1B, PSS1B	0.50	0.50	N/A	0.00	0.50	N/A	1.00
Seasonally Saturated Needle-leaved Forest PFO2B, PFO4B	0.50	0.50	N/A	0.66	0.50	N/A	1.00

The TLRA is in public use and provides numerous educational, recreational, and subsistence uses since the area has been improved to include swim beaches, playgrounds, boat rentals, and boat launches. All wetland functional classes were rated with an FCI value of 1 for this function.

Fish habitat suitability and erosion control and shoreline stabilization were not assessed for any wetlands because they are not directly bordering any waterbodies, The waters present in the study area were assessed (Table 3).

Flood flow regulation was ranked under 0.50 FCI for all waters except Lacustrine Lentic Waters and >0.50 for all wetlands. Most waters in the study area are inherently poor in regulating floodwaters except where storage is available in depressional features or where dense shoreline vegetation persists as for Lacustrine Lentic Waters. Semipermanently Flooded and Seasonally Flooded wetlands scored high on the basis of thick emergent vegetation and the capacity for emergent vegetation to attenuate floodwaters through sheet flow.

Rankings for sediment/nutrient and toxicant removal were >0.50 for waters and >0.50 and <0.66 for wetlands. Lower Perennial Stream and Lacustrine Lentic Waters have dense emergent vegetation bordering a waterbody with the capacity to filter pollutants that may result from roadway runoff. Wetlands also had dense vegetation and thick organic mats to filter runoff but did not have extensive interspersion of vegetation and water and did not show evidence of repeat flooding events.

Erosion control and shoreline stabilization was rated <0.33 for all waters and not assessed for wetlands because the wetlands in the study area do not directly abut any waterbodies. Most of the substrates in the area are composed of highly erodible sands and silts, and review of historical imagery indicates that shorelines are changing rapidly in the area due to increased flooding and changes in channel morphology.

Organic matter production and export ranked >0.66 to 1.00 for all wetlands and waters in the study area. Lower Perennial Stream, Lacustrine Lentic Waters, Semipermanently Flooded, and Seasonally Flooded wetlands all had FCI values of 1.00, on the basis of dense vegetation, frequent flood events, and availability of organic materials.

Avian and mammal habitat suitability was rated between 0.33 and 0.50 FCI for most functional classes, though Semipermanently Flooded Wetlands (marsh habitats) had an FCI score of 0.75. Breeding bird species were observed in June 2020 (ABR 2020) in habitats in all four wetland functional classes but not in any of the four waters classes. The waters classes in the study area are represented by small, isolated waterbodies and are relatively unattractive to breeding birds. They will also be sparingly used by foraging shorebirds and waterbirds. Suitable habitat structure (vegetation strata) for use by bird and mammal species was present throughout the study area.

The Lacustrine Lentic Waters were mapped at the edge of Cushman Lake in an area that appears to be seasonally flooded based on analysis of historical imagery. Based on the well-developed vascular aquatic and emergent aquatic plant community on the shoreline the area is very likely to be connected to Cushman Lake for significant periods throughout the growing season. Lacustrine Lentic Waters ranked high for Fish Habitat Suitability with an FCI score of 1.00. It was assumed that Cushman Lake was deep enough to provide overwintering habitat, connectivity to the fish bearing Tanana River (ADF&G 2020) indicated that fish are present and suitable rearing and spawning habitat is available. The Lower Perennial Stream also ranked high with an FCI of 0.80, lacking only the capacity to provide overwintering habitat based on the shallow channel depth.

PROPOSED JURISDICTIONAL STATUS

The nearest TNW to the study area is the Tanana River (USACE 2020; Figure 1). Cushman Lake is a permanently flooded waterbody created through the impoundment of river water. It is immediately abutting the active channel (the edge of the lake is only separated by a natural levee with a surface water connection to the main channel) of the Tanana River and also connected via surface water flowing in a side slough (STREAM-2). STREAM-2 was considered a jurisdictional tributary on the basis that it connects directly to the Tanana River (Figures 1 and 2). STREAM-1 is intermittent lotic water that conveys water intermittently from upslope wetlands into Cushman Lake on the east side of the swim beach (Figure 2). STREAM-1 was considered a tributary on the basis of downstream connectivity to the Tanana River via Cushman Lake (Table 4).

The majority of the wetlands identified in the study area were considered to be adjacent wetlands on the basis that they abut Cushman Lake, STREAM-2, are drained by STREAM-1, or are part of the naturally occurring riverine wetland complex that directly abuts the Tanana River. PUBH waters mapped as W-8, W-10, and W-28 are proposed as non-jurisdictional on the basis that they are formed in depressions likely resulting from prior gravel mining or construction in the area; they are completely surrounded by uplands and no surface water inlets or outlets were observed during the field survey (Figure 2 and Table 4).

Table 4. Connectivity characteristics and proposed jurisdictional classification for each mapped wetland within the mapping area for planned improvements, Tanana River Recreation Access Improvements Project, Fairbanks, AK, 2020.

Wetland Name	NWI Code	Area (acres)	Jurisdictional class	Characteristics
Stream-1	R4USC	0.01	tributary	Constructed ditch contributing intermittent flow from upstream wetlands to Cushman lake, to STREAM-2, and then to the Tanana River
Stream-2	R2UBH	0.14	tributary	Active riparian slough with perennial flow connecting directly to the Tanana River
W-1	PEM1B	0.07	review required	Possibly non-jurisdictional as an exemption for prior converted cropland with no direct surface water connection
W-2	PEM1B	0.09	review required	Possibly non-jurisdictional as an exemption for prior converted cropland with no direct surface water connection
W-3	PSS1E	0.35	review required	Impounded wetlands with no direct surface water connection
W-4	PSS1E	0.04	review required	Impounded wetlands with no direct surface water connection
W-5	PSS1/EM1B	1.71	adjacent wetlands	Wetland abuts Cushman Lake, connected directly to the Tanana River through STREAM-2
W-6	PEM1F	0.13	adjacent wetlands	Wetland abuts W-5
W-7	PSS1B	0.05	adjacent wetlands	Wetland abuts W-21
W-8	PUBH	0.01	non-jurisdictional	Constructed ditch within surrounding uplands, flooding likely to be solely from precipitation
W-9	PFO2B	0.38	adjacent wetlands	Wetland is part of the undisturbed riverine wetland complex directly abutting the Tanana River
W-10	PUBH	0.01	non-jurisdictional	Depression possibly from prior gravel mining operations, flooding likely to be solely from precipitation
W-11	PSS1F	0.37	adjacent wetlands	Wetland is part of the undisturbed riverine wetland complex directly abutting the Tanana River
W-12	PSS1F	0.04	adjacent wetlands	Wetland is part of the undisturbed riverine wetland complex directly abutting the Tanana River
W-13	PEM1F	0.99	adjacent wetlands	Wetland is part of the undisturbed riverine wetland complex directly abutting the Tanana River
W-14	PSS1E	0.21	adjacent wetlands	Wetland is part of the undisturbed riverine wetland complex directly abutting the Tanana River
W-16	PSS1E	0.24	adjacent wetlands	Wetland is part of the undisturbed riverine wetland complex directly abutting the Tanana River
W-17	PEM1/SS1F	0.04	adjacent wetlands	Wetland directly abuts Cushman Lake
W-18	PEM1F	0.14	adjacent wetlands	Wetland directly abuts Cushman Lake
W-19	PEM1/SS1F	0.02	adjacent wetlands	Wetland directly abuts Cushman Lake
W-20	L2EM2H	0.01	adjacent wetlands	Wetland directly abuts Cushman Lake
W-21	PSS1F	0.03	adjacent wetlands	Wetland connects to Cushman Lake via STREAM-1

Table 4. Continued.

Wetland Name	NWI Code	Area (acres)	Jurisdictional class	Characteristics
W-22	PFO1C	0.11	review required	Impounded wetlands with no surface water connection
W-23	PFO4B	0.12	review required	Impounded wetlands with no surface water connection
W-24	PFO1C	0.21	review required	Impounded wetlands with no surface water connection
W-25	PSS1F	0.08	adjacent wetlands	Wetland directly abuts STREAM-2
W-26	PFO4B	0.13	adjacent wetlands	Wetland is part of the undisturbed riverine wetland complex directly abutting the Tanana River
W-27	PSS1F	0.16	adjacent wetlands	Wetland drains to Cushman Lake through STREAM-1
W-28	PUBH	0.04	non-jurisdictional	Flooded depression, possibly from prior gravel mining, surrounded by uplands, no surface water inlets or outlets observed during field survey
W-30	PSS1F	0.20	adjacent wetlands	Wetland is part of the undisturbed riverine wetland complex directly abutting the Tanana River
W-31	PEM1F	0.18	adjacent wetlands	Wetland directly abuts the Tanana River
W-32	PFO2B	0.02	adjacent wetlands	Wetland is part of the undisturbed riverine wetland complex directly abutting the Tanana River

Based on the new NWPR, seven wetlands are potentially in a non-jurisdictional category but further review should be provided by the USACE. Wetlands W-3, W-4, W-22, W-23, and W-24 are all located on the river side of the flood control levee but have impounded waters due to the presence of existing site access roads with no active culverts. These wetlands may not meet the criteria of adjacency because they are separated from the active Tanana River floodplain by an artificial structure with no built-in surface water connection. We believe that these wetlands were flooded at the time of field sampling because of high rainfall in the Fairbanks area combined with a high water table due to peak flows in the Tanana River. Further review will be required to determine adjacency of these wetlands in light of the NWPA.

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Appendix A. Wetland Determination Plot Forms

Wetland Determination Data Form - Alaska Region

Project/Site: TLRA Improvements; Wetland Delineation Borough/City: Fairbanks Northstar Borough Sampling Date: 2020-07-08
Applicant/Owner: Federal Highway Administration (FHWA) Sampling Point: W2-SP1
Investigator(s): WAD, JPP Landform (hillside, terrace, hummocks, etc.): Water Tracks Or Feather Pattern
Local relief (concave, convex, none): concave Slope: 0.0 % / 0.0 ° Elevation: 464
Subregion: Alaska Lat.: 64.8039 Long.: -147.7449 Datum: WGS84
Soil Map Unit Name: Tanana-Mosquito complex NWI classification: PEM1B
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ✓, Soil ✓, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

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

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

Remarks: Swale visible in imagery within the fallow field on the west side of S. Lathrop St. Assume veg, soil and hydrology significantly disturbed because of the presence of non-native plants, evidence of vehicle tracks and altered drainage because of the road.

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

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
	Total Cover:	0.0		
	50% of total cover: 0.0		20% of total cover: 0.0	
	Sapling/Shrub Stratum			
	Total Cover:	0.0		
	50% of total cover: 0.0		20% of total cover: 0.0	
	Herb Stratum			
1.	Calamagrostis canadensis	45.0	✓	FAC
2.	Equisetum arvense	10.0		FAC
3.	Sonchus arvensis	5.0		FACU
4.	Carex utriculata	5.0		OBL
5.	Carex aquatilis	5.0		OBL
6.	Hordeum jubatum	4.0		FACU
7.	Achillea millefolium	2.0		FACU
8.	Poa pratensis	2.0		FACU
9.	Beckmannia syzigachne	2.0		OBL
10.	Trifolium hybridum	2.0		FAC
11.	Rorippa hispida	2.0		
12.	Plantago major	1.0		FAC
13.	Moehringia lateriflora	1.0		FACU
	Total Cover:	86.0		
	50% of total cover: 43.0		20% of total cover: 17.2	

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	12.0	× 1 =	12.0
FACW Species	0.0	× 2 =	0.0
FAC Species	58.0	× 3 =	174.0
FACU Species	14.0	× 4 =	56.0
UPL Species	0.0	× 5 =	0.0
Column Totals:	84.0 (A)		242.0 (B)

Prevalence Index = B/A = 2.881

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

Plot size (radius, or length × width) 1m radius
% Cover of Wetland Bryophytes (Where applicable) 0.0
% Bare Ground 0.0
Total Cover of Bryophytes 0.0

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: Unk gram 1 = poa pratensis Unk gram 2 = beckmannia syzigachne

SOIL

Sampling Point: W2-SP1

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks
0-1		0.0					peat		
1-9		0.0					muck		
9-11		0.0					muck		
11-14	5y 3/2	90	7.5yr 4/6	10	C	PL	silt loam		

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

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

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

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: No Data

Depth (inches): -1000

Hydric Soil Present? Yes ✓ No ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

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

Wetland Hydrology Present? Yes ✓ No ____

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

Remarks: Swale within agricultural field, microtopgraphic depressions wth evidence of fooding

Sampling Point: W2-SP1
NWI classification: PEM1B

Hydric Soil Indicators: Alaska Redox (A14)
Wetland Hydrology Indicators: Geomorphic Position (D2), Drainage Patterns (B10)

Wetland Determination Data Form - Alaska Region

Project/Site: TLRA Improvements; Wetland Delineation Borough/City: Fairbanks Northstar borough Sampling Date: 2020-07-07
Applicant/Owner: Federal Highway Administration (FHWA) Sampling Point: W5-SP1
Investigator(s): JPP, WAD Landform (hillside, terrace, hummocks, etc.): Flat or fluvial related
Local relief (concave, convex, none): concave Slope: 0.0 % / 0.0 ° Elevation: 473
Subregion: Alaska Lat.: 64.8004 Long.: -147.7374 Datum: WGS84
Soil Map Unit Name: Tanana-Mosquito complex NWI classification: PSS1/EM1B
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

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

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

Remarks: Located in a cleared field adjacent to the beach parking area. Completely surrounded by roads and berms.

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

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
	Total Cover:	0.0		
	50% of total cover: 0.0		20% of total cover: 0.0	
	Sapling/Shrub Stratum			
1.	Betula nana	15.0	✓	FAC
2.	Salix pulchra	10.0	✓	FACW
3.	Myrica gale	10.0	✓	OBL
4.	Chamaedaphne calyculata	10.0	✓	FACW
5.	Salix niphoclada	5.0		
6.	Salix interior	5.0		FACW
7.	Salix alaxensis	5.0		FAC
8.	Rhododendron groenlandicum	5.0		FAC
9.	Vaccinium uliginosum	1.0		FAC
	Total Cover:	66.0		
	50% of total cover: 33.0		20% of total cover: 13.2	
	Herb Stratum			
1.	Equisetum arvense	15.0	✓	FAC
2.	Calamagrostis canadensis	15.0	✓	FAC
3.	Dasiphora fruticosa	4.0		FAC
4.	Iris setosa	1.0		FAC
	Total Cover:	35.0		
	50% of total cover: 17.5		20% of total cover: 7.0	

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 6 (A)
Total Number of Dominant Species Across all Strata: 6 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	10.0	× 1 =	10.0
FACW Species	25.0	× 2 =	50.0
FAC Species	61.0	× 3 =	183.0
FACU Species	0.0	× 4 =	0.0
UPL Species	0.0	× 5 =	0.0
Column Totals:	96.0 (A)		243.0 (B)

Prevalence Index = B/A = 2.531

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

Plot size (radius, or length × width)	5m radius
% Cover of Wetland Bryophytes (Where applicable)	5.0
% Bare Ground	0.0
Total Cover of Bryophytes	25.0

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

SOIL

Sampling Point: W5-SP1

Depth	Matrix			Redox Features						
(inches)	Color (moist)		%	Color (moist)		%	Type[1]	Loc[2]	Texture	Mod	Remarks
0-3			0.0						peat		
3-7	10yr	3/2				0			mucky peat		
7-9	7.5yr	2.5/2				0			muck		
9-12	10yr	4/2	90	7.5yr	4/6	10	C	PL	silt		

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

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

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

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: No Data

Depth (inches): -1000

Hydric Soil Present? Yes _✓_ No ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

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

Wetland Hydrology Present? Yes _✓_ No ____

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

Remarks: Hydrology may be disturbed by surrounding roadways but vegetation and soils clearly indicate wetland conditions predating disturbance.

Sampling Point: W5-SP1
NWI classification: PSS1/EM1B

Hydric Soil Indicators: Histic Epipedon (A2)
Wetland Hydrology Indicators: High Water Table (A2), FAC-Neutral Test (D5), Saturation (A3)

Wetland Determination Data Form - Alaska Region

Project/Site: TLRA Improvements; Wetland Delineation Borough/City: Fairbanks Northstar Borough Sampling Date: 2020-07-07
Applicant/Owner: Federal Highway Administration (FHWA) Sampling Point: W6-SP1
Investigator(s): WAD Landform (hillside, terrace, hummocks, etc.): Flat or fluvial related
Local relief (concave, convex, none): concave Slope: 0.0 % / 0.0 ° Elevation: 498
Subregion: Alaska Lat.: 64.7988 Long.: -147.7407 Datum: WGS84
Soil Map Unit Name: Salchaket very fine sandy loam NWI classification: PEM1F
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

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

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

Remarks: Inundated swale within the shrubby meadow adjacent to the parking area. Vehicle tracks running through plot.

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

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
	Total Cover:	0.0		
	50% of total cover: 0.0		20% of total cover: 0.0	
	Sapling/Shrub Stratum			
	Total Cover:	0.0		
	50% of total cover: 0.0		20% of total cover: 0.0	
	Herb Stratum			
1.	Equisetum fluviatile	25.0	✓	OBL
2.	Schoenoplectus tabernaemontani	5.0		OBL
3.	Comarum palustre	5.0		OBL
4.	Carex aquatilis	5.0		OBL
5.	Calamagrostis canadensis	2.0		FAC
	Total Cover:	42.0		
	50% of total cover: 21.0		20% of total cover: 8.4	

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	40.0	× 1 =	40.0
FACW Species	0.0	× 2 =	0.0
FAC Species	2.0	× 3 =	6.0
FACU Species	0.0	× 4 =	0.0
UPL Species	0.0	× 5 =	0.0
Column Totals:	42.0	(A)	46.0 (B)

Prevalence Index = B/A = 1.095

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

Plot size (radius, or length × width)	1m radius
% Cover of Wetland Bryophytes (Where applicable)	0.0
% Bare Ground	0.0
Total Cover of Bryophytes	0.0

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

Soil

Sampling Point: W6-SP1

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

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

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

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

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type:

Depth (inches):

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

Remarks: No pit, site inundated

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

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

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

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

Remarks: Vehicle tracks running through the plot

Sampling Point: W6-SP1
NWI classification: PEM1F

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

No Soil Pit Photo Taken

Wetland Determination Data Form - Alaska Region

Project/Site: TLRA Improvements; Wetland Delineation Borough/City: Fairbanks Northstar Borough Sampling Date: 2020-07-07
Applicant/Owner: Federal Highway Administration (FHWA) Sampling Point: W7-SP1
Investigator(s): JPP, WAD Landform (hillside, terrace, hummocks, etc.): Flat or fluvial related
Local relief (concave, convex, none): none Slope: 0.0 % / 0.0 ° Elevation: 478
Subregion: Alaska Lat.: 64.7996 Long.: -147.7331 Datum: WGS84
Soil Map Unit Name: Eielson-Piledriver complex NWI classification: PSS1B
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ✓, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

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

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

Remarks: Open mixed forest, water table much higher than would be indicated by vegetation composition. Water flowing from flooded upstream wetlands possibly impounded by downslope hiking trail and also high river water. Vegetation may be considered problematic.

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

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1.	Populus balsamifera	10.0	✓	FACU
2.	Picea glauca	5.0	✓	FACU
	Total Cover:	15.0		
	50% of total cover: 7.5		20% of total cover: 3.0	
	Sapling/Shrub Stratum			
1.	Rosa acicularis	25.0	✓	FACU
2.	Salix alaxensis	5.0		FAC
3.	Alnus incana	5.0		FAC
4.	Ribes hudsonianum	4.0		FAC
	Total Cover:	39.0		
	50% of total cover: 19.5		20% of total cover: 7.8	
	Herb Stratum			
1.	Equisetum arvense	65.0	✓	FAC
2.	Cornus canadensis	35.0	✓	FACU
3.	Calamagrostis canadensis	5.0		FAC
	Total Cover:	105.0		
	50% of total cover: 52.5		20% of total cover: 21.0	

Dominance Test worksheet:

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

Total Number of Dominant Species Across all Strata: 5 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 20.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0.0	× 1 =	0.0
FACW Species	0.0	× 2 =	0.0
FAC Species	84.0	× 3 =	252.0
FACU Species	75.0	× 4 =	300.0
UPL Species	0.0	× 5 =	0.0
Column Totals:	159.0 (A)		552.0 (B)

Prevalence Index = B/A = 3.472

Hydrophytic Vegetation Indicators:

_____ Dominance Test is > 50%

_____ Prevalence Index is ≤ 3.0

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

✓ Problematic Hydrophytic Vegetation[1] (Explain)

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

Plot size (radius, or length × width): 5m radius

% Cover of Wetland Bryophytes (Where applicable): ____

% Bare Ground: 0.0

Total Cover of Bryophytes: 1.0

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

Remarks: Both hydric soil and hydrologic indicators are present, the site is located on an active floodplain and there is evidence that the newly constructed hiking trail may be altering the hydrology. Since the trail was constructed recently the vegetation may not have had time to adjust to a higher water table periodically through the growing season.

SOIL

Sampling Point: W7-SP1

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type[1]	Loc[2]	Texture	Mod	Remarks
0-5	Not Assessed	NA	100						peat		
5-9	10yr	3/1	80	10yr	3/6	20	C	PL	sandy loam		
9-10			0.0						muck		
10-12	10yr	3/1	90	10yr	4/6	10	C	PL	sandy loam		
12-15			0.0						muck		

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

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

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

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: Unknown

Depth (inches): 1000

Hydric Soil Present? Yes _✓_ No ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

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

Wetland Hydrology Present? Yes _✓_ No ____

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

Remarks: Water table much higher than expected for this site, see site remarks

Sampling Point: W7-SP1
NWI classification: PSS1B

Hydric Soil Indicators: Histic Epipedon (A2)
Wetland Hydrology Indicators: Saturation (A3), Presence of Reduced Iron (C4), High Water Table (A2), Geomorphic Position (D2)

Wetland Determination Data Form - Alaska Region

Project/Site: TLRA Improvements; Wetland Delineation Borough/City: Fairbanks Northstar Borough Sampling Date: 2020-07-08
Applicant/Owner: Federal Highway Administration (FHWA) Sampling Point: W9-SP1
Investigator(s): JPP, WAD Landform (hillside, terrace, hummocks, etc.): Flat or fluvial related
Local relief (concave, convex, none): none Slope: 0.0 % / 0.0 ° Elevation: 476
Subregion: Alaska Lat.: 64.8011 Long.: -147.7448 Datum: WGS84
Soil Map Unit Name: Tanana-Mosquito complex NWI classification: PFO2B
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

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

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

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

Remarks: Tamarack forest along border of sedge marsh

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

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1.	Larix laricina	55.0	✓	FACW
	Total Cover:	55.0		
	50% of total cover: 27.5		20% of total cover: 11.0	
	Sapling/Shrub Stratum			
1.	Rhododendron groenlandicum	65.0	✓	FAC
2.	Betula glandulosa	40.0	✓	FAC
3.	Chamaedaphne calyculata	15.0		FACW
4.	Salix glauca	5.0		FAC
5.	Picea glauca	5.0		FACU
6.	Vaccinium uliginosum	1.0		FAC
	Total Cover:	131.0		
	50% of total cover: 65.5		20% of total cover: 26.2	
	Herb Stratum			
1.	Equisetum arvense	5.0	✓	FAC
2.	Dasiphora fruticosa	4.0	✓	FAC
3.	Calamagrostis canadensis	1.0		FAC
	Total Cover:	10.0		
	50% of total cover: 5.0		20% of total cover: 2.0	

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0.0	× 1 =	0.0
FACW Species	70.0	× 2 =	140.0
FAC Species	121.0	× 3 =	363.0
FACU Species	5.0	× 4 =	20.0
UPL Species	0.0	× 5 =	0.0
Column Totals:	196.0 (A)		523.0 (B)

Prevalence Index = B/A = 2.668

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

Plot size (radius, or length × width) 5m radius
% Cover of Wetland Bryophytes (Where applicable) 75.0
% Bare Ground 0.0
Total Cover of Bryophytes 75.0

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

Remarks: Tamarack stand, moss cover is entirely live sphagnum

Soil

Sampling Point: W9-SP1

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks
0-6							peat		
6-8							mucky peat		
8-12							muck		

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

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

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

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: Seasonal Frost

Depth (inches): 14

Hydric Soil Present? Yes ✓ No ____

Remarks:

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

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

Wetland Hydrology Present? Yes ✓ No ____

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

Remarks:

Sampling Point: W9-SP1
NWI classification: PFO2B

Hydric Soil Indicators: Histosol or Histel (A1)
Wetland Hydrology Indicators: FAC-Neutral Test (D5), Saturation (A3), High Water Table (A2)

Wetland Determination Data Form - Alaska Region

Project/Site: TLRA Improvements; Wetland Delineation Borough/City: Fairbanks Northstar Borough Sampling Date: 2020-07-08
Applicant/Owner: Federal Highway Administration (FHWA) Sampling Point: W13-SP1
Investigator(s): WAD Landform (hillside, terrace, hummocks, etc.): Flat or fluvial related
Local relief (concave, convex, none): concave Slope: 0.0 % / 0.0 ° Elevation: 474
Subregion: Alaska Lat.: 64.8008 Long.: -147.7445 Datum: WGS84
Soil Map Unit Name: Tanana-Mosquito complex NWI classification: PEM1F
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

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

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

Remarks: Wet sedge marsh, disturbed by 4 wheeler trail along the proposed road alignment

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

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
	Total Cover:	0.0		
	50% of total cover: 0.0		20% of total cover: 0.0	
	Sapling/Shrub Stratum			
	Total Cover:	0.0		
	50% of total cover: 0.0		20% of total cover: 0.0	
	Herb Stratum			
1.	Carex aquatilis	40.0	✓	OBL
2.	Calamagrostis canadensis	35.0	✓	FAC
3.	Carex utriculata	30.0	✓	OBL
4.	Comarum palustre	20.0		OBL
	Total Cover:	125.0		
	50% of total cover: 62.5		20% of total cover: 25.0	

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across all Strata: 3 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	90.0	× 1 =	90.0
FACW Species	0.0	× 2 =	0.0
FAC Species	35.0	× 3 =	105.0
FACU Species	0.0	× 4 =	0.0
UPL Species	0.0	× 5 =	0.0
Column Totals:	125.0 (A)		195.0 (B)

Prevalence Index = B/A = 1.560

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

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

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

Soil

Sampling Point: W13-SP1

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

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

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

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

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type:

Depth (inches):

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

Remarks: Site inundated, no pit

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

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

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

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

Remarks:

Sampling Point: W13-SP1
NWI classification: PEM1F

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

No Soil Pit Photo Taken

Wetland Determination Data Form - Alaska Region

Project/Site: TLRA Improvements; Wetland Delineation Borough/City: Fairbanks Northstar borough Sampling Date: 2020-07-07
Applicant/Owner: Federal Highway Administration (FHWA) Sampling Point: W17-SP1
Investigator(s): WAD Landform (hillside, terrace, hummocks, etc.): Flat or fluvial related
Local relief (concave, convex, none): concave Slope: 0.0 % / 0.0 ° Elevation: 476
Subregion: Alaska Lat.: 64.7975 Long.: -147.7426 Datum: WGS84
Soil Map Unit Name: Salchaket very fine sandy loam NWI classification: PEM1/SS1F
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

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

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

Remarks: Wet meadow on the edge of the lake interspersed with tall willow.

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

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
	Total Cover:	0.0		
	50% of total cover: 0.0	20% of total cover: 0.0		
	Sapling/Shrub Stratum			
1.	Salix alaxensis	10.0	✓	FAC
2.	Salix lasiandra	10.0	✓	FACW
3.	Salix interior	10.0	✓	FACW
	Total Cover:	30.0		
	50% of total cover: 15.0	20% of total cover: 6.0		
	Herb Stratum			
1.	Equisetum palustre	15.0	✓	FACW
2.	Calamagrostis canadensis	10.0	✓	FAC
3.	Comarum palustre	5.0	____	OBL
4.	Equisetum arvense	5.0	____	FAC
5.	Chamaenerion angustifolium	3.0	____	FACU
6.	Carex saxatilis	1.0	____	FACW
	Total Cover:	39.0		
	50% of total cover: 19.5	20% of total cover: 7.8		

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	5.0	× 1 =	5.0
FACW Species	36.0	× 2 =	72.0
FAC Species	25.0	× 3 =	75.0
FACU Species	3.0	× 4 =	12.0
UPL Species	0.0	× 5 =	0.0
Column Totals:	69.0	(A)	164.0 (B)

Prevalence Index = B/A = 2.377

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

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

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

Soil

Sampling Point: W17-SP1

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

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

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

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

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: No Data

Depth (inches): -1000

Hydric Soil Present? Yes ✓ No ____

Remarks: No pit, site inundated

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

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

Wetland Hydrology Present? Yes ✓ No ____

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

Remarks:

Sampling Point: W17-SP1
NWI classification: PEM1/SS1F

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

No Soil Pit Photo Taken

Wetland Determination Data Form - Alaska Region

Project/Site: TLRA Improvements; Wetland Delineation Borough/City: Fairbanks Northstar Borough Sampling Date: 2020-07-07
Applicant/Owner: Federal Highway Administration (FHWA) Sampling Point: W21-SP1
Investigator(s): WAD Landform (hillside, terrace, hummocks, etc.): Flat or fluvial related
Local relief (concave, convex, none): none Slope: 0.0 % / 0.0 ° Elevation: 504
Subregion: Alaska Lat.: 64.7995 Long.: -147.7336 Datum: WGS84
Soil Map Unit Name: Eielson-Piledriver complex NWI classification: PSS1E
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ✓ naturally problematic? (If needed, explain any answers in Remarks.)

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

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

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

Remarks: Site is located upslope of the hiking trail and water appears to impounded. Forest floor is barren, understory vegetation appears to be impacted but flooding may not have been present long enough for obligate plant species to establish and for overstory species to begin dying out.

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

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
	Total Cover:	0.0		
	50% of total cover: 0.0		20% of total cover: 0.0	
	Sapling/Shrub Stratum			
1.	Prunus padus	85.0	✓	FACU
2.	Alnus incana	10.0	____	FAC
3.	Rosa acicularis	5.0	____	FACU
4.	Salix bebbiana	4.0	____	FAC
	Total Cover:	104.0		
	50% of total cover: 52.0		20% of total cover: 20.8	
	Herb Stratum			
1.	Equisetum arvense	1.0	____	FAC
	Total Cover:	1.0		
	50% of total cover: 0.5		20% of total cover: 0.2	

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0.0	× 1 =	0.0
FACW Species	0.0	× 2 =	0.0
FAC Species	15.0	× 3 =	45.0
FACU Species	90.0	× 4 =	360.0
UPL Species	0.0	× 5 =	0.0
Column Totals:	105.0 (A)		405.0 (B)

Prevalence Index = B/A = 3.857

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

Plot size (radius, or length × width) 5m radius
% Cover of Wetland Bryophytes (Where applicable) 0.0
% Bare Ground 25.0
Total Cover of Bryophytes 0.0

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

Remarks: Forest floor is mostly composed of dead woody debris with few surviving plants in the herb stratum.

Soil

Sampling Point: W21-SP1

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

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

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

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

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: No Data

Depth (inches): -1000

Hydric Soil Present? Yes _✓_ No ____

Remarks: No pit due to flooding but assume histic epipedon similar to neighboring plot

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

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

Wetland Hydrology Present? Yes _✓_ No ____

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

Remarks: Water may be impounded upslope of trail, creating wetlands

Sampling Point: W21-SP1
NWI classification: PSS1E

Hydric Soil Indicators: Other (explain in remarks)
Wetland Hydrology Indicators: Saturation (A3), Surface Water (A1), Hydrogen Sulfide Odor (C1), High Water Table (A2), Water-Stained Leaves (B9), Geomorphic Position (D2)

No Soil Pit Photo Taken

Wetland Determination Data Form - Alaska Region

Project/Site: TLRA Improvements; Wetland Delineation Borough/City: Fairbanks Northstar borough Sampling Date: 2020-07-08
Applicant/Owner: Federal Highway Administration (FHWA) Sampling Point: W23-SP1
Investigator(s): WAD, JPP Landform (hillside, terrace, hummocks, etc.):
Local relief (concave, convex, none): none Slope: 0.0 % / 0.0 ° Elevation: 490
Subregion: Alaska Lat.: 64.8002 Long.: -147.7449 Datum: WGS84
Soil Map Unit Name: Tanana mucky silt loam NWI classification: PFO4B
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

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

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

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

Remarks:

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

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1.	Picea mariana	20.0	✓	FACW
2.	Betula neoalaskana	10.0	✓	FACU
	Total Cover:	30.0		
	50% of total cover: 15.0		20% of total cover: 6.0	
	Sapling/Shrub Stratum			
1.	Rhododendron groenlandicum	35.0	✓	FAC
2.	Betula glandulosa	10.0	✓	FAC
3.	Betula neoalaskana	10.0	✓	FACU
4.	Vaccinium vitis-idaea	10.0	✓	FAC
5.	Chamaedaphne calyculata	5.0		FACW
6.	Myrica gale	1.0		OBL
7.	Larix laricina	1.0		FACW
	Total Cover:	72.0		
	50% of total cover: 36.0		20% of total cover: 14.4	
	Herb Stratum			
1.	Calamagrostis canadensis	25.0	✓	FAC
2.	Equisetum arvense	5.0		FAC
	Total Cover:	30.0		
	50% of total cover: 15.0		20% of total cover: 6.0	

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 5 (A)
Total Number of Dominant Species Across all Strata: 7 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 71.4% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	1.0	× 1 =	1.0
FACW Species	26.0	× 2 =	52.0
FAC Species	85.0	× 3 =	255.0
FACU Species	20.0	× 4 =	80.0
UPL Species	0.0	× 5 =	0.0
Column Totals:	132.0 (A)		388.0 (B)

Prevalence Index = B/A = 2.939

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

Plot size (radius, or length × width) 5m radius
% Cover of Wetland Bryophytes (Where applicable) 5.0
% Bare Ground 0.0
Total Cover of Bryophytes 30.0

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

Remarks:

Soil

Sampling Point: W23-SP1

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks
0-4							peat		
4-8							mucky peat		
8-12	5gy 5/1	90	5yr 4/6	10	C	M	silt		

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

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

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

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: Seasonal Frost
Depth (inches): 17

Hydric Soil Present? Yes _✓_ No ____

Remarks: Reached frozen layer with the shavel blade, a a dip positive

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present?	Yes	____	No	_✓_	Depth (inches):
Water Table Present?	Yes	____	No	_✓_	Depth (inches): 5
Saturation Present? (includes capillary fringe)	Yes	____	No	_✓_	Depth (inches): 1

Wetland Hydrology Present? Yes _✓_ No ____

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

Remarks:

Sampling Point: W23-SP1
NWI classification: PFO4B

Hydric Soil Indicators: Histic Epipedon (A2)
Wetland Hydrology Indicators: High Water Table (A2), Presence of Reduced Iron (C4), Saturation (A3)

Wetland Determination Data Form - Alaska Region

Project/Site: TLRA Improvements; Wetland Delineation Borough/City: Fairbanks Northstar Borough Sampling Date: 2020-07-07
Applicant/Owner: Federal Highway Administration (FHWA) Sampling Point: W27-SP1
Investigator(s): WAD Landform (hillside, terrace, hummocks, etc.): Flat or fluvial related
Local relief (concave, convex, none): concave Slope: 0.0 % / 0.0 ° Elevation: 479
Subregion: Alaska Lat.: 64.8003 Long.: -147.7356 Datum: WGS84
Soil Map Unit Name: Tanana-Mosquito complex NWI classification: PSS1F
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ✓, Soil ____, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

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

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

Remarks: Water impounded due to parking lot and poor drainage, vegetation covered in dust.

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

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
	Total Cover:	0.0		
	50% of total cover: 0.0		20% of total cover: 0.0	
	Sapling/Shrub Stratum			
1.	Myrica gale	20.0	✓	OBL
2.	Salix alaxensis	5.0		FAC
3.	Betula nana	5.0		FAC
4.	Salix niphoclada	1.0		
	Total Cover:	31.0		
	50% of total cover: 15.5		20% of total cover: 6.2	
	Herb Stratum			
1.	Carex aquatilis	10.0	✓	OBL
2.	Schoenoplectus tabernaemontani	5.0	✓	OBL
3.	Equisetum fluviatile	5.0	✓	OBL
4.	Equisetum arvense	5.0	✓	FAC
5.	Calamagrostis canadensis	5.0	✓	FAC
	Total Cover:	30.0		
	50% of total cover: 15.0		20% of total cover: 6.0	

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 6 (A)
Total Number of Dominant Species Across all Strata: 6 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	40.0	× 1 =	40.0
FACW Species	0.0	× 2 =	0.0
FAC Species	20.0	× 3 =	60.0
FACU Species	0.0	× 4 =	0.0
UPL Species	0.0	× 5 =	0.0
Column Totals:	60.0	(A)	100.0 (B)

Prevalence Index = B/A = 1.667

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

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

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: Site is likely flooded regularly during the growing season based on the presence of obligate plant species

SOIL

Sampling Point: W27-SP1

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

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

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

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

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ✓ No ____

Remarks: No pit, plot inundated, assume hydric soils

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

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

Wetland Hydrology Present? Yes ✓ No ____

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

Remarks: Flooded ditch adjacent to parking lot, water may be higher than usual due to heavy rains a

Sampling Point: W27-SP1
NWI classification: PSS1F

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

NO SOIL PIT PHOTO TAKEN

Wetland Determination Data Form - Alaska Region

Project/Site: TLRA Improvements; Wetland Delineation Borough/City: Fairbanks Northstar Borough Sampling Date: 2020-07-07
Applicant/Owner: Federal Highway Administration (FHWA) Sampling Point: W31-SP1
Investigator(s): WAD Landform (hillside, terrace, hummocks, etc.): Flat or fluvial related
Local relief (concave, convex, none): concave Slope: 0.0 % / 0.0 ° Elevation: 474
Subregion: Alaska Lat.: 64.7970 Long.: -147.7425 Datum: WGS84
Soil Map Unit Name: Salchaket very fine sandy loam NWI classification: PEM1F
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

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

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

Remarks: Wet sedge meadow. Most of the plants in the wetland are coated with dust from the road.

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

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
	Total Cover:	0.0		
	50% of total cover: 0.0		20% of total cover: 0.0	
	Sapling/Shrub Stratum			
	Total Cover:	0.0		
	50% of total cover: 0.0		20% of total cover: 0.0	
	Herb Stratum			
1.	Carex utriculata	45.0	✓	OBL
2.	Calamagrostis canadensis	10.0	____	FAC
3.	Equisetum arvense	5.0	____	FAC
	Total Cover:	60.0		
	50% of total cover: 30.0		20% of total cover: 12.0	

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	45.0	× 1 =	45.0
FACW Species	0.0	× 2 =	0.0
FAC Species	15.0	× 3 =	45.0
FACU Species	0.0	× 4 =	0.0
UPL Species	0.0	× 5 =	0.0
Column Totals:	60.0	(A)	90.0 (B)

Prevalence Index = B/A = 1.500

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

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

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

Soil

Sampling Point: W31-SP1

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

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

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

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

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: Not Assessed

Depth (inches): -1000

Hydric Soil Present? Yes _✓_ No ____

Remarks: No pit, site inundated

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

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

Wetland Hydrology Present? Yes _✓_ No ____

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

Remarks: Hydrology does not appear to be significantly disturbed despite proximity to roadways.

Sampling Point: W31-SP1
NWI classification: PEM1F

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

No Soil Pit Photo Taken

Wetland Determination Data Form - Alaska Region

Project/Site: TLRA Improvements; Wetland Delineation Borough/City: Fairbanks Northstar Borough Sampling Date: 2020-07-07
Applicant/Owner: Federal Highway Administration (FHWA) Sampling Point: TL-05
Investigator(s): JPP, WAD Landform (hillside, terrace, hummocks, etc.):
Local relief (concave, convex, none): _____ Slope: 0.0 % / 0.0 ° Elevation: 450
Subregion: Alaska Lat.: 64.7994 Long.: -147.7332 Datum: WGS84
Soil Map Unit Name: Eielson-Piledriver complex NWI classification: U
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

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

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

Remarks: Site is located directly downstream from TL-04, with similar vegetation but separated by the newly constructed hiking trail. No wetland indicators observed at this site.

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

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1.	Populus balsamifera	35.0	✓	FACU
2.	Picea glauca	5.0		FACU
	Total Cover:	40.0		
	50% of total cover: 20.0		20% of total cover: 8.0	
	Sapling/Shrub Stratum			
1.	Rosa acicularis	45.0	✓	FACU
2.	Salix bebbiana	10.0		FAC
3.	Prunus padus	5.0		FACU
4.	Salix alaxensis	5.0		FAC
5.	Salix lasiandra	5.0		FACW
	Total Cover:	70.0		
	50% of total cover: 35.0		20% of total cover: 14.0	
	Herb Stratum			
1.	Equisetum arvense	45.0	✓	FAC
2.	Equisetum pratense	40.0	✓	FACW
3.	Calamagrostis canadensis	10.0		FAC
4.	Chamaenerion angustifolium	10.0		FACU
	Total Cover:	105.0		
	50% of total cover: 52.5		20% of total cover: 21.0	

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0.0	× 1 =	0.0
FACW Species	45.0	× 2 =	90.0
FAC Species	70.0	× 3 =	210.0
FACU Species	100.0	× 4 =	400.0
UPL Species	0.0	× 5 =	0.0
Column Totals:	215.0 (A)		700.0 (B)

Prevalence Index = B/A = 3.256

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

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

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks: Prupad found throughout the riparian forest and shrub types at Tanana Lakes.

Soil

Sampling Point: TL-05

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks
0-5		0.0					peat		
5-12	10yr 3/2	95	5yr 4/4	5	C	PL	sand		

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

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

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

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes _____ No ✓

Remarks: No hydric soil indicators

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

- _____Surface Water (A1)
- _____High Water Table (A2)
- _____Saturation (A3)
- _____Water Marks (B1)
- _____Sediment Deposits (B2)
- _____Drift Deposits (B3)
- _____Algal Mat or Crust (B4)
- _____Iron Deposits (B5)
- _____Surface Soil Cracks (B6)
- _____Inundation Visible on Aerial Imagery (B7)
- _____Sparsely Vegetated Concave Surface (B8)
- _____Marl Deposits (B15)
- _____Hydrogen Sulfide Odor (C1)
- _____Dry-Season Water Table (C2)
- _____Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- _____Water Stained Leaves (B9)
- _____Drainage Patterns (B10)
- _____Oxidized Rizospheres along Living Roots (C3)
- _____Presence of Reduced Iron (C4)
- _____Salt Deposits (C5)
- _____Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- _____Shallow Aquitard (D3)
- _____Microtopographic Relief (D4)
- _____FAC-neutral Test (D5)

Field Observations:

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

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

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

Wetland Hydrology Present? Yes _____ No ✓

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

Remarks: Site is located in active floodplain but no other hydrology indicators are present.

Sampling Point: TL-05
NWI classification: U

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

Wetland Determination Data Form - Alaska Region

Project/Site: TLRA Improvements; Wetland Delineation Borough/City: Fairbanks Northstar Borough Sampling Date: 2020-07-07
Applicant/Owner: Federal Highway Administration (FHWA) Sampling Point: TL-10
Investigator(s): WAD, JPP Landform (hillside, terrace, hummocks, etc.): Flat or fluvial related
Local relief (concave, convex, none): convex Slope: 0.0 % / 0.0 ° Elevation: 481
Subregion: Alaska Lat.: 64.7988 Long.: -147.7408 Datum: WGS84
Soil Map Unit Name: Salchaket very fine sandy loam NWI classification: U
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

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

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

Remarks: Disturbed poplar forest, convex topography, surface soil layers composed of fill and also garbage. A small inundated puddle was delineated close to the plot.

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

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1.	Populus balsamifera	80.0	✓	FACU
	Total Cover:	80.0		
	50% of total cover: 40.0		20% of total cover: 16.0	
	Sapling/Shrub Stratum			
1.	Rosa acicularis	75.0	✓	FACU
2.	Alnus incana	5.0		FAC
3.	Rubus idaeus	5.0		FACU
4.	Salix bebbiana	1.0		FAC
	Total Cover:	86.0		
	50% of total cover: 43.0		20% of total cover: 17.2	
	Herb Stratum			
1.	Galium boreale	5.0	✓	FACU
2.	Chamaenerion angustifolium	5.0	✓	FACU
3.	Calamagrostis canadensis	4.0	✓	FAC
	Total Cover:	14.0		
	50% of total cover: 7.0		20% of total cover: 2.8	

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across all Strata: 5 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 20.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0.0	× 1 =	0.0
FACW Species	0.0	× 2 =	0.0
FAC Species	10.0	× 3 =	30.0
FACU Species	170.0	× 4 =	680.0
UPL Species	0.0	× 5 =	0.0
Column Totals:	180.0 (A)		710.0 (B)

Prevalence Index = B/A = 3.944

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

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

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks: Other cover is leaf litter

SOIL

Sampling Point: TL-10

Depth	Matrix			Redox Features							
(inches)	Color (moist)		%	Color (moist)		%	Type[1]	Loc[2]	Texture	Mod	Remarks
0-2			0.0						peat		
2-4	10yr	2/1				0			mucky peat		
4-12	10yr	3/2				0			sand	gravelly	

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

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

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

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: None

Depth (inches): -1000

Hydric Soil Present? Yes _____ No ✓

Remarks: Soil pit significantly disturbed, digging up trash

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

- _____Surface Water (A1)
- _____High Water Table (A2)
- _____Saturation (A3)
- _____Water Marks (B1)
- _____Sediment Deposits (B2)
- _____Drift Deposits (B3)
- _____Algal Mat or Crust (B4)
- _____Iron Deposits (B5)
- _____Surface Soil Cracks (B6)
- _____Inundation Visible on Aerial Imagery (B7)
- _____Sparsely Vegetated Concave Surface (B8)
- _____Marl Deposits (B15)
- _____Hydrogen Sulfide Odor (C1)
- _____Dry-Season Water Table (C2)
- _____Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- _____Water Stained Leaves (B9)
- _____Drainage Patterns (B10)
- _____Oxidized Rizospheres along Living Roots (C3)
- _____Presence of Reduced Iron (C4)
- _____Salt Deposits (C5)
- _____Stunted or Stressed Plants (D1)
- _____Geomorphic Position (D2)
- _____Shallow Aquitard (D3)
- _____Microtopographic Relief (D4)
- _____FAC-neutral Test (D5)

Field Observations:

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

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

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

Wetland Hydrology Present? Yes _____ No ✓

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

Remarks: No hydrology indicators, except for small inundated puddle just outside plot radius. Water table is well below the average surface within the forest.

Sampling Point: TL-10
NWI classification: U

Hydric Soil Indicators: None
Wetland Hydrology Indicators: None

Wetland Determination Data Form - Alaska Region

Project/Site: TLRA Improvements; Wetland Delineation Borough/City: Fairbanks Northstar Borough Sampling Date: 2020-07-07
Applicant/Owner: Federal Highway Administration (FHWA) Sampling Point: TL-15
Investigator(s): JPP, WAD Landform (hillside, terrace, hummocks, etc.): Flat or fluvial related
Local relief (concave, convex, none): none Slope: 0.0 % / 0.0 ° Elevation: 451
Subregion: Alaska Lat.: 64.7988 Long.: -147.7453 Datum: WGS84
Soil Map Unit Name: Eielson-Piledriver complex NWI classification: U
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

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

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

Remarks: Balsam poplar forest, well drained substrates, no evidence of surface water or periodic flooding.

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

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1.	Populus balsamifera	75.0	✓	FACU
	Total Cover:	75.0		
	50% of total cover: 37.5		20% of total cover: 15.0	
	Sapling/Shrub Stratum			
1.	Alnus incana	35.0	✓	FAC
	Total Cover:	35.0		
	50% of total cover: 17.5		20% of total cover: 7.0	
	Herb Stratum			
1.	Chamaenerion angustifolium	10.0	✓	FACU
2.	Orthilia secunda	10.0	✓	FACU
3.	Cornus canadensis	5.0		FACU
4.	Pyrola asarifolia	5.0		FACU
5.	Calamagrostis canadensis	2.0		FAC
6.	Geocaulon lividum	1.0		FACU
7.	Moehringia lateriflora	1.0		FACU
	Total Cover:	34.0		
	50% of total cover: 17.0		20% of total cover: 6.8	

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0.0	× 1 =	0.0
FACW Species	0.0	× 2 =	0.0
FAC Species	37.0	× 3 =	111.0
FACU Species	107.0	× 4 =	428.0
UPL Species	0.0	× 5 =	0.0
Column Totals:	144.0 (A)		539.0 (B)

Prevalence Index = B/A = 3.743

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

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

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks: Predominant ground cover is leaf litter

Soil

Sampling Point: TL-15

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks
0-1		0.0					peat		
1-5							mucky peat		
5-13	10yr 3/2	90	5yr 3/4	10	C	PL	sand		

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

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

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

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: No Data

Depth (inches): -1000

Hydric Soil Present? Yes _____ No ✓

Remarks: No hydric soil indicators observed

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

- _____Surface Water (A1)
- _____High Water Table (A2)
- _____Saturation (A3)
- _____Water Marks (B1)
- _____Sediment Deposits (B2)
- _____Drift Deposits (B3)
- _____Algal Mat or Crust (B4)
- _____Iron Deposits (B5)
- _____Surface Soil Cracks (B6)
- _____Inundation Visible on Aerial Imagery (B7)
- _____Sparsely Vegetated Concave Surface (B8)
- _____Marl Deposits (B15)
- _____Hydrogen Sulfide Odor (C1)
- _____Dry-Season Water Table (C2)
- _____Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- _____Water Stained Leaves (B9)
- _____Drainage Patterns (B10)
- _____Oxidized Rizospheres along Living Roots (C3)
- _____Presence of Reduced Iron (C4)
- _____Salt Deposits (C5)
- _____Stunted or Stressed Plants (D1)
- _____Geomorphic Position (D2)
- _____Shallow Aquitard (D3)
- _____Microtopographic Relief (D4)
- _____FAC-neutral Test (D5)

Field Observations:

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

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

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

Wetland Hydrology Present? Yes _____ No ✓

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

Remarks: No hydrology indicators observed other than the site being on the active floodplain.

Sampling Point: TL-15
NWI classification: U

Hydric Soil Indicators: None
Wetland Hydrology Indicators: None

Wetland Determination Data Form - Alaska Region

Project/Site: TLRA Improvements; Wetland Delineation Borough/City: Fairbanks Northstar Borough Sampling Date: 2020-07-08
Applicant/Owner: Federal Highway Administration (FHWA) Sampling Point: TL-17
Investigator(s): WAD, JPP Landform (hillside, terrace, hummocks, etc.): Flat or fluvial related
Local relief (concave, convex, none): _____ Slope: 0.0 % / 0.0 ° Elevation: 460
Subregion: Alaska Lat.: 64.8040 Long.: -147.7447 Datum: WGS84
Soil Map Unit Name: Tanana-Mosquito complex NWI classification: U
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ✓, Soil ✓, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

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

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

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

Remarks: Fallow cleared field, supports multiple non-native potentially invasive species.

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

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
	Total Cover:	0.0		
	50% of total cover: 0.0		20% of total cover: 0.0	
	Sapling/Shrub Stratum			
1.	Salix alaxensis	5.0	✓	FAC
2.	Salix glauca	5.0	✓	FAC
3.	Salix interior	5.0	✓	FACW
	Total Cover:	15.0		
	50% of total cover: 7.5		20% of total cover: 3.0	
	Herb Stratum			
1.	Equisetum arvense	25.0	✓	FAC
2.	Senecio viscosus	20.0	✓	____
3.	Melilotus albus	10.0	____	____
4.	Trifolium hybridum	5.0	____	FAC
5.	Vicia cracca	5.0	____	____
6.	Achillea millefolium	4.0	____	FACU
7.	Sonchus arvensis	3.0	____	FACU
8.	Iris setosa	2.0	____	FAC
9.	Festuca rubra	1.0	____	FAC
10.	Carex aurea	1.0	____	FACW
11.	Calamagrostis canadensis	1.0	____	FAC
12.	Solidago multiradiata	1.0	____	FACU
13.	Platanthera aquilonis	1.0	____	FACW
14.	Juncus castaneus	1.0	____	FACW
	Total Cover:	80.0		
	50% of total cover: 40.0		20% of total cover: 16.0	

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 4 (A)
Total Number of Dominant Species Across all Strata: 5 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 80.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0.0	× 1 =	0.0
FACW Species	8.0	× 2 =	16.0
FAC Species	44.0	× 3 =	132.0
FACU Species	8.0	× 4 =	32.0
UPL Species	0.0	× 5 =	0.0
Column Totals:	60.0 (A)		180.0 (B)

Prevalence Index = B/A = 3.000

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

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

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: Invasives, senvis, melalb and viccra do no have indicator status and not included in the calculations, however, vegetation is not likely to be considered hydrophytic if these plants with the majority of cover at the site are considered UPL plants. ADD Galeopsis bifida to species list.

SOIL

Sampling Point: TL-17

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks
0-1		0.0					peat		
1-5	10yr 2/1			0			muck		
5-9	10yr 4/1	85	5yr 5/6	15	C	PL	silt loam		
9-11	5y 4/2	95	10gy 4/1	5	RM	PL	silt loam		Very few root channels with reduced matrix observed in the lowest horizon.

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

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

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

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: No Data

Depth (inches):

Hydric Soil Present? Yes ____ No ✓

Remarks: No alpha reaction

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

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

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

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

Wetland Hydrology Present? Yes ____ No ✓

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

Remarks: No hydrology indicators observed.

Sampling Point: TL-17
NWI classification: U

Hydric Soil Indicators: None
Wetland Hydrology Indicators: FAC-Neutral Test (D5)

Wetland Determination Data Form - Alaska Region

Project/Site: TLRA Improvements; Wetland Delineation Borough/City: Fairbanks Northstar Borough Sampling Date: 2020-07-08
Applicant/Owner: Federal Highway Administration (FHWA) Sampling Point: TL-19
Investigator(s): WAD, JPP Landform (hillside, terrace, hummocks, etc.): Flat or fluvial related
Local relief (concave, convex, none): concave Slope: 0.0 % / 0.0 ° Elevation: 471
Subregion: Alaska Lat.: 64.8059 Long.: -147.7443 Datum: WGS84
Soil Map Unit Name: Urban land NWI classification: U
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

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

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

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

Remarks: Disturbed patch next to railroad. Hydrophytic vegetation present not with 1 dominant an NI indicator not included in veg analysis. Hydric soils present but hydrology absent. Potentially borderline plot but classed as an upland because hydrology should be present given the wet spring and early summer in Fairbanks.

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

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
	Total Cover:	0.0		
	50% of total cover: 0.0		20% of total cover: 0.0	
	Sapling/Shrub Stratum			
1.	Salix glauca	65.0	✓	FAC
2.	Rosa acicularis	55.0	✓	FACU
3.	Myrica gale	30.0		OBL
4.	Salix interior	15.0		FACW
5.	Betula neoalaskana	5.0		FACU
6.	Populus balsamifera	5.0		FACU
	Total Cover:	175.0		
	50% of total cover: 87.5		20% of total cover: 35.0	
	Herb Stratum			
1.	Iris setosa	8.0	✓	FAC
2.	Calamagrostis canadensis	5.0	✓	FAC
3.	Vicia cracca	5.0	✓	
4.	Petasites frigidus	4.0		FACW
5.	Dasiphora fruticosa	2.0		FAC
6.	Carex aurea	2.0		FACW
7.	Achillea millefolium	2.0		FACU
8.	Rumex arcticus	2.0		FAC
9.	Carex utriculata	2.0		OBL
10.	Galium boreale	1.0		FACU
	Total Cover:	33.0		
	50% of total cover: 16.5		20% of total cover: 6.6	

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	32.0	× 1 =	32.0
FACW Species	21.0	× 2 =	42.0
FAC Species	82.0	× 3 =	246.0
FACU Species	68.0	× 4 =	272.0
UPL Species	0.0	× 5 =	0.0
Column Totals:	203.0 (A)		592.0 (B)

Prevalence Index = B/A = 2.916

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

Plot size (radius, or length × width) 1m radius
% Cover of Wetland Bryophytes (Where applicable) 0.0
% Bare Ground 0.0
Total Cover of Bryophytes 0.0

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

SOIL

Sampling Point: TL-19

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type[1]	Loc[2]	Texture	Mod	Remarks
0-1			0.0						peat		
1-3			0.0						muck		
3-5	10yr	3/2				0			silt loam		
5-6			0.0						muck		
6-14	5y	3/1	85	7.5yr	5/6	15	C	PL	silt loam		Organic inclusions throughout

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

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

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

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: None

Depth (inches): -1000

Hydric Soil Present? Yes ✓ No ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

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

Wetland Hydrology Present? Yes ____ No ✓

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

Remarks: Depressed area beside the road, receiving runoff from road. A few small depressions supporting car utr that may be flooded periodically during growing season. Site should have some hydrology indicators given the wet spring and early summer in Fairbanks.

Sampling Point: TL-19
NWI classification: U

Hydric Soil Indicators: Alaska Redox (A14)
Wetland Hydrology Indicators: None

Wetland Determination Data Form - Alaska Region

Project/Site: TLRA Improvements; Wetland Delineation Borough/City: Fairbanks Northstar Borough Sampling Date: 2020-07-08
Applicant/Owner: Federal Highway Administration (FHWA) Sampling Point: TL-21
Investigator(s): JPP, WAD Landform (hillside, terrace, hummocks, etc.): Bluffs or Banks
Local relief (concave, convex, none): convex Slope: 1.7 % / 1.0 ° Elevation: 463
Subregion: Alaska Lat.: 64.7996 Long.: -147.7445 Datum: WGS84
Soil Map Unit Name: Tanana-Mosquito complex NWI classification: U
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

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

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

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

Remarks: Convex bank, supporting tall shrubs next to the slough.

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

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
	Total Cover:	0.0		
	50% of total cover: 0.0		20% of total cover: 0.0	
	Sapling/Shrub Stratum			
1.	Salix alaxensis	35.0	✓	FAC
2.	Alnus incana	25.0	✓	FAC
3.	Rhododendron groenlandicum	5.0		FAC
4.	Salix interior	5.0		FACW
5.	Prunus padus	4.0		FACU
6.	Rosa acicularis	1.0		FACU
	Total Cover:	75.0		
	50% of total cover: 37.5		20% of total cover: 15.0	
	Herb Stratum			
1.	Equisetum pratense	50.0	✓	FACW
2.	Chamaenerion angustifolium	30.0	✓	FACU
	Total Cover:	80.0		
	50% of total cover: 40.0		20% of total cover: 16.0	

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0.0	× 1 =	0.0
FACW Species	55.0	× 2 =	110.0
FAC Species	65.0	× 3 =	195.0
FACU Species	35.0	× 4 =	140.0
UPL Species	0.0	× 5 =	0.0
Column Totals:	155.0 (A)		445.0 (B)

Prevalence Index = B/A = 2.871

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

Plot size (radius, or length × width) 1m radius
% Cover of Wetland Bryophytes (Where applicable) 0.0
% Bare Ground ____
Total Cover of Bryophytes 5.0

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

Remarks: Other ground cover is leaf litter

SOIL

Sampling Point: TL-21

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks
0-2							peat		
2-4							mucky peat		
4-12	5y 3/2	75	7.5yr 4/6	25	C	PL	sandy loam		

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

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

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

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: No Data

Depth (inches): -1000

Hydric Soil Present? Yes ✓ No ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

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

Secondary Indicators (2 or more required)

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

Field Observations:

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

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

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

Wetland Hydrology Present? Yes ____ No ✓

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

Remarks: Hydrology indicators absent, alpha alpha negative, no surface evidence of periodic flooding.

Sampling Point: TL-21
NWI classification: U

Hydric Soil Indicators: Alaska Redox (A14)
Wetland Hydrology Indicators: None

Wetland Determination Data Form - Alaska Region

Project/Site: TLRA Improvements; Wetland Delineation Borough/City: Fairbanks Northstar Borough Sampling Date: 2020-07-08
Applicant/Owner: Federal Highway Administration (FHWA) Sampling Point: TL-22
Investigator(s): WAD, JPP Landform (hillside, terrace, hummocks, etc.): Flat or fluvial related
Local relief (concave, convex, none): convex Slope: 0.0 % / 0.0 ° Elevation: 504
Subregion: Alaska Lat.: 64.8002 Long.: -147.7449 Datum: WGS84
Soil Map Unit Name: Tanana-Mosquito complex NWI classification: U
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

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

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

Remarks: Black spruce stand immediately adjacent to flooded 4-wheeler trail. Frozen soils but not ice rich.

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

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1.	Picea mariana	45.0	✓	FACW
2.	Betula neoalaskana	5.0		FACU
	Total Cover:	50.0		
	50% of total cover: 25.0		20% of total cover: 10.0	
	Sapling/Shrub Stratum			
1.	Rosa acicularis	10.0	✓	FACU
2.	Vaccinium vitis-idaea	5.0	✓	FAC
3.	Rhododendron groenlandicum	2.0		FAC
	Total Cover:	17.0		
	50% of total cover: 8.5		20% of total cover: 3.4	
	Herb Stratum			
1.	Geocaulon lividum	50.0	✓	FACU
2.	Equisetum pratense	1.0		FACW
	Total Cover:	51.0		
	50% of total cover: 25.5		20% of total cover: 10.2	

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0.0	× 1 =	0.0
FACW Species	46.0	× 2 =	92.0
FAC Species	7.0	× 3 =	21.0
FACU Species	65.0	× 4 =	260.0
UPL Species	0.0	× 5 =	0.0
Column Totals:	118.0 (A)		373.0 (B)

Prevalence Index = B/A = 3.161

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

Plot size (radius, or length × width)	5m radius
% Cover of Wetland Bryophytes (Where applicable)	0.0
% Bare Ground	0.0
Total Cover of Bryophytes	80.0

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks:

SOIL

Sampling Point: TL-22

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks
0-7							peat		
7-10	10yr 4/2	5	5yr 5/6	95	C	PL	sand		Frozen at bottom

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

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

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

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: Seasonal Frost

Depth (inches): 10

Hydric Soil Present? Yes _____ No ✓

Remarks: Frozen layer is not ice rich, mineral soil texture is sand, did not consider it a saturated layer

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

- _____Surface Water (A1)
- _____High Water Table (A2)
- _____Saturation (A3)
- _____Water Marks (B1)
- _____Sediment Deposits (B2)
- _____Drift Deposits (B3)
- _____Algal Mat or Crust (B4)
- _____Iron Deposits (B5)
- _____Surface Soil Cracks (B6)
- _____Inundation Visible on Aerial Imagery (B7)
- _____Sparsely Vegetated Concave Surface (B8)
- _____Marl Deposits (B15)
- _____Hydrogen Sulfide Odor (C1)
- _____Dry-Season Water Table (C2)
- _____Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- _____Water Stained Leaves (B9)
- _____Drainage Patterns (B10)
- _____Oxidized Rizospheres along Living Roots (C3)
- _____Presence of Reduced Iron (C4)
- _____Salt Deposits (C5)
- _____Stunted or Stressed Plants (D1)
- _____Geomorphic Position (D2)
- ✓ Shallow Aquitard (D3)
- _____Microtopographic Relief (D4)
- _____FAC-neutral Test (D5)

Field Observations:

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

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

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

Wetland Hydrology Present? Yes _____ No ✓

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

Remarks:

Sampling Point: TL-22
NWI classification: U

Hydric Soil Indicators: None
Wetland Hydrology Indicators: Shallow Aquitard (D3)

Wetland Determination Data Form - Alaska Region

Project/Site: TLRA Improvements; Wetland Delineation Borough/City: Fairbanks Northstar Borough Sampling Date: 2020-07-08
Applicant/Owner: Federal Highway Administration (FHWA) Sampling Point: TL-27
Investigator(s): WAD, JPP Landform (hillside, terrace, hummocks, etc.):
Local relief (concave, convex, none): convex Slope: 8.7 % / 5.0 ° Elevation: 476
Subregion: Alaska Lat.: 64.8012 Long.: -147.7438 Datum: WGS84
Soil Map Unit Name: Tanana-Mosquito complex NWI classification: U
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

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

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

Remarks: Base of s shallow ridge dominated by mature paper birch

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

	Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
1.	Betula neoalaskana	85.0	✓	FACU
2.	Picea glauca	5.0		FACU
	Total Cover:	90.0		
	50% of total cover: 45.0		20% of total cover: 18.0	
	Sapling/Shrub Stratum			
1.	Rosa acicularis	75.0	✓	FACU
2.	Salix bebbiana	2.0		FAC
	Total Cover:	77.0		
	50% of total cover: 38.5		20% of total cover: 15.4	
	Herb Stratum			
1.	Calamagrostis canadensis	5.0		FAC
	Total Cover:	5.0		
	50% of total cover: 2.5		20% of total cover: 1.0	

Dominance Test worksheet:
Number of Dominant Species That are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across all Strata: 2 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0.0	× 1 =	0.0
FACW Species	0.0	× 2 =	0.0
FAC Species	7.0	× 3 =	21.0
FACU Species	165.0	× 4 =	660.0
UPL Species	0.0	× 5 =	0.0
Column Totals:	172.0 (A)		681.0 (B)

Prevalence Index = B/A = 3.959

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

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

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks: Other cover is leaf litter

SOIL

Sampling Point: TL-27

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Mod	Remarks
0-4							peat		
4-12							mucky peat		

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

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

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

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type:
Depth (inches):

Hydric Soil Present? Yes _____ No ✓

Remarks: No frost detected, soil profile is organic but not saturated

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one is sufficient)

_____Surface Water (A1)
_____High Water Table (A2)
_____Saturation (A3)
_____Water Marks (B1)
_____Sediment Deposits (B2)
_____Drift Deposits (B3)
_____Algal Mat or Crust (B4)
_____Iron Deposits (B5)
_____Surface Soil Cracks (B6)
_____Inundation Visible on Aerial Imagery (B7)
_____Sparsely Vegetated Concave Surface (B8)
_____Marl Deposits (B15)
_____Hydrogen Sulfide Odor (C1)
_____Dry-Season Water Table (C2)
_____Other (Explain in Remarks)

Secondary Indicators (2 or more required)

_____Water Stained Leaves (B9)
_____Drainage Patterns (B10)
_____Oxidized Rizospheres along Living Roots (C3)
_____Presence of Reduced Iron (C4)
_____Salt Deposits (C5)
_____Stunted or Stressed Plants (D1)
_____Geomorphic Position (D2)
_____Shallow Aquitard (D3)
_____Microtopographic Relief (D4)
_____FAC-neutral Test (D5)

Field Observations:

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

Wetland Hydrology Present? Yes _____ No ✓

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

Remarks:

Sampling Point: TL-27
NWI classification: U

Hydric Soil Indicators: None
Wetland Hydrology Indicators: None

Appendix B. Map Verification Plot Information and Photos

Sampling Point: STREAM-1
Site: TLRA Improvements; Wetland Delineation
Date: 2020-07-07
NWI classification: R4SBC
Viereck code:
Species:
Notes: Site is a constructed drainage channel from upslope wetland to Cushman lake across the beach. The channel was lined with landscaping fabric but channel bed has been eroded and the fabric is exposed. Assumed that veg, soil and hydrology are significantly disturbed because it's a constructed drainage channel that been degraded from original condition. R4USC

Sampling Point: STREAM-2
Site: TLRA Improvements; Wetland Delineation
Date: 2020-07-07
NWI classification: R2UBH
Viereck code:
Species: *Hippuris vulgaris, Equisetum palustre, Schoenoplectus pungens*
Notes: Flowing slough, water 6 inches deep

Sampling Point: W3-V1

Site: TLRA Improvements; Wetland Delineation

Date: 2020-07-08

NWI classification: PSS1E

Viereck code:

Species: *Chamaedaphne calyculata, Salix bebbiana, Rosa acicularis, Alnus incana, Betula glandulosa, Iris setosa, Calamagrostis canadensis, Equisetum palustre*

Notes: Inundated through the width of study area, not evident in 2019 imagery. Inundation is likely due to the combination of impounded waters accumulating from rainfall and not draining due to high flood stage on the Tanana River. Vegetation is not yet supporting obligate plants and existing shrubs and trees are not yet dying. Flooding may be very intermittent.

Sampling Point: W4-V1

Site: TLRA Improvements; Wetland Delineation

Date: 2020-07-08

NWI classification: PSS1E

Viereck code:

Species: *Populus balsamifera, Betula glandulosa, Salix alaxensis, Calamagrostis canadensis*

Notes: Inundated through the width of study area, not evident in 2019 imagery. Inundation is likely due to the combination of impounded waters accumulating from rainfall and not draining due to high flood stage on the Tanana River. Vegetation is not yet supporting obligate plants and existing shrubs and trees are not yet dying. Flooding may be very intermittent.

Sampling Point: W8-V1

Site: TLRA Improvements; Wetland Delineation

Date: 2020-07-07

NWI classification: PUBH

Viereck code:

Species: *Salix interior, Equisetum palustre, Juncus alpinoarticulatus, Schoenoplectus tabernaemontani, Equisetum variegatum*

Notes: Ditch impounding water supporting obligate plants, likely flooded throughout the growing season in most years.

Sampling Point: W20-V1

Site: TLRA Improvements; Wetland Delineation

Date: 2020-07-07

NWI classification: L2EM2H

Viereck code:

Species: *Salix interior, Schoenoplectus tabernaemontani, Typha latifolia*

Notes: The shoreline of the lake is much higher upslope during the time of sampling than indicated in the 2019 aerial photograph. However the presence of obligate aquatic wetland plants such as scival and typlat indicate that the area is typically flooded.

Sampling Point: W24-V1

Site: TLRA Improvements; Wetland Delineation

Date: 2020-07-08

NWI classification: U

Viereck code:

Species: *Picea mariana, Rosa acicularis, Vaccinium vitis-idaea, Salix bebbiana, Geocaulon lividum*

Notes: Similar black spruce upland on slightly raised ridge. Assume upland based on veg composition and lack of hydrology.

Sampling Point: TL-02

Site: TLRA Improvements; Wetland Delineation

Date: 2020-07-07

NWI classification: Us

Viereck code:

Species: *Salix lasiandra, Salix interior, Populus balsamifera, Salix niphoclada, Epilobium palustre, Melilotus albus, Crepis tectorum*

Notes: Edge of parking lot with a large population of white sweet clover. Verification plot to document invasive population.

Sampling Point: TL-07

Site: TLRA Improvements; Wetland Delineation

Date: 2020-07-07

NWI classification: U

Viereck code:

Species: *Populus balsamifera, Achillea millefolium, Equisetum arvense, Equisetum palustre, Festuca rubra, Hordeum jubatum, Juncus sp., Melilotus albus, Piperia dilatata, Platanthera aquilonis, Plantago major, Poa pratensis, Potentilla recta, Taraxacum officinale, Trifolium hybridum, Vicia cracca*

Notes: Constructed berm above beach area, colonized by some non native plants.

Sampling Point: TL-18

Site: TLRA Improvements; Wetland Delineation

Date: 2020-07-08

NWI classification: U

Viereck code: Moist Forb Meadow

Species: *Vicia cracca*

Notes: Extensive infestation of viccra alongside road and extending into the field.

Appendix C. Wetland Functional Assessment Worksheets

NWI Code(s): R2UBH [Lower Perennial Stream]
HGM: Riverine

Function and Indicators	Rating	Project Rationale
A. Flood Flow Regulation (Storage)		
1. Dense vegetation or tussocks, low to tall woody vegetation present (N/A if assessing waters).	N/A	
2. Wetland or water is a depressional HGM class or has depressional features capable of storage.	0	The waterbody is an active slough draining Cushman Lake.
3. Wetland or water shows signs of storage (i.e. fluctuating water levels, algal mats, and/or lodged debris).	1	Extensive lodged debris and sediment deposits were observed during the field survey.
4. Floodwaters enter and flow through wetland predominantly as sheet flow rather than channel flow.	0	The waterbody is an active channel.
5. Waterbody is a lake (>20 acres) (N/A if assessing wetlands).	0	The waterbody is a perennial stream.
Functional score = sum of ratings for indicators/total possible score = 1/4	0.25	
B. Sediment, Nutrient (N and P), Toxicant Removal		
1. Slow-moving or still water is present.	1	Slow moving water was observed near the banks, within areas of emergent vegetation.
2. Low to tall woody vegetation present (N/A if assessing waters).	N/A	
3. At least moderate interspersion of vegetation and water is present. Surface water patches should account for >10% areal coverage (N/A if assessing waters).	1	An area of well developed riparian emergent vegetation is present, as well as rooted aquatic vegetation within the stream.
4. Sediment deposits are present, providing evidence of deposition during natural flood events.	1	Extensive sediment deposits were observed during the field survey.
5. Thick surface organic horizon and/or abundant fine organic litter is present (N/A if assessing waters).	N/A	
6. Sediment, nutrients, or toxicants (from agriculture, roadways, or development) appear to be or are likely to be entering the wetland.	1	The study area is completely surrounded by urban development, floodwaters present during the field survey are likely to contain pollutants from surrounding access roads and groins
Functional score = sum of ratings for indicators/total possible score = 4/4	1	
C. Erosion Control and Shoreline Stabilization		
1. Wetland has dense, energy absorbing vegetation bordering the watercourse and no evidence of erosion.	1	Dense emergent obligate wetland vascular plants on the banks and in-stream rooted aquatics within the channel.
2. Soils are not predominantly sandy or silty, and are not ice rich.	0	The soil profiles are dominated by riverine sands and silts.
3. Historical aerial photography (if available) indicates stable shoreline features.	0	Shorelines of sloughs are typically susceptible to rapid change in active riverine systems.
Functional score = sum of ratings for indicators/total possible score= 1/3	0.33	
D. Organic Matter Production and Export		
1. Wetland has at least 30%, or water has at least 10%, cover herbaceous vegetation. Woody plants are predominantly deciduous.	1	Well developed emergent vegetation in channel.
2. At least 10% of wetland is seasonally flooded (N/A for waters).	N/A	
3. Surface water outflow occurs regularly throughout the growing season.	1	The waterbody is an active flowing channel.
Functional score = sum of ratings for indicators/total possible score = 2/2	1	

NWI Code(s): R2UBH [Lower Perennial Stream]
HGM: Riverine

Function and Indicators	Rating	Project Rationale
E. Avian and Mammal Habitat Suitability		
1. Wetland or water is undisturbed by human habitation or development.	0	The study area is completely surrounded by urban development.
2. Birds and/or mammals recorded using habitat.	0	No breeding birds were present during the June 2020 field survey.
3. Interspersion of vegetation and water is at least moderate (surface water patches accounting for 5–10% areal cover, or continuous cover of surface water with a well-developed emergent component).	1	The cover of emergent vegetation is at least 10%.
4. Wetland has 2 or more vegetation strata with at least 30% total cover each (N/A for waters).	N/A	
Functional score = sum of ratings for indicators/total possible score = 1/3	0.33	
F. Fish Habitat Suitability		
1. Water has sufficient size and depth of open water so as not to freeze completely during winter (N/A for wetlands).	0	Channel was up to 12 inches deep at the time of sampling but expected to fluctuate throughout the growing season and potentially dry up during the winter
2. Fish are present.	1	Fish are assumed to be present due to the close proximity to the Tanana River.
3. Herbaceous and/or woody vegetation is present in wetland and/or buffer to provide cover, shade, and/or detrital matter.	1	A well developed littoral zone is present.
4. Suitable spawning areas are present.	1	Well developed bank vegetation and in-channel vegetation providing cover, substrate is sands and silts
5. Juvenile rest areas present.	1	Well developed bank vegetation and in-channel vegetation providing cover, substrate is sands and silts
Functional score = sum of ratings for indicators/total possible score = 4/5	0.8	
G. Educational, Scientific, Recreational, or Subsistence Use		
1. Site has documented scientific or educational use.	1	The Tanana Lakes Recreation area has multiple recreational and educational uses. This site has a nature trail, swim beach, non-motorized watercraft rentals, and motorized boat launch
2. Wetland or water is in public ownership.	1	The study area is managed by the Fairbanks North Star Borough.
3. Accessible trails are available.	1	See indicator 1 above.
4. Wetland or water supports subsistence activities (e.g., hunting, fishing, berry picking).	1	The area provides some hunting opportunities as well as a motorized boat launch for access to hunting and fishing locations along the Tanana River.
Functional score = sum of ratings for indicators/total possible score = 4/4	1	

NWI Code(s): R4USC [Intermittent Stream]
HGM: Riverine

Function and Indicators	Rating	Project Rationale
A. Flood Flow Regulation (Storage)		
1. Dense vegetation or tussocks, low to tall woody vegetation present (N/A if assessing waters).	N/A	
2. Wetland or water is a depressional HGM class or has depressional features capable of storage.	0	The waterbody is an active riverine feature
3. Wetland or water shows signs of storage (i.e. fluctuating water levels, algal mats, and/or lodged debris).	1	The waterbody is a small constructed drainage channel draining a semipermanently flooded wetland into Cushman Lake across the swim beach.
4. Floodwaters enter and flow through wetland predominantly as sheet flow rather than channel flow.	0	The waterbody is an active channel.
5. Waterbody is a lake (>20 acres) (N/A if assessing wetlands).	0	The waterbody is not a lake.
Functional score = sum of ratings for indicators/total possible score = 1/4	0.25	
B. Sediment, Nutrient (N and P), Toxicant Removal		
1. Slow-moving or still water is present.	1	Water was not flowing in the channel at the time of the field survey, but patches of stagnant surface water were present.
2. Low to tall woody vegetation present (N/A if assessing waters).	N/A	
3. At least moderate interspersion of vegetation and water is present. Surface water patches should account for >10% areal coverage (N/A if assessing waters).	0	The waterbody is a constructed channel with landscaping fabric and no bank vegetation.
4. Sediment deposits are present, providing evidence of deposition during natural flood events.	1	The landscaping fabric and banks were eroded indicating higher water levels in the past.
5. Thick surface organic horizon and/or abundant fine organic litter is present (N/A if assessing waters).	N/A	
6. Sediment, nutrients, or toxicants (from agriculture, roadways, or development) appear to be or are likely to be entering the wetland.	1	The study area is completely surrounded by urban development; floodwaters present during the field survey are likely to contain pollutants from surrounding access roads and groins.
Functional score = sum of ratings for indicators/total possible score = 3/4	0.75	
C. Erosion Control and Shoreline Stabilization		
1. Wetland has dense, energy absorbing vegetation bordering the watercourse and no evidence of erosion.	0	No vegetation present.
2. Soils are not predominantly sandy or silty, and are not ice rich.	0	Channel is constructed with landscaping fabric and sand from the swim beach.
3. Historical aerial photography (if available) indicates stable shoreline features.	0	Channel was recently constructed.
Functional score = sum of ratings for indicators/total possible score = 0/3	0	
D. Organic Matter Production and Export		
1. Wetland has at least 30%, or water has at least 10%, cover herbaceous vegetation. Woody plants are predominantly deciduous.	0	No vegetation present.
2. At least 10% of wetland is seasonally flooded (N/A for waters).	N/A	
3. Surface water outflow occurs regularly throughout the growing season.	1	Assume that channel is active periodically during the growing season
Functional score = sum of ratings for indicators/total possible score = 1/2	0.5	

NWI Code(s): R4USC [Intermittent Stream]
HGM: Riverine

Function and Indicators	Rating	Project Rationale
E. Avian and Mammal Habitat Suitability		
1. Wetland or water is undisturbed by human habitation or development.	0	The study area is completely surrounded by urban development.
2. Birds and/or mammals recorded using habitat.	0	No breeding birds were present during the June 2020 field survey.
3. Interspersion of vegetation and water is at least moderate (surface water patches accounting for 5–10% areal cover, or continuous cover of surface water with a well-developed emergent component).	0	No in-stream vegetation, channel is a degraded constructed feature
4. Wetland has 2 or more vegetation strata with at least 30% total cover each (N/A for waters).	N/A	
Functional score = sum of ratings for indicators/total possible score = 0/3	0	
F. Fish Habitat Suitability		
1. Water has sufficient size and depth of open water so as not to freeze completely during winter (N/A for wetlands).	0	
2. Fish are present.	0	
3. Herbaceous and/or woody vegetation is present in wetland and/or buffer to provide cover, shade, and/or detrital matter.	0	0
4. Suitable spawning areas are present.	0	
5. Juvenile rest areas present.	0	
Functional score = sum of ratings for indicators/total possible score = 0/5	0	
G. Educational, Scientific, Recreational, or Subsistence Use		
1. Site has documented scientific or educational use.	1	The Tanana Lakes Recreation area has multiple recreational and educational uses. This site has a nature trail, swim beach, non-motorized watercraft rentals, and motorized boat launch
2. Wetland or water is in public ownership.	1	The study area is managed by the Fairbanks North Star Borough.
3. Accessible trails are available.	1	See indicator 1 above.
4. Wetland or water supports subsistence activities (e.g., hunting, fishing, berry picking).	1	The area provides some hunting opportunities as well as a motorized boat launch for access to hunting and fishing locations along the Tanana River.
Functional score = sum of ratings for indicators/total possible score = 4/4	1	

NWI Code(s): L2EM2H [Lacustrine Lentic Waters]
HGM: Depressional

Function and Indicators	Rating	Project Rationale
A. Flood Flow Regulation (Storage)		
1. Dense vegetation or tussocks, low to tall woody vegetation present (N/A if assessing waters).	N/A	
2. Wetland or water is a depressional HGM class or has depressional features capable of storage.	1	The waterbody is a lacustrine fringe surrounding a depressional lake (Cushman Lake).
3. Wetland or water shows signs of storage (i.e. fluctuating water levels, algal mats, and/or lodged debris).	1	Based on comparison with historical imagery, the entire littoral area has developed within the past 3 years since the construction of TLRA.
4. Floodwaters enter and flow through wetland predominantly as sheet flow rather than channel flow.	0	Channelized outflow was observed on the west side of the lake.
5. Waterbody is a lake (>20 acres) (N/A if assessing wetlands).	1	The waterbody is a lacustrine fringe surrounding a lake >20 acres in size.
Functional score = sum of ratings for indicators/total possible score = 3/4	0.75	
B. Sediment, Nutrient (N and P), Toxicant Removal		
1. Slow-moving or still water is present.	1	Still water is present (Cushman Lake).
2. Low to tall woody vegetation present (N/A if assessing waters).	N/A	
3. At least moderate interspersion of vegetation and water is present. Surface water patches should account for >10% areal coverage (N/A if assessing waters).	1	Persistent Emergent vegetation is present along the shoreline, and extensive rooted aquatic vegetation is also present.
4. Sediment deposits are present, providing evidence of deposition during natural flood events.	1	Assume significant fluctuation in water levels by comparison to historical imagery.
5. Thick surface organic horizon and/or abundant fine organic litter is present (N/A if assessing waters).	N/A	
6. Sediment, nutrients, or toxicants (from agriculture, roadways, or development) appear to be or are likely to be entering the wetland.	1	The study area is completely surrounded by urban development; waterbody is likely to contain pollutants from surrounding access roads and groins.
Functional score = sum of ratings for indicators/total possible score = 4/4	1	
C. Erosion Control and Shoreline Stabilization		
1. Wetland has dense, energy absorbing vegetation bordering the watercourse and no evidence of erosion.	0	Vegetation is primarily rooted aquatic plants, with little lacustrine shoreline vegetation development
2. Soils are not predominantly sandy or silty, and are not ice rich.	0	The soil profiles were dominated by riverine sands and silts.
3. Historical aerial photography (if available) indicates stable shoreline features.	0	Comparison with historical imagery indicates increasing water levels with the rapid development of a vegetated littoral zone.
Functional score = sum of ratings for indicators/total possible score = 0/3	0	
D. Organic Matter Production and Export		
1. Wetland has at least 30%, or water has at least 10%, cover herbaceous vegetation. Woody plants are predominantly deciduous.	1	A well developed littoral zone is present.
2. At least 10% of wetland is seasonally flooded (N/A for waters).	N/A	
3. Surface water outflow occurs regularly throughout the growing season.	1	Active outflow was occurring through a culvert on the east side of Cushman Lake at the time of the field survey.
Functional score = sum of ratings for indicators/total possible score = 2/2	1	

NWI Code(s): L2EM2H [Lacustrine Lentic Waters]
HGM: Depressional

Function and Indicators	Rating	Project Rationale
E. Avian and Mammal Habitat Suitability		
1. Wetland or water is undisturbed by human habitation or development.	0	The study area is completely surrounded by urban development.
2. Birds and/or mammals recorded using habitat.	0	No breeding birds were present during the June 2020 field survey.
3. Interspersion of vegetation and water is at least moderate (surface water patches accounting for 5–10% areal cover, or continuous cover of surface water with a well-developed emergent component).	1	Well developed rooted aquatic vegetation is present.
4. Wetland has 2 or more vegetation strata with at least 30% total cover each (N/A for waters).	N/A	
Functional score = sum of ratings for indicators/total possible score = 1/3	0.33	
F. Fish Habitat Suitability		
1. Water has sufficient size and depth of open water so as not to freeze completely during winter (N/A for wetlands).	1	Assume Cushman lake is deep enough to allow overwintering.
2. Fish are present.	1	Cushman Lake is assumed to support fish based on its close proximity to the Tanana River.
3. Herbaceous and/or woody vegetation is present in wetland and/or buffer to provide cover, shade, and/or detrital matter.	1	A well developed littoral zone is present.
4. Suitable spawning areas are present.	1	Cushman Lake has vegetated littoral zones and some areas of overhanging vegetation
5. Juvenile rest areas present.	1	Cushman Lake has vegetated littoral zones and some areas of overhanging vegetation
Functional score = sum of ratings for indicators/total possible score = 5/5	1	
G. Educational, Scientific, Recreational, or Subsistence Use		
1. Site has documented scientific or educational use.	1	The Tanana Lakes Recreation area has multiple recreational and educational uses. This site has a nature trail, swim beach, non-motorized watercraft rentals, and motorized boat launch
2. Wetland or water is in public ownership.	1	The study area is managed by the Fairbanks North Star Borough.
3. Accessible trails are available.	1	See indicator 1 above.
4. Wetland or water supports subsistence activities (e.g., hunting, fishing, berry picking).	1	The area provides some hunting opportunities as well as a motorized boat launch for access to hunting and fishing locations along the Tanana River.
Functional score = sum of ratings for indicators/total possible score = 4/4	1	

NWI Code(s): PUBH [Palustrine Lentic Waters]
HGM: Depressional

Function and Indicators	Rating	Project Rationale
A. Flood Flow Regulation (Storage)		
1. Dense vegetation or tussocks, low to tall woody vegetation present (N/A if assessing waters).	N/A	
2. Wetland or water is a depressional HGM class or has depressional features capable of storage.	1	HGM class is depressional.
3. Wetland or water shows signs of storage (i.e. fluctuating water levels, algal mats, and/or lodged debris).	1	Small ponds are present in isolated depressions with no evidence of inflow or outflow; shorelines show limited evidence of fluctuation.
4. Floodwaters enter and flow through wetland predominantly as sheet flow rather than channel flow.	0	No evidence of throughflow; these small features are not in landscape positions that would receive floodflow. Due to their very small size, they do not provide significant storage function.
5. Waterbody is a lake (>20 acres) (N/A if assessing wetlands).	0	Waterbodies <20 acres, shallow water, forming in depressions caused by prior disturbance
Functional score = sum of ratings for indicators/total possible score = 2/4	0.5	
B. Sediment, Nutrient (N and P), Toxicant Removal		
1. Slow-moving or still water is present.	1	PUBH waters were assumed to be flooded throughout the growing season.
2. Low to tall woody vegetation present (N/A if assessing waters).	N/A	
3. At least moderate interspersion of vegetation and water is present. Surface water patches should account for >10% areal coverage (N/A if assessing waters).	0	No islands are present; floating vegetation and lacustrine fringe development are limited.
4. Sediment deposits are present, providing evidence of deposition during natural flood events.	0	No sediment deposits were observed during the field survey.
5. Thick surface organic horizon and/or abundant fine organic litter is present (N/A if assessing waters).	N/A	
6. Sediment, nutrients, or toxicants (from agriculture, roadways, or development) appear to be or are likely to be entering the wetland.	1	Small waterbodies completely surrounded by disturbance
Functional score = sum of ratings for indicators/total possible score = 2/4	0.5	
C. Erosion Control and Shoreline Stabilization	N/A	The PUBH waters are surrounded entirely by uplands.
1. Wetland has dense, energy absorbing vegetation bordering the watercourse and no evidence of erosion.	N/A	
2. Soils are not predominantly sandy or silty, and are not ice rich.	N/A	
3. Historical aerial photography (if available) indicates stable shoreline features.	N/A	
Functional score = sum of ratings for indicators/total possible score (not applicable)	N/A	
D. Organic Matter Production and Export		
1. Wetland has at least 30%, or water has at least 10%, cover herbaceous vegetation. Woody plants are predominantly deciduous.	0	No emergent vegetation is present.
2. At least 10% of wetland is seasonally flooded (N/A for waters).	0	
3. Surface water outflow occurs regularly throughout the growing season.	0	No inflow or outflow was observed.
Functional score = sum of ratings for indicators/total possible score = 0/3	0	

NWI Code(s): PUBH [Palustrine Lentic Waters]
HGM: Depressional

Function and Indicators	Rating	Project Rationale
E. Avian and Mammal Habitat Suitability		
1. Wetland or water is undisturbed by human habitation or development.	0	The study area is completely surrounded by urban development.
2. Birds and/or mammals recorded using habitat.	0	No breeding birds were present during the June 2020 field survey.
3. Interspersion of vegetation and water is at least moderate (surface water patches accounting for 5–10% areal cover, or continuous cover of surface water with a well-developed emergent component).	0	
4. Wetland has 2 or more vegetation strata with at least 30% total cover each (N/A for waters).	N/A	
Functional score = sum of ratings for indicators/total possible score = 0/3	0	
F. Fish Habitat Suitability		
1. Water has sufficient size and depth of open water so as not to freeze completely during winter (N/A for wetlands).	0	
2. Fish are present.	0	
3. Herbaceous and/or woody vegetation is present in wetland and/or buffer to provide cover, shade, and/or detrital matter.	1	PUBH in the study area are surrounded by forested uplands, very little littoral development is present but forest canopy overhangs the waterbody.
4. Suitable spawning areas are present.	0	
5. Juvenile rest areas present.	0	
Functional score = sum of ratings for indicators/total possible score 1/5	0.2	
G. Educational, Scientific, Recreational, or Subsistence Use		
1. Site has documented scientific or educational use.	1	The Tanana Lakes Recreation area has multiple recreational and educational uses. This site has a nature trail, swim beach, non-motorized watercraft rentals, and motorized boat launch
2. Wetland or water is in public ownership.	1	The study area is managed by the Fairbanks North Star Borough.
3. Accessible trails are available.	1	See indicator 1 above.
4. Wetland or water supports subsistence activities (e.g., hunting, fishing, berry picking).	1	The area provides some hunting opportunities as well as a motorized boat launch for access to hunting and fishing locations along the Tanana River.
Functional score = sum of ratings for indicators/total possible score = 4/4	1	

NWI Code(s): PEM1F, PEM1/SS1F, PSS1F [Semipermanently Flooded Wetlands]
HGM: Slope

Function and Indicators	Rating	Project Rationale
A. Flood Flow Regulation (Storage)		
1. Dense vegetation or tussocks, low to tall woody vegetation present (N/A if assessing waters).	1	Wetlands in this functional class have dense graminoid vegetation or closed canopies of tall, broad-leaved deciduous shrubs.
2. Wetland or water is a depressional HGM class or has depressional features capable of storage.	0	All wetlands in this functional class are classified as HGM slope.
3. Wetland or water shows signs of storage (i.e. fluctuating water levels, algal mats, and/or lodged debris).	1	Wetlands in this functional class were flooded at the time of the field survey. Prior disturbances (ATV tracks) indicate that water levels have not always been as high.
4. Floodwaters enter and flow through wetland predominantly as sheet flow rather than channel flow.	1	The area is within an active floodplain with evidence of impounded waters throughout. No channelized features were observed.
5. Waterbody is a lake (>20 acres) (N/A if assessing wetlands).	N/A	
Functional score = sum of ratings for indicators/total possible score = 3/4	0.75	
B. Sediment, Nutrient (N and P), Toxicant Removal		
1. Slow-moving or still water is present.	1	Substantial surface water was present during the field survey.
2. Low to tall woody vegetation present (N/A if assessing waters).	1	Woody vegetation is the dominant stratum.
3. At least moderate interspersion of vegetation and water is present. Surface water patches should account for >10% areal coverage (N/A if assessing waters).	0	The wetlands were completely flooded at the time of the field survey.
4. Sediment deposits are present, providing evidence of deposition during natural flood events.	0	No sediment deposits were observed during the field survey,
5. Thick surface organic horizon and/or abundant fine organic litter is present (N/A if assessing waters).	1	The organic layer wasn't directly assessed because the wetlands were flooded. The organic layers are expected to be thick histosols.
6. Sediment, nutrients, or toxicants (from agriculture, roadways, or development) appear to be or are likely to be entering the wetland.	1	The wetlands are completely surrounded by urban development; floodwaters present during the field survey are likely to contain pollutants from surrounding access roads and groins.
Functional score = sum of ratings for indicators/total possible score = 4/6	0.66	
C. Erosion Control and Shoreline Stabilization	N/A	None of the wetlands in this class borders a waterbody; thus this function was not assessed.
1. Wetland has dense, energy absorbing vegetation bordering the watercourse and no evidence of erosion.	N/A	
2. Soils are not predominantly sandy or silty, and are not ice rich.	N/A	
3. Historical aerial photography (if available) indicates stable shoreline features.	N/A	
Functional score = sum of ratings for indicators/total possible score (not applicable)	N/A	
D. Organic Matter Production and Export		
1. Wetland has at least 30%, or water has at least 10%, cover herbaceous vegetation. Woody plants are predominantly deciduous.	1	The wetlands in this functional class have at least 30% cover of herbaceous vegetation, woody vegetation when present is composed of broad-leaved deciduous shrubs.
2. At least 10% of wetland is seasonally flooded (N/A for waters).	1	The wetlands were completely flooded at the time of the field survey.
3. Surface water outflow occurs regularly throughout the growing season.	1	These wetlands are likely to be flooded throughout most of the growing season, and are assumed to be draining downstream to the Tanana River
Functional score = sum of ratings for indicators/total possible score = 3/3	1	

NWI Code(s): PEM1F, PEM1/SS1F, PSS1F [Semipermanently Flooded Wetlands]
HGM: Slope

Function and Indicators	Rating	Project Rationale
E. Avian and Mammal Habitat Suitability		
1. Wetland or water is undisturbed by human habitation or development.	0	The study area is completely surrounded by urban development.
2. Birds and/or mammals recorded using habitat.	1	Breeding birds were present during the June 2020 field survey.
3. Interspersion of vegetation and water is at least moderate (surface water patches accounting for 5–10% areal cover, or continuous cover of surface water with a well-developed emergent component).	1	Emergent vegetation and tall shrub canopy cover provide interspersion.
4. Wetland has 2 or more vegetation strata with at least 30% total cover each (N/A for waters).	1	Wetlands in this class are dominated by emergent vegetation, shrubs are typically also present and may be low shrubs within the emergent canopy or tall shrubs above the emergent canopy.
Functional score = sum of ratings for indicators/total possible score = 3/4	0.75	
F. Fish Habitat Suitability		This function is not assessed for terrestrial wetland types that are not immediately adjacent to a fish-bearing waterbody.
1. Water has sufficient size and depth of open water so as not to freeze completely during winter (N/A for wetlands).	N/A	
2. Fish are present.	N/A	
3. Herbaceous and/or woody vegetation is present in wetland and/or buffer to provide cover, shade, and/or detrital matter.	N/A	
4. Suitable spawning areas are present.	N/A	
5. Juvenile rest areas present.	N/A	
Functional score = sum of ratings for indicators/total possible score (not applicable)	N/A	
G. Educational, Scientific, Recreational, or Subsistence Use		
1. Site has documented scientific or educational use.	1	The Tanana Lakes Recreation area has multiple recreational and educational uses. This site has a nature trail, swim beach, non-motorized watercraft rentals, and motorized boat launch
2. Wetland or water is in public ownership.	1	The study area is managed by the Fairbanks North Star Borough.
3. Accessible trails are available.	1	See indicator 1 above.
4. Wetland or water supports subsistence activities (e.g., hunting, fishing, berry picking).	1	The area provides some hunting opportunities as well as a motorized boat launch for access to hunting and fishing locations along the Tanana River.
Functional score = sum of ratings for indicators/total possible score = 4/4	1	

NWI Code(s): PSS1E, PFO1C [Seasonally Flooded Wetlands]
HGM: Slope

Function and Indicators	Rating	Project Rationale
A. Flood Flow Regulation (Storage)		
1. Dense vegetation or tussocks, low to tall woody vegetation present (N/A if assessing waters).	1	Wetlands in this functional class have open canopies of low or tall shrubs or broad-leaved deciduous trees.
2. Wetland or water is a depressional HGM class or has depressional features capable of storage.	0	All wetlands in this functional class are classified as HGM slope.
3. Wetland or water shows signs of storage (i.e. fluctuating water levels, algal mats, and/or lodged debris).	1	These wetlands have vegetation typical of upland or seasonally saturated communities, but at least 12 inches of water was observed during the field survey. Frogs, aquatic invertebrates and algal covering on substrate were present but obligate wetland vegetation had not yet developed
4. Floodwaters enter and flow through wetland predominantly as sheet flow rather than channel flow.	1	The area is within an active floodplain with evidence of impounded waters throughout. No channelized features observed
5. Waterbody is a lake (>20 acres) (N/A if assessing wetlands).	N/A	
Functional score = sum of ratings for indicators/total possible score = 3/4	0.75	
B. Sediment, Nutrient (N and P), Toxicant Removal		
1. Slow-moving or still water is present.	1	Substantial surface water present was present during the field survey.
2. Low to tall woody vegetation present (N/A if assessing waters).	1	Woody vegetation is the dominant stratum.
3. At least moderate interspersion of vegetation and water is present. Surface water patches should account for >10% areal coverage (N/A if assessing waters).	0	The wetlands were flooded at the time of the field survey.
4. Sediment deposits are present, providing evidence of deposition during natural flood events.	0	No sediment deposits were observed during the field survey
5. Thick surface organic horizon and/or abundant fine organic litter is present (N/A if assessing waters).	1	The organic layer was not directly assessed because the area was flooded at the time of the field survey. The organic layer is expected to be similar to that of a typical seasonally saturated wetland.
6. Sediment, nutrients, or toxicants (from agriculture, roadways, or development) appear to be or are likely to be entering the wetland.	1	The wetlands are completely surrounded by urban development; floodwaters present during the field survey are likely to contain pollutants from surrounding access roads and groins.
Functional score = sum of ratings for indicators/total possible score = 4/6	0.66	
C. Erosion Control and Shoreline Stabilization	N/A	None of the wetlands in this class borders a waterbody; thus this function was not assessed.
1. Wetland has dense, energy absorbing vegetation bordering the watercourse and no evidence of erosion.	N/A	
2. Soils are not predominantly sandy or silty, and are not ice rich.	N/A	
3. Historical aerial photography (if available) indicates stable shoreline features.	N/A	
Functional score = sum of ratings for indicators/total possible score (not applicable)	N/A	
D. Organic Matter Production and Export		
1. Wetland has at least 30%, or water has at least 10%, cover herbaceous vegetation. Woody plants are predominantly deciduous.	1	The wetlands have at least 30% cover of vegetation, including an open canopy of shrubs or broad-leaved deciduous trees.
2. At least 10% of wetland is seasonally flooded (N/A for waters).	1	These wetlands may receive floodwaters due to impoundment of water by TLRA access roads.

NWI Code(s): PSS1E, PFO1C [Seasonally Flooded Wetlands]
HGM: Slope

Function and Indicators	Rating	Project Rationale
3. Surface water outflow occurs regularly throughout the growing season.	1	Floodwaters are likely to recede periodically through the growing season.
Functional score = sum of ratings for indicators/total possible score = 3/3	1	
E. Avian and Mammal Habitat Suitability		
1. Wetland or water is undisturbed by human habitation or development.	0	The study area is completely surrounded by urban development.
2. Birds and/or mammals recorded using habitat.	1	Breeding birds were present during the June 2020 field survey.
3. Interspersion of vegetation and water is at least moderate (surface water patches accounting for 5–10% areal cover, or continuous cover of surface water with a well-developed emergent component).	0	Surface water was continuous during the field survey, based on the vegetation at the site very little interspersion is expected when floodwaters recede
4. Wetland has 2 or more vegetation strata with at least 30% total cover each (N/A for waters).	1	Wetlands in this class have an open canopy of broad-leaved deciduous trees with an understory of deciduous shrubs, or an open tall deciduous shrub canopy with an herbaceous understory.
Functional score = sum of ratings for indicators/total possible score = 2/4	0.5	
F. Fish Habitat Suitability		This function is not assessed for terrestrial wetland types that are not immediately adjacent to a fish-bearing waterbody.
1. Water has sufficient size and depth of open water so as not to freeze completely during winter (N/A for wetlands).	N/A	
2. Fish are present.	N/A	
3. Herbaceous and/or woody vegetation is present in wetland and/or buffer to provide cover, shade, and/or detrital matter.	N/A	
4. Suitable spawning areas are present.	N/A	
5. Juvenile rest areas present.	N/A	
Functional score = sum of ratings for indicators/total possible score (not applicable)	N/A	
G. Educational, Scientific, Recreational, or Subsistence Use		
1. Site has documented scientific or educational use.	1	The Tanana Lakes Recreation area has multiple recreational and educational uses. This site has a nature trail, swim beach, non-motorized watercraft rentals, and motorized boat launch
2. Wetland or water is in public ownership.	1	The study area is managed by the Fairbanks North Star Borough.
3. Accessible trails are available.	1	See indicator 1 above.
4. Wetland or water supports subsistence activities (e.g., hunting, fishing, berry picking).	1	The area provides some hunting opportunities as well as a motorized boat launch for access to hunting and fishing locations along the Tanana River.
Functional score = sum of ratings for indicators/total possible score = 4/4	1	

NWI Code(s): PEM1B, PSS1/EM1B, PSS1B [Seasonally Saturated Emergent and Shrub Scrub]
HGM: Slope

Function and Indicators	Rating	Project Rationale
A. Flood Flow Regulation (Storage)		
1. Dense vegetation or tussocks, low to tall woody vegetation present (N/A if assessing waters).	1	Wetlands in this functional class have dense graminoid cover or closed tall shrub canopies.
2. Wetland or water is a depressional HGM class or has depressional features capable of storage.	0	All wetlands in this functional class are classified as HGM slope.
3. Wetland or water shows signs of storage (i.e. fluctuating water levels, algal mats, and/or lodged debris).	0	No signs of storage or fluctuating surface water levels were observed during the field survey.
4. Floodwaters enter and flow through wetland predominantly as sheet flow rather than channel flow.	1	The area is within an active floodplain with evidence of impounded waters throughout. No channelized features were observed; the wetlands are seasonally saturated.
5. Waterbody is a lake (>20 acres) (N/A if assessing wetlands).	N/A	
Functional score = sum of ratings for indicators/total possible score = 2/4	0.5	
B. Sediment, Nutrient (N and P), Toxicant Removal		
1. Slow-moving or still water is present.	0	No surface water was observed during the field survey.
2. Low to tall woody vegetation present (N/A if assessing waters).	1	Woody vegetation is present.
3. At least moderate interspersion of vegetation and water is present. Surface water patches should account for >10% areal coverage (N/A if assessing waters).	0	No surface water was observed during the field survey.
4. Sediment deposits are present, providing evidence of deposition during natural flood events.	0	No sediment deposits were observed during the field survey
5. Thick surface organic horizon and/or abundant fine organic litter is present (N/A if assessing waters).	1	The organic layer is more than 8 inches in depth.
6. Sediment, nutrients, or toxicants (from agriculture, roadways, or development) appear to be or are likely to be entering the wetland.	1	The wetlands are completely surrounded by urban development; in the unlikely event of a flood, pollutants could enter the system from the surrounding roadways.
Functional score = sum of ratings for indicators/total possible score = 3/6	0.5	
C. Erosion Control and Shoreline Stabilization	N/A	None of the wetlands in this functional class borders a waterbody; thus this function was not assessed.
1. Wetland has dense, energy absorbing vegetation bordering the watercourse and no evidence of erosion.	N/A	
2. Soils are not predominantly sandy or silty, and are not ice rich.	N/A	
3. Historical aerial photography (if available) indicates stable shoreline features.	N/A	
Functional score = sum of ratings for indicators/total possible score (not applicable)	N/A	
D. Organic Matter Production and Export		Wetlands in this class have >30% cover of vegetation with deciduous shrubs, but are not likely to receive flood waters regularly; thus this function was scored at 0.
1. Wetland has at least 30%, or water has at least 10%, cover herbaceous vegetation. Woody plants are predominantly deciduous.	0	
2. At least 10% of wetland is seasonally flooded (N/A for waters).	0	
3. Surface water outflow occurs regularly throughout the growing season.	0	
Functional score = sum of ratings for indicators/total possible score = 0/3	0	

NWI Code(s): PEM1B, PSS1/EM1B, PSS1B [Seasonally Saturated Emergent and Shrub Scrub]
HGM: Slope

Function and Indicators	Rating	Project Rationale
E. Avian and Mammal Habitat Suitability		
1. Wetland or water is undisturbed by human habitation or development.	0	The study area is completely surrounded by urban development.
2. Birds and/or mammals recorded using habitat.	1	Breeding birds were present during the June 2020 field survey.
3. Interspersion of vegetation and water is at least moderate (surface water patches accounting for 5–10% areal cover, or continuous cover of surface water with a well-developed emergent component).	0	No surface water was observed during the field survey.
4. Wetland has 2 or more vegetation strata with at least 30% total cover each (N/A for waters).	1	Wetlands in this class consist of a forb/shrub understory with a low or tall deciduous shrub stratum.
Functional score = sum of ratings for indicators/total possible score = 2/4	0.5	
F. Fish Habitat Suitability		This function is not assessed for terrestrial wetland types that are not immediately adjacent to a fish-bearing waterbody.
1. Water has sufficient size and depth of open water so as not to freeze completely during winter (N/A for wetlands).	N/A	
2. Fish are present.	N/A	
3. Herbaceous and/or woody vegetation is present in wetland and/or buffer to provide cover, shade, and/or detrital matter.	N/A	
4. Suitable spawning areas are present.	N/A	
5. Juvenile rest areas present.	N/A	
Functional score = sum of ratings for indicators/total possible score (not applicable)	N/A	
G. Educational, Scientific, Recreational, or Subsistence Use		
1. Site has documented scientific or educational use.	1	The Tanana Lakes Recreation area has multiple recreational and educational uses. This site has a nature trail, swim beach, non-motorized watercraft rentals, and motorized boat launch
2. Wetland or water is in public ownership.	1	The study area is managed by the Fairbanks North Star Borough.
3. Accessible trails are available.	1	See indicator 1 above.
4. Wetland or water supports subsistence activities (e.g., hunting, fishing, berry picking).	1	The area provides some hunting opportunities as well as a motorized boat launch for access to hunting and fishing locations along the Tanana River.
Functional score = sum of ratings for indicators/total possible score = 4/4	1	

NWI Code(s): PFO2B, PFO4B [Seasonally Saturated Needle-leaved Forest]
HGM: Slope

Function and Indicators	Rating	Project Rationale
A. Flood Flow Regulation (Storage)		
1. Dense vegetation or tussocks, low to tall woody vegetation present (N/A if assessing waters).	1	Wetlands in this functional class have open canopies of needle-leaved trees (*Picea mariana* and *Larix laricina*), in some cases with dense tall deciduous shrub understory.
2. Wetland or water is a depressional HGM class or has depressional features capable of storage.	0	All wetlands in this functional class are classified as HGM slope.
3. Wetland or water shows signs of storage (i.e. fluctuating water levels, algal mats, and/or lodged debris).	0	No signs of storage or fluctuating surface water levels were observed during the field survey.
4. Floodwaters enter and flow through wetland predominantly as sheet flow rather than channel flow.	1	The area is within an active floodplain with evidence of impounded waters throughout. No channelized features were observed; the wetlands were seasonally saturated. Evidence of permafrost was observed in the PFO4B wetlands.
5. Waterbody is a lake (>20 acres) (N/A if assessing wetlands).	N/A	
Functional score = sum of ratings for indicators/total possible score = 2/4	0.5	
B. Sediment, Nutrient (N and P), Toxicant Removal		
1. Slow-moving or still water is present.	0	No surface water was observed during the field survey.
2. Low to tall woody vegetation present (N/A if assessing waters).	1	Woody vegetation is present.
3. At least moderate interspersion of vegetation and water is present. Surface water patches should account for >10% areal coverage (N/A if assessing waters).	0	No surface water was observed during the field survey.
4. Sediment deposits are present, providing evidence of deposition during natural flood events.	0	No sediment deposits were observed during the field survey.
5. Thick surface organic horizon and/or abundant fine organic litter is present (N/A if assessing waters).	1	The organic layer is more than 8 inches in depth.
6. Sediment, nutrients, or toxicants (from agriculture, roadways, or development) appear to be or are likely to be entering the wetland.	1	The wetlands are completely surrounded by urban development; in the unlikely event of a flood, pollutants could enter the system from the surrounding roadways.
Functional score = sum of ratings for indicators/total possible score = 3/6	0.5	
C. Erosion Control and Shoreline Stabilization	N/A	None of the wetlands in this class borders a waterbody; thus this function was not assessed.
1. Wetland has dense, energy absorbing vegetation bordering the watercourse and no evidence of erosion.	N/A	
2. Soils are not predominantly sandy or silty, and are not ice rich.	N/A	
3. Historical aerial photography (if available) indicates stable shoreline features.	N/A	
Functional score = sum of ratings for indicators/total possible score (not applicable)	N/A	
D. Organic Matter Production and Export		
1. Wetland has at least 30%, or water has at least 10%, cover herbaceous vegetation. Woody plants are predominantly deciduous.	0	
2. At least 10% of wetland is seasonally flooded (N/A for waters).	1	Wetlands may receive floodwaters due to impoundment of water at TLRA access roads.
3. Surface water outflow occurs regularly throughout the growing season.	1	Floodwaters are likely to recede periodically through the growing season.
Functional score = sum of ratings for indicators/total possible score = 2/3	0.66	

NWI Code(s): PFO2B, PFO4B [Seasonally Saturated Needle-leaved Forest]
HGM: Slope

Function and Indicators	Rating	Project Rationale
E. Avian and Mammal Habitat Suitability		
1. Wetland or water is undisturbed by human habitation or development.	0	The study area is completely surrounded by urban development.
2. Birds and/or mammals recorded using habitat.	1	Breeding birds were present during the June 2020 field survey.
3. Interspersion of vegetation and water is at least moderate (surface water patches accounting for 5–10% areal cover, or continuous cover of surface water with a well-developed emergent component).	0	No surface water was observed during the field survey.
4. Wetland has 2 or more vegetation strata with at least 30% total cover each (N/A for waters).	1	Wetlands in this class consist of an open canopy of needle-leaved trees with an understory of deciduous shrubs.
Functional score = sum of ratings for indicators/total possible score = 2/4	0.5	
F. Fish Habitat Suitability		This function is not assessed for terrestrial wetland types that are not immediately adjacent to a fish-bearing waterbody.
1. Water has sufficient size and depth of open water so as not to freeze completely during winter (N/A for wetlands).	N/A	
2. Fish are present.	N/A	
3. Herbaceous and/or woody vegetation is present in wetland and/or buffer to provide cover, shade, and/or detrital matter.	N/A	
4. Suitable spawning areas are present.	N/A	
5. Juvenile rest areas present.	N/A	
Functional score = sum of ratings for indicators/total possible score (not applicable)	N/A	
G. Educational, Scientific, Recreational, or Subsistence Use		
1. Site has documented scientific or educational use.	1	The Tanana Lakes Recreation area has multiple recreational and educational uses. This site has a nature trail, swim beach, non-motorized watercraft rentals, and motorized boat launch
2. Wetland or water is in public ownership.	1	The study area is managed by the Fairbanks North Star Borough.
3. Accessible trails are available.	1	See indicator 1 above.
4. Wetland or water supports subsistence activities (e.g., hunting, fishing, berry picking).	1	The area provides some hunting opportunities as well as a motorized boat launch for access to hunting and fishing locations along the Tanana River.
Functional score = sum of ratings for indicators/total possible score = 4/4	1	

ADDENDUM TO THE WETLAND AND STREAM DELINEATION FOR THE TANANA RIVER RECREATION ACCESS IMPROVEMENTS PROJECT, FAIRBANKS, ALASKA, 2020: AK FNSB TANANA(1)

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INTRODUCTION

A wetland field survey, wetland delineation, and functional assessment were prepared to support wetland permitting and NEPA documentation for the Tanana River Recreation Access Improvements Project in October 2020 (ABR 2020a). The project design has evolved since the original report was finalized and this addendum documents the changes in study area boundaries and the new wetland types and wetland functional classes found within the revised study area boundaries.

PROJECT LOCATION

The project area is located immediately south of the city of Fairbanks within the Fairbanks North Star Borough (Figure 1). The coordinates for the center point of the main portion of the project are: 64.800963, -147.741609° and the legal land description is: Sections 21-22, and 27-28, Township 1South, Range 1West, Fairbanks Meridian, Alaska.

STUDY AREA

The revised wetland delineation study area is as described in ABR (2020a), but it has been expanded from 23.0 to 31.1 acres. The additional acreage encompasses expansions of the project footprint for the motorized boat launch at the Tanana River and the non-motorized boat launch on Cushman Lake as well as an expansion of the swim beach on Cushman Lake (Figure 1). The majority of the expansion area is composed of upland fill, but the expansion of the swim beach and non-motorized boat launch boundaries now includes seasonally flooded and unvegetated fringe wetlands and open lake water on Cushman Lake. Revisions to the design of the proposed extension of South Lathrop Street involved shifting the road alignment slightly to the west near the intersection with Northlake Lane. Similarly, the road alignment for Northlake Lane was also shifted and curved slightly to the north. Both of these alterations were done to minimize fill in high-value wetlands (see ABR 2020b).

METHODS

WETLAND CLASSIFICATION AND MAPPING

As noted above, the wetland mapping study area was expanded and now includes new wetland and waters types not previously mapped or described. Mapping followed the methods detailed in ABR (2020a). No additional field data were collected to support the mapping prepared for this addendum.

WETLAND FUNCTIONAL ASSESSMENT

The new wetlands and waters types mapped were evaluated for wetland functions using the same methodology described in ABR (2020a). The new functional assessment worksheets are presented in Appendix A.

RESULTS AND DISCUSSION

WETLAND CLASSIFICATION AND MAPPING

WETLANDS

No new wetland types were identified during the mapping for the revised study area. One additional wetland polygon was mapped as Palustrine Semipermanently Flooded Persistent Emergent/Broad-leaved Deciduous Shrub (PEM1/SS1F, polygon W-33, Figure 2). Polygon W-33 encompasses 0.07 acres or 0.2% of the study area (Table 1). A total of 6 existing wetland polygons increased slightly in size where the new study area boundaries expanded slightly; these are W-18 (0.18 acres or 0.6% of the study area), W-30 (0.21 acres, 0.7%), W-21 (0.05 acres, 0.2%), W-9, 0.42 acres, 1.4%), W-23 (0.24 acres, 0.8%) and W-26 (0.16 acres, 0.5%).

STREAMS AND WATERS OF THE U.S.

Lacustrine Permanently Flooded Littoral Unconsolidated Sandy Bottom (L2UB2H) and Lacustrine Seasonally Flooded Littoral Unconsolidated Sandy Shore (L2US2C) were new waters types mapped in polygons W-37, W-34, W-36, and W-38 (Figure 2, Table 1). Both waters are unvegetated with a sandy unconsolidated substrate composed of sand deposited to form the swim beach and the non-motorized boat launch. L2UB2H is the portion of constructed beach

determined to be permanently flooded and L2US2C is subject to seasonal lake level fluctuations and slight wave action.

The Stream-2 polygon classified as Riverine Permanently Flooded Lower Perennial Unconsolidated Bottom (R2UBH) increased slightly in size in the new mapping to 0.15 acres or 0.5% of the study area (Table 1). The R2UBH polygon is an extention of the lower perennial active slough connecting Cushman Lake to the Tanana River.

UPLANDS

In the new mapping, total uplands increased from 16.70 acres (72.6% of the study area) to 23.66 acres (76.2% of the study area; Table 1). The majority of the additional acreage was categorized as upland fill within the two boat launch parking lots and the swim beach (Figure 2).

WETLAND FUNCTIONAL ASSESSMENT

The two new waters types included in the revised study area were combined into one new wetland functional class (Appendix A). L2UB2H and L2US2C make up the Lacustrine Sandy Shoreline wetland functional class, which is considered to occupy the lacustrine fringe surrounding Cushman Lake. The overall Functional Capacity Index (FCI) score for Lacustrine Sandy Shoreline is 0.49, which is low to moderate functioning across all evaluated functional indicators (Table 2).

The water level of Cushman lake appears to fluctuate based on assessments of historical imagery and field observations, which indicates the potential for moderately high functional value (0.75) in flood-flow regulation or storage for the Lacustrine Sandy Shoreline wetland functional class (Table 2). Sediment nutrient and toxicant removal also rated moderate-high (0.75) because still water is present, which would allow for settlement and because the proximity to urban development increases the likelihood that pollutants are entering the system during floods (Table 2; Appendix A). There were no changes to the functional assessment scores for the remaining wetlands and waters within the new study area boundaries. Descriptions and functional assessment worksheets for those types can be found in ABR (2020a).

PROPOSED JURISDICTIONAL STATUS

The previous assessment established Cushman Lake as a jurisdictional lake on the basis that it immediately abuts the active channel of the Tanana River (a traditional navigable water). The new waters types (mapped in polygons W-36 and W-37, Figure 2) described in this addendum are part of Cushman Lake and are thus considered jurisdictional. Similarly, the L2EM2H wetland mapped at polygon W-38 and the PEM1/SS1F wetland mapped at W-33 both directly abut Cushman Lake and are considered jurisdictional. The remaining increases in mapped acreages were extensions of previously mapped and numbered polygons and the jurisdictional determination for those types discussed in ABR (2020a) still applies. Table 3 provides updated acreages and jurisdictional categories for all mapped wetlands in the new study area.

LITERATURE CITED

ABR, Inc.—Environmental Research & Services (ABR). 2020a. Wetland and stream delineation for the Tanana River Recreation Access Improvements Project, Fairbanks, Alaska, 2020: AK FNSB Tanana(1). Final report prepared for PND Engineers, Inc., and Federal Highway Administration, Western Federal Lands Highway Division. 24 pp. + Appendices.

ABR, Inc.—Environmental Research & Services (ABR). 2020b. Addendum to the wetland impacts and mitigation report for the Tanana River Recreation Access Improvements Project, Fairbanks, Alaska, 2020: AK FNSB Tanana(1). Final report prepared for PND Engineers, Inc., and Federal Highway Administration, Western Federal Lands Highway Division. 15 pp.

Table 1. Acreages of wetlands, waters, and uplands types in numbered, mapped polygons in the Tanana River Recreation Access Improvements study area, Fairbanks, Alaska, 2020.

NWI_Code[a]	NWI Description[a]	Wetland Name	Acres[b]	% of Study Area
Waters		**Total**	**0.93**	**3.00**
L2UB2H	Lacustrine Permanently Flooded Littoral Unconsolidated Sandy Bottom	W-37	0.32	1.04
L2US2C	Lacustrine Seasonally Flooded Littoral Unconsolidated Sandy Shore	W-34	0.20	0.65
		W-36	0.15	0.49
L2EM2H	Lacustrine Permanently Flooded Littoral Nonpersistent Emergent Marsh	W-20	0.01	0.02
		W-38	0.03	0.11
PUBH	Palustrine Permanently Flooded Unconsolidated Bottom	W-10	0.01	0.02
		W-28	0.04	0.13
		W-8	0.01	0.03
R2UBH	Riverine Permanently Flooded Lower Perennial Unconsolidated Bottom	Stream-2	0.15	0.48
R4USC	Riverine Seasonally Flooded Intermittent Unconsolidated Shore	Stream-1	0.01	0.04
Wetlands		**Total**	**6.45**	**20.78**
PEM1F	Palustrine Semipermanently Flooded Persistent Emergent	W-13	0.99	3.18
		W-18	0.18	0.58
		W-31	0.18	0.57
		W-6	0.13	0.41
PSS1F	Palustrine Semipermanently Flooded Broad-leaved Deciduous Shrub	W-11	0.37	1.18
		W-12	0.04	0.14
		W-25	0.08	0.26
		W-27	0.16	0.50
		W-30	0.21	0.69
PEM1/SS1F	Palustrine Semipermanently Flooded Persistent Emergent/Broad-leaved Deciduous Shrub	W-17	0.16	0.50
		W-19	0.02	0.08
		W-33	0.07	0.23

Table 1. Continued.

NWI_Code[a]	NWI Description[a]	Wetland Name	Acres[b]	% of Study Area
Wetlands (cont.)				
PSS1E	Palustrine Seasonally Flooded-Saturated Broad-leaved Deciduous Shrub	W-14	0.12	0.39
		W-16	0.24	0.76
		W-21	0.05	0.16
		W-3	0.35	1.14
		W-4	0.04	0.12
PEM1B	Palustrine Seasonally Saturated Persistent Emergent	W-1	0.07	0.24
		W-2	0.09	0.28
PSS1/EM1B	Palustrine Seasonally Saturated Broad-leaved Deciduous Shrub/Persistent Emergent	W-5	1.71	5.50
PSS1B	Palustrine Seasonally Saturated Broad-leaved Deciduous Shrub	W-7	0.05	0.16
PFO2B	Palustrine Seasonally Saturated Needle-leaved Deciduous Forest	W-32	0.02	0.07
		W-9	0.42	1.36
PFO4B	Palustrine Seasonally Saturated Needle-leaved Evergreen Forest	W-23	0.24	0.77
		W-26	0.16	0.50
PFO1C	Palustrine Seasonally Flooded Broad-leaved Deciduous Forest	W-22	0.11	0.34
		W-24	0.21	0.67
Uplands		**Total**	**23.66**	**76.22**
U	Uplands		7.82	25.20
Ur	Uplands (urban)		0.86	2.78
Us	Uplands (fill)		14.97	48.23
Grand Total			31.05	100.00

[a] National Wetland Inventory (NWI) annotation based on FGDC (2013) classification system.
[b] All values rounded to the nearest 0.01 acre.

Table 2. Wetland function (Functional Capacity Index) scores for wetlands and waters functional classes within the mapping area for planned improvements, Tanana River Recreation Access Improvements Project, Fairbanks, Alaska, 2020.

Wetland Functional Class	Flood Flow Regulation	Sediment/ Nutrient/ Toxicant Removal	Erosion Control & Shoreline Stabil.	Organic Matter Production and Export	Avian and Mammal Habitat Suitability	Fish Habitat Suitability	Education/ Science/ Rec/ Subsist Use	Overall FCI score
Waters								
Lower Perennial Stream R2UBH	0.25	1.00	0.33	1.00	0.33	0.80	1.00	0.67
Intermittent Stream R4USC	0.25	0.75	0.00	0.50	0.00	0.00	1.00	0.36
Lacustrine Lentic Waters L2EM2H	0.75	1.00	0.00	1.00	0.33	1.00	1.00	0.73
Lacustrine Sandy Shoreline L2UB2H, L2US2C	0.75	0.75	0	0.5	0	0.4	1.00	0.49
Palustrine Lentic Waters PUBH	0.50	0.50	N/A	0.00	0.00	0.20	1.00	0.37
Wetlands								
Semipermanently Flooded Wetlands PEM1F, PEM1/SS1F, PSS1F	0.75	0.66	N/A	1.00	0.75	N/A	1.00	0.83
Seasonally Flooded Wetlands PSS1E, PFO1C	0.75	0.66	N/A	1.00	0.50	N/A	1.00	0.78
Seasonally Saturated Emergent and Shrub Scrub PEM1B, PSS1/EM1B, PSS1B	0.50	0.50	N/A	0.00	0.50	N/A	1.00	0.50
Seasonally Saturated Needle-leaved Forest PFO2B, PFO4B	0.50	0.50	N/A	0.66	0.50	N/A	1.00	0.63

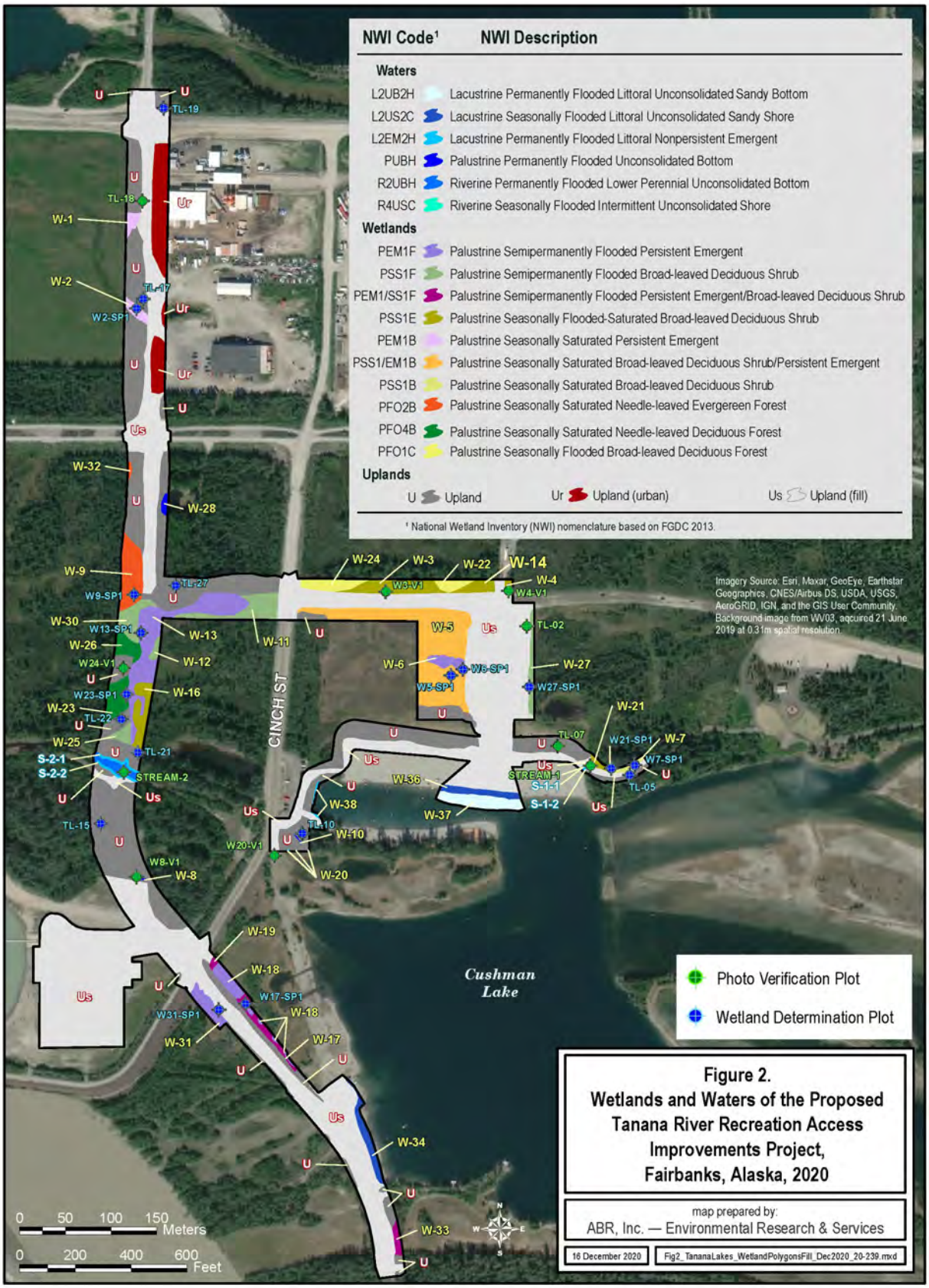
Table 3. Connectivity characteristics and proposed jurisdictional classification for each mapped wetland within the mapping area for planned improvements, Tanana River Recreation Access Improvements Project, Fairbanks, Alaska, 2020.

Wetland Name	NWI Code	Area (acres)	Jurisdictional Class	Characteristics
Stream-1	R4USC	0.01	(a)(2) tributaries	Constructed ditch contributing intermittent flow from upstream wetlands to Cushman lake, to STREAM-2, to the Tanana River
Stream-2	R2UBH	0.15	(a)(2) tributaries	Active riparian slough with perennial flow connecting directly to the Tanana River
W-1	PEM1B	0.07	non-jurisdictional (wetlands)	Drainage feature within a fallow field with no direct surface water connection to a navigable water
W-2	PEM1B	0.09	non-jurisdictional (wetlands)	Drainage feature within a fallow field with no direct surface water connection to a navigable water
W-3	PSS1E	0.35	non-jurisdictional (wetlands)	Impounded wetlands with no direct surface water connection to a navigable water
W-4	PSS1E	0.04	non-jurisdictional (wetlands)	Impounded wetlands with no direct surface water connection to a navigable water
W-5	PSS1/EM1B	1.71	(a)(4) adjacent wetlands	Wetland abuts Cushman Lake, connected directly to the Tanana River through STREAM-2
W-6	PEM1F	0.13	(a)(4) adjacent wetlands	Wetland abuts W-5
W-7	PSS1B	0.05	(a)(4) adjacent wetlands	Wetland abuts W-21
W-8	PUBH	0.01	non-jurisdictional (wetlands)	Constructed ditch within surrounding uplands, flooding likely to be solely from precipitation
W-9	PFO2B	0.42	(a)(4) adjacent wetlands	Wetland is part of the undisturbed riverine wetland complex directly abutting the Tanana River
W-10	PUBH	0.01	non-jurisdictional (waters)	Depression possibly from prior gravel mining operations, flooding likely to be solely from precipitation
W-11	PSS1F	0.37	(a)(4) adjacent wetlands	Wetland is part of the undisturbed riverine wetland complex directly abutting the Tanana River
W-12	PSS1F	0.04	(a)(4) adjacent wetlands	Wetland is part of the undisturbed riverine wetland complex directly abutting the Tanana River
W-13	PEM1F	0.99	(a)(4) adjacent wetlands	Wetland is part of the undisturbed riverine wetland complex directly abutting the Tanana River

Table 3. Continued.

Wetland Name	NWI Code	Area (acres)	Jurisdictional Class	Characteristics
W-14	PSS1E	0.12	(a)(4) adjacent wetlands	Wetland is part of the undisturbed riverine wetland complex directly abutting the Tanana River
W-16	PSS1E	0.24	(a)(4) adjacent wetlands	Wetland is part of the undisturbed riverine wetland complex directly abutting the Tanana River
W-17	PEM1/SS1F	0.16	(a)(4) adjacent wetlands	Wetland directly abuts Cushman Lake
W-18	PEM1F	0.18	(a)(4) adjacent wetlands	Wetland directly abuts Cushman Lake
W-19	PEM1/SS1F	0.02	(a)(4) adjacent wetlands	Wetland directly abuts Cushman Lake
W-20	L2EM2H	0.01	(a)(3) lakes and ponds	Wetland directly abuts Cushman Lake
W-21	PSS1E	0.05	(a)(4) adjacent wetlands	Wetland connects to Cushman Lake via STREAM-1
W-22	PFO1C	0.11	non-jurisdictional (wetlands)	Impounded wetlands with no surface water connection
W-23	PFO4B	0.24	non-jurisdictional (wetlands)	Impounded wetlands with no surface water connection
W-24	PFO1C	0.21	non-jurisdictional (wetlands)	Impounded wetlands with no surface water connection
W-25	PSS1F	0.08	(a)(4) adjacent wetlands	Wetland directly abuts STREAM-2
W-26	PFO4B	0.16	(a)(4) adjacent wetlands	Wetland is part of the undisturbed riverine wetland complex directly abutting the Tanana River
W-27	PSS1F	0.16	(a)(4) adjacent wetlands	Wetland drains to Cushman Lake through STREAM-1
W-28	PUBH	0.04	non-jurisdictional (waters)	Flooded depression, possibly from prior gravel mining, surrounded by uplands, no surface water inlets or outlets observed during field survey
W-30	PSS1F	0.21	(a)(4) adjacent wetlands	Wetland is part of the undisturbed riverine wetland complex directly abutting the Tanana River
W-31	PEM1F	0.18	(a)(4) adjacent wetlands	Wetland directly abuts the Tanana River
W-32	PFO2B	0.02	(a)(4) adjacent wetlands	Wetland is part of the undisturbed riverine wetland complex directly abutting the Tanana River
W-33	PEM1/SS1F	0.07	(a)(4) adjacent wetlands	Wetland directly abuts Cushman Lake
W-34	L2US2C	0.20	(a)(3) lakes and ponds	Wetland directly abuts Cushman Lake
W-36	L2US2C	0.15	(a)(3) lakes and ponds	Wetland directly abuts Cushman Lake
W-37	L2UB2H	0.32	(a)(3) lakes and ponds	Wetland directly abuts Cushman Lake
W-38	L2EM2H	0.03	(a)(3) lakes and ponds	Wetland directly abuts Cushman Lake


Imagery Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community. Background image from WV03, aqcuired 21 June 2019 at 0.31m spatial resolution.
VAN HORN RD
LATHROP ST
SANDURI AVE
CUSHMAN ST
SADDLE AVE
CINCH ST
Flood control Levee
Motorized boat launch
Hiking trail
Swim Beach
Groin 8
Cushman Lake
GOOSE ISLAND CAUSEWAY
Tanana River
Goose Island
Chukchi Sea
Utqiagvik
Nome
ALASKA
Fairbanks
Map View
Bering Sea
Anchorage
Gulf of Alaska
Wetland Study Area
GVEA Intertie
0 100 200 300 400 Meters
0 500 1,000 1,500 Feet
Figure 1.
Wetland Mapping Study Area for the Proposed Tanana River Recreation Access Improvements Project, Fairbanks, Alaska, 2020
map prepared by:
ABR, Inc. — Environmental Research & Services
16 December 2020
Fig1_Tananalakes_Wetlands_Dec2020_SA_20-239.mxd


NWI Code¹ NWI Description
Waters
L2UB2H Lacustrine Permanently Flooded Littoral Unconsolidated Sandy Bottom
L2US2C Lacustrine Seasonally Flooded Littoral Unconsolidated Sandy Shore
L2EM2H Lacustrine Permanently Flooded Littoral Nonpersistent Emergent
PUBH Palustrine Permanently Flooded Unconsolidated Bottom
R2UBH Riverine Permanently Flooded Lower Perennial Unconsolidated Bottom
R4USC Riverine Seasonally Flooded Intermittent Unconsolidated Shore
Wetlands
PEM1F Palustrine Semipermanently Flooded Persistent Emergent
PSS1F Palustrine Semipermanently Flooded Broad-leaved Deciduous Shrub
PEM1/SS1F Palustrine Semipermanently Flooded Persistent Emergent/Broad-leaved Deciduous Shrub
PSS1E Palustrine Seasonally Flooded-Saturated Broad-leaved Deciduous Shrub
PEM1B Palustrine Seasonally Saturated Persistent Emergent
PSS1/EM1B Palustrine Seasonally Saturated Broad-leaved Deciduous Shrub/Persistent Emergent
PSS1B Palustrine Seasonally Saturated Broad-leaved Deciduous Shrub
PFO2B Palustrine Seasonally Saturated Needle-leaved Evergereen Forest
PFO4B Palustrine Seasonally Saturated Needle-leaved Deciduous Forest
PFO1C Palustrine Seasonally Flooded Broad-leaved Deciduous Forest
Uplands
U Upland
Ur Upland (urban)
Us Upland (fill)
¹ National Wetland Inventory (NWI) nomenclature based on FGDC 2013.
Imagery Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community. Background image from WV03, acquired 21 June 2019 at 0.31m spatial resolution.
CINCH ST
Cushman Lake
Photo Verification Plot
Wetland Determination Plot
0 50 100 150 Meters
0 200 400 600 Feet
Figure 2.
Wetlands and Waters of the Proposed Tanana River Recreation Access Improvements Project, Fairbanks, Alaska, 2020
map prepared by:
ABR, Inc. — Environmental Research & Services
16 December 2020
Fig2_TananaLakes_WetlandPolygonsFill_Dec2020_20-239.mxd

Appendix A. Wetland Functional Assessment Data Form.

NWI Code(s): L2UB2H and L2US2C [Lacustrine Sandy Shoreline]
HGM: Lacustrine Fringe

Function and Indicators	Rating	Project Rationale
A. Flood Flow Regulation (Storage)		
1. Dense vegetation or tussocks, low to tall woody vegetation present (N/A if assessing waters).	N/A	
2. Wetland or water is a depressional HGM class or has depressional features capable of storage.	1	The waterbody is a lacustrine fringe surrounding a depressional lake (Cushman Lake).
3. Wetland or water shows signs of storage (i.e. fluctuating water levels, algal mats, and/or lodged debris).	1	This shoreline is a constructed feature involving the placement of sandy fill material within the lacustrine fringe. Based on aerial photography and field observations the water levels in the lake appear to fluctuate
4. Floodwaters enter and flow through wetland predominantly as sheet flow rather than channel flow.	0	Channelized outflow was observed on the west side of the lake.
5. Waterbody is a lake (>20 acres) (N/A if assessing wetlands).	1	The waterbody is a lacustrine fringe surrounding a lake >20 acres in size.
Functional score = sum of ratings for indicators/total possible score = 3/4	0.75	
B. Sediment, Nutrient (N and P), Toxicant Removal		
1. Slow-moving or still water is present.		Still water is present (Cushman Lake).
2. Low to tall woody vegetation present (N/A if assessing waters).	N/A	
3. At least moderate interspersion of vegetation and water is present. Surface water patches should account for >10% areal coverage (N/A if assessing waters).	0	This is an unvegetated constructed water feature
4. Sediment deposits are present, providing evidence of deposition during natural flood events.	1	Assume significant fluctuation in water levels by comparison to historical imagery.
5. Thick surface organic horizon and/or abundant fine organic litter is present (N/A if assessing waters).	N/A	
6. Sediment, nutrients, or toxicants (from agriculture, roadways, or development) appear to be or are likely to be entering the wetland.	1	The study area is completely surrounded by urban development; waterbody is likely to contain pollutants from surrounding access roads and groins.
Functional score = sum of ratings for indicators/total possible score = 3/4	0.75	

NWI Code(s): L2UB2H and L2US2C [Lacustrine Sandy Shoreline]
HGM: Lacustrine Fringe

Function and Indicators	Rating	Project Rationale
C. Erosion Control and Shoreline Stabilization		
1. Wetland has dense, energy absorbing vegetation bordering the watercourse and no evidence of erosion.	0	Vegetation is primarily rooted aquatic plants, with little lacustrine shoreline vegetation development
2. Soils are not predominantly sandy or silty, and are not ice rich.	0	The soil profiles were dominated by riverine sands and silts.
3. Historical aerial photography (if available) indicates stable shoreline features.	0	Comparison with historical imagery indicates changing water levels.
Functional score = sum of ratings for indicators/total possible score= 0/3	0	
D. Organic Matter Production and Export		
1. Wetland has at least 30%, or water has at least 10%, cover herbaceous vegetation. Woody plants are predominantly deciduous.	0	Water feature is unvegetated
2. At least 10% of wetland is seasonally flooded (N/A for waters).	N/A	
3. Surface water outflow occurs regularly throughout the growing season.	1	Active outflow was occurring through a culvert on the east side of Cushman Lake at the time of the field survey.
Functional score = sum of ratings for indicators/total possible score = 1/2	0.5	
E. Avian and Mammal Habitat Suitability		
1. Wetland or water is undisturbed by human habitation or development.	0	The study area is completely surrounded by urban development.
2. Birds and/or mammals recorded using habitat.	0	Although non-breeding waterbirds are known to use Cushman Lake, the sandy substrate in this functional class is unlikely to provide suitable habitat for foraging by dabbling or diving species.
3. Interspersion of vegetation and water is at least moderate (surface water patches accounting for 5–10% areal cover, or continuous cover of surface water with a well-developed emergent component).	0	
4. Wetland has 2 or more vegetation strata with at least 30% total cover each (N/A for waters).	N/A	
Functional score = sum of ratings for indicators/total possible score = 0/3	0	

NWI Code(s): L2UB2H and L2US2C [Lacustrine Sandy Shoreline]
HGM: Lacustrine Fringe

Function and Indicators	Rating	Project Rationale
F. Fish Habitat Suitability		
1. Water has sufficient size and depth of open water so as not to freeze completely during winter (N/A for wetlands).	1	Assume Cushman lake is deep enough to allow overwintering.
2. Fish are present.	1	Cushman Lake is assumed to support fish based on its close proximity to the Tanana River.
3. Herbaceous and/or woody vegetation is present in wetland and/or buffer to provide cover, shade, and/or detrital matter.	0	
4. Suitable spawning areas are present.	0	Sandy bottom may provide limited spawning habitat but the swim beach is highly disturbed
5. Juvenile rest areas present.	0	
Functional score = sum of ratings for indicators/total possible score 2/5	0.4	
G. Educational, Scientific, Recreational, or Subsistence Use		
1. Site has documented scientific or educational use.	1	The Tanana Lakes Recreation area has multiple recreational and educational uses. This site has a nature trail, swim beach, non motorized watercraft rentals, and motorized boat launch
2. Wetland or water is in public ownership.	1	The study area is managed by the Fairbanks North Star Borough.
3. Accessible trails are available.	1	See indicator 1 above.
4. Wetland or water supports subsistence activities (e.g., hunting, fishing, berry picking).	1	The area provides some hunting opportunities as well as a motorized boat launch for access to hunting and fishing locations along the Tanana River.
Functional score = sum of ratings for indicators/total possible score = 4/4	1	

WETLAND IMPACTS AND MITIGATION REPORT FOR THE TANANA RIVER RECREATION ACCESS IMPROVEMENTS PROJECT, FAIRBANKS, ALASKA, 2020: AK FNSB TANANA(1)

Prepared for:

PND Engineers Inc.
1506 W. 36th Ave
Anchorage, Alaska 99503

On behalf of:

Federal Highway Administration
Western Federal Lands Highway Division
610 E. 5th St
Vancouver, Washington 98661

Prepared by:
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and

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Anchorage, Alaska 99524

October 2020

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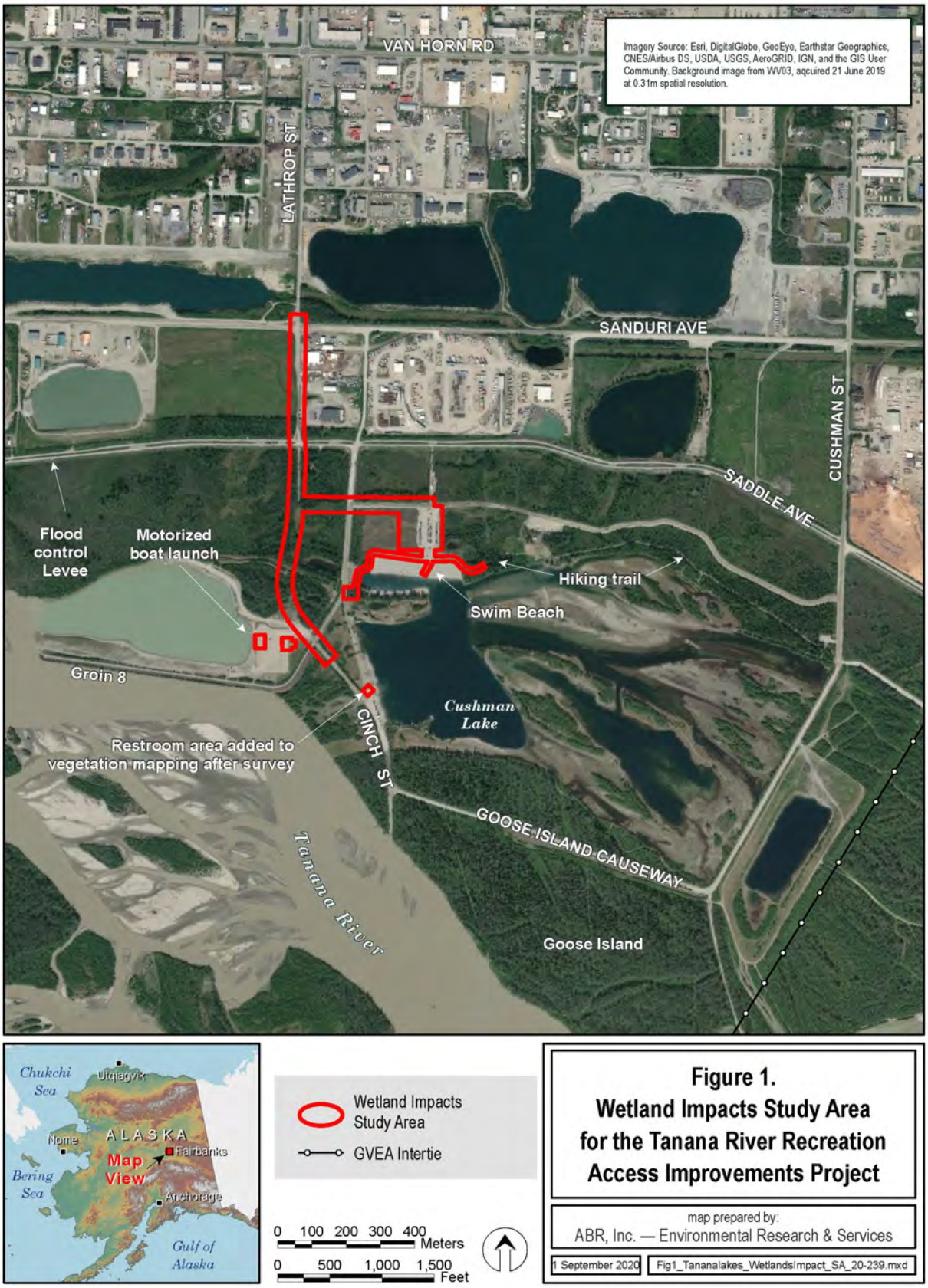
INTRODUCTION

The Tanana River Recreation Access Improvements Project is managed by the Federal Highway Administration, Western Federal Lands Highway Division (WFLHD). The project is intended to improve access to the Tanana Lakes Recreation Area (TLRA), which is managed by Fairbanks North Star Borough (FNSB). PND Engineers Inc. (PND) is the engineering and environmental contractor to WFLHD for the project and ABR, Inc.—Environmental Research & Services (ABR) is the subcontractor providing wetland information, National Environmental Policy Act (NEPA), and permitting support for the project.

This impacts and mitigation report is based on data in the draft wetland and stream delineation survey report for the project (ABR 2020a), the scientific literature, and the proposed improvement plans for the project. This report summarizes the impacts to wetlands that are likely to occur from gravel fill for construction and from subsequent use of the proposed infrastructure. In addition, the report outlines potential wetland mitigation measures mitigation measures that could be used to offset the loss of wetlands from gravel fill. This information is provided to support subsequent consultation, permitting efforts, and preparation of the NEPA document for the project.

STUDY AREA

The TLRA is located on the south (river) side of the Tanana Flood Control levee in south Fairbanks. A small portion of the project study area north of the levee is outside of the TLRA boundary. The recreation area has been established around Cushman Lake, which was formed by the impounded waters of an active slough of the Tanana River (Figure 1). The Goose Island Causeway (a groin extension of South Cushman Street) and Groin 8 (an extension of Cinch Street) were constructed to create the freshwater Cushman Lake, which is suitable for recreation activities and habitat conservation. Groin 8 also protects the motorized boat launch area at the Tanana River. Following the master plan for the area (FNSB 2007), the TLRA was developed after 2012 to include a swimming beach on Cushman Lake, hiking trails, the motorized boat launch on the Tanana River, and the non-motorized boat launch on the shore of Cushman Lake.


Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community. Background image from WV03, aqcuired 21 June 2019 at 0.31m spatial resolution.
VAN HORN RD
LATHROP ST
SANDURI AVE
CUSHMAN ST
SADDLE AVE
Flood control Levee
Motorized boat launch
Hiking trail
Swim Beach
Groin 8
Cushman Lake
Restroom area added to vegetation mapping after survey
CINCH ST
GOOSE ISLAND CAUSEWAY
Tanana River
Goose Island
Chukchi Sea
Utqiagvik
ALASKA
Nome
Fairbanks
Map View
Bering Sea
Anchorage
Gulf of Alaska
Wetland Impacts Study Area
GVEA Intertie
0 100 200 300 400 Meters
0 500 1,000 1,500 Feet
Figure 1.
Wetland Impacts Study Area for the Tanana River Recreation Access Improvements Project
map prepared by:
ABR, Inc. — Environmental Research & Services
1 September 2020
Fig1_Tananalakes_WetlandsImpact_SA_20-239.mxd

The entire TLRA area is located within the active floodplain of the large, braided Tanana River, but the hydrology has been substantially altered by the construction of the levee system and the creation of Cushman Lake. Surface water levels in the area are driven by water levels in the Tanana River and rainfall, but frequent flood events typical of undisturbed floodplains are moderated in the TLRA by the groins. Waters in the area have been formed by the impoundment of active sloughs of the Tanana River, the filling of gravel excavation depressions, and there is one flowing slough crossing the study area north of the motorized boat launch area. Overall, the terrain is characterized by flat, riverine-influenced lowlands, with small variations in elevation along the edges of abandoned river channels and depressions. North of the levee along South Lathrop Street, the study area is composed of a fallow field and an industrial park. According to the 2007 TLRA Master Plan, historically the area was composed of over 80% jurisdictional wetlands prior to any facility development (FNSB 2007). Surficial deposits are composed of alluvial sands and silts, with shallow organic layers developing in wetland areas. The geomorphology of the area consists of fluvial landscape features. As is much of Interior Alaska, the TLRA is located in a discontinuous permafrost zone.

The wetland survey and impacts study area was defined in the FHWA Statement of Work as specific buffer zones surrounding areas of proposed infrastructure improvements. This included a buffer of 75 feet of either side of the proposed road centerlines, a buffer of 25 feet on either side of the proposed trail centerlines, a buffer of 25 feet around the proposed parking areas, and a buffer of 50 feet around the proposed restroom locations (Figure 1). In total, the wetland study area encompasses approximately 23 acres. However, because the project footprint was finalized after the wetland field survey and mapping work was completed, small portions of the footprint (0.55 acre total, see Results and Discussion below) were not included in the study area; these areas were examined during the preparation of this report on the same satellite imagery used to map wetlands. The study area includes a proposed extension of South Lathrop Street to access the motorized boat launch on the Tanana River, a spur road from South Lathrop Street to the east to access the existing swim beach, and proposed improvements to the motorized boat launch facilities, the non-motorized boat launch facilities on the southwest side of Cushman Lake, and the facilities at the swim beach on the north side of Cushman Lake. With the exception of a short

section of South Lathrop Street north of the Tanana Flood Control levee, the majority of the study area is on the Tanana River side of the levee, on both the east and west sides of Groin 8.

METHODS

WETLAND IMPACTS

Impacts to wetlands in the study area were evaluated in ArcGIS by overlaying the expected cut and fill boundaries (the footprint) of the proposed project improvements on the mapped National Wetland Inventory (NWI) wetland types occurring in the area. The cut and fill boundaries were provided by PND and the wetland mapping was prepared by ABR. The two layers were intersected, using an ArcGIS analytical operation, to calculate the total acreage of each wetland type that would be lost to cut and fill during construction. The acreage of each wetland type within the wetland mapping area, but outside the project footprint, was calculated to assess the additional acreage that could be altered during construction, operation, and maintenance of the proposed infrastructure.

WETLAND AVOIDANCE AND MINIMIZATION

The acreage and locations of the wetland and waters types in the study area were assessed after the proposed project footprint was overlaid on the mapping of wetlands to determine if any modifications of the infrastructure plans could be made to avoid and/or minimize impacts to wetlands. In this process, the functional values of the wetland and waters types were also taken into account so as to identify design modifications that could made to reduce impacts on the higher functioning wetlands in the study area.

WETLAND MITIGATION

On-site mitigation options within the TLRA that could be used to offset the loss and alteration of wetlands from construction, operation, and maintenance of the proposed project infrastructure were evaluated by ABR staff while in the field conducting the wetland survey in July 2020. This site visit provided key information on the current status of wetlands in the study area and generated ideas on how wetland functions in the area could be maintained and/or improved by various local mitigation measures. Information on suitable wetland mitigation banks that could be used to offset wetland impacts from the proposed project was assessed after

the field survey. A search for active mitigation banks in Interior Alaska (within the same region of the state as the project) was made using the U.S. Army Corps of Engineers (USACE) Regulatory In-lieu Fee and Bank Information Tracking System (RIBITS) website, and by contacting ablestaff at the Salcha-Delta Soil & Water Conservation District (Salcha-Delta SWCD), which maintains wetland banks in the region. Only those banks that are currently known to have wetland credits available were evaluated.

RESULTS AND DISCUSSION

WETLANDS AFFECTED

The mapping of wetlands for the proposed project (ABR 2020a) indicates that 14 NWI wetland and waters types occur in the study area (Table 1, Figure 2). This includes 4 waters and 10 wetland types. The waters cover only small portions of the study area and include both lotic (active sloughs) and lentic (impounded) waters. Wetlands include 3 semipermanently flooded wetland types, 1 semipermanently flooded/saturated type, 1 seasonally flooded type, and 5 saturated types. These wetlands include open sedge marshes, grass- and forb-dominated meadows, shrub wetlands dominated by willows (*Salix* species), and forested wetlands dominated by needleleaf (coniferous) trees and mixed needleleaf and broadleaf deciduous trees. Upland portions of the study area support both needleleaf and mixed needleleaf-broadleaf forests. Areas of gravel fill in the study area are extensive and were classified as Upland (fill).

For the assessment of wetland functions, the 14 NWI wetland and waters types that occur in the study area were aggregated into a smaller set of 8 wetland functional classes that share the same wetland functions (ABR 2020a). The seven wetland functions assessed were the capacity for flood flow regulation (water storage); sediment, nutrient, and toxicant removal; erosion control and shoreline stabilization; organic matter production and export; avian/mammal habitat suitability; fish habitat suitability; and educational, scientific, recreational, or subsistence use. The wetland functional classes (and the NWI wetland classes within) in the study area ranged from low to high functioning depending on the functional class and the wetland function assessed (Table 2). For waters, across all functions, the Lacustrine Lentic Waters class (the shoreline of Cushman Lake) had the highest average functional score (0.73). The Lower Perennial Stream class ranked slightly lower (0.67), and the other two waters in the study area

Table 1. Acreages of wetlands and waters by wetland type and name, and acreages of uplands within the mapping area for planned improvements, Tanana River Recreation Access Improvements Project, Fairbanks, AK.

NWI Code[a]	NWI Description[a]	Wetland Name	Acres[b]	Percent of Study Area
Waters		**Total**	**0.22**	**0.96**
PUBH	Palustrine Permanently Flooded Unconsolidated Bottom	Subtotal	0.07	0.30
		W-10	0.01	0.04
		W-28	0.04	0.17
		W-8	0.01	0.04
R2UBH	Riverine Permanently Flooded Lower Perennial Unconsolidated Bottom	Stream-2	0.14	0.61
R4USC	Riverine Seasonally Flooded Intermittent Unconsolidated Shore	Stream-1	0.01	0.04
L2EM2H	Lacustrine Permanently Flooded Littoral Nonpersistent	W-20	0.01	0.04
Wetlands		**Total**	**6.09**	**26.47**
PEM1F	Palustrine Semipermanently Flooded Persistent Emergent	Subtotal	1.43	6.21
		W-13	0.99	4.30
		W-18	0.14	0.61
		W-31	0.18	0.78
		W-6	0.13	0.56
PEM1/SS1F	Palustrine Semipermanently Flooded Persistent Emergent/Broad-leaved Deciduous Shrub	Subtotal	0.07	0.30
		W-17	0.04	0.17
		W-19	0.02	0.09
PSS1F	Palustrine Semipermanently Flooded Broad-leaved Deciduous Shrub	Subtotal	0.85	3.69
		W-11	0.37	1.61
		W-12	0.04	0.17
		W-25	0.08	0.35
		W-27	0.16	0.70
		W-30	0.20	0.87
PSS1E	Palustrine Seasonally Flooded-Saturated Broad-leaved Deciduous Shrub	Subtotal	0.78	3.39
		W-14	0.12	0.52
		W-16	0.24	1.04
		W-21	0.03	0.13
		W-3	0.35	1.52
		W-4	0.04	0.17
PEM1B	Palustrine Seasonally Saturated Persistent Emergent	Subtotal	0.16	0.70
		W-1	0.07	0.30
		W-2	0.09	0.39

Table 1. Continued.

NWI Code[a]	NWI Description[a]	Wetland Name	Acres[b]	Percent of Study Area
Wetlands				
PSS1/EM1B	Palustrine Seasonally Saturated Broad-leaved Deciduous Shrub/Persistent Emergent	W-5	1.71	7.43
PSS1B	Palustrine Seasonally Saturated Broad-leaved Deciduous Shrub	W-7	0.05	0.22
PFO2B	Palustrine Seasonally Saturated Needle-leaved Deciduous Forest	Subtotal	0.40	1.74
		W-9	0.21	0.91
		W-32	0.02	0.09
PFO4B	Palustrine Seasonally Saturated Needle-leaved Evergreen Forest	Subtotal	0.34	1.48
		W-23	0.21	0.88
		W26	0.13	0.60
PFO1C	Palustrine Seasonally Flooded Broad-leaved Deciduous Forest	Subtotal	0.32	1.39
		W-22	0.11	0.48
		W-24	0.21	0.91
Uplands		**Total**	**16.70**	**72.58**
U	Uplands	n/a	6.38	27.73
Ur	Uplands (urban)	n/a	0.86	3.74
Us	Uplands (fill)	n/a	9.46	41.11

[a] National Wetland Inventory (NWI) annotation based on the FGDC (2013) classification system.
[b] All values rounded to the nearest 0.01 acre.

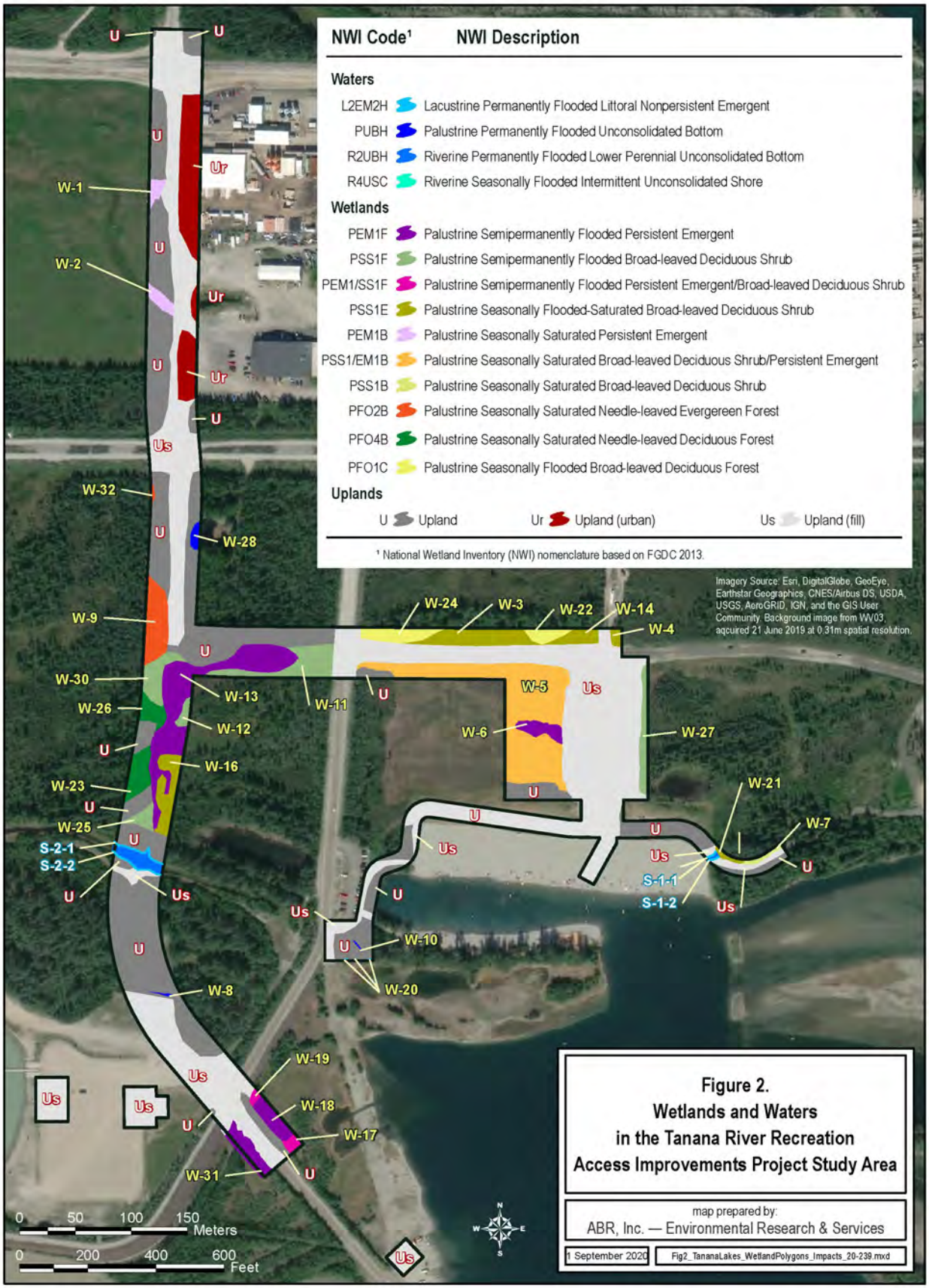

NWI Code¹
NWI Description
Waters
L2EM2H Lacustrine Permanently Flooded Littoral Nonpersistent Emergent
PUBH Palustrine Permanently Flooded Unconsolidated Bottom
R2UBH Riverine Permanently Flooded Lower Perennial Unconsolidated Bottom
R4USC Riverine Seasonally Flooded Intermittent Unconsolidated Shore
Wetlands
PEM1F Palustrine Semipermanently Flooded Persistent Emergent
PSS1F Palustrine Semipermanently Flooded Broad-leaved Deciduous Shrub
PEM1/SS1F Palustrine Semipermanently Flooded Persistent Emergent/Broad-leaved Deciduous Shrub
PSS1E Palustrine Seasonally Flooded-Saturated Broad-leaved Deciduous Shrub
PEM1B Palustrine Seasonally Saturated Persistent Emergent
PSS1/EM1B Palustrine Seasonally Saturated Broad-leaved Deciduous Shrub/Persistent Emergent
PSS1B Palustrine Seasonally Saturated Broad-leaved Deciduous Shrub
PFO2B Palustrine Seasonally Saturated Needle-leaved Evergreen Forest
PFO4B Palustrine Seasonally Saturated Needle-leaved Deciduous Forest
PFO1C Palustrine Seasonally Flooded Broad-leaved Deciduous Forest
Uplands
U Upland
Ur Upland (urban)
Us Upland (fill)
¹ National Wetland Inventory (NWI) nomenclature based on FGDC 2013.
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community. Background image from WV03, aqcuired 21 June 2019 at 0.31m spatial resolution.
W-1
W-2
W-32
W-28
W-9
W-30
W-26
W-23
W-25
S-2-1
S-2-2
W-24
W-3
W-22
W-14
W-4
W-13
W-11
W-12
W-16
W-5
W-6
W-27
W-21
W-7
S-1-1
S-1-2
W-10
W-20
W-8
W-19
W-18
W-17
W-31
0 50 100 150 Meters
0 200 400 600 Feet
Figure 2.
Wetlands and Waters
in the Tanana River Recreation
Access Improvements Project Study Area
map prepared by:
ABR, Inc. — Environmental Research & Services
1 September 2020
Fig2_TananaLakes_WetlandPolygons_Impacts_20-239.mxd

Table 2. Wetland function (functional capacity index) scores for wetlands and waters functional classes within the mapping area for planned improvements, Tanana River Recreation Access Improvements Project, Fairbanks, AK.

Wetland Functional Class and Included NWI Types	Flood Flow Regulation	Sediment/ Nutrient/ Toxicant Removal	Erosion Control & Shoreline Stabilization	Organic Matter Production and Export	Avian and Mammal Habitat Suitability	Fish Habitat Suitability	Education/ Science/ Rec/ Subsist Use	Average Functional Score[a]
Waters								
Lower Perennial Stream R2UBH	0.25	1.00	0.33	1.00	0.33	0.80	1.00	0.67
Intermittent Stream R4USC	0.25	0.75	0.00	0.50	0.00	0.00	1.00	0.36
Lacustrine Lentic Waters L2EM2H	0.75	1.00	0.00	1.00	0.33	1.00	1.00	0.73
Palustrine Lentic Waters PUBH	0.50	0.50	N/A	0.00	0.00	0.20	1.00	0.37
Wetlands								
Semipermanently Flooded Wetlands PEM1F, PEM1/SS1F, PSS1F	0.75	0.66	N/A	1.00	0.75	N/A	1.00	0.83
Seasonally Flooded Wetlands PSS1E, PFO1C	0.75	0.66	N/A	1.00	0.50	N/A	1.00	0.78
Seasonally Saturated Emergent and Shrub Scrub PEM1B, PSS1/EM1B, PSS1B	0.50	0.50	N/A	0.00	0.50	N/A	1.00	0.50
Seasonally Saturated Needle-leaved Forest PFO2B, PFO4B	0.50	0.50	N/A	0.66	0.50	N/A	1.00	0.63

[a] Averages calculated by omitting N/A (null) values.

had low average functional scores (0.36 or 0.37). For wetlands, across all functions, the semipermanently flooded open marsh and meadow wetlands (the Semipermently Flooded Wetland class) had the highest average functional score (0.83). Seasonally flooded shrub and forest wetlands were ranked slightly lower (0.78). Those two functional classes were ranked higher functioning than the seasonally saturated emergent, shrub, and forested wetlands (average functional scores of 0.50 to 0.63).

IMPACTS TO WETLANDS

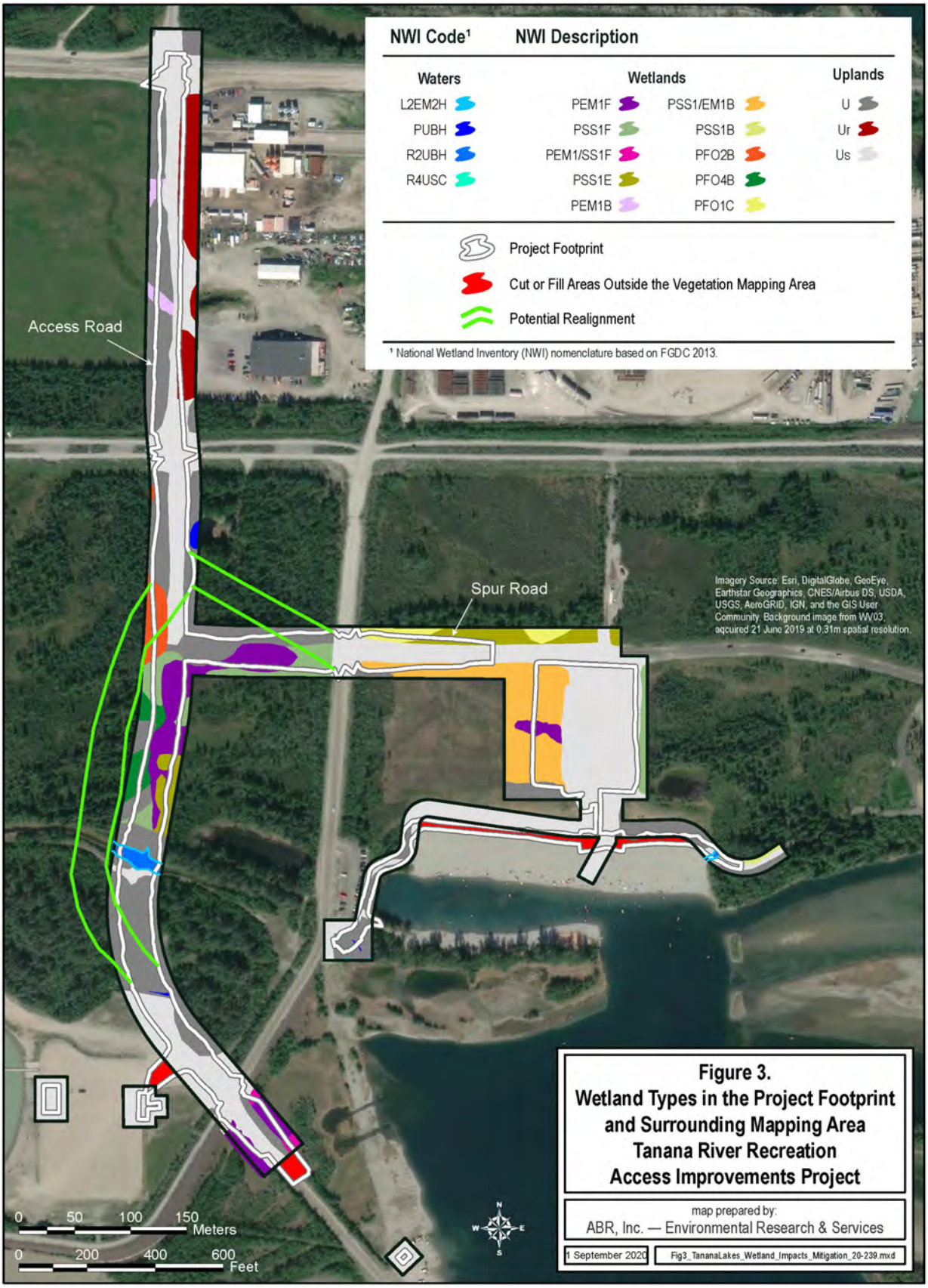
Impacts on wetlands in the study area as a result of the proposed project improvements will generally fall into several broad categories including (1) direct loss of wetlands from cut and fill work during construction; (2) direct alteration of wetlands in areas adjacent to the new infrastructure from construction activities; and (3) indirect alteration of wetlands adjacent to the new infrastructure from operation and maintenance activities.

Direct loss of wetlands will occur in the study area as a result of cut and fill construction within the project footprint for the new proposed access road to the swim beach and the motorized boat launch, the construction of new trails and parking lots, and upgrades to the swim beach berm. In total, 2.33 acres of wetlands and waters within the project footprint will be lost; this includes 10 wetland and 3 waters types (Table 3, Figure 3). The Palustrine Semipermanently Flooded Persistent Emergent (PEM1F) wetland type is the single most extensive of the wetlands and waters in the footprint, encompassing 0.81 acre or 7.7% of the footprint area. This type was also observed to be used by several breeding bird species of conservation concern during the avian census conducted in June 2020 (see Potential Design Modifications below). The other two semipermanently flooded wetland types combined cover only 0.35 acre or 3.3% of the project footprint; these include Palustrine Semipermanently Flooded Broad-leaved Deciduous Shrub (PSS1F) and Palustrine Semipermanently Flooded Persistent Emergent/Broad-leaved Deciduous Shrub (PEM1/SS1F). The one seasonally flooded wetland type, Palustrine Seasonally Flooded Broad-leaved Deciduous Forest (PFO1C), occupies 0.03 acre or 0.3% of the project footprint. A single seasonally flooded/saturated wetland type, Palustrine Seasonally Flooded-Saturated Broad-leaved Deciduous Shrub (PSS1E), also encompasses 0.03 acre or 0.3% of the project footprint. The remaining set of five wetland types in the project footprint are all seasonally saturated types, which combined occupy 1.0 acre or 9.5% of the project footprint. These five

Table 3. Acres of wetland and waters types within the project footprint and disturbance buffers for planned improvements, Tanana River Recreation Access Improvements Project, Fairbanks, Alaska.

NWI Code and Description	Footprint Acres	% of Project Footprint[a]	Additional Acres Disturbed[b]
Waters			
PUBH, Palustrine Permanently Flooded Unconsolidated Bottom	0.01	0.10	0.06
R2UBH, Riverine Permanently Flooded Lower Perennial Unconsolidated Bottom	0.10	0.91	0.04
R4USC, Riverine Seasonally Flooded Intermittent Unconsolidated Shore	0.01	0.06	<0.01
L2EM2H, Lacustrine Permanently Flooded Littoral Nonpersistent	0.00	0.00	0.01
Wetlands			
PEM1F, Palustrine Semipermanently Flooded Persistent Emergent	0.81	7.70	0.62
PEM1/SS1F, Palustrine Semipermanently Flooded Persistent Emergent/Broad-leaved Deciduous Shrub	0.01	0.14	0.05
PSS1F, Palustrine Semipermanently Flooded Broad-leaved Deciduous Shrub	0.33	3.17	0.55
PSS1E, Palustrine Seasonally Flooded-Saturated Broad-leaved Deciduous Shrub	0.04	0.34	0.47
PEM1B, Palustrine Seasonally Saturated Persistent Emergent	0.04	0.42	0.12
PSS1/EM1B, Palustrine Seasonally Saturated Broad-leaved Deciduous Shrub/Persistent Emergent	0.66	6.29	1.05
PSS1B, Palustrine Seasonally Saturated Broad-leaved Deciduous Shrub	<0.01	<0.01	0.05
PFO2B, Palustrine Seasonally Saturated Needle-leaved Deciduous Forest	0.23	2.16	0.41
PFO4B, Palustrine Seasonally Saturated Needle-leaved Evergreen Forest	0.06	0.58	0.28
PFO1C, Palustrine Seasonally Flooded Broad-leaved Deciduous Forest	0.03	0.28	0.29
(outside of mapped area)	0.55	5.21	0.00
Totals	2.88	27.37	3.98

[a] Represents only the acreage of wetlands in the footprint; uplands are not included so the total is less than 100%.
[b] Acreage within the various wetland mapping buffers (see Study Area section above) that could be disturbed during construction and use of the new infrastructure.


NWI Code¹
NWI Description
Waters
L2EM2H
PUBH
R2UBH
R4USC
Wetlands
PEM1F
PSS1F
PEM1/SS1F
PSS1E
PEM1B
PSS1/EM1B
PSS1B
PFO2B
PFO4B
PFO1C
Uplands
U
Ur
Us
Project Footprint
Cut or Fill Areas Outside the Vegetation Mapping Area
Potential Realignment
¹ National Wetland Inventory (NWI) nomenclature based on FGDC 2013.
Access Road
Spur Road
Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community. Background image from WV03, aqcuired 21 June 2019 at 0.31m spatial resolution.
0 50 100 150 Meters
0 200 400 600 Feet
N
W E
S
Figure 3.
Wetland Types in the Project Footprint and Surrounding Mapping Area
Tanana River Recreation Access Improvements Project
map prepared by:
ABR, Inc. — Environmental Research & Services
1 September 2020
Fig3_TananaLakes_Wetland_Impacts_Mitigation_20-239.mxd

Palustrine Seasonally Saturated Broad-leaved Deciduous Shrub (PSS1B), and Palustrine Seasonally Saturated Needle-leaved Deciduous Forest (PFO2B), and Palustrine Seasonally Saturated Needle-leaved Evergreen Forest (PFO4B).

Of the four waters types mapped in the study area, one does not occur in the project footprint; this type, Lacustrine Permanently Flooded Littoral Nonpersistent (L2EM2H), occurs only outside the footprint along the eastern shore of Cushman Lake (Figure 3). The three waters types that do occur in the project footprint are not extensive and combined occupy only 0.11 acre or 1.1% of the project footprint (Table 3, Figure 3). The waters types include Palustrine Permanently Flooded Unconsolidated Bottom (PUBH), Riverine Permanently Flooded Lower Perennial Unconsolidated Bottom (R2UBH), and Riverine Seasonally Flooded Intermittent Unconsolidated Shore (R4USC).

The project footprint was finalized after the wetland field survey and mapping work was completed, and some portions of the footprint occur outside the area mapped for wetlands. These unmapped areas combined represent 0.55 acre or 5.2% of the project footprint (Table 3, Figure 3). Inspection of the aerial photography, however, indicates that the majority of these areas are composed of gravel fill and would be classified as Uplands (fill).

Direct alteration of wetlands in the mapping area outside of and adjacent to the project footprint will occur due to disturbance from construction activities. The use and staging of machinery outside of the project footprint during construction will damage wetland vegetation and could potentially compress wetland soils as well. Indirect alteration of wetlands in those areas is likely to occur from use of the new infrastructure. During operation and maintenance of the infrastructure, especially the new access road, fugitive dust deposition will occur and may contribute to the alteration of vegetation in wetlands. In studies along the Dalton Highway in northern Alaska, fugitive dust accumulations were documented to impact vegetation up to 328 feet from the road edge (Walker and Everett 1987; Myers-Smith et al. 2006). Fugitive dust deposition in the study area likely will not be as extensive as along the Dalton Highway (where truck traffic is more common) and can be minimized by keeping the speed limits low. Additional alteration to wetland vegetation may occur in areas outside of the project footprint from impounded drainages, drifted snow that can alter hydrologic patterns, and from snow plowing

and snow dumping activities that can delay plant phenology during spring and contribute additional road gravel, fines, and contaminants to adjacent wetlands.

A total of 3.98 acres of wetlands, including the same 10 wetland types present in the project footprint, occur in the mapping area outside the project footprint (Table 3, Figure 3). The same 3 waters types as in the footprint also occur in the mapping area outside the footprint, along with a fourth waters type, Lacustrine Permanently Flooded Littoral Nonpersistent (L2EM2H), that occurs outside the footprint along the eastern shore of Cushman Lake (Figure 3). The wetland and waters types occurring outside the footprint are likely to be altered from the operation and maintenance activities described above that will be associated with the new infrastructure. Similar proportions of wetland and waters types occur in the mapping area outside the project footprint as occur in the footprint. However, the most common wetland type in the footprint, Palustrine Semipermanently Flooded Persistent Emergent (PEM1F), is less extensive outside the footprint (Table 3, Figure 3).

DRAINAGE CONSIDERATIONS

The inclusion of culverts with adequate flow capacity at the two drainages in the study area (Stream-1 and Stream-2; Figure 2) that provide surface water connections for wetlands in the TLRA to the navigable Tanana River will be necessary to maintain existing wetland functions or to avoid degradation of existing habitats due to impounded waters. A culvert at Stream-1 would be installed as part of the proposed trail that is to be compliant with the Americans with Disabilities Act (ADA), and a culvert at Stream-2 would be installed as part of the construction of the proposed new access road. Additional culvert(s) should be considered along the proposed access road as it will bisect a number of wetland types, especially in the area just north of Stream-2; Figure 2). Culverts to drain impounded areas north of the swim beach parking lot could also be considered to reduce further habitat degradation. These culvert(s) should be installed at the lowest point(s) along the road to convey any possible water that would otherwise be impounded and to help maintain existing wetland hydrology in the TLRA.

POTENTIAL DESIGN MODIFICATIONS

To avoid and minimize fill in the highest functioning wetlands in the study area, we are recommending small changes to the proposed access road alignment (Figure 3). These changes

would result in reductions in fill in the aggregate wetland functional class (Semipermanently Flooded Wetlands), which is composed of three high-functioning NWI wetland types (Table 2). The design modifications involve re-routing the north-south portion of the access road slightly to the west of the current alignment, constructing the intersection with the spur road to the swim beach farther to the north, and aligning the spur road in a southeasterly direction towards the swim beach. These changes would avoid the need for fill in many Semipermanently Flooded Wetlands in the study area, and would avoid fill completely in PEM1F wetlands (Fresh Sedge Marsh), which comprises the largest area to be filled of the 13 wetland and waters types that occur in the project footprint (Table 3). The single PEM1F wetland in the road corridor portion of study area (see W-13 on Figure 2) was being used during the biological resources survey in June 2020 by two breeding shorebird species (Solitary Sandpiper [*Tringa solitaria*] and Lesser Yellowlegs [*T. flavipes*]), and one breeding landbird species (Blackpoll Warbler [*Setophaga striata*]) that are considered to be of conservation concern, as well as other breeding bird species (ABR 2020b). This is indicative of the high wildlife habitat support function this wetland type provides in that particular area. The PEM1F wetland type also scored high for the other four wetland functions assessed (Table 2). These road realignments likely will also reduce the overall acreage of fill in wetlands because the realigned spur road to the swim beach would be constructed largely in upland white spruce (*Picea glauca*) and paper birch (*Betula neoalaskana*) forest. During the permitting process, these design modifications to avoid fill in high-value wetlands should be well received by federal and state management agencies.

However, there will be cost and design ramifications from implementing these modifications to the proposed access road. For the alternate extension of South Lathrop Street (the longer alignment running north-south depicted in Figure 3), the roadway length would be increased from 2,500 to 2,770 feet, which represents an approximately 10% increase in length and an increase in cost of approximately $100,000. The alternate alignment would be moved away from portions of PEM1F wetlands that have already been impacted by off-road vehicle tracks, though wetland function is still classified high for those wetlands (Table 2). This design change would also result in the following negative impacts to the roadway design:

- The TLRA entrance station would have to be placed on a curve in the roadway.
- The alternate road design would likely include compound or back-to-back curves.

- Northlake Lane (the east-west running spur road depicted in Figure 3) would either have to be extended to connect with South Lathrop Street (impacting some of the avoided wetlands) or re-aligned; in both cases Northlake Lane would connect on or immediately before/after a curve.

For the alternate Northlake Lane route, the roadway would be extended from 960 to 1,110 feet, representing an increase of about 5% in length and $10,175 in cost. This cost is unavoidable if South Lathrop Street is shifted to the west as depicted in Figure 3. The design change to Northlake Land would also result in the following negative impacts to the roadway design:

- The intersection with South Lathrop Street would be placed at the base of the ramp to the levee roadway (Saddle Avenue).
- The design change would also require (1) a shift of the entrance station onto the ramp down from the levee, (2) a raising of the roadway grade to level out the section for the entrance station, (3) moving the entrance station south of the Northlake Lane intersection, or (4) eliminating the entrance station completely.

WETLAND MITIGATION OPTIONS

The preliminary project design footprint provided for this report would result in direct impacts to 2.3 acres of wetlands (Table 3). The affected wetlands range from low to high functioning (Table 2). All the wetlands occur within the floodplain of the Tanana River and are connected by surface water, and almost certainly by groundwater as well, to the Tanana River.

The design modifications recommended above for the proposed access road will help to avoid and minimize impacts on the highest functioning wetlands in the TLRA, but additional compensatory mitigation for wetland impacts may be requested during the permitting process. Assuming that mitigation will be required for the project, the available options for mitigating the unavoidable wetland impacts are outlined below. Mitigation is not always required, however, and is project dependent. Decisions regarding compensatory mitigation are usually made early in the permitting process in consultation with a USACE project manager. The USACE project manager assigned to evaluate the Section 404, Clean Water Act (CWA) permit application for the project will have the final authority in determining whether mitigation will be required.

The Alaska District Compensatory Mitigation Thought Process (USACE 2018) is a working document prepared to assist in determining whether mitigation will be required for a project, and to assess whether the proposed mitigation in the wetland permit application is sufficient to offset the proposed impacts. Mitigation is likely to be required for the Tanana River Recreation Access Improvements Project because it meets three of the criteria outlined in USACE (2018), including (1) the project impacts more than 1/10 of an acre of wetlands, (2) fill may be placed within 500 feet of fish bearing waters, and (3) the project is federally funded. Once all measures have been taken to avoid and minimize impacts (see above), compensatory mitigation may be calculated using the current USACE debit/credit calculator (USACE 2016) in conjunction with a suitable functional assessment method such as the one used in this report. Applicants may choose permittee-responsible mitigation in the form of restoration or rehabilitation of a previously disturbed wetland with similar functions within the project watershed, or preservation of a similar set of wetland types within the same region. Other options include the purchase of credits from an existing local mitigation bank or an in-lieu-fee (ILF) option in which monetary mitigation costs are calculated and payed to the USACE.

For the proposed project, there are at least three possible permittee-responsible mitigation options as described below.

1. The removal of the extensive infestation of the invasive tree *Prunus padus* (European bird cherry) in the TLRA will help to restore natural riverine wetland function in the area. During the wetland field survey in July 2020, it was recognized that the infestation of *P. padus* was substantially greater than the relatively few plants recorded in the area a decade ago by Heidemann (2010). *P. padus* proliferates easily in Alaska and is especially problematic in riparian areas where it can outcompete and displace native shrub species such as willows and alders (*Alnus* species). Over time, in high density infestations the species may alter riverine wetland functions through reductions in terrestrial invertebrate biomass on the foliage of *P. padus* compared to native species (Roon 2011).
2. As noted under Drainage Considerations above, including culverts in the proposed access road will help to (a) maintain hydrology in existing and higher value wetlands that are adjacent to those in the road corridor, and (b) reduce the prevalence of

impounded waters in non-wetland habitats in the study area, which may, over time, alter those non-wetland habitats. The well documented trend of increasing precipitation, and especially rainfall in the snow-free months, in Interior Alaska will maintain high groundwater levels in the TLRA because of connectivity with high water in the Tanana River. This, along with increased direct precipitation, is likely contributing to impounded waters in otherwise non-wetland habitats (ABR 2020a).

3. Consider paving the access road to substantially reduce the prevalence of fugitive dust impacts on adjacent wetland habitats.

Regarding the possible purchase of wetland credits, there is currently a single wetland mitigation bank with available credits in the Interior Alaska region. The Salcha-Delta SWCD maintains the Chena Greenbelt Bank in Fairbanks, which currently has 13.41 wetland credits available for purchase; as of August 2020, a rate of $15,000 per credit would be charged (Jeff Durham, Salcha-Delta SWCD, pers. comm.). Two additional wetland banks in Interior Alaska maintained by the Salcha-Delta SWCD also may have credits available in the future. This includes the Tanana Watershed Umbrella Stream & Wetland Mitigation Bank – Jarvis Block F, which is located south of Fairbanks, and the Huntsbury Bank near the Fort Wainwright Small Arms Complex in Fairbanks.

Because of the uncertainty surrounding the actual debit:credit ratio that would be determined during the permitting process for any wetland bank transaction for the proposed project, a cost estimate for the purchase of wetland credits is speculative at this time. However, assuming a minimum debit:credit ratio of 1:1 for the preservation of wetlands as indicated in USACE (2018), and using the current rate of $15,000 per credit in the Chena Greenbelt Bank, the estimated minimum cost to purchase wetland credits to compensate for the 2.3 acres of wetlands lost in the project footprint would be $34,500. Note that the specific debit:credit ratio used will be determined by the USACE project manager assigned to process the Section 404, CWA permit application for any particular project.

The ILF option has not been commonly used recently in Alaska, but if it is recommended, The Conservation Fund can work with project applicants to develop an appropriate ILF transaction.

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ADDENDUM TO THE WETLAND IMPACTS AND MITIGATION REPORT FOR THE TANANA RIVER RECREATION ACCESS IMPROVEMENTS PROJECT, FAIRBANKS, ALASKA, 2020: AK FNSB TANANA(1)

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INTRODUCTION

A wetland impacts and mitigation report was prepared to support wetland permitting and NEPA documentation for the Tanana River Recreation Access Improvements Project in October 2020 (ABR 2020a). The design of the proposed improvements and study area for wetland impacts have evolved since the original report was finalized and this addendum updates the assessment of wetland impacts within the revised study area boundaries. To minimize fill in wetlands, slight alterations in the proposed road alignments have been made. The wetland mitigation options presented in the October 2020 report remain unchanged.

STUDY AREA

The revised study area for wetland impacts is as described in ABR (2020a), but it has been expanded from 23.0 to 31.1 acres. The additional acreage encompasses expansions of the project footprint for the motorized boat launch at the Tanana River and the non-motorized boat launch on Cushman Lake as well as an expansion of the swim beach on Cushman Lake (Figure 1). The majority of the expansion area is composed of upland fill, but the expansion of the swim beach and non-motorized boat launch boundaries now includes seasonally flooded and unvegetated fringe wetlands and open lake water on Cushman Lake. Revisions to the design of the proposed extension of South Lathrop Street involved shifting the road alignment slightly to the west near the intersection with Northlake Lane. Similarly, the road alignment for Northlake Lane was also shifted and curved slightly to the north. Both of these alterations were done to minimize fill in high-value wetlands (see Results and Discussion below).

METHODS

The methods used to assess impacts to wetlands in the study area have not been changed and are as described in ABR (2020a). As noted above, the wetland mitigation options also have not changed and the project design procedures used to avoid and minimize fill in wetlands are the same as those presented in the October 2020 report.

RESULTS AND DISCUSSION

WETLANDS AFFECTED

The revised mapping of wetlands for the proposed project (ABR 2020b) indicates that 16 NWI wetland and waters types occur in the study area (Table 1, Figure 2). This includes 10 wetland and 6 waters types. The waters cover only small portions of the study area and include both lotic (active sloughs) and lentic (impounded) waters. Wetlands include 3 semipermanently flooded wetland types, 1 semipermanently flooded/saturated type, 1 seasonally flooded type, and 5 saturated types. These wetlands include open sedge marshes, grass- and forb-dominated meadows, shrub wetlands dominated by willows (*Salix* species), and forested wetlands dominated by needleleaf (coniferous) trees and mixed needleleaf and broadleaf deciduous trees. Upland portions of the study area support both needleleaf and mixed needleleaf-broadleaf forests. Areas of gravel fill in the study area are extensive and were classified as Upland (fill).

For the assessment of wetland functions, the 16 NWI wetland and waters types that occur in the study area were aggregated into a smaller set of 9 wetland functional classes that share the same wetland functions (ABR 2020b). The seven wetland functions assessed were the capacity for flood flow regulation (water storage); sediment, nutrient, and toxicant removal; erosion control and shoreline stabilization; organic matter production and export; avian/mammal habitat suitability; fish habitat suitability; and educational, scientific, recreational, or subsistence use. The wetland functional classes (and the NWI wetland classes within) in the study area ranged from low to high functioning depending on the functional class and the wetland function assessed (Table 2). For waters, across all functions, the Lacustrine Lentic Waters class (the shoreline of Cushman Lake) had the highest average functional score (0.73). The Lower Perennial Stream class ranked slightly lower (0.67), and the other three waters in the study area had moderate to low average functional scores (0.49, 0.37, and 0.36). For wetlands, across all functions, the semipermanently flooded open marsh and meadow wetlands (the Semipermently Flooded Wetland class) had the highest average functional score (0.83). Seasonally flooded shrub and forest wetlands were ranked slightly lower (0.78). Those two functional classes were ranked higher functioning than the seasonally saturated emergent, shrub, and forested wetlands (average functional scores of 0.50 to 0.63).

IMPACTS TO WETLANDS

Impacts on wetlands in the study area as a result of the proposed project improvements will generally fall into several broad categories including (1) direct loss of wetlands from cut and fill work during construction; (2) direct alteration of wetlands in areas adjacent to the new infrastructure from construction activities; and (3) indirect alteration of wetlands adjacent to the new infrastructure from operation and maintenance activities.

Direct loss of wetlands will occur in the study area as a result of cut and fill construction within the project footprint for the new proposed access road to the motorized and non-motorized boat launches, the spur road to the swim beach, the construction of new trails and parking lots, and upgrades to the swim beach berm. In total, 2.33 acres of wetlands and waters within the project footprint will be lost; this includes 9 wetland and 5 waters types (Table 3, Figure 3). The Palustrine Seasonally Saturated Broad-leaved Deciduous Shrub/Persistent Emergent (PSS1/EM1B) wetland type is the single most extensive of the wetlands and waters in the footprint, encompassing 0.69 acre or 4.2% of the footprint area. The other three seasonally saturated wetland types combined cover 0.61 acre or 3.7% of the project footprint; these include Palustrine Seasonally Saturated Needle-leaved Deciduous Forest (PFO2B, 0.29 acre), Palustrine Seasonally Saturated Needle-leaved Evergreen Forest (PFO4B, 0.27 acre), and Palustrine Seasonally Saturated Persistent Emergent (PEM1B, 0.05 acre). Three semipermanently flooded wetland types are also relatively common in the project footprint and combined cover 0.73 acre or 4.4% of the project footprint; these include Palustrine Semipermanently Flooded Persistent Emergent (PEM1F, 0.34 acre), Palustrine Semipermanently Flooded Broad-leaved Deciduous Shrub (PSS1F, 0.33 acre), and Palustrine Semipermanently Flooded Persistent Emergent/Broad-leaved Deciduous Shrub (PEM1/SS1F, 0.06 acre). The one seasonally flooded wetland type, Palustrine Seasonally Flooded Broad-leaved Deciduous Forest (PFO1C), occupies 0.05 acre or 0.3% of the project footprint. A single seasonally flooded/saturated wetland type, Palustrine Seasonally Flooded-Saturated Broad-leaved Deciduous Shrub (PSS1E), encompasses 0.06 acre or 0.4% of the project footprint.

Of the six waters types mapped in the study area, two do not occur within the project footprint. One of these types, Lacustrine Permanently Flooded Littoral Nonpersistent (L2EM2H), occurs only outside the footprint along the eastern shore of Cushman Lake (Figure

3). The other type, Lacustrine Permanently Flooded Littoral Unconsolidated Sandy Bottom (L2UB2H), represents the waters of Cushman Lake at the end of the middle portion of the swim beach that will be made wheel-chair accessible and compliant with the Americans with Disabilities Act (ADA; Figure 3).

The four waters types that do occur in the project footprint are not extensive and combined occupy only 0.19 acre or 1.1% of the project footprint (Table 3, Figure 3). The waters types include Lacustrine Seasonally Flooded Littoral Unconsolidated Sandy Shore (L2US2C), Palustrine Permanently Flooded Unconsolidated Bottom (PUBH), Riverine Permanently Flooded Lower Perennial Unconsolidated Bottom (R2UBH), and Riverine Seasonally Flooded Intermittent Unconsolidated Shore (R4USC).

Direct alteration of wetlands in the mapping area outside of and adjacent to the project footprint will occur due to disturbance from construction activities. The use and staging of machinery outside of the project footprint during construction will damage wetland vegetation and could potentially compress wetland soils as well. Indirect alteration of wetlands in those areas is likely to occur from use of the new infrastructure. During operation and maintenance of the infrastructure, especially the new access roads, fugitive dust deposition will occur and may contribute to the alteration of vegetation in wetlands. In studies along the Dalton Highway in northern Alaska, fugitive dust accumulations were documented to impact vegetation up to 328 feet from the road edge (Walker and Everett 1987; Myers-Smith et al. 2006). Fugitive dust deposition in the study area likely will not be as extensive as along the Dalton Highway (where truck traffic is more common) and can be minimized by keeping the speed limits low. Additional alteration to wetland vegetation may occur in areas outside of the project footprint from impounded drainages, drifted snow that can alter hydrologic patterns, and from snow plowing and snow dumping activities that can delay plant phenology during spring and contribute additional road gravel, fines, and contaminants to adjacent wetlands.

A total of 5.05 acres of wetlands, including the same nine wetland types present in the project footprint, occur in the mapping area outside the project footprint (Table 3, Figure 3). The same four waters types that are present in the footprint also occur in the mapping area outside the footprint. As noted above, there are two waters types, Lacustrine Permanently Flooded Littoral Nonpersistent (L2EM2H) and Lacustrine Permanently Flooded Littoral Unconsolidated Sandy

Bottom (L2UB2H) that occur only outside the project footprint (Table 3, Figure 3). The wetland and waters types occurring outside of and adjacent to the footprint are likely to be altered from the construction, operation, and maintenance activities described above that will be associated with the new infrastructure. Roughly similar proportions of wetland and waters types occur in the mapping area outside the project footprint as occur inside the footprint. However, two wetland types, Palustrine Seasonally Flooded-Saturated Broad-leaved Deciduous Shrub (PSS1E) and the high-functioning Palustrine Semipermanently Flooded Persistent Emergent (PEM1F), are notably more extensive outside the footprint (Table 3, Figure 3). Similarly, one waters type, Lacustrine Seasonally Flooded Littoral Unconsolidated Sandy Shore (L2US2C), is also notably more common outside the project footprint.

DRAINAGE CONSIDERATIONS

The drainage considerations discussed in ABR (2020a) to help maintain existing wetland hydrology in the Tanana River floodplain areas surrounding the proposed project do not need to be changed as a result of the revisions to the project improvement plans.

DESIGN MODIFICATIONS

To minimize fill in the highest functioning wetlands in the study area, the alignment for the South Lathrop Street extension has been shifted slightly to the west, and the alignment for the extension of Northlake Lane has been shifted and curved slightly to the north (Figure 3). This will result in reductions in fill in the aggregate wetland functional class (Semipermanently Flooded Wetlands), which is composed of three high-functioning NWI wetland types (Table 2). These design modifications will reduce the fill in high-functioning PEM1F wetlands by more than 50%, from 0.81 acre as noted in ABR (2020a) to 0.34 acre (Table 3). Previously, in the October 2020 report, PEM1F wetlands represented the greatest wetland area to be filled of the 13 wetland and waters types that occurred in the project footprint at that time. Overall, because of the current design modifications, fill in wetlands has been reduced in the project footprint from 2.88 acres as noted in ABR (2020a) to 2.33 acres (Table 3).

WETLAND MITIGATION OPTIONS

The wetland mitigation options discussed in ABR (2020a) are still applicable to the revised design plans for the project improvements. One of those mitigation options was to pave the

proposed access roads to reduce the prevalence of fugitive dust impacts on adjacent wetland habitats. As part of the revised design plans for the project, the extension of South Lathrop Street will be paved and this will help reduce fugitive dust. However, the extension of Northlake Lane will not be paved, so there will be fugitive dust effects from the use of that access road to the swim beach.

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Myers-Smith I. H., B. K., Arnesenm, R. M. Thompson, and F. S. Chapin III. 2006. Cumulative impacts on Alaskan arctic tundra of a quarter century of road dust. Ecoscience 13: 503–510.

Walker, D. A., and K. R. Everett. 1987. Road dust and its environmental impact on Alaskan taiga and tundra. Arctic and Alpine Research 19: 479–489.

Table 1. Acreages of wetlands, waters, and uplands types in numbered, mapped polygons in the Tanana Lakes Recreation Access Improvements study area, Fairbanks, Alaska, 2020.

NWI_Code[a]	NWI Description[a]	Wetland Name	Acres[b]	% of Study Area
Waters		**Total**	**0.93**	**3.00**
L2UB2H	Lacustrine Permanently Flooded Littoral Unconsolidated Sandy Bottom	W-37	0.32	1.04
L2US2C	Lacustrine Seasonally Flooded Littoral Unconsolidated Sandy Shore	W-34	0.20	0.65
		W-36	0.15	0.49
L2EM2H	Lacustrine Permanently Flooded Littoral Nonpersistent Emergent Marsh	W-20	0.01	0.02
		W-38	0.03	0.11
PUBH	Palustrine Permanently Flooded Unconsolidated Bottom	W-10	0.01	0.02
		W-28	0.04	0.13
		W-8	0.01	0.03
R2UBH	Riverine Permanently Flooded Lower Perennial Unconsolidated Bottom	Stream-2	0.15	0.48
R4USC	Riverine Seasonally Flooded Intermittent Unconsolidated Shore	Stream-1	0.01	0.04
Wetlands		**Total**	**6.45**	**20.78**
PEM1F	Palustrine Semipermanently Flooded Persistent Emergent	W-13	0.99	3.18
		W-18	0.18	0.58
		W-31	0.18	0.57
		W-6	0.13	0.41
PSS1F	Palustrine Semipermanently Flooded Broad-leaved Deciduous Shrub	W-11	0.37	1.18
		W-12	0.04	0.14
		W-25	0.08	0.26
		W-27	0.16	0.50
		W-30	0.21	0.69
PEM1/SS1F	Palustrine Semipermanently Flooded Persistent Emergent/Broad-leaved Deciduous Shrub	W-17	0.16	0.50
		W-19	0.02	0.08
		W-33	0.07	0.23

Table 1. Continued.

NWI_Code[a]	NWI Description[a]	Wetland Name	Acres[b]	% of Study Area
Wetlands (cont.)				
PSS1E	Palustrine Seasonally Flooded-Saturated Broad-leaved Deciduous Shrub	W-14	0.12	0.39
		W-16	0.24	0.76
		W-21	0.05	0.16
		W-3	0.35	1.14
		W-4	0.04	0.12
PEM1B	Palustrine Seasonally Saturated Persistent Emergent	W-1	0.07	0.24
		W-2	0.09	0.28
PSS1/EM1B	Palustrine Seasonally Saturated Broad-leaved Deciduous Shrub/Persistent Emergent	W-5	1.71	5.50
PSS1B	Palustrine Seasonally Saturated Broad-leaved Deciduous Shrub	W-7	0.05	0.16
PFO2B	Palustrine Seasonally Saturated Needle-leaved Deciduous Forest	W-32	0.02	0.07
		W-9	0.42	1.36
PFO4B	Palustrine Seasonally Saturated Needle-leaved Evergreen Forest	W-23	0.24	0.77
		W-26	0.16	0.50
PFO1C	Palustrine Seasonally Flooded Broad-leaved Deciduous Forest	W-22	0.11	0.34
		W-24	0.21	0.67
Uplands		**Total**	**23.66**	**76.22**
U	Uplands		7.82	25.20
Ur	Uplands (urban)		0.86	2.78
Us	Uplands (fill)		14.97	48.23
Grand Total			31.05	100.00

[a] National Wetland Inventory (NWI) annotation based on FGDC (2013) classification system.
[b] All values rounded to the nearest 0.01 acre.

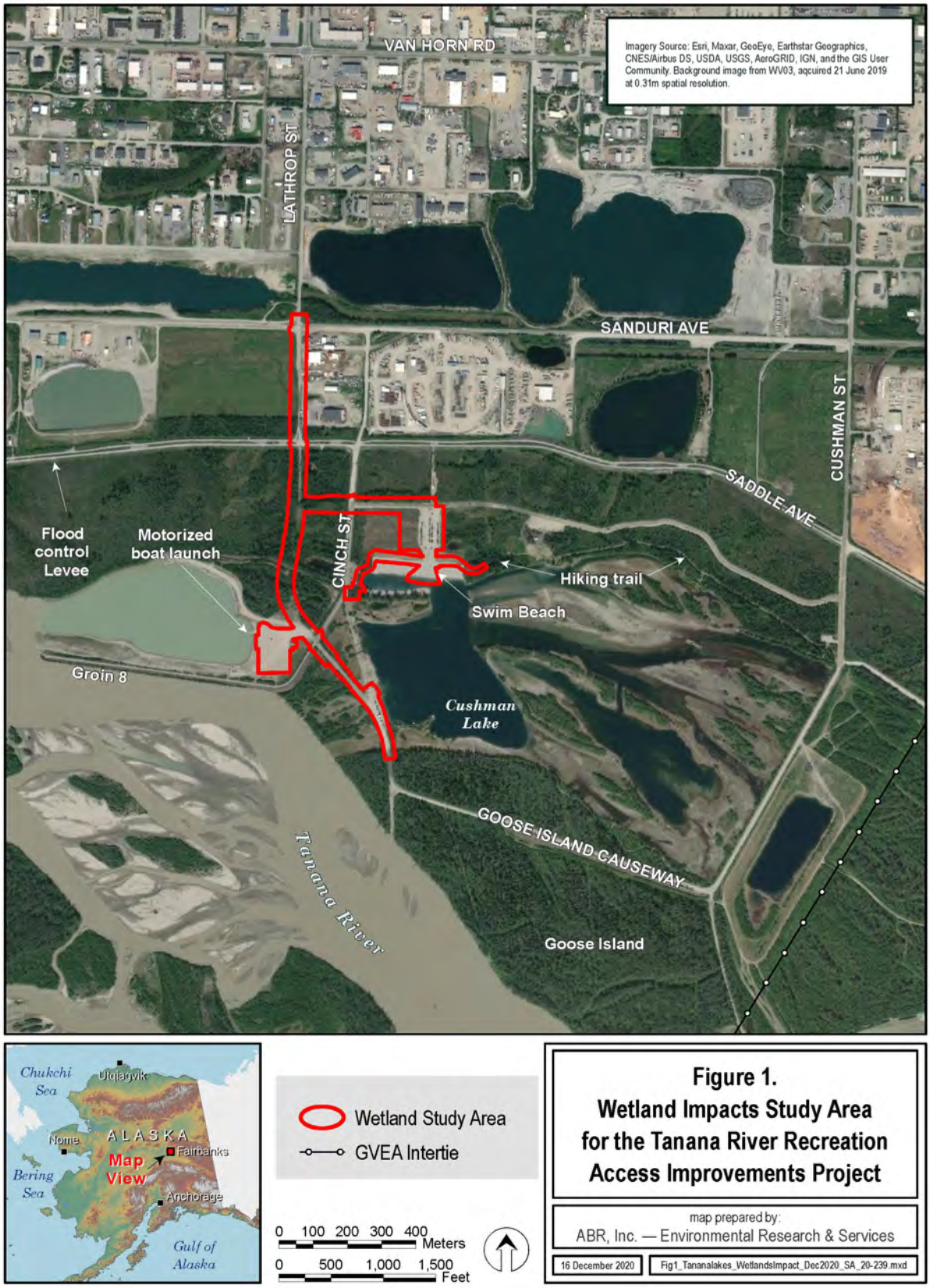
Table 2. Wetland function (Functional Capacity Index) scores for wetlands and waters functional classes within the mapping area for planned improvements, Tanana River Recreation Access Improvements Project, Fairbanks, Alaska, 2020.

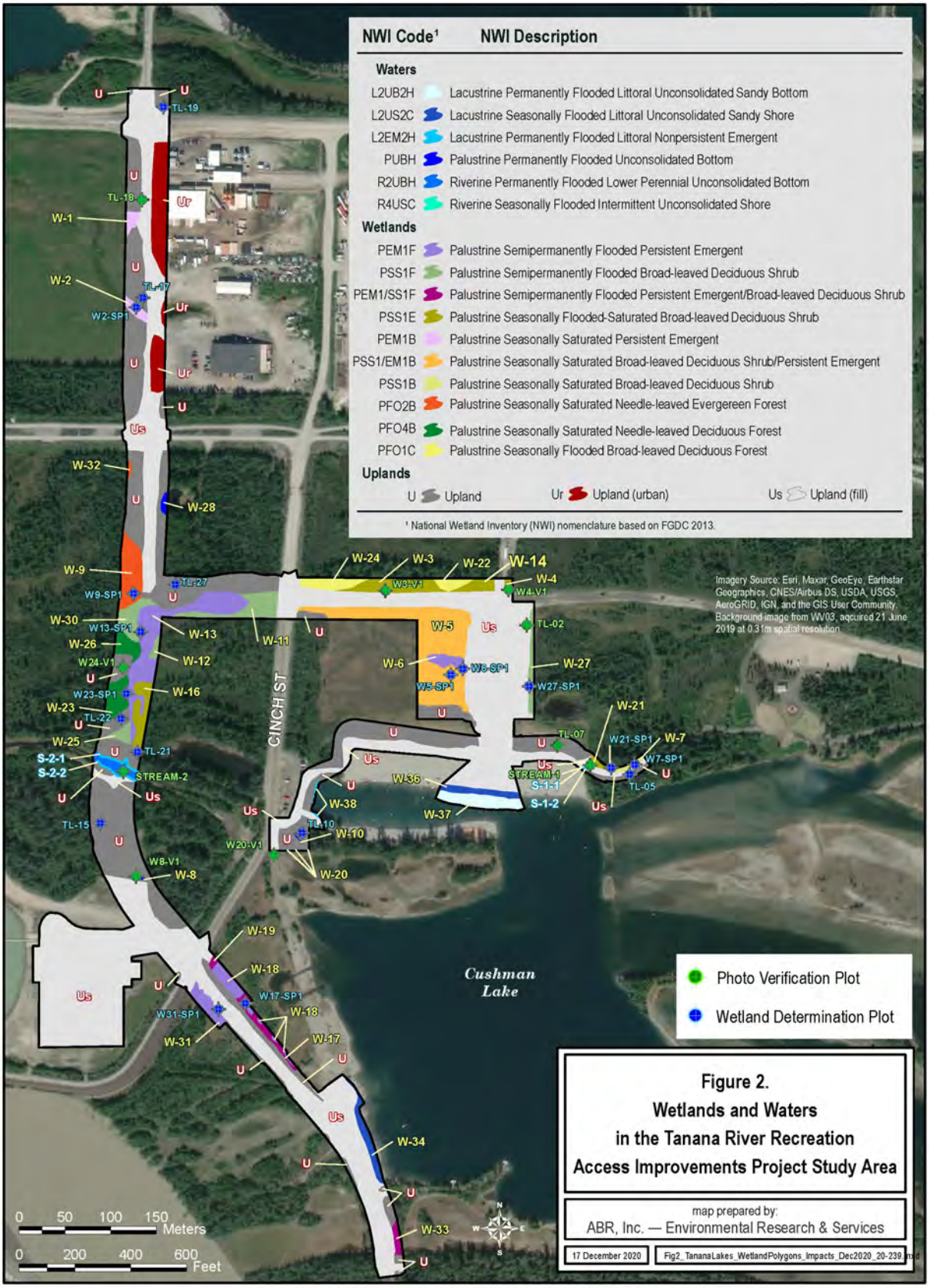
Wetland Functional Class	Flood Flow Regulation	Sediment/ Nutrient/ Toxicant Removal	Erosion Control & Shoreline Stabil.	Organic Matter Production and Export	Avian and Mammal Habitat Suitability	Fish Habitat Suitability	Education/ Science/ Rec/ Subsist Use	Overall FCI score
Waters								
Lower Perennial Stream R2UBH	0.25	1.00	0.33	1.00	0.33	0.80	1.00	0.67
Intermittent Stream R4USC	0.25	0.75	0.00	0.50	0.00	0.00	1.00	0.36
Lacustrine Lentic Waters L2EM2H	0.75	1.00	0.00	1.00	0.33	1.00	1.00	0.73
Lacustrine Sandy Shoreline L2UB2H, L2US2C	0.75	0.75	0	0.5	0	0.4	1.00	0.49
Palustrine Lentic Waters PUBH	0.50	0.50	N/A	0.00	0.00	0.20	1.00	0.37
Wetlands								
Semipermanently Flooded Wetlands PEM1F, PEM1/SS1F, PSS1F	0.75	0.66	N/A	1.00	0.75	N/A	1.00	0.83
Seasonally Flooded Wetlands PSS1E, PFO1C	0.75	0.66	N/A	1.00	0.50	N/A	1.00	0.78
Seasonally Saturated Emergent and Shrub Scrub PEM1B, PSS1/EM1B, PSS1B	0.50	0.50	N/A	0.00	0.50	N/A	1.00	0.50
Seasonally Saturated Needle-leaved Forest PFO2B, PFO4B	0.50	0.50	N/A	0.66	0.50	N/A	1.00	0.63

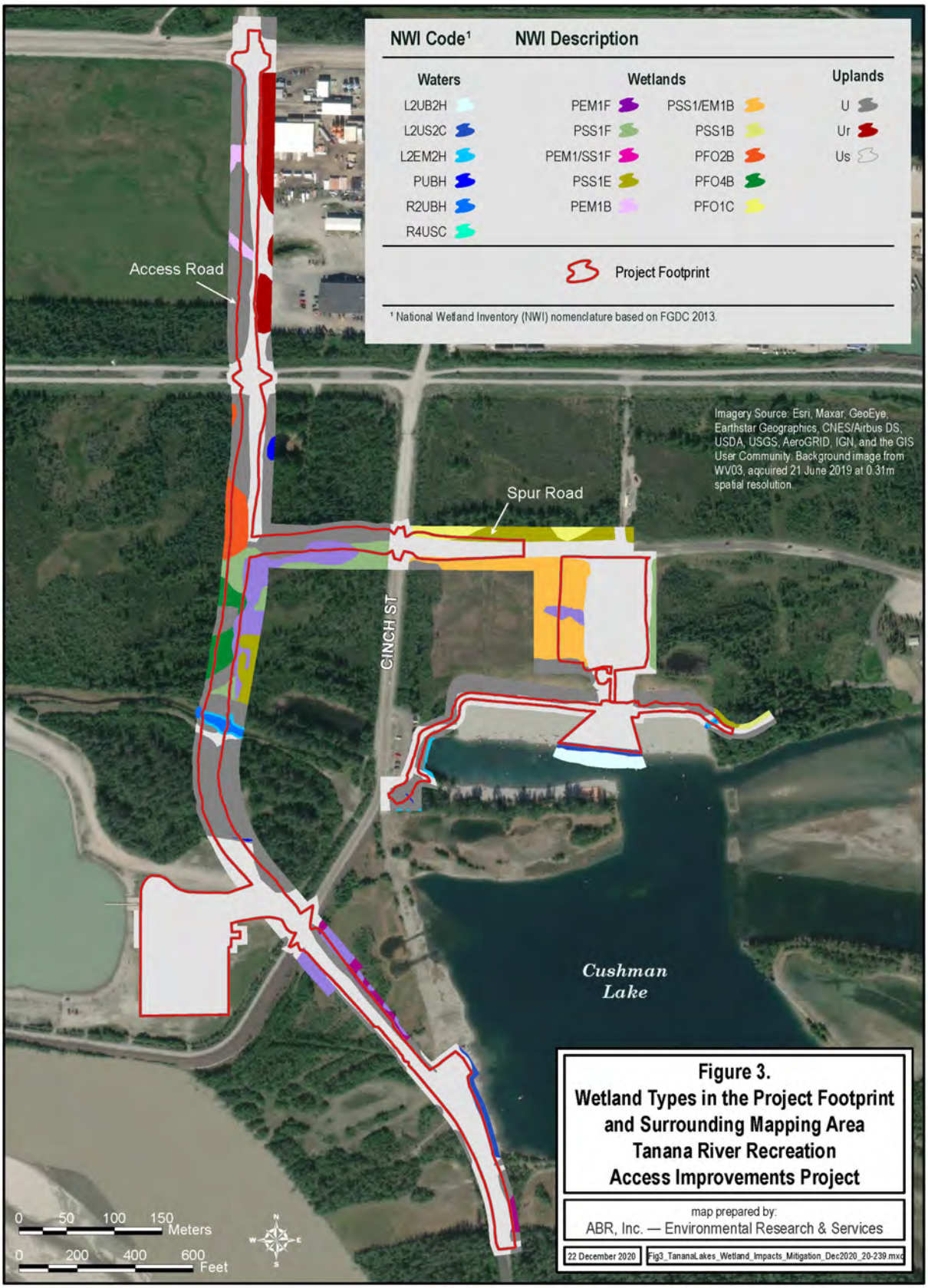
Table 3. Acres of wetland and waters types within the project footprint and disturbance buffers for planned improvements, Tanana River Recreation Access Improvements Project, Fairbanks, Alaska, 2020.

NWI Code and Description	Footprint Acres	% of Project Footprint[a]	Additional Acres Mapped[b]
Waters			
L2UB2H, Lacustrine Permanently Flooded Littoral Unconsolidated Sandy Bottom	0	0	0.32
L2US2C, Lacustrine Seasonally Flooded Littoral Unconsolidated Sandy Shore	0.09	0.52	0.27
L2EM2H, Lacustrine Permanently Flooded Littoral Nonpersistent Emergent Marsh	0	0	0.04
PUBH, Palustrine Permanently Flooded Unconsolidated Bottom	0.01	0.05	0.05
R2UBH, Riverine Permanently Flooded Lower Perennial Unconsolidated Bottom	0.08	0.50	0.07
R4USC, Riverine Seasonally Flooded Intermittent Unconsolidated Shore	0.01	0.04	0.01
Wetlands			
PEM1F, Palustrine Semipermanently Flooded Persistent Emergent	0.34	2.08	1.12
PSS1F, Palustrine Semipermanently Flooded Broad-leaved Deciduous Shrub	0.33	2.00	0.53
PEM1/SS1F, Palustrine Semipermanently Flooded Persistent Emergent/Broad-leaved Deciduous Shrub	0.06	0.34	0.19
PSS1E, Palustrine Seasonally Flooded-Saturated Broad-leaved Deciduous Shrub	0.06	0.39	0.73
PEM1B, Palustrine Seasonally Saturated Persistent Emergent	0.05	0.32	0.11
PSS1B, Palustrine Seasonally Saturated Broad-leaved Deciduous Shrub	0	0	0.05
PSS1/EM1B, Palustrine Seasonally Saturated Broad-leaved Deciduous Shrub/Persistent Emergent	0.69	4.17	1.02
PFO2B, Palustrine Seasonally Saturated Needle-leaved Deciduous Forest	0.29	1.78	0.15
PFO4B, Palustrine Seasonally Saturated Needle-leaved Evergreen Forest	0.27	1.63	0.13
PFO1C, Palustrine Seasonally Flooded Broad-leaved Deciduous Forest	0.05	0.31	0.26
Total	2.33	14.13	5.05

[a] Represents only the acreage of wetlands in the footprint; uplands are not included so the total is less than 100%.
[b] Acreage within the wetland mapping area that could be disturbed during construction and use of the new infrastructure.


Imagery Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community. Background image from WV03, aqcuired 21 June 2019 at 0.31m spatial resolution.
VAN HORN RD
LATHROP ST
SANDURI AVE
CUSHMAN ST
SADDLE AVE
CINCH ST
Flood control Levee
Motorized boat launch
Hiking trail
Swim Beach
Groin 8
Cushman Lake
GOOSE ISLAND CAUSEWAY
Tanana River
Goose Island
Chukchi Sea
Utqiagvik
ALASKA
Nome
Fairbanks
Map View
Bering Sea
Anchorage
Gulf of Alaska
Wetland Study Area
GVEA Intertie
0 100 200 300 400 Meters
0 500 1,000 1,500 Feet
Figure 1.
Wetland Impacts Study Area for the Tanana River Recreation Access Improvements Project
map prepared by:
ABR, Inc. — Environmental Research & Services
16 December 2020
Fig1_Tananalakes_WetlandsImpact_Dec2020_SA_20-239.mxd


NWI Code[1]
NWI Description
Waters
L2UB2H Lacustrine Permanently Flooded Littoral Unconsolidated Sandy Bottom
L2US2C Lacustrine Seasonally Flooded Littoral Unconsolidated Sandy Shore
L2EM2H Lacustrine Permanently Flooded Littoral Nonpersistent Emergent
PUBH Palustrine Permanently Flooded Unconsolidated Bottom
R2UBH Riverine Permanently Flooded Lower Perennial Unconsolidated Bottom
R4USC Riverine Seasonally Flooded Intermittent Unconsolidated Shore
Wetlands
PEM1F Palustrine Semipermanently Flooded Persistent Emergent
PSS1F Palustrine Semipermanently Flooded Broad-leaved Deciduous Shrub
PEM1/SS1F Palustrine Semipermanently Flooded Persistent Emergent/Broad-leaved Deciduous Shrub
PSS1E Palustrine Seasonally Flooded-Saturated Broad-leaved Deciduous Shrub
PEM1B Palustrine Seasonally Saturated Persistent Emergent
PSS1/EM1B Palustrine Seasonally Saturated Broad-leaved Deciduous Shrub/Persistent Emergent
PSS1B Palustrine Seasonally Saturated Broad-leaved Deciduous Shrub
PFO2B Palustrine Seasonally Saturated Needle-leaved Evergreen Forest
PFO4B Palustrine Seasonally Saturated Needle-leaved Deciduous Forest
PFO1C Palustrine Seasonally Flooded Broad-leaved Deciduous Forest
Uplands
U Upland
Ur Upland (urban)
Us Upland (fill)
[1] National Wetland Inventory (NWI) nomenclature based on FGDC 2013.
Imagery Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community. Background image from WV03, acquired 21 June 2019 at 0.31m spatial resolution.
CINCH ST
Cushman Lake
STREAM-1
STREAM-2
Photo Verification Plot
Wetland Determination Plot
0 50 100 150 Meters
0 200 400 600 Feet
N
S
E
W
Figure 2.
Wetlands and Waters
in the Tanana River Recreation
Access Improvements Project Study Area
map prepared by:
ABR, Inc. — Environmental Research & Services
17 December 2020
Fig2_TananaLakes_WetlandPolygons_Impacts_Dec2020_20-239.mxd


NWI Code[1]
NWI Description
Waters
L2UB2H
L2US2C
L2EM2H
PUBH
R2UBH
R4USC
Wetlands
PEM1F
PSS1F
PEM1/SS1F
PSS1E
PEM1B
PSS1/EM1B
PSS1B
PFO2B
PFO4B
PFO1C
Uplands
U
Ur
Us
Project Footprint
[1] National Wetland Inventory (NWI) nomenclature based on FGDC 2013.
Access Road
Spur Road
CINCH ST
Cushman Lake
Imagery Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community. Background image from WV03, acquired 21 June 2019 at 0.31m spatial resolution.
0 50 100 150 Meters
0 200 400 600 Feet
Figure 3.
Wetland Types in the Project Footprint and Surrounding Mapping Area
Tanana River Recreation Access Improvements Project
map prepared by:
ABR, Inc. — Environmental Research & Services
22 December 2020
Fig3_TananaLakes_Wetland_Impacts_Mitigation_Dec2020_20-239.mxd