Mitigation Banking Instrument

Portage Reserve Mitigation Bank

Portage, Alaska

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Submitted to:
Interagency Review Team
May 2019

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Acronyms and Abbreviations

ARRC	Alaska Railroad Corporation
Bank (or PRMB)	Portage Reserve Mitigation Bank
CFR	Code of Federal Regulations
DA	Department of the Army
HUC	Hydrologic Unit Code
IRT	Interagency Review Team
Reserve	Portage Terminal Reserve
RIBITS	Regulatory In-Lieu Fee and Bank Information Tracking System
USACE	U.S. Army Corps of Engineers
USC	U.S. Code

1.0 Introduction

This Mitigation Banking Instrument (hereinafter, the "Instrument") regarding the establishment, use, operation, and maintenance of the Portage Reserve Mitigation Bank (hereinafter, the "Bank" or "PRMB") is made and entered into by and among the Alaska Railroad Corporation (hereinafter, the "Sponsor" or "ARRC") and the Alaska District, U.S. Army Corps of Engineers (hereinafter, "USACE").

USACE approval of this Instrument constitutes the regulatory approval required for the Bank to be used to provide compensatory mitigation for Department of the Army (DA) permits pursuant to 33 Code of Federal Regulations (CFR) §332.8(a)(1). This Instrument is not a contract between the Sponsor and USACE or any other agency of the federal government. Any dispute arising under this Instrument will not give rise to any claim by the Sponsor for monetary damages. This provision is controlling, notwithstanding any other provision or statement in the Instrument to the contrary.

1.1 Purpose and Need

The purpose of this Bank is to provide commercially available palustrine credits within the Bank's service area (see Section 3.0 Geographic Service Area) in order to offset unavoidable impacts from DA permit authorizations in accordance with the 2008 Final Rule on Compensatory Mitigation for Losses of Aquatic Resources (2008 Mitigation Rule).[1]

Future growth and infrastructure improvement projects within the service area create the market for credits within the service area. Information on the needs of the watershed and the current and projected future development trends in the watershed is included in Exhibit A - Watershed Approach.

1.2 Location and Ownership

The Bank property consists of two parcels totaling 240.926 acres within the Portage Terminal Reserve (Reserve) along the ARRC main line. The Bank extends south of the existing developments along Portage Glacier Road to the Reserve's southern boundary, and is approximately 0.23 mile wide and 1.65 miles long. All land within the Bank is owned in fee simple by ARRC.

1.3 Project Description

The Bank will restore and preserve aquatic resources and their functions impacted by previous placement of gravel fill for a road and microwave tower. The Bank will accomplish this goal via the following objectives:

- **Restoration (re-establishment) and preservation** of natural functions to former wetlands within the Reserve that have been filled by previous development

[1] 33 CFR §332 (2008)

- **Preservation** of wetlands, waterbodies, waterways, and wetland/upland buffers under threat of development

The acres of resources that will be restored and/or preserved within the Bank are shown in Table 1. The Bank will produce 149.476 palustrine credits, based on calculations using the Anchorage Debit Credit Method.

Table 1. Resources to be Restored and/or Preserved within the Bank

Objective	Acres
Restoration (re-establishment) and preservation of wetlands	2.119
Preservation of wetlands, waterbodies, waterways, and wetland/upland buffers under threat of development	238.806*
Total	***240.926***

* Includes preservation of waterways, which will not generate credit.

1.4 Bank Type

The Bank will produce mitigation credits that are commercially available to all permittees seeking mitigation credits within the service area.

1.5 Approval

The Instrument is effective upon the latter date of signature by the Sponsor and USACE.

1.6 Interagency Review Team

The Interagency Review Team (IRT) is a group of federal and State agencies that has reviewed and will advise USACE regarding the establishment and management of the Bank pursuant to the provisions of the Instrument. USACE serves as the Chair of the IRT, and the following agencies have agreed to serve on the IRT:

- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service
- Alaska Department of Fish and Game

1.7 Exhibits

The following exhibits are included in this Instrument:

Exhibit A – Watershed Approach

Exhibit B – Mitigation Plan

Exhibit C – Credit Purchase Receipt Form

Exhibit D – Bank Credit Ledger

Exhibit E – Deed Restriction and Restrictive Covenants

Exhibit F – Letter of Commitment

Exhibit G – Long-Term Management Costs

2.0 Role of Relevant Authorities and Guidance

The Bank will be established and operated in accordance with the 2008 Mitigation Rule, as well as the following applicable federal, state, and local authorities:

A. Federal
   1. Clean Water Act (33 U.S. Code [USC] §§1251 et seq.)
   2. Rivers and Harbors Act of 1899 (33 USC §403)
   3. Regulatory Program of the USACE, Final Rule (33 CFR §320-332)
   4. USACE Regulatory Guidance Letter 05-1, *Guidance on Use of Financial Assurances, and Suggested Language for Special Conditions for Department of the Army Permits Requiring Performance Bonds*, USACE, February 14, 2005
   5. Memorandum of Agreement between the U.S. Environmental Protection Agency and the DA concerning the Determination of Mitigation Under the Clean Water Act, Section 404(b)(1) Guidelines (February 6, 1990)
   6. Guidelines for the Specification of Disposal Sites for Dredged and Fill Material (40 CFR §404(b)(1))
   7. National Environmental Policy Act (44 USC §§4321 et seq.)
   8. Council on Environmental Quality Procedures for Implementing the National Environmental Policy Act (40 CFR §1500–1508)
   9. Executive Order 11990 (Protection of Wetlands)
   10. Executive Order 11988 (Protection of Floodplains)
   11. Executive Order 13112 (Invasive Species)
   12. Fish and Wildlife Coordination Act (16 USC §§661 et seq.)
   13. Fish and Wildlife Service Mitigation Policy (46 *Federal Register* [FR] 7644–7663, 1981)
   14. Endangered Species Act (16 USC §§1531 et seq.)
   15. Magnuson-Stevens Fishery Conservation and Management Act (16 USC §§1801 et seq.)
   16. National Historic Preservation Act, as amended (16 USC §470)

B. State
   1. Alaska Department of Environmental Conservation Section 401 Water Quality Certification
   2. Alaska Land Act, Alaska Statute Section 38.05.070.075

C. Municipal
   1. Anchorage Municipal Code, Chapter 21 Land Use Planning
   2. Anchorage Municipal Code 21.05.115 Implementation – Anchorage Wetlands Management Plan
   3. *Anchorage Wetlands Management Plan*
   4. Anchorage Assembly Ordinance AO No. 28-67(2-1), as amended, approved October 9, 2018 – regarding stream setbacks

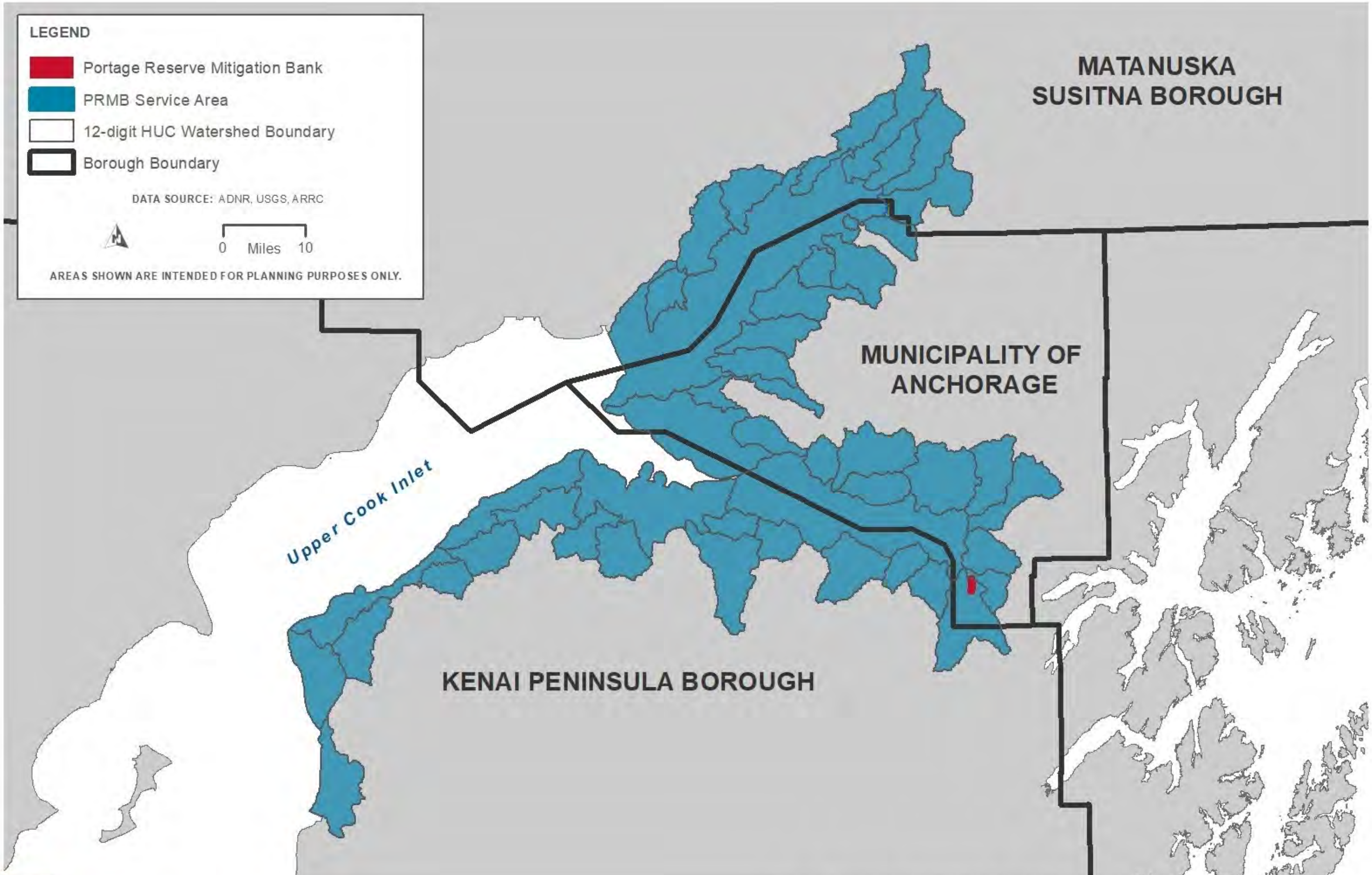
3.0 Geographic Service Area (33 CFR §332.8(d)(6)(ii)(A))

The Bank's service area is the lower portions of the Upper Cook Inlet Basin (Figure 1). This service area flows directly into Upper Cook Inlet, including Turnagain and Knik Arms. The service area contains threatened, valuable natural resources within Anchorage, where more than half of Alaska's population resides, as well as the rapidly growing Kenai Peninsula Borough and Matanuska-Susitna Borough. The service area also supports the Cook Inlet Distinct Population Segment of beluga whales, recreation and subsistence fisheries, and seabird and waterfowl habitat. This service area has experienced significant development and will continue to experience development into the future. The Hydrologic Unit Codes (HUCs) for the service area watersheds are shown in Figure 1, and listed in Table 2. Additional information concerning the location of the service area, the development within the service area, the needs of the service area watersheds, other watershed considerations, and the anticipated future growth within the service area is included in Exhibit A - Watershed Approach.

Table 2. 12-digit HUC Watersheds within the Service Area

Watershed	12-digit HUC	Watershed	12-digit HUC
Bedlam Creek	190203022004	Otter Creek	190203021902
Big Indian Creek	190203022002	Outlet Eklutna River	190204010105
Bird Glacier-Bird Creek	190203020102	Outlet Matanuska River	190204020709
Bishop Creek	190203021904	Outlet Peters Creek	190204010202
Burnt Island Creek-Frontal	190203022005	Outlet Ship Creek	190204010404
Chester Creek	190204010806	Penguin Creek	190203020101
Cottonwood Creek	190204010803	Pincher Creek	190203022003
Echo Lake-Frontal Cook Inlet	190203021907	Portage Creek	190203020304
Fire Creek	190204010804	Rabbit Creek	190204010701
Furrow Creek-Frontal	190204010702	Rabbit Slough-Palmer Slough	190204010801
Glacier Creek	190203020702	Salamatof Creek-Frontal Cook	190203021906
Gull Lake	190203021905	Seattle Creek	190203020704
Indian Creek	190203020701	Seven Egg Creek	190203021901
Island Lake-Frontal Cook Inlet	190203021908	Skookum Creek-Placer River	190203020305
Knik Arm-Frontal Cook Inlet	190204010808	Stephan Lake-Goose Creek	190204010805
Little Indian Creek	190203022001	Threemile Creek-Fish Creek	190204010504
Lower Eagle River	190204010306	Turnagain Arm	190203020705
Lower Knik River-Frontal Knik	190204021209	Twin Island Lake	190204010807
Lower Resurrection Creek	190203020504	Upper Twentymile River	190203020201
Lower Twentymile River	190203020205	Walker Creek-Sixmile Creek	190203020408
Middle Twentymile River	190203020202	Wasilla Creek	190204010802
Miller Creek-Frontal Cook	190203021903	Wolverine Creek-Ingram Creek	190203020703
North Fork Campbell Creek	190204010603		

Source: U.S. Geological Survey. 2017. Watershed Boundary Dataset. National Geospatial Technical Operations Center. Accessed at http://nhd.usgs.gov/wbd.html on April 12, 2017.



ALASKA RAILROAD

PORTAGE RESERVE MITIGATION BANK INSTRUMENT
SERVICE AREA
FIGURE 1
ALASKA RAILROAD CORPORATION

4.0 Mitigation Plan (33 CFR §332.8(d)(6)(iii)(A))

The Mitigation Plan is attached as Exhibit B to this Instrument. The Mitigation Plan includes:

1. Objectives
2. Site Selection
3. Site Protection Instrument
4. Baseline Information
5. Determination of Credits
6. Mitigation Work Plans
7. Maintenance Plan
8. Performance Standards
9. Monitoring Requirements
10. Financial Assurances

5.0 Reporting

5.1 Ledger Account (33 CFR §332.8(d)(6)(ii)(B))

The Sponsor will maintain a credit ledger documenting the credits available and each credit transaction. The ledger will include an accounting of credits, the date of sale, the DA permit number, the total credits released, the total credits used, and the total credits remaining. See Exhibit D for an example of the credit ledger.

The Bank credit transactions will take place according to the following general procedure:

1. A Permittee will approach the Sponsor with the number of credits required to compensate for unavoidable losses of aquatic resources prior to the sale of credits;
2. the Sponsor will inform the Permittee of credit availability at this mitigation Bank;
3. if the required credits are available, the Permittee will proceed to purchase the credit(s) from the Sponsor;
4. the Permittee and the Sponsor will sign a credit receipt (Exhibit C – Credit Purchase Receipt Form), which will be submitted to the USACE as proof of the credit transaction and documentation that the liability for compensatory mitigation is transferred from the Permittee to the Sponsor; and
5. each credit purchase transaction will be formally documented with the signed credit receipt and entry into the credit ledger; USACE will enter the data into the Regulatory In-Lieu Fee and Bank Information Tracking System (RIBITS).

The Sponsor shall submit an annual credit ledger report as a component of the annual monitoring report by January 31 of the following year. The annual credit ledger report shall document all Bank transactions for the previous calendar year, with copies of all credit receipts and a cumulative tabulation of all transactions to date. The ledger report must be submitted to the district engineer, who will distribute copies to the IRT members. The annual credit ledger report is part of the administrative record for the Bank. The district engineer will make the ledger report available to the public through RIBITS.

After the last credit is sold, the Sponsor shall submit a final credit ledger to USACE.

5.2 Monitoring Reports (33 CFR §332.8(d)(6)(ii)(E)

Following approval of the Instrument, annual monitoring reports documenting the progress of the restoration and preservation areas for the year shall be submitted to USACE. Each annual monitoring report shall be submitted to USACE by January 31 of the following year.

The monitoring report will be concise and will include a description of site conditions and whether or not the mitigation projects are meeting the performance standards. The report will include a narrative of the activities that have occurred to date and site photographs that illustrate site conditions. The report will also include:

1. Name of party responsible for conducting the monitoring and the dates of inspection.
2. A brief description of the approved compensatory mitigation plan and the dates when specific mitigation activities were commenced and/or completed.
3. A paragraph describing whether the mitigation bank is developing as expected. This summary will include a description of each restoration and preservation area and whether or not it is developing as expected and meeting the necessary performance standards.
4. If a project is not meeting the necessary performance standards or on the trajectory to meet performance standards, the Sponsor will include a description of the existing condition, the reason(s) that the project is not meeting performance standards, and a proposal to conduct remedial actions to bring the project into compliance with the approved Instrument.
5. Dates of any corrective or maintenance activities conducted since the previous report submission.
6. A copy of all data collected and a brief analysis.

Performance standards and monitoring requirements are detailed in Exhibit B – Mitigation Plan.

6.0 Credit Release Schedule (33 CFR §332.8(d)(6)(iii)(B))

The milestones for establishing credit releases are provided in Table 3. All credit releases must be approved by USACE. Performance standards are described in Exhibit B – Mitigation Plan.

Table 3. Credit Release Schedule

Restoration/ Preservation Area	Performance Standard	Percent*	Number of Palustrine Credits Released
All	1) USACE Approval of the PRMB Instrument and the Mitigation Plan 2) Recording of the Site Protection Instrument 3) Installation of signage and posters	65%	97.159
Restoration Area	Design	10%	14.948
Restoration Area	Hydrophytic Vegetation	5%	7.474
Restoration Area	Wetland Hydrology	5%	7.474
Preservation Area	Hydrophytic Vegetation	5%	7.474
Preservation Area	Wetland Hydrology	5%	7.474
Preservation Area	Hydric Soil	5%	7.474
	Total	***100%***	***149.476***

* Numbers may not add up due to rounding

7.0 Long-Term Management Plan

Long-term management will commence upon written approval of the Bank closure report by USACE. The long-term management strategy for the Bank will be to protect the site through enforcement of the conditions of the deed restriction (Exhibit E – Deed Restriction and Restrictive Covenants) in order to ensure long-term sustainability and viability of the restored and preserved aquatic resources with a goal to maintain the natural conditions of the Bank.

Long-term management of the Bank will be performed by ARRC, a state-owned entity. The 2008 Mitigation Rule allows state entities to hold site-protection instruments[2] as well as to provide for long-term management.[3] Per Alaska State Statute, ARRC cannot convey its entire interest in land or lease land for a period greater than 95 years without legislative approval;[4] thus third-party management of the Bank is not feasible. ARRC currently owns and manages approximately 36,000 acres of land across Alaska and has full-time staff whose responsibilities include real estate, land management, permitting, and environmental analysis. The ARRC Real Estate and Facilities Department manages all leases and permitted activities on ARRC property. The Bank will be included in their land management portfolio and monitored according to this Long-Term Management Plan.

The ARRC Real Estate and Facilities Department will manage the Bank according to conditions outlined in the deed restriction. The deed restriction prohibits "filling, draining, flooding, dredging, impounding, clearing, burning, cutting or destroying vegetation, cultivating,

[2] 33 CFR §332.7(a) (2008)
[3] 33 CFR §332.7(d) (2008)
[4] Alaska State Statute 42.40.285

excavating, erecting, constructing, releasing wastes, or otherwise doing any work on the Property; introducing exotic species into the Property (except biological controls preapproved in writing by the Corps and any State of Alaska agency with jurisdiction over such controls); and from changing the grade or elevation, impairing the flow or circulation of waters, reducing the reach of waters, and any other discharge or activity requiring a permit under clean water or water pollution control laws and regulations, as amended." These restrictions will prohibit any entity from carrying out unauthorized activities that may negatively impact the aquatic resources within the Bank.

As part of the enforcement of the deed restriction, ARRC will maintain the signs restricting access along the Bank boundary. Access restrictions will be monitored and enforced by ARRC personnel at ARRC's Portage Section House, which is typically staffed by ARRC personnel daily, year round. Posters showing the boundaries of the Bank, detailing activities prohibited by the deed restriction, and providing contact information for enforcement agencies will be posted within ARRC's Portage Section House and will be updated (as needed) and replaced every five (5) years. ARRC will also actively manage the Bank to prevent trespass or unauthorized encroachments with its own sworn police force, supplementing local, state, and federal law enforcement agencies.

ARRC will actively manage the Bank by performing long-term monitoring activities every five (5) years, which will include:

- an inventory and maintenance or replacement of signage around the perimeter of the Bank;
- an inventory and maintenance or replacement of posters within Portage Section House;
- interviews with ARRC Portage House personnel about any unauthorized activities observed at the Bank;
- field data collection at preservation monitoring locations (described in Exhibit B – Mitigation Plan) to verify that the deed restriction conditions are met and to inventory the presence of invasive species;[5]
- trash removal;
- minor weed management (as needed);
- major weed management (as needed);
- a review of currently available aerial imagery with an effort to identify prohibited activities; and
- a long-term management report submitted to USACE.

The identification of any invasive species within the Bank boundary during the long-term monitoring will immediately initiate weed management activities. Weed management may include mechanical control, competition exclusion/seeding, and, in extreme cases, herbicide use.

[5] Invasive species are defined as those listed on the Alaska Department of Natural Resources' Prohibited and Noxious Weed list, available at http://plants.alaska.gov/invasives/noxious-weeds.htm.

Mechanical control consists of pulling, mowing, digging, or cutting plants and is the simplest method to control small infestations. Competition exclusion/seeding involves seeding areas after the mechanical removal of infestations in order for the seeded native species to outcompete the invasive species. Herbicides will be used in extreme cases for large infestations and only after the required permits and approvals from state and local agencies, in addition to authorization from USACE, are obtained.

Annual costs for these activities are estimated at $2,092 and will be allocated as part of ARRC's annual operating budget. A breakdown of the long-term management costs are included in Exhibit G.

8.0 Adaptive Management Plan

The adaptive management process is designed to deal with the uncertainty of the restoration and preservation processes and allow for problem solving and adjustments during implementation and long-term management. There are two stages of adaptive management: (1) adaptive management during the monitoring period to ensure that performance standards are met and (2) adaptive management of the Long-Term Management Plan to enforce the conditions of the site protection instrument.

Prior to successful completion of performance standards, the Adaptive Management Plan will promote successful restoration and preservation by providing ARRC a mechanism to adjust and adapt to issues with implementation and onsite conditions, as required. Issues that may arise and require adaptive management include topsoil settlement, invasive species infestations, and unsuccessful revegetation efforts. Solutions to the issues may involve placement of additional topsoil material, additional plantings or seeding, and invasive species management measures. If any of these conditions are found within the restoration or preservation area, a Corrective Action Plan will be assembled and submitted immediately for USACE approval.

After all performance standards are met, adaptive management will be incorporated as part of the long-term management of the Bank. Issues that may arise during long-term monitoring and require adaptive management include unauthorized fill placement, unauthorized recreational activities, or invasive species infestations that require control activities beyond the weed management allocated in the Long-Term Management Plan. Solutions to the problems may involve increased patrols from ARRC's police force, removal of unauthorized fill, or additional weed management.

If any monitoring activity demonstrates that the Bank or any portion of the Bank does not meet, or is not on the trajectory to meet, performance standards or adhere to the conditions of the site protection instrument, the Sponsor will develop a Corrective Action Plan and implement appropriate remedial actions. Corrective Action Plans will be submitted to USACE for review and approval within 60 days of any monitoring activity or site visit showing that a performance standard is not met or on a trajectory to be met, or that a condition of the site protection instrument has been violated. The Corrective Action Plan will include a schedule for implementation of adaptive management activities. No corrective action will be taken without prior approval from USACE.

Following implementation of corrective actions, USACE and the IRT may perform a compliance visit. If a Corrective Action Plan is not developed or implemented within the appropriate timeframe, USACE may determine that the Bank is in noncompliance.

9.0 Transfer of or Responsibility for Compensatory Mitigation (33 CFR §332.8(d)(6)(ii)(C)

The Sponsor assumes the responsibility for the Permittee's required compensatory mitigation once (1) the Permittee has secured the appropriate number of credits from the Sponsor and (2) the Sponsor has submitted documentation to USACE that confirms that the Sponsor has accepted the legal responsibility for providing the required compensatory mitigation (Exhibit C – Credit Purchase Receipt Form).

10.0 Noncompliance

Should USACE determine that the Sponsor is in noncompliance of any provision of this Instrument, USACE, in consultation with the IRT, may take appropriate action including, but not limited to, adaptive management, decreasing available credits, suspension of credit sales, and termination of the Instrument.[6] If the Bank is operating at a deficit (released credits exceed successful credits), the Bank shall be considered noncompliant. In the event of suspension of sales, USACE will notify the Sponsor that the sale of credits is suspended until the appropriate deficiencies have been remedied to the satisfaction of USACE. Upon notice of suspension, the Sponsor agrees to immediately cease all sales or transfers of credits until USACE informs the Sponsor that sales or transfers may be resumed. In the case of noncompliance and in the event the Instrument is terminated as a result of that noncompliance, the Sponsor agrees to fulfill all of its obligations under this Instrument.

11.0 Force Majeure

Force majeure events include natural or human-caused catastrophic events. If the Sponsor asserts that the Bank has sustained significant adverse impacts due to an event that may be determined to be a force majeure, the Sponsor shall give written notice with supporting evidence to USACE as soon as is reasonably practicable. USACE retains sole discretion over the final determination of whether an event constitutes a force majeure, whether significant adverse impacts to the Bank have occurred, and to what extent changes to the Bank will be permitted. The consequences of any events of force majeure shall not affect the status of previously released credits that have been either sold or transferred.

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[6] 33 CFR §332.8(o)(10) (2008)

12.0 Default and Closure Provisions (33 CFR §332.8(d)(6)(ii)(D))

12.1 Default

Should USACE, in consultation with the IRT, determine that the Sponsor is in material default of any provision of this Instrument, USACE may cease award of Bank credits, and may notify the Sponsor that the award, sale, and/or transfer of Bank credits, or use by the Sponsor of Bank credits as compensatory mitigation for its own activities causing adverse impacts to the aquatic environment, are suspended until the delineated deficiencies are rectified. Upon written notification of suspension, the Sponsor agrees to immediately cease any sale or transfer transactions not yet finally completed, and/or to cease any use by the Sponsor of Bank credits as compensatory mitigation for its own activities causing adverse impacts to the aquatic environment where USACE authorization has not yet been issued, until informed by the notifying agency that award, sale, use, or transfer of Bank credits may be resumed. Should the Sponsor remain in default for a period of 90 days, USACE, in consultation with the IRT, may terminate this Instrument and any subsequent banking operations. In the event such termination action is commenced, the Sponsor agrees to fulfill its pre-existing obligations to perform all establishment, monitoring, maintenance, management, and remediation responsibilities that arise directly from Bank credits that have already been awarded, sold, used, or transferred at the time of termination. In the event of termination, no further sale or transfer of Bank credits may occur, nor any use by the Sponsor of Bank credits as compensatory mitigation for its own activities causing adverse impacts to the aquatic environment within the service area where USACE authorization has not yet been issued.

12.2 Bank Closure

USACE shall issue a written “Mitigation Site Closure Certification” to the Sponsor upon meeting all the following requirements:

1. All applicable Performance Standards described in the Mitigation Plan (Exhibit B) for the Bank have been achieved in areas where Credits are released, as demonstrated by the monitoring reports;
2. All released credits for the Bank are debited from the credit ledger;
3. The Sponsor has reviewed and revised, if necessary, the Long-Term Management Plan, and the revised Long-Term Management Plan has been approved by USACE, in coordination with the IRT;
4. The site protection instrument is recorded and a copy has been furnished to USACE; and
5. The Bank is in compliance with the terms outlined in this Instrument and Mitigation Plan.

13.0 Other Provisions

13.1 Dispute Resolution

Resolution of disputes regarding development or modification of this Instrument shall be in accordance with the DA and U.S. Environmental Protection Agency regulations titled "Compensatory Mitigation for Aquatic Resources Dispute Resolution Process,"[7] as well as any other applicable federal or state regulations governing bank operation. Any dispute arising under this Instrument will not rise to any claim by Sponsor or Property Owner for monetary damages.

13.2 Notice

Any notice required or permitted hereunder shall be deemed to have been given either (i) when delivered by hand, or (ii) three (3) days following the date deposited in the United States mail, postage pre-paid, by registered or certified mail, return receipt requested, or (iii) sent by FedEx or similar next-day nationwide delivery system, addressed as follows:

ARRC
Attn: Matt Kelzenberg, Manager of Environmental Operations
PO Box 107500
Anchorage, AK 99510-7500

U.S. Army Corps of Engineers – Alaska District
Regulatory Division
PO Box 6898
JBER, AK 99506-0898

13.3 Modifications

This Instrument, including Exhibits, may be amended or modified only with the written approval of USACE in consultation with the IRT and the Sponsor. In the event the Sponsor determines that modifications must be made in the Instrument or Mitigation Plan to ensure successful establishment and operation of the Bank, the Sponsor shall submit a written request for such modification to the USACE for written approval. Any modification to the Instrument will comply with USACE regulations at 33 CFR §332.8(g).

13.4 Invalid Provisions

In the event any one or more of the provisions contained in this Instrument are held to be invalid, illegal, or unenforceable in any respect, such invalidity, illegality, or unenforceability will not affect any other provisions hereof, and this Instrument shall be construed as if such invalid, illegal, or unenforceable provision had not been contained herein.

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[7] 33 CFR §332.8(3) (2008)

13.5 Liability of Regulatory Agencies

The responsibility for financial success and risk to the investment initiated by the Sponsor rests solely with the Sponsor. The regulatory agencies that are parties to this Instrument administer their respective regulatory programs and make no guarantee of the financial success of mitigation banks, specific individuals, or entities. Accordingly, there is no guarantee of profitability for any individual mitigation bank. Because the regulatory agencies do not control the number of mitigation banks proposed or the resulting market impacts upon success or failure of individual banks, market studies of the potential and future demand for bank credits are the sole responsibility of the Sponsor. The Sponsor should not construe this Instrument as a guarantee in any way that the agencies will ensure sales of credits from this Bank or that the agencies will forego other mitigation options that may also serve the public interest. Sponsor shall have no right to money damages and shall have no right to claim or to recover a loss of anticipated revenue based on any decision by USACE and/or based on USACE's administration of its mitigation banking program and/or mitigation bank.

13.6 Grant Program Participation

State and federal funds designated for voluntary restoration projects shall not be used to generate mitigation credits sold for profit.

13.7 Sale of Bank Property or Conveyance of Property Interests

The Sponsor shall not transfer title or otherwise convey interests in the Property without 60-day prior notice and written approval by the USACE.

Portage Reserve Mitigation Bank

IN WITNESS WHEREOF, the parties hereto have executed this Instrument on the date herein below last written by USACE.

William G. O'Leary
President and Chief Executive Officer
Alaska Railroad Corporation

6/5/19
DATE

Dave Hobbie
Chief, Regional Regulatory Division
U.S. Army Corps of Engineers

6-7-19
DATE

EXHIBIT A

WATERSHED APPROACH

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Exhibit A Watershed Approach

Portage Reserve Mitigation Bank Instrument, Exhibit A

Portage, Alaska

Alaska Railroad Corporation

Prepared by HDR Alaska, Inc.

May 2019

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Figures

Acronyms and Abbreviations

ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
APDES	Alaska Pollutant Discharge Elimination System
ARRC	Alaska Railroad Corporation
AWMP	Anchorage Wetland Management Plan
Bank	Portage Reserve Mitigation Bank
CFR	Code of Federal Regulations
DOT&PF	Alaska Department of Transportation and Public Facilities
DPS	Distinct Population Segment
ESA	Endangered Species Act
ESI	Environmental Sensitivity Index
FR	Federal Register
HUC	Hydrologic Unit Code
KPB	Kenai Peninsula Borough
MOA	Municipality of Anchorage
MSB	Matanuska-Susitna Borough
MSBSHP	Mat-Su Basin Salmon Habitat Partnership
NLCD	National Land Cover Dataset
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NWI	National Wetlands Inventory
Reserve	Portage Terminal Reserve
STIP	Statewide Transportation Improvement Plan
USACE	U.S. Army Corps of Engineers
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

1.0 Introduction

The Alaska Railroad Corporation (ARRC) seeks to establish the Portage Reserve Mitigation Bank (Bank) in accordance with U.S. Army Corps of Engineers (USACE) and U.S. Environmental Protection Agency requirements under the 2008 Final Rule on Compensatory Mitigation for Losses of Aquatic Resources (2008 Mitigation Rule).[1] This document describes how a watershed approach to compensatory mitigation planning was used throughout the development of the Bank, and is intended to provide supporting information for the Mitigation Banking Instrument.

2.0 Watershed Approach

The 2008 Mitigation Rule requires the use of a watershed approach to compensatory mitigation site selection to ensure that selected compensatory mitigation sites maintain and improve the quality and quantity of aquatic resources within watersheds that are impacted by activities authorized by USACE under Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act of 1899. In addition to considering how selected compensatory mitigation sites will contribute to the sustainability of aquatic resource functions within a watershed, a watershed approach considers the habitat of important species, habitat loss or conversion trends, sources of watershed impairment, and current development trends.[2]

A watershed approach to compensatory mitigation planning was used throughout the development of the Bank, beginning with the selection of a location for a potential bank from all ARRC-owned land. ARRC owns approximately 36,000 acres of land along its 467 miles of main line and 54 miles of branch lines. This land is widespread across Southcentral and Interior Alaska. The main line stretches from Fairbanks to Seward, and crosses 15 U.S. Geological Survey (USGS) 8-digit Hydrologic Unit Code (HUC) watersheds and six Level II ecoregions (as established in the Ecoregions of Alaska mapping).[3] ARRC evaluated its lands in consideration of the current health of the watershed(s), important natural resources, and the threat of development within each watershed to identify areas that would provide the best opportunities for compensatory mitigation under a watershed approach.

Using a watershed approach, the Portage Terminal Reserve (Reserve) was selected from all ARRC-owned land for establishment of a mitigation bank. The Reserve comprises approximately 1,200 acres at the junction of the ARRC main line and Whittier Branch line. It is located in the area where Twentymile River, Portage Creek, and Placer River enter Cook Inlet at the head of Turnagain Arm. Although the Portage area has experienced minimal development to date, development pressures in the area are increasing. The Reserve is also located within the lower reaches of the Upper Cook Inlet Basin, which contains the Municipality of Anchorage (MOA), the largest population center in Alaska, as well as portions of the rapidly growing Kenai Peninsula Borough (KPB) and Matanuska-Susitna Borough (MSB). All these areas have experienced

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[1] 33 Code of Federal Regulations [CFR] §332 (2008)
[2] 33 CFR §332.3(c)(2)(iv) (2008)
[3] From north to south: Yukon-Tanana Uplands, Tanana-Kuskokwim Lowlands, Alaska Range, Cook Inlet Basin, Chugach-St. Elias Mountains, and Gulf of Alaska Coast. Nowacki, G., P. Spencer, T. Brock, M. Fleming, and T. Jorgenson. 2001. *Ecoregions of Alaska and neighboring territory [map].* U.S. Geological Survey, Reston, VA.

considerable historical and ongoing loss and degradation of aquatic resources. In response to ongoing development and associated impacts to aquatic resources, multiple planning and management entities have recognized the need for restoration and preservation of aquatic resources in the lower Upper Cook Inlet Basin. The Reserve was determined to be optimally located for planning of compensatory mitigation activities that could effectively address the needs of the watershed.

The Reserve was also selected for the important natural resources it contains, including large complexes of wetlands, waterbodies, and streams located where riverine, estuarine, and palustrine systems converge. These aquatic resources are of high ecological value and perform many chemical, physical, and biological functions. Most notably, they support the Cook Inlet Distinct Population Segment (DPS) of beluga whales, which is listed as endangered under the Endangered Species Act (ESA), and are adjacent to federally designated critical habitat for the population.[4] The Reserve is also adjacent to lands within the Chugach National Forest that are managed by the U.S. Forest Service (USFS) for wildlife and recreation values that are consistent with the objectives of a mitigation bank.

After the Reserve had been selected as the site for a potential bank, a watershed approach was used to identify potential mitigation projects and to assess the potential of those projects to meet the needs of the watershed. There are multiple opportunities for mitigation projects within the Reserve that meet the needs of the watershed, including needs that have been identified in planning and management documents. Potential projects identified include re-establishment of aquatic resources that have been converted to upland fill, rehabilitation of aquatic resource functions that have been impacted by previous development, and preservation of high-value resources that are under threat of destruction and adverse modification. These projects would restore and preserve aquatic resource functions that are important for the sustainability of the watershed, including anadromous fish habitat and beluga habitat support.

This Watershed Approach document describes how the establishment and operation of the Bank, including the planned restoration activities, service area, and long-term management strategy, will maintain and improve the quality and quantity of aquatic resources within the watershed. While the Bank's size is small relative to the Upper Cook Inlet Basin watershed, the Bank's strategic location will help advance the watershed health and the broader environmental and social goals of the region. The Bank will have a large environmental return on investment because it will:

1) Restore wetlands and wetland functions that previously existed.
2) Protect one of the largest developable wetland tracts in the watershed and preserve resources that are currently under threat of destruction or adverse modification.
3) Be protected from future impact in upgradient systems by the Chugach National Forest.
4) Be contiguous with Turnagain Arm and large wetland complexes within the Placer River and Portage Creek valleys.
5) Be compatible with adjacent land uses. The Bank will be ecologically contiguous to lands managed in a compatible manner within the Chugach National Forest.

[4] 50 CFR §226.220 (2011)

6) Guarantee a high likelihood of success because its source of water is tidal backflow and flow from streams that originate within the Chugach National Forest.
7) Allow for natural biological processes.
8) Not involve overcomplicated engineering or continual maintenance.

3.0 Service Area

A service area is "the watershed, ecoregion, physiographic province, and/or other geographic area within which [a] mitigation bank…is authorized to provide compensatory mitigation."[5] The 2008 Mitigation Rule requires use of a watershed approach when selecting a service area for a mitigation bank. The 2008 Mitigation Rule also states that "the economic viability of the mitigation bank…may also be considered in determining the size of the service area."[6] The service area for the Bank was delimited using a watershed approach to ensure that the aquatic resources that will be restored and preserved by the Bank will effectively compensate for adverse environmental impacts resulting from permitted activities across the entire service area, while also taking in to consideration the economic viability of the Bank. The service area has been refined in consideration of comments from USACE.

The watershed comprising the Bank's service area is the lower portions of the Upper Cook Inlet Basin (Figure 1). This watershed flows directly into Upper Cook Inlet, including Turnagain and Knik Arms. The Upper Cook Inlet Basin is important because it contains threatened, valuable natural resources directly adjacent to Alaska's largest city, where more than half of Alaska's population resides. The watershed flowing into Cook Inlet supports the Cook Inlet DPS of beluga whales, recreation and subsistence fisheries, and seabird and waterfowl habitat. This watershed has experienced significant development and will continue to experience development. The 45 12-digit HUC watersheds in the service area are listed in Table 1.

Table 1. 12-digit HUC Watersheds within the Service Area

Watershed	12-digit HUC	Watershed	12-digit HUC
Bedlam Creek	190203022004	Otter Creek	190203021902
Big Indian Creek	190203022002	Outlet Eklutna River	190204010105
Bird Glacier-Bird Creek	190203020102	Outlet Matanuska River	190204020709
Bishop Creek	190203021904	Outlet Peters Creek	190204010202
Burnt Island Creek-Frontal	190203022005	Outlet Ship Creek	190204010404
Chester Creek	190204010806	Penguin Creek	190203020101
Cottonwood Creek	190204010803	Pincher Creek	190203022003
Echo Lake-Frontal Cook Inlet	190203021907	Portage Creek	190203020304
Fire Creek	190204010804	Rabbit Creek	190204010701
Furrow Creek-Frontal	190204010702	Rabbit Slough-Palmer Slough	190204010801
Glacier Creek	190203020702	Salamatof Creek-Frontal Cook	190203021906
Gull Lake	190203021905	Seattle Creek	190203020704
Indian Creek	190203020701	Seven Egg Creek	190203021901
Island Lake-Frontal Cook Inlet	190203021908	Skookum Creek-Placer River	190203020305

[5] 33 CFR §332.8(d)(6)(ii)(A) (2008)
[6] *ibid.*

Table 1. 12-digit HUC Watersheds within the Service Area

Watershed	12-digit HUC	Watershed	12-digit HUC
Knik Arm-Frontal Cook Inlet	190204010808	Stephan Lake-Goose Creek	190204010805
Little Indian Creek	190203022001	Threemile Creek-Fish Creek	190204010504
Lower Eagle River	190204010306	Turnagain Arm	190203020705
Lower Knik River-Frontal Knik	190204021209	Twin Island Lake	190204010807
Lower Resurrection Creek	190203020504	Upper Twentymile River	190203020201
Lower Twentymile River	190203020205	Walker Creek-Sixmile Creek	190203020408
Middle Twentymile River	190203020202	Wasilla Creek	190204010802
Miller Creek-Frontal Cook Inlet	190203021903	Wolverine Creek-Ingram Creek	190203020703
North Fork Campbell Creek	190204010603		

Source: U.S. Geological Survey. 2017. Watershed Boundary Dataset. National Geospatial Technical Operations Center. Accessed at http://nhd.usgs.gov/wbd.html on April 12, 2017.

4.0 Needs of the Watershed

A key component of the watershed approach is identification of watershed needs, which are the specific ecological functions or ecosystems services that have been identified as necessary for improvement or sustainability of a watershed. Since there is no existing watershed plan for the Upper Cook Inlet Basin, existing federal, state, local, and regional plans containing goals for the restoration and protection of aquatic resources were identified and evaluated. Table 2 shows a list of plans that include a portion of the Upper Cook Inlet Basin watershed and summarizes relevant information describing the watershed needs within their administrative boundaries.

Generally, all management and planning documents reviewed acknowledge that development within existing communities and along major transportation corridors is one of the primary sources of impacts to aquatic resource functions across the Upper Cook Inlet Basin. Aquatic resources within communities and in areas accessible by highways and rail lines are at risk for conversion, degradation, and fragmentation as residential, industrial, and commercial developments expand. The MOA is the largest population center and urban area in Alaska. More than half of the historical wetland area to date within the Anchorage Bowl has been lost due to development.[7] Data compiled by USACE indicates that more than 2,200 acres of wetlands within the MOA were permitted for fill between 1976 and 2004.[8] The MSB and KPB are the third and fourth most populous boroughs in Alaska. Road construction, industrial development, and residential development are the primary drivers of wetland loss in the KPB[9] and the MSB.[10] Continued growth in these communities will lead to continued loss and degradation of aquatic resources with the watershed.

Since the Upper Cook Inlet Basin contains the majority of Alaska's population, it is understandable that the watershed is divided by numerous administrative boundaries. The vast majority of the

[7] Municipality of Anchorage (MOA), Planning Division, Community Development Department. July 2014. *Anchorage Wetland Management Plan*.
[8] *ibid.*
[9] Hall, J.V., and S.E. Kratzer. 2001. *Status and Trends of Wetlands in the Lower Kenai River Area, Alaska.*
[10] Hall, J.V. 2001. *Status and trends of wetlands in the Palmer/Wasilla area, Alaska (1978 to 1996)*. U.S. Fish and Wildlife Service, Ecological Services Office, Anchorage, AK.

management and planning documents covering this area focus on the importance of protecting and restoring anadromous stream habitats, riparian habitats, and intertidal estuaries. Although some of the planning documents listed are no longer in effect, their assessments of existing impacts and future threats to aquatic resources are still applicable.

Table 2. Watershed Needs by Planning Document

Region	Planning Document	Watershed Needs Identified
Alaska	Alaska Coastal Program 2012-2016 Strategic Plan: Statewide[11]	One of the primary goals of the strategic plan is to conserve coastal habitat.
	Alaska Partners for Fish and Wildlife Program 2012-2016 Strategic Plan[12]	This plan identifies and directs habitat improvement and conservation opportunities on private land. Anadromous fish streams, riparian habitats, and wetlands are identified as high priority for restoration and protection within the MOA, MSB, and KPB. Continued habitat loss and fragmentation are identified as significant challenges to protection of aquatic resources. A primary strategy listed to combat habitat loss is restoration of riparian habitats.
Kenai Peninsula Borough	Alaska Coastal Program 2012-2016 Strategic Plan: Kenai Peninsula[13]	High-priority habitats targeted for restoration and protection in this focus area include waters that support anadromous fish.
	Alaska Partners for Fish and Wildlife Program 2012-2016 Strategic Plan: Kenai Peninsula[14]	High-priority habitats targeted for restoration and protection in this focus area include anadromous waters, riparian zones, and wetlands.
	Kenai Peninsula Fish Habitat Partnership Strategic Plan [15]	Goals include (1) fish and other aquatic organisms have unrestricted access to at least 99 percent of available habitat within each of the 14 major watersheds covered, and (2) no fish populations or species with critical ties to fish within the Plan focus are listed under the ESA. Targets for marine conservation within the KPB include salt marsh and estuarine systems.
	Kenai Watershed Forum The Way Forward: Action Plan for 2012-2020[16]	One of the main goals is to protect, restore, and repair conditions for the long-term health of the Kenai River watershed. This includes strategies to (1) maintain and protect intact habitats for both terrestrial habitats where landscape-scale connections are necessary to support native fauna, (2) restore and reconnect both aquatic and terrestrial fragmented habitat, (3) continue to support efforts to eradicate or minimize the effects of invasive species, and (4) identify important watershed areas that have been damaged, and restore habitat to its natural potential.

[11] U.S. Fish and Wildlife Service (USFWS), Conservation Partnerships Program. May 2012. *Alaska Coastal Program Strategic Plan, 2012-2016*.
[12] USFWS, Conservation Partnerships Program. June 2012. *Alaska Partners for Fish and Wildlife Program Strategic Plan, 2012-2016*.
[13] USFWS, Conservation Partnerships Program. May 2012. *Alaska Coastal Program Strategic Plan, 2012-2016*.
[14] USFWS, Conservation Partnerships Program. June 2012. *Alaska Partners for Fish and Wildlife Program Strategic Plan, 2012-2016*.
[15] Kenai Peninsula Fish Habitat Partnership. March 2014. *Strategic Plan*.
[16] Kenai Watershed Forum. 2016. *The Way Forward: Action Plan for 2016-2020*.

Table 2. Watershed Needs by Planning Document

Region	Planning Document	Watershed Needs Identified
Kenai Peninsula Borough / Municipality of Anchorage	Chugach National Forest Assessment of Ecological and Socio-Economic Conditions and Trends[17]	This National Forest Assessment used the USFS Watershed Condition Classification Technical Guide to evaluate aquatic ecosystems within 275 12-digit HUC watersheds. Eleven of the 12-digit HUCs evaluated are within service area. Of the 11 watersheds within the service area, two watersheds were rated fair, functioning at risk for water quality, and two watersheds were rated fair, functioning at risk for water quantity. For watersheds with wetland and riparian impacts, two watersheds were rated fair, functioning at risk, and one watershed was rated poor, functionally impaired. Water quality impacts are associated primarily with the Seward Highway, ARRC's railroad embankment, and placer mining. Water quantity impacts are associated with Portage Glacier Road diverting surface water flow. Wetland and riparian impacts were associated primarily with the highway, the railroad, and gravel extraction, as well as impacts from the spruce bark beetle.
	Upper Turnagain Landscape Assessment[18]	Existing major highway and railroad corridors, private land development, and recreational facilities within Chugach National Forest are identified as major sources of existing wildlife habitat alteration.
Municipality of Anchorage	Alaska Coastal Program 2012-2016 Strategic Plan: Anchorage Bowl[19]	High-priority habitats to be targeted for restoration and protection efforts include anadromous waters, wetlands, riparian habitats, and increasingly tenuous aquatic and terrestrial wildlife corridors. Coastal wetlands in this area provide outstanding resting, feeding, and breeding habitat for migratory birds.
	Alaska Partners for Fish and Wildlife Program 2012-2016 Strategic Plan: Anchorage Bowl[20]	High-priority habitats to be targeted for restoration and protection efforts include anadromous fish streams, wetlands, riparian habitats, and increasingly tenuous aquatic and terrestrial wildlife reserves corridors.
	Anchorage Wetland Management Plan (AWMP)[21]	The primary goal of the AWMP is to protect the ecological and hydrological functions served by coastal marshes, freshwater marshes, and wetlands.
	Anchorage Coastal Management Plan[22]	Identified shoreline modifications, stream channel alterations, removal of shoreline vegetation, improper placement of drainage structures, increase in impervious surface, and loss of aquatic habitats activities of specific concern that adversely impact streams, lakes and wetlands, which can directly and secondarily impact water quality and fish and wildlife habitat.

[17] U.S. Department of Agriculture. November 2014. *Assessment of Ecological and Socio-Economic Conditions and Trends; Chugach National Forest, Alaska*. U.S. Forest Service, Alaska Region. R10-MB-787.
[18] U.S. Forest Service. 2004. *Upper Turnagain Landscape Assessment*.
[19] USFWS, Conservation Partnerships Program. May 2012. *Alaska Coastal Program Strategic Plan, 2012-2016*.
[20] USFWS, Conservation Partnerships Program. June 2012. *Alaska Partners for Fish and Wildlife Program Strategic Plan, 2012-2016*.
[21] MOA, Planning Division, Community Development Department. July 2014. *Anchorage Wetland Management Plan*.
[22] MOA, Planning Department. July 2007. *Anchorage Coastal Management Plan*. Prepared by Bristol Environmental & Engineering Services Corporation and LaRoche Associates, Anchorage, AK.

Table 2. Watershed Needs by Planning Document

Region	Planning Document	Watershed Needs Identified
Matanuska-Susitna Borough	Alaska Coastal Program 2012-2016 Strategic Plan: Mat-Su Valley[23]	High-priority habitats to be targeted for restoration and protection in this focus area include anadromous streams, riparian zones, and wetlands.
	Alaska Partners for Fish and Wildlife Program 2012-2016 Strategic Plan: Mat-Su Valley[24]	High-priority habitats to be targeted for restoration and protection efforts include anadromous waters, wetlands, riparian habitats, and wildlife reserves and corridors in both wetland and upland habitats.
	Conserving Salmon Habitat in the Mat-Su Basin: The Strategic Action Plan[25]	The Strategic Action Plan identified eight primary issues impacting Mat-Su Basin Salmon, including (1) alteration of riparian areas, (2) filling of wetlands, (3) impervious surfaces and stormwater runoff, (4) septic systems, (5) culverts that block fish passage, (6) loss or alteration of water flow or volume, (7) loss of estuaries and nearshore habitats, and (8) increased predation from Northern Pike.
	Status and trends of wetlands in the Palmer/Wasilla Area Alaska (1978 to 1996)[26]	Residential development was identified as the single biggest threat to wetlands. As development increases, wetlands can be expected to deteriorate due to increased runoff from commercial and residential developments, increased sedimentation, fragmentation of wetland systems, and modification to natural hydrologic regimes.
	MSB Wetlands Management Plan[27]	Two goals of the Management Plan are to (1) identify, conserve, and protect wetlands that are important for water quality; fish and wildlife habitats; flood control; stormwater retention; and recreational opportunities to the benefit of the MSB's economy, lifestyle, and environment; and (2) prioritize and implement protection and restoration of wetlands.
Cook Inlet	Recovery Plan for the Cook Inlet beluga whale (*Delphinapterus leucas*)[28]	Seven threats of high and medium concern were identified to the recovery of the Cook Inlet DPS of beluga whales. Three of these seven threats are (1) habitat loss or degradation, (2) reduction of prey, and (3) cumulative effects of multiple stressors.
Cook Inlet Basin	Cook Inlet Basin Ecoregional Assessment[29]	Strategies needed to address the most pressing threats to the Cook Inlet Basin ecoregion include (1) acquisition of conservation easements over priority tracts and (2) protection of natural hydrologic regimes at priority aquatic areas.

[23] USFWS, Conservation Partnerships Program. May 2012. *Alaska Coastal Program Strategic Plan, 2012-2016*.
[24] USFWS, Conservation Partnerships Program. June 2012. *Alaska Partners for Fish and Wildlife Program Strategic Plan, 2012-2016*.
[25] Mat-Su Basin Salmon Habitat Partnership (MSBSHP). 2008. *Conserving Salmon Habitat in the Mat-Su Basin; The Strategic Action Plan of the Mat-Su Basin Salmon Habitat Partnership*.
[26] Hall, J.V. 2001. *Status and trends of wetlands in the Palmer/Wasilla area, Alaska (1978 to 1996)*. U.S. Fish and Wildlife Service, Ecological Services Office, Anchorage, AK.
[27] HDR Alaska, Inc. March 2012. *Matanuska-Susitna Borough Wetlands Management Plan*.
[28] National Marine Fisheries Service (NMFS). 2016. Recovery Plan for the Cook Inlet Beluga Whale (*Delphinapterus leucas*). National Marine Fisheries Service, Alaska Region, Protected Resources Division, Juneau, AK.
[29] The Nature Conservancy of Alaska. August 2003. *Cook Inlet Basin Ecoregional Assessment*.

Table 2. Watershed Needs by Planning Document

Region	Planning Document	Watershed Needs Identified
	Water Quality Assessment of the Cook Inlet Basin, Alaska[30]	The primary activity impairing the water quality of the Cook Inlet Basin is residential development, which has led to increases in concentrations of suspended sediment, trace elements, fecal coliform bacteria, and dissolved constituents.

The Bank would meet the demonstrated needs of the watershed by:

- Supporting recreational and subsistence salmon fisheries.
- Restoring and protecting important coastal habitats and bird habitats.
- Supporting the Cook Inlet DPS of beluga whales.
- Restoring 2.119 acres of freshwater wetlands that have been filled by development.

The Bank will address the needs of the watershed by restoring areas that have been impacted by one of the primary causes of impacts to aquatic resource functions across the service area, wetland fill. The restoration project represents an opportunity to restore functions to wetlands on a large parcel of land within Alaska's most degraded watershed. The Bank will also restore aquatic resource functions in wetlands in the lower watershed near the intertidal zone. These resources are among the most at-risk for impacts across the service area.

Restoration and preservation of the resources in the Bank will also provide support to the endangered Cook Inlet DPS of beluga whales. The resources within the Bank are directly connected to critical habitat for the Cook Inlet belugas in Turnagain Arm (Figure 2). Restoration of wetlands and preservation of wetlands, waterbodies, and streams in the Bank will protect many functions that support the downstream beluga habitat, including anadromous fish support, water quality enhancement, hydrologic regulation, and nutrient export functions. Flow from anadromous fish streams and water free of toxins have been identified by the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA/NMFS) as primary constituent elements essential to the conservation of the Cook Inlet DPS of beluga whales.[31]

While there is no existing watershed plan for Upper Cook Inlet, USFS has assessed watershed conditions for the Chugach National Forest, which covers a portion of the service area adjacent to the head of Turnagain Arm. The USFS performed its assessment on all 12-digit HUC watersheds within the Chugach National Forest system. It assessed watershed conditions using the Watershed Condition Framework and the Forest Service Watershed Condition Classification Technical Guide.[32] Of the 275 12-digit HUC watersheds assessed, 11 are within the service area of the Bank (Figure 3). These watersheds were given ratings based on their (1) riparian areas and wetland conditions, (2) water quality impairments, and (3) deviations from their natural hydrographs. While most of the watersheds were rated as functioning properly (Class 1), some

[30] Brabets, T.P., G.L. Nelson, J.M. Dorava, and A.M. Milner. 1999. *Water-Quality Assessment of the Cook Inlet Basin, Alaska – Environmental Setting*. U.S. Geological Survey, Water Resources Investigations Report 99-4025. National Water-Quality Assessment Program.
[31] 50 CFR §226.220 (2011)
[32] U.S. Department of Agriculture. November 2014. *Assessment of Ecological and Socio-Economic Conditions and Trends; Chugach National Forest, Alaska*. U.S. Forest Service, Alaska Region. R10-MB-787.

were rated as either functioning at risk (Class 2) or as functionally impaired (Class 3). The 12-digit HUC watersheds within the service area that did not receive a Class 1 rating, and a descriptions of the reasons are presented in Table 3 and shown in Figure 3.

Table 3. Chugach National Forest Watershed Condition Assessment

HUC	Watershed Name	Rating	Comments
Riparian/Wetland Vegetation Condition			
190203020304	Portage Creek	**Class 2** (fair, functioning at risk) • Native vegetation demonstrates a moderate loss of vigor, reproduction, and growth, especially in areas most susceptible to human impact. • Areas displaying light to moderate impact to structure, composition, and cover may occupy 25 to 80 percent of the overall riparian area with only a few areas displaying significant impacts.	Much of Portage Creek riparian corridor impacted by highway, railroad, and gravel extraction.
190203020408	Walker Creek-Sixmile Creek		Spruce in riparian floodplain impacted by spruce bark beetle, numerous dead trees.
190203020504	Lower Resurrection Creek	**Class 3** (poor, functionally impaired) • Native vegetation is vigorous, healthy, and diverse in age, structure, cover, and composition on less than 25 percent of the riparian/wetland areas in the watershed.	Three miles of Resurrection Creek riparian corridor severely impacted by past and present placer mining, 1 mile of 2005-2006 Phase I restored area has not yet reached maturity. Spruce in remaining riparian floodplain impacted by spruce bark beetle, numerous dead trees.
Water-Quality Impairments			
190203020304	Portage Creek	**Class 2** (fair, functioning at risk) • The watershed has moderate water quality problems. • For example, minor contamination from active or abandoned mines; localized incidence of accelerated sediment, nutrients, chemicals, or infrequent, documented incidents of contamination of public drinking water sources.	Portage Creek susceptible to highway and railroad pollutants; bank erosion, gravel extraction activities; sewage lagoon.
190203020504	Lower Resurrection Creek		Sediment from bank erosion and settling ponds in large scale placer mines, hydrocarbons from existing large-scale mining operations, sediment from bank erosion in recreational mining areas, potential mercury from historic placer mining operations.
Deviations from Natural Hydrograph			
190203020304	Portage Creek	**Class 2** (fair, functioning at risk) • The watershed contains diversion facilities that are operated to partially mimic natural hydrographs.	Explorer Creek diverted into Placer River Watershed by Portage Glacier Road. Flow alteration caused by gravel extraction ponds.
190203020305	Skookum Creek-Placer River		Explorer Creek diverted into Placer River Watershed by Portage Glacier Road. Railroad diverts some drainages and causes artificial concentration of flows along tracks.

5.0 Watershed Considerations

The watershed approach to selecting a service area also considers the importance of landscape position and resource type, the habitat requirements of important species, habitat loss and conversion trends, sources of watershed impairment, and current development trends, as well as the requirements of other regulatory and non-regulatory programs that affect the watershed.[33] Based on the identified needs of the Upper Cook Inlet Basin watershed, the service area was delimited using these considerations to identify areas where the mitigation projects within the Bank will effectively compensate for adverse environmental impacts. The service area contains aquatic resources that perform important functions similar to those within the Bank. The service area also contains resources that have been previously impacted and are likely to continue to be impacted by developments similar to those within the Bank.

The Bank will restore and preserve aquatic resources and their functions in the lower watershed at the interface of the freshwater, riverine, and estuarine systems. The service area has been established to offset impacts to similarly functioning aquatic resources in the lower portions of watersheds adjacent to Turnagain Arm, Knik Arm, and Upper Cook Inlet. Aquatic resources similar to those within the Bank are found across the service area, such as:

- Palustrine wetlands and waterbodies, and streams in the lower portion of the watershed
- Palustrine wetlands that have been converted to uplands by the placement of fill
- Wetlands that directly and indirectly support anadromous fish habitat
- Wetlands that directly and indirectly support the Cook Inlet DPS of beluga whales

A key similarity is that the aquatic resources across the service area directly or indirectly support downstream Cook Inlet DPS beluga whale critical habitat (Figure 2). The service area includes 12-digit HUCs that are adjacent to the coastal areas of Upper Cook Inlet. Aquatic resources adjacent to and upstream from Cook Inlet perform functions that support the Cook Inlet DPS of beluga whales and their critical habitat, including anadromous fish support, water quality enhancement, hydrologic regulation, and nutrient export functions.

Upper Cook Inlet, including Turnagain Arm and Knik Arm, is a hypertidal environment that experiences the second highest tidal range in North America. These areas are dynamic, with distinct sedimentation and flow velocity patterns, and are characterized by vast extents of mudflats. Mudflats are an important habitat feature for the Cook Inlet DPS of beluga whales, providing prey accumulations, calving habitat, and shelter from predators.[34]

The Bank will also restore functions to aquatic resources that have been impacted by placement of gravel fill. Aquatic resources across the entire service area have experienced similar impacts, and these impacts are among the most common sources of watershed impairment across the service area (Table 2).

[33] 33 CFR §332.2 (c)(2)(i) (2008)

[34] Goetz, K.T., D.J. Rugh, A.J. Read, and R.C. Hobbs. 2007. Habitat use in a marine ecosystem: beluga whales *Delphinapterus leucas* in Cook Inlet, Alaska. Marine Ecology Progress Series 330:247-256.

By removing gravel fill, the Bank will restore palustrine wetland functions to those areas previously converted to upland (e.g., fill), and will restore hydrologic connectivity within the larger wetland complex. Conversion of palustrine wetlands to upland fill has occurred throughout the service area, and has been identified in many planning and management documents as a major source of watershed impairment (Table 2). Palustrine habitats across the service area are likely to be impacted by construction or expansion of fill pads for commercial and residential developments.

The service area is within three distinct administrative boundaries: the MOA, the KPB, and the MSB. Each of these areas borders Upper Cook Inlet and has its own planning documents, history of wetland loss, and resource restoration and protection goals. The service area is also within three 8-digit HUCs: Upper Kenai Peninsula (HUC19020302), Anchorage (HUC19020401), and Matanuska (HUC19020402). For discussion of watershed considerations, the service area was divided into the following six groups, which account for their administrative boundaries and watersheds:

- KPB – Upper Kenai Peninsula Watershed (HUC 19020302), Upper Cook Inlet
- KPB – Upper Kenai Peninsula Watershed (HUC 19020302), Turnagain Arm
- MOA – Upper Kenai Peninsula Watershed (HUC 19020302), Turnagain Arm
- MOA – Anchorage Watershed (HUC 19020401), Turnagain Arm and Knik Arm
- MSB – Anchorage Watershed (HUC 19020401), Knik Arm
- MSB – Matanuska Watershed (HUC 19020402), Knik Arm

These service area groups are shown in Figure 4. The watershed considerations for the Bank and each of the service area groups are described in Table 4.

Table 4. Watershed Considerations

Service Area Group	12-digit HUC Watershed(s)	Landscape Position	Aquatic Resource Types	Habitat Requirements of Important Species	Habitat Loss and Conversion Trends	Sources of Watershed Impairments	Current Development Trends	Requirement of Other Regulatory and Non-Regulatory Programs
Portage Reserve Mitigation Bank (within MOA – Upper Kenai Peninsula Watershed, Turnagain Arm) Total area: 241 acres	• Skookum Creek-Placer River	• Lower portion of watershed. • Tidally influenced by Turnagain Arm. • Adjacent to lower Placer River and five streams. • Directly supports Upper Cook Inlet, Turnagain Arm, and Knik Arm.	• Riverine wetlands • Palustrine wetlands • Streams (anadromous and non-anadromous; tidally influenced and non-tidally influenced) • Tidally influenced waters • Ponds (unconsolidated bottoms and aquatic beds) • According to NOAA's ShoreZone Mapping, the coastal habitat adjacent to the Bank is classified as protected estuary and has an Environmental Sensitivity Index (ESI) classification of salt and brackish water marshes.[35]	• Provides coastal wetland habitat that supports migratory birds and downstream aquatic ecosystems. • According to NOAA, the Bank is a spring and fall waterbird concentration area that supports: ○ Dabbling ducks, such as pintail, widgeon, green-winged teal, northern shoveler, and mallard ○ Diving ducks, such as scaups, scoters, canvasback, goldeneyes, bufflehead, oldsquaw, harlequin, and mergansers ○ Geese and swans, including Canada goose, white-fronted goose, snow goose, tundra swans, and trumpeter swans ○ The area also has documented use by Arctic terns.[36] • The Alaska Department of Fish and Game (ADF&G) documents habitat for pink, sockeye, and coho salmon within the Bank, and recommends replacing the four culverts that currently restrict fish passage with structures designed to allow for fish passage. • The habitat within the Bank is "high value rearing habitat."[37]	• Contains impacts from placement of fill for the ARRC rail embankment, ARRC's Portage Reserve Section House, and Chugach Electric's abandoned microwave tower site. • Railroad embankment restricts tidal inundation. • Railroad embankment restricts fish passage.	• Watershed impairments to Upper Cook Inlet watersheds are described by Service Area Group.	• Site of proposed developments including train station, hotel facilities, and commercial/industrial lots.	• All activities involving a stream containing anadromous or resident fish must receive a permit from ADF&G under the Anadromous Fish Act or the Fish Passage Act.

[35] National Oceanic and Atmospheric Administration (NOAA). 2018. Alaska ShoreZone Coastal Mapping and Imagery. Accessed at www.ShoreZone.org.
[36] NOAA. 2002. Cook Inlet and Kenai Peninsula, Alaska. Environmentally Sensitive Areas. Accessed at: https://response.restoration.noaa.gov/maps-and-spatial-data/download-esi-maps-and-gis-data.html#Alaska.
[37] Alaska Department of Fish and Game (ADF&G). 2016. Trip Report.

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Kenai Peninsula Borough – Upper Kenai Peninsula Watershed (HUC 19020302)
 	
Upper Cook Inlet
 	
Total area:
207,155 acres
	• Bishop Creek
	• Echo Lake-Frontal Cook Inlet
	• Gull Lake
	• Island Lake-Frontal Cook Inlet
	• Miller Creek-Frontal Cook Inlet
	• Otter Creek
	• Salamatof Creek-Frontal Cook Inlet
	• Seven Egg Creek
		• Includes frontal watershed directly adjacent to Upper Cook Inlet (lower portion of watershed).
		• Portions inundated by Upper Cook Inlet.
		• Contains short anadromous streams and their confluence with Upper Cook Inlet.
		• Directly supports Upper Cook Inlet, Turnagain Arm, and Knik Arm.
			• Riverine wetlands
			• Palustrine wetlands
			• Estuarine wetlands
			• Streams (anadromous and non-anadromous; tidally influenced and non-tidally influenced)
			• Tidally influenced waters
			• Ponds and lakes (unconsolidated bottoms and aquatic beds)
			• According to National Wetlands Index (NWI) mapping, approximately 45 percent of the area is wetlands or other waters of the U.S.[38]
			• According to NOAA's ShoreZone Mapping, there are 2 miles of protected estuary, of which 0.4 mile has an ESI classification of salt and brackish water marshes along the coast in this area. [39]
				• Nearshore areas have been deemed critical habitat of the Cook Inlet DPS of beluga whales. These areas are where whales feed in fall and winter and are less concentrated in spring and summer.[40]
				• The Cook Inlet Beluga Whale recovery plan lists seven high and medium potential threats to the recovery of the Cook Inlet DPS of beluga whales. Three of these seven are (1) habitat loss or degradation, (2) reduction of prey, and (3) cumulative effects of multiple stressors.[41]
				• The U.S. Fish and Wildlife Service's (USFWS') Alaska Coastal Program lists important species for the Kenai Peninsula as Kenai brown bear, five species of Pacific salmon, anadromous trout and char, marine mammals, and a diversity of migratory birds.[42]
				• According to NOAA, this area contains waterfowl concentration areas.[43]
					• The USFWS Alaska Coastal Program states that development within the lower watersheds of the Kenai Peninsula is occurring rapidly with new roads crossing waters and subdivisions encroaching on important wetland habitats.[44]
					• The primary drivers of wetland loss in the KPB are road construction, industrial development, and residential development.[45]
					• Between 2013 and 2016, USACE issued two permits that required compensatory mitigation within this area.[46]
					• According to ADF&G, there are 0 culverts inventoried within this area that are inadequate for fish passage.[47]
						• According to the National Land Cover Dataset (NLCD), in 2011 there were approximately 7,131 acres of impervious surface within this area.[48]
						• The Alaska Department of Environmental Conservation (ADEC) lists 37 open contaminated sites within this area.[49]
							• According to NLCD, 1,062 acres transitioned from undeveloped to developed between 2001 and 2011.[50]
							• Upcoming projects in this area that have been identified include:
							  ○ Alaska Liquefied Natural Gas, includes industrial and port facilities on Upper Cook Inlet and pipeline through upper Cook Inlet
							  ○ ARRC Bridge 56 replacement
								• Any activity requiring federal authorization in intertidal or subtidal habitats within Upper Cook Inlet must consult with NMFS under the ESA to ensure the activity does not jeopardize the continued existence of the Cook Inlet DPS of beluga whales.
								• All activities involving a stream containing anadromous or resident fish must receive a permit from ADF&G under the Anadromous Fish Act or the Fish Passage Act.
								• Approximately 92 percent of this area is Kenai National Wildlife Refuge.

[38] USFWS. 2018 National Wetland Inventory Mapping. Accessed at https://www.fws.gov/wetlands/Data/Data-Download.html.
[39] NOAA. 2018. Alaska ShoreZone Coastal Mapping and Imagery. Accessed at www.ShoreZone.org.
[40] 50 CFR §226. 76 Federal Register (FR) 20179.
[41] NMFS. 2016. Recovery Plan for the Cook Inlet Beluga Whale (*Delphinapterus leucas*). National Marine Fisheries Service, Alaska Region, Protected Resources Division, Juneau, AK.
[42] USFWS, Conservation Partnerships Program. May 2012. *Alaska Coastal Program Strategic Plan, 2012-2016.*
[43] NOAA. 2002. Cook Inlet and Kenai Peninsula, Alaska. Environmentally Sensitive Areas. Accessed at: https://response.restoration.noaa.gov/maps-and-spatial-data/download-esi-maps-and-gis-data.html#Alaska.
[44] USFWS, Conservation Partnerships Program. May 2012. *Alaska Coastal Program Strategic Plan, 2012-2016.*
[45] Hall, J.V., and S.E. Kratzer. 2001. *Status and Trends of Wetlands in the Lower Kenai River Area, Alaska.*
[46] Freedom of Information Act request for 3 years data of compensatory mitigation projects. File: FOIA_Mitigation_04APR2016.xlsx.
[47] ADF&G. 2009. Fish Passage Inventory Database.
[48] Xian, G., et al. 2011. The change of impervious surface area between 2001 and 2006 in the conterminous United States. Photogrammetric Engineering and Remote Sensing, Vol. 77(8): 758-762.
[49] Alaska Department of Environmental Conservation (ADEC). 2018. Contaminated Sites Program Database. Accessed at http://dec.alaska.gov/spar/csp.aspx.
[50] Xian, G., et al. 2011. The change of impervious surface area between 2001 and 2006 in the conterminous United States. Photogrammetric Engineering and Remote Sensing, Vol. 77(8): 758-762.

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Kenai Peninsula Borough – Upper Kenai Peninsula Watershed (HUC 19020302) **Turnagain Arm** Total area: 308,489 acres	• Bedlam Creek • Big Indian Creek • Burnt Island Creek-Frontal Turnagain Arm • Little Indian Creek • Lower Resurrection Creek • Pincher Creek • Seattle Creek • Skookum Creek-Placer River* • Turnagain Arm* • Walker Creek-Sixmile Creek • Wolverine Creek-Ingram Creek	• Includes watersheds directly adjacent to Turnagain Arm (lower portion of watershed). • Portions inundated by Turnagain Arm. • Contains anadromous streams and their confluence with Turnagain Arm. • Directly supports Upper Cook Inlet, Turnagain Arm, and Knik Arm.	• Riverine wetlands • Palustrine wetlands • Estuarine wetlands • Streams (anadromous and non-anadromous; tidally influenced and non-tidally influenced) • Tidally influenced waters • Ponds and lakes (unconsolidated bottoms and aquatic beds) • According to NWI mapping, approximately 30 percent of the area is wetland or other waters of the U.S.[51] • According to NOAA's ShoreZone Mapping, there are 22 miles of protected estuary that have an ESI classification of salt and brackish water marshes along the coast in this area.[52]	• Intertidal and subtidal areas have been designated critical habitat for the Cook Inlet population of beluga whales. Shallow tidal flats and river mouths or estuarine areas are important foraging and calving habitats. These habitats, along with four species of Pacific salmon (Chinook, sockeye, chum, and coho) and five other fish species, have been identified as primary constituent elements essential to the Cook Inlet DPS of beluga whales' survival.[53] The Cook Inlet Beluga Whale recovery plan lists seven high and medium potential threats to the recovery of the Cook Inlet DPS of beluga whales. Three of these seven are (1) habitat loss or degradation, (2) reduction of prey, and (3) cumulative effects of multiple stressors.[54] • The USFWS' Alaska Coastal Program lists important species for the Kenai Peninsula as Kenai brown bear, five species of Pacific salmon, anadromous trout and char, marine mammals, and a diversity of migratory birds.[55] • According to NOAA, this area contains waterfowl concentration areas.[56]	• Contains impacts from placement of fill for the ARRC rail embankment. • The USFWS' Alaska Coastal Program states that development within the lower watersheds of the Kenai Peninsula is occurring rapidly, with new roads crossing waters and subdivisions encroaching on important wetland habitats.[57] • The primary drivers of wetland loss in the KPB are road construction, industrial development, and residential development.[58] • Between 2013 and 2016, USACE issued 0 permits that required compensatory mitigation within this area.[59] • According to ADF&G, there are two culverts inventoried within this area that are inadequate for fish passage.[60]	• According to USGS' NLCD, in 2011 there were approximately 374 acres of impervious surface within this area.[61] • ADEC lists one open contaminated site within this area.[62]	• According to NLCD, no areas transitioned from undeveloped to developed between 2001 and 2011.[63] • Upcoming projects in this area that have been identified include: o ARRC Bridge 86.6 Replacement	• Any activity requiring federal authorization in intertidal or subtidal habitats within Turnagain Arm must consult with NMFS under the ESA to ensure the activity does not jeopardize the continued existence of the Cook Inlet DPS of beluga whales. • All activities involving a stream containing anadromous or resident fish must receive a permit from ADF&G under the Anadromous Fish Act or the Fish Passage Act. • Approximately, 73 percent of this area is either Chugach State Park or Kenai National Wildlife Refuge.

[51] USFWS. 2018 National Wetland Inventory Mapping. Accessed at https://www.fws.gov/wetlands/Data/Data-Download.html.
[52] NOAA. 2018. Alaska ShoreZone Coastal Mapping and Imagery. Accessed at www.ShoreZone.org.
[53] 50 CFR §226. 76 FR 20179.
[54] NMFS. 2016. Recovery Plan for the Cook Inlet Beluga Whale (*Delphinapterus leucas*). National Marine Fisheries Service, Alaska Region, Protected Resources Division, Juneau, AK.
[55] USFWS, Conservation Partnerships Program. May 2012. *Alaska Coastal Program Strategic Plan, 2012-2016.*
[56] NOAA. 2002. Cook Inlet and Kenai Peninsula, Alaska. Environmentally Sensitive Areas. Accessed at: https://response.restoration.noaa.gov/maps-and-spatial-data/download-esi-maps-and-gis-data.html#Alaska.
[57] USFWS, Conservation Partnerships Program. May 2012. *Alaska Coastal Program Strategic Plan, 2012-2016.*
[58] Hall, J.V., and S.E. Kratzer. 2001. *Status and Trends of Wetlands in the Lower Kenai River Area, Alaska.*
[59] Freedom of Information Act request for 3 years data of compensatory mitigation projects. File: FOIA_Mitigation_04APR2016.xlsx.
[60] ADF&G. 2009. Fish Passage Inventory Database.
[61] Xian, G., et al. 2011. The change of impervious surface area between 2001 and 2006 in the conterminous United States. Photogrammetric Engineering and Remote Sensing, Vol. 77(8): 758-762.
[62] ADEC. 2018. Contaminated Sites Program Database. Accessed at http://dec.alaska.gov/spar/csp.aspx.
[63] Xian, G., et al. 2011. The change of impervious surface area between 2001 and 2006 in the conterminous United States. Photogrammetric Engineering and Remote Sensing, Vol. 77(8): 758-762.

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Municipality of Anchorage – Upper Kenai Peninsula Watershed(HUC 19020302) **Turnagain Arm** Total area: 253,991 acres	• Bird Glacier-Bird Creek • Glacier Creek • Indian Creek • Lower Twentymile River • Middle Twentymile River • Penguin Creek • Portage Creek • Skookum Creek-Placer River* • Turnagain Arm* • Upper Twentymile River *Watershed split between 2 service area groups along administrative boundary	• Includes watersheds directly adjacent to Turnagain Arm (lower portion of watershed). • Portions inundated by Turnagain Arm. • Contains anadromous streams and their confluence with Turnagain Arm. • Directly supports Upper Cook Inlet, Turnagain Arm, and Knik Arm.	• Riverine wetlands • Palustrine wetlands • Estuarine wetlands • Streams (anadromous and non-anadromous; tidally influenced and non-tidally influenced) • Tidally influenced waters • Ponds and lakes (unconsolidated bottoms and aquatic beds) • According to NWI mapping, approximately 19 percent of the area is wetlands or other waters of the U.S.[64] • According to NOAA's ShoreZone Mapping, there are 9 miles of protected estuary with an ESI classification of salt and brackish water marshes along the coast in this area. [65]	• The USFWS' Alaska Coastal Program lists as important streams and wetland habitats that support five species of Pacific salmon and a variety of plant and animal species of conservation concern, including Peregrine falcon, olive-sided flycatcher, rusty blackbird, trumpeter swan, and surfbird.[66] • Intertidal and subtidal areas have been designated critical habitat for the Cook Inlet population of beluga whales. Shallow tidal flats and river mouths or estuarine areas are important foraging and calving habitats. These habitats, along with four species of Pacific salmon (Chinook, sockeye, chum, and coho) and five other fish species, have been identified as primary constituent elements essential to the Cook Inlet DPS of beluga whales' survival.[67] • The Cook Inlet Beluga Whale recovery plan lists seven high and medium potential threats to the recovery of the Cook Inlet DPS of beluga whales. Three of these seven are (1) habitat loss or degradation, (2) reduction of prey, and (3) cumulative effects of multiple stressors.[68] • According to NOAA, this area contains waterfowl concentration areas.[69]	• Contains impacts from placement of fill for the ARRC rail embankment. • Over half of wetlands within the Anchorage Bowl have been lost due to development.[70] • Between 2013 and 2016 USACE issued three permits that required compensatory mitigation within this area.[71] • USFWS has documented the cumulative loss of shorebird habitat and other sensitive species, and vegetation studies have showed a general drying trend that has converted bog habitats into scrub-shrub habitats.[72] • According to ADF&G, there are 56 culverts inventoried within this area that are inadequate for fish passage.[73]	• According to NLCD, in 2011 there were approximately 1,256 acres of impervious surface within this area.[74] • Residential developments have led to increases in concentration of suspended sediment, trace elements, fecal coliform bacteria, and dissolved constituents in some streams.[75] • The *Anchorage Wetland Management Plan* (AWMP) states that construction of residential, industrial, and commercial establishments as well as transportation corridors directly impacts wetlands and waterbodies with potential to modify natural movements of water, damage or destroy fish and wildlife habitat, adversely affect biological productivity, reduce flood storage capacity, or alter nutrient exchange characteristics.[76] • ADEC lists two open contaminated sites within this area.[77]	• According to NLCD, 21 acres transitioned from undeveloped to developed between 2001 and 2011.[78] • Upcoming projects in this area that have been identified include: ○ Seward Highway MP 75-90 Ingram Creek to Girdwood Road Rehabilitation ○ Crow Creek Road MP 4.3 to 4.95 ○ Seward Highway MP 105-115 Passing Lanes Indian to Potter ○ Seward Highway MP 99-105 Bird and Indian Improvements ○ Seward Highway MP 77 to 81 Placer River to Twentymile River Improvements ○ ARRC Bridge 58.7 Replacement ○ ARRC Bridge 64.7 Replacement ○ Brookman siding extension ○ Rainbow siding extension ○ ARRC Bridge 86.6 Replacement	• Any activity requiring federal authorization in intertidal or subtidal habitats within Turnagain Arm must consult with NMFS under the ESA to ensure the activity does not jeopardize the continued existence of the Cook Inlet DPS of beluga whales. • Streams and floodplains within the MOA are protected by the Municipal Code. Most activities are prohibited within 25 feet of any stream or watercourse within the MOA. • All discharges into waterways or wetlands within the MOA require compliance with MOA's Alaska Pollutant Discharge Elimination System (APDES) Permit. • All activities involving a stream containing anadromous or resident fish must receive a permit from ADF&G under the Anadromous Fish Act or the Fish Passage Act. • Approximately 88 percent of this area is either Chugach State Park or Chugach National Forest.

[64] USFWS. 2018 National Wetland Inventory Mapping. Accessed at https://www.fws.gov/wetlands/Data/Data-Download.html.
[65] NOAA. 2018. Alaska ShoreZone Coastal Mapping and Imagery. Accessed at www.ShoreZone.org.
[66] USFWS, Conservation Partnerships Program. May 2012. *Alaska Coastal Program Strategic Plan, 2012-2016.*
[67] 50 CFR §226. 76 FR 20179.
[68] NMFS. 2016. Recovery Plan for the Cook Inlet Beluga Whale (*Delphinapterus leucas*). National Marine Fisheries Service, Alaska Region, Protected Resources Division, Juneau, AK.
[69] NOAA. 2002. Cook Inlet and Kenai Peninsula, Alaska. Environmentally Sensitive Areas. Accessed at: https://response.restoration.noaa.gov/maps-and-spatial-data/download-esi-maps-and-gis-data.html#Alaska.
[70] MOA, Planning Division, Community Development Department. July 2014. *Anchorage Wetland Management Plan.*
[71] Freedom of Information Act request for 3 years data of compensatory mitigation projects. File: FOIA_Mitigation_04APR2016.xlsx.
[72] USFWS. 1993. Anchorage wetlands trends study (1950 to 1990). U.S. Department of Interior, USFWS. Anchorage, AK.
[73] ADF&G. 2009. Fish Passage Inventory Database.
[74] Xian, G., et al. 2011. The change of impervious surface area between 2001 and 2006 in the conterminous United States. Photogrammetric Engineering and Remote Sensing, Vol. 77(8): 758-762.
[75] Brabets, T.P., G.L. Nelson, J.M. Dorava, and A.M. Milner. 1999. Water-Quality Assessment of the Cook Inlet Basin, Alaska – Environmental Setting. U.S. Geological Survey, Water Resources Investigations Report 99-4025. National Water-Quality Assessment Program.
[76] MOA, Planning Division, Community Development Department. July 2014. *Anchorage Wetland Management Plan.*
[77] ADEC. 2018. Contaminated Sites Program Database. Accessed at http://dec.alaska.gov/spar/csp.aspx.
[78] Xian, G., et al. 2011. The change of impervious surface area between 2001 and 2006 in the conterminous United States. Photogrammetric Engineering and Remote Sensing, Vol. 77(8): 758-762.

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Municipality of Anchorage – Anchorage Watershed (HUC19020401) **Turnagain Arm and Knik Arm** Total area: 317,849 acres	• Chester Creek • Fire Creek • Furrow Creek-Frontal Turnagain Arm • Knik Arm-Frontal Cook Inlet* • Lower Eagle River • North Fork Campbell Creek • Outlet Eklutna River • Outlet Peters Creek • Outlet Ship Creek • Rabbit Creek *Watershed split between 2 service area groups along administrative boundary	• Includes watersheds directly adjacent to Turnagain Arm and Knik Arm (lower portion of watershed). • Portions inundated by Turnagain Arm and Knik Arm. • Contains anadromous streams and their confluence with Turnagain Arm and Knik Arm. • Directly supports Upper Cook Inlet, Turnagain Arm, and Knik Arm.	• Riverine wetlands • Palustrine wetlands • Estuarine wetlands • Streams (anadromous and non-anadromous; tidally influenced and non-tidally influenced) • Tidally influenced waters • Ponds and lakes (unconsolidated bottoms and aquatic beds) • According to NWI mapping, approximately 37 percent of the area is wetlands or other waters of the U.S.[79] • According to NOAA's ShoreZone Mapping there are 27 miles of protected estuary that have an ESI classification of salt and brackish water marshes along the coast in this area. [80]	• Intertidal and subtidal areas have been designated critical habitat for the Cook Inlet population of beluga whales. Shallow tidal flats and river mouths or estuarine areas are important foraging and calving habitats. These habitats, along with four species of Pacific salmon (Chinook, sockeye, chum, and coho) and five other fish species, have been identified as primary constituent elements essential to the Cook Inlet DPS of beluga whales' survival.[81] The Cook Inlet Beluga Whale Recovery Plan lists seven high and medium potential threats to the recovery of the Cook Inlet DPS of beluga whales. Three of these seven are (1) habitat loss or degradation, (2) reduction of prey, and (3) cumulative effects of multiple stressors.[82] • The USFWS' Alaska Coastal Program lists as important habitat stream and wetland habitats that support five species of Pacific salmon and a variety of plant and animal species of conservation concern, including Peregrine falcon, olive-sided flycatcher, rusty blackbird, trumpeter swan, and surfbird.[83] • According to NOAA, this area contains waterfowl concentration areas.[84]	• Contains impacts from placement of fill for the ARRC rail embankment, freight yard, and other facilities. • Over half of wetlands within the Anchorage Bowl have been lost due to development.[85] • Between 2013 and 2016, USACE issued 25 permits that required compensatory mitigation within this area.[86] • USFWS has documented the cumulative loss of shorebird habitat and other sensitive species. Vegetation studies have shown a general drying trend that has converted bog habitats into scrub-shrub habitats.[87] • According to ADF&G, there are 35 culverts inventoried within this area that are inadequate for fish passage.[88]	• According to NLCD, in 2011 there was approximately 49,853 acres of impervious surface within this area.[89] • Residential developments have led to increases in concentration of suspended sediment, trace elements, fecal coliform bacteria, and dissolved constituents in some streams.[90] • The AWMP states that construction of residential, industrial, and commercial establishments as well as transportation corridors directly impact wetlands and waterbodies with potential to modify natural movements of water, damage or destroy fish and wildlife habitat, adversely affect biological productivity, reduce flood storage capacity, or alter nutrient exchange characteristics.[91] • Over half of the wetlands within the Anchorage Bowl have been lost due to development.[92] • Nine streams and four lakes are listed as impaired waterbodies by ADEC. The primary contaminant is fecal coliform bacteria.[93] • ADEC lists 211 open contaminated sites within this area.[94]	• According to NLCD, 4,263 acres transitioned from undeveloped to developed between 2001 and 2011.[95] • Upcoming projects in this area that have been identified include: ○ ARRC MP 133 Realignment ○ Port of Alaska Modernization ○ 23 Alaska Department of Transportation and Public Facilities (DOT&PF) Central Region Road Projects	• Any activity requiring federal authorization in intertidal or subtidal habitats within Turnagain and Knik Arms must consult with NMFS under the ESA to ensure the activity does not jeopardize the continued existence of the Cook Inlet DPS of beluga whales. • Streams and floodplains within the MOA are protected by the Municipal Code. Most activities are prohibited within 25 feet of any stream or watercourse within the MOA. • All discharged into waterways or wetlands within the MOA require compliance with MOA's APDES Permit. • All activities involving a stream containing anadromous or resident fish must receive a permit from ADF&G under the Anadromous Fish Act or the Fish Passage Act. • Approximately 40 percent of this area is in state protected lands, including Palmer Hay Flats State Game Refuge, Chugach State Park, and Anchorage Coastal State Game Refuge.

[79] USFWS. 2018 National Wetland Inventory Mapping. Accessed at https://www.fws.gov/wetlands/Data/Data-Download.html.
[80] NOAA. 2018. Alaska ShoreZone Coastal Mapping and Imagery. Accessed at www.ShoreZone.org.
[81] 50 CFR §226. 76 FR 20179.
[82] NMFS. 2016. Recovery Plan for the Cook Inlet Beluga Whale (*Delphinapterus leucas*). National Marine Fisheries Service, Alaska Region, Protected Resources Division, Juneau, AK.
[83] USFWS, Conservation Partnerships Program. May 2012. *Alaska Coastal Program Strategic Plan, 2012-2016.*
[84] NOAA. 2002. Cook Inlet and Kenai Peninsula, Alaska. Environmentally Sensitive Areas. Accessed at: https://response.restoration.noaa.gov/maps-and-spatial-data/download-esi-maps-and-gis-data.html#Alaska.
[85] MOA, Planning Division, Community Development Department. July 2014. *Anchorage Wetland Management Plan.*
[86] Freedom of Information Act request for 3 years data of compensatory mitigation projects. File: FOIA_Mitigation_04APR2016.xlsx.
[87] USFWS. 1993. Anchorage wetlands trends study (1950 to 1990). U.S. Department of Interior, USFWS. Anchorage, AK.
[88] ADF&G. 2009. Fish Passage Inventory Database.
[89] Xian, G., et al. 2011. The change of impervious surface area between 2001 and 2006 in the conterminous United States. Photogrammetric Engineering and Remote Sensing, Vol. 77(8): 758-762.
[90] Brabets, T.P., G.L. Nelson, J.M. Dorava, and A.M. Milner. 1999. Water-Quality Assessment of the Cook Inlet Basin, Alaska – Environmental Setting. U.S. Geological Survey, Water Resources Investigations Report 99-4025. National Water-Quality Assessment Program.
[91] MOA, Planning Division, Community Development Department. July 2014. *Anchorage Wetland Management Plan.*
[92] *Ibid.*
[93] ADEC. 2010. Alaska's Impaired Waters. Division of Water. Updated September 2010.
[94] ADEC. 2018. Contaminated Sites Program Database. Accessed at http://dec.alaska.gov/spar/csp.aspx.
[95] Xian, G., et al. 2011. The change of impervious surface area between 2001 and 2006 in the conterminous United States. Photogrammetric Engineering and Remote Sensing, Vol. 77(8): 758-762.

Table 4. Watershed Considerations

Service Area Group	12-digit HUC Watershed(s)	Landscape Position	Aquatic Resource Types	Habitat Requirements of Important Species	Habitat Loss and Conversion Trends	Sources of Watershed Impairments	Current Development Trends	Requirement of Other Regulatory and Non-Regulatory Programs
Matanuska Susitna Borough – Anchorage Watershed HUC 19020401) **Knik Arm** Total area: 268,966 acres	• Cottonwood Creek • Knik Arm-Frontal Cook Inlet* • Rabbit Slough-Palmer Slough • Stephan Lake-Goose Creek • Threemile Creek-Fish Creek • Twin Island Lake • Wasilla Creek *Watershed split between 2 service area groups along administrative boundary	• Includes watersheds directly adjacent to Knik Arm (lower portion of watershed). • Portions inundated by Knik Arm. • Contains anadromous streams and their confluence with Knik Arm. • Directly supports Upper Cook Inlet, Turnagain Arm, and Knik Arm.	• Riverine wetlands • Palustrine wetlands • Estuarine wetlands • Streams (anadromous and non-anadromous; tidally influenced and non-tidally influenced) • Tidally influenced waters • Ponds and lakes (unconsolidated bottoms and aquatic beds) • According to NWI mapping, approximately 50 percent of the area is wetlands or other waters of the U.S.[96] • According to NOAA's ShoreZone Mapping, there are 53 miles of protected estuary and 56 miles of salt and brackish water marshes along the coast in this area.[97]	• Intertidal and subtidal areas have been designated critical habitat for the Cook Inlet population of beluga whales. Shallow tidal flats and river mouths or estuarine areas are important foraging and calving habitats. These habitats, along with four species of Pacific salmon (Chinook, sockeye, chum, and coho) and five other fish species, have been identified as primary constituent elements essential to the Cook Inlet DPS of beluga whales' survival.[98] • The Cook Inlet Beluga Whale Recovery Plan lists seven high and medium potential threats to the recovery of the Cook Inlet DPS of beluga whales. Three of these seven are (1) habitat loss or degradation, (2) reduction of prey, and (3) cumulative effects of multiple stressors.[99] • The USFWS Alaska Coastal Program lists important species for the MSB as the five species of Pacific salmon, anadromous rainbow trout and Dolly Varden char, and a diversity of migratory birds.[100] • According to NOAA, this area contains waterbird concentration areas.[101]	• Contains impacts from placement of fill for the ARRC rail embankment. • According to the Mat-Su Basin Salmon Habitat Partnership (MSBSHP), the activities with the highest potential threat to salmon and their habitats are housing and urban areas, as well as roads and railroads.[102] • Between 2013 and 2016, USACE issued 0 permits that required compensatory mitigation within this area.[103] • According to ADF&G, there are 37 culverts inventoried within this area that are inadequate for fish passage.[104]	• According to NLCD, in 2011 there were approximately 19,184 acres of impervious surface within this area.[105] • According to the MSBSHP the main issues impacting fish habitat in the Mat-Su are: 1) alteration of riparian areas, 2) filling of wetlands, 3) impervious surfaces, 4) septic systems, 5) culverts that block fish passage, 6) loss or alteration of water flow or volume, 7) loss of estuaries and nearshore habitats, and 8) increased predation from Northern Pike.[106] • The Matanuska River is listed as an impaired waterbody by ADEC due to landfill debris.[107] • ADEC lists 19 open contaminated sites within this area. [108] • Anchorage performs only primary treatment of wastewater discharged into Cook Inlet.	• According to NLCD, 4,576 acres transitioned from undeveloped to developed between 2001 and 2011.[109] • Upcoming projects in this area that have been identified include: ○ ARRC South Wasilla Realignment	• Any activity requiring federal authorization in intertidal or subtidal habitats within Knik Arm must consult with NMFS under the ESA to ensure the activity does not jeopardize the continued existence of the Cook Inlet DPS of beluga whales. • All activities involving a stream containing anadromous or resident fish must receive a permit from ADF&G under the Anadromous Fish Act or the Fish Passage Act. • Approximately 27 percent of this area is in state protected areas, including Chugach State Park, Knik River Public Use Area, and Palmer Hay Flats State Game Refuge.

[96] USFWS. 2018 National Wetland Inventory Mapping. Accessed at https://www.fws.gov/wetlands/Data/Data-Download.html.
[97] NOAA. 2018. Alaska ShoreZone Coastal Mapping and Imagery. Accessed at www.ShoreZone.org.
[98] 50 CFR §226. 76 FR 20179.
[99] NMFS. 2016. Recovery Plan for the Cook Inlet Beluga Whale (*Delphinapterus leucas*). National Marine Fisheries Service, Alaska Region, Protected Resources Division, Juneau, AK.
[100] USFWS, Conservation Partnerships Program. May 2012. *Alaska Coastal Program Strategic Plan, 2012-2016.*
[101] NOAA. 2002. Cook Inlet and Kenai Peninsula, Alaska. Environmentally Sensitive Areas. Accessed at: https://response.restoration.noaa.gov/maps-and-spatial-data/download-esi-maps-and-gis-data.html#Alaska.
[102] MSBSHP. 2008. Conserving Salmon Habitat in the Mat-Su Basin; The Strategic Action Plan of the Mat-Su Basin Salmon Habitat Partnership.
[103] Freedom of Information Act request for 3 years data of compensatory mitigation projects. File: FOIA_Mitigation_04APR2016.xlsx.
[104] ADF&G. 2009. Fish Passage Inventory Database.
[105] Xian, G., et al. 2011. The change of impervious surface area between 2001 and 2006 in the conterminous United States. Photogrammetric Engineering and Remote Sensing, Vol. 77(8): 758-762.
[106] MSBSHP. 2008. Conserving Salmon Habitat in the Mat-Su Basin; The Strategic Action Plan of the Mat-Su Basin Salmon Habitat Partnership.
[107] ADEC. 2010. Alaska's Impaired Waters. Division of Water. Updated September 2010.
[108] ADEC. 2018. Contaminated Sites Program Database. Accessed at http://dec.alaska.gov/spar/csp.aspx.
[109] Xian, G., et al. 2011. The change of impervious surface area between 2001 and 2006 in the conterminous United States. Photogrammetric Engineering and Remote Sensing, Vol. 77(8): 758-762.

Table 4. Watershed Considerations

Service Area Group	12-digit HUC Watershed(s)	Landscape Position	Aquatic Resource Types	Habitat Requirements of Important Species	Habitat Loss and Conversion Trends	Sources of Watershed Impairments	Current Development Trends	Requirement of Other Regulatory and Non-Regulatory Programs
Matanuska Susitna Borough – Matanuska Watershed (HUC 19020402) **Knik Arm** Total area: 60,199 acres	• Lower Knik River-Frontal Knik Arm • Outlet Matanuska River	• Includes 12-digit HUC watersheds directly adjacent to Knik Arm (lower portion of watershed). • Portions inundated by Knik Arm. • Contains anadromous streams and their confluence with Knik Arm. • Directly supports Upper Cook Inlet, Turnagain Arm, and Knik Arm.	• Riverine wetlands • Palustrine wetlands • Estuarine wetlands • Streams (anadromous and non-anadromous; tidally influenced and non-tidally influenced) • Tidally influenced waters • Ponds and lakes (unconsolidated bottoms and aquatic beds) • According to NWI mapping, approximately 31 percent of the area is wetlands or other waters of the U.S.[110] • According to NOAA's ShoreZone Mapping, all 8.3 miles of coastline in this region are classified as protected estuary.[111]	• Intertidal and subtidal areas have been designated critical habitat for the Cook Inlet population of beluga whales. Shallow tidal flats and river mouths or estuarine areas are important foraging and calving habitats. These habitats, along with four species of Pacific salmon (Chinook, sockeye, chum, and coho) and five other fish species, have been identified as primary constituent elements essential to the Cook Inlet DPS of beluga whales' survival.[112] • The Cook Inlet Beluga Whale Recovery Plan lists seven high and medium potential threats to the recovery of the Cook Inlet DPS of beluga whales. Three of these seven are (1) habitat loss or degradation, (2) reduction of prey, and (3) cumulative effects of multiple stressors.[113] • The USFWS Alaska Coastal Program lists important species for the MSB as the five species of Pacific salmon, anadromous rainbow trout and Dolly Varden char, and a diversity of migratory birds.[114] • According to NOAA, this area contains waterbird concentration areas.[115]	• Contains impacts from placement of fill for the ARRC rail embankment. • According to the MSBSHP, the activities with the highest potential threat to salmon and their habitats are housing and urban areas, as well as roads and railroads.[116] • Between 2013 and 2016, USACE issued 0 permits that required compensatory mitigation within this area.117 • According to ADF&G, there are 10 culverts inventoried within this area that are inadequate for fish passage.[118]	• According to NLCD, in 2011 there were approximately 4,936 acres of impervious surface within this area.[119] • According to the MSBSHP the main issues impacting fish habitat in the Mat-Su are: 1) alteration of riparian areas, 2) filling of wetlands, 3) impervious surfaces, 4) septic systems, 5) culverts that block fish passage, 6) loss or alteration of water flow or volume, 7) loss of estuaries and nearshore habitats, and 8) increased predation from Northern Pike.[120] • The Matanuska River is listed as an impaired waterbody by ADEC due to landfill debris.[121] • ADEC lists 10 open contaminated sites within this area. [122] • Anchorage performs only primary treatment of wastewater discharged into Cook Inlet.	• According to NLCD, 547 acres transitioned from undeveloped to developed between 2001 and 2011.[123] • Upcoming projects in this area that have been identified include: ○ ARRC Bridge 147.5 Replacement	• Any activity requiring federal authorization in intertidal or subtidal habitats within Knik Arm must consult with NMFS under the ESA to ensure the activity does not jeopardize the continued existence of the Cook Inlet DPS of beluga whales. • All activities involving a stream containing anadromous or resident fish must receive a permit from ADF&G under the Anadromous Fish Act or the Fish Passage Act. • Approximately 18 percent of this area is in state protected areas, including Chugach State Park, Knik River Public Use Area, and Palmer Hay Flats State Game Refuge.

[110] USFWS. 2018 National Wetland Inventory Mapping. Accessed at https://www.fws.gov/wetlands/Data/Data-Download.html.
[111] NOAA. 2018. Alaska ShoreZone Coastal Mapping and Imagery. Accessed at www.ShoreZone.org.
[112] 50 CFR §226. 76 FR 20179.
[113] NMFS. 2016. Recovery Plan for the Cook Inlet Beluga Whale (*Delphinapterus leucas*). National Marine Fisheries Service, Alaska Region, Protected Resources Division, Juneau, AK.
[114] USFWS, Conservation Partnerships Program. May 2012. *Alaska Coastal Program Strategic Plan, 2012-2016*.
[115] NOAA. 2002. Cook Inlet and Kenai Peninsula, Alaska. Environmentally Sensitive Areas. Accessed at: https://response.restoration.noaa.gov/maps-and-spatial-data/download-esi-maps-and-gis-data.html#Alaska.
[116] MSBSHP. 2008. Conserving Salmon Habitat in the Mat-Su Basin; The Strategic Action Plan of the Mat-Su Basin Salmon Habitat Partnership.
[117] Freedom of Information Act request for 3 years data of compensatory mitigation projects. File: FOIA_Mitigation_04APR2016.xlsx.
[118] ADF&G. 2009. Fish Passage Inventory Database.
[119] Xian, G., et al. 2011. The change of impervious surface area between 2001 and 2006 in the conterminous United States. Photogrammetric Engineering and Remote Sensing, Vol. 77(8): 758-762.
[120] MSBSHP. 2008. Conserving Salmon Habitat in the Mat-Su Basin; The Strategic Action Plan of the Mat-Su Basin Salmon Habitat Partnership.
[121] ADEC. 2010. Alaska's Impaired Waters. Division of Water. Updated September 2010.
[122] ADEC. 2018. Contaminated Sites Program Database. Accessed at http://dec.alaska.gov/spar/csp.aspx.
[123] Xian, G., et al. 2011. The change of impervious surface area between 2001 and 2006 in the conterminous United States. Photogrammetric Engineering and Remote Sensing, Vol. 77(8): 758-762.

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6.0 Need for the Bank

Future developments within the service area are likely to require compensatory mitigation for unavoidable impacts to waters of the U.S. According to USACE, permit actions between 2013 and 2016 within the Bank's service area required approximately 34.7 credits to be purchased from a mitigation bank or in-lieu fee provider.[124] The USACE-permitted developments were primarily pad construction and expansion from residential and commercial developments.[125] One of the larger projects included improvements to the Seward Highway along Turnagain Arm.[126] Figure 5 shows the location of the USACE-permitted projects between 2013 and 2016 and the amount of credits USACE required to offset the aquatic resource impacts.

Potential future projects within the service area were identified by reviewing the 2016 to 2019 DOT&PF Statewide Transportation Improvement Program (STIP),[127] publicly available information, and planned ARRC projects. The STIP lists projects for which partial or full federal funding is approved and that are expected to take place during the 4-year duration of the STIP. Altogether, approximately 16 potential projects were identified within the service area that would most likely have impacts to aquatic resources with functions similar to those restored by the Bank. These projects and their potential impacts to aquatic resources are listed in **Table 5** and shown on Figure 5.

[124] U.S Army Corps of Engineers response to Alaska Department of Natural Resources Freedom of Information Act request for the 3 years prior data of compensatory mitigation projects. File: FOIA_Mitigation_04APR2016.xlsx.
[125] Example of residential and commercial pad construction permit actions between 2013 and 2016 within the service area: POA-2013-00541, POA-2015-00356, and POA-2012-00876.
[126] POA-2014-00412
[127] DOT&PF. 2018-2021 Statewide Transportation Improvement Program. Amendment 1. Approved August 28, 2018.

Table 5. Potential Future Projects in the Service Area

Potential Future Projects within Service area	Project Description	Types of Wetland Impacts			
		Fill Placement	Culvert or Bridge Placement/ Extension	Direct or Indirect Impacts to Fish Habitat	Direct or Indirect Impacts to Beluga Whale Habitat
DOT&PF 2018-2021 Statewide Transportation Improvement Program Projects					
Seward Highway MP 75-90 Ingram Creek to Girdwood Road and Bridge Rehabilitation	The project includes rehabilitation of the highway including passing lanes, parking facilities, and construction of three replacement bridges at Glacier Creek, Virgin Creek, and Petersen Creek.	X	X	X	X
Seward Highway MP 99-105 Bird and Indian Improvements	Project includes passing lanes and bike/pedestrian trail. Includes replacement of bridge over Indian Creek.	X	X	X	X
Seward Highway MP 105-115 Passing Lanes Indian to Potter	The project includes improvements in the Windy Corner area of the Seward Highway consisting of highway realignment, auxiliary lanes, safety improvements, wildlife viewing turnouts, and railroad relocation as needed.	X	X	X	X
Glenn Highway MP 34-42 Reconstruction – Parks to Old Glenn Highway	Reconstruct to four lanes, pathway, and shoulders. Accommodate turning movements and add traffic, safety, and intersection improvements, as necessary.	X	X	X	
Seward Highway MP 77-81 Placer River to Twenty Mile River	The project consists of highway rehabilitation, including minor realignment and replacement of the following bridges: Placer River Overflow, Placer River Main Cross, Portage Creek, and Twenty Mile River.	X	X	X	X

Table 5. Potential Future Projects in the Service Area

Potential Future Projects within Service area	Project Description	Types of Wetland Impacts			
		Fill Placement	Culvert or Bridge Placement/ Extension	Direct or Indirect Impacts to Fish Habitat	Direct or Indirect Impacts to Beluga Whale Habitat
ARRC Projects					
Bridge 56 Replacement	Replace an aging bridge at a Placer River tributary.	X	X	X	
Bridge 58.7 Replacement	Replace an aging timber trestle bridge.	X	X	X	
Bridge 64.7 Replacement	Replace a bridge at Twenty Mile River.	X	X	X	
Brookman Siding Extension	Extend the Brookman siding along Turnagain Arm.	X			
Rainbow Siding Extension	Extend the 1,055 siding along Turnagain Arm to increase operational efficiency.	X			
Bridge 86.6 Replacement	Replace an aging bridge at Bird Creek.	X	X	X	
MP 133 Re-alignment	Minor re-alignment adjacent to Fire Creek to improve operational efficiency	X	X	X	
Bridge 147.5 Replacement	Convert steel thru-girder bridge into a ballast deck span.	X	X	X	X
South Wasilla Re-alignment	Realign approximately 4 miles of track to enhance safety and improve efficiency. Includes bridge over Wasilla Creek.	X	X	X	
Oil and Gas Development					
Alaska Liquefied Natural Gas Project	The project would construct a liquefaction facility in Nikiski as well as place a pipeline across Upper Cook Inlet.	X		X	X
Port Projects					
Port of Alaska Modernization Project	The project will reconstruct the Port's aging infrastructure within Knik Arm.	X		X	X

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Figures

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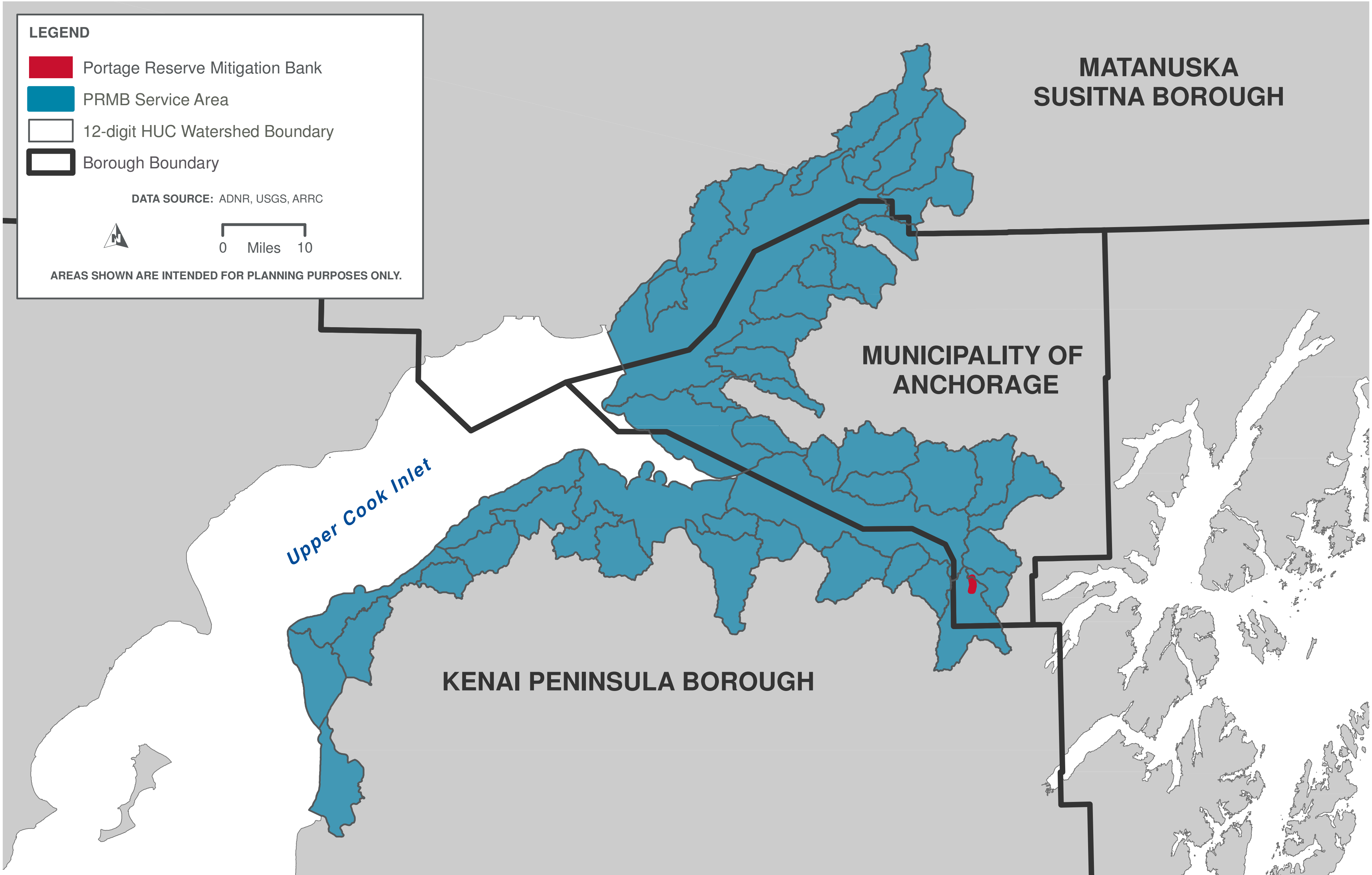


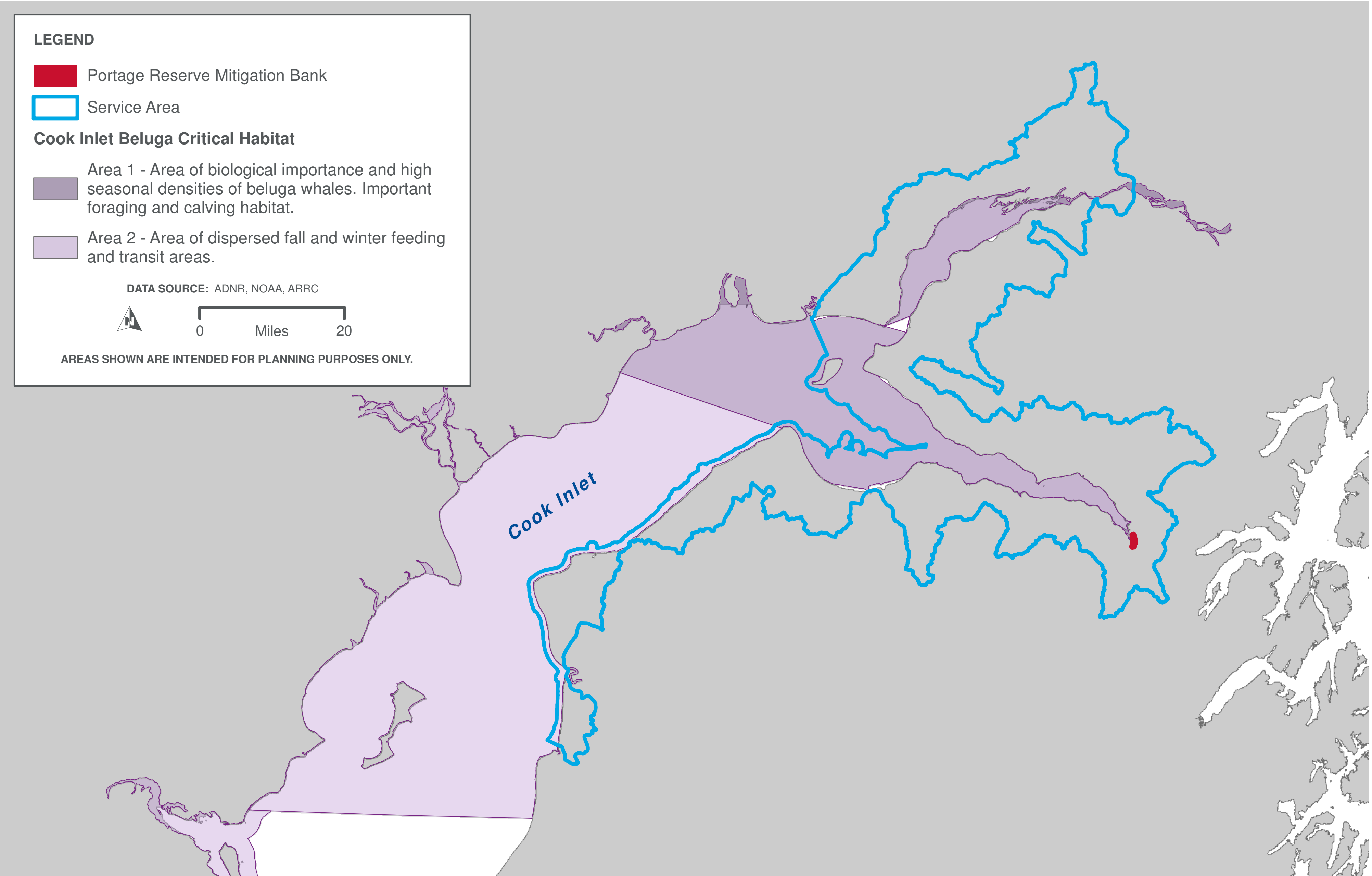
ALASKA RAILROAD

PRMB INSTRUMENT - EXHIBIT A: WATERSHED APPROACH

SERVICE AREA

FIGURE 1

ALASKA RAILROAD CORPORATION

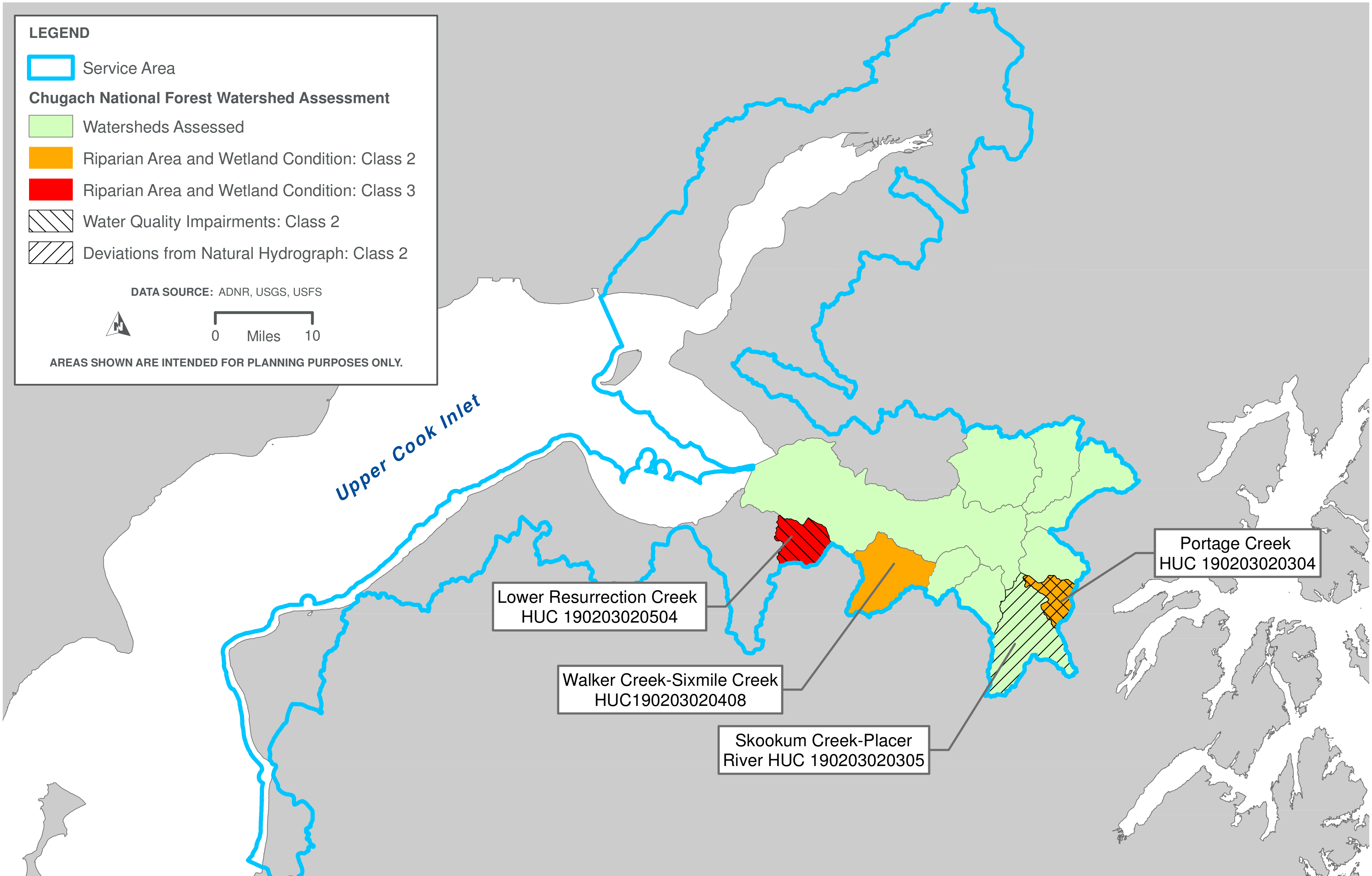


ALASKA RAILROAD

PRMB INSTRUMENT - EXHIBIT A: WATERSHED APPROACH

CRITICAL HABITAT FOR THE ENDANGERED COOK INLET DPS OF BELUGA WHALES

FIGURE 2

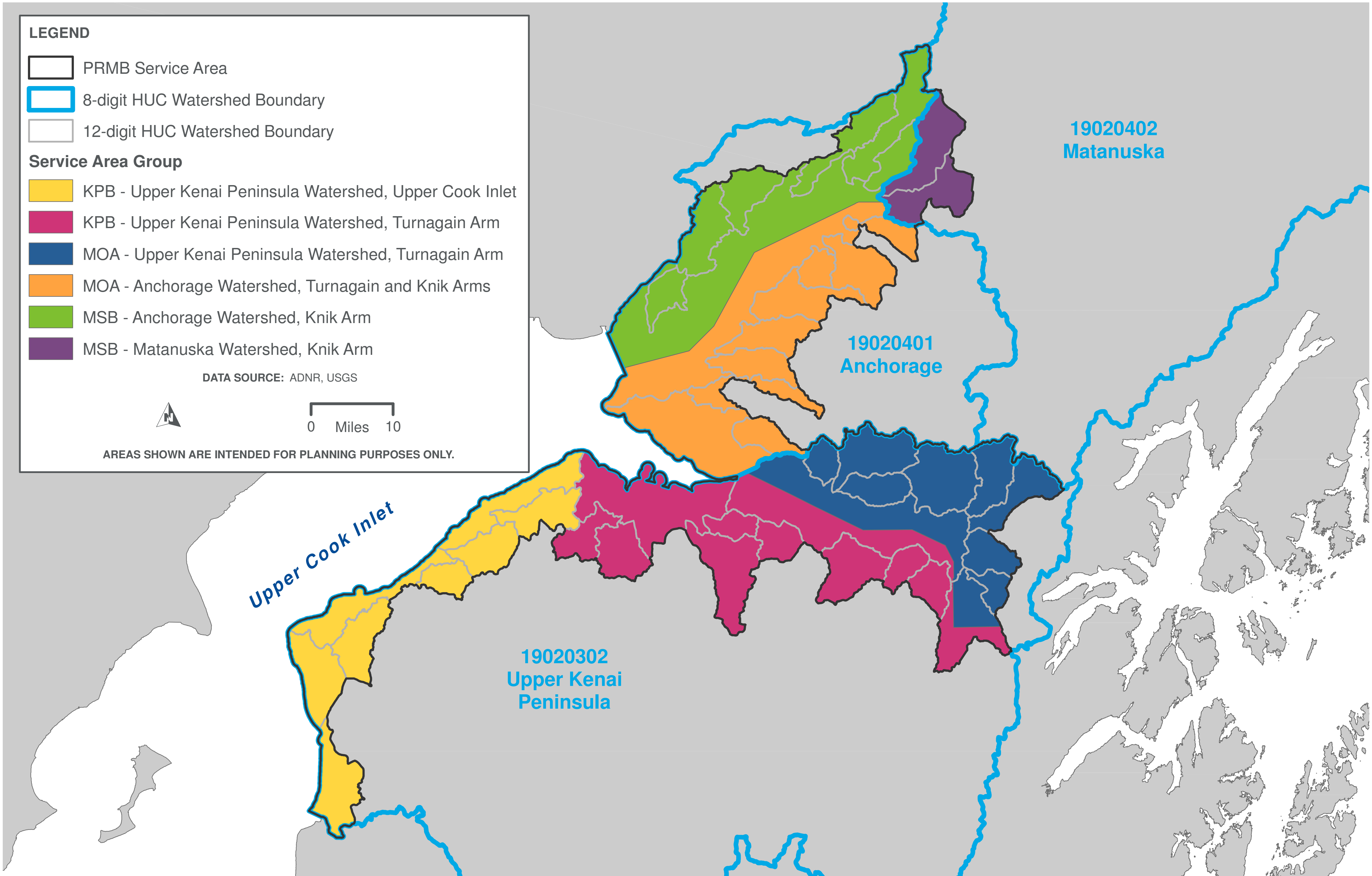


ALASKA RAILROAD

PRMB INSTRUMENT - EXHIBIT A: WATERSHED APPROACH

CHUGACH NATIONAL FOREST WATERSHED ASSESSMENT

FIGURE 3



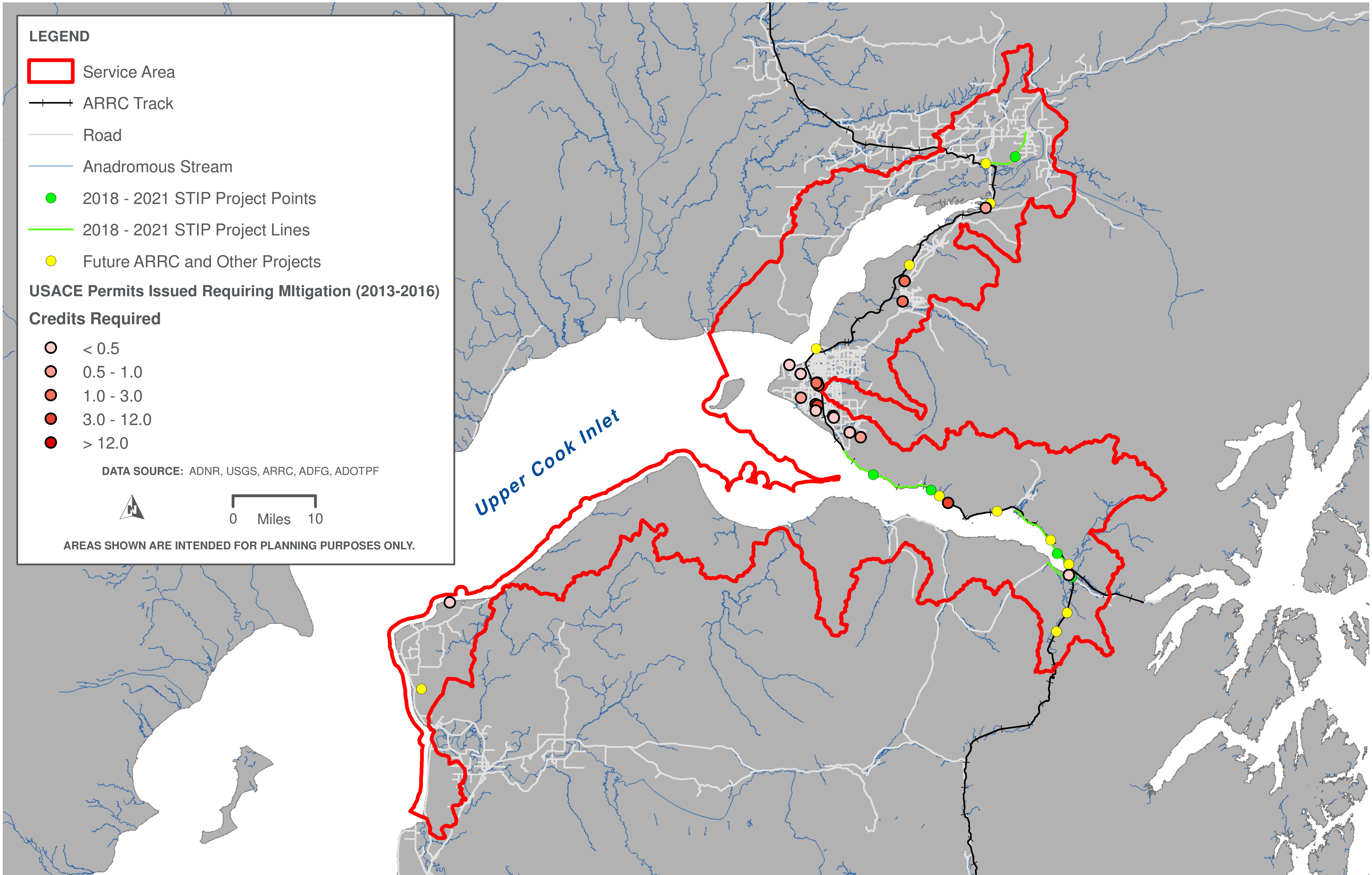
ALASKA RAILROAD

PRMB INSTRUMENT - EXHIBIT A: WATERSHED APPROACH

SERVICE AREA GROUPS

FIGURE 4

ALASKA RAILROAD CORPORATION



ALASKA RAILROAD

PRMB INSTRUMENT - EXHIBIT A: WATERSHED APPROACH

PAST AND FUTURE PROJECTS WITHIN THE PROPOSED SERVICE AREA

FIGURE 5

ALASKA RAILROAD CORPORATION

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EXHIBIT B

MITIGATION PLAN

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Exhibit B Mitigation Plan

Portage Reserve Mitigation Bank Instrument, Exhibit B

Portage, Alaska

Alaska Railroad Corporation

Prepared by HDR Alaska, Inc.

May 2019

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Appendices

Acronyms and Abbreviations

ADCM	Anchorage Debit-Credit Methodology
ADNR	Alaska Department of Natural Resources
ARRC	Alaska Railroad Corporation
Bank	Portage Reserve Mitigation Bank
CFR	Code of Federal Regulations
DOT&PF	Alaska Department of Transportation and Public Facilities
DPS	Distinct Population Segment
GPS	Global Positioning System
HDR	HDR Alaska, Inc.
KPB	Kenai Peninsula Borough
MOA	Municipality of Anchorage
MP	Milepost
MSB	Matanuska-Susitna Borough
PLI	Public Lands and Institutions
Reserve	Portage Terminal Reserve
REV	Relative Ecological Value
USACE	U.S. Army Corps of Engineers
USFS	U.S. Forest Service

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1.0 Objectives (33 CFR §332.4(c)(2))

The primary goals of the Alaska Railroad Corporation's (ARRC) planned Portage Reserve Mitigation Bank (Bank) are to preserve high-value aquatic resources currently under threat of adverse modification or destruction from development and to restore aquatic resources and their natural functions impacted by the previous placement of gravel fill for a gravel road and microwave tower (Figure 1). These goals were developed with consideration for the aquatic resource needs of the watershed. The Bank will accomplish this goal via the following objectives:

- **Restoration (re-establishment) and preservation** of natural functions to former wetlands within the Portage Terminal Reserve (Reserve) that have been filled by previous development
- **Preservation** of wetlands, waterbodies, waterways, and wetland/upland buffers under threat of development

The acres of resources that will be restored and preserved within the Bank are shown in Table 1.

Table 1. Resources to be Restored and/or Preserved within the Bank

Objective	Acres
Restoration (re-establishment) and preservation of wetlands	2.119
Preservation of wetlands, waterbodies, waterways, and wetland/upland buffers under threat of development	238.806*
Total	***240.926***

* Includes preservation of waterways, which will not generate credit.

The Bank will satisfy these objectives by completing the restoration project and protecting the restored and preserved resources within the Bank under a deed restriction and restrictive covenants. These planned activities will generate compensatory mitigation credits that can be used to offset environmental losses resulting from unavoidable impacts to waters of the U.S. within the Bank's service area. The long-term sustainability of the Bank will be assured under the long-term management strategy.

1.1 Preservation

The Bank will preserve high-value aquatic resources that are currently under threat of development. Because preservation alone does not provide an increase in the quantity or quality of aquatic resource functions within a watershed, the 2008 Final Rule on Compensatory Mitigation for Losses of Aquatic Resources (2008 Mitigation Rule) states that preservation should be used in conjunction with aquatic resource restoration, establishment, and/or enhancement activities to the extent practicable.[1] In order to satisfy this requirement and to most effectively address the needs of the Upper Cook Inlet Basin watershed, the Bank will combine the proposed preservation activities with a project to restore functions to former aquatic resources. These complimentary activities are designed to provide the maximum ecological benefit to the watershed and increase the likelihood of success of the restoration project by preserving of surrounding resources.

[1] 33 Code of Federal Regulations (CFR) §332.3(h)(2) (2008)

The 2008 Mitigation Rule permits use of preservation to provide compensatory mitigation, providing that five criteria are met.[2] Preservation of aquatic resources within the Bank will satisfy these criteria, as follows:

1. *The resources to be preserved provide important physical, chemical, or biological functions for the watershed.*[3]

In 2016, ARRC contracted HDR Alaska, Inc. (HDR) to delineate wetlands and other waters of the U.S. within the Reserve (Appendix A).[4] The mapped resources within the Bank are shown in Figure 2. HDR also categorized wetlands and waterbodies based on their Relative Ecological Value (REV) using the Anchorage Debit Credit Method (ADCM).[5] REV categories indicate the level of ecological function performed by an aquatic resource with consideration for its landscape position, hydrologic regime, plant community, fish and wildlife use, and/or extent of degradation. Approximately 82 percent of the wetlands and waterbodies within the Bank are classified as REV 1, meaning that they have the highest ecological value.

The aquatic resources within the Bank include large complexes of wetlands, waterbodies, and streams, and are located where riverine, estuarine, and palustrine systems converge. They provide high-value habitat to wildlife and fish, including spawning and rearing habitat for salmon, and habitat for moose, waterfowl, beaver, and a wide diversity of smaller aquatic and terrestrial species. They are tidally influenced and provide important water quality enhancement, hydrologic regulation, and nutrient export functions that support Turnagain Arm and the Placer, Portage, and Twentymile valleys. These functions also support the Cook Inlet Distinct Population Segment (DPS) of beluga whales. Additional information about the needs of the watershed and the importance of the Bank is included in Exhibit A of the Instrument.

2. *The resources to be preserved contribute significantly to the ecological sustainability of the watershed.*[6]

The Bank is within the Placer River Watershed (10-digit hydrologic unit code 1902030203), which is mostly undisturbed. However, the resources that will be preserved within the Bank are close to developments that do exist within the watershed, and are most likely to be impacted by any future development in the watershed. The resources are also of types similar and of relatively equivalent value to the resources that have previously been altered by existing developments. This includes areas that provide valuable migratory bird stopover habitat and salmon spawning and rearing habitat.

The Bank is within the larger Upper Cook Inlet Basin watershed, which contains the Municipality of Anchorage (MOA), Alaska's largest metropolitan area, as well as portions of the rapidly growing Kenai Peninsula Borough (KPB) and Matanuska-Susitna Borough (MSB). The watershed has experienced considerable historical and ongoing loss of aquatic resources, and multiple

[2] 33 CFR §332.3(h)(1) (2008)
[3] 33 CFR §332.3(h)(1)(i) (2008)
[4] HDR Alaska, Inc. (HDR). February 2017. *Portage Reserve Mitigation Bank Jurisdictional Determination Report and REV Classification.* Prepared for Alaska Railroad Corporation.
[5] Dean, Heather. Anchorage Debit-Credit Method (ADCM). April 2011.
[6] 33 CFR §332.3(h)(1)(ii) (2008)

management and planning documents identify the need for protecting anadromous stream habitats, riparian habitats, and intertidal estuaries, such as those preserved by the Bank (see Exhibit A of the Instrument).

Preservation of the resources within the Bank will be self-sustaining and will not require any active maintenance. No maintenance of water flow control structures is anticipated. The large size of the area preserved and its contiguity with the Chugach National Forest will contribute to watershed sustainability. How the Bank will contribute to the ecological sustainability of the watershed is discussed in Exhibit A of the Instrument.

3. *Preservation is determined by the district engineer to be appropriate and practicable.*[7]

The proposed preservation is intended to perform in conjunction with the proposed restoration activities to maximize the aquatic resource function gains provided by the Bank. The proposed restoration activities will re-establish historical functions to former aquatic resources. The resources preserved will serve as buffers to the restored resources, protecting them from existing or future physical, chemical, hydrological, or other disturbances, and will maintain hydrologic and ecological connectivity throughout the resources within the Bank. It will be both appropriate and practicable to preserve these areas to ensure the success and sustainability of the entire Bank.

4. *The resources are under threat of destruction or adverse modifications.*[8]

The resources that will be preserved are all on land currently owned in fee simple by ARRC. The land within the Bank was deeded to ARRC by the federal government to provide ARRC with the land base to provide transportation services into the future, and to generate income through real estate development revenue. As a state-owned corporation, ARRC must generate sufficient revenue from transportation and real estate services to cover its maintenance and operation expenses. Growing interest in tourism and increased need for commercial and transportation developments in the Portage area, combined with the lack of developable land in the area, create significant development pressure on the Reserve.

Portage is located where Portage Glacier Road meets the Seward Highway, and is the largest community on the Seward Highway between Girdwood and Moose Pass. This area contains the intersection of two major highways and two significant rail lines. All traffic between the Kenai Peninsula and Anchorage and other points north travels through this area. It also includes all traffic moving to and from Whittier and the coastal communities served by the Alaska Marine Highway System out of Whittier. The rail crossroads is the intersection of the original ARRC rail line from Seward to Anchorage and the Interior, and the branch line to the tourism and freight port of Whittier. As with many crossroads, there is pressure for development in the Portage area. There are few services for travelers in the area, the closest way point being Girdwood, 11 miles to the northwest. The many tourism and recreation opportunities in the Portage area have driven significant growth in visitor numbers in recent years, and continued growth will increase pressure for additional facilities.

[7] 33 CFR §332.3(h)(1)(iii) (2008)
[8] 33 CFR §332.3(h)(1)(iv) (2008)

This development pressure is hampered by the limited availability of developable land. Of the 8,903 acres of land in the Portage area, 6,889 acres are within the Chugach National Forest, 1,125 acres are owned by ARRC, and 717 acres are private property (Table 2, Figure 3).

Table 2. Land Use and Ownership in Portage[9,10]

Land Use/Ownership		Acres
Chugach National Forest		6,889
ARRC		1,125
James Toman Mary Redmond Reserve Wetland Mitigation Bank		50
Stream Beds		122
Private Property	Alaska Wildlife Conservation Center	109
	Rural Homestead	485
	Turnagain Mixed Use	18
	Single Family	84
	Original Portage Townsite	21
	Total	***8,903***

There are no planning or zoning restrictions that are incompatible with the development of the Bank. All of the land within the Bank has been zoned by the MOA as Public Lands and Institutions (PLI; Figure 4). This land district includes areas of significant public open space, major public and quasi-public institutional uses and activities, and land reserves for which a specific use or activity is not defined.[11] Allowed uses of PLI lands include utility and transportation facilities as well as commercial recreational uses, including commercial and residential uses associated with such commercial recreation uses. These allowed uses are governed by the Anchorage Municipal Code, and subject to approval of the planning and zoning commission. The land use outlined in the Turnagain Arm Comprehensive Plan[12] shows the Bank as a transportation facility (Figure 5).

If a Bank is not established, ARRC intends to develop the land within the Reserve as a combination of operating land to support its train services and non-operating land leased to other entities for commercial development. These development scenarios would utilize portions or the entirety of the Bank area, and would result in the adverse modification or destruction of the aquatic resources within the Bank boundary.

Operating Land Development Scenarios

Operating lands are those that support and maintain ARRC's freight and passenger train services. The rail right-of-way and the Portage Section House are currently considered operating land. Numerous plans to develop the rest of the Reserve as operating land have been considered since its establishment. Current development pressures on lands within the Reserve are primarily due to the need to accommodate freight services with additional sidings and rail yard development.

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[9] Municipality of Anchorage (MOA) Planning Department. 2009. Turnagain Arm Comprehensive Plan. Adopted December 1, 2009. Assembly Ordinance 2009-126.
[10] MOA Project Management and Engineering. 2018. Land Records Geodatabase Downloaded January 11, 2018.
[11] Anchorage Municipal Code 21.40.0202
[12] MOA. 2009. Turnagain Comprehensive Plan. Adopted December 1, 2009. MOA, Planning Department. Assembly Ordinance 2009-126.

In 1972, a preliminary design was advanced for the area that included a balloon track and an "in-motion" unloading facility. The Reserve site was selected because of its location adjacent to the Seward Highway and the flat terrain.[13]

The Reserve has also been historically identified for use as a large classification yard. Currently, ARRC's headquarters and main rail yard are located along Ship Creek within the Anchorage Reserve, the majority of which has already been developed by ARRC and long-term lease holders such as the Port of Alaska. ARRC's operating land within the Anchorage Reserve cannot be expanded due to existing developments and constraints. If ARRC requires additional operations and facilities within the MOA in the future, they would be developed within the Bank.

ARRC's Portage Section House is directly adjacent to the proposed Bank. The Section House is the facility responsible for maintaining this section of railroad track, houses maintenance facilities, and has a permanent workforce. Development of the Section House and expansion of the facilities pose a threat to the resources within the adjacent Bank. The gravel pad for the Section House has recently been expanded in 2008 and 2011 (U.S. Army Corps of Engineers [USACE] authorizations POA-2005-827-M1 and POA-2005-827-M2).

There is also development pressure on the Reserve from freight. In 2017, freight generated more than half (55 percent) of ARRC's operating revenues (excluding capital grants).[14] Whittier acts as a major gateway for freight in Southcentral Alaska. It is the second largest port in Alaska by trade volume, and passes through an estimated 11 percent of all of Alaska's freight.[15] In 2013, approximately 280,600 tons of goods were imported and approximately 11,800 tons of goods were exported through the Port of Whittier. Between 2004 and 2013, there was a 35 percent increase in the total volume of goods imported through the Port of Whittier.[16]

ARRC has a freight depot, rail yard, and container terminal in Whittier, and has made several improvements to facilities in Whittier in recent years. However, the amount of land in Whittier for the shoreside logistics of sorting and forwarding is extremely constrained. The limited space in Portage has been used in the past for staging materials moving to and from Whittier. Currently, freight offloaded at Whittier is transported to the rail yard in Anchorage for sorting before distribution back to the Kenai Peninsula or the Interior. A freight yard in Portage would eliminate the need for cargo to be transported to Anchorage and then back down the main line to the Kenai Peninsula. As freight companies consider the distribution of goods between the Railbelt and the Kenai Peninsula, Portage continues to be considered as a potential logistical hub. The area most attractive for development of a potential freight hub is the portion of the Portage Reserve along Portage Glacier Road.

[13] Alaska Transportation Corridor Study. Design Criteria Cost Estimates Oil Transportation Study. Interim Report 5. April 1972. Prepared for Federal Highway Administration, U.S. Department of Transportation. Prepared by Tudor-Kelly-Shannon, Alaska Transportation Corridor Consultants.
[14] Alaska Railroad Corporation (ARRC). "Freight Services." April 2, 2018. Accessed on January 29, 2019. https://www.alaskarailroad.com/sites/default/files/Communications/2018_Freight_Business.pdf
[15] Competitive Market Analysis and Long Range Planning for the Port of Valdez (September 2015) prepared for the City of Valdez by McDowell Group.
[16] ARRC. 2017. Seward Marine Terminal Expansion Planning Freight Traffic Study. Prepared for Alaska Railroad Corporation by DOWL.

Non-Operating Land Development Scenarios

Non-operating lands are those that are not dedicated to rail-specific and transportation uses. ARRC is prohibited by Alaska State Statute from selling, exchanging, or conveying a complete interest in its land. However, it leases non-operating lands such as those within the Bank for up to 95 years for commercial, industrial, and public uses. One current tenant, Chugach Electric Association, Inc., leases land directly adjacent to the Bank, and has indicated a desire to expand its facilities into the Bank.[17] ARRC is currently offering the Reserve as an available property for development.[18] The location of the Reserve along the Seward Highway, a major transportation route that connects the population centers of Southcentral Alaska, makes it attractive to tourism-related development or wayside services. ARRC has received increasing interest from potential developers in recent years.

There has been a significant increase in use and demand for recreation in the Placer, Portage, and Twentymile valleys since the early 2000s.[19] Due to its accessibility from Portage Glacier Road and proximity to Anchorage, Portage Valley is one of the top tourist destinations in Alaska and receives consistently high summer use. Up to 500,000 people per year visit the Begich, Boggs Visitor Center on Portage Lake, with 90 percent of visits occurring during the summer.[20] The U.S. Forest Service (USFS) has developed many recreation facilities in the Portage Valley, including campgrounds, hiking trails, wildlife viewing sites, fishing docks, and the Trail of Blue Ice, which is part of the Iditarod National Historic Trail.

USFS has also recommended development of additional facilities along the Seward Highway to increase access to the Twentymile and Placer rivers and to provide balanced recreational opportunities across the three valleys.[21] Several projects are being developed in coordination with the Seward Highway Milepost (MP) 75 to 90 Rehabilitation Project, including:

- Enhanced recreational access at Placer River and Portage Creek.
- Construction of two new parking lots north of Twentymile River that will be connected by a pedestrian path to improve access to the Turnagain Arm hooligan fishery.
- A multiuse recreational path along the highway between Ingram Creek and Twentymile River, which will connect a critical piece of the Iditarod National Historic Trail.[22, 23]

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[17] Email from Chugach Electric Association, Inc. (Karen Keesecker), to Danielle Knight, U.S. Army Corps of Engineers (USACE), commenting on the Portage Reserve Mitigation Bank Prospectus dated May 24, 2017.
[18] ARRC. 2015. "Available Properties." Accessed on January 29, 2019. https://www.alaskarailroad.com/real-estate/available-properties.
[19] U.S. Forest Service (USFS). 2010. Three Rivers Planning on the Chugach National Forest. Accessed on January 29, 2019. https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5252082.pdf
[20] USFS. 2004. Upper Turnagain Landscape Assessment.
[21] USFS. 2010. Evaluation of Issues and Management Recommendations for the Three Rivers Area.
[22] Alaska Department of Transportation and Public Facilities (DOT&PF). 2018. Seward Highway Mile Post 75-9 Road & Bridge Rehabilitation Proposed Project Area Map. Accessed on January 29, 2019. http://www.sewardhighway75to90.com/Mapbook/
[23] USFS. 2017. "Chugach National Forest Invites Comments – Iditarod National Historic Trail-Portage Curve Multimodal Connector." November 20, 2017.

The Seward Highway MP 75-90 Rehabilitation Project will also provide for improved access to the Alaska Wildlife Conservation Center, which is another significant attraction in the Portage area.

In 2017, passenger service accounted for 27 percent of ARRC revenue.[24] Between 2016 and 2017, passenger service revenue increased by 8 percent, a continuation of an increasing trend.[25] One of the drivers behind this increase is ARRC's Glacier Discovery train. The Glacier Discovery train stops in Portage four times per day during the summer, allowing ARRC to coordinate a significant amount of passenger traffic in and out of the area. The Glacier Discovery train provides service between Anchorage, Girdwood, Portage, and Whittier, as well as to whistle stops in the Chugach National Forest. Passengers can also disembark in Portage for a day trip to the Alaska Wildlife Conservation Center. Between 2008 and 2015, ridership on the Glacier Discovery train increased 10 percent year-over-year.[26] The Grandview Cruise Train charter service, which transports cruise ship passengers from the cruise docks at Seward and Whittier to cities, airports, and other locations throughout the state, also passes through Portage.

Portage is also the closest point for transfer from the road system to the growing development between Spencer Glacier and Grandview. The ARRC has formed a partnership with the USFS to offer whistle stop services within the Chugach National Forest. The purpose of the Whistle Stop Project, which is described in detail in the 2006 Final Environmental Impact Statement[27] and Record of Decision,[28] is to provide access to backcountry recreation opportunities in the Chugach National Forest. To date, the Spencer Whistle Stop and the Grandview Whistle Stop facilities have been constructed along with a trail connecting Spencer Whistle Stop to Spencer Glacier, campground facilities, and USFS's Spencer Bench public use cabin. Additional plans include Whistle Stops at Luebner Lake, Bartlett Glacier, and Trail Creek to include various recreation facilities at each location as well as a trail connecting all of the Whistle Stops. These destinations have been extremely popular with over 13,000 people visiting the Spencer Glacier and Grandview Whistle Stops in 2017.[29] Upon completion of the project, a maximum of 672 visitors per day could access the Whistle Stops.[30]

Another service ARRC has considered offering is tourism train rides using a refurbished steam locomotive. The Engine 557 Restoration Company is a non-profit organization that is coordinating numerous foundations and volunteers to restore Engine 557, a steam locomotive that was in use in Alaska between 1944 and 1962. The locomotive was brought back to Alaska from Washington

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24 ARRC. "Railroad at a Glance." April 2, 2018. Accessed on January 29, 2019. https://www.alaskarailroad.com/sites/default/files/Communications/2018_ARRC_Facts_and_Figures_or.pdf
25 ARRC Board of Directors Meeting. February 8, 2018. Agenda and Meeting Materials. https://www.alaskarailroad.com/corporate/leadership/board-meetings.
26 DOT&PF. 2016. *Alaska State Rail Plan*. Prepared by HDR in association with CDM Smith.
27 USFS. 2006. Whistle Stop Project Final Environmental Impact Statement. R10-MB-594. U.S. Department of Agriculture, Forest Service, Chugach National Forest, Girdwood, AK.
28 USFS. 2006. Whistle Stop Project Record of Decision. R10-MB-593. U.S. Department of Agriculture, Forest Service, Chugach National Forest, Girdwood, AK.
29 ARRC. "Railroad at a Glance." April 2, 2018. Accessed on January 29, 2019. https://www.alaskarailroad.com/sites/default/files/Communications/2018_ARRC_Facts_and_Figures_or.pdf
30 USFS. 2006. Whistle Stop Project Final Environmental Impact Statement. R10-MB-594. U.S. Department of Agriculture, Forest Service, Chugach National Forest, Girdwood, AK.

state in 2011. Once the restoration is finished, ARRC may use Engine 557 to offer rides between Anchorage and Portage during the summer tourist season.[31]

ARRC is also considering the possible development of a hotel or resort in the southern portion of the Bank (Figure 6). The development of the Whistle Stop Project has generated a significant demand for additional facilities in the area. This demand is expected to grow with increased cruise ship traffic to Whittier. In 2018, Whittier saw an increase in cruise ship dockings of 35 percent over 2016 and 2017.[32,33,34] A large hotel facility in proximity to Seward, Whittier, and Anchorage with access to recreation opportunities within Chugach National Forest could efficiently accommodate thousands of cruise ship passengers and other tourists every year. Proven pressure for this type of shoreside activity coupled with the construction of the USFS facilities has created a significant opportunity for this sort of development. Limited geotechnical information is available in the area; however, the geography of the area suggests that the best location for such a large development is within the Bank at the very south end of the Reserve. The remainder of the Bank area would be developed for freight logistics as well as commercial development to support the hotel/resort.

Development of a hotel/resort and associated facilities is considered the most likely scenario within the Reserve, and would result in the loss of the majority of the aquatic resources that will be preserved within the Bank. This scenario was used to assess the preservation activities under this Mitigation Plan (see Section 5.1.1 - Preservation Area 1: Direct Impacts).

The trend toward development of the area is also apparent through examination of available historical images, as illustrated in Figure 7, which shows aerial photography beginning in 1950. Since 1950, in the area directly adjacent to the northern end of the Bank, there has been development of multiple gravel fill pads along the Seward Highway, the Alaska Wildlife Conservation Center, a road and homestead site, the Portage Section House, and the Chugach Electric substation (including a microwave tower site). To the east of the Bank, there has been development of a road and trails to recreational cabins as well as the Portage Valley Cabins and RV Park.

5. *The preserved site will be permanently protected through an appropriate real estate or other legal instrument.*[35]

The 2008 Mitigation Rule provides flexibility for state agencies in determining the appropriate real estate instrument or other mechanism to provide for the long-term protection of a Bank.[36] ARRC will use a deed restriction and restrictive covenants to ensure the long-term protection and sustainable management of the Bank (see Exhibit E of the Instrument). Although ARRC is

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[31] ARRC. "Return of Steam Locomotive 557." May 9. 2012. Accessed on January 29, 2019. http://www.557.alaskarails.org/media/2012_Engine_557.pdf
[32] Cruise Line Agencies of Alaska. Cruise Ship Calendar for 2018 for Whittier. Accessed on January 29, 2019. http://www.experienceketchikan.com/support-files/wht_2018.pdf
[33] Cruise Line Agencies of Alaska. Cruise Ship Calendar for 2017 for Whittier. Accessed on January 29, 2019. http://www.experienceketchikan.com/support-files/wht_2017.pdf
[34] Cruise Line Agencies of Alaska. Cruise Ship Calendar for 2016 for Whittier. Accessed on January 29, 2019. http://www.experienceketchikan.com/support-files/wht_2016.pdf
[35] 33 CFR §332.3(h)(1)(v) (2008)
[36] 33 CFR §332.7(a)(1) (2008)

prohibited from transferring property interests to another entity for more than 95 years without legislative approval,[37] it does have the ability to manage the development of its lands by its own authority. The proposed deed restriction and restrictive covenants are based on the USACE Charleston District's Model Restrictive Covenant.[38] The Bank will be sequestered from development by the ARRC in accordance with USACE requirements under the 2008 Mitigation Rule.

2.0 Site Selection (33 CFR §332.4(c)(3))

The location of the Bank was selected from all ARRC-owned land using a watershed approach as described in Exhibit A of the Instrument. The suitability of the Bank to provide compensatory mitigation for projects in the service area was determined based on the following factors:

1. *Hydrologic conditions, soil characteristics, and other physical and chemical characteristics* (33 Code of Federal Regulations [CFR] §332.3(d)(i))

The Bank contains important natural resources including large complexes of wetlands, waterbodies, and streams located where riverine, estuarine, and palustrine systems converge. These aquatic resources are of high ecological value and perform many chemical, physical, and biological functions. Most notably, they support the federally listed, endangered Cook Inlet DPS of beluga whales, and are adjacent to federally designated critical habitat for the population.

2. *Watershed-scale features, such as aquatic habitat diversity, habitat connectivity, and other landscape scale functions* (33 CFR §332.3(d)(ii))

The Bank's size and strategic location will help advance the health of the Portage Valley and Turnagain Arm watershed, and the broader environmental and social goals of the region. The Bank will protect one of the largest developable wetland tracts in the watershed. The restoration projects will restore historic aquatic resources and their functions, and restore hydrologic connectivity to wetland habitat within the Chugach National Forest, the Placer River and Portage Creek valleys, and Turnagain Arm.

3. *The size and location of the compensatory mitigation site relative to hydrologic sources and other ecological features* (33 CFR §332.3(d)(iii))

Hydrology within the Bank is driven primarily by surface water from perennial streams originating in the Placer River and Portage Creek valleys. These streams are fed by glacial snowmelt, as well as groundwater discharge at the base of the mountains within the Kenai Range that separate these valleys. The Bank also receives tidal backflow through culverts within the railroad embankment. Due to the location of the Bank low in the watershed, between two river systems, and at the tidal interface, the hydrology of the area is well suited to provide for the long-term viability and ecological sustainability of the aquatic resources within the Bank.

[37] Alaska State Statute 42.40.285
[38] USACE, Charleston District. Restrictive Covenant Model. September 2010. Accessed on January 29, 2019. http://www.sac.usace.army.mil/Portals/43/docs/regulatory/Model_Restrictive_Covenants.pdf

4. *Compatibility with adjacent land use uses and watershed management plans* (33 CFR §332.3(d)(iv))

The Bank is mostly surrounded by the Chugach National Forest. National Forest lands adjacent to the Bank are managed primarily for wildlife and recreation values that are consistent with the objectives of a mitigation bank.

5. *Reasonably foreseeable effects the compensatory mitigation project will have on ecologically important aquatic or terrestrial resources, cultural sites, or habitat for federally- or state-listed threatened and endangered species* (33 CFR §332.3(d)(v))

The restoration project represents an opportunity to restore functions to wetlands on a large parcel of land within Alaska's most heavily impacted watershed. Focusing on preserving anadromous fish habitat within the MOA will greatly benefit the overall ecosystem, supporting recreational and subsistence salmon fisheries.

Restoration and preservation of the resources in the Bank will also provide support to the endangered Cook Inlet DPS of beluga whales. The resources within the Bank are directly connected to critical habitat for the Cook Inlet belugas in Turnagain Arm (see Exhibit A, Figure 2). Restoration of wetlands and preservation of wetlands, waterbodies, and streams in the Bank will protect many functions that support the downstream beluga habitat, including anadromous fish support, water quality enhancement, hydrologic regulation, and nutrient export functions. Flow from anadromous fish streams and water free of toxins have been identified by the National Oceanic and Atmospheric Administration, National Marine Fisheries Service as primary constituent elements essential to the conservation of the Cook Inlet DPS of beluga whales.[39]

6. *Other relevant factors including, but not limited to, development trends, anticipated land use changes, habitat status and trends, the relative locations of the impact and mitigation sites in the stream network, local or regional goals for the restoration or protection of particular habitat types or functions (e.g., re-establishment of habitat corridors or habitat for species of concern), water quality goals, floodplain management goals, and the relative potential for chemical contamination of the aquatic resources* (33 CFR §332.3(d)(vi))

The Bank is located in Portage, which has experienced minimal development to date but is experiencing increasing development pressures. It is located within the lower reaches of the Upper Cook Inlet Basin, which contains the MOA, as well as portions of the KPB and MSB. All of these areas have experienced considerable historical and ongoing loss and degradation of aquatic resources. In response to ongoing development and associated impacts to aquatic resources, multiple planning and management entities have recognized the need for restoration and preservation of aquatic resources in the lower Upper Cook Inlet Basin (see Exhibit A of the Instrument). The Bank was determined to be optimally located for planning of compensatory mitigation activities that could effectively address the needs of the watershed.

[39] 50 CFR §226.220 (2011)

3.0 Site Protection Instrument (33 CFR §332.4(c)(4))

The entirety of the two parcels comprising the Bank (240.926 acres) will be protected under a deed a restrictive covenants. The western boundary of the Bank is the right-of-way for the ARRC main line, as this operational land cannot be protected under a deed restriction.

The following activities are prohibited by the deed restriction (as amended):

> *… filling, draining, flooding, dredging, impounding, clearing, burning, cutting or destroying vegetation, cultivating, excavating, erecting, constructing, releasing wastes, or otherwise doing any work on the Property; introducing exotic species into the Property (except biological controls preapproved in writing by the Corps and any State of Alaska agency with jurisdiction over such controls); and from changing the grade or elevation, impairing the flow or circulation of waters, reducing the reach of waters, and any other discharge or activity requiring a permit under clean water or water pollution control laws and regulations, as amended.*

The deed restriction can be found in Exhibit D of the Instrument.

4.0 Baseline Information (33 CFR §332.4(c)(5))

Baseline information for the Bank is presented within the *Portage Reserve Jurisdictional Determination Report and REV Classification* (Appendix A).

4.1 REV Classification

The resources within the Bank have been categorized based on their REV using the ADCM, which is a methodology approved for use within the MOA. The REV classifications present in the Bank are included in Table 3.

Table 3. REV Classifications within the Bank

Resource Type	Relative Ecological Value	Acres
Wetland	REV1	185.498
	REV2	33.964
Waterbody	REV1	5.703
Waterway	REV1	0.966
Upland	REV1 – Undeveloped, within 100-foot setback of REV1 waterway or waterbody	4.944
	REV2 – Undeveloped, within 300-foot buffer of REV1 or REV2 aquatic resource	7.732
	REV4 - Developed	2.119
	Total	***240.926***

5.0 Determination of Credits (33 CFR §332.4(c)(6))

The Bank will generate a total of 149.476 credits in four assessment areas (Figure 8). The assessment areas were delineated based on the proposed mitigation activities. Credits were determined using the ADCM.

5.1 Assessment Areas

The acres of resources that will be preserved or restored within the Bank have been divided into four assessment areas based on location, type of mitigation, and presence of threat. The assessment areas are shown on Figure 8 and the acreage is presented in Table 4. The total credit generating area of the Bank is 239.960 acres; the 0.966 acre of waterways within the Bank are not included within the assessment areas.

Table 4. Assessment Area Descriptions

Assessment Area	Objective	Description	Acres
Restoration Area - Road/Pad Removal	Restoration (re-establishment)	The current footprint of gravel fill for the road and microwave pad will be converted from upland to wetland.	2.119
Preservation Area 1 – Direct Impacts	Preservation in conjunction with aquatic resource restoration*	Preservation of the footprint of the proposed development scenario, which includes a hotel facility and associated outbuildings, access road, train station, two sidings, and five commercial/industrial lots.	177.451
Preservation Area 2 – Indirect Impacts	Preservation in conjunction with aquatic resource restoration*	Preservation of areas within 300 feet of the proposed development scenario.	52.349

Table 4. Assessment Area Descriptions

Assessment Area	Objective	Description	Acres
Preservation Area 3 – Site Protection Buffer	Preservation in conjunction with aquatic resource restoration*	Preservation of areas adjacent to the other assessment areas within the Bank that provide protection from disturbance and ensure long-term viability of the Bank.	8.041
		Total Credit Generating Area	***239.960***

*Does not require a waiver under 33 CFR §332.3(h)(2).

The Restoration Area is based on the current fill footprint that will be removed. The limits of the Preservation Areas are discussed in the following sections.

5.1.1 Preservation Area 1: Direct Impacts

Preservation Area 1 includes wetlands and waterbodies that are within the direct footprint of the most likely development scenario for the Reserve, absent the establishment of the Bank (see Section 1.1 Preservation). If the Bank is not established, ARRC is considering development of a hotel or resort at the southern end of the Reserve. Such a development would consist of a large hotel with multiple outbuildings and a parking lot, an access road, five lots that would be used for commercial or industrial developments, one lot that would be used for commercial development, a station for the historic Engine 557, and two new sidings (Figure 6). The aquatic resources, as well as buffering uplands, within the footprints of these components would be filled. Preservation Area 1 would preserve 177.451 acres of resources, preventing the conversion of high-value aquatic resources to filled uplands.

5.1.2 Preservation Area 2: Indirect Impacts

Preservation Area 2 includes resources that would experience indirect impacts under the development scenario. The ADCM defines the area in which indirect adverse impacts of development activities are most likely to occur as extending to 300 feet from the edges of the developed area.[40] These indirect impacts may result due to decreased hydrologic connectivity within the complex, increased erosion, sedimentation or turbidity, clearing of vegetation beyond the project boundaries, the spread of exotic or invasive plant species, establishment of informal foot trails, increased noise, and harassment of wildlife. Preservation Area 2 will preserve 52.349 acres of resources, preventing the decline of high-value aquatic resources and their functions.

5.1.3 Preservation Area 3: Site Protection Buffer

Preservation Area 3 consists of aquatic resources and buffering uplands adjacent to the other assessment areas within the Bank. Preservation Area 3 will preserve 8.041 acres of resources that provide protection to the restored and preserved resources from disturbance and ensure the long-term sustainability and viability of the Bank.

5.2 Credit Types

The Bank will generate palustrine credits, as defined by the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al.), which will offset impacts to palustrine

[40] Dean, Heather. ADCM. April 2011.

aquatic resources. Palustrine areas include all non-tidal wetland dominated by trees, shrubs, persistent emergent, emergent mosses, or lichens.

The Preservation Areas contain 0.966 acres of riverine resources. However, no riverine credits will be generated by streams within the Preservation Areas because they are subject to other federal, state, and local approvals (i.e., they have a regulatory constraint factor of 4 in the ADCM).

5.3 Credit Calculation

The amount of credits generated by each assessment area was calculated using the ADCM. ADCM maps and worksheets are included in Appendix B. The proposed projects would result in the creation of 149.476 palustrine credits. Table 5 shows the number of credits generated by each assessment area.

The ADCM is an appropriate method for calculating credits because it is an agency-developed and approved method. The ADCM was developed by USACE, the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, and the MOA, and USACE currently considers ADCM the default method to be used within the boundaries of the MOA.[41] The ADCM accounts for watershed health, ecological significance, and threat as well as the REV of the wetland within the credit-generating formulas. Aquatic resources that are protected by other regulations (e.g. salmon streams and MOA's stream setbacks) receive much less credit for preservation than areas with less protections. Areas that are road-accessible receive more credit for preservation. Other factors accounted for include size of contiguous undeveloped area, adjacency to current development, and the disturbance within the watershed.

The ADCM, while developed for the MOA, is applicable to the Bank service area because it values similar wetland characteristics that are important across the entire Upper Cook Inlet watershed (see Exhibit A of the Instrument). Important aquatic resource qualities given a higher value in the ADCM include areas undisturbed by development, salmon habitat, beluga whale concentration areas, waterbird concentration areas, position within a larger wetland complex, flooded water regimes, and proximity to other important aquatic resources.

USACE will determine the appropriate debit to credit ratio for each project for any applicant purchasing credits from the Bank.

Table 5. Credits Generated by Assessment Areas

Assessment Area	Acres	Credits
Restoration Area: Road/Pad Removal	2.119	1.476
Preservation Area 1 – Direct Impacts	177.451	109.163
Preservation Area 2 – Indirect Impacts	52.349	33.545
Preservation Area 3 - Site Protection Buffer	8.041	5.322
Total	***239.960***	***149.476***

[41] USACE Alaska District. "Alaska District Compensatory Mitigation Thought Process." Revised September 18, 2018. Accessed on January 29, 2019.
https://www.poa.usace.army.mil/Portals/34/docs/regulatory/2018MitigationThoughtProcess.pdf

The Bank will generate 148.031 credits through the preservation of 237.841 acres, for an acre-to-credit preservation ratio of 1.6:1. USACE concurred with this ratio in a letter to ARRC dated January 22, 2019.[42]

6.0 Mitigation Work Plans (33 CFR §332.4(c)(7))

The mitigation work plans for the restoration project and preservation areas within the Bank are described below. Each project is anticipated to provide ecological benefits to the entire Bank area, as well as to upstream areas outside the Bank.

6.1 Restoration Area: Road/Pad Removal

The Restoration Area is centered on a wetland re-establishment project that will remove an abandoned gravel road and microwave tower pad (Inset 1; Figure 9). The road, constructed in the early 1970s, is approximately 2,600 feet long, and extends south from Portage Glacier Road beginning approximately 0.15 mile east of the Seward Highway. The road is occasionally used as a ski trail in the winter and spring and as an access route for waterfowl and game hunting. The project will re-establish wetland functions to 2.119 acres of wetlands that were previously filled and converted to upland for the road and pad, and will also re-establish hydrologic connectivity within the larger wetland complex. The limits of the roadway and pad to be removed are shown in Figures 9 and 10.

Inset 1. Abandoned microwave tower pad. September 6, 2016.

The existing fill (approximately 15,000 cubic yards) will be removed through the use of excavators, dump trucks, and other heavy equipment as necessary. Excavation will begin in spring or early summer. The fill will be over-excavated to below the ground surface, because the ground surface has likely been compacted below the original elevation. Compacted soils beneath the fill material will be loosened by mechanical means. Clean topsoil or stockpiled peat soils from permitted off-

[42] David S. Hobbie, USACE Alaska District Regional Regulatory Chief, letter to Bill O'Leary, ARRC President and CEO. January 22, 2019.

site sources will be used to backfill and recontour over-excavated areas. The undisturbed wetlands adjacent to the road fill will serve as a reference for final grade. A site survey will be conducted, and a grading plan will be developed prior to excavation and submitted to USACE for review and approval. Hydrology is expected to re-establish in equilibrium with the adjacent wetlands. If additional restoration or topsoil is needed after initial construction in order to meet performance standards, it will be addressed through adaptive management.

Following construction and final grading, the site will be allowed to revegetate naturally or, if necessary, will be planted and/or seeded with native hydrophytic vegetation.

6.2 Preservation Areas

The Preservation Areas are delineated into Preservation Areas 1 through 3 for credit calculations, but this work plan will cover all preservation areas uniformly. This work plan is designed to protect the resources within the Bank. ARRC will install signs restricting access along the Bank boundary at a minimum of every 1,000 feet. The signs will be labeled “No Trespassing,” state that the area is a protected wetland mitigation site, and list a contact number for ARRC. All signs will be permitted under Section 404 of the Clean Water Act as non-reporting under Nationwide Permit 18 for minor discharges. All ARRC staff at Portage Section House, which is located less than 200 feet from the Bank, will be informed of the presence of the Bank site and will be instructed to inform the Real Estate and Facilities Department and ARRC’s police force if any unauthorized activities are observed. Posters will be placed within Portage Section House showing the boundaries of the Bank and with the relevant phone numbers.

7.0 Maintenance Plan (33 CFR §332.4(c)(8))

The restoration and preservation projects are designed to be self-sustaining and eliminate the need for regular maintenance. Rectification of any failures or deficiencies noted during the monitoring period or long-term management will be addressed under the Adaptive Management Plan or the Long-Term Management Plan.

8.0 Performance Standards (33 CFR §332.4(c)(9))

Performance standards will be used to judge the success of the restoration project and preservation area. The restoration project has a design performance standard to ensure that construction of the project is completed successfully as well as an ecologically based performance standard to ensure that that the ecological improvements will be stable and sustainable. All assessment areas have ecological performance standards to verify that the preserved resources are functioning naturally.

8.1 Restoration Area: Road/Pad Removal

Following removal of gravel fill, the areas within the current road/pad footprint are expected to become naturally functioning wetlands similar in vegetation community and hydrology to the surrounding wetlands. The performance standards for the Restoration Area are included in Table 6.

Table 6. Performance Standards for Restoration Area

Type of Performance Standard	Performance Standard
Design	Post-construction survey demonstrates the removal of the road/pad fill and the remaining area has been regraded to match the natural contours of the adjacent wetlands. Soil pits at monitoring point locations show that soil is not compacted.
Hydrophytic Vegetation	1) Total herbaceous layer cover is within 10 percent of reference point. 2) Total shrub cover is within 10 percent of reference point. 3) Cover of invasive species is less than 5 percent.
Wetland Hydrology	Presence of at least one primary indicator of wetland hydrology that is consistent with reference site.

Achievement of the vegetation and hydrology performance standards will be assessed at three locations within the footprint of the road/pad and will be based on three reference locations adjacent to the footprint. Locations are shown on Figure 11. Standard wetland determination forms from the 2007 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual, Alaska Region* (Alaska Regional Supplement) will be collected at the reference locations and submitted to USACE along with the site survey and grading plan prior to fill removal.[43] Monitoring locations will be monumented with a Global Positioning System (GPS) device as well as physically, using rebar stakes and flagging to facilitate revisit.

Hydrophytic plant species are those that have a wetland indicator status of facultative (species equally likely to occur in wetlands and non-wetlands), facultative wetland (species usually occurs in wetlands), or obligate wetland (species almost always occurs under natural conditions in wetlands), as listed in the most current National Wetland Plant List.[44] Invasive plant species are defined as those listed on the Alaska Department of Natural Resources' (ADNR's) Prohibited and Restricted Noxious Weeds list.[45] Presence of wetland hydrology indicators will be assessed using criteria established in the Alaska Regional Supplement. The design performance standard will be obtained after one successful measurement, while the ecological performance standards will be obtained after a successful measurement at each monitoring location after a minimum of 5 years of monitoring.

8.2 Preservation Areas

Because the Preservation Areas are comprised of presently high-functioning resources, success of these areas will be considered to be prevention of any new disturbances and assurance that the functions of the aquatic resources and buffering uplands within the Bank boundary are maintained. This will be measured by comparing field data collected before establishment of the

[43] USACE. 2007. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Alaska Region (Version 2.0). U.S. Army Engineer Research and Development Center, Vicksburg, MS. TR-07-24.
[44] USACE. National Wetland Plant List. Available at http://wetland-plants.usace.army.mil/
[45] Alaska Department of Natural Resources (ADNR), Division of Agriculture. Prohibited & Restricted Noxious Weeds. Available at http://plants.alaska.gov/invasives/noxious-weeds.htm

Bank (e.g. baseline data) to field data collected after construction of the restoration project. Performance standards for the Preservation Areas are included in Table 7.

Table 7. Performance Standards for Preservation Areas

Type of Performance Standard	Performance Standard
Design	1) Recording of deed restriction 2) Installation of signage around perimeter of the Bank 3) Posters placed inside Portage Section House
Hydrophytic vegetation	1) Percent cover of individual species is within 5 percent of baseline observations 2) No invasive species present
Wetland Hydrology	Presence of at least one primary or two secondary indicators of hydrology consistent with baseline conditions.
Hydric soil	Wetlands meet hydric soil indicators consistent with baseline conditions.

The Preservation Areas will be assessed collectively. Four monitoring locations were selected within the Preservation Areas at locations where HDR collected data in 2016 for the *Portage Reserve Jurisdictional Determination Report and REV Classification* (Sites 003, 019, 036, and 052; Appendix A).[46] These sites are approximately 200-300 feet from the railroad embankment. The proximity to the railroad would expose these areas to invasives species spreading from the ARRC embankment prior to the rest of the Bank. At three of these sites (Sites 003, 019, and 036), full wetland determination forms were collected, and observational data was collected at Site 052. A full determination form will be completed at Site 052 prior to commencement of any restoration activities. The wetland determination forms completed at these sites provide the baseline conditions for the preservation area. Locations of the monitoring points are shown on Figure 11. Monitoring locations will be monumented with a GPS device as well as physically, using rebar stakes and flagging to facilitate revisit.

Invasive plant species are defined as those listed on the ADNR Prohibited and Restricted Noxious Weeds list.[47] Presence of wetland hydrology indicators and hydric soil indicators will be assessed using criteria established in the Alaska Regional Supplement.[48]

The design performance standard for the Preservation Areas will be required for the initial credit release and will be obtained after proof of completion is submitted to USACE. The vegetation, hydrology, and soil performance standards will be obtained after one successful measurement at each monitoring location after a minimum of 5 years of monitoring.

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[46] HDR. February 2017. *Portage Reserve Mitigation Bank Jurisdictional Determination Report and REV Classification*. Prepared for Alaska Railroad Corporation.
[47] ADNR, Division of Agriculture. Prohibited & Restricted Noxious Weeds. Available at http://plants.alaska.gov/invasives/noxious-weeds.htm
[48] USACE. 2007. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Alaska Region (Version 2.0). U.S. Army Engineer Research and Development Center, Vicksburg, MS. TR-07-24.

9.0 Monitoring Requirements (33 CFR §332.4(c)(10))

An annual monitoring report will be submitted to USACE by January 31 of the following year. Monitoring at each site will occur for a minimum of 5 years. The monitoring report will include a post-construction survey of the restoration project to document achievement of the design performance standards. The monitoring report will document the progress of all projects with respect to each applicable performance standard. The monitoring report will include a discussion of the success of each performance standard at the site at the time of inspection, analysis of the trajectory of the site in respect to performance standards, discussion of any problems encountered, and a written plan to correct any major flaws in accordance with the adaptive management plan. Photographs and field data collected during the annual monitoring events will also be included. Any proposed modifications to performance standards or annual monitoring will be described in the report and submitted to USACE for approval.

9.1 Restoration Area: Road/Pad Removal

A post-construction survey of the road/pad removal area will be conducted immediately after construction during the growing season. Monitoring of the area will begin during the next growing season and continue annually for a minimum of 5 years. Monitoring will be considered complete and performance standards achieved when documentation shows that the hydrophytic vegetation and wetland hydrology performance standards have been met at all monitoring locations. If any performance standard is not met in the fifth monitoring year, monitoring will continue annually until all performance standards are obtained.

Three monitoring locations and three reference locations are shown on Figure 11. At all locations, vegetation and hydrology data will be collected according to protocols defined in the 2007 Alaska Regional Supplement. Vegetation will be identified within a 0.1-acre area. The percent coverage of species, bare ground, and open water, as well as the number of species present, will be recorded within the plot. All non-native plant species and their relative cover will be recorded. Hydrology will be identified by visual observations and by digging a soil pit to a minimum depth of 20 inches. Vegetation data collected at the monitoring locations will be compared to data from the reference locations to identify if any active measures are needed. Additional management measures may include, but are not limited to, additional willow and shrub plantings, additional seeding, or invasive species control measures. Any required management actions identified during the monitoring process will be addressed through the adaptive management plan.

9.2 Preservation Areas

Once the deed restriction has been recorded, posters hung in the Portage Section House, signs installed around the perimeter of the Bank, and construction on the restoration project has begun, monitoring for the Preservation Areas will begin during the next growing season and continue once annually for a minimum of 5 years. Monitoring will be considered complete and performance standards achieved when documentation shows that the hydrophytic vegetation, wetland hydrology, and hydric soil performance standards have been met at all monitoring locations. If any performance standard is not met in the fifth monitoring year, monitoring will continue annually until all performance standards are obtained.

Four monitoring locations are shown on Figure 11. Wetland determination forms were completed at three locations in 2016, and a wetland determination form will be completed at Site 052 prior to commencement of monitoring. Each subsequent monitoring event will be analyzed with respect to this baseline data. At these locations, vegetation, hydrology, and soil data will be collected according to protocols defined in the 2007 Alaska Regional Supplement. Vegetation will be identified within a 0.1-acre area. The percent coverage of species, bare ground, and open water, as well as the number of species present, will be recorded within the plot. All non-native plant species and their relative cover will be recorded. Hydrology and soil determinations will be identified by visual observations and by digging a soil pit to a minimum depth of 20 inches. Vegetation data from the monitoring locations will be compared to the baseline conditions to identify if any active measures are needed. Invasive plant recruitment data may lead to active measures to remove invasive plants from preserved areas. Any management actions identified during the monitoring process will be addressed through the adaptive management plan.

10.0 Financial Assurances (33 CFR §332.4(c)(13))

ARRC is a public corporation owned by the State of Alaska. A formal documented commitment from ARRC to comply with all terms of the Instrument is included as Exhibit F of the Instrument. No other financial assurances are required or proposed.

Figures

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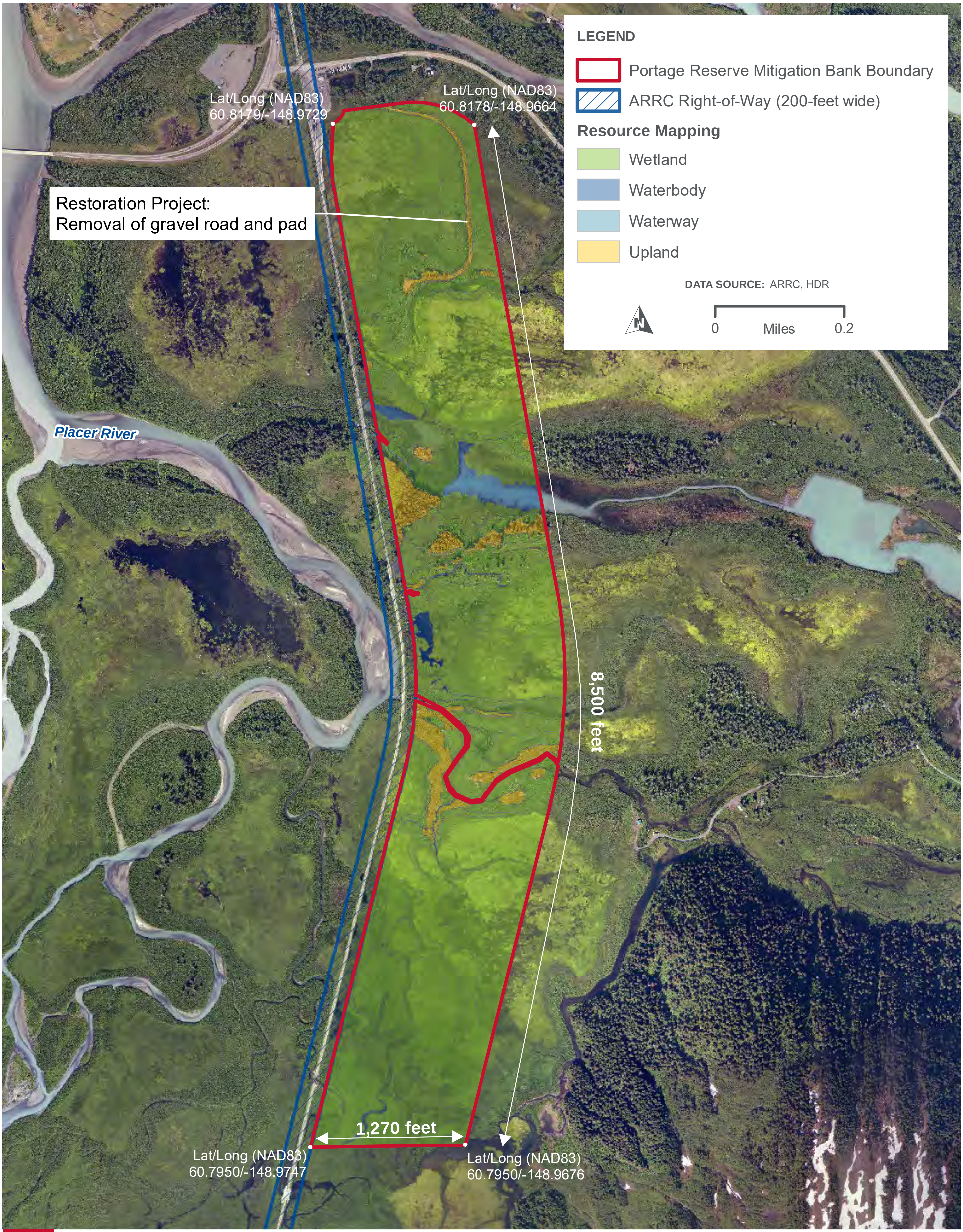


PRMB INSTRUMENT - EXHIBIT B: MITIGATION PLAN

SITE OVERVIEW

FIGURE 1

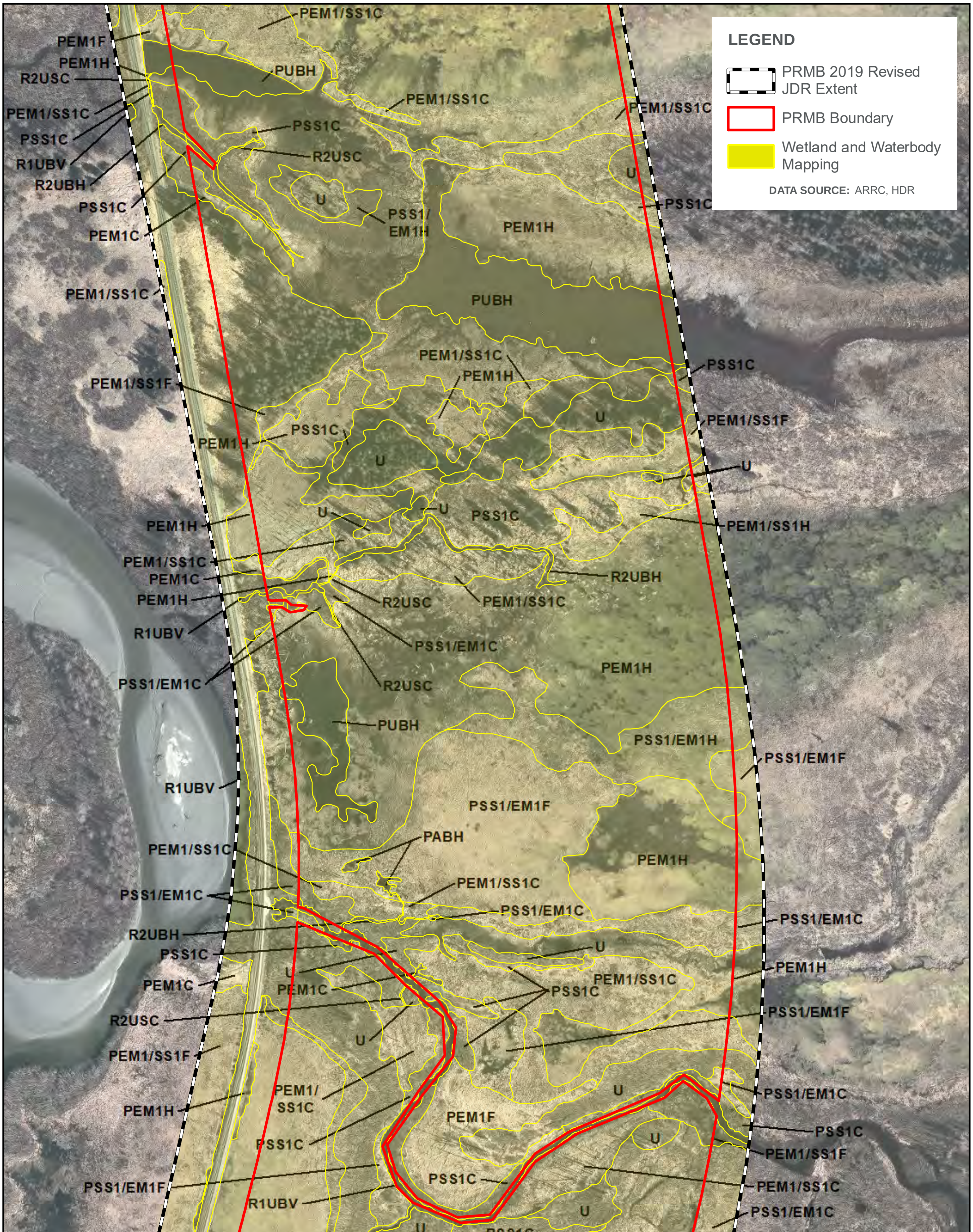
PRMB INSTRUMENT - EXHIBIT B: MITIGATION PLAN

AQUATIC RESOURCES

0 Feet 500

FIGURE 2A

ALASKA RAILROAD CORPORATION



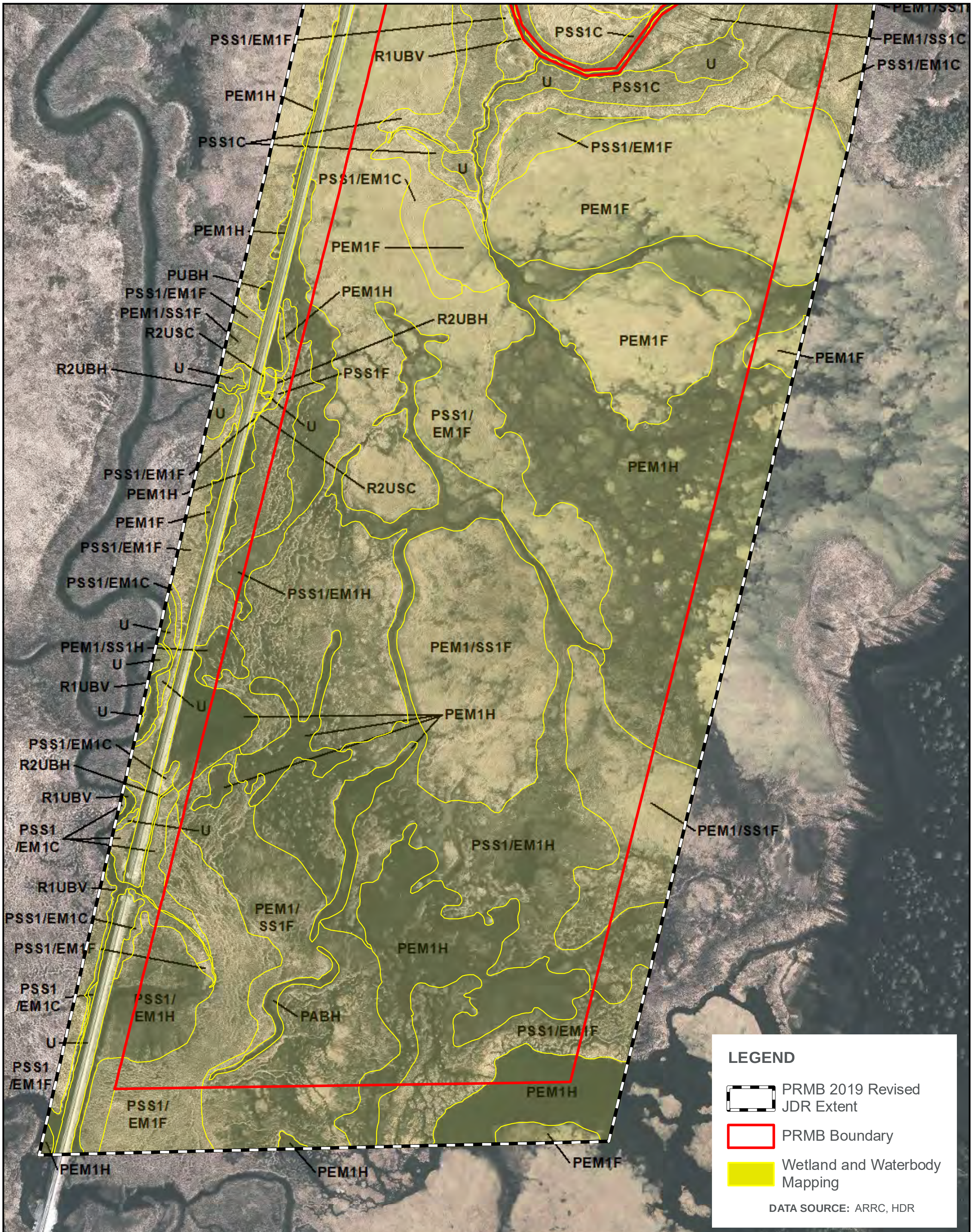
PRMB INSTRUMENT - EXHIBIT B: MITIGATION PLAN

AQUATIC RESOURCES

0 Feet 500

FIGURE 2B

ALASKA RAILROAD CORPORATION



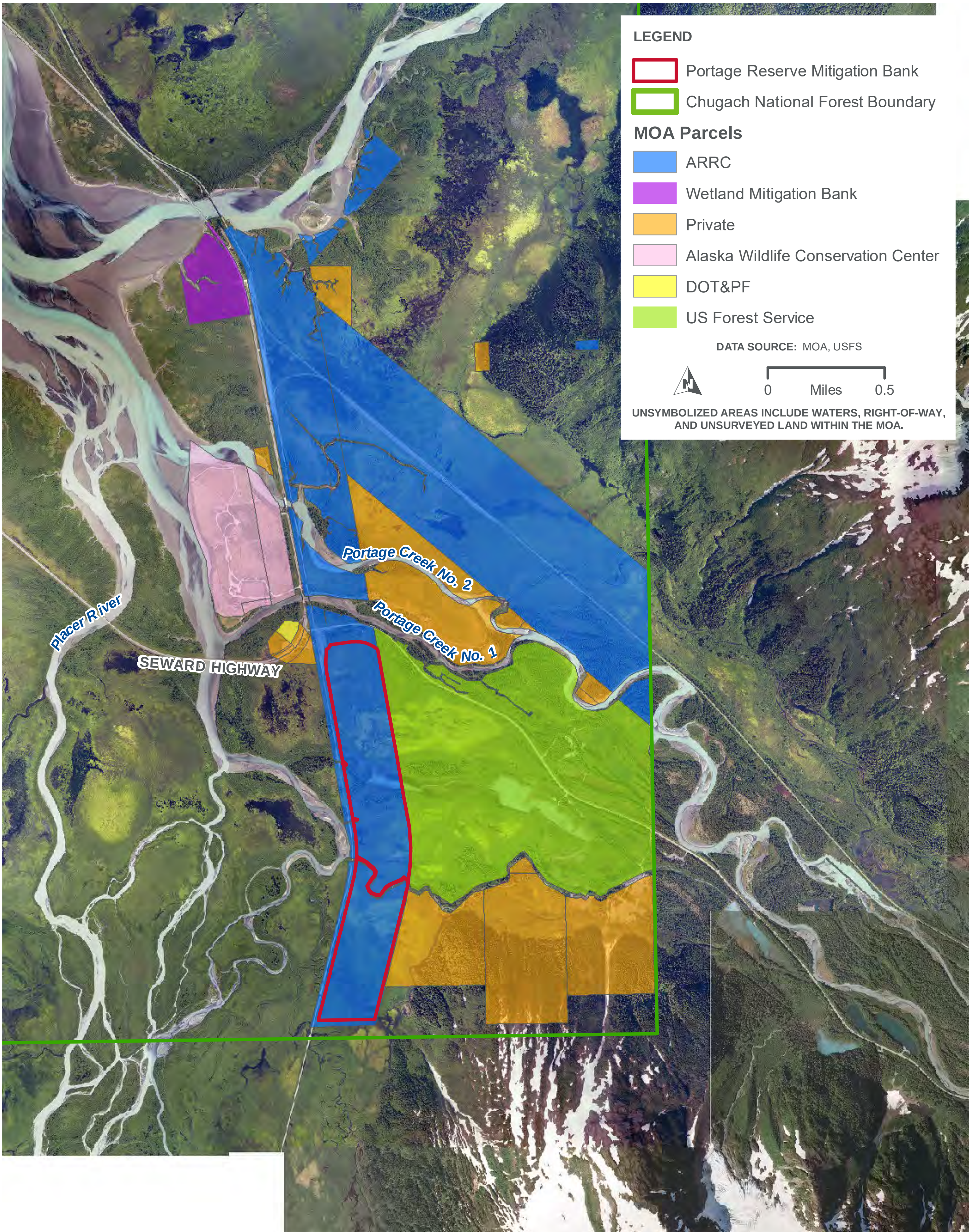
ALASKA RAILROAD

PRMB INSTRUMENT - EXHIBIT B: MITIGATION PLAN

AQUATIC RESOURCES

FIGURE 2C

ALASKA RAILROAD CORPORATION

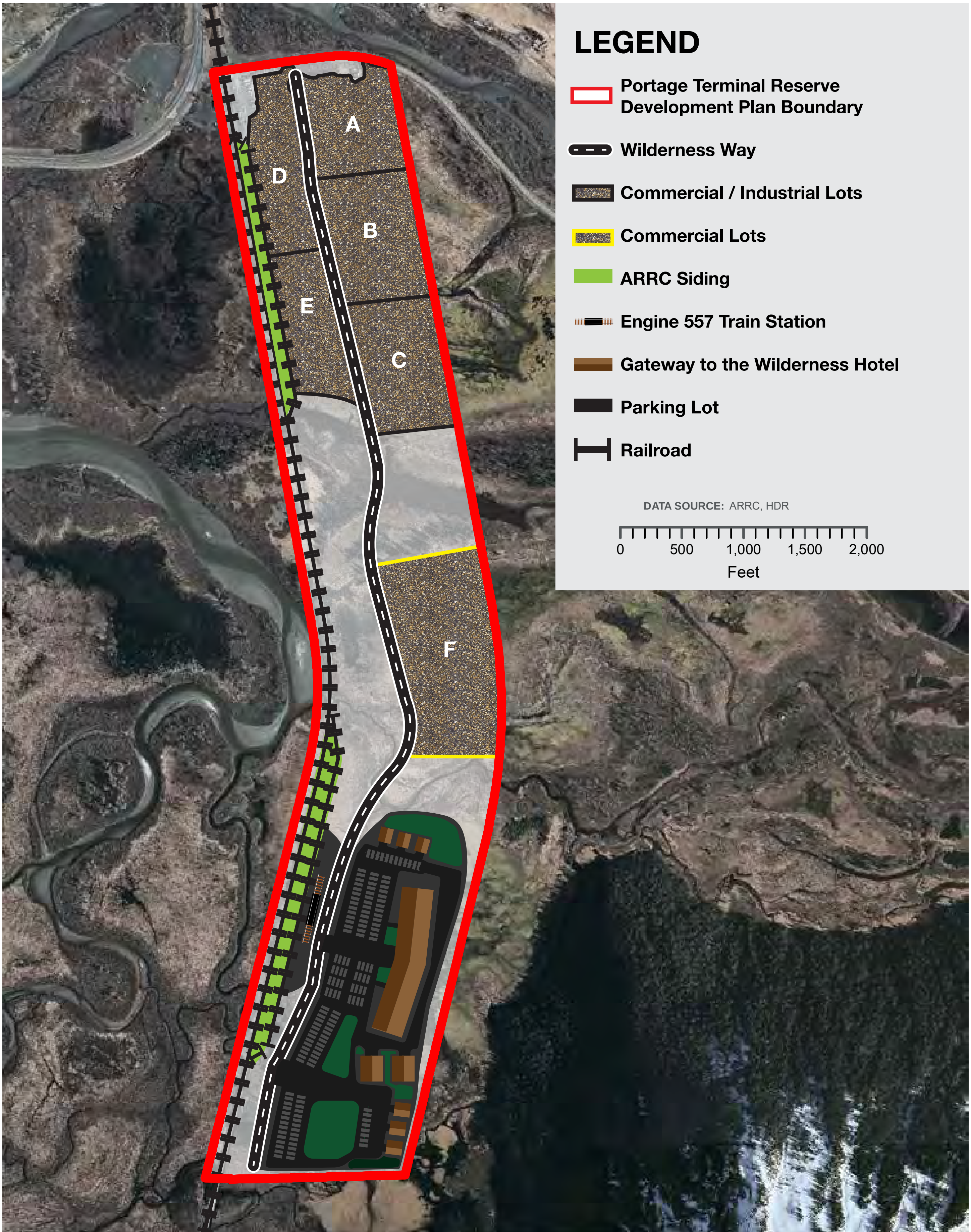


ALASKA RAILROAD

PRMB INSTRUMENT - EXHIBIT B: MITIGATION PLAN

ADJACENT LAND STATUS

FIGURE 3

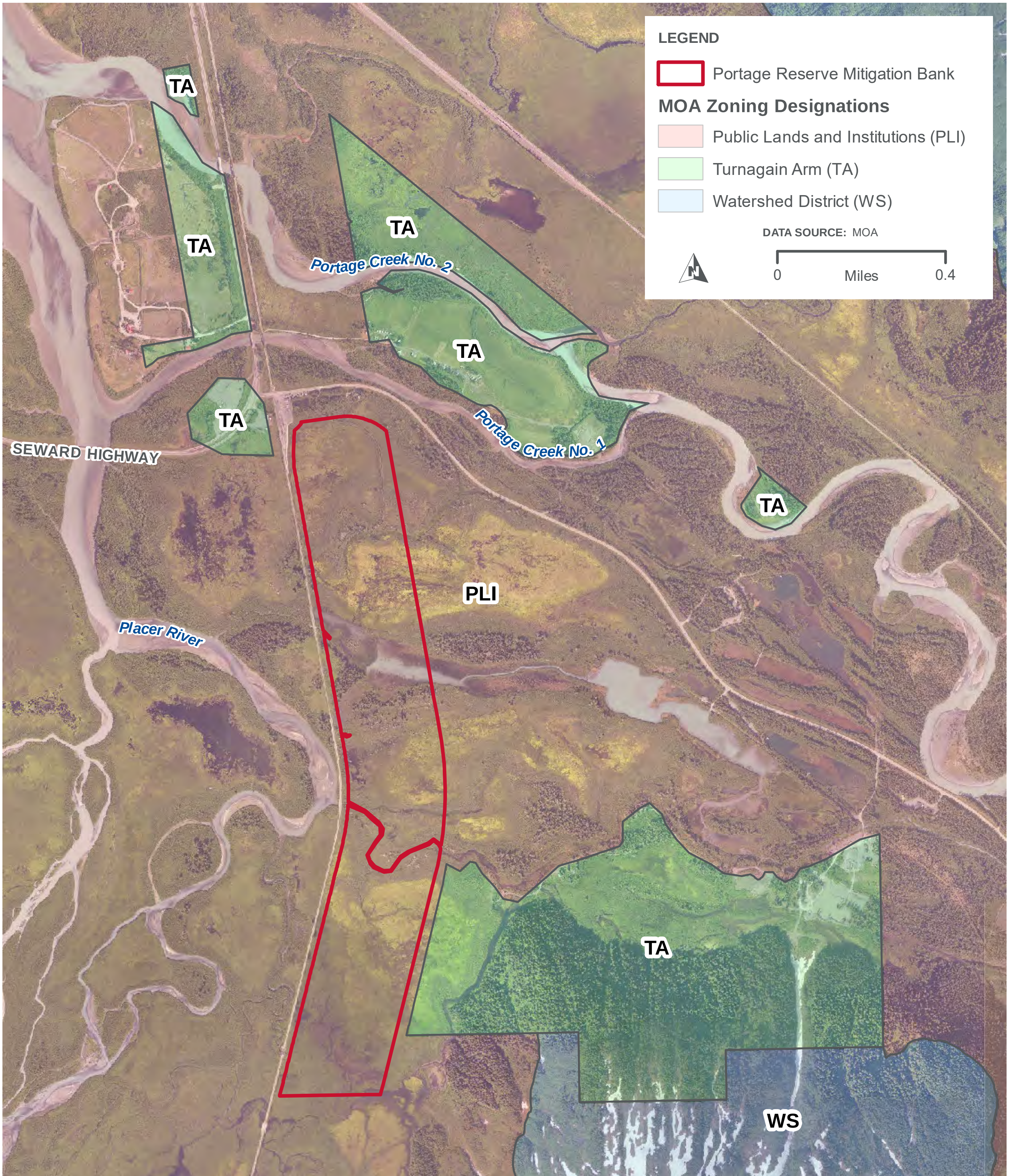


ALASKA RAILROAD

PRMB INSTRUMENT - EXHIBIT B: MITIGATION PLAN

PORTAGE TERMINAL RESERVE DEVELOPMENT CONCEPT #1

FIGURE 4



Land Use Code	Land Use District	Purpose (AMC 21.04)
PLI	Public Lands and Institutions	The PLI district is intended to include major public and quasi-public civic, administrative, and institutional uses and activities.
TA	Turnagain Arm District	The TA district covers areas governed by the *Turnagain Arm Comprehensive Plan* . Requires conditional use permits for major developments.
WS	Watershed District	The WS district is intended to preserve and protect the potable water reserves available to the municipality in the Chugach Range.

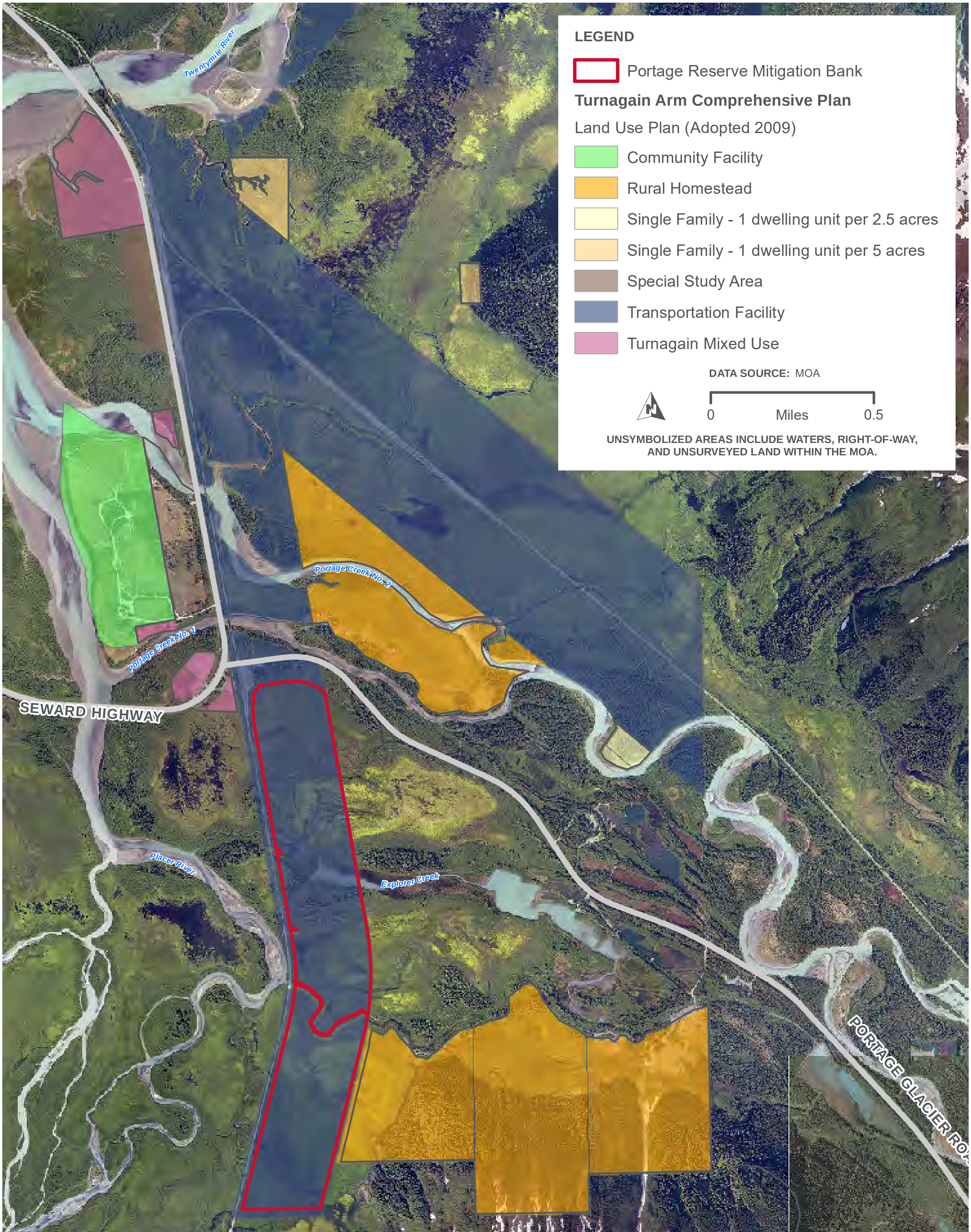
ALASKA RAILROAD

PRMB INSTRUMENT - EXHIBIT B: MITIGATION PLAN

MUNICIPALITY OF ANCHORAGE ZONING

FIGURE 5

ALASKA RAILROAD CORPORATION

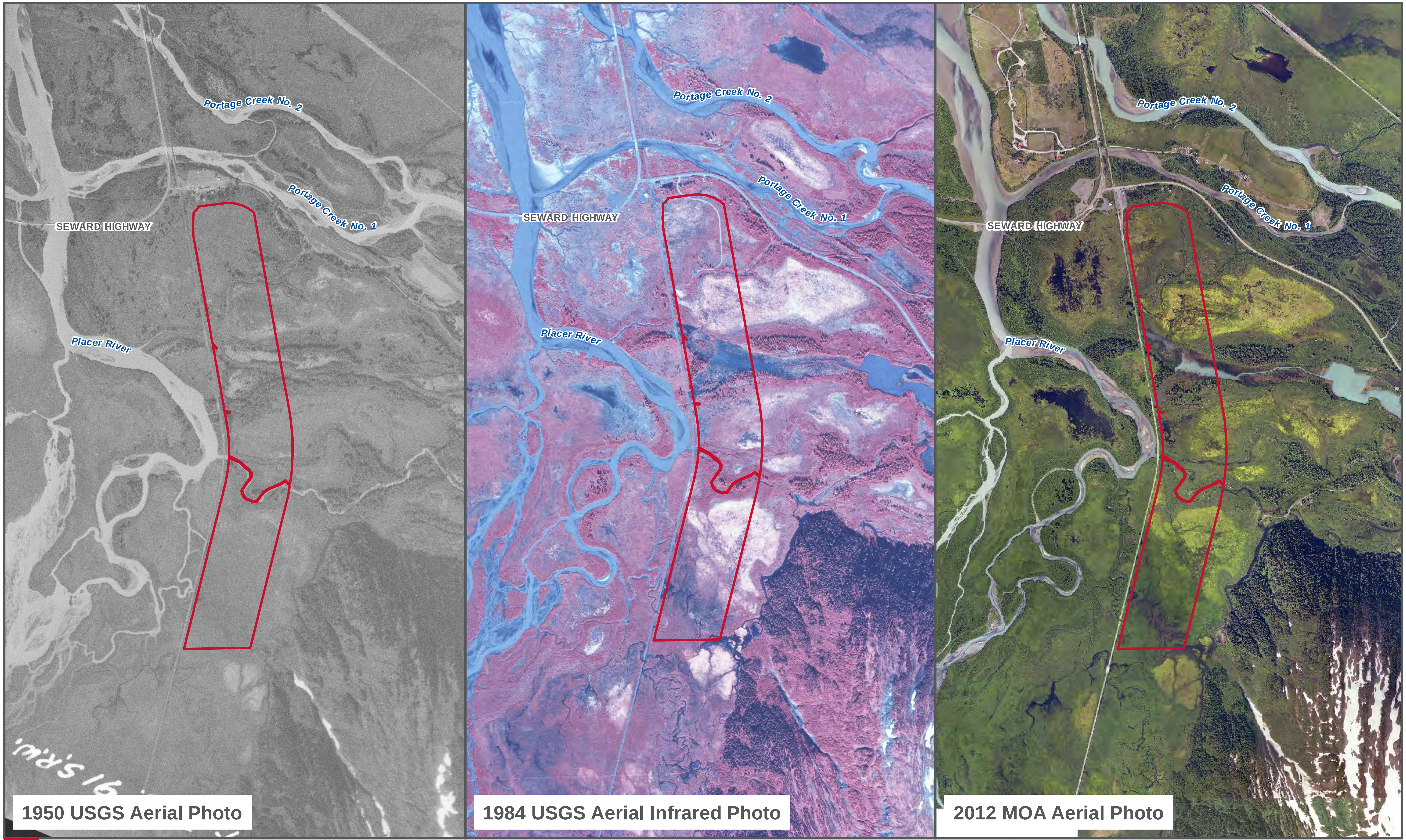


ALASKA RAILROAD

PRMB INSTRUMENT - EXHIBIT B: MITIGATION PLAN

TURNAGAIN ARM COMPREHENSIVE PLAN: LAND USE PLAN

FIGURE 6



0 Miles 0.35

LEGEND

Portage Reserve Mitigation Bank Boundary

PRMB INSTRUMENT - EXHIBIT B: MITIGATION PLAN

HISTORICAL AND RECENT AERIAL IMAGERY

FIGURE 7

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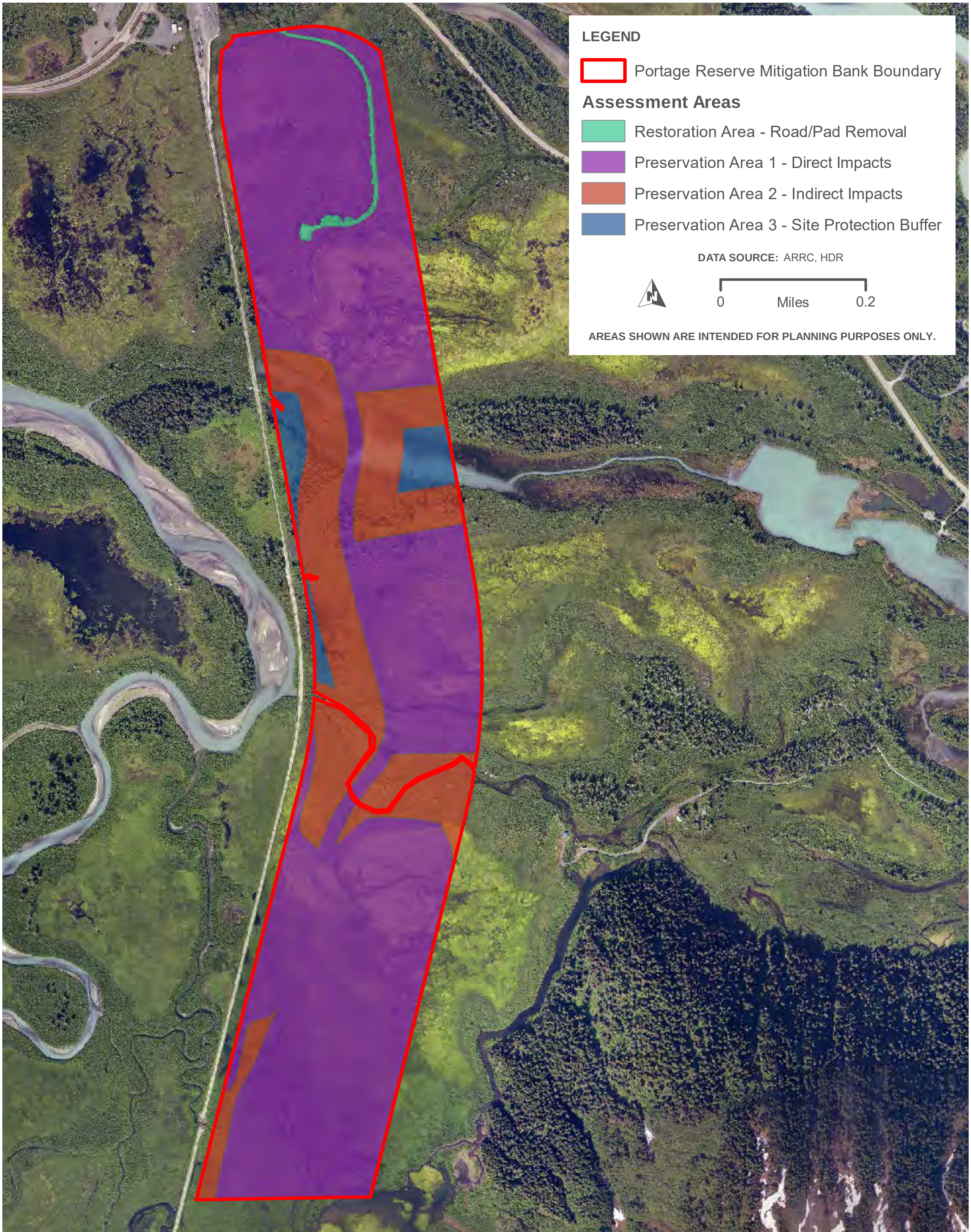


PRMB INSTRUMENT - EXHIBIT B: MITIGATION PLAN

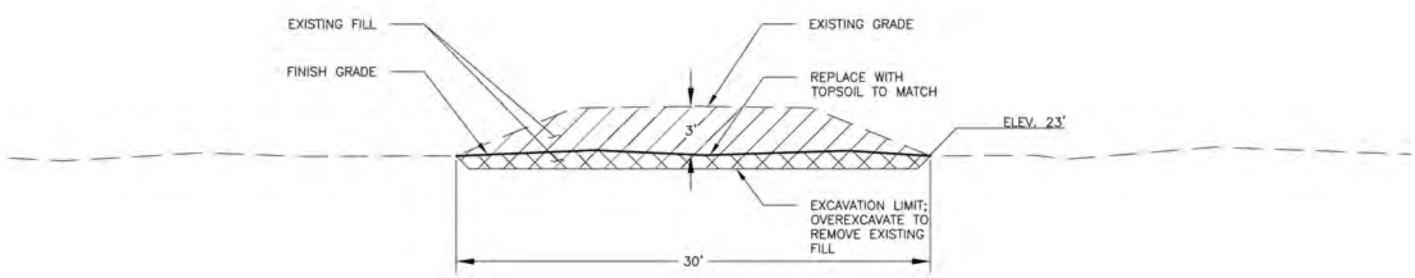
RESTORATION AND PRESERVATION ASSESSMENT AREAS

FIGURE 8

PRMB INSTRUMENT - EXHIBIT B: MITIGATION PLAN

RESTORATION PROJECT

FIGURE 9



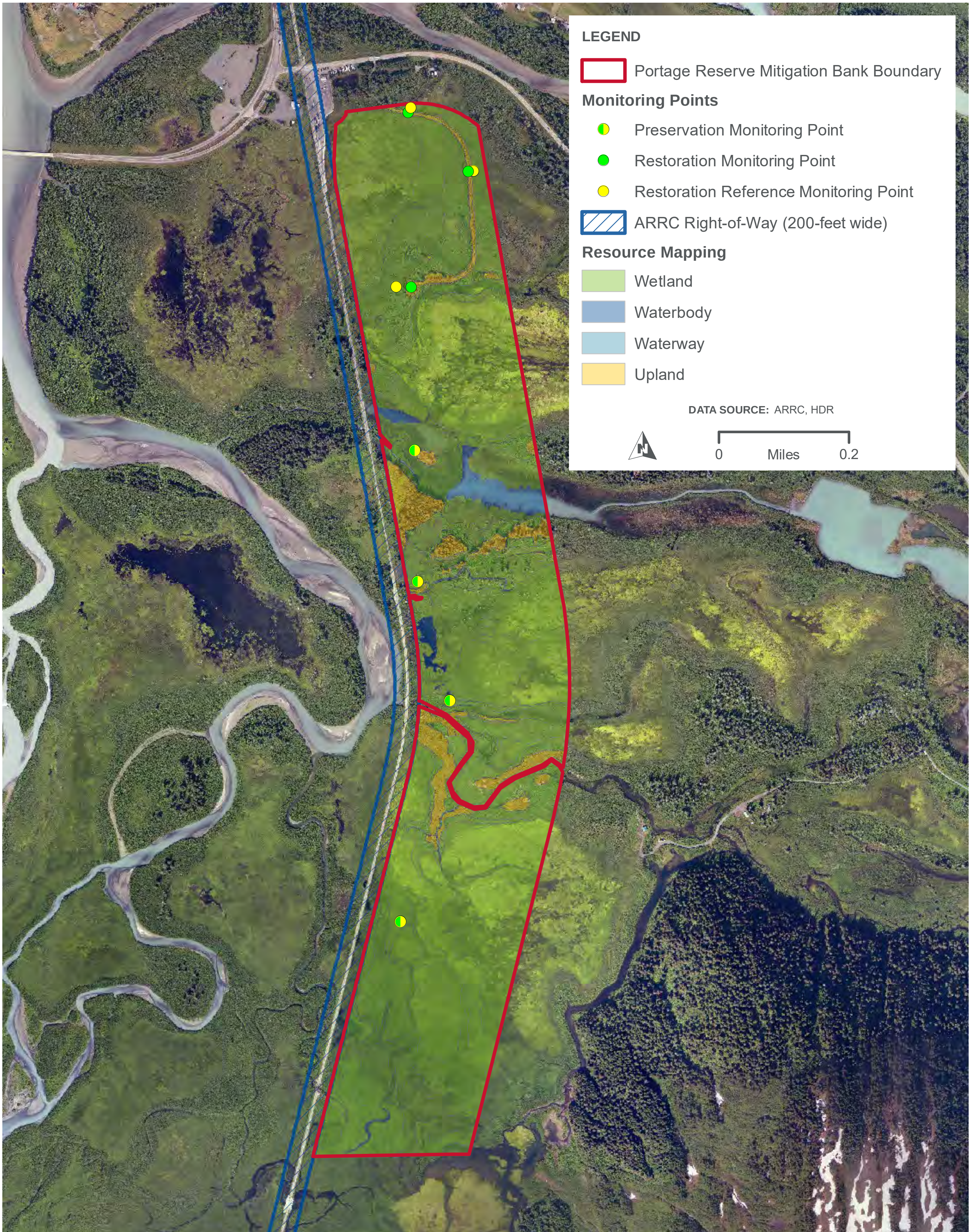
ALASKA RAILROAD

PRMB INSTRUMENT - EXHIBIT B: MITIGATION PLAN

RESTORATION PROJECT - TYPICAL CROSS SECTION

FIGURE 10

ALASKA RAILROAD CORPORATION



ALASKA RAILROAD

PRMB INSTRUMENT - EXHIBIT B: MITIGATION PLAN

MONITORING POINT LOCATIONS

FIGURE 11

Appendix A

Portage Reserve Mitigation Bank Jurisdictional Determination Report and REV Classification

Updated January 2019

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Jurisdictional Determination Report and REV Classification

Portage Reserve Mitigation Bank

Alaska Railroad Corporation

Portage, Alaska

February 2017; updated January 2019

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Contents

Tables

Figures

Appendices

Abbreviations

ADCM	Anchorage Debit Credit Method
ARRC	Alaska Railroad Corporation
CFR	Code of Federal Regulations
FAC	facultative
FACU	facultative upland
FACW	facultative wetland
GIS	Geographic Information System
GPS	Global Positioning System
HDR	HDR, Inc.
HGM	hydrogeomorphic
LiDAR	Light Detection and Ranging
MOA	Municipality of Anchorage
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
OBL	obligate
PAB	palustrine aquatic bed [pond]
PEM1	palustrine persistent emergent [wetland]
PSS1	palustrine deciduous scrub-shrub [wetland]
PUB	palustrine unconsolidated bottom [pond]
PWS	Professional Wetland Scientist
R1	tidally influenced [stream]
R3	upper perennial [stream]
REV	Relative Ecological Value
RPW	Relatively Permanent Water
TNW	Traditionally Navigable Water
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

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1.0 Introduction and Purpose

The Alaska Railroad Corporation (ARRC) is developing the Portage Reserve Mitigation Bank (PRMB) within the ARRC's Portage Terminal Reserve near Portage, Alaska. The Portage Terminal Reserve comprises 1,200 acres of developed and undeveloped land along the ARRC's main line and Whittier branch line. The proposed PRMB consists of 240.926 acres along the main line south of Portage Glacier Road. This area was identified as suitable for mitigation banking due to its high ecological value and potential for restoration projects. A requirement for development of a mitigation bank is preparation of a mitigation plan delineating wetlands and other waters of the U.S within the project site. (33 Code of Federal Regulations [CFR] §332.4 (c)(2)). ARRC contracted HDR, Inc. (HDR) to assist with the evaluation of the proposed mitigation bank parcel by identifying wetlands and other waters of the U.S. within the PRMB area. This report describes the wetlands and other waters of the U.S. delineated within the study area and classifies them by Relative Ecological Value (REV) using the Anchorage Debit-Credit Method (ADCM; Dean 2011).

The wetlands and other waters of the U.S. identified in this report are potentially subject to jurisdiction of the U.S. Army Corps of Engineers (USACE) under authority of Section 404 of the Clean Water Act of 1972 (as amended) or Section 10 of the Rivers and Harbors Act of 1899. Information presented herein complies with the USACE guidance for jurisdictional determination reports, Special Public Notice 2010-45 (USACE 2010).

1.1 Study Area Description

The 311-acre study area (PRMB area) comprises the area of the Portage Terminal Reserve south of Portage Glacier Road. This area includes the entire area of the PRMB as well as the right-of-way for the Alaska Railroad main line, and is approximately 0.25 mile wide and 1.75 long (Figure 1). The Placer River runs parallel to the rail line, less than a mile to the west of the PRMB area.

The PRMB area is located within the Skookum Creek-Placer River and Portage Creek watersheds (12-digit hydrologic unit codes] 190208000007 and 190203020304 respectively; U.S. Geological Survey [USGS] 2016). These watersheds drain runoff from snow and glaciers visible from the PRMB; the closest glaciers include Explorer Glacier, Portage Glacier, Byron Glacier, and Skookum Glacier. Many more glaciers upstream of the Placer River influence the hydrology in the area as well. The PRMB area can be found on the Seward D-6 USGS quadrangle located within Sections 5 and 6; Township 8 North, Range 3 East, Seward Meridian. The center of the PRMB area is located approximately at a latitude/longitude of 60.80656° N, -14896857° W (NAD83).

The PRMB area is within the Municipality of Anchorage (MOA). The PRMB area is within one of several private land parcels located in Portage, an area surrounded by the Chugach National Forest. The town of Portage was abandoned after the 1964 Good Friday Earthquake, which lowered the elevation of the town and surrounding area by 6 feet. This caused the area to become inundated with saltwater, killing most of the trees. Much of the Portage area now floods at high tide. Portage is now comprised of the Portage Section House (owned by ARRC) and the Alaska Wildlife Conservation Center, adjacent to Turnagain Arm.

1.2 Regulatory Definitions

Wetlands, waters of the U.S., and uplands (non-wetlands), as referenced in this report, are defined as follows:

> *Wetlands:* "Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR 328.3(b)). Wetlands are a subset of "waters of the U.S." Note that according to the 1987 Corps of Engineers Wetlands Delineation Manual (*Wetlands Delineation Manual*) and in the 2007 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Alaska Region (*Regional Supplement*; USACE 1987, 2007), wetlands must possess the following three characteristics: (1) a vegetation community dominated by plant species that are typically adapted for life in saturated soils, (2) inundation or saturation of the soil during the growing season, and (3) soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions.
>
> *Other Waters of the U.S.:* In addition to wetlands, waters of the U.S. include other waterbodies regulated by USACE including navigable waters, lakes, ponds, and streams.
>
> *Uplands:* Non-water and non-wetland areas are called uplands.

2.0 Methods

2.1 Field Work

HDR wetland scientists Malcolm Salway (Professional Wetland Scientist [PWS] # 1762), Zachary Halstead (PWS # 2046), Simon Wigren (PWS # 2669), and Andrew Dougherty conducted an on-site investigation of wetlands and waterbodies within the entire Portage Terminal Reserve on September 29 and 30, 2016; however, only field data collected within the PRMB area are included in this report. Soil conditions, hydrology, and vegetation communities were studied using methods described in the 1987 *Wetlands Delineation Manual* and 2007 *Regional Supplement* (USACE 1987, USACE 2007). The field work occurred less than a week outside the USACE's recommended growing season (May 29 to September 27) for the Pacific Coastal Mountains ecoregion in which the PRMB area is located (USACE 2007). However, while the first hard frost (temperature below 28° F) of the fall occurred on September 28 (Natural Resources Conservation Service [NRCS], 2016a), vegetation was still able to be identified to meet the requirements of the 2007 *Regional Supplement* (greater than 80% of plant species were identifiable).

Wetland/upland boundaries were determined by completing paired data points. This process involved completing standard USACE Wetland Determination Forms (taken from the 2007 *Regional Supplement*) near observable transition zones between wetter and drier areas. A determination form was completed in the wet area to verify its wetland status and then a second determination form was completed in the drier area to verify its upland status. The wetland/upland boundary between the two data plots was then identified and marked on field maps.

Standard USACE Wetland Determination Forms were completed at 15 sites within the PRMB area. Photographs and observational data were collected at 56 additional Observation Points to document sites that exhibited similar characteristics to those areas where a data form had already been completed, or to document the presence of a waterbody or stream. Locations of both Wetland Determination Form and Observation Point sites were logged into a handheld global positioning system (GPS) unit and are shown on Figure 3.

2.2 Wetland Mapping and Classification

Upon returning from the field, scientists analyzed field-collected data and reviewed the following datasets in a Geographic Information System (GIS) to help delineate and classify wetlands and waterbodies in the PRMB area:

- Digital color ortho-rectified aerial photography taken in 2015, at sub-meter horizontal accuracy ground pixel resolution provided by the MOA (MOA 2015a)
- Light Detection and Ranging (LiDAR) raster dataset, at a 3-foot ground pixel resolution provided by MOA (MOA 2015b)
- U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) digital wetland mapping (USFWS 2014; see Figure 2)
- *Anchorage Wetland Management Plan* wetland mapping (MOA 2005; see Figure 2)

GPS locations of field-visited sites were overlaid on the aerial photography in GIS to identify and classify wetlands and other waters present within the PRMB area. Aerial photography vegetation signatures from these field-visited sites were then extrapolated to similar locations throughout the PRMB area and wetland/upland boundaries were digitized into GIS. Delineating wetlands from aerial photography includes the following methods:

- *Vegetation clues:* Scientists examine aerial photographs for saturation-adapted vegetation communities; indicative canopy structure and height; and presence of hydrophytic plant species.
- *Evidence of soil saturation:* A site's proximity to streams, open water habitat, and marshes can be indicative of shallow subsurface water. Scientists, therefore, look for visible evidence of wetland hydrology, including surface water and darker areas of photos indicating surface saturation.
- *Topography:* Evidence of topographic high points and sloped surfaces that would allow soils to drain supports classification of areas as upland. Topographic depressions, toes of slopes, and flat topography serve as indicators of potentially poor soil drainage.

Wetlands and waterbodies were classified based on a review of field notes, data forms, and site photographs. Polygons identifying homogeneous wetland and waterbody areas in the GIS-based mapping were attributed with NWI mapping codes based on the USFWS's *Classification of Wetlands and Deepwater Habitats of the U.S.* (Cowardin et al. 1979).

2.3 Relative Ecological Value (REV) Categorization

Wetland scientists analyzed field data and GIS mapping to classify the PRMB area by REV, according to the process detailed in the ADCM (Dean 2011). REV categories are a hierarchical way of indicating the "level of ecological function typically performed by a particular polygon"

(Dean 2011). This wetland functional categorization is used within the MOA to determine appropriate compensatory mitigation during the Section 404/10 permitting process. Categories range from REV1 (highest functional value) to REV4 (lowest functional value), and are based on factors including landform, size, hydrologic regime, plant community, fish and wildlife use, extent of degradation, and adjacency to waterbodies.

The REVs assigned to wetlands and waterbodies within the PRMB area are presented in Section 7.0 of this report. Each REV was assigned based on the characteristics described in "*Table 1: Polygons, and Relative Ecological Values (REVs), Grouped by Landform,*" found in the ADCM (Dean 2011).

3.0 Summary of Wetland Indicators

The vegetation, hydrology, and soil conditions described in this report are based on the field investigation conducted by HDR between September 29 and 30, 2016. Wetlands were identified in the field where scientists observed indicators of hydrophytic vegetation, wetland hydrology, and hydric soils. Of the 15 locations where a data form was completed, ten were determined to be wetland. Of the five remaining upland sites, two met the criteria for hydrophytic vegetation and wetland hydrology, but did not meet the criteria for hydric soil. Two sites met the criteria for hydrophytic vegetation but did not meet the criteria for hydric soil or wetland hydrology. The other upland site did not meet any of the three criteria required to be a wetland. Table 1 summarizes the Wetland Determination Form sites. The completed Wetland Determination Forms and photographs taken at each site are included in Appendix A.

In addition to the 15 locations where Wetland Determination Forms were completed, 55 Observation Points were documented. Observational data was collected at these points to describe the wetland or upland status of the community sampled, or to document the presence of a waterbody or stream feature. Photographs taken at each Observation Point are included in Appendix B.

Table 1. Summary of Wetland Determination Form Sites

Site	Latitude	Longitude	NWI Code[a]	HGM Class[b]	Hydrophytic Vegetation	Hydric Soils	Wetland Hydrology
1	60.800022	-148.97209	PSS1/EM1F	Flat	X	X	X
2	60.799913	-148.97136	PSS1/EM1H	Flat	X	X	X
3	60.80016	-148.970525	PSS1/EM1F	Flat	X	X	X
6	60.80024	-148.972084	U	-	X		X
13	60.804367	-148.96992	U	-	X		
19	60.805045	-148.968138	PEM1/SS1C	Flat	X	X	X
31	60.807392	-148.970043	U	-	X		X
36	60.807698	-148.969513	PEM1C	Flat	X	X	X
38	60.808132	-148.970398	U	-	X		
46	60.810926	-148.971398	PSS1C	Riverine	X	X	X
47	60.810546	-148.970933	PEM1C	Flat	X	X	X
49	60.810152	-148.970794	U	-			
56	60.811827	-148.971357	PEM1F	Flat	X	X	X

Table 1. Summary of Wetland Determination Form Sites

Site	Latitude	Longitude	NWI Code[a]	HGM Class[b]	Hydrophytic Vegetation	Hydric Soils	Wetland Hydrology
59	60.814246	-148.970273	PSS1/EM1C	Flat	X	X	X
63	60.815457	-148.966476	PSS1/EM1C	Flat	X	X	X

[a] Cowardin et al. 1979.
[b] Brinson 1993
HGM = hydrogeomorphic

3.1 Vegetation

A list of the dominant vascular plant species observed in the PRMB area during the field investigation and their indicator status (Lichvar et al. 2014, USACE 2016) is provided in Table 2. Synonyms of plant species names that were recorded in the field on Wetland Determination Forms are also included in the table. The dominant plant species were identified by using the "50/20 Rule" from the *Regional Supplement* (USACE 2007).

In total, 14 of the 15 sites where Wetland Determination Forms were completed met the requirements for hydrophytic vegetation, either through the dominance test or prevalence index (see Table 3). Hydrophytic vegetation was not always correlated with a wetland, as four sites with hydrophytic vegetation did not meet the remaining criteria to be classified as wetland. Site 49 was the only site not meeting the requirements for hydrophytic vegetation. Dominant plant species at Site 49 were red elder (*Sambucus racemosa*), narrow-leaf fireweed (*Chamaenerion angustifolium*), and bluejoint reedgrass (*Calamagrostis canadensis).*

Nine of the 14 sites where hydrophytic vegetation was documented were scrub-shrub communities. The remaining hydrophytic communities sampled were emergent (4 sites) and forested (1 site).

Table 2. Dominant Plant Species and Alaska Regional Indicator Status

Scientific Name (Synonym)	Common Name	Indicator Status[1]	Scientific Name (Synonym)	Common Name	Indicator Status[1]
Alnus viridus (Alnus sinuata)	Sitka Alder	FAC	*Myrica gale*	Sweetgale	OBL
Athyrium cyclosorum (Athyrium filix-femina)	Western Lady Fern	FAC	*Pedicularis langsdorfii*	Langsdorf's Lousewort	FACW
Calamagrostis canadensis	Bluejoint Reedgrass	FAC	*Picea glauca*	White Spruce	FACU
Carex limosa	Mud Sedge	OBL	*Populus balsamifera*	Balsam Poplar	FACU
Carex utriculata	Northwest Territory Sedge	OBL	*Salix barclayi*	Barclay's WIllow	FAC
Chamaenerion angustifolium (Epilobium angustifolium)	Narrow-Leaf Fireweed	FACU	*Salix fuscescens*	Alaska Bog Willow	FACW
Comarum palustre (Potentilla palustrus)	Purple Marshlocks	OBL	*Salix glauca*	Gray-Leaf Willow	FAC

Table 2. Dominant Plant Species and Alaska Regional Indicator Status

Scientific Name (Synonym)	Common Name	Indicator Status[1]	Scientific Name (Synonym)	Common Name	Indicator Status[1]
Dryopteris expansa (Dryopteris dilatata)	Spreading Wood Fern	FACU	*Salix pulchra*	Diamond-Leaf Willow	FACW
Eriophorum angustifolium	Tall Cotton-Grass	OBL	*Salix scouleriana*	Scouler's WIllow	FAC
Equisetum arvense	Field Horsetail	FAC	*Sambucus racemosa*	Red Elder	FACU
Equisetum fluviatile	Water Horsetail	OBL	*Viburnum edule*	Squashberry	FACU

[1] Wetland Indicator Status (Lichvar et al. 2014, USACE 2016). **FAC**: Facultative - species equally likely to occur in wetlands and non-wetlands; **FACU**: Facultative Upland - species usually occurs in non-wetlands; **FACW**: Facultative Wetland - species usually occurs in wetlands; **OBL:** Obligate Wetland - species almost always occurs under natural conditions in wetlands.

Table 3. Hydrophytic Vegetation Indicators at Wetland Determination Form Sites

Site	NWI Code[a]	Dominance Test (percent)	Hydrophytic Through Dominance Test	Prevalence Index	Hydrophytic Through Prevalence Index	Hydrophytic Vegetation Present?
1	PSS1/EM1F	100	X	2.01	X	**X**
2	PSS1/EM1H	100	X	1.23	X	**X**
3	PSS1/EM1F	100	X	1.34	X	**X**
6	U	100	X	2.89	X	**X**
13	U	67	X	3.25	-	**X**
19	PEM1/SS1C	100	X	2.78	X	**X**
31	U	100	X	3.00	X	**X**
36	PEM1C	100	X	2.64	X	**X**
38	U	60	X	3.49	-	**X**
46	PSS1C	100	X	2.69	X	**X**
47	PEM1C	100	X	1.94	X	**X**
49	U	33	-	3.42	-	**-**
56	PEM1F	100	X	1.67	X	**X**
59	PSS1/EM1C	100	X	2.58	X	**X**
63	PSS1/EM1C	100	X	2.97	X	**X**
	TOTAL	-	14	-	12	**14**

[a] Cowardin et al. 1979.

3.2 Soils

The PRMB area is not mapped by any detailed regionally-specific NRCS soil survey. Site specific soil characteristics were documented at each of the 15 Wetland Determination Form sites and is summarized in Table 4. Histosols were observed at three of the 15 Wetland Determination Form sites and a histic epipedon was observed at another site. Hydrogen sulfide was detected at four of the sites, Alaska redox at four sites, and Alaska gleyed without hue 5Y or redder underlying layer was found at one site. Five Wetland Determination Form sites did not exhibit hydric soil characteristics and were classified as upland. These sites generally had shallow organic horizons, with six inches or less of an organic soil layer. These sites lacked all other hydric soil indicators.

Specific information about the soil horizons and hydric soil indicators (e.g., depth of organic horizon) can be found on the data forms included in Appendix A. These indicators are further described in the 2007 *Regional Supplement* (USACE 2007).

Table 4. Hydric Soil Indicators at Data Collection Sites

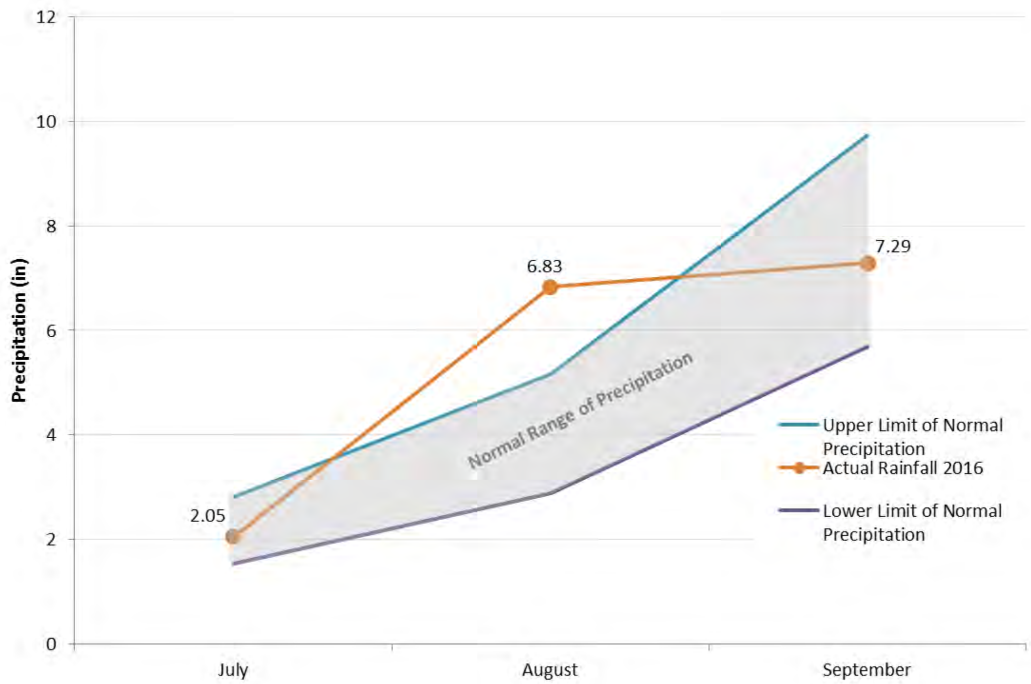
Site	NWI Code[a]	Histosol or Histel	Histic Epipedon	Hydrogen Sulfide	Alaska Redox	Alaska Gleyed without Hue 5Y or Redder Underlying Layer	Hydric Soil Present?
1	PSS1/EM1F	X		X			**X**
2	PSS1/EM1H	X					**X**
3	PSS1/EM1F	X					**X**
6	U						**-**
13	U						**-**
19	PEM1/SS1C			X	X		**X**
31	U						**-**
36	PEM1C			X			**X**
38	U						**-**
46	PSS1C				X		**X**
47	PEM1C				X		**X**
49	U						**-**
56	PEM1F		X	X			**X**
59	PSS1/EM1C				X		**X**
63	PSS1/EM1C					X	**X**
	TOTAL	**3**	**1**	**4**	**4**	**1**	**10**

[a] Cowardin et al. 1979.

3.3 Hydrology

Precipitation data for the 3 months prior to the September 29 and 30 field investigation was reviewed to determine the degree to which any recent weather (e.g., abnormal wet or dry conditions) may have influenced field hydrology (NRCS 2016a). Climate data for the surrounding region were obtained for the Alyeska weather station in Girdwood, located approximately 11 miles northwest of the PRMB area (NRCS 2016b). A closer weather station at the Portage Glacier Visitor Center (4.5 miles southeast of the PRMB) provides monthly precipitation data but not the historical weather data necessary to determine normal conditions. The precipitation trend of the Portage Glacier Visitor Center in the preceding 3 months closely correlated that of the Alyeska weather station. Therefore, the Alyeska station was deemed sufficient to compare antecedent precipitation to normal conditions in the PRMB area.

The monthly precipitation totals recorded at the Alyeska weather station for the 3 months preceding the field visit were then compared to normal monthly totals derived from 1971 to 2000 using the NRCS *Engineering Field Handbook* method (NRCS 2016b, 1997). This method weights the data by both the amount of precipitation and the relative age of a rainfall event. The results of the comparison are shown in Inset 1. Using the NRCS method, it was determined that the field work occurred during a period with normal antecedent precipitation.



Inset 1: Monthly precipitation totals in Girdwood, Alaska, compared to normal

Twelve of the fifteen Wetland Determination Form sites showed indicators of wetland hydrology. Of those twelve, six were inundated (see Table 5). The most common primary hydrology indicators displayed were saturation and/or a high water table present within the upper 12 inches. The most common secondary indicators observed were drainage patterns and a positive FAC-neutral test result.

Specific information about the different wetland hydrology indicators (e.g., depth to saturation within the soil pit) can be found on the data forms included in Appendix A. These indicators are further described in the 2007 *Regional Supplement* (USACE 2007).

Table 5. Wetland Hydrology Indicators at Data Collection Sites

Site	NWI Code[a]	Primary Indicators					Secondary Indicators					Wetland Hydrology Present?
		Surface Water	High Water Table	Saturation	Water Marks	Hydrogen Sulfide Odor	Water-Stained Leaves	Drainage Patterns	Oxidized Rhizospheres	Geomorphic Position	FAC-Neutral Test	
1	PSS1/EM1F	X	X	X		X					X	**X**
2	PSS1/EM1H	X	X	X							X	**X**
3	PSS1/EM1F	X	X	X							X	**X**
6	U							X	X			**X**
13	U											**-**
19	PEM1/SS1C			X		X		X				**X**
31	U								X	X		**X**
36	PEM1C	X	X	X		X		X				**X**
38	U											**-**
46	PSS1C						X	X			X	**X**
47	PEM1C			X	X				X		X	**X**
49	U											**-**
56	PEM1F	X	X	X		X					X	**X**
59	PSS1/EM1C	X	X	X				X				**X**
63	PSS1/EM1C		X	X								**X**
TOTAL		**6**	**7**	**9**	**1**	**4**	**1**	**5**	**3**	**1**	**6**	**12**

[a] Cowardin et al. 1979.

4.0 Wetland and Waterbody Classification

Wetlands were identified where wetland scientists observed indicators of hydrophytic vegetation, wetland hydrology, and hydric soils. If any of these three requirements are not met under normal conditions, the site does not meet the USACE criteria for being classified as a wetland. Waterbodies were identified to their ordinary high water mark using procedures outlined in Regulatory Guidance Letter 05-05 (USACE 2005). Wetland/upland determinations were made at 15 sites where Wetland Determination Forms were completed and at 55 Observation Points.

4.1 Scrub-Shrub Wetlands

Broad-leaved deciduous scrub-shrub (PSS1) wetlands occupy 98.5 acres (approximately 32 percent) of the PRMB area (Inset 2). These wetlands are found throughout the PRMB area, especially in the southern half adjacent to the rail line.

Inset 2: Semipermanently flooded broad-leaved deciduous scrub-shrub/ persistent emergent wetland (PSS1/EM1F) at Site 1

Vegetation is typically dominated by sweetgale (*Myrica gale*), Barclay's willow (*Salix barclayi*), Sitka alder (*Alnus viridus*), and squashberry (*Viburnum edule*). Common herb species include bluejoint reedgrass, water horsetail (*Equisetum fluviatile*), tall cotton-grass (*Eriophorum angustifolium*), and mud sedge (*Carex limosa*).

Scrub-shrub wetlands mapped within the project area typically have a have a semipermanently flooded, seasonally flooded, or permanently flooded hydrologic regime. Soils are typically composed of at least 16 inches of organic material (Histosol) or contain mineral soil displaying Alaska Redox or Alaska Gleyed without Hue 5Y or Redder Underlying Layer. Soils with Alaska Gleyed without Hue 5Y or Redder Underlying Layer also had at least one primary indicator of wetland hydrology, hydrophytic vegetation, and were in an appropriate landscape position.

4.2 Emergent Wetlands

Persistent emergent (PEM1) wetlands comprise 164.6 acres (approximately 53 percent) of the PRMB area (Inset 3). These wetlands are part of large wetland complexes and found directly adjacent to waterbodies within the PRMB area.

Vegetation is typically dominated by bluejoint reedgrass, water horsetail, and Northwest Territory sedge (*Carex utriculata*).

Inset 3: Permanently flooded persistent emergent wetland (PEM1H) at Site 65

Approximately 92 percent of emergent wetlands mapped within the PRMB area have a semipermanently flooded or permanently flooded hydrologic regime. These areas are typically wetter than the immediately surrounding scrub-shrub vegetation communities. Hydric soil indicators included a hydrogen sulfide odor within the upper 12 inches of the soil surface, Alaska Redox, and/or a histic epipedon.

4.3 Waterbodies

Waterbodies account for 9.2 acres (approximately 3 percent) o of the PRMB area. Waterbodies in the PRMB area were classified either as streams or ponds.

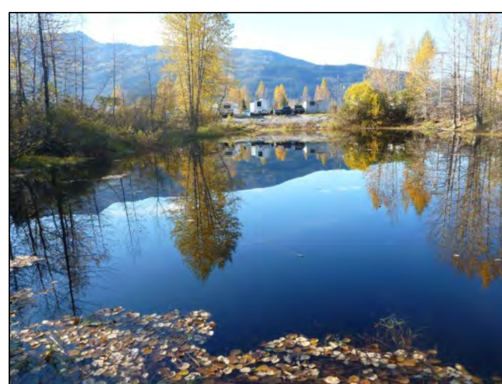
4.3.1 Streams

Streams within the PRMB area are both perennial (R3) and tidally influenced (R1). Portage is located at the head of Turnagain Arm, which has a mean tidal range of 30 feet, the fourth largest tide in the world. These tides result in a fluctuating water level at the mouth of Placer River and some of the surrounding streams within the PRMB area. These tidally influenced streams are relatively deep with steep banks. They are permanently flooded with a silty unconsolidated bottom similar to the mudflats adjacent to Turnagain Arm (Inset 4). Perennial streams in the PRMB area are either permanently or seasonally flooded with an unconsolidated bottom or shore. Several streams flow through culverts beneath the rail line. These culverts connect the wetlands and streams within the PRMB to Placer and Portage rivers as they flow into Cook Inlet.

Inset 4: Permanently flooded freshwater tidal stream with an unconsolidated bottom (R1UBV) at Site 16

4.3.2 Ponds

Ponds within the PRMB area are permanently flooded waterbodies with either unconsolidated bottoms (PUB) or aquatic beds (PAB). One small pond adjacent to the Portage Section House at the northern end of the PRMB area appears to be excavated out of uplands (Site 70, PUBHx; Inset 5).



Inset 5: Excavated permanently flooded pond with an unconsolidated bottom (PUBHx) at Site 70

4.4 Uplands

Uplands account for 38.4 acres (approximately 12 percent) of the PRMB area. Forty-three percent of the mapped uplands are disturbed and have been filled, including the rail line and a parking lot off Portage Glacier Road. The ARRC main line is a narrow band of gravel fill running along the western boundary of the PRMB area. The fill prism is typically bordered by a narrow band of natural or naturalized uplands. The north section of the PRMB area also contains an overgrown gravel road and abandoned microwave tower pad.

Inset 6: Upland (U) tall closed willow shrub at Site 6

Local topography is a major factor influencing wetland/upland status within the PRMB area, with uplands present on elevated ground surfaces above the influence of the water table. Upland vegetation communities in the PRMB area include closed alder thicket, spruce forest, or tall closed willow shrub. Common trees and shrubs in upland areas include Sitka alder, white spruce (*Picea glauca*), cottonwood (*Populus balsamifera*), diamond-leaf willow (*Salix pulchra*), and squashberry. Common herbs found include narrow-leaf fireweed, bluejoint reedgrass, and spreading wood fern (*Dryopteris expansa*). Soils at upland sites were generally well-drained and sandy with no indicators of hydrology.

5.0 Wetland Mapping Results

Wetland/upland determinations were made at 15 sites where Wetland Determination Forms were completed and at 35 Observation Points. Waterbodies were documented at an additional 20 Observation Points.

Approximately 272.2 acres (approximately 88 percent) of the 311.0-acre PRMB area were identified as wetlands and waterbodies. Wetland types include scrub-shrub and emergent wetlands. The remaining 38.4 acres of the PRMB area was identified as upland. Wetland and waterbody classes found within the PRMB area and acreages of each NWI classification type are provided in Table 6.

Figure 3 displays the wetland, upland, and waterbody boundaries, and the boundaries between different wetland and waterbody types identified in the PRMB area. Locations of the Wetland Determination Form sites and Observation Points collected during the fieldwork are also shown on the Figure 3.

Table 6. Wetland, Waterbody, and Upland Mapping Summary

NWI Code	Description	Acres*
Scrub-Shrub Wetlands		
PSS1B	Saturated broad-leaved deciduous scrub-shrub wetland	0.17
PSS1C	Seasonally flooded broad-leaved deciduous scrub-shrub wetland	10.24
PSS1F	Semipermanently flooded broad-leaved deciduous scrub-shrub wetland	0.13
PSS1/EM1B	Saturated broad-leaved deciduous scrub-shrub/persistent emergent wetland	0.35
PSS1/EM1C	Seasonally flooded broad-leaved deciduous scrub-shrub/persistent emergent wetland	29.22
PSS1/EM1F	Semipermanently flooded broad-leaved deciduous scrub-shrub/ persistent emergent wetland	40.37
PSS1/EM1H	Permanently flooded broad-leaved deciduous scrub-shrub/ persistent emergent wetland	17.99
	Total Scrub-Shrub Wetlands	***98.46***
Emergent Wetlands		
PEM1B	Saturated persistent emergent wetland	0.30
PEM1C	Seasonally flooded persistent emergent wetland	0.92
PEM1F	Semipermanently flooded persistent emergent wetland	19.73
PEM1H	Permanently flooded persistent emergent wetland	108.66
PEM1/SS1C	Seasonally flooded persistent emergent/ broad-leaved deciduous scrub-shrub wetland	11.88
PEM1/SS1F	Semipermanently flooded persistent emergent/ broad-leaved deciduous scrub-shrub wetland	22.17
PEM1/SS1H	Permanently flooded persistent emergent/ broad-leaved deciduous scrub-shrub wetland	0.93
	Total Emergent Wetlands	***164.58***
Waterbodies		
Ponds		
PABH	Permanently flooded aquatic bed wetland	0.35
PUBH	Permanently flooded unconsolidated bottom wetland	5.84
PUBHx	Permanently flooded unconsolidated bottom wetland (excavated)	0.45
Streams		
R1UBV	Permanently flooded tidal unconsolidated bottom stream	2.31
R2UBH	Permanently flooded lower perennial unconsolidated bottom stream	0.53
R2USC	Seasonally flooded lower perennial unconsolidated shore stream	0.05
	Total Waterbodies	**9.53**
	Total Wetland and Other Waters of the U.S.	***272.57***
	Uplands	***38.44***
	Total PRMB Area	***311.01***

*Values have been rounded.

6.0 Jurisdictional Status

This wetland delineation was prepared in compliance with the U*SACE Wetlands Delineation Manual* (USACE 1987) and the *Regional Supplement* (USACE 2007). The on-site determination conducted by HDR on September 29 and 30, 2016 indicates that of the total 311.0 acres in the PRMB area, there are approximately 272.6 acres of potentially jurisdictional wetlands or waterbodies subject to USACE regulations.

Based on the current USACE guidance on jurisdiction, the USACE will assert jurisdiction over traditional navigable waters (TNWs), wetlands adjacent to TNWs, relatively permanent waters (RPWs) that flow into TNWs, and wetlands that abut those RPWs. RPWs are defined as those tributaries that have flow year-round or at least seasonally (e.g. typically three months; U.S. Environmental Protection Agency and USACE 2008). All of the wetlands in the PRMB area are directly adjacent to relatively permanent tributaries flowing into Placer River and Portage Creek. These streams flow into Cook Inlet, a TNW. Therefore, all of the wetlands and the waterbodies within the PRMB area are preliminarily determined to be within the jurisdiction of the USACE under Section 404 of the Clean Water Act.

These preliminary determinations are based on current guidance in effect. New guidance has been released, the Clean Water Rule (33 CFR §328), but has been currently "stayed" nationwide by the 6th Circuit U.S. Court of Appeals. Enactment of the Clean Water Rule would not change the preliminary determination of the PRMB area wetlands.

7.0 REV Classification

The mapped wetlands, waterbodies, and uplands were classified into REV categories based on the ADCM. The results of the classification as well as any buffers and setbacks affecting the PRMB area are shown on Figure 4.

7.1 Wetland and Waterbody REV Classification

7.1.1 REV1 Areas

Approximately 233.5 acres (86 percent) of all the wetlands and waterbodies within the PRMB area are classified as REV1. Most of the REV1 wetlands within the PRMB area are inundated from break-up through the end of June, are natural, and part of a large wetland complex. All waterbodies within the PRMB area, with exception of the excavated pond, are classified REV1 because they are part or a wetland complex and surface water is typically present through the end of June. Streams are classified as REV1 due to their perennial nature and the presence of salmonids. Although salmonids are present in PRMB area streams, fish passage in the PRMB area is typically restricted by culverts under the rail line.

Additionally, wetlands within a 100-foot setback of REV1 waterbodies and waterways that support salmonids are also considered REV1 wetlands. According to ADCM, the setbacks of these areas typically provide higher functions and values and are particularly vulnerable to disturbance.

7.1.2 REV2 Areas

The 39.11 acres (14 percent) of wetlands and waterbodies within the PRMB area categorized as REV2 are comprised of wetlands and a small excavated pond. The majority of REV2 wetlands are inundated for at least two weeks during the growing season, are natural, and are part of a large wetland complex.

A small percentage of the REV2 wetlands (0.6 acre) are designated REV2 based on their location within a 300-foot buffer of a REV1 or REV2 aquatic resource. These areas typically provide higher value habitat than similar communities elsewhere in the landscape and therefore are also given a REV2 classification.

7.2 Upland REV Classification

A total of 22.0 acres of natural upland habitat was also categorized by REV value. A total of 7.0 acres of natural undisturbed uplands within a 100-foot setback of a waterway or waterbody that supports anadromous fish were classified as REV1, and 15.1 acres of natural undisturbed uplands within 300-foot buffer of a high value aquatic area were classified as REV2. According to ADCM, these upland buffers protect the adjacent aquatic resource and are particularly susceptible to disturbance, as they are not protected by the Clean Water Act.

Developed uplands (gravel fill) were given a classification of REV4.

7.3 REV Classification Summary

A total of 311.0 acres were classified into REV categories based on their landform, size, hydrologic regime, plant community, fish and wildlife use, extent of degradation, and adjacency to waterbodies.

Table 7. Wetlands and Waterbodies by REV

REV	Characteristic	Wetland Area (acres)	Waterbody Area (acres)
REV1	Based on polygon characteristics	181.34	9.08
	Based on location within 100-foot setback of anadromous waterways	43.04	-
REV1 Total		***224.38***	***9.08***
REV2	Based on polygon characteristics	38.01	0.45
	Based on location within 300-foot buffer of REV1 or REV2 area	0.64	-
REV2 Total		***39.11***	***0.45***
	TOTAL	**263.04**	**9.53**

Table 8. Uplands by REV

REV	Characteristic	Area (acres)
REV1	Undeveloped upland within 100-feet of anadromous waterway or waterbody	6.96
REV2	Undeveloped upland within 300 feet of REV1 or REV1 aquatic resource	15.08
REV4	Developed	16.40
	TOTAL	**38.44**

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Figures

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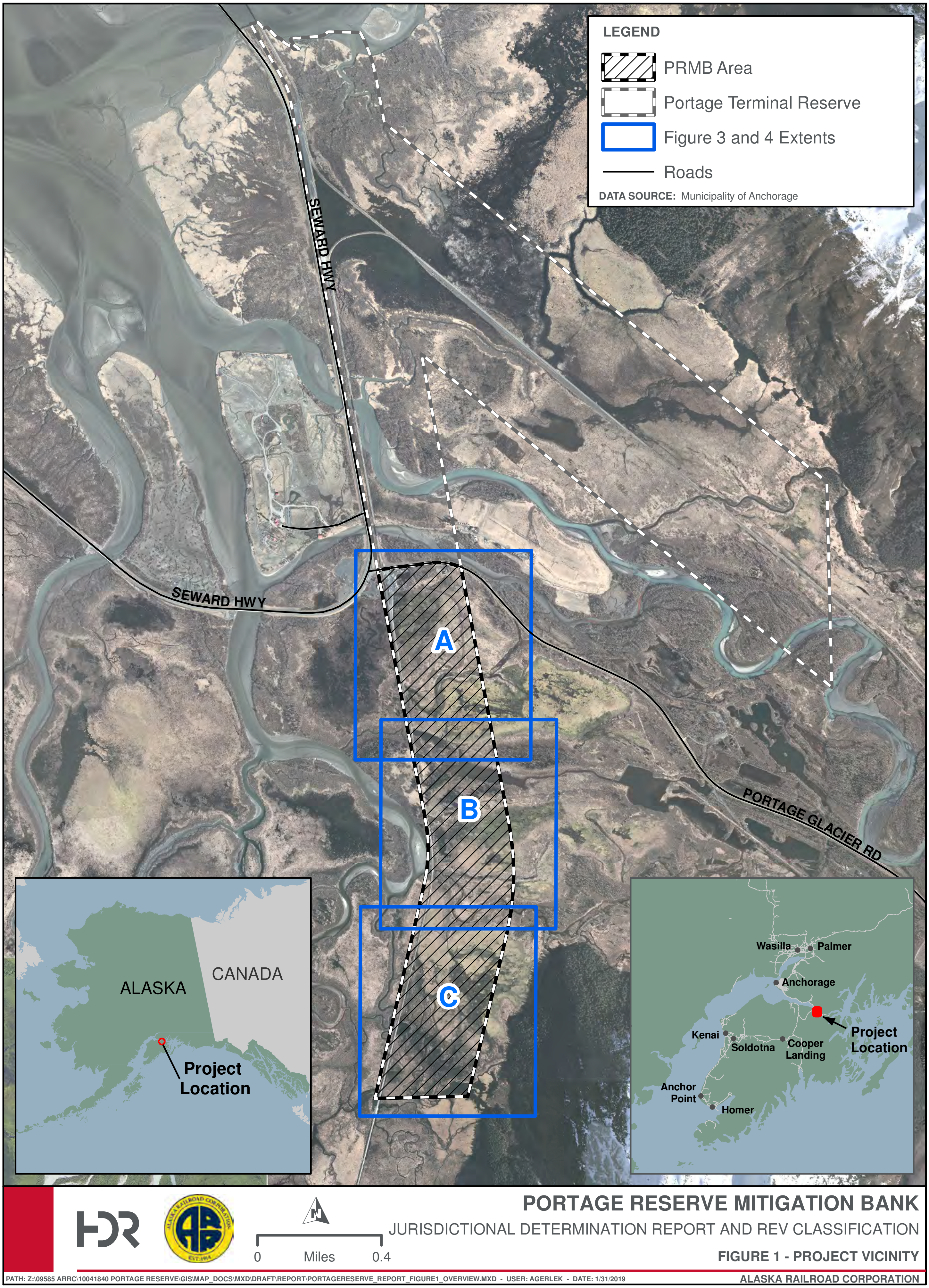

PORTAGE RESERVE MITIGATION BANK

JURISDICTIONAL DETERMINATION REPORT AND REV CLASSIFICATION

FIGURE 1 - PROJECT VICINITY

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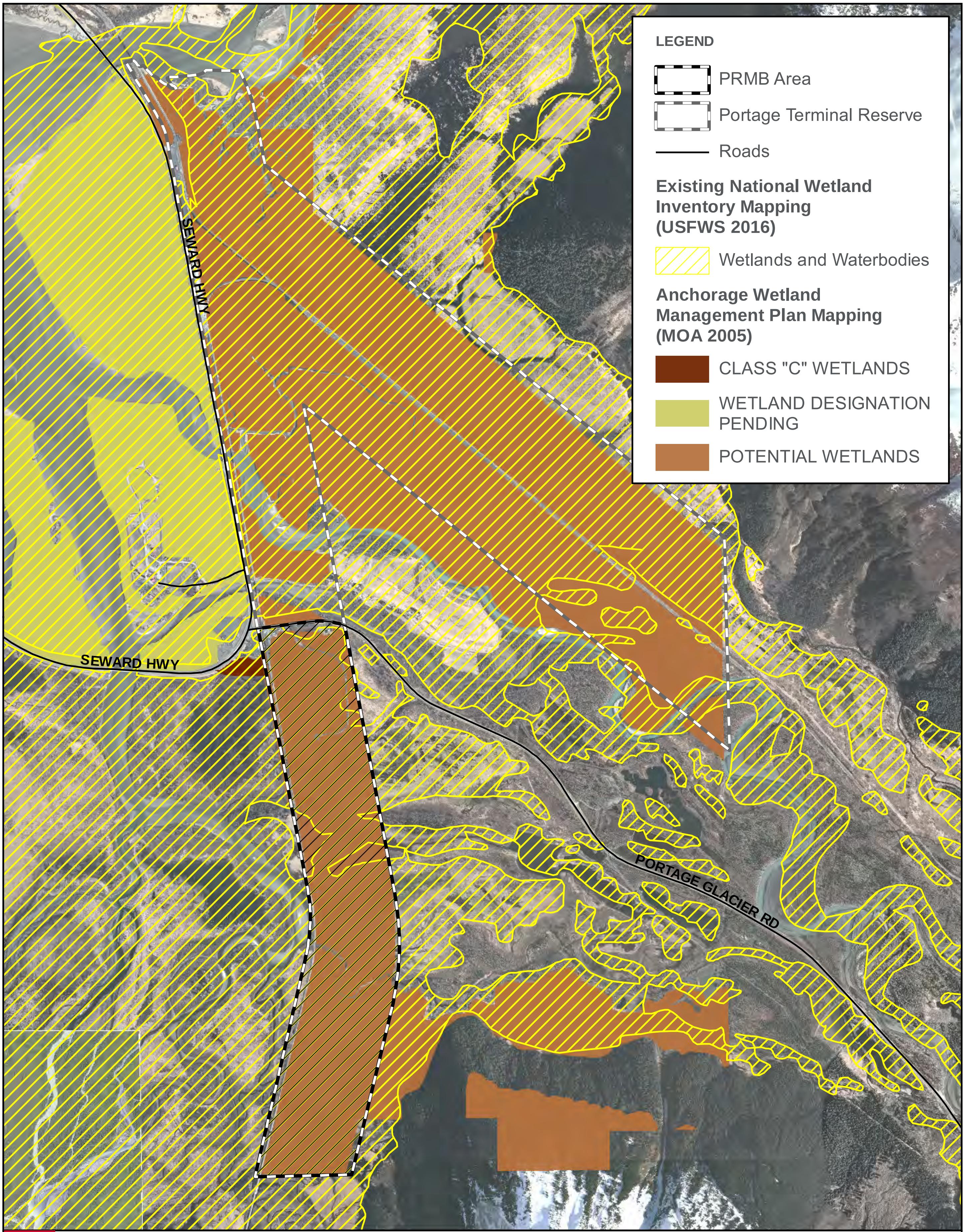
ALASKA RAILROAD CORPORATION



PORTAGE RESERVE MITIGATION BANK

JURISDICTIONAL DETERMINATION REPORT AND REV CLASSIFICATION

FIGURE 2 - EXISTING WETLAND MAPPING

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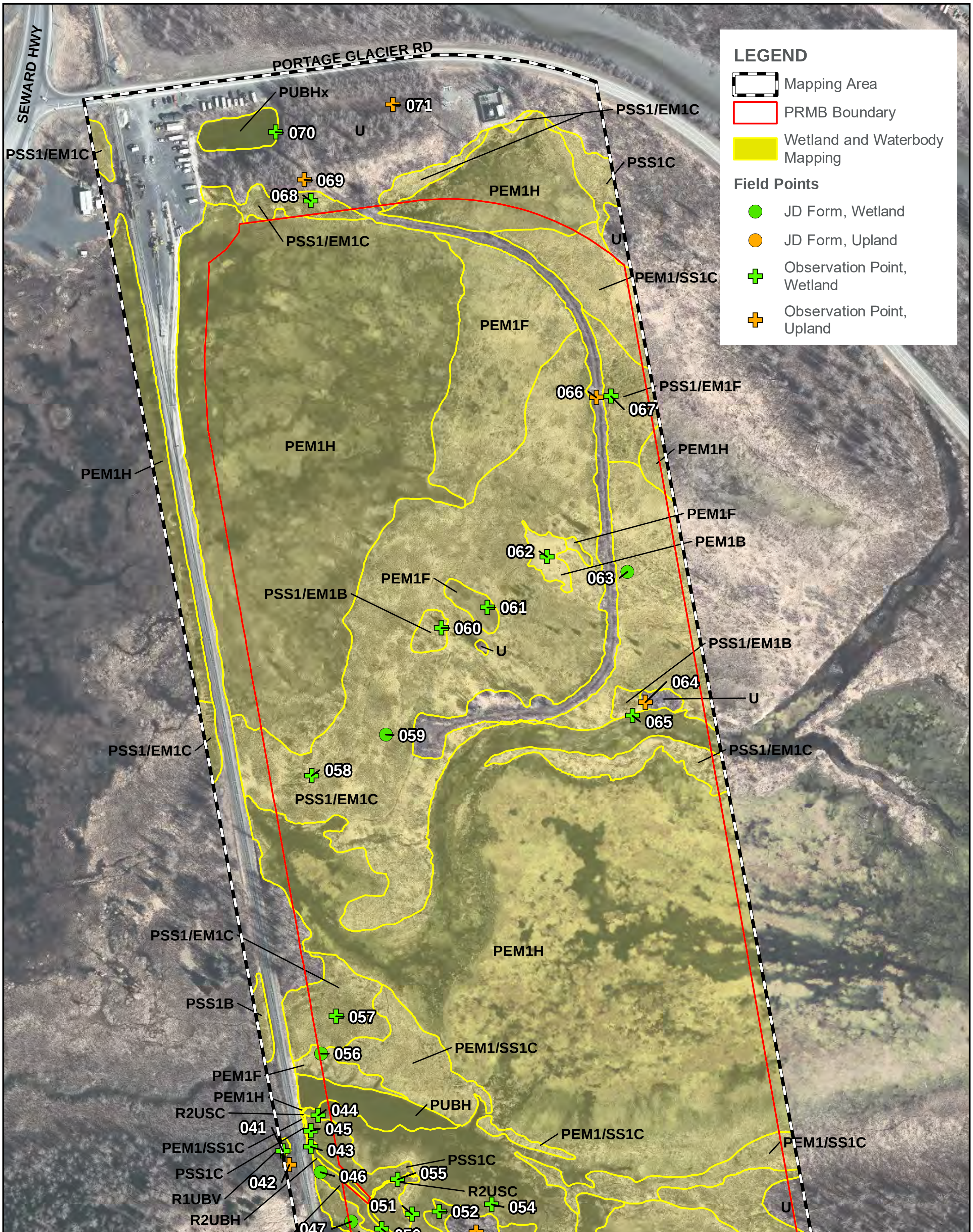

PORTAGE RESERVE MITIGATION BANK

JURISDICTIONAL DETERMINATION REPORT AND REV CLASSIFICATION

FIGURE 3A - WETLANDS MAPPING

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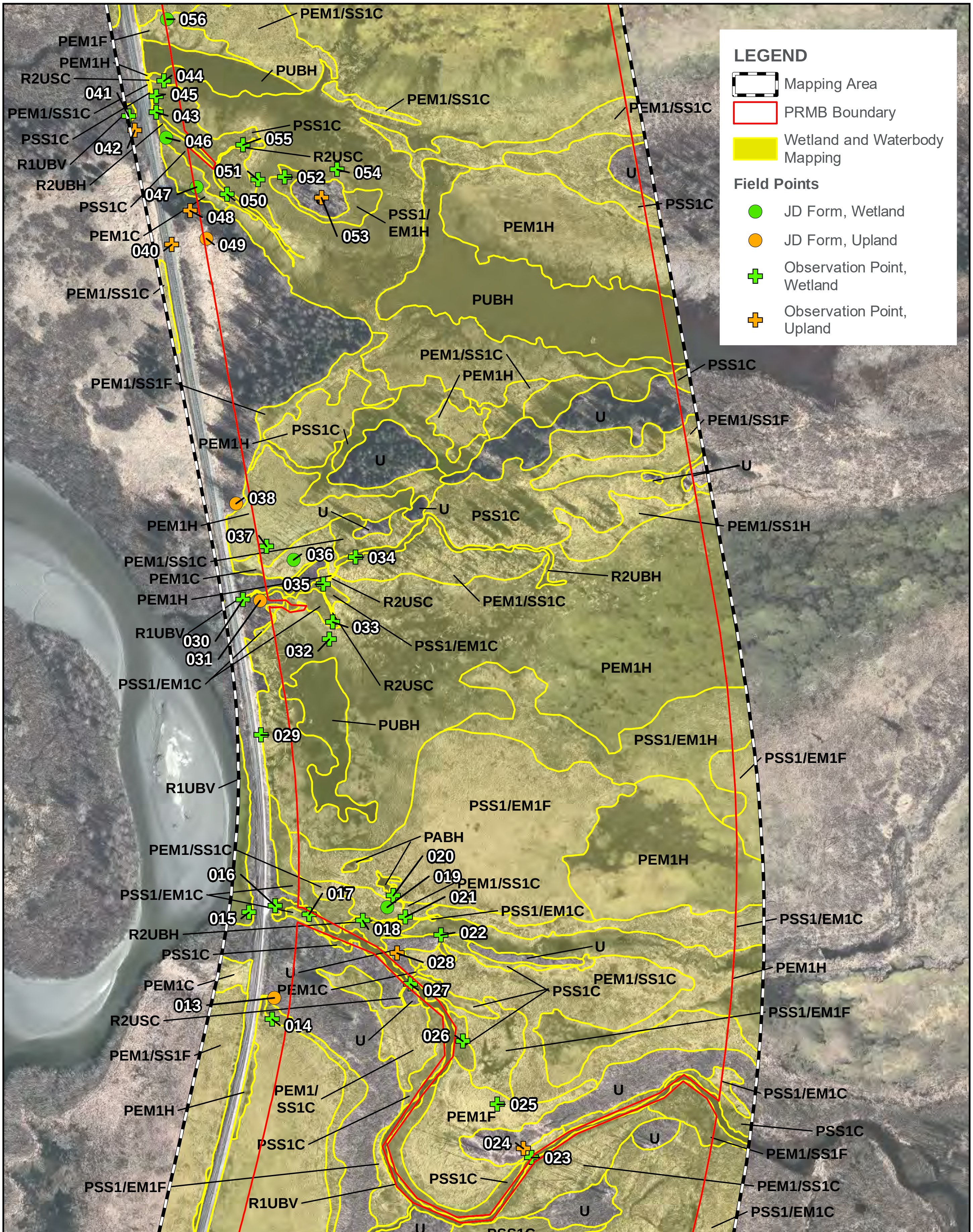

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PORTAGE RESERVE MITIGATION BANK

JURISDICTIONAL DETERMINATION REPORT AND REV CLASSIFICATION

FIGURE 3B - WETLANDS MAPPING

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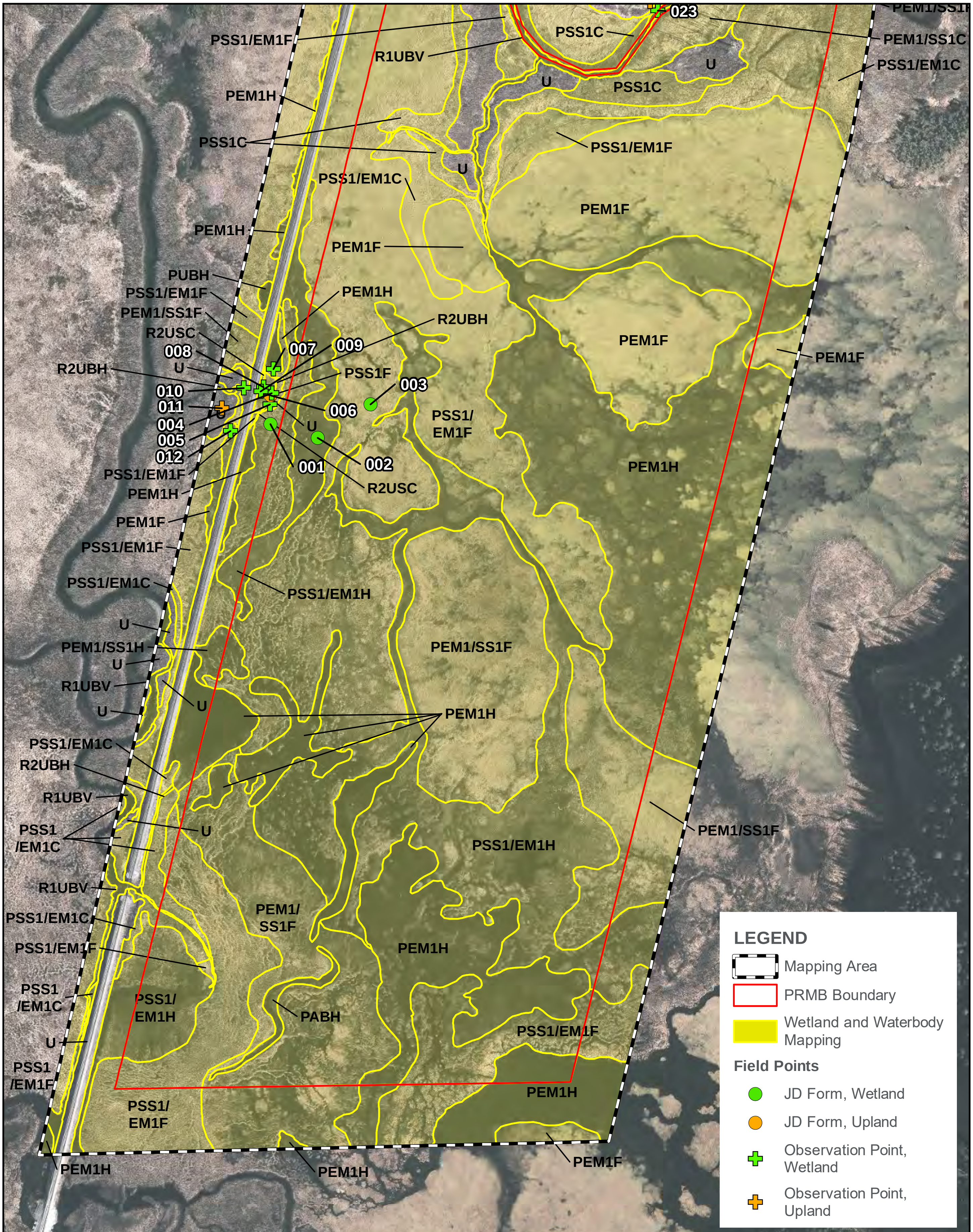


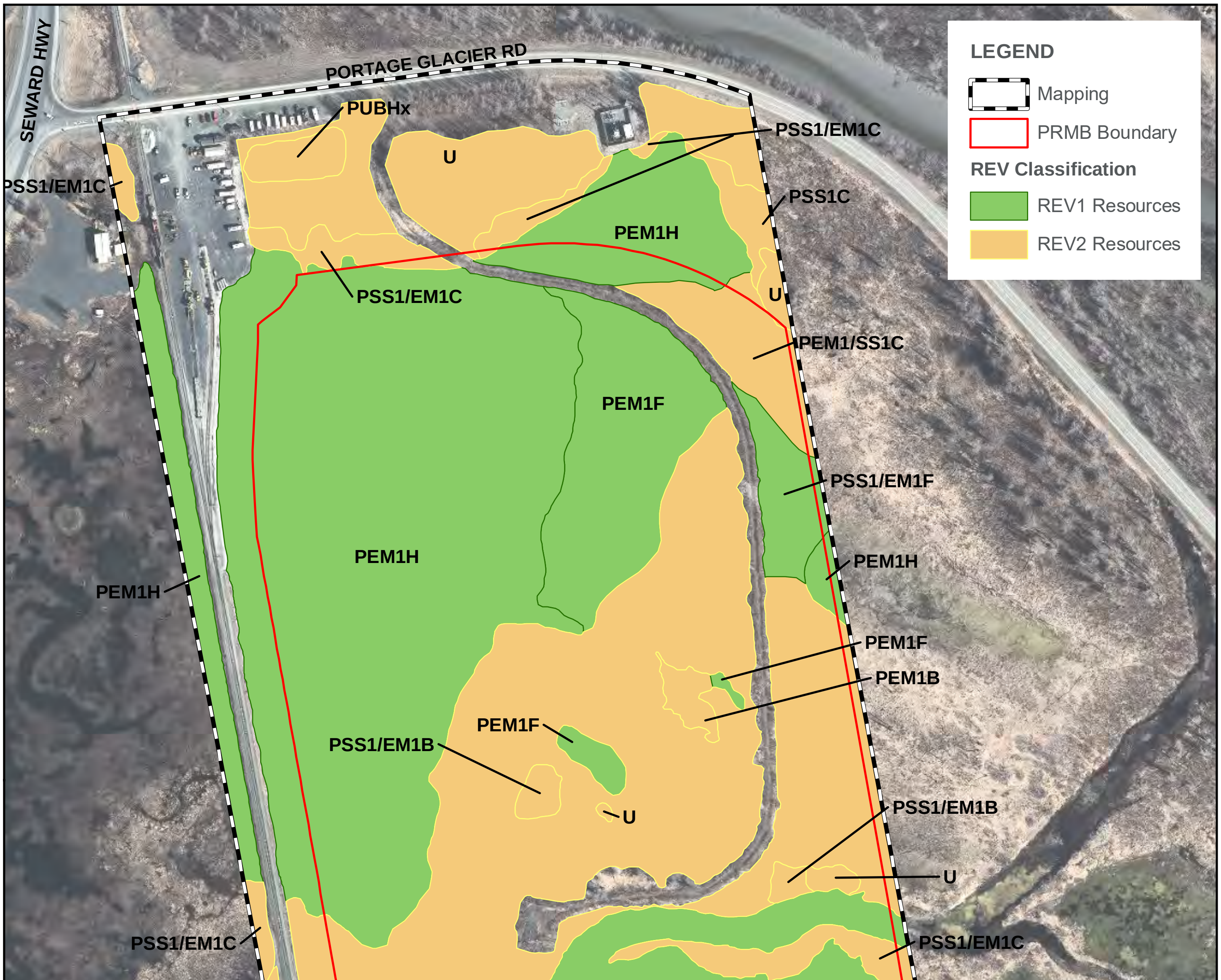
PORTAGE RESERVE MITIGATION BANK

JURISDICTIONAL DETERMINATION REPORT AND REV CLASSIFICATION

FIGURE 3C - WETLANDS MAPPING

PATH: Z:\09585 ARRC\10041840 PORTAGE RESERVE\GIS\MAP_DOCS\MXD\DRAFT\REPORT\PORTAGERESERVE_REPORT_FIGURE3_MAPPING.MXD - USER: AGERLEK - DATE: 2/6/2019

ALASKA RAILROAD CORPORATION



N

0 Miles 0.065

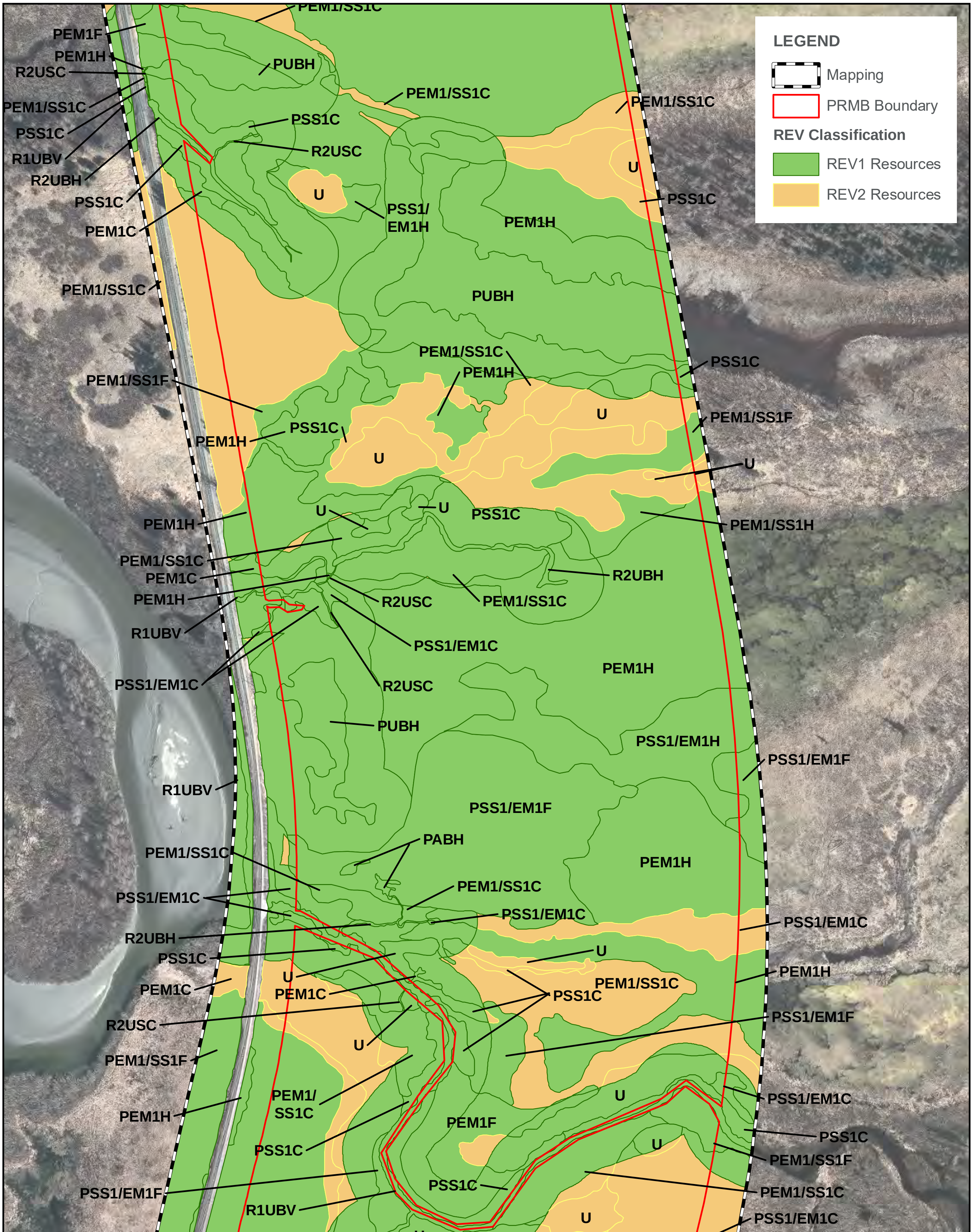
PORTAGE RESERVE MITIGATION BANK

JURISDICTIONAL DETERMINATION REPORT AND REV CLASSIFICATION

FIGURE 4A - REV CLASSIFICATION

PATH: Z:\09585 ARRC\10041840 PORTAGE RESERVE\GIS\MAP_DOCS\MXD\DRAFT\REPORT\PORTAGERESERVE_REPORT_FIGURE4_CAT.MXD - USER: AGERLEK - DATE: 2/6/2019

ALASKA RAILROAD CORPORATION



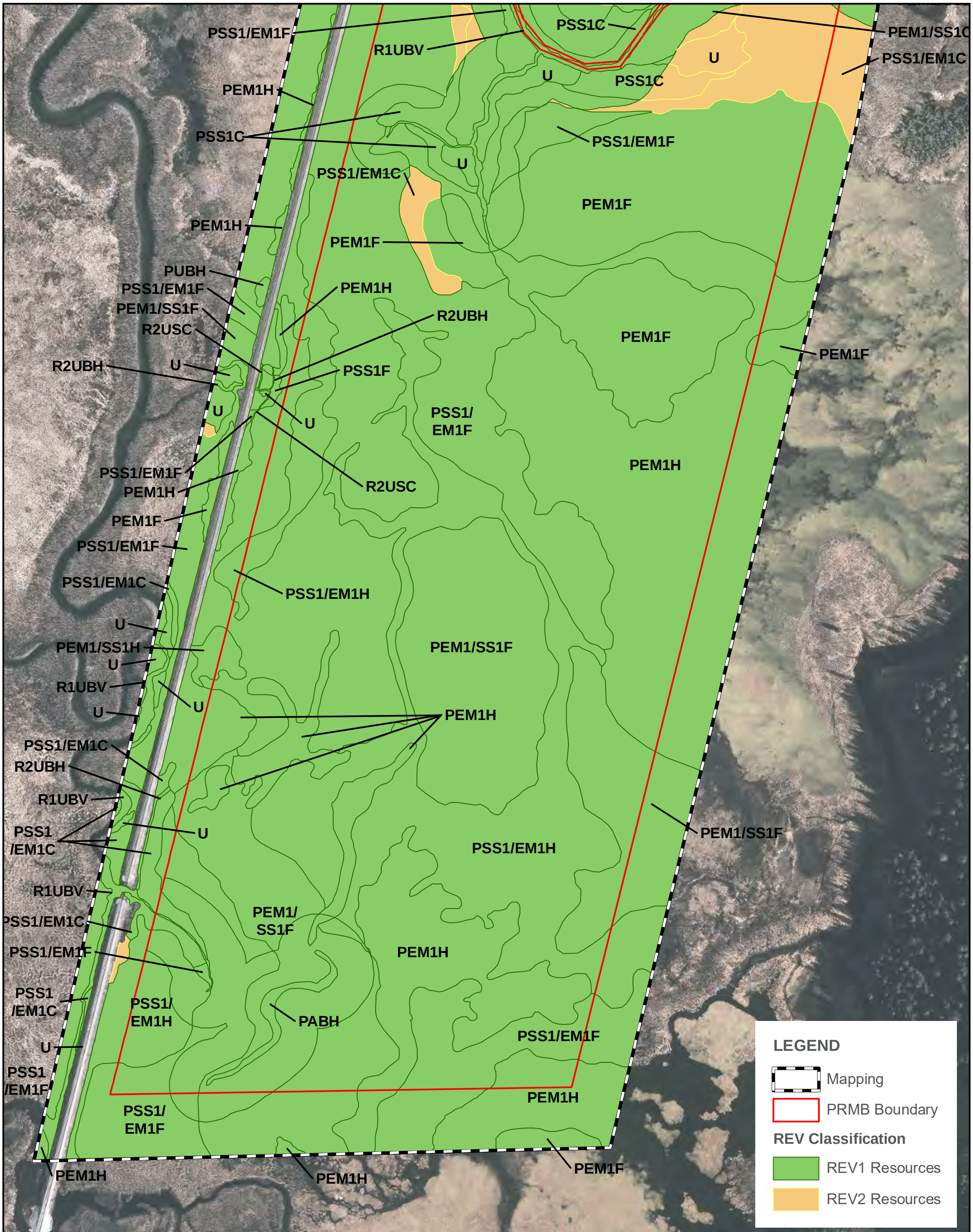
PORTAGE RESERVE MITIGATION BANK

JURISDICTIONAL DETERMINATION REPORT AND REV CLASSIFICATION

FIGURE 4B - REV CLASSIFICATION

PATH: Z:\09585 ARRC\10041840 PORTAGE RESERVE\GIS\MAP_DOCS\MXD\DRAFT\REPORT\PORTAGERESERVE_REPORT_FIGURE4_CAT.MXD - USER: AGERLEK - DATE: 2/6/2019

ALASKA RAILROAD CORPORATION



N

0 Miles 0.065

PORTAGE RESERVE MITIGATION BANK

JURISDICTIONAL DETERMINATION REPORT AND REV CLASSIFICATION

FIGURE 4C - REV CLASSIFICATION

PATH: Z:\09585 ARRC\10041840 PORTAGE RESERVE\GIS\MAP_DOCS\MXD\DRAFT\REPORT\PORTAGERESERVE_REPORT_FIGURE4_CAT.MXD - USER: AGERLEK - DATE: 2/6/2019

ALASKA RAILROAD CORPORATION

Appendix A

Wetland Determination Forms and Photographs

September 29 and 30, 2016

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WETLAND DETERMINATION DATA FORM – Alaska Region

Project: ARRC Portage Reserve Borough/City: MOA Date: 9/29/16
Applicant/Owner: ARRC Sampling Point #: 001
Investigator(s): Max S., Andrew D. Firm: HDR Alaska, Inc.
Lat. (dec.°) 60.80002 Long. -148.97211 ±___' NAD 83 Recorded on GPS #: ✓ Marked on map? 407 Field Map #: 11
Subregion (circle one): SE Southcentral Western Aleutian Interior Northern Landform: Flat Slope (%): 0 Aspect: —
Local relief: Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: PSS1/EM1F
Photo nos./descriptions: soil 277-79 (512-13) veg 280-281 (514-15) Camera #: — Veg Type (Viereck Level 4 or other): —
Are climatic / hydrologic conditions on the site typical for this time of year? Yes: X No: ____ If no, explain. HGM type: Flat
Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here. Near FT87

REV1

SUMMARY OF FINDINGS

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

Is the sampled area within a wetland? Yes X No ____
Remarks (e.g., marginal?):

VEGETATION (Use scientific names.) Estimate absolute % cover (not relative cover). % can total >100%. Use 2012 indicator status.

Tree Stratum (dbh≥ 3")

Species	Cov.%	Dom?	Ind.	Species	Cov.%	Dom?	Ind.
1. —				5.			
2.				6.			
3.				7.			
4.				8.			

Total Tree Cover: —
50% of total cover: — 20% of total cover: —

Sapling/Shrub Stratum (woody plants < 3" dbh)

Species	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.
1. Myr gal	45	X	OBL	7.			
2. Sal bar	40	X	FAC	8.			
3. —				9.			
4.				10.			
5.				11.			
6.				12.			

Total Sapling/Shrub Cover: 85
50% of total cover: 42.5 20% of total cover: 17

Herb Stratum

Species	Abs.Cov.%	Dom?	Ind.	Species	Abs. Cov.%	Dom?	Ind.
1. Equ flu	20	X	OBL	12.			
2. Cal can	15	X	FAC	13.			
3. Pot pal	5		OBL	14.			
4. Car aqu	5		OBL	15.			
5. Car utr	3		OBL	16.			
6. Ang gen	1		FACW	17.			
7. Equ arv	25	X	FAC	18.			
8. Men tri	1		OBL	19.			
9. —				20.			
10.				21.			
11.				22.			

Total Herb Cover: 75
50% of total cover: 37.5 20% of total cover: 15

Circular 1/10-ac plot X or other plot dimension: ____ % of bare ground: ____
% Cover of Wetland Bryophytes (where applicable) —% Total Cover of Bryophytes —%

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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	79	X1= 79
FACW species	1	X2= 2
FAC species	80	X3= 240
FACU species	—	X4= —
UPL + NL species	—	X5= —
Column Totals:	160 (A)	321 (B)

Prevalence Index = B/A = 2.01

Hydrophytic Vegetation Indicators:

X Dominance Test is>50%
X 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 of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: Frost the night before - leaves still covered w/ ice
willows missing many of their leaves
15% standing water

Sampling Point #: 1

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

Horizon (opt.)	Soil Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	α,α dip. (pos/neg)	Remarks (or use comment number)
Oi	—		—						

Type: C = Concentration, D = Depletion, RM = Reduced Matrix, CS=Coated Sand Grains [2]Location: PL = Pore Lining, RC = Root Channel, M = Matrix

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

Standard Indicators:

X Histosol or Histel (A1) (≥16"organic surface, sat'd during wet period of growing season)
___ Histic Epipedon (A2) (8-16" organics, sat'd, underlain by mineral soil with chroma ≤2)
X Hydrogen Sulfide (A4) (within 12"of ground surface; @ 4" in this pit
___ Thick Dark Surface (A12)
___ Alaska Gleyed (A13)
___ Alaska Redox (A14)
___ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

___ Alaska Color Change[4] (TA4)
___ Alaska Alpine Swales (TA5)
___ Alaska Redox with 2.5Y Hue
___ Alaska Gleyed without Hue 5Y or Redder Underlying Layer
___ Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)

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

Restrictive Layer (if present)
Type: —
Depth (inches) ___

Drainage Class: vpd
Soil Map Unit Name:

Hydric Soil Present? Yes X No ___

Comments:
1.
2.
3.

HYDROLOGY

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

Primary Indicators (any one indicator is sufficient)

X Surface Water (A1)
X High Water Table (A2) (w/in 12")
X Saturation (A3) (w/in 12")
___ 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)
X Hydrogen Sulfide Odor (C1) (w/in 12")
___ Dry-Season Water Table (C2) (w/in 24")
___ Other (explain)

Secondary Indicators (at least 2 are required)

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

Field Observations (in. from ground surface):
Surface Water Present? Yes X No ___ Depth of water (in.) 6"
Water Table Present? Yes X No ___ Depth to water (in.) 0
Seeping in at that depth but not yet filled?: ___
Saturation Present? Yes X No ___ Depth to sat. (in.) 0
(includes capillary fringe) Epi Endo Unknown

Wetland Hydrology Present? Yes X No ___

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

Remarks:

Site 1: Soil. Photo taken September 29, 2016

Site 1: Soil. Photo taken September 29, 2016

Site 1: Vegetation. Photo taken September 29, 2016

Site 1: Vegetation. Photo taken September 29, 2016

WETLAND DETERMINATION DATA FORM – Alaska Region

Project: ARRC Portage Reserve Borough/City: Mat Date: 9/29/16
Applicant/Owner: ARRC Sampling Point #: 2
Investigator(s): Marc S., Andrew B. Firm: HDR Alaska, Inc.
Lat. (dec.°) 60.79992 Long. 148.97139 ' NAD 83 Recorded on GPS #: 402 Marked on map? X Field Map #: 11
Subregion (circle one): SE Southcentral Western Aleutian Interior Northern Landform: Flat Slope (%): — Aspect: —
Local relief: Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: PSS1/EM1H
Photo nos./descriptions: Soil 282 283 (516-17) n-s 284-5 (518-519) Camera #: — Veg Type (Viereck Level 4 or other): —
Are climatic / hydrologic conditions on the site typical for this time of year? Yes: X No: ____ If no, explain. HGM type: Flat
Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

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

VEGETATION (Use scientific names.) Estimate absolute % cover (not relative cover). % can total >100%. Use 2012 indicator status.

Tree Stratum (dbh≥ 3")

Species	Cov.%	Dom?	Ind.	Species	Cov.%	Dom?	Ind.
1. —				5.			
2.				6.			
3.				7.			
4.				8.			

Total Tree Cover: —
50% of total cover: — 20% of total cover: —

Sapling/Shrub Stratum (woody plants < 3" dbh)

	Abs.Cov.%	Dom?	Ind.		Abs.Cov.%	Dom?	Ind.
1. Myr gal	65	X	OBL	7.			
2.				8.			
3.				9.			
4.				10.			
5.				11.			
6.				12.			

Total Sapling/Shrub Cover: 65
50% of total cover: 32.5 20% of total cover: 13

Herb Stratum

	Abs.Cov.%	Dom?	Ind.		Abs. Cov.%	Dom?	Ind.
1. Pot pal	15		OBL	12.			
2. Equ flu	17	X	OBL	13.			
3. Men tri	12		OBL	14.			
4. Equ arv	13		FAC	15.			
5. Eri ang.	30	X	OBL	16.			
6. Ped labr	1		FACW	17.			
7. Agro sca	5		FAC	18.			
8.				19.			
9.				20.			
10.				21.			
11.				22.			

Total Herb Cover: 93
50% of total cover: 46.5 20% of total cover: 18.6
Circular 1/10-ac plot X or other plot dimension: ________ % of bare ground: ____
% Cover of Wetland Bryophytes 60 % Total Cover of Bryophytes ____ %
(where applicable)

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	139	X1= 139
FACW species	1	X2= 2
FAC species	18	X3= 54
FACU species	—	X4= —
UPL + NL species	—	X5= —
Column Totals:	158 (A)	195 (B)

Prevalence Index = B/A = 1.23

Hydrophytic Vegetation Indicators:

X Dominance Test is>50%
X 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 of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ______

Remarks: Sphagnum 60%
Most plants dead - Men tri heavily degraded. Very few leaves on Myr gal

Sampling Point #: 2

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

Horizon (opt.)	Soil Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	α,α dip. (pos/neg)	Remarks (or use comment number)
Oi	—		—						

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

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

Standard Indicators:

- X Histosol or Histel (A1) (≥16"organic surface, sat'd during wet period of growing season)
- ___ Histic Epipedon (A2) (8-16" organics, sat'd, underlain by mineral soil with chroma ≤2)
- ___ Hydrogen Sulfide (A4) (within 12"of ground surface; @ ______" in this pit
- ___ Thick Dark Surface (A12)
- ___ Alaska Gleyed (A13)
- ___ Alaska Redox (A14)
- ___ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ___ Alaska Color Change[4] (TA4)
- ___ Alaska Alpine Swales (TA5)
- ___ Alaska Redox with 2.5Y Hue
- ___ Alaska Gleyed without Hue 5Y or Redder Underlying Layer
- ___ Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)

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

Restrictive Layer (if present)
Type: none
Depth (inches) ______

Drainage Class: vpd
Soil Map Unit Name:

Hydric Soil Present? Yes X No ___

Comments:
1.
2.
3.

HYDROLOGY

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

Primary Indicators (any one indicator is sufficient)

- X Surface Water (A1)
- X High Water Table (A2) (w/in 12")
- X Saturation (A3) (w/in 12")
- ___ 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) (w/in 12")
- ___ Dry-Season Water Table (C2) (w/in 24")
- ___ Other (explain)

Secondary Indicators (at least 2 are required)

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

Field Observations (in. from ground surface):

Surface Water Present? Yes X No ___ Depth of water (in.) 10
Water Table Present? Yes X No ___ Depth to water (in.) 0
Seeping in at that depth but not yet filled?: ___
Saturation Present? (includes capillary fringe) Yes X No ___ Depth to sat. (in.) 0
Epi Endo Unknown

Wetland Hydrology Present? Yes X No ___

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

Remarks:

Site 2: Soil. Photo taken September 29, 2016

Site 2: Soil. Photo taken September 29, 2016

Site 2: Vegetation. Photo taken September 29, 2016

Site 2: Vegetation. Photo taken September 29, 2016

WETLAND DETERMINATION DATA FORM – Alaska Region

Project: ARRC Portage Reserve Borough/City: MOA Date: 7/29/16

Applicant/Owner: ARRC Sampling Point #: 3

Investigator(s): Mac S. Andrew D Firm: HDR Alaska, Inc.

Lat. (dec.°) 60.80016 Long. 148.97055 ' NAD 83 Recorded on GPS #: X Marked on map? Y Field Map #: 11

Subregion (circle one): SE Southcentral Western Aleutian Interior Northern Landform: Flat Slope (%): — Aspect: —

Local relief: Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: PSS1/EM1F

Photo nos./descriptions: soil 286-7 520-21 north-s 288-89 522-23 Camera #: — Veg Type (Viereck Level 4 or other): —

Are climatic / hydrologic conditions on the site typical for this time of year? Yes: X No: ____ If no, explain. HGM type: Flat

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

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

SUMMARY OF FINDINGS

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

VEGETATION (Use scientific names.) Estimate absolute % cover (not relative cover). % can total >100%. **Use 2012 indicator status.**

Tree Stratum (dbh≥ 3")

Species	Cov.%	Dom?	Ind.	Species	Cov.%	Dom?	Ind.
1. —				5.			
2.				6.			
3.				7.			
4.				8.			

Total Tree Cover: —

50% of total cover: — 20% of total cover: —

Sapling/Shrub Stratum (woody plants < 3" dbh)

Species	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.
1. Myr gal	30	X	OBL	7.			
2. Sal fusc	15	X	FACW	8.			
3. —				9.			
4.				10.			
5.				11.			
6.				12.			

Total Sapling/Shrub Cover: 45

50% of total cover: 22.5 20% of total cover: 9

Herb Stratum

Species	Abs.Cov.%	Dom?	Ind.	Species	Abs. Cov.%	Dom?	Ind.
1. Pot pal	10	X	OBL	12.			
2. Car lim	15	X	OBL	13.			
lowg 3. Ped lab	10	X	FACW	14.			
4. Grass sp	3		—	15.			
5. Men tri	5		OBL	16.			
6. ~~Sal fusc~~	~~12~~			17.			
7. Equ arv	2		FAC	18.			
clump on top 8. Ped alb	1		FACW	19.			
9. Cal can	3		FACW	20.			
10. Equ flu	5		OBL	21.			
11. —				22.			

Total Herb Cover: 54

50% of total cover: 27 20% of total cover: 10.8

Circular 1/10-ac plot X or other plot dimension: ____ % of bare ground: —

% Cover of Wetland Bryophytes (where applicable) 95 % Sphagnum Total Cover of Bryophytes 95 %

Remarks: Myr gale ~6" high
Area covered in moss. Moss is saturated permanently

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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	65	X1= 65
FACW species	29	X2= 58
FAC species	2	X3= 6
FACU species	—	X4= —
UPL + NL species	—	X5= —
Column Totals:	96 (A)	129 (B)

Prevalence Index = B/A = 1.34

Hydrophytic Vegetation Indicators:

X Dominance Test is>50%
X 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 of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

SOIL

Sampling Point #: 3

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

Depth (in.)	Horizon (opt.)	Soil Matrix Color (moist)	Soil Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	α,α dip. (pos/neg)	Remarks (or use comment number)
0-20	Oi	—								

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

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

Standard Indicators:

- X Histosol or Histel (A1) (≥16"organic surface, sat'd during wet period of growing season)
- ___ Histic Epipedon (A2) (8-16" organics, sat'd, underlain by mineral soil with chroma ≤2)
- ___ Hydrogen Sulfide (A4) (within 12"of ground surface; @ ______" in this pit
- ___ Thick Dark Surface (A12)
- ___ Alaska Gleyed (A13)
- ___ Alaska Redox (A14)
- ___ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ___ Alaska Color Change[4] (TA4)
- ___ Alaska Alpine Swales (TA5)
- ___ Alaska Redox with 2.5Y Hue
- ___ Alaska Gleyed without Hue 5Y or Redder Underlying Layer
- ___ Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)

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

Restrictive Layer (if present)
Type: none
Depth (inches) ______

Drainage Class: vpd
Soil Map Unit Name: —

Hydric Soil Present? Yes X No ___

Comments:
1.
2.
3.

HYDROLOGY

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

Primary Indicators (any one indicator is sufficient)

- X Surface Water (A1)
- X High Water Table (A2) (w/in 12")
- X Saturation (A3) (w/in 12")
- ___ 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) (w/in 12")
- ___ Dry-Season Water Table (C2) (w/in 24")
- ___ Other (explain)

Secondary Indicators (at least 2 are required)

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

Field Observations (in. from ground surface):

Surface Water Present? Yes X No ___ Depth of water (in.) 1
Water Table Present? Yes X No ___ Depth to water (in.) 0
Seeping in at that depth but not yet filled?: ___
Saturation Present? Yes X No ___ Depth to sat. (in.) 0
(includes capillary fringe) Epi Endo Unknown

Wetland Hydrology Present? Yes X No ___

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

Remarks:

Site 3: Soil. Photo taken September 29, 2016

Site 3: Soil. Photo taken September 29, 2016

Site 3: Vegetation. Photo taken September 29, 2016

Site 3: Vegetation. Photo taken September 29, 2016

WETLAND DETERMINATION DATA FORM – Alaska Region

Project: ARRC Portage Reserve Borough/City: MOA Date: 9/29/16

Applicant/Owner: ARRC Sampling Point #: 6

Investigator(s): Mac S. Andrew D. Firm: HDR Alaska, Inc.

Lat. (dec.°) 60.40022 Long. 148.97211 ±___' NAD 83 Recorded on GPS #: ✓ Marked on map? Y Field Map #: 11

Subregion (circle one): SE Southcentral Western Aleutian Interior Northern Landform: Flat Slope (%): — Aspect: —

Local relief: Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: U

Photo nos./descriptions: 295-6 soils 529-530 n-s 297-8 531-532 Camera #: — Veg Type (Viereck Level 4 or other): Tall closed willow

Are climatic / hydrologic conditions on the site typical for this time of year? Yes: X No: ____ If no, explain. HGM type: —

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

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

SUMMARY OF FINDINGS

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

VEGETATION (Use scientific names.) Estimate absolute % cover (not relative cover). % can total >100%. **Use 2012 indicator status.**

Tree Stratum (dbh≥ 3")

Species	Cov.%	Dom?	Ind.	Species	Cov.%	Dom?	Ind.
1. —				5.			
2.				6.			
3.				7.			
4.				8.			

Total Tree Cover: ____

50% of total cover: ____ 20% of total cover: ____

Sapling/Shrub Stratum (woody plants < 3" dbh)

	Abs.Cov.%	Dom?	Ind.		Abs.Cov.%	Dom?	Ind.
1. Sal sco	70	X	FAC	7.			
2. Myr gal	5		OBL	8.			
3. Sal bar	20	X	FAC	9.			
4. —				10.			
5.				11.			
6.				12.			

Total Sapling/Shrub Cover: 95

50% of total cover: 47.5 20% of total cover: 19

Herb Stratum

	Abs.Cov.%	Dom?	Ind.		Abs. Cov.%	Dom?	Ind.
1. Pyr asa	2		FACU	12.			
2. Equ arv	15	X	FAC	13.			
3. Poa sp	1		—	14.			
4. Sang stip	2		FACW	15.			
5. Cal can	1		FAC	16.			
6. Ang gen	1		FACW	17.			
7. Moh unv	1		FACU	18.			
8. Pyr gran	1		FAC	19.			
9. Gal trif	1		FACW	20.			
10. Equ flu	1		OBL	21.			
11.				22.			

Total Herb Cover: 26

50% of total cover: 13 20% of total cover: 5.2

Circular 1/10-ac plot X or other plot dimension: ____ % of bare ground: 50

% Cover of Wetland Bryophytes none % Total Cover of Bryophytes ____%
(where applicable)

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	6	X1= 6
FACW species	4	X2= 8
FAC species	107	X3= 321
FACU species	3	X4= 12
UPL + NL species	—	X5= —
Column Totals:	120 (A)	347 (B)

Prevalence Index = B/A = 2.89

Hydrophytic Vegetation Indicators:

X Dominance Test is>50%
X 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 of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: Myr gale L'hvy on edge of plot. plot is small. Lots of bare ground

SOIL

Sampling Point #: 6

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

Depth (in.)	Horizon (opt.)	Soil Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	α,α dip. (pos/neg)	Remarks (or use comment number)
0-1	Oi									
1-4	A	2.5Y2.5/1						sil		
4-9	B1	2.5Y3/1						sil	–	
9-16	B2	2.5Y3/1	75	10YR4/4	25	C	M	sil	–	
16-20	B3	10YR3/1	90	5YR3/4	10	C	M	sil	–	

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

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

Standard Indicators:

- N Histosol or Histel (A1) (≥16"organic surface, sat'd during wet period of growing season)
- ___ Histic Epipedon (A2) (8-16" organics, sat'd, underlain by mineral soil with chroma ≤2)
- ___ Hydrogen Sulfide (A4) (within 12"of ground surface; @ ______" in this pit
- ___ Thick Dark Surface (A12)
- ___ Alaska Gleyed (A13)
- ___ Alaska Redox (A14)
- ___ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- N Alaska Color Change[4] (TA4)
- ___ Alaska Alpine Swales (TA5)
- ___ Alaska Redox with 2.5Y Hue
- ___ Alaska Gleyed without Hue 5Y or Redder Underlying Layer
- ___ Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)

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

Restrictive Layer (if present)
Type: none
Depth (inches) ______

Drainage Class: wd

Soil Map Unit Name: —

Hydric Soil Present? Yes ____ No X

Comments:
1. Does not make AK Redox w/ 2.5Y Hue because there is no primary indicator of wetland hydro
2.
3.

HYDROLOGY

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

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (at least 2 are required)

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

Field Observations (in. from ground surface):

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

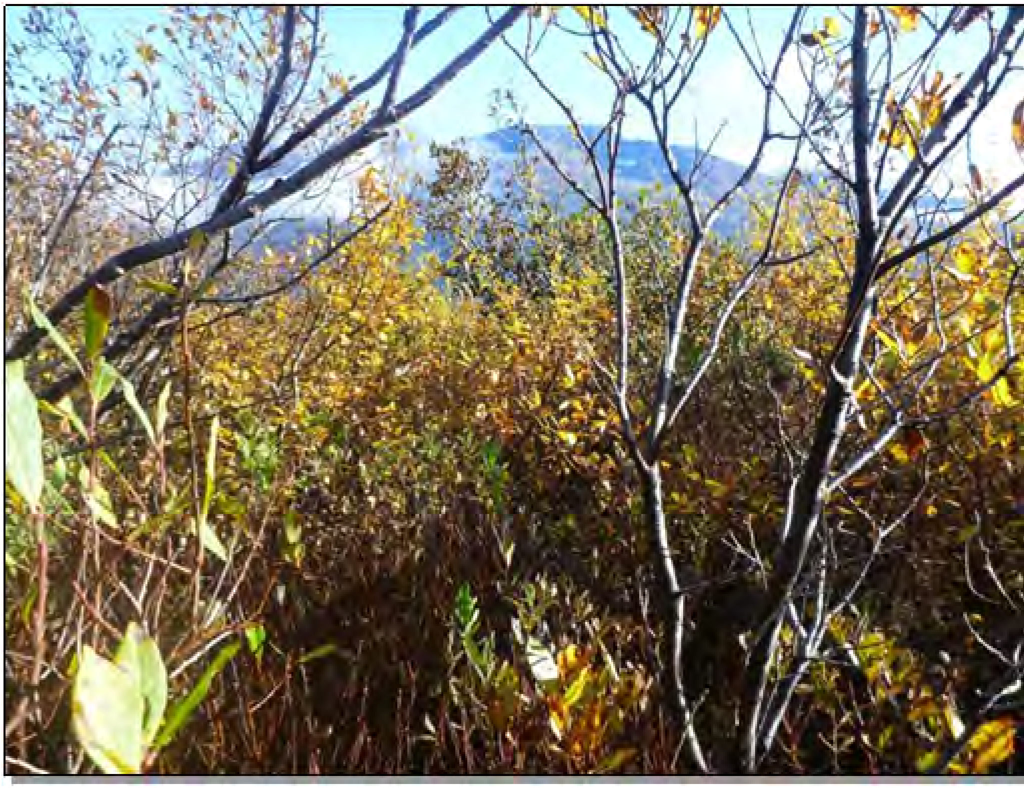
Wetland Hydrology Present? Yes X No ____

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

Remarks: Dry to 20". Likely gets some overland flow at some point during the year. Bare ground and silt prevalent. On banks of incised stream. Small pocket of upland

Site 6: Soil. Photo taken September 29, 2016

Site 6: Soil. Photo taken September 29, 2016



Site 6: Vegetation. Photo taken September 29, 2016

Site 6: Vegetation. Photo taken September 29, 2016

WETLAND DETERMINATION DATA FORM – Alaska Region

Project: APRC Portage Reserve Borough/City: MOA Date: 9/29/16
Applicant/Owner: APRC Sampling Point #: 13
Investigator(s): Mac S., Andrew D Firm: HDR Alaska, Inc.
Lat. (dec.°) 60.80437 Long. 148.96994 ± ' NAD 83 Recorded on GPS #: 40L Marked on map? X Field Map #: 10
Subregion (circle one): SE Southcentral Western Aleutian Interior Northern Landform: Flat Slope (%): — Aspect: —
Local relief: Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: U
Photo nos./descriptions: 553 554 soils N 556 Camera #: — Veg Type (Viereck Level 4 or other): Tall closed alder
Are climatic / hydrologic conditions on the site typical for this time of year? Yes: X No: ___ If no, explain. HGM type: —
Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

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

VEGETATION (Use scientific names.) Estimate absolute % cover (not relative cover). % can total >100%. Use 2012 indicator status.

Tree Stratum (dbh≥ 3")

Species	Cov.%	Dom?	Ind.	Species	Cov.%	Dom?	Ind.
1. —				5.			
2.				6.			
3.				7.			
4.				8.			

Total Tree Cover: —
50% of total cover: — 20% of total cover: —

Sapling/Shrub Stratum (woody plants < 3" dbh)

Species	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.
1. Aln sin	90	X	FAC	7.			
2. Vib edu	12		FACU	8.			
3. Sam rac	5		FACU	9.			
4. —				10.			
5.				11.			
6.				12.			

Total Sapling/Shrub Cover: 107
50% of total cover: 53.5 20% of total cover: 21.4

Herb Stratum

Species	Abs.Cov.%	Dom?	Ind.	Species	Abs. Cov.%	Dom?	Ind.
1. Dry dil	20	X	FACU	12.			
2. Cal can	5		FAC	13.			
3. Equ arv	4		FAC	14.			
4. Ath fel	10	X	FAC	15.			
5. —				16.			
6.				17.			
7.				18.			
8.				19.			
9.				20.			
10.				21.			
11.				22.			

Total Herb Cover: 39
50% of total cover: 19.5 20% of total cover: 7.8
Circular 1/10-ac plot X or other plot dimension: ___ % of bare ground: ___
% Cover of Wetland Bryophytes — % Total Cover of Bryophytes — %
(where applicable)

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	—	X1= —
FACW species	—	X2= —
FAC species	109	X3= 327
FACU species	37	X4= 148
UPL + NL species	—	X5= —
Column Totals:	146 (A)	475 (B)

Prevalence Index = B/A = 3.25

Hydrophytic Vegetation Indicators:

X 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 of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

SOIL

Sampling Point #: 13

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

Depth (in.)	Horizon (opt.)	Soil Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	α,α dip. (pos/ neg)	Remarks (or use comment number)
0-1	Oi									
1-3	A	10YR2/1						sil		
3-18	B/C	5Y2.5/1						loamy sand		
18-20	B/C	2.5Y2.5/1	85	5YR3/4	15	C	M	loamy sand		

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

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

Standard Indicators:

- N Histosol or Histel (A1) (≥16"organic surface, sat'd during wet period of growing season)
- N Histic Epipedon (A2) (8-16" organics, sat'd, underlain by mineral soil with chroma ≤2)
- N Hydrogen Sulfide (A4) (within 12"of ground surface; @ ______" in this pit
- N Thick Dark Surface (A12)
- N Alaska Gleyed (A13)
- N Alaska Redox (A14)
- N Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- N Alaska Color Change[4] (TA4)
- N Alaska Alpine Swales (TA5)
- N Alaska Redox with 2.5Y Hue
- N Alaska Gleyed without Hue 5Y or Redder Underlying Layer
- ____ Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)

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

Restrictive Layer (if present)
Type: none
Depth (inches) ____

Drainage Class: wd

Soil Map Unit Name:

Hydric Soil Present? Yes ____ No X

Comments:
1. Sandy soil drains quickly
2.
3.

HYDROLOGY

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

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (at least 2 are required)

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

Field Observations (in. from ground surface):

Surface Water Present? Yes ____ No X Depth of water (in.) ______
Water Table Present? Yes X No ____ Depth to water (in.) 21
Seeping in at that depth but not yet filled?: ____
Saturation Present? (includes capillary fringe) Yes X No ____ Depth to sat. (in.) 20 Epi Endo Unknown

Wetland Hydrology Present? Yes ____ No X

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

Remarks:

Site 13: Soil. Photo taken September 29, 2016

Site 13: Soil. Photo taken September 29, 2016

Site 13: Vegetation. Photo taken September 29, 2016

Site 13: Vegetation. Photo taken September 29, 2016

WETLAND DETERMINATION DATA FORM – Alaska Region

Project: ARRC Portage Reserve Borough/City: MOA Date: 9/29/16
Applicant/Owner: ARRC Sampling Point #: 19
Investigator(s): Mac S. Andrew D Firm: HDR Alaska, Inc.
Lat. (dec.°) 60.80505 Long. 148.96815 ± ' NAD 83 Recorded on GPS #: 462 Marked on map? X Field Map #: 10
Subregion (circle one): SE Southcentral Western Aleutian Interior Northern Landform: Flat Slope (%): — Aspect: —
Local relief: Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: PEM1/SS1C
Photo nos./descriptions: Soil 568 569 570 N 571 S Camera #: — Veg Type (Viereck Level 4 or other): Open alder / bj meadow
Are climatic / hydrologic conditions on the site typical for this time of year? Yes: X No: ___ If no, explain. HGM type: Flat
Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

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

VEGETATION (Use scientific names.) Estimate absolute % cover (not relative cover). % can total >100%. **Use 2012 indicator status.**

Tree Stratum (dbh≥ 3")

Species	Cov.%	Dom?	Ind.	Species	Cov.%	Dom?	Ind.
1. —				5.			
2.				6.			
3.				7.			
4.				8.			

Total Tree Cover: —
50% of total cover: — 20% of total cover: —

Sapling/Shrub Stratum (woody plants < 3" dbh)

Species	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.
1. Aln sin	20	X	FAC	7.			
2. Vib edu	2		FACU	8.			
3. Sal glau	7	X	FAC	9.			
4. —				10.			
5.				11.			
6.				12.			

Total Sapling/Shrub Cover: 29
50% of total cover: 14.5 20% of total cover: 5.8

Herb Stratum

Species	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.
1. Ang gen	5		FACW	12.			
2. Cal can	80	X	FAC	13.			
3. Ath fel	10		FAC	14.			
4. Sang stip	2		FACU	15.			
5. Pot pal	1		OBL	16.			
6. Equ flu	2		OBL	17.			
7. Car aqu	10		OBL	18.			
8. —				19.			
9.				20.			
10.				21.			
11.				22.			

Total Herb Cover: 110
50% of total cover: 55 20% of total cover: 22

Circular 1/10-ac plot X or other plot dimension: ___ % of bare ground: ___
% Cover of Wetland Bryophytes — % Total Cover of Bryophytes — %
(where applicable)

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	13	X1= 13
FACW species	7	X2= 14
FAC species	117	X3= 351
FACU species	2	X4= 8
UPL + NL species	—	X5=
Column Totals:	139 (A)	386 (B)

Prevalence Index = B/A = 2.78

Hydrophytic Vegetation Indicators:

X Dominance Test is>50%
X 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 of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

SOIL

Sampling Point #: 19

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

Depth (in.)	Horizon (opt.)	Soil Matrix Color (moist)	Soil Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	α,α dip. (pos/neg)	Remarks (or use comment number)
0-1	Oi	—								
1-8	A	5Y3/1		—				sil		lots of organics
8-20	B	10Y4/1	70	10YR4/6	30	C	RC,PL	sil		

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

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

Standard Indicators:

- ___ Histosol or Histel (A1) (≥16"organic surface, sat'd during wet period of growing season)
- ___ Histic Epipedon (A2) (8-16" organics, sat'd, underlain by mineral soil with chroma ≤2)
- X Hydrogen Sulfide (A4) (within 12"of ground surface; @ 12 " in this pit
- ___ Thick Dark Surface (A12)
- ___ Alaska Gleyed (A13)
- X Alaska Redox (A14)
- ___ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ___ Alaska Color Change[4] (TA4)
- ___ Alaska Alpine Swales (TA5)
- ___ Alaska Redox with 2.5Y Hue
- ___ Alaska Gleyed without Hue 5Y or Redder Underlying Layer
- ___ Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)

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

Restrictive Layer (if present)
Type: none
Depth (inches) ________

Drainage Class: pd
Soil Map Unit Name: —

Hydric Soil Present? Yes X No ___

Comments:
1.
2.
3.

HYDROLOGY

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

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2) (w/in 12")
- X Saturation (A3) (w/in 12")
- ___ 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)
- X Hydrogen Sulfide Odor (C1) (w/in 12")
- ___ Dry-Season Water Table (C2) (w/in 24")
- ___ Other (explain)

Secondary Indicators (at least 2 are required)

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

Field Observations (in. from ground surface):

Surface Water Present? Yes ___ No X Depth of water (in.) 0
Water Table Present? Yes X No ___ Depth to water (in.) 14
Seeping in at that depth but not yet filled?: 13
Saturation Present? (includes capillary fringe) Yes X No ___ Depth to sat. (in.) 11 Epi Endo Unknown

Wetland Hydrology Present? Yes X No ___

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

Remarks: Lots of small drainages through area that are currently dry.

Site 19: Soil. Photo taken September 29, 2016

Site 19: Soil. Photo taken September 29, 2016

Site 19: Vegetation. Photo taken September 29, 2016

Site 19: Vegetation. Photo taken September 29, 2016

WETLAND DETERMINATION DATA FORM – Alaska Region

Project: ARRC Portage Reserve Borough/City: MOA Date: 9/29/16
Applicant/Owner: Alaska Railroad Sampling Point #: 31
Investigator(s): Max S., Andrew D Firm: HDR Alaska, Inc.
Lat. (dec.°) 60.80739 Long. 148.97006 ±__' NAD 83 Recorded on GPS #: 402 Marked on map? Y FT65 Field Map #: 10
Subregion (circle one): SE Southcentral Western Aleutian Interior Northern Landform: streambank Slope (%): — Aspect: —
Local relief: Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: U
Photo nos./descriptions: S4 608 609 N 610 611 Camera #: — Veg Type (Viereck Level 4 or other): Closed tall alder
Are climatic / hydrologic conditions on the site typical for this time of year? Yes: X No: ___ If no, explain. HGM type: —
Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

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

VEGETATION (Use scientific names.) Estimate absolute % cover (not relative cover). % can total >100%. Use 2012 indicator status.

Tree Stratum (dbh≥ 3")

Species	Cov.%	Dom?	Ind.	Species	Cov.%	Dom?	Ind.
1. —				5.			
2.				6.			
3.				7.			
4.				8.			

Total Tree Cover: —
50% of total cover: — 20% of total cover: —

Sapling/Shrub Stratum (woody plants < 3" dbh)

	Abs.Cov.%	Dom?	Ind.		Abs.Cov.%	Dom?	Ind.
1. Aln sin	80	X	FAC	7.			
2. Sal sco	10		FAC	8.			
3. —				9.			
4.				10.			
5.				11.			
6.				12.			

Total Sapling/Shrub Cover: 90
50% of total cover: 45 20% of total cover: 18

Herb Stratum

	Abs.Cov.%	Dom?	Ind.		Abs. Cov.%	Dom?	Ind.
1. Ang luc	3		FACW	12.			
2. Cal can	40	X	FAC	13.			
3. Equ arv	5		FAC	14.			
4. Dry dil	7		FACU	15.			
5. Sang stip	4		FACW	16.			
6. Ath fel	15	X	FAC	17.			
7. Rub arc	2		FAC	18.			
8. Gal trifid	1		FACW	19.			
9. Ang gen	5		FACW	20.			
10.				21.			
11.				22.			

Total Herb Cover: 82
50% of total cover: 41 20% of total cover: 16.4

Circular 1/10-ac plot X or other plot dimension: ___ % of bare ground: 40
% Cover of Wetland Bryophytes — % Total Cover of Bryophytes ___%
(where applicable)

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	—	X1= —
FACW species	10	X2= 20
FAC species	152	X3= 456
FACU species	10	X4= 40
UPL + NL species	—	X5= —
Column Totals:	172 (A)	516 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

X Dominance Test is>50%
X 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 of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: Adj to large dead cottonwoods
lots of bare ground

SOIL

Sampling Point #: 31

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

Depth (in.)	Horizon (opt.)	Soil Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	α,α dip. (pos/neg)	Remarks (or use comment number)
0-2	A	2.5Y3/1		—				sil		
2-11	B1	10YR3/1	95	5YR3/3	5	C	RC,PL	vfnsa	—	
11-20	B2	5YR4/1	85	2.5YR3/4	15	C	RC,PL	vfsa	—	

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

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

Standard Indicators:

- N Histosol or Histel (A1) (≥16"organic surface, sat'd during wet period of growing season)
- N Histic Epipedon (A2) (8-16" organics, sat'd, underlain by mineral soil with chroma ≤2)
- N Hydrogen Sulfide (A4) (within 12"of ground surface; @ ______" in this pit
- N Thick Dark Surface (A12)
- N Alaska Gleyed (A13)
- N Alaska Redox (A14)
- N Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- N Alaska Color Change[4] (TA4)
- N Alaska Alpine Swales (TA5)
- N Alaska Redox with 2.5Y Hue
- N Alaska Gleyed without Hue 5Y or Redder Underlying Layer
- — Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)

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

Restrictive Layer (if present)
Type: —
Depth (inches) ______

Drainage Class: wd
Soil Map Unit Name:

Hydric Soil Present? Yes _____ No X

Comments:
1.
2.
3.

HYDROLOGY

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

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2) (w/in 12")
- ___ Saturation (A3) (w/in 12")
- ___ 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) (w/in 12")
- ___ Dry-Season Water Table (C2) (w/in 24")
- ___ Other (explain)

Secondary Indicators (at least 2 are required)

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

Field Observations (in. from ground surface):

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

Wetland Hydrology Present? Yes X No ____

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

Remarks:

Site 31: Soil. Photo taken September 29, 2016

Site 31: Soil. Photo taken September 29, 2016

Site 31: Vegetation. Photo taken September 29, 2016

Site 31: Vegetation. Photo taken September 29, 2016

WETLAND DETERMINATION DATA FORM – Alaska Region

Project: ARRC Portage Reserve Borough/City: MOA Date: 9/29/16
Applicant/Owner: ARRC Sampling Point #: 036
Investigator(s): Mac S., Andrew D Firm: HDR Alaska, Inc.
Lat. (dec.°) 60.80770 Long. 148.96954 ± ' NAD 83 Recorded on GPS #: 401 Marked on map? 9 Field Map #: 9
Subregion (circle one): SE Southcentral Western Aleutian Interior Northern Landform: Flat Slope (%): — Aspect: —
Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: PEM1C
Photo nos./descriptions: Soil 620-1 N 22 523 Camera #: — Veg Type (Viereck Level 4 or other): Bluejoint meadow
Are climatic / hydrologic conditions on the site typical for this time of year? Yes: X No: ____ HGM type: Flat
Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

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

VEGETATION (Use scientific names.)

Tree Stratum (dbh≥ 3")

Sp.	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom ?	Ind.
1. —				5.			
2.				6.			
3.				7.			
4.				8.			

Total Tree Cover: —
50% of total cover: — 20% of total cover: —

Sapling/Shrub Stratum (woody plants < 3" dbh)

	Cov.%	Dom	Ind.		Cov.%	Dom	Ind.
1. Sal bar	1		FAC	7.			
2.				8.			
3.				9.			
4.				10.			
5.				11.			
6.				12.			

Total Sapling/Shrub Cover: —
50% of total cover: — 20% of total cover: —

Herb Stratum

	Cov.%	Dom	Ind.		Cov.%	Dom	Ind.
1. Cal can	85	X	FAC	12.			
2. Car aqua	5		OBL	13.			
3. Equ flu	10		OBL	14.			
4. Pot pal	3		OBL	15.			
5. Rumex fen	1		OBL	16.			
6.				17.			
7.				18.			
8.				19.			
9.				20.			
10.				21.			
11.				22.			

Total Herb Cover: 105 (includes 1% Sal bar)
50% of total cover: 52.5 20% of total cover: 21
Circular 1/10-ac plot X or other plot dimension: ____ % of bare ground: 25%
% Cover of Wetland Bryophytes — % Total Cover of Bryophytes — %
(where applicable)

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	19	X1= 19
FACW species	—	X2= —
FAC species	86	X3= 258
FACU species	—	X4= —
UPL + NL species		X5= —
Column Totals:	105 (A)	277 (B)

Prevalence Index = B/A = 2.64

Hydrophytic Vegetation Indicators:

X Dominance Test is>50%
X 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 of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: Lots of bare silt ground Water 5%
Sal bar grouped into herbs for 50/20 Rule

SOIL

Sampling Point #: 36

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

Depth (in.)	Horizon Name	Soil Matrix Color (moist)	Soil Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	α,α dip. (pos/neg)	Remarks (or use comment number)
0-6	B1	N 3/1						sil	+	
6-20	B2	N4/1						vfsa	+	

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

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

___ Histosol or Histel (A1) (≥16",sat'd during wet period of growing season)
___ Histic Epipedon (A2)(8-16", sat'd, underlain by mineral soil with chroma ≤2)
X Hydrogen Sulfide (A4) (w/in 12"of ground surface; @ 5" in this pit
___ Thick Dark Surface (A12)
___ Alaska Gleyed (A13)
___ Alaska Redox (A14)
___ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

___ Alaska Color Change[4] (TA4)
___ Alaska Alpine Swales (TA5)
___ Alaska Redox with 2.5Y Hue
___ Alaska Gleyed without Hue 5Y or Redder Underlying Layer* - It meets this, but already has 1° indicator
___ Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)

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

Restrictive Layer (if present)
Type: none
Depth (inches) ___

Drainage Class: vpd
Soil Map Unit Name:

Hydric Soil Present? Yes X No ___

Comments:
1. Verly bright rxn to ror
2.
3.

HYDROLOGY

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

Primary Indicators (any one indicator is sufficient)

X Surface Water (A1)
X High Water Table (A2) (w/in 12")
X Saturation (A3) (w/in 12")
___ 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)
X Hydrogen Sulfide Odor (C1) (w/in 12")
___ Dry-Season Water Table (C2) (w/in 24")
___ Other (explain)

Secondary Indicators (at least 2 are required)

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

Field Observations (in. from ground surface):
Surface Water Present? Yes X No ___ Depth of water (in.) 2
Water Table Present? Yes X No ___ Depth to water (in.) 10
Seeping in at that depth but not yet filled: ___
Saturation Present? (includes capillary fringe) Yes X No ___ Depth to sat. (in.) 3
Epi Endo Unknown

Wetland Hydrology Present? Yes X No ___

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

Remarks: Surface water present in depressions throughout plot

Site 36: Soil. Photo taken September 29, 2016

Site 36: Soil. Photo taken September 29, 2016

Site 36: Vegetation. Photo taken September 29, 2016

Site 36: Vegetation. Photo taken September 29, 2016

WETLAND DETERMINATION DATA FORM – Alaska Region

Project: ARRC Portage Reserve Borough/City: MOA Date: 9/29/16

Applicant/Owner: ARRC Sampling Point #: 038

Investigator(s): Mac S., Andrew D. Firm: HDR Alaska, Inc.

Lat. (dec.°) 60.80813 Long. 148.97043 ±___' NAD 83 Recorded on GPS #: 402 Marked on map? Y Field Map #: —

Subregion (circle one): SE Southcentral Western Aleutian Interior Northern Landform: terrace Slope (%): — Aspect: —

Local relief: Shape across slope: linear / convex / concave Shape up/downslope: linear / ~~convex / concave~~ NWI classification: Upland

Photo nos./descriptions: Soil 627-8 N 629 S 636 Camera #: — Veg Type (Viereck Level 4 or other): Open cottonwood for alder under

Are climatic / hydrologic conditions on the site typical for this time of year? Yes: X No: ___ If no, explain. HGM type: ___

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

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

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	Yes X	No ___
Hydric Soil Present?	Yes ___	No X
Wetland Hydrology Present?	Yes ___	No X

Is the sampled area within a wetland? Yes ___ No X

Remarks (e.g., marginal?):

VEGETATION (Use scientific names.) Estimate absolute % cover (not relative cover). % can total >100%. Use 2012 indicator status.

Tree Stratum (dbh≥ 3")

Species	Cov.%	Dom?	Ind.	Species	Cov.%	Dom?	Ind.
1. Pop bal	25	X	FACU	5.			
2. —				6.			
3.				7.			
4.				8.			

Total Tree Cover: 25

50% of total cover: 12.5 20% of total cover: 5

Sapling/Shrub Stratum (woody plants < 3" dbh)

Species	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.
1. Vib edu	25	X	FACU	7.			
2. Aln sin	50	X	FAC	8.			
3. Sam race	5		FACU	9.			
4. —				10.			
5.				11.			
6.				12.			

Total Sapling/Shrub Cover: 80

50% of total cover: 40 20% of total cover: 16

Herb Stratum

Species	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.
1. Pyr asa	1		FACU	12.			
2. Ath. felix	7	X	FAC	13.			
3. Cal can	10	X	FAC	14.			
4. Ang luc	1		FACU	15.			
5. Epi ang	5		FACU	16.			
6. Dry dil	3		FACU	17.			
7. —				18.			
8.				19.			
9.				20.			
10.				21.			
11.				22.			

Total Herb Cover: 27

50% of total cover: 13.5 20% of total cover: 5.4

Circular 1/10-ac plot X or other plot dimension: ___ % of bare ground: —

% Cover of Wetland Bryophytes — % Total Cover of Bryophytes — %
(where applicable)

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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	—	X1= —
FACW species	—	X2= —
FAC species	67	X3= 201
FACU species	65	X4= 260
UPL + NL species	—	X5= —
Column Totals:	132 (A)	461 (B)

Prevalence Index = B/A = 3.49

Hydrophytic Vegetation Indicators:

X 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 of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

SOIL

Sampling Point #: 38

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

Depth (in.)	Horizon (opt.)	Soil Matrix Color (moist)	Soil Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	α,α dip. (pos/neg)	Remarks (or use comment number)
0-6	Oi	—								
6-20	C	10YR 2.5/1		—				loamy sand	—	αα negative

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

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

Standard Indicators:

N Histosol or Histel (A1) (≥16"organic surface, sat'd during wet period of growing season)
N Histic Epipedon (A2) (8-16" organics, sat'd, underlain by mineral soil with chroma ≤2)
N Hydrogen Sulfide (A4) (within 12"of ground surface; @ ______" in this pit
N Thick Dark Surface (A12)
N Alaska Gleyed (A13)
N Alaska Redox (A14)
N Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

N Alaska Color Change[4] (TA4)
N Alaska Alpine Swales (TA5)
N Alaska Redox with 2.5Y Hue
N Alaska Gleyed without Hue 5Y or Redder Underlying Layer
— Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)

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

Restrictive Layer (if present)
Type: none
Depth (inches) ______

Drainage Class: wd
Soil Map Unit Name: —

Hydric Soil Present? Yes ____ No X

Comments:
1. Very sandy. Drains rapidly.
2.
3.

HYDROLOGY

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

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (at least 2 are required)

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

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

Wetland Hydrology Present? Yes ____ No X

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

Remarks:

Site 38: Soil. Photo taken September 29, 2016

Site 38: Soil. Photo taken September 29, 2016

Site 38: Vegetation. Photo taken September 29, 2016

Site 38: Vegetation. Photo taken September 29, 2016

WETLAND DETERMINATION DATA FORM – Alaska Region

Project: ARRC Portage Reserve Borough/City: MOA Date: 9/30/16
Applicant/Owner: ARRC Sampling Point #: 46
Investigator(s): Mac S., Andrew D Firm: HDR Alaska, Inc.
Lat. (dec.°) 60.81093 Long. 148.97142 ±___' NAD 83 Recorded on GPS #: 402 Marked on map? X Field Map #: FT51
Subregion (circle one): SE Southcentral Western Aleutian Interior Northern Landform: terrace Slope (%): — Aspect: —
Local relief: Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: PSS1C
Photo nos./descriptions: Soil 648-9 N 650, S 651 Camera #: — Veg Type (Viereck Level 4 or other): Closed alder willo
Are climatic / hydrologic conditions on the site typical for this time of year? Yes: X No: ___ If no, explain. HGM type: Riverine
Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

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

VEGETATION (Use scientific names.) Estimate absolute % cover (not relative cover). % can total >100%. **Use 2012 indicator status.**

Tree Stratum (dbh≥ 3")

Species	Cov.%	Dom?	Ind.	Species	Cov.%	Dom?	Ind.
1. —				5.			
2.				6.			
3.				7.			
4.				8.			

Total Tree Cover: —
50% of total cover: ___ 20% of total cover: —

Sapling/Shrub Stratum (woody plants < 3" dbh)

Species	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.
1. Aln sin	35	X	FAC	7.			
2. Sal sco	60	X	FAC	8.			
3. Myr gal	10		OBL	9.			
4. Sal gla	3		FAC	10.			
5.				11.			
6.				12.			

Total Sapling/Shrub Cover: 108
50% of total cover: 54 20% of total cover: 21.6

Herb Stratum

Species	Abs.Cov.%	Dom?	Ind.	Species	Abs. Cov.%	Dom?	Ind.
1. Ang gen	5		FACW	12.			
2. Cal can	20	X	FAC	13.			
3. Equ flu	7	X	OBL	14.			
4. Ranun sp.	1		—	15.			
5. Equ arv	3		FAC	16.			
6. Equ var	3		FACW	17.			
7. Sang sti	1		FACW	18.			
8. Pyr asa	1		FACU	19.			
9. Car lyn	2		OBL	20.			
10. —				21.			
11.				22.			

Total Herb Cover: 43
50% of total cover: 21.5 20% of total cover: 8.6
Circular 1/10-ac plot X or other plot dimension: ___ % of bare ground: 30
% Cover of Wetland Bryophytes 0 % Total Cover of Bryophytes ___ %
(where applicable)

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 4 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	19	X1= 19
FACW species	9	X2= 18
FAC species	121	X3= 363
FACU species	1	X4= 4
UPL + NL species	—	X5= —
Column Totals:	150 (A)	404 (B)

Prevalence Index = B/A = 2.69

Hydrophytic Vegetation Indicators:

X Dominance Test is>50%
X 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 of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: 30% bare ground, grey silt area may be tidally influenced

SOIL

Sampling Point #: 46

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

Depth (in.)	Horizon (opt.)	Soil Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	α,α dip. (pos/neg)	Remarks (or use comment number)
0-5	A	5Y2.5/1	90	10YR4/3	10%	C	M	sil	–	
5-19	B	N4/1	90	2.5YR4/4	10%	C	RC/PL	vfsal	–	

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

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

Standard Indicators:

- ____ Histosol or Histel (A1) (≥16"organic surface, sat'd during wet period of growing season)
- ____ Histic Epipedon (A2) (8-16" organics, sat'd, underlain by mineral soil with chroma ≤2)
- ____ Hydrogen Sulfide (A4) (within 12"of ground surface; @ ______" in this pit
- ____ Thick Dark Surface (A12)
- ____ Alaska Gleyed (A13)
- X Alaska Redox (A14)
- ____ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ____ Alaska Color Change[4] (TA4)
- ____ Alaska Alpine Swales (TA5)
- ____ Alaska Redox with 2.5Y Hue
- ____ Alaska Gleyed without Hue 5Y or Redder Underlying Layer
- ____ Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)

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

Restrictive Layer (if present)
Type: —
Depth (inches) ______

Drainage Class: sw pd
Soil Map Unit Name: —

Hydric Soil Present? Yes X No ____

Comments:
1.
2.
3.

HYDROLOGY

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

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (at least 2 are required)

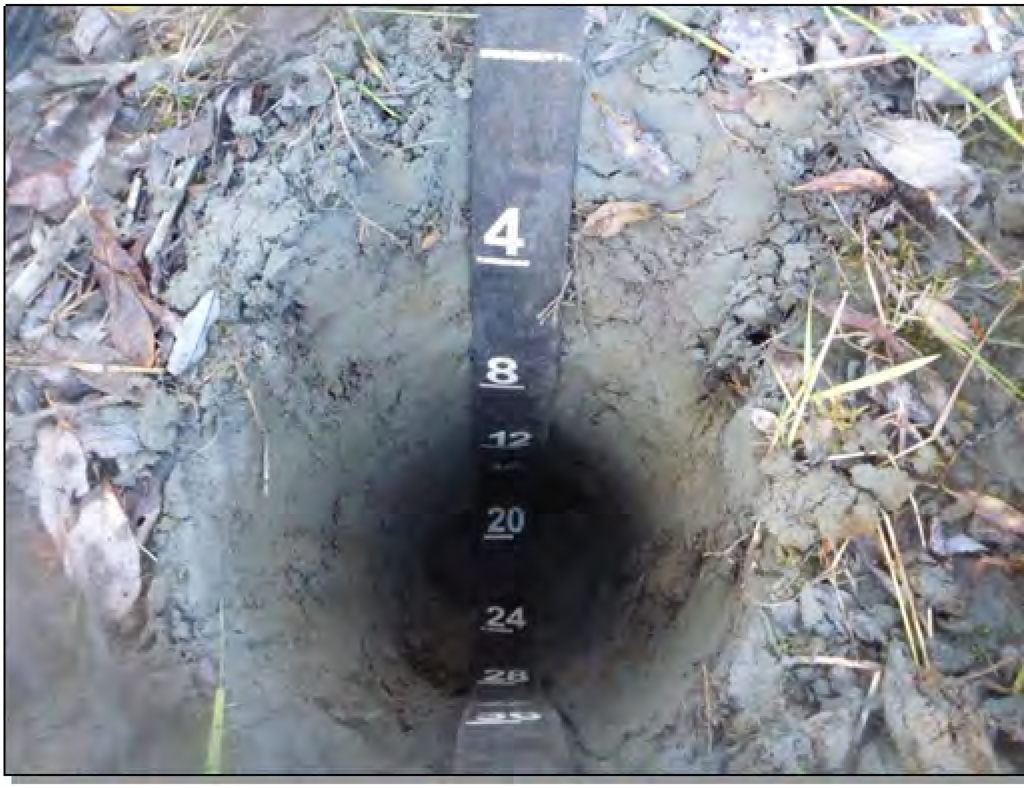
- X Water-Stained Leaves (B9)
- X Drainage Patterns (B10) ______
- ____ Oxid'd Rhizospheres on Living Roots (C3) (within 12")
- ____ Presence of Reduced Iron (C4) (pos. α,α or soil color change w/in 12")
- ____ Salt Deposits (C5)
- ____ Stunted or Stressed Plants (D1)
- ____ Geomorphic Position (D2)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

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

Wetland Hydrology Present? Yes X No ____

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

Remarks: Area may be tidally influenced. Large patches of silt. Lots of downed herb veg. Water flows through area, small dry channels connecting to Explorer Creek



Site 46: Soil. Photo taken September 30, 2016

Site 46: Soil. Photo taken September 30, 2016

Site 46: Vegetation. Photo taken September 30, 2016

Site 46: Vegetation. Photo taken September 30, 2016

WETLAND DETERMINATION DATA FORM – Alaska Region

Project: ARRC Portage Reserve Borough/City: MOA Date: 9/30/16

Applicant/Owner: ARRC Sampling Point #: 47

Investigator(s): Mac S., Andrew D. Firm: HDR Alaska, Inc.

Lat. (dec.°) 60.81055 Long. 148.97096 ±___' NAD 83 Recorded on GPS #: 407 Marked on map? X Field Map #: 8 FT54

Subregion (circle one): SE ~~Southcentral~~ Western Aleutian Interior Northern Landform: Flat Slope (%): — Aspect: —

Local relief: Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: PEM1C

Photo nos./descriptions: 652-3 soil 654 N 655 S Camera #: — Veg Type (Viereck Level 4 or other): Grass marsh

Are climatic / hydrologic conditions on the site typical for this time of year? Yes: X No: ___ If no, explain. HGM type: Flat

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

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

SUMMARY OF FINDINGS

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

VEGETATION (Use scientific names.) Estimate absolute % cover (not relative cover). % can total >100%. Use 2012 indicator status.

Tree Stratum (dbh≥ 3")

Species	Cov.%	Dom?	Ind.	Species	Cov.%	Dom?	Ind.
1. —				5.			
2.				6.			
3.				7.			
4.				8.			

Total Tree Cover: —

50% of total cover: — 20% of total cover: —

Sapling/Shrub Stratum (woody plants < 3" dbh)

	Abs.Cov.%	Dom?	Ind.		Abs.Cov.%	Dom?	Ind.
1. Sal bar	2		FAC	7.			
2. —				8.			
3.				9.			
4.				10.			
5.				11.			
6.				12.			

Total Sapling/Shrub Cover: — (<5%, so moved to herb)

50% of total cover: — 20% of total cover: —

Herb Stratum

	Abs.Cov.%	Dom?	Ind.		Abs. Cov.%	Dom?	Ind.
1. Equ flu	25	X	OBL	12.			
2. Car aqu	7		OBL	13.			
3. Pot pal	2		OBL	14.			
4. Cal can	30	X	FAC	15.			
5. Equ var	2		FACW	16.			
6. Car lyn	2		OBL	17.			
7.				18.			
8.				19.			
9.				20.			
10.				21.			
11.				22.			

Total Herb Cover: 70 (includes Sal bar)

50% of total cover: 35 20% of total cover: 14

Circular 1/10-ac plot X or other plot dimension: ___ % of bare ground: ___

% Cover of Wetland Bryophytes — % Total Cover of Bryophytes — %
(where applicable)

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	36	X1= 36
FACW species	2	X2= 4
FAC species	32	X3= 96
FACU species	—	X4= —
UPL + NL species	—	X5= —
Column Totals:	70 (A)	136 (B)

Prevalence Index = B/A = 1.94

Hydrophytic Vegetation Indicators:

X Dominance Test is>50%
X 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 of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: Standing dead spruce trunks. Open patches w/ only Equ fluv dispersed throughout. Sal bar included in herb stratum for 50/20 calculations

SOIL

Sampling Point #: 47

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

Depth (in.)	Horizon (opt.)	Soil Matrix Color (moist)	Soil Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	α,α dip. (pos/neg)	Remarks (or use comment number)
0-5	A	5Y3/1		10YR3/4	10	C	RC	sil	–	
5-15	B	10YR4/1		10YR4/4	10	C	RC	sil	–	

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

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

Standard Indicators:

- ____ Histosol or Histel (A1) (≥16"organic surface, sat'd during wet period of growing season)
- ____ Histic Epipedon (A2) (8-16" organics, sat'd, underlain by mineral soil with chroma ≤2)
- ____ Hydrogen Sulfide (A4) (within 12"of ground surface; @ ______" in this pit
- ____ Thick Dark Surface (A12)
- ____ Alaska Gleyed (A13)
- X Alaska Redox (A14)
- ____ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ____ Alaska Color Change[4] (TA4)
- ____ Alaska Alpine Swales (TA5)
- ____ Alaska Redox with 2.5Y Hue
- ____ Alaska Gleyed without Hue 5Y or Redder Underlying Layer
- ____ Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)

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

Restrictive Layer (if present)
Type: none
Depth (inches) ______

Drainage Class: pd
Soil Map Unit Name: –

Hydric Soil Present? Yes X No ____

Comments:
1.
2.
3.

HYDROLOGY

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

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2) (w/in 12")
- X Saturation (A3) (w/in 12")
- X 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) (w/in 12")
- ___ Dry-Season Water Table (C2) (w/in 24")
- ___ Other (explain)

Secondary Indicators (at least 2 are required)

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

Field Observations (in. from ground surface):

Surface Water Present? Yes ____ No X Depth of water (in.) ______
Water Table Present? Yes X No ____ Depth to water (in.) 19
Seeping in at that depth but not yet filled?: 15
Saturation Present? (includes capillary fringe) Yes X No ____ Depth to sat. (in.) 8
Epi Endo Unknown

Wetland Hydrology Present? Yes X No ____

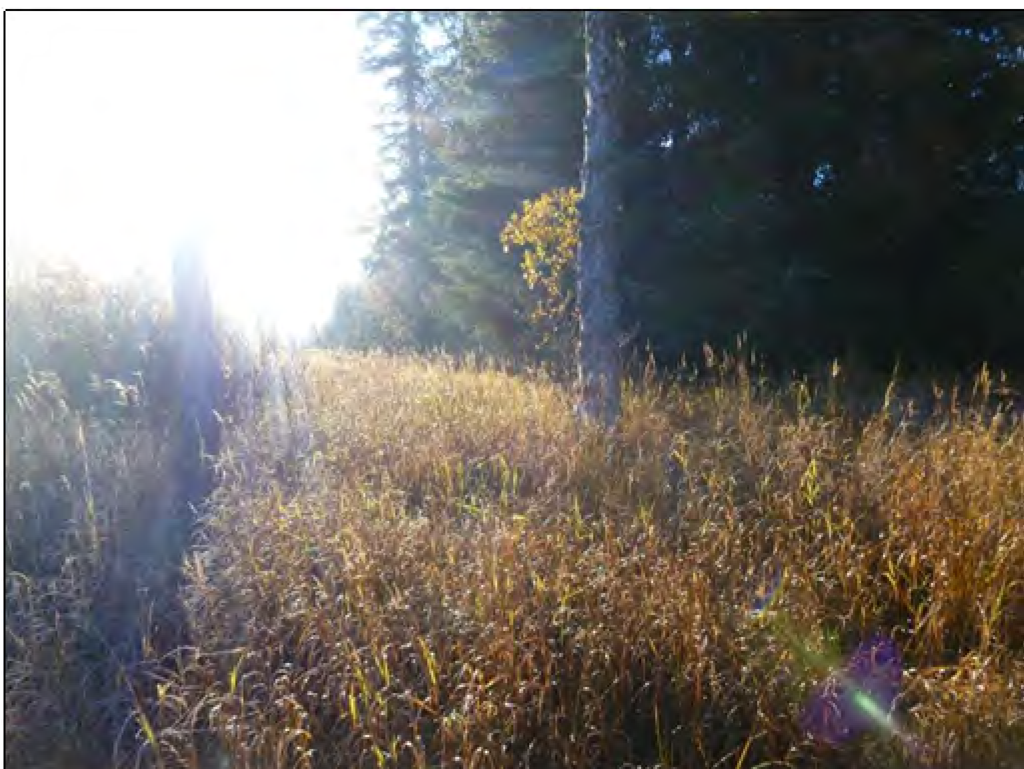
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Water marks on dead trees

Site 47: Soil. Photo taken September 30, 2016

Site 47: Soil. Photo taken September 30, 2016

Site 47: Vegetation. Photo taken September 30, 2016



Site 47: Vegetation. Photo taken September 30, 2016

WETLAND DETERMINATION DATA FORM – Alaska Region

Project: ARRC Portage Reserve Borough/City: MOA Date: 9/30/16
Applicant/Owner: ARRC Sampling Point #: 49
Investigator(s): Mac S., Andrew D. Firm: HDR Alaska, Inc.
Lat. (dec.°) 60.81015 Long. 148.97081 ± ' NAD 83 Recorded on GPS #: 402 Marked on map? Y Field Map #: 8
Subregion (circle one): SE Southcentral Western Aleutian Interior Northern Landform: Flat Slope (%): — Aspect: —
Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: U
Photo nos./descriptions: 659-60 N 61 S 662 Camera #: 402 Veg Type (Viereck Level 4 or other): —
Are climatic / hydrologic conditions on the site typical for this time of year? Yes: X No: ____ HGM type: —
Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

Fireweed meadow

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

VEGETATION (Use scientific names.)

Tree Stratum (dbh≥ 3")

Sp.	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom ?	Ind.
1. —				5.			
2.				6.			
3.				7.			
4.				8.			

Total Tree Cover: —
50% of total cover: — 20% of total cover: —

Sapling/Shrub Stratum (woody plants < 3" dbh)

	Cov.%	Dom	Ind.		Cov.%	Dom	Ind.
1. Sam rac	5	X	FACU	7.			
2. —				8.			
3.				9.			
4.				10.			
5.				11.			
6.				12.			

Total Sapling/Shrub Cover: 5
50% of total cover: 2.5 20% of total cover: 1

Herb Stratum

	Cov.%	Dom	Ind.		Cov.%	Dom	Ind.
1. Rub arc	1		FAC	12.			
2. Epi ang	40	X	FACU	13.			
3. Ath fel	15		FAC	14.			
4. Cal can	50	X	FAC	15.			
5. Equ arv	5		FAC	16.			
6. Her lan	5		FACU	17.			
7. Gal bor	2		FACU	18.			
8. Poa sp.	1		—	19.			
9. —				20.			
10.				21.			
11.				22.			

Total Herb Cover: 119
50% of total cover: 59.5 20% of total cover: 23.8

Circular 1/10-ac plot X or other plot dimension: ________ % of bare ground: ______
% Cover of Wetland Bryophytes —% Total Cover of Bryophytes —%
(where applicable)

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	—	X1= —
FACW species	—	X2= —
FAC species	71	X3= 213
FACU species	52	X4= 208
UPL + NL species	—	X5= —
Column Totals:	123 (A)	421 (B)

Prevalence Index = B/A = 3.42

Hydrophytic Vegetation Indicators:

N Dominance Test is>50%
N 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 of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ______ No X

Remarks:

SOIL

Sampling Point #: 47

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

Depth (in.)	Horizon Name	Soil Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	α,α dip. (pos/neg)	Remarks (or use comment number)
0-2	Oi									
2-7	A	10YR 3/1		—				l fsa		
7-20	B	10YR 2/1		—				fsa		

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

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

N Histosol or Histel (A1) (≥16",sat'd during wet period of growing season)
N Histic Epipedon (A2)(8-16", sat'd, underlain by mineral soil with chroma ≤2)
N Hydrogen Sulfide (A4) (w/in 12"of ground surface; @ ____" in this pit
N Thick Dark Surface (A12)
N Alaska Gleyed (A13)
N Alaska Redox (A14)
N Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

N Alaska Color Change[4] (TA4)
___ Alaska Alpine Swales (TA5)
___ Alaska Redox with 2.5Y Hue
___ Alaska Gleyed without Hue 5Y or Redder Underlying Layer
___ Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)

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

Restrictive Layer (if present)
Type: none
Depth (inches) ____

Drainage Class: wd
Soil Map Unit Name: —

Hydric Soil Present? Yes ___ No X

Comments:
1.
2.
3.

HYDROLOGY

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

Primary Indicators (any one indicator is sufficient)

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

Secondary Indicators (at least 2 are required)

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

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

Wetland Hydrology Present? Yes ___ No X

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

Remarks:

Site 49: Soil. Photo taken September 30, 2016

Site 49: Soil. Photo taken September 30, 2016

Site 49: Vegetation. Photo taken September 30, 2016

Site 49: Vegetation. Photo taken September 30, 2016

WETLAND DETERMINATION DATA FORM – Alaska Region

Project: ARRC Portage Reserve Borough/City: MOA Date: 9/30/16
Applicant/Owner: ARRC Sampling Point #: 56
Investigator(s): Mac S., Andrew D Firm: HDR Alaska, Inc.
Lat. (dec.°) 60.81183 Long. 148.97137 ± ___' NAD 83 Recorded on GPS #: 402 Marked on map? Y Field Map #: 7
Subregion (circle one): SE Southcentral Western Aleutian Interior Northern Landform: Flat Slope (%): — Aspect: —
Local relief: Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: PEM1E
Photo nos./descriptions: Soil 6704 N82 583 Camera #: — Veg Type (Viereck Level 4 or other): Sedge Grass Marsh
Are climatic / hydrologic conditions on the site typical for this time of year? Yes: X No: ___ If no, explain. HGM type: —
Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	Yes X	No ___
Hydric Soil Present?	Yes X	No ___
Wetland Hydrology Present?	Yes X	No ___

Is the sampled area within a wetland? Yes X No ___
Remarks (e.g., marginal?):

VEGETATION (Use scientific names.) Estimate absolute % cover (not relative cover). % can total >100%. Use 2012 indicator status.

Tree Stratum (dbh≥ 3")

Species	Cov.%	Dom?	Ind.	Species	Cov.%	Dom?	Ind.
1. —				5.			
2.				6.			
3.				7.			
4.				8.			

Total Tree Cover: —
50% of total cover: — 20% of total cover: —

Sapling/Shrub Stratum (woody plants < 3" dbh)

Species	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.
1. —				7.			
2.				8.			
3.				9.			
4.				10.			
5.				11.			
6.				12.			

Total Sapling/Shrub Cover: —
50% of total cover: — 20% of total cover: —

Herb Stratum

Species	Abs.Cov.%	Dom?	Ind.	Species	Abs. Cov.%	Dom?	Ind.
1. Car aqu	10		OBL	12.			
2. Cal can	50	X	FAC	13.			
3. Equ flu	15	X	OBL	14.			
4. Car utr	30	X	OBL	15.			
5. Equ arv	5		FAC	16.			
6. Pot pal	3		OBL	17.			
7.				18.			
8.				19.			
9.				20.			
10.				21.			
11.				22.			

Total Herb Cover: 163
50% of total cover: 81.5 20% of total cover: 32.6
Circular 1/10-ac plot X or other plot dimension: ___ % of bare ground: —
% Cover of Wetland Bryophytes — % Total Cover of Bryophytes 25 %
(where applicable)

Remarks: Water 20%

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	108	x1= 108
FACW species	—	x2= —
FAC species	55	x3= 165
FACU species	—	x4= —
UPL + NL species	—	x5= —
Column Totals:	163 (A)	273 (B)

Prevalence Index = B/A = 1.67

Hydrophytic Vegetation Indicators:

X Dominance Test is>50%
X 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 of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

SOIL

Sampling Point #: 56

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

Depth (in.)	Horizon (opt.)	Soil Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	α,α dip. (pos/neg)	Remarks (or use comment number)
0-10	Oi	—								
10-20	B	10Y4/1		—						

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

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

Standard Indicators:

___ Histosol or Histel (A1) (≥16"organic surface, sat'd during wet period of growing season)
X Histic Epipedon (A2) (8-16" organics, sat'd, underlain by mineral soil with chroma ≤2)
X Hydrogen Sulfide (A4) (within 12"of ground surface; @ 10" in this pit
___ Thick Dark Surface (A12)
___ Alaska Gleyed (A13)
___ Alaska Redox (A14)
___ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

___ Alaska Color Change[4] (TA4)
___ Alaska Alpine Swales (TA5)
___ Alaska Redox with 2.5Y Hue
___ Alaska Gleyed without Hue 5Y or Redder Underlying Layer
___ Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)

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

Restrictive Layer (if present)
Type: None
Depth (inches) ___

Drainage Class: vpd
Soil Map Unit Name:

Hydric Soil Present? Yes X No ___

Comments:
1.
2.
3.

HYDROLOGY

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

Primary Indicators (any one indicator is sufficient)

X Surface Water (A1)
X High Water Table (A2) (w/in 12")
X Saturation (A3) (w/in 12")
___ 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)
X Hydrogen Sulfide Odor (C1) (w/in 12")
___ Dry-Season Water Table (C2) (w/in 24")
___ Other (explain)

Secondary Indicators (at least 2 are required)

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

Field Observations (in. from ground surface):
Surface Water Present? Yes X No ___ Depth of water (in.) 2
Water Table Present? Yes X No ___ Depth to water (in.) 0
Seeping in at that depth but not yet filled?: ___
Saturation Present? (includes capillary fringe) Yes X No ___ Depth to sat. (in.) 0
Epi Endo Unknown

Wetland Hydrology Present? Yes X No ___

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

Remarks: Area inundated.

Site 56: Soil. Photo taken September 30, 2016

Site 56: Soil. Photo taken September 30, 2016

Site 56: Vegetation. Photo taken September 30, 2016

Site 56: Vegetation. Photo taken September 30, 2016

WETLAND DETERMINATION DATA FORM – Alaska Region

Project: ARRC Portage Reserve Borough/City: MOA Date: 9/30/16

Applicant/Owner: Sampling Point #: 59

Investigator(s): Mac Salway, Andrew Dougherty Firm: HDR Alaska, Inc.

Lat. (dec.°) 60.81425 Long. 148.97029 ±___' NAD 83 Recorded on GPS #: 402 Marked on map? Y Field Map #: 6

Subregion (circle one): SE Southcentral Western Aleutian Interior Northern Landform: gentle slope Slope (%): .5 Aspect: W

Local relief: Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: PSS1/EM1C

Photo nos./descriptions: soil 89 90 N91 S92 Camera #: X Veg Type (Viereck Level 4 or other): Open S-S

Are climatic / hydrologic conditions on the site typical for this time of year? Yes: X No: ____ If no, explain. HGM type: Flat

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

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

SUMMARY OF FINDINGS

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

VEGETATION (Use scientific names.) Estimate absolute % cover (not relative cover). % can total >100%. **Use 2012 indicator status.**

Tree Stratum (dbh≥ 3")

Species	Cov.%	Dom?	Ind.	Species	Cov.%	Dom?	Ind.
1. —				5.			
2.				6.			
3.				7.			
4.				8.			

Total Tree Cover: —

50% of total cover: — 20% of total cover: —

Sapling/Shrub Stratum (woody plants < 3" dbh)

Species	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.
1. Myr gal	25	X	OBL	7.			
2. Sal bar	40	X	FAC	8.			
3. —				9.			
4.				10.			
5.				11.			
6.				12.			

Total Sapling/Shrub Cover: 65

50% of total cover: 32.5 20% of total cover: 13

Herb Stratum

Species	Abs.Cov.%	Dom?	Ind.	Species	Abs. Cov.%	Dom?	Ind.
1. Epl ang	2		FACU	12.			
2. Cal can	60	X	FAC	13.			
3. Ang gen	6		FACW	14.			
4. Rub arc	3		FAC	15.			
5. Pot pal	2		OBL	16.			
6. Sang stip	1		FACW	17.			
7. —				18.			
8.				19.			
9.				20.			
10.				21.			
11.				22.			

Total Herb Cover: 74

50% of total cover: 37 20% of total cover: 14.8

Circular 1/10-ac plot X or other plot dimension: ________ % of bare ground: —

% Cover of Wetland Bryophytes (where applicable) —% Total Cover of Bryophytes —%

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	27	X1= 27
FACW species	7	X2= 14
FAC species	103	X3= 309
FACU species	2	X4= 8
UPL + NL species	—	X5= —
Column Totals:	139 (A)	358 (B)

Prevalence Index = B/A = 2.58

Hydrophytic Vegetation Indicators:

X Dominance Test is>50%

X 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 of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ______

Remarks:

SOIL

Sampling Point #: 59

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

Depth (in.)	Horizon (opt.)	Soil Matrix Color (moist)	Soil Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	α,α dip. (pos/neg)	Remarks (or use comment number)
0-4	Oi									
4-13	A	N4/1	90	7.5YR 4/4	10	C	RC,PL	vfsal	+	
13-20	B	N3/1	95	10YR 4/6	5	C	M	vfsal	+	

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

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

Standard Indicators:

- ___ Histosol or Histel (A1) (≥16"organic surface, sat'd during wet period of growing season)
- ___ Histic Epipedon (A2) (8-16" organics, sat'd, underlain by mineral soil with chroma ≤2)
- ___ Hydrogen Sulfide (A4) (within 12"of ground surface; @ ______" in this pit
- ___ Thick Dark Surface (A12)
- ___ Alaska Gleyed (A13)
- X Alaska Redox (A14)
- ___ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ___ Alaska Color Change[4] (TA4)
- ___ Alaska Alpine Swales (TA5)
- ___ Alaska Redox with 2.5Y Hue
- ___ Alaska Gleyed without Hue 5Y or Redder Underlying Layer
- ___ Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)

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

Restrictive Layer (if present)
Type: —
Depth (inches) ______

Drainage Class: PD
Soil Map Unit Name:

Hydric Soil Present? Yes X No ___

Comments:
1. positive ad on both A and B layers
2.
3.

HYDROLOGY

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

Primary Indicators (any one indicator is sufficient)

- X Surface Water (A1)
- X High Water Table (A2) (w/in 12")
- X Saturation (A3) (w/in 12")
- ___ 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) (w/in 12")
- ___ Dry-Season Water Table (C2) (w/in 24")
- ___ Other (explain)

Secondary Indicators (at least 2 are required)

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

Field Observations (in. from ground surface):
Surface Water Present? Yes X No ___ Depth of water (in.) 1
Water Table Present? Yes X No ___ Depth to water (in.) 11
Seeping in at that depth but not yet filled?: 8
Saturation Present? (includes capillary fringe) Yes X No ___ Depth to sat. (in.) 0
Epi Endo Unknown

Wetland Hydrology Present? Yes X No ___

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

Remarks: Scattered patches of [illegible]

Site 59: Soil. Photo taken September 30, 2016

Site 59: Soil. Photo taken September 30, 2016

Site 59: Vegetation. Photo taken September 30, 2016

Site 59: Vegetation. Photo taken September 30, 2016

WETLAND DETERMINATION DATA FORM – Alaska Region

Project: ARRC Portage Reserve Borough/City: MOA Date: 9/30/16
Applicant/Owner: ARRC Sampling Point #: 63
Investigator(s): Mac S., Andrew D. Firm: HDR Alaska, Inc.
Lat. (dec.°) 60.81546 Long. 148.96649 ±___' NAD 83 Recorded on GPS #: 402 Marked on map? X Field Map #: 7 FT36
Subregion (circle one): SE Southcentral Western Aleutian Interior Northern Landform: — Slope (%): — Aspect: —
Local relief: Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: PSS1/EM1C
Photo nos./descriptions: Soils 702-3 N4 55 Camera #: — Veg Type (Viereck Level 4 or other): Open alder / bj mead
Are climatic / hydrologic conditions on the site typical for this time of year? Yes: X No: ____ If no, explain. HGM type: Flat
Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

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

VEGETATION (Use scientific names.) Estimate absolute % cover (not relative cover). % can total >100%. **Use 2012 indicator status.**

Tree Stratum (dbh≥ 3")

Species	Cov.%	Dom?	Ind.	Species	Cov.%	Dom?	Ind.
1. —				5.			
2.				6.			
3.				7.			
4.				8.			

Total Tree Cover: —
50% of total cover: — 20% of total cover: —

Sapling/Shrub Stratum (woody plants < 3" dbh)

	Abs.Cov.%	Dom?	Ind.		Abs.Cov.%	Dom?	Ind.
1. Aln sin	40	X	FAC	7.			
2. Pic glau	2		FACU	8.			
3.				9.			
4.				10.			
5.				11.			
6.				12.			

Total Sapling/Shrub Cover: 42
50% of total cover: 21 20% of total cover: 8.4

Herb Stratum

	Abs.Cov.%	Dom?	Ind.		Abs. Cov.%	Dom?	Ind.
1. Cal can	80	X	FAC	12.			
2. Rub arc	5		FAC	13.			
3. Equ arv	3		FAC	14.			
4. Pot pal	3		OBL	15.			
5. Viola sp	1		—	16.			
6.				17.			
7.				18.			
8.				19.			
9.				20.			
10.				21.			
11.				22.			

Total Herb Cover: 92
50% of total cover: 46 20% of total cover: 18.4
Circular 1/10-ac plot X or other plot dimension: ________ % of bare ground: ________
% Cover of Wetland Bryophytes 10 % Total Cover of Bryophytes ________ %
(where applicable) Sphagnum

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	3	X1= 3
FACW species	—	X2= —
FAC species	128	X3= 384
FACU species	2	X4= 8
UPL + NL species	—	X5= —
Column Totals:	133 (A)	395 (B)

Prevalence Index = B/A = 2.97

Hydrophytic Vegetation Indicators:

X Dominance Test is>50%
X 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 of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ________

Remarks:

SOIL

Sampling Point #: 103

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

Depth (in.)	Horizon (opt.)	Soil Matrix Color (moist)	Soil Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	α,α dip. (pos/neg)	Remarks (or use comment number)
0-5	Oi	—								
5-20	B	10Y4/1		—				vfsal	+	

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

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

Standard Indicators:

- ___ Histosol or Histel (A1) (≥16"organic surface, sat'd during wet period of growing season)
- ___ Histic Epipedon (A2) (8-16" organics, sat'd, underlain by mineral soil with chroma ≤2)
- ___ Hydrogen Sulfide (A4) (within 12"of ground surface; @ ______" in this pit
- ___ Thick Dark Surface (A12)
- ___ Alaska Gleyed (A13)
- ___ Alaska Redox (A14)
- ___ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

- ___ Alaska Color Change[4] (TA4)
- ___ Alaska Alpine Swales (TA5)
- ___ Alaska Redox with 2.5Y Hue
- X Alaska Gleyed without Hue 5Y or Redder Underlying Layer
- ___ Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. Valley bottom — broad Fl.
[4]Give details of color change in Remarks.

Restrictive Layer (if present)	Drainage Class: PD	Hydric Soil Present? Yes X No ___
Type: none	Soil Map Unit Name:	
Depth (inches) ______		

Comments:
1. pos. αα @ 12"
2.
3.

HYDROLOGY

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

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- X High Water Table (A2) (w/in 12")
- X Saturation (A3) (w/in 12")
- ___ 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) (w/in 12")
- ___ Dry-Season Water Table (C2) (w/in 24")
- ___ Other (explain)

Secondary Indicators (at least 2 are required)

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

Field Observations (in. from ground surface):

- Surface Water Present? Yes X No ___ Depth of water (in.) 0-1
- Water Table Present? Yes X No ___ Depth to water (in.) 8
- Seeping in at that depth but not yet filled?: ___
- Saturation Present? Yes X No ___ Depth to sat. (in.) 0
- (includes capillary fringe) Epi Endo Unknown

Wetland Hydrology Present? Yes X No ___

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

Remarks:

Site 63: Soil. Photo taken September 30, 2016

Site 63: Soil. Photo taken September 30, 2016

Site 63: Vegetation. Photo taken September 30, 2016

Site 63: Vegetation. Photo taken September 30, 2016

Appendix B

Observation Points – Photographs

September 29 and 30, 2016

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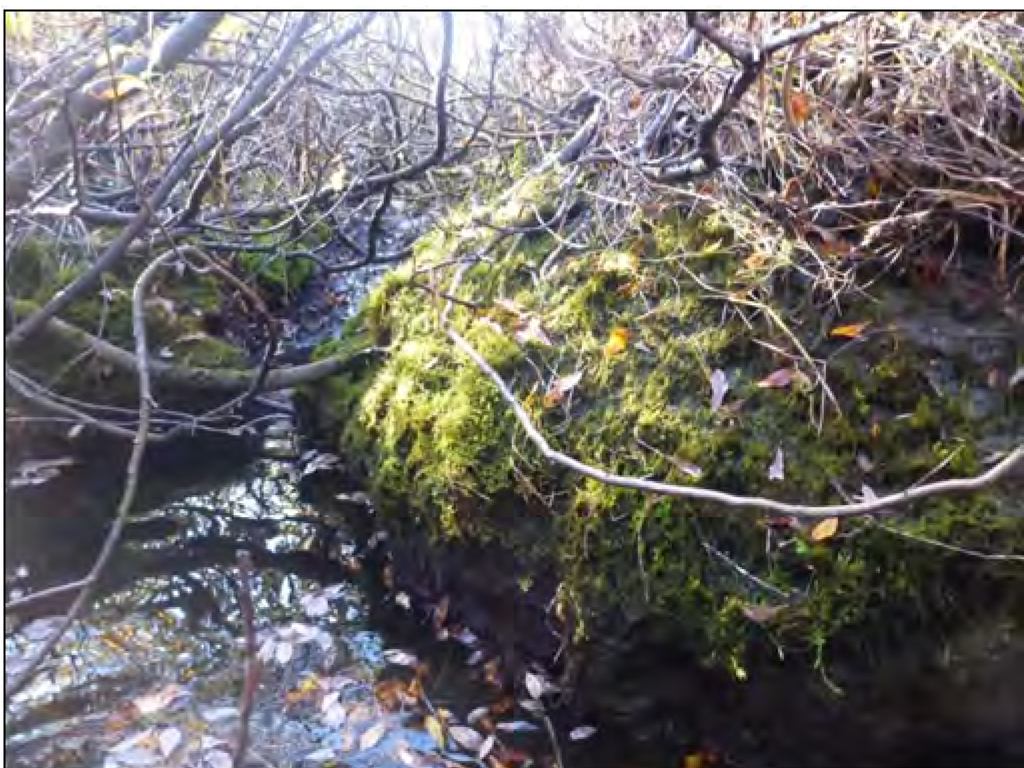
Site 4: Waterbody, upstream north. Photo taken September 29, 2016



Site 4: Waterbody, upstream south. Photo taken September 29, 2016

Site 4: Waterbody, downstream. Photo taken September 29, 2016

Site 5: Vegetation. Photo taken September 29, 2016

Site 5: Vegetation. Photo taken September 29, 2016

Site 7: Vegetation. Photo taken September 29, 2016

Site 7: Vegetation. Photo taken September 29, 2016

Site 8: Vegetation. Photo taken September 29, 2016

Site 8: Vegetation. Photo taken September 29, 2016

Site 9: Culvert. Photo taken September 29, 2016

Site 9: Upstream. Photo taken September 29, 2016

Site 9: Vegetation. Photo taken September 29, 2016

Site 9: Culvert. Photo taken September 29, 2016

Site 10: Culvert. Photo taken September 29, 2016

Site 10: Vegetation. Photo taken September 29, 2016

Site 11: Soil. Photo taken September 29, 2016

Site 11: Vegetation. Photo taken September 29, 2016

Site 11: Vegetation. Photo taken September 29, 2016

Site 12: Vegetation. Photo taken September 29, 2016

Site 12: Vegetation. Photo taken September 29, 2016

Site 14: Soil. Photo taken September 29, 2016

Site 14: Vegetation. Photo taken September 29, 2016

Site 14: Vegetation. Photo taken September 29, 2016

Site 15: South culvert. Photo taken September 29, 2016

Site 15: North culvert. Photo taken September 29, 2016

Site 16: Culvert. Photo taken September 29, 2016

Site 16: Waterbody, upstream. Photo taken September 29, 2016

Site 17: Waterbody, upstream. Photo taken September 29, 2016

Site 17: Waterbody, downstream. Photo taken September 29, 2016

Site 18: Waterbody, upstream. Photo taken September 29, 2016

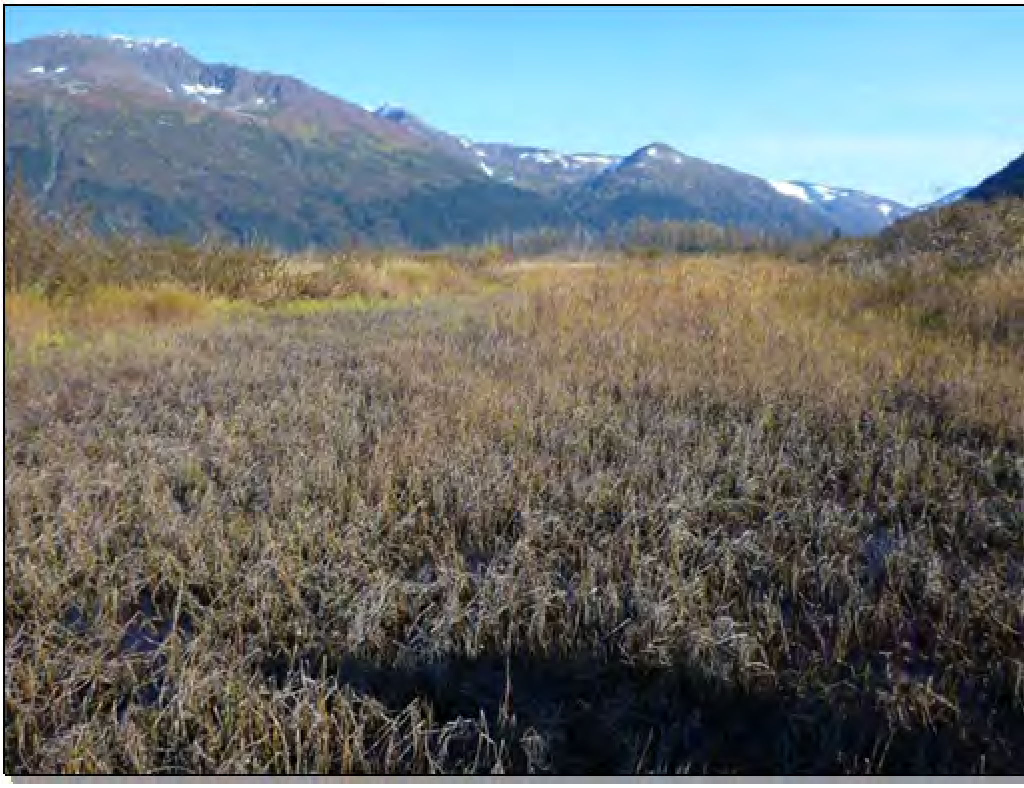
Site 18: Waterbody, downstream. Photo taken September 29, 2016

Site 20: Pond. Photo taken September 29, 2016

Site 20: Vegetation. Photo taken September 29, 2016

Site 21: Vegetation. Photo taken September 29, 2016

Site 21: Vegetation. Photo taken September 29, 2016



Site 22: Vegetation. Photo taken September 29, 2016

Site 22: Vegetation. Photo taken September 29, 2016

Site 23: Waterbody, upstream. Photo taken September 29, 2016

Site 23: Waterbody, downstream. Photo taken September 29, 2016

Site 24: Soil. Photo taken September 29, 2016

Site 24: Vegetation. Photo taken September 29, 2016

Site 24: Vegetation. Photo taken September 29, 2016

Site 25: Soil. Photo taken September 29, 2016

Site 25: Vegetation. Photo taken September 29, 2016

Site 25: Vegetation. Photo taken September 29, 2016

Site 26: Soil. Photo taken September 29, 2016

Site 26: Vegetation. Photo taken September 29, 2016

Site 26: Vegetation. Photo taken September 29, 2016

Site 27: Channel. Photo taken September 29, 2016

Site 27: Upstream. Photo taken September 29, 2016

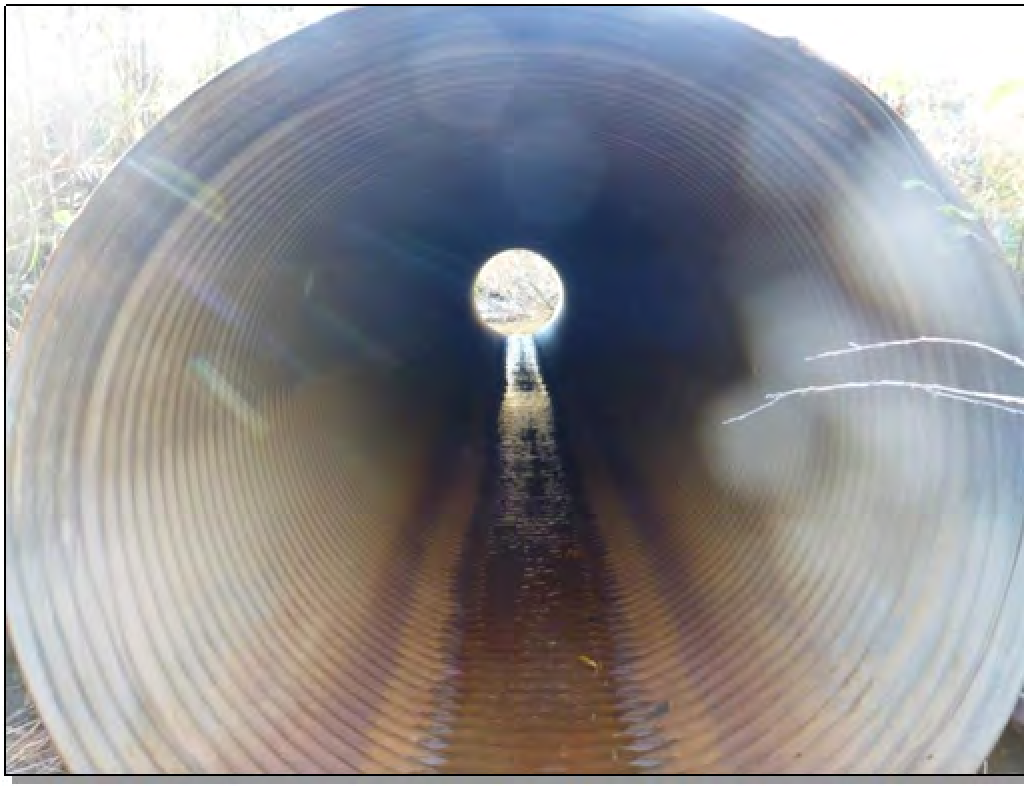
Site 28: Soil. Photo taken September 29, 2016

Site 28: Vegetation. Photo taken September 29, 2016

Site 28: Vegetation. Photo taken September 29, 2016

Site 29: Vegetation. Photo taken September 29, 2016

Site 29: Vegetation. Photo taken September 29, 2016



Site 30: Culvert. Photo taken September 29, 2016

Site 30: Waterbody, upstream. Photo taken September 29, 2016

Site 32: Vegetation. Photo taken September 29, 2016

Site 32: Vegetation. Photo taken September 29, 2016

Site 33: Vegetation. Photo taken September 29, 2016

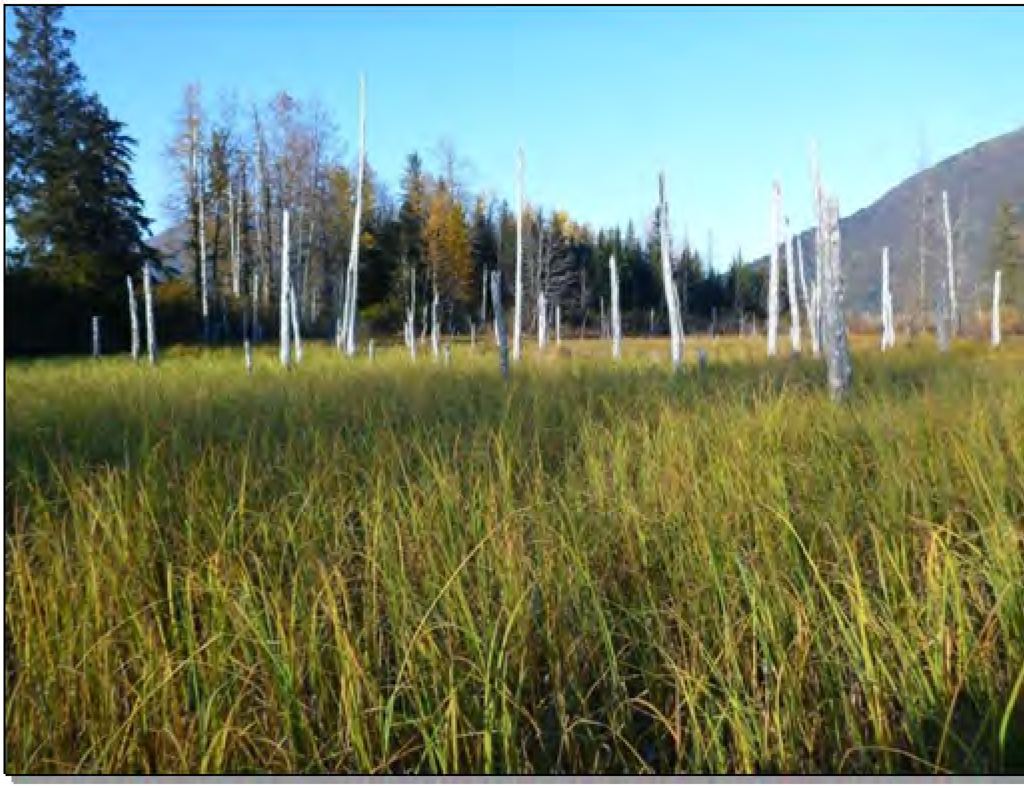
Site 33: Dry stream channel. Photo taken September 29, 2016

Site 34: Waterbody, upstream. Photo taken September 29, 2016

Site 34: Waterbody, downstream. Photo taken September 29, 2016

Site 35: Towards larger channel. Photo taken September 29, 2016

Site 35: Vegetation. Photo taken September 29, 2016



Site 37: Vegetation. Photo taken September 29, 2016

Site 37: Vegetation. Photo taken September 29, 2016

Site 40: North. Photo taken September 29, 2016

Site 40: East. Photo taken September 29, 2016

Site 40: South. Photo taken September 29, 2016

Site 40: West. Photo taken September 29, 2016

Site 41: Culvert. Photo taken September 29, 2016

Site 41: Downstream. Photo taken September 29, 2016

Site 42: Soil. Photo taken September 29, 2016

Site 42: Vegetation. Photo taken September 29, 2016

Site 42: Vegetation. Photo taken September 29, 2016

Site 43: Culvert. Photo taken September 29, 2016

Site 43: Waterbody, downstream. Photo taken September 29, 2016

Site 44: Waterbody. Photo taken September 29, 2016

Site 44: Vegetation. Photo taken September 29, 2016

Site 45: Vegetation. Photo taken September 29, 2016

Site 45: Vegetation. Photo taken September 29, 2016

Site 48: Soil. Photo taken September 30, 2016

Site 48: Vegetation. Photo taken September 30, 2016

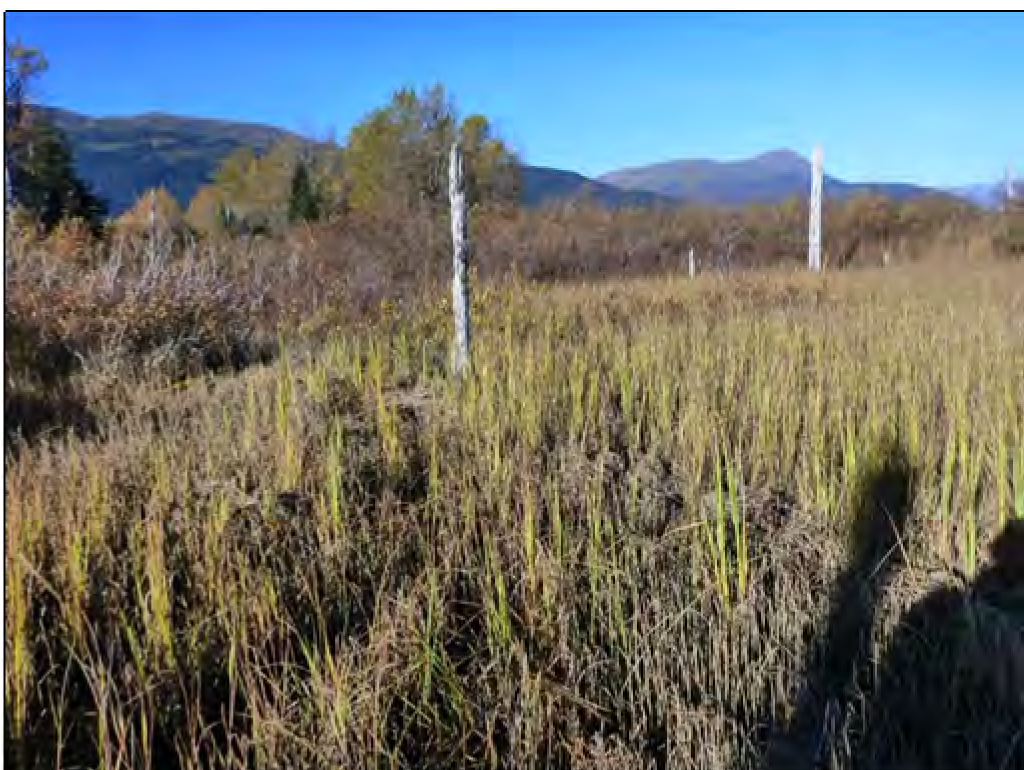
Site 48: Vegetation. Photo taken September 30, 2016

Site 50: Soil. Photo taken September 30, 2016

Site 50: Vegetation. Photo taken September 30, 2016

Site 50: Vegetation. Photo taken September 30, 2016

Site 51: Vegetation. Photo taken September 30, 2016



Site 51: Vegetation. Photo taken September 30, 2016

Site 52: Vegetation. Photo taken September 30, 2016

Site 52: Vegetation. Photo taken September 30, 2016

Site 53: Soil. Photo taken September 30, 2016

Site 53: Vegetation. Photo taken September 30, 2016

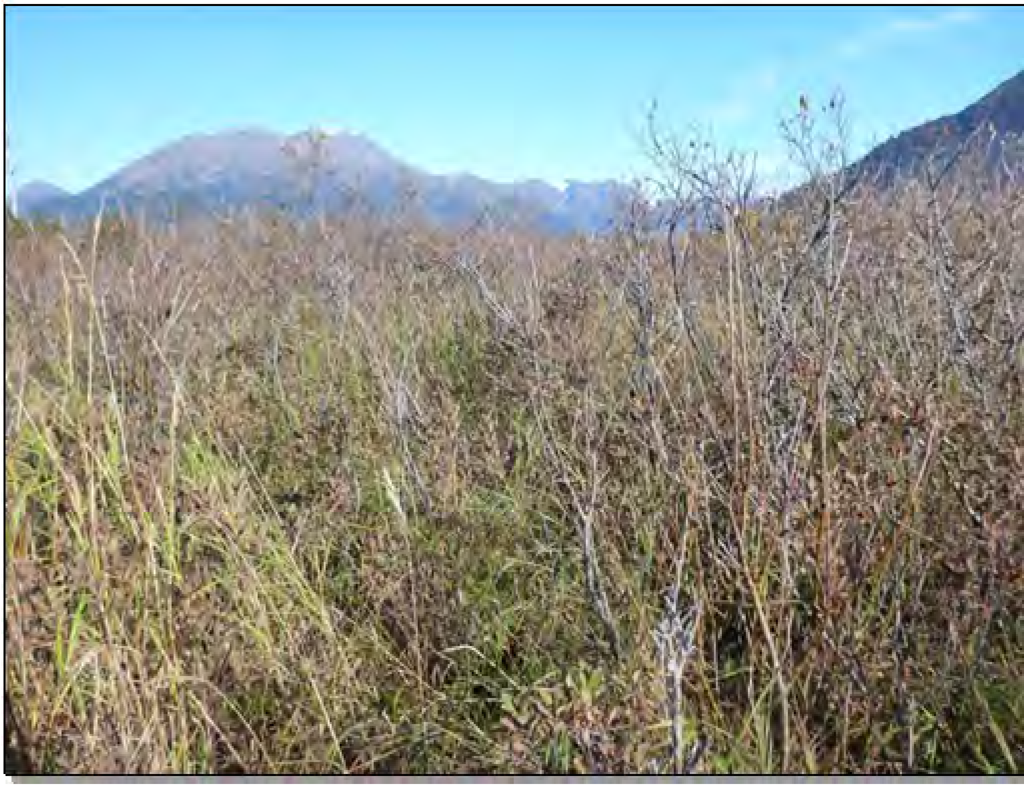
Site 53: Vegetation. Photo taken September 30, 2016

Site 54: Vegetation. Photo taken September 30, 2016

Site 54: Vegetation. Photo taken September 30, 2016

Site 55: Vegetation. Photo taken September 30, 2016

Site 55: Vegetation. Photo taken September 30, 2016



Site 57: Vegetation. Photo taken September 30, 2016

Site 57: Vegetation. Photo taken September 30, 2016

Site 58: Vegetation. Photo taken September 30, 2016

Site 58: Vegetation. Photo taken September 30, 2016

Site 60: Vegetation. Photo taken September 30, 2016

Site 60: Vegetation. Photo taken September 30, 2016

Site 61: Vegetation. Photo taken September 30, 2016

Site 61: Vegetation. Photo taken September 30, 2016

Site 62: Soil. Photo taken September 30, 2016

Site 62: Soil. Photo taken September 30, 2016

Site 62: Vegetation. Photo taken September 30, 2016

Site 62: Vegetation. Photo taken September 30, 2016

Site 64: Soil. Photo taken September 30, 2016

Site 64: Vegetation. Photo taken September 30, 2016

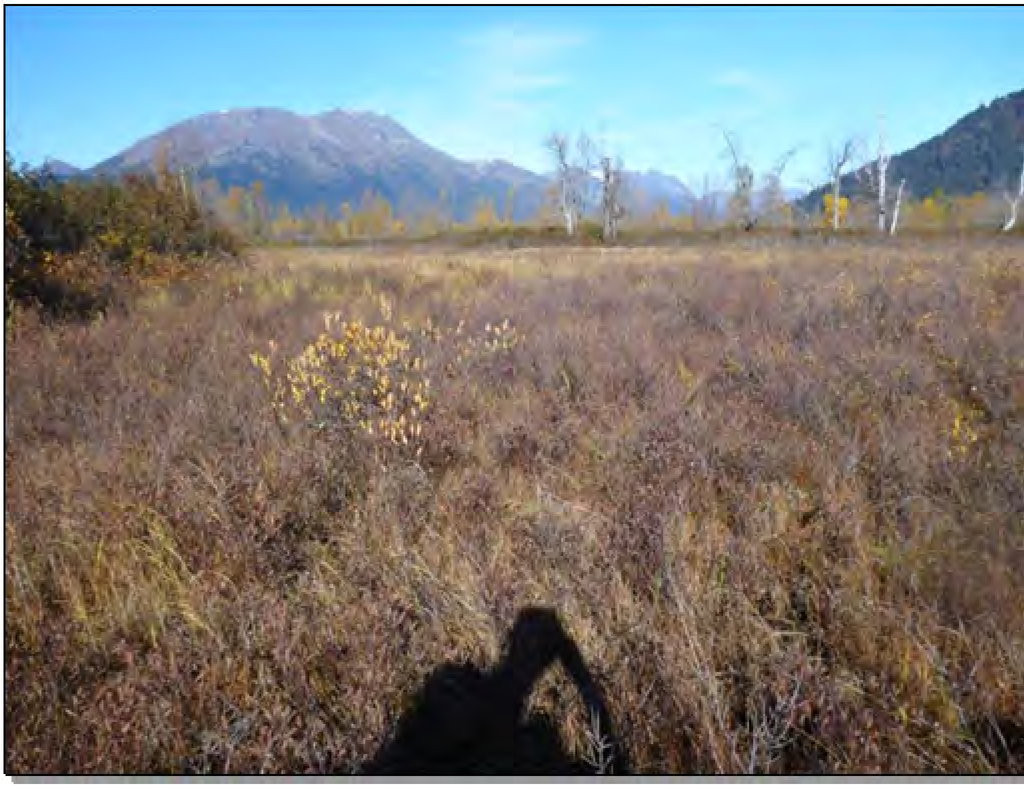
Site 64: Vegetation. Photo taken September 30, 2016

Site 65: Vegetation. Photo taken September 30, 2016

Site 65: Vegetation. Photo taken September 30, 2016

Site 66: Vegetation. Photo taken September 30, 2016

Site 66: Vegetation. Photo taken September 30, 2016



Site 67: Vegetation. Photo taken September 30, 2016

Site 67: Vegetation. Photo taken September 30, 2016

Site 68: Vegetation. Photo taken September 30, 2016

Site 68: Vegetation. Photo taken September 30, 2016

Site 69: Vegetation. Photo taken September 30, 2016

Site 69: Vegetation. Photo taken September 30, 2016

Site 70: Waterbody. Photo taken September 30, 2016

Site 70: Waterbody. Photo taken September 30, 2016

Site 71: Vegetation. Photo taken September 30, 2016

Site 71: Vegetation. Photo taken September 30, 2016

Appendix B

Portage Reserve Mitigation Bank Anchorage Debit Credit Worksheets and Maps

February 2019

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Information for Projects Producing Credits							
Project Name:	Portage Reserve Mitigation Bank	POA #:	POA-2017-00055	Name of Waterway/ Aquatic Area:	Portage Reserve	Date:	2/5/2019
Project Proponent:	Alaska Railroad Corporation	Watershed:	Turnagain Arm			Prepared by:	Alena Gerlek
Project to which Credits Apply							
Project Name:	NA	Applicant/Permittee:		NA		POA #:	NA

Spreadsheet 1: List of Polygons

Credit-Producing Project					
Project Name:	Portage Reserve Mitigation Bank	POA #:	POA-2017-00055	Date:	2/5/2019
Proponent:	Alaska Railroad Corporation	Watershed:	Turnagain Arm	Prepared by:	Alena Gerlek
Sheet/Figure # Depicting Polygon #'s (list by sheet, if more than one):					

S. Landform	T. REV	U. Polygon ID	V. Polygon Description	W. Dominant Indirect Impacts Factor	X. Size Factor	Y. Aggregate Indirect Impacts Factor (Col W$^{Col\ X}$)	Z. Polygon Size
Waterways	1	1-30	open channel: stream; perennial; natural or naturalized; supports salmonids	1.00	1	1.00	30,520 sf
		31-49	open channel: stream; perennial; natural or naturalized; supports salmonids	0.95	1	0.95	11,550 sf
Wetlands	1	50-211	inundated through June; >2500sf; natural or naturalized	1.00	1	1.00	127.453 ac
		212-218	inundated through June; >2500sf; natural or naturalized	0.99	1	0.99	2.869 ac
		219-313	inundated through June; >2500sf; natural or naturalized	0.95	1	0.95	26.717 ac
		314-333	inundated through June; >2500sf; natural or naturalized	0.90	1	0.90	12.129 ac
		334-448	rarely or never inundated; setback for REV 1 waterway or waterbody	1.00	1	1.00	8.740 ac
		449-516	rarely or never inundated; setback for REV 1 waterway or waterbody	0.95	1	0.95	7.591 ac
	2	517-565	inundated in spring or autumn; >2500sf; natural or naturalized	1.00	1	1.00	13.269 ac
		566	inundated through June; >2500sf; non-naturalized	0.99	1	0.99	2.085 ac
		567-580	inundated in spring or autumn; >2500sf; natural or naturalized	0.95	1	0.95	2.413 ac
		581-592	inundated in spring or autumn; >2500sf; natural or naturalized	0.90	1	0.90	15.555 ac
		593-595	rarely or never inundated; 300' buffer for REV 1 or 2 aquatic area	0.90	1	0.90	0.642 ac
Waterbo	1	596-604	persistent; natural or naturalized; >2500sf	1.00	1	1.00	4.209 ac
		605-612	persistent; natural or naturalized; >2500sf	0.95	1	0.95	1.494 ac
Uplands	1	613-656	not developed; setback for REV 1 waterway or waterbody	1.00	1	1.00	3.900 ac
		657-671	not developed; setback for REV 1 waterway or waterbody	0.95	1	0.95	1.044 ac
	2	672-689	not developed; buffer	1.00	1	1.00	4.338 ac
		690-696	not developed; buffer	0.95	1	0.95	3.226 ac
		697-700	not developed; buffer	0.90	1	0.90	0.168 ac
	4	701-706	developed	0.90	1	0.90	2.298 ac

Spreadsheet 4-RES: Credits for Restoration of Aquatic Resources

Project Name:	Portage Reserve Mitigation Bank	POA #:	POA-2017-00055	Name of Waterway/ Aquatic Area:	Portage Reserve	Date:	2/5/2019
Project Proponent:	Alaska Railroad Corporation	Watershed:	Turnagain Arm			Prepared by:	Alena Gerlek

M.	N.	O.	P.	Q.	R.	S.	T.	U.	V.	Z.
Landform	Post-Project Polygons		Pre-Project Polygons		REV Improvement (Col P-Col M)	Credit Ratio	Aggregate Post-project Indirect Impacts Factor	ID's (if nec)	Size	Credits [(Col V/Col R)xCol T x(1+Col X)xCol Y]
	REV	Description	Description	REV						
Wetlands	1	inundated through June; >2500sf; natural or naturalized	uplands: developed	4	3	1.0	0.95	703	0.11 ac	0.106
		inundated through June; >2500sf; natural or naturalized	uplands: developed	4	3	1.0	0.90	705	0.04 ac	0.036
	REV 1 Sub-totals								0.15 ac	0.142
	2	inundated in spring or autumn; >2500sf; natural or naturalized	uplands: developed	4	2	1.5	1.00	702	1.18 ac	0.785
		inundated in spring or autumn; >2500sf; natural or naturalized	uplands: developed	4	2	1.5	0.99	706	0.71 ac	0.469
		inundated in spring or autumn; >2500sf; natural or naturalized	uplands: developed	4	2	1.5	0.95	701	0.05 ac	0.033
		inundated in spring or autumn; >2500sf; natural or naturalized	uplands: developed	4	2	1.5	0.90	704	0.03 ac	0.018
	REV 2 Sub-totals								1.97 ac	1.304
Total Restoration Credits									2.12 ac	1.445

Spreadsheet 5: Credits for Preservation

Project Name:	Portage Reserve Mitigation Bank	POA #:	POA-2017-00055	Watershed:	Turnagain Arm	Date:	2/5/2019
Project Proponent:	Alaska Railroad Corporation	Name of Waterway/Aquatic Area:	Portage Reserve			Prepared by:	Alena Gerlek

P.	Q.	R.	S.	T.	U.	V.	W.	X.	Y.	Z.
Landform	REV	Polygon Description	Regulatory Constraints Factor	Accessibility Factor	Threat (Col RxCol S)	Credit Ratio	Aggregate Post-project Indirect Impacts Factor	ID# (if nec)	Size	Credits [(Col Y/Col U) x Col W]
Wetlands	1	inundated through June; >2500sf; natural or naturalized	3	1	3	1.5	1.00	50-211	127.45 ac	84.969
		inundated through June; >2500sf; natural or naturalized	3	1	3	1.5	0.99	212-218	2.87 ac	1.893
		inundated through June; >2500sf; natural or naturalized	3	1	3	1.5	0.95	219-313	26.72 ac	16.921
		inundated through June; >2500sf; natural or naturalized	3	1	3	1.5	0.90	314-333	12.13 ac	7.277
		rarely or never inundated; setback for REV 1 waterway or waterbody	3	1	3	1.5	1.00	334-448	8.74 ac	5.826
		rarely or never inundated; setback for REV 1 waterway or waterbody	3	1	3	1.5	0.95	449-516	7.59 ac	4.808
	REV 1 Sub-totals								185.50 ac	121.694
	2	inundated in spring or autumn; >2500sf; natural or naturalized	3	1	3	2.5	1.00	517-565	13.27 ac	5.308
		inundated in spring or autumn; >2500sf; natural or naturalized	3	1	3	2.5	0.99	566	2.09 ac	0.826
		inundated in spring or autumn; >2500sf; natural or naturalized	3	1	3	2.5	0.95	567-580	2.41 ac	0.917
		inundated in spring or autumn; >2500sf; natural or naturalized	3	1	3	2.5	0.90	581-592	15.56 ac	5.600
		rarely or never inundated; buffer; inner 50'	3	1	3	2.5	0.90	593-595	0.64 ac	0.231
	REV 2 Sub-totals								33.96 ac	12.881
Waterbodies	1	persistent; natural or naturalized; >2500sf	3	1	3	1.5	1.00	596-604	4.21 ac	2.806
		persistent; natural or naturalized; >2500sf	3	1	3	1.5	0.95	605-612	1.49 ac	0.946
	REV 1 Sub-totals								5.70 ac	3.752
Uplands	1	not developed; Muni-required setback for REV 1 waterway or waterbody	2	1	2	1.25	1.00	614, 618, 620, 623-625, 627-628, 636, 641, 643-645, 647-649, 652-653	0.92 ac	0.739
		not developed; Muni-required setback for REV 1 waterway or waterbody	2	1	2	1.25	0.95	657-658, 664-668	0.21 ac	0.158
		not developed; setback for REV 1 waterway or waterbody; not required by Muni	1	1	1	1.0	1.00	613, 615-617, 619, 621-622, 626, 629-635, 637-640, 642, 646, 650-652, 654-656	2.98 ac	2.977
		not developed; setback for REV 1 waterway or waterbody; not required by Muni	1	1	1	1.0	0.95	659-663, 669-671	0.84 ac	0.794
	REV 1 Sub-totals								4.94 ac	4.667
	2	not developed; buffer	1	1	1	1.5	1.00	672-689	4.34 ac	2.892
		not developed; buffer	1	1	1	1.5	0.95	690-696	3.23 ac	2.043
		not developed; buffer	1	1	1	1.5	0.90	697-700	0.17 ac	0.101
	REV 2 Sub-totals								7.73 ac	5.036
Total Preservation Credits									237.84 ac	148.031

Spreadsheet 6: Project Debit-Credit Summary

Credit-Producing Project							
Name of Project:	Portage Reserve Mitigation Bank				Watershed:	Turnagain Arm	
Proponent:	Alaska Railroad Corporation				POA #:	POA-2017-00055	
Prepared by:	Alena Gerlek				Date:	2/5/2019	
Size of...	Waterways	Subtidal Zone	Intertidal Zone	Waterbodies	Wetlands	Uplands	Total Non-waterways
Restored Area:					2.12 ac	N/A	2.119 ac
Preserved Area:				5.70 ac	219.46 ac	12.68 ac	237.841 ac
Credits Area:	0 sf	0.00 ac	0.00 ac	5.70 ac	221.58 ac	12.68 ac	239.960 ac

Project Credits Summary								
		Number of Credits per Landform						
R.	S.	T.	U.	V.	W.	X.	Y.	Z.
Type of Project	REV	Subtidal Zone	Intertidal Zone	Waterways	Waterbodies	Wetlands	Uplands	Total Credits (T+U+V+W+X+Y)
Restoration	1	N/A				0.14	N/A	0.142
	2					1.30	N/A	1.304
Preservation	1	N/A			3.75	121.69	4.67	130.113
	2					12.88	5.04	17.917
Totals		0.00	0.00	0.00	3.75	136.02	9.70	149.476

Preservation Area - Direct Impacts

Project Name:	Portage Reserve Mitigation Bank	POA #:	POA-2017-00055	Watershed:	Turnagain Arm	Date:	2/5/2019
Project Proponent:	Alaska Railroad Corporation	Name of Waterway/Aquatic Area:	Portage Reserve			Prepared by:	Alena Gerlek

P.	Q.	R.	S.	T.	U.	V.	W.	X.	Y.	Z.
Landform	REV	Polygon Description	Regulatory Constraints Factor	Accessibility Factor	Threat (Col RxCol S)	Credit Ratio	Aggregate Post-project Indirect Impacts Factor	ID# (if nec)	Size	Credits [(Col Y/Col U) x Col W]
Wetlands	1	inundated through June; >2500sf; natural or naturalized	3	1	3	1.5	1.00		109.82 ac	73.216
		inundated through June; >2500sf; natural or naturalized	3	1	3	1.5	0.99		2.87 ac	1.893
		inundated through June; >2500sf; natural or naturalized	3	1	3	1.5	0.95		15.48 ac	9.804
		inundated through June; >2500sf; natural or naturalized	3	1	3	1.5	0.90		12.13 ac	7.277
		rarely or never inundated; setback for REV 1 waterway or waterbody	3	1	3	1.5	1.00		3.11 ac	2.076
		rarely or never inundated; setback for REV 1 waterway or waterbody	3	1	3	1.5	0.95		4.60 ac	2.915
	REV 1 Sub-totals								148.02 ac	97.181
	2	inundated in spring or autumn; >2500sf; natural or naturalized	3	1	3	2.5	1.00		6.67 ac	2.670
		inundated in spring or autumn; >2500sf; natural or naturalized	3	1	3	2.5	0.99		2.09 ac	0.826
		inundated in spring or autumn; >2500sf; natural or naturalized	3	1	3	2.5	0.95		1.98 ac	0.751
		inundated in spring or autumn; >2500sf; natural or naturalized	3	1	3	2.5	0.90		15.56 ac	5.600
		rarely or never inundated; buffer; inner 50'	3	1	3	2.5	0.90		0.64 ac	0.231
	REV 2 Sub-totals								26.93 ac	10.077
Waterbodies	1	persistent; natural or naturalized; >2500sf	3	1	3	1.5	1.00		0.51 ac	0.339
	REV 1 Sub-totals								0.51 ac	0.339
Uplands	1	not developed; Muni-required setback for REV 1 waterway or waterbody	2	1	2	1.25	1.00		0.40 ac	0.316
		not developed; setback for REV 1 waterway or waterbody; not required by Muni	1	1	1	1.0	1.00		0.61 ac	0.607
	REV 1 Sub-totals								1.00 ac	0.924
	2	not developed; buffer	1	1	1	1.5	1.00		0.64 ac	0.425
		not developed; buffer	1	1	1	1.5	0.95		0.18 ac	0.116
		not developed; buffer	1	1	1	1.5	0.90		0.17 ac	0.101
	REV 2 Sub-totals								0.99 ac	0.642
Total Preservation Credits									177.45 ac	109.163

Preservation Area - Indirect Impacts

Project Name:	Portage Reserve Mitigation Bank	POA #:	POA-2017-00055	Watershed:	Turnagain Arm	Date:	2/5/2019
Project Proponent:	Alaska Railroad Corporation	Name of Waterway/Aquatic Area:	Portage Reserve			Prepared by:	Alena Gerlek

P.	Q.	R.	S.	T.	U.	V.	W.	X.	Y.	Z.
Landform	REV	Polygon Description	Regulatory Constraints Factor	Accessibility Factor	Threat (Col RxCol S)	Credit Ratio	Aggregate Post-project Indirect Impacts Factor	ID# (if nec)	Size	Credits [(Col Y/Col U) x Col W]
Wetlands	1	inundated through June; >2500sf; natural or naturalized	3	1	3	1.5	1.00		15.65 ac	10.433
		inundated through June; >2500sf; natural or naturalized	3	1	3	1.5	0.95		9.72 ac	6.156
		rarely or never inundated; setback for REV 1 waterway or waterbody	3	1	3	1.5	1.00		5.62 ac	3.749
		rarely or never inundated; setback for REV 1 waterway or waterbody	3	1	3	1.5	0.95		2.12 ac	1.345
	REV 1 Sub-totals								33.12 ac	21.684
	2	inundated in spring or autumn; >2500sf; natural or naturalized	3	1	3	2.5	1.00		6.54 ac	2.615
		inundated in spring or autumn; >2500sf; natural or naturalized	3	1	3	2.5	0.95		0.44 ac	0.166
	REV 2 Sub-totals								6.97 ac	2.781
Waterbodies	1	persistent; natural or naturalized; >2500sf	3	1	3	1.5	1.00		1.95 ac	1.302
		persistent; natural or naturalized; >2500sf	3	1	3	1.5	0.95		1.35 ac	0.856
	REV 1 Sub-totals								3.30 ac	2.158
Uplands	1	not developed; Muni-required setback for REV 1 waterway or waterbody	2	1	2	1.25	1.00		0.53 ac	0.422
		not developed; Muni-required setback for REV 1 waterway or waterbody	2	1	2	1.25	0.95		0.19 ac	0.143
		not developed; setback for REV 1 waterway or waterbody; not required by Muni	1	1	1	1.0	1.00		2.37 ac	2.369
		not developed; setback for REV 1 waterway or waterbody; not required by Muni	1	1	1	1.0	0.95		0.47 ac	0.446
	REV 1 Sub-totals								3.55 ac	3.380
	2	not developed; buffer	1	1	1	1.5	1.00		3.70 ac	2.467
		not developed; buffer	1	1	1	1.5	0.95		1.70 ac	1.075
	REV 2 Sub-totals								5.40 ac	3.542
Total Preservation Credits									52.35 ac	33.545

Preservation Area - Site Protection Buffer

Project Name:	Portage Reserve Mitigation Bank	POA #:	POA-2017-00055	Watershed:	Turnagain Arm	Date:	2/5/2019
Project Proponent:	Alaska Railroad Corporation	Name of Waterway/Aquatic Area:	Portage Reserve			Prepared by:	Alena Gerlek

P.	Q.	R.	S.	T.	U.	V.	W.	X.	Y.	Z.
Landform	REV	Polygon Description	Regulatory Constraints Factor	Accessibility Factor	Threat (Col RxCol S)	Credit Ratio	Aggregate Post-project Indirect Impacts Factor	ID# (if nec)	Size	Credits [(Col Y/Col U) x Col W]
Wetlands	1	inundated through June; >2500sf; natural or naturalized	3	1	3	1.5	1.00		1.98 ac	1.319
		inundated through June; >2500sf; natural or naturalized	3	1	3	1.5	0.95		1.52 ac	0.961
		rarely or never inundated; setback for REV 1 waterway or waterbody	3	1	3	1.5	1.00		0.00 ac	0.002
		rarely or never inundated; setback for REV 1 waterway or waterbody	3	1	3	1.5	0.95		0.86 ac	0.547
	REV 1 Sub-totals								4.36 ac	2.829
	2	inundated in spring or autumn; >2500sf; natural or naturalized	3	1	3	2.5	1.00		0.06 ac	0.023
	REV 2 Sub-totals								0.06 ac	0.023
Waterbodies	1	persistent; natural or naturalized; >2500sf	3	1	3	1.5	1.00		1.75 ac	1.165
		persistent; natural or naturalized; >2500sf	3	1	3	1.5	0.95		0.14 ac	0.090
	REV 1 Sub-totals								1.89 ac	1.255
Uplands	1	not developed; Muni-required setback for REV 1 waterway or waterbody	2	1	2	1.25	0.95		0.02 ac	0.015
		not developed; setback for REV 1 waterway or waterbody; not required by Muni	1	1	1	1.0	0.95		0.37 ac	0.348
	REV 1 Sub-totals								0.39 ac	0.363
	2	not developed; buffer	1	1	1	1.5	0.95		1.35 ac	0.852
	REV 2 Sub-totals								1.35 ac	0.852
Total Preservation Credits									8.04 ac	5.322

0 Feet 470

PRMB INSTRUMENT - EXHIBIT B: MITIGATION PLAN

APPENDIX B: ADCM WORKSHEETS AND MAPS

FIGURE 1A

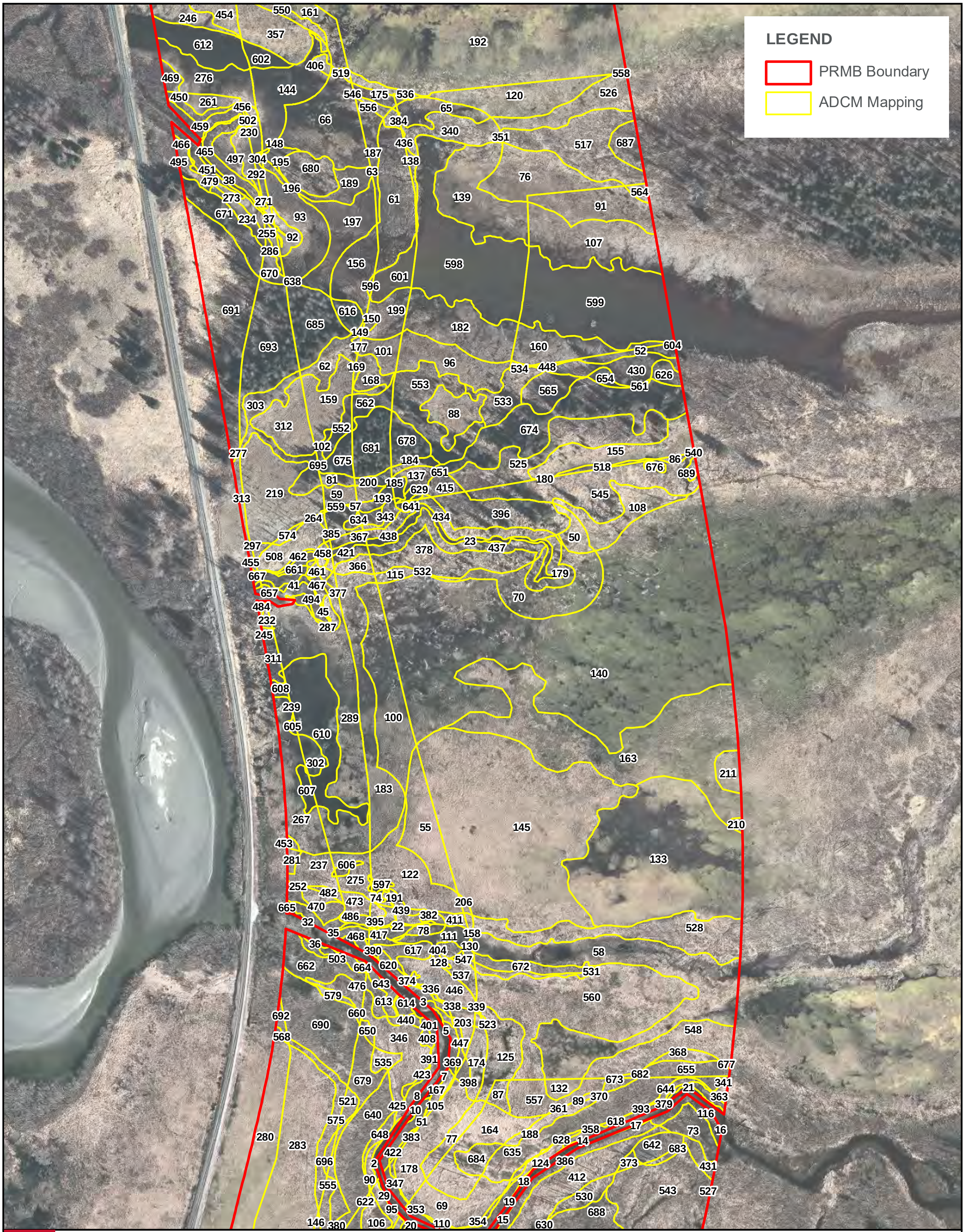
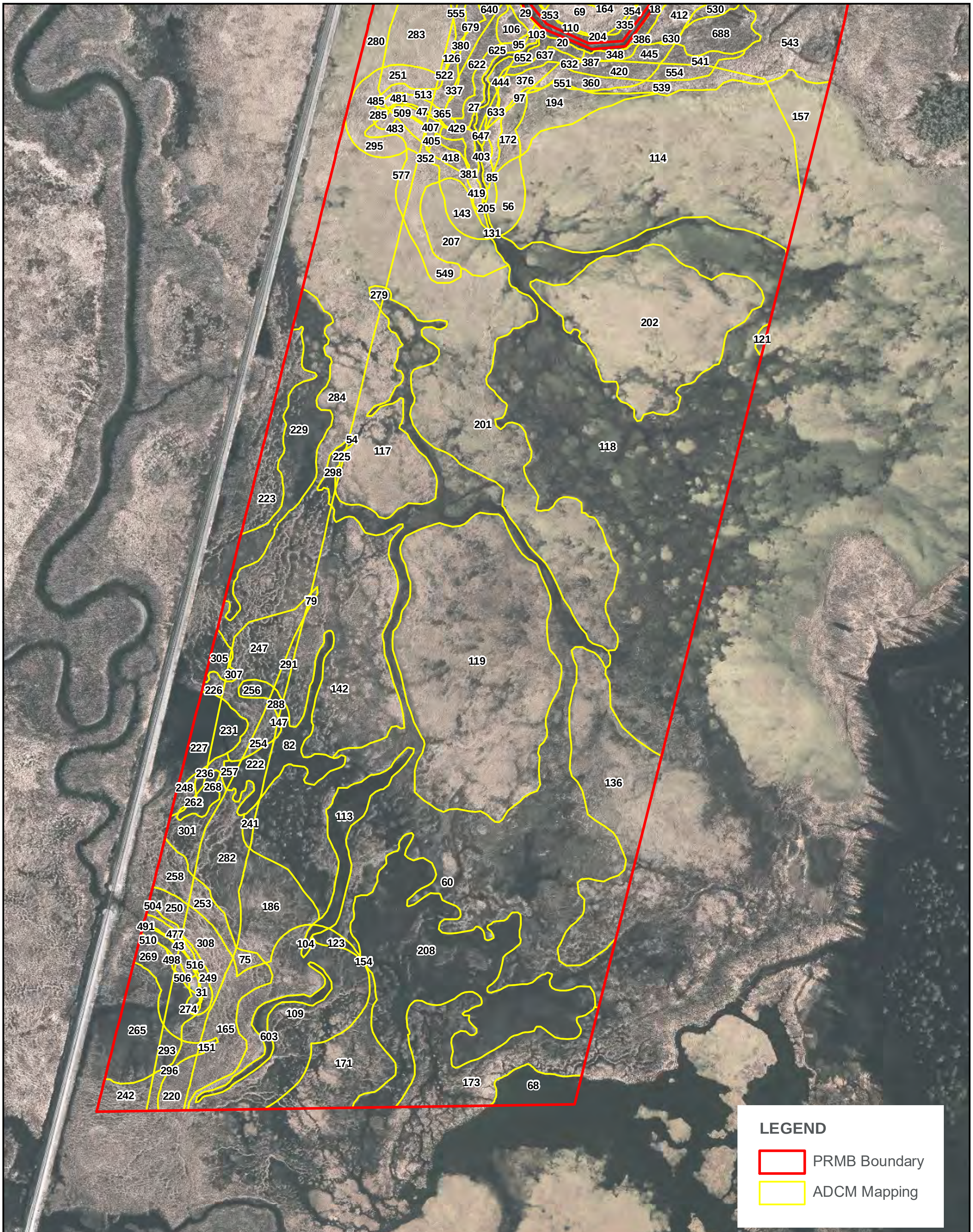


FIGURE 1B



ALASKA RAILROAD

PRMB INSTRUMENT - EXHIBIT B: MITIGATION PLAN

APPENDIX B: ADCM WORKSHEETS AND MAPS

FIGURE 1C

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EXHIBIT C

Credit Purchase Receipt

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PORTAGE RESERVE MITIGATION BANK	
CREDIT PURCHASE RECEIPT	
Date:	
Permittee:	
Project Name:	
Permit Number:	
USACE Project Manager:	
Waterway:	
Impact Site Location: Latitude °N, Longitude °W	
CREDITS PURCHASED	
Credit Type	***Number of Credits***
Palustrine	
TOTAL CREDITS PURCHASED	
Permittee	Date
Matt Kelzenberg, Alaska Railroad Corporation	Date

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EXHIBIT D

Bank Credit Ledger

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Transaction No.	Type	Date	Permittee	Permit No.	Palustrine Credits Used	Total Available Palustrine Credits	Comments
Example 1	*Init*	*6/13/2018*	*NA*	*NA*	*NA*	*149.476*	
Example 2	*Rel*	*6/13/2018*	*NA*	*NA*	*NA*	*97.159*	
Example 3	*Wdr*	*6/13/2018*	*Company X*	*POA-XXXX*	*5.155*	*92.004*	
1							
2							
3							
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Credit Ledger Key:	
Type	There are three types: Initiation (Init), Credit Release (Rel), and Credit Withdrawal (Wdr)
	Initiation (Init) transaction describe the potential credits a bank may have once it meets all of the success criteria.
	Release (Rel) transactions describe credits which have been released for sale by meeting the appropriate milestone.
	Credit withdrawal (Wdr) transactions describe credit sales or debits.
Date	The date of the transaction.
Permittee	This column is populated for Wdr transactions and contains the name of the entity purchasing credits.
Permit Number	This column is populated for Wdr transactions and contains the USACE permit number associated with the credit withdrawal.
Palustrine Credits Used	This column is populated for Wdr transactions and contains the number of palustrine credits withdrawn.
Total Available Palustrine Credits	This column equals the total released palustrine credits minus the total withdrawn palustrine credits.

EXHIBIT E

DEED RESTRICTION AND RESTRICTIVE COVENANTS

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DEED RESTRICTION AND DECLARATION OF RESTRICTIVE COVENANTS

THIS DEED RESTRICTION AND DECLARATION OF RESTRICTIVE COVENANTS is made this ____ day of ___________, 20__, by the Alaska Railroad Corporation ("Declarant"), whose address is P.O. Box 107500, Anchorage, Alaska 99510-7500.

RECITALS

WHEREAS, Declarant is the owner in fee simple of certain real property ("real property" includes wetlands, any interest in submerged lands, uplands, associated riparian/littoral rights) located in the vicinity of Portage, Alaska, more particularly described as:

Two parcels of land located within Lots 30 and 35 of U.S. Survey 7012, officially filed October 17, 1984, Alaska Railroad Portage Reserve, Anchorage Recording District, Third Judicial District, State of Alaska, shown on the drawing attached hereto as Exhibit A, consisting of two parcels and comprising a total area of 241 acres, more or less, and being more particularly described as follows:

Parcel 1

That Portion of U.S. Survey 7012 Lot 30 lying:

Easterly of a line that is 100' easterly of the Alaska Railroad Mainline tracks centerline;
Easterly of a line that is 100' easterly of the Portage House Track Spur centerline;
Southeasterly of a line that is 100' southeasterly of the toe of the filled slope southeasterly of the Portage House Track Spur;
Easterly of a line that is 400' southerly of the Portage Glacier Road Baseline as shown on Plat 2013-74, comprising 149 acres, more or less.

Parcel 2

That Portion of U.S. Survey 7012 Lot 35 lying:

Easterly of a line that is 100' easterly of the Alaska Railroad Mainline tracks centerline, comprising 92 acres, more or less.

For indexing purposes this property is located in Secs. 5 and 8, T8N, R3E, S.M.

WHEREAS, as compensatory mitigation under Federal law for Department of the Army permit number POA-2017-00055 ("Permit") issued by the U.S. Army Corps of

Engineers, Alaska District ("Corps" or "Alaska District," to include any successor agency), and in recognition of the continuing benefit to the permitted property, and for the protection of waters of the United States and scenic, resource, environmental, and general property values, Declarant has agreed to place certain restrictive covenants on the Property, in order that the Property shall remain substantially in its natural condition forever.

NOW THEREFORE, Declarant hereby declares that the Property shall be held, transferred, conveyed, leased, occupied or otherwise disposed of and used subject to the following restrictive covenants, which shall run with the land and be binding on all heirs, successors, assigns, lessees, or other occupiers and users.

1. Prohibitions. Declarant is and shall be prohibited from the following: filling, draining, flooding, dredging, impounding, clearing, burning, cutting or destroying vegetation, cultivating, excavating, erecting, constructing, releasing wastes, or otherwise doing any work on the Property; introducing exotic species into the Property (except biological controls preapproved in writing by the Corps and any State of Alaska agency with jurisdiction over such controls); and from changing the grade or elevation, impairing the flow or circulation of waters, reducing the reach of waters, and any other discharge or activity requiring a permit under clean water or water pollution control laws and regulations, as amended. The following are expressly excepted from this paragraph: a) cumulatively very small impacts associated with hunting (excluding planting or burning), fishing, and similar recreational or educational activities, consistent with the continuing natural condition of the Property; b) removal or trimming of vegetation hazardous to person or property, or of timber downed or damaged due to natural disaster; and c) restoration or mitigation required under law.

2. Amendment. After recording, these restrictive covenants may only be amended by a recorded document signed by the Corps and Declarant. The recorded document, as amended, shall be consistent with the Alaska District model conservation restrictions at the time of amendment. Amendment shall be allowed at the discretion of the Corps, in consultation with resource agencies as appropriate, and then only in exceptional circumstances. Compensatory mitigation for any adverse impacts associated with an amendment will be required pursuant to Alaska District mitigation policy at the time of amendment. There shall be no obligation to allow an amendment.

3. Notice to Government. Any permit application, or request for certification or modification, which may affect the Property, made to any governmental entity with authority over wetlands or other waters of the United States, shall expressly reference and include a copy (with the recording stamp) of these restrictive covenants.

4. Reserved Rights. It is expressly understood and agreed that these restrictive covenants do not grant or convey to members of the general public any rights of ownership, entry or use of the Property. These restrictive covenants are created solely for the protection of the Property, and for the consideration and values set forth above, and Declarant reserves the ownership of the fee simple estate and all rights appertaining thereto, including without limitation the rights to exclude others and to use the property for all purposes not inconsistent with these restrictive covenants.

5. <u>Compliance Inspections</u>. The Corps, DHEC, and its/their authorized agents shall have the right to enter and go upon the lands of Declarant(s), to inspect the Property and take actions necessary to verify compliance with these restrictive covenants.

6. <u>Enforcement</u>. The Declarant grants to the Corps and/or the U.S. Department of Justice a discretionary right to enforce these restrictive covenants in a judicial action against any person(s) or other entity(ies) violating or attempting to violate these restrictive covenants; provided, however, that no violation of these restrictive covenants shall result in a forfeiture or reversion of title. In any enforcement action, an enforcing agency shall be entitled to a complete restoration for any violation, as well as any other judicial remedy such as civil penalties. Nothing herein shall limit the right of the Corps to modify, suspend, or revoke the Permit.

7. <u>Property Transfers</u>. Declarant shall include the following notice on all deeds, mortgages, plats, or any other legal instruments used to convey any interest in the Property (failure to comply with this paragraph does not impair the validity or enforceability of these restrictive covenants): NOTICE: This Property Subject to Deed Restriction and Declaration of Restrictive Covenants Recorded at [insert document number, recording district, and date of recording].

8. <u>Marking of Property</u>. The perimeter of the Property shall at all times be plainly marked by permanent signs saying, "Protected Natural Area," or by an equivalent, permanent marking system.

[Note re Paragraph 9 - generally, a surveyed, recorded plat is required; however, at the discretion of the Corps, an approved permit drawing or site plan attached to these restrictive covenants may suffice]

9. <u>Recording of Plat</u>. A plat depicting the boundaries of the Property subject to these restrictive covenants shall be recorded in the recorder's office for the recording district in which the Property is situated prior to the recording of these restrictive covenants. The plat is recorded at **[include document number, recording district, and date of recording]**.

10. <u>Long-Term Management</u>. The Declarant is responsible for long-term management activities identified in an approved mitigation plan, dated **[Insert date of plan]**. The required activities include but are not limited to management activities (invasive species, fire, etc.) and the maintenance and/or replacement of structures (fences, ditch plugs, weirs, etc.) that are critical to the long-term success of the mitigation activities as described in the approved mitigation plan.

11. Separability Provision. Should any separable part of this deed restriction and restrictive covenants be held contrary to law, the remainder shall continue in full force and effect.

12. Notice of Actions to Void or Modify Deed Restriction. Before any action is taken to void or modify this instrument, including transfer of title to, or establishment of any other legal claims over, the Property, at least sixty (60) days' written advance notice of such action must be provided to the Alaska District Engineer at the following address: **Alaska District, U.S. Army Corps of Engineers, Regulatory Division, P.O. Box 6898, JBER, Alaska 99506-0898**.

IN WITNESS WHEREOF, Declarant has executed this Deed Restriction and Declaration of Restrictive Covenants on the date given above.

DECLARANT: ALASKA RAILROAD CORPORATION

Dated:______________________ By:____________________________________

Its:____________________________________

STATE OF ALASKA)
) ss:
THIRD JUDICIAL DISTRICT)

THIS IS TO CERTIFY that on the ______ day of _______________, 201_, before me, the undersigned, a Notary Public in and for the State of Alaska, duly commissioned and sworn, personally appeared __________________________, to me known to be the individual described in and who executed the within and foregoing instrument, and s/he acknowledged to me that s/he signed the same as ____________________ of Alaska Railroad Corporation in the name of and for and on behalf of said entity, freely and voluntarily and by authority of its Bylaws, for the uses and purposes therein mentioned.

GIVEN UNDER MY HAND and official seal the day and year last above written.

____
Notary Public in and for Alaska
My commission expires:_________________

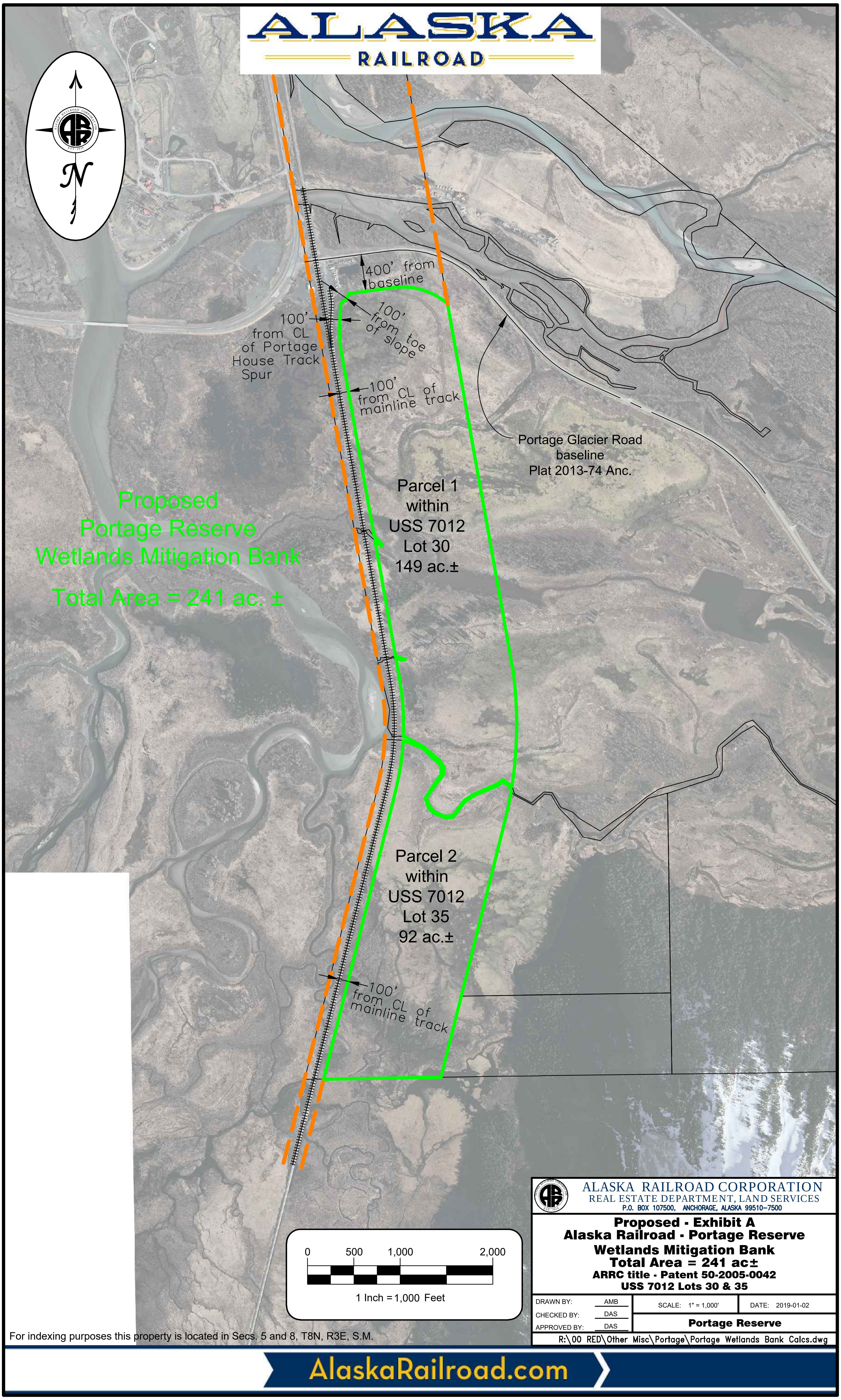
ALASKA RAILROAD
N
400' from baseline
100' from toe of slope
100' from CL of Portage House Track Spur
100' from CL of mainline track
Portage Glacier Road baseline Plat 2013-74 Anc.
Parcel 1 within USS 7012 Lot 30 149 ac.±
Proposed Portage Reserve Wetlands Mitigation Bank
Total Area = 241 ac. ±
Parcel 2 within USS 7012 Lot 35 92 ac.±
100' from CL of mainline track
0 500 1,000 2,000
1 Inch = 1,000 Feet
ALASKA RAILROAD CORPORATION
REAL ESTATE DEPARTMENT, LAND SERVICES
P.O. BOX 107500, ANCHORAGE, ALASKA 99510-7500
Proposed - Exhibit A
Alaska Railroad - Portage Reserve
Wetlands Mitigation Bank
Total Area = 241 ac±
ARRC title - Patent 50-2005-0042
USS 7012 Lots 30 & 35
DRAWN BY: AMB
CHECKED BY: DAS
APPROVED BY: DAS
SCALE: 1" = 1,000'
DATE: 2019-01-02
Portage Reserve
R:\00 RED\Other Misc\Portage\Portage Wetlands Bank Calcs.dwg
For indexing purposes this property is located in Secs. 5 and 8, T8N, R3E, S.M.
AlaskaRailroad.com

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EXHIBIT F

LETTER OF COMMITMENT

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May 13, 2019

United States Army Corps Of Engineers
Alaska District, Regulatory Division
P.O. Box 107500
JBER, Alaska 99506-0898

Re: Portage Reserve Mitigation Bank POA-2017-00055

To whom it may concern:

This letter is in reference to the Mitigation Bank Instrument (MBI) by the Alaska Railroad Corporation (ARRC) for the Portage Reserve Mitigation Bank. The bank is located within Section 5, T 8 N., R 3 E, Seward Meridian, USGS Quad Map Seward D-6, Latitude 60.8065º N., Longitude 148.9685º W., on the east side of the Seward Highway in Portage, Alaska.

The ARRC is hereby committed and hereby commits the necessary resources to implement and maintain all components as outlined in the Portage Reserve MBI.

If you have any further questions, please contact Brian Lindamood at Lindamoodb@akrr.com or by telephone at (907) 265-3095.

Sincerely,

William G. O'Leary
President and Chief Executive Officer
Alaska Railroad Corporation

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EXHIBIT G

LONG-TERM MANAGEMENT COSTS

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Estimated Costs of Long-term Management Activities

Task ID		Task	Frequency	Number of Units	Units	Cost/unit	Cost	Annualized Cost
1		Inventory and maintenance or replacement of all signage around perimeter of the mitigation site (assumes replacement of half the signs)	Every 5 years	8	hours	$ 50	$ 400	$ 80
				11	signs	$ 100	$ 1,100	$ 220
2		Inventory and maintenance or replacement of all posters within Portage Section House	Every 5 years	4	hours	$ 50	$ 200	$ 40
				2	posters	$ 10	$ 20	$ 4
3		Interviews with ARRC Portage House personnel about any activities observed at the mitigation site	Every 5 years	4	hours	$ 50	$ 200	$ 40
4		Field data collection at monitoring locations to verify the deed restriction conditions are met and that no invasives species are present,	Every 5 years	16	hours	$ 150	$ 2,400	$ 480
	4a	Trash removal, correct trespass damage	Every 5 years	8	hours	$ 50	$ 400	$ 80
	4b	Minor Weed Management	Every 5 years - estimated	8	hours	$ 50	$ 400	$ 80
				1	equipement	$ 200	$ 200	$ 40
	4c	Major weed mangement	Every 10 years - estimated	8	hours	$ 50	$ 400	$ 40
				1	equipement	$ 250	$ 250	$ 25
5		Review of currently available aerial imagery with an effort to identify prohibited activities	Every 5 years	4	hours	$ 150	$ 600	$ 120
6		Reporting	Every 5 years	8	hours	$ 150	$ 1,200	$ 240
	6a	Coordination/meetings/outreach	Every 5 years	4	hours	$ 150	$ 600	$ 120
							Subtotal	$ 1,609
							Administration (10%)	$ 161
							Contingency (20%)	$ 322
							Total Annualized Cost	$ 2,092

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