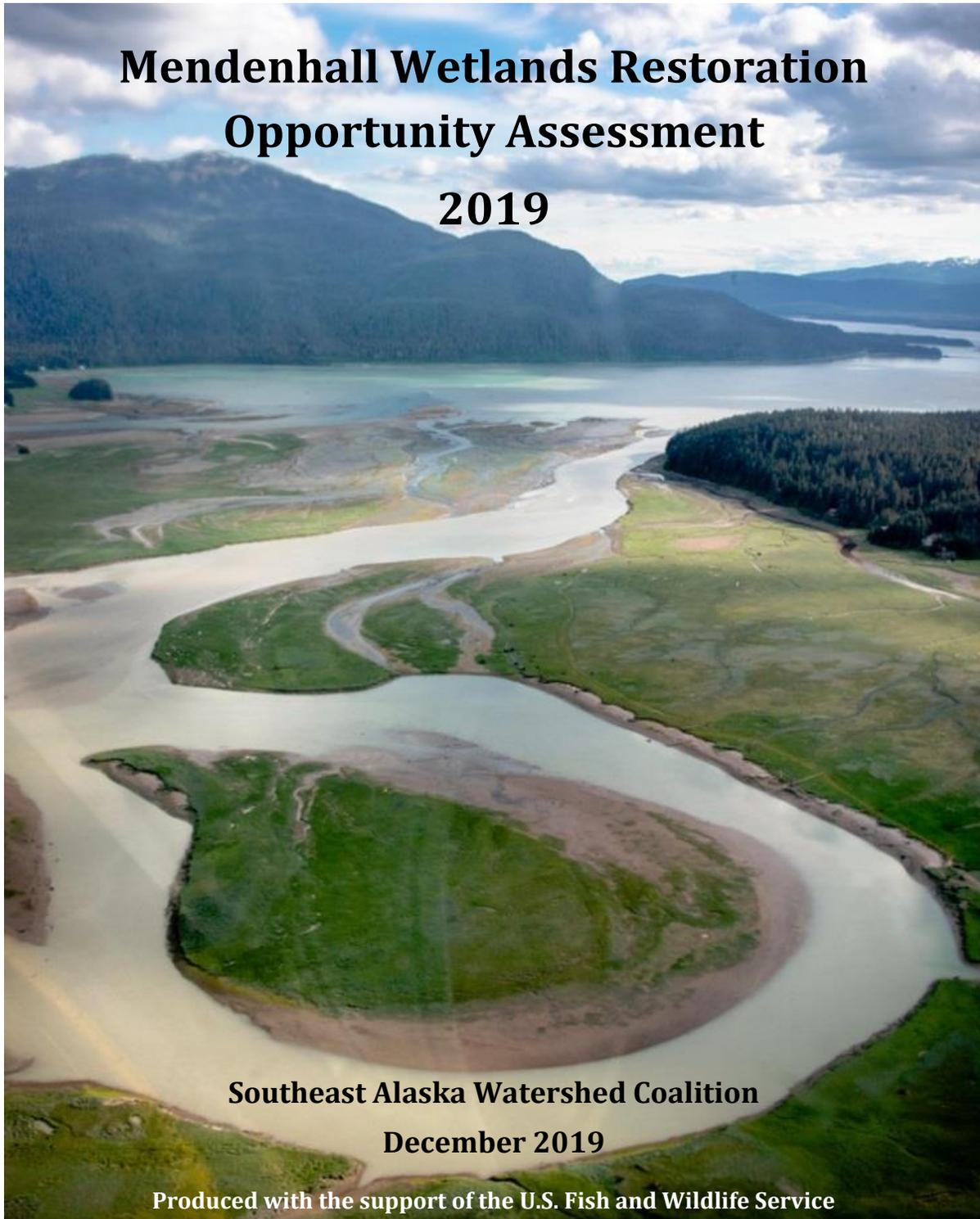




**SOUTHEAST ALASKA
WATERSHED COALITION**
CONNECT - INFORM - PARTICIPATE

1107 W. 8th St., Ste. #4
Juneau, AK 99801
alaskawatershedcoalition.org
907.205.4028

Mendenhall Wetlands Restoration Opportunity Assessment 2019



Southeast Alaska Watershed Coalition

December 2019

Produced with the support of the U.S. Fish and Wildlife Service

Contents

Executive Summary	3
Purpose	3
Background	4
Methods	6
Site Assessments, Proposed and Ongoing Projects	8
Invasive Plant Management (ongoing)	8
Site Name: Mendenhall Golf Course	9
Site Name: Fish Creek Estuary	14
Site Name: S&S/Duran Pond	22
Site Name: Lower Switzer Creek	28
Site Name: North Twin Lake/Pioneer Marsh	33
Site Name: Sunny Point Interchange/West Creek Area	40
Site Name: SEAL Trust Property northeast of Honsinger Pond	43
Additional Impacts to the Wetlands and Streams	48
Site Name: Vanderbilt Creek	48
Site Name: Mendenhall River Mouth	50
Site Name: Ninemile Estuary Area	52
Citations	54

Executive Summary

- **Invasive Plant Management (ongoing).** Several non-native invasive plants have been documented in and around the Mendenhall Wetlands, including alongside several anadromous streams that drain into the north side of the area. SAWC recently received a grant from the Alaska Sustainable Salmon Fund to control reed canarygrass, Bohemian knotweed, European mountain ash and European bird cherry infestations in this area from 2020 to 2022.
- **Mendenhall Golf Course, S&S/Duran Pond, and Switzer Creek.** Considerable restoration and preservation opportunity exists in these privately owned parcels. Interventions could include invasive species management, removal of fill and dikes, backfilling an old gravel pit to create wetland habitat, and reestablishing tidal flow. The feasibility of restoration at these sites is uncertain as outreach to private landowners was not successful in moving a project forward.
- **Fish Creek Estuary.** Historic gravel mining channelized the Fish Creek River, isolated wetlands from tidal inundation, and created two large open pits that are filled with water. Restoration of habitat at the two abandoned gravel pits and restoration of natural river migration for the Fish Creek will enhance fish and wildlife habitat, recreation opportunities, and a valuable hatchery release site. Land managers with the Alaska Department of Fish and Game and City and Borough of Juneau are open to consideration of enhancement and restoration options.
- **North Twin Lake/Pioneer Marsh.** The construction of Vanderbilt Road and Egan Drive isolated and dramatically altered salt marsh and other intertidal habitats in the northeastern portion of the Mendenhall Wetlands. The goal of this project is to reconnect North Twin Lake and Pioneer Marsh to the Mendenhall Wetlands. Existing water control structures will be breached to allow daily tidal inundation in the two water bodies.
- **Sunny Point Interchange/West Creek Area.** A portion of Sunny Point Drive was abandoned with the construction of the Sunny Point Interchange on Egan Drive. While the pavement has been removed from the abandoned roadbed, 0.7 acres of fill remains. This project would remove the fill to restore meadow and high marsh in the Mendenhall Wetlands.
- **Southeast Alaska Land Trust Property Northeast of Honsinger Pond.** The Southeast Alaska Land (SEAL) Trust acquired 32 acres of meadow and high marsh in the Mendenhall Wetlands near Honsinger Pond in 2018. The area has been protected with a conservation easement and contains meadow and high marsh intersected by tidal channels and a small anadromous stream. This project would manage invasive plants on the property and restore a relocated and channelized reach of a Coho salmon stream.

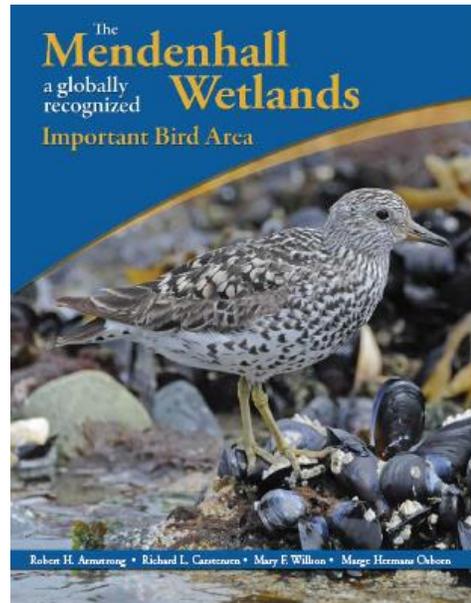
Purpose

The Mendenhall Wetlands are an ecological hotspot on the Pacific Northwest coast and a treasured recreation area for Juneau residents and visitors. The State of Alaska owns and manages a large portion of the wetlands, the Mendenhall Wetlands State Game Refuge, while adjacent properties are owned by city, state, federal, and private entities. Over time, the wetlands have been encroached on and fragmented by development and water pollution and invasive species that originate beyond the boundaries of the wetland threaten its integrity. Individual land managers cannot address these issues alone, so the Watershed Coalition began a process of assessing impacted properties within the Mendenhall State Game Refuge and in adjacent lands to identify potential opportunities for restoration and management. The goal of this assessment and landowner outreach is ultimately to reconnect and restore habitats that were historically part of the Mendenhall wetland complex. We hope that this and future work helps highlight importance of the wetlands as a place for both wildlife and people, and promotes collaboration in enhancing and protecting the integrity of the wetlands.

Background

The Mendenhall Wetlands area covers 1,500 acres of Gastineau Channel between the Juneau mainland to the north and Douglas Island to the south (Figure 1). This dynamic area includes upland meadows, high marsh, low marsh, non-vegetated mudflats and stream channels. The wetlands support a wide variety of fish, including all five species of Pacific salmon and several species of flatfish, and the area is a globally recognized Important Bird Area, providing critical habitat for multiple resident and migratory bird species ([Armstrong et al. 2009](#)). Most of the wetlands are encompassed by the Mendenhall Wetlands State Game Refuge, which was established to protect wildlife and be a place for recreation. Areas surrounding the refuge are in local, state, federal, and private ownership with varying land use priorities.

Historical and current development in and adjacent to the wetlands have eliminated and fragmented habitat (Figure 2). Notably, the Juneau airport was built on the wetlands, and Egan Highway bisects a long section of the wetlands on the mainland side. Additionally, as uplift continues, lands that accrete above high tide that were owned by the state can be claimed by adjacent upland landowners. This has prompted the Southeast Alaska Land (SEAL) Trust to prioritize acquisition and protection of these accreted parcels. Other activities, such as gravel mining, industrial and residential development, and

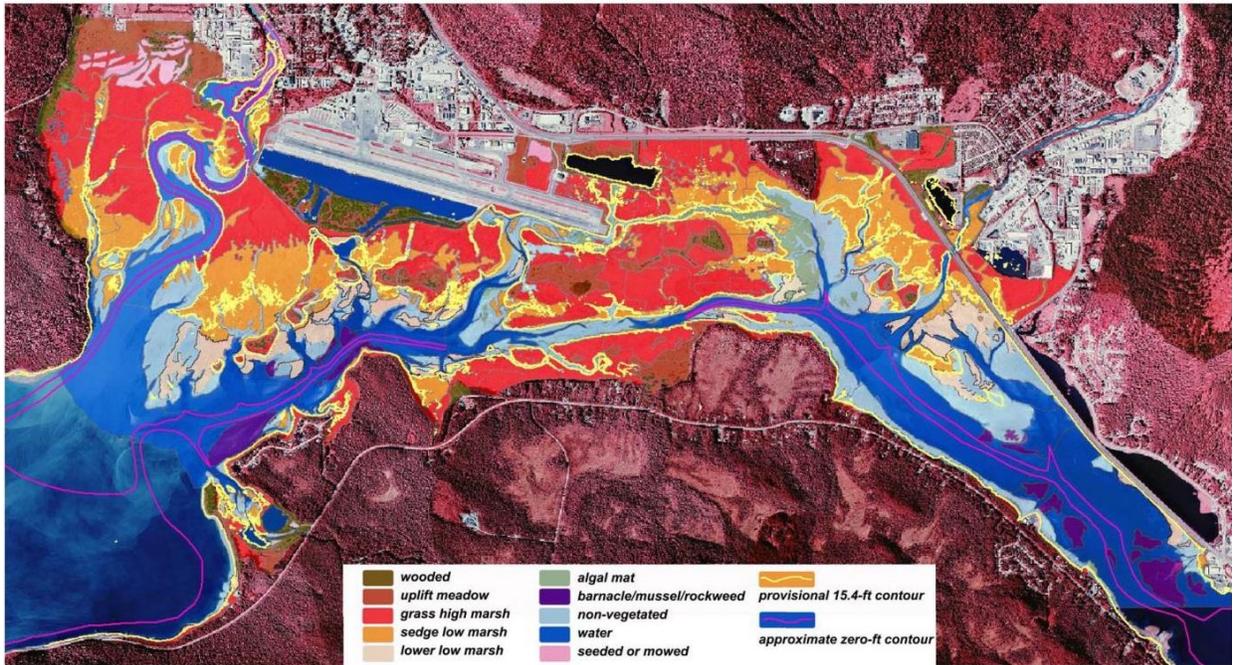


Dredging in the wetlands during expansion of the Juneau Airport in 1953.

road-building have filled-in, fragmented or degraded wetlands over the years. Development in the wetlands continues. For example, the City and Borough of Juneau and US Army Corps have recently approved the filling of one of the largest privately owned wetland properties, the “Honsinger Pond,” and proposal for a second bridge crossing to Douglas Island have threatened to bisect the wetlands. Additionally, five streams with water quality that is considered “impaired” by the Alaska Department of Environmental Conservation flow into the wetlands. These streams transport sediment, invasive plants, litter, and pollutants into the wetlands. Invasive plants, notably reed canarygrass and perennial sowthistle, have invaded meadow and high marsh habitats in parts of the wetlands.

Management plans currently exist for the Mendenhall State Game Refuge, Alaska Dept. of Natural Resources (ADNR) lands outside the refuge, and for city-owned wetlands. All of these management plans have goals in line with wetland restoration and enhancement. The 1990 Management Plan for the state game refuge includes provisions for restoring and enhancing habitat for fish and wildlife, but the state does not actively pursue these activities. A 1993 [State Land Plan](#) for the Juneau area indicates that the ADNR-owned land is to be managed for habitat, although transportation

improvements are allowable. It is noted that the area has potential for habitat enhancement and should be considered for this use either through mitigation banking or as replacement habitat for projects in the planning area. As with the refuge, there is currently little active management of habitat in the area. The Juneau Wetland Management Plan, which remains in draft form, assesses functions and values of city-owned wetlands around Juneau to aid in development, restoration, and mitigation decisions. The uplift meadows around the Mendenhall Wetlands have some of the highest assessment scores for songbird, raptor, and mammal habitat, waterbird nesting and feeding habitat, amphibian habitat, and phosphorus retention. These plans, while outdated or unofficial, provide a basis for working with public land owners on restoration in the assessment area.



Appendix C Vegetation 2003, and contours: Mean High Water (15.4 foot, provisional, LIDAR-generated) and Mean Lower Low Water (from photography on zero-foot tide)

Figure 1. Map of Mendenhall Wetland complex. (Discovery Southeast, 2004)



Figure 2. *Extent of development in the Mendenhall wetlands in 1949 (top) and current (bottom).*

Methods

Focal areas were chosen based on GIS survey, historical information, field survey, and review of available reports, permits, and assessments. The focal areas of this assessment are highlighted in Figure 3, and include the Mendenhall Golf Course, a SEAL Trust property east of the airport, Sunny Point, lower Switzer Creek area, dredge pond areas on private lands upslope of Egan in the Switzer/Lemon Creek area (Duran Pond), Pioneer Marsh and North Twin Lake, and Fish Creek estuary. These areas have all been affected by development, but restoration is still feasible due to the lack of permanent infrastructure on these properties (e.g. housing developments). Properties were initially assessed through qualitative reconnaissance visits. Where warranted, these visits were followed up with outreach to land owners/managers, and more detailed assessments and surveys. In the following vignettes, we

have included relevant background information about the properties, observations from assessments, the status of outreach to the landowner/manager, and proposed projects. In addition to development, invasive plants also threaten the integrity of the wetlands and adjacent areas. We include a brief description of our efforts to inventory and manage high priority invasive plant species. Several additional areas with known impacts but uncertain restoration opportunity, including the mouth of the Mendenhall River, Vanderbilt Creek, and Ninemile Wetlands, are also highlighted.

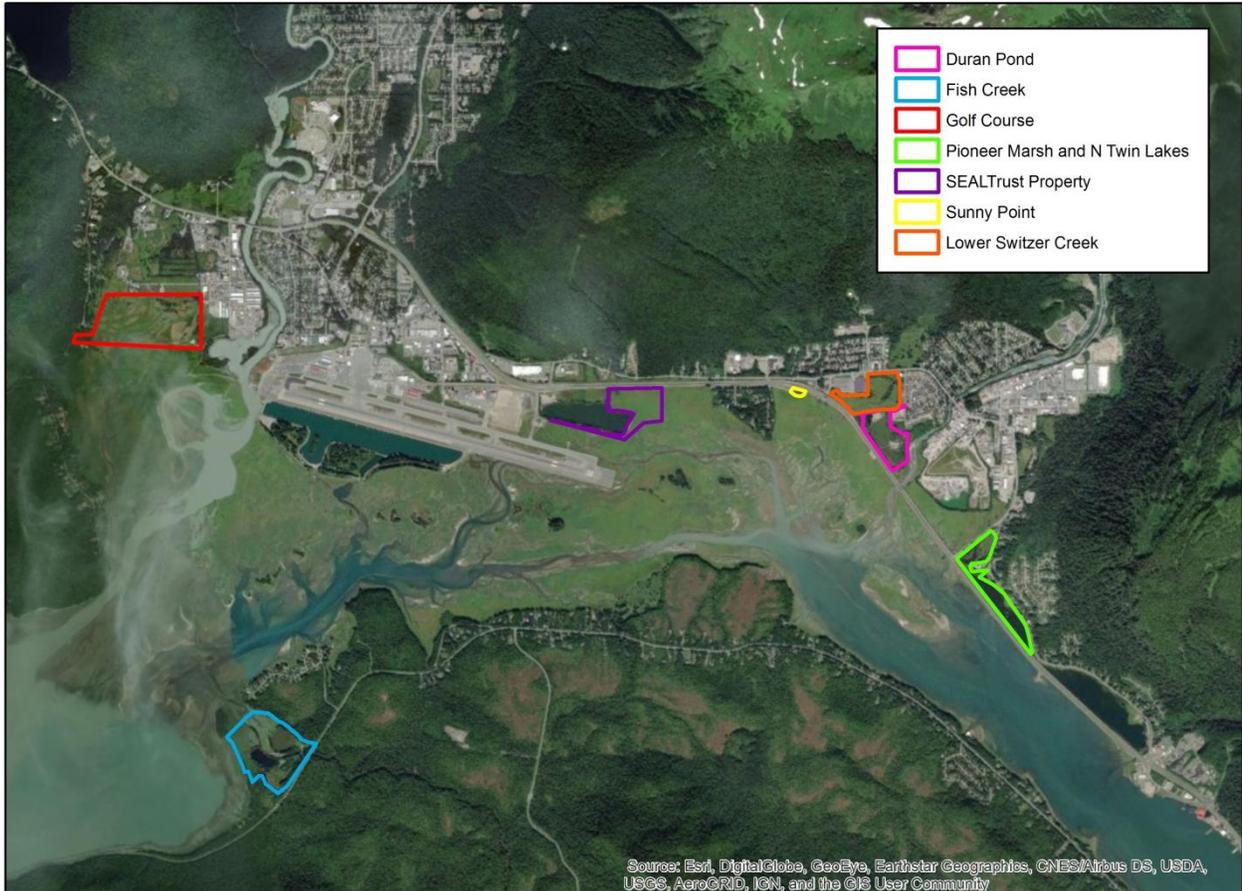
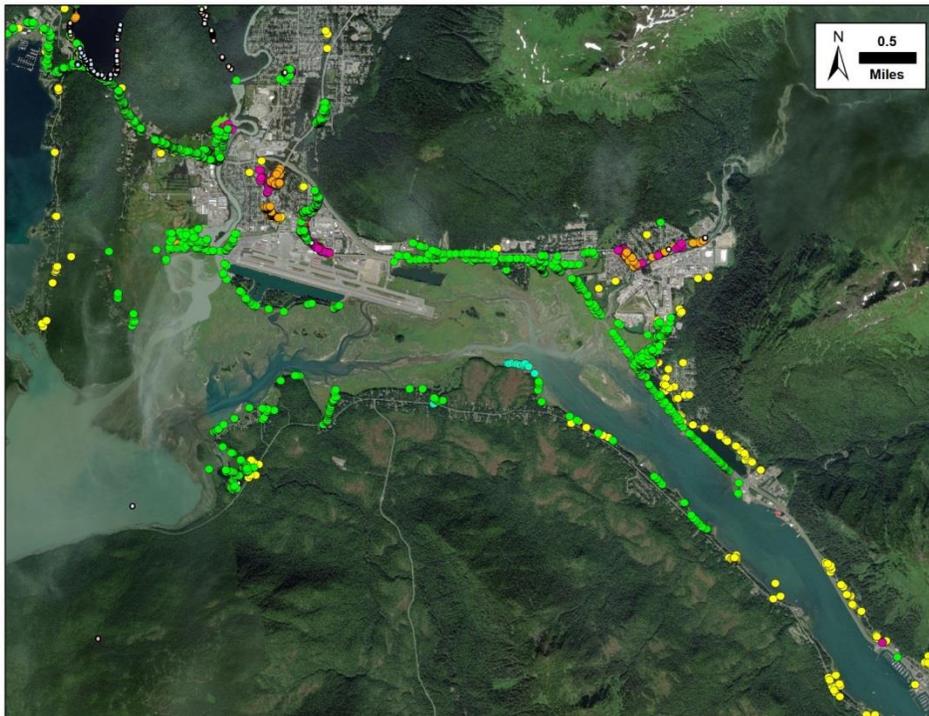


Figure 3. Overview of assessment areas.

Site Assessments, Proposed and Ongoing Projects

Invasive Plant Management (ongoing)

Native plants are highly valued by humans and provide numerous ecological functions. These important values and functions are threatened by non-native invasive plants that can outcompete and displace native plants and plant communities. Invasive plants surveys have been conducted in the Mendenhall Wetlands, the upland fringe bordering the wetlands, and along several of the urban stream corridors that connect to the wetlands (Hudson et al. undated). Invasive plant records from these surveys are maintained by the Southeast Alaska Watershed Coalition (SAWC) and are updated as new records are obtained. SAWC is actively managing several invasive plant species in the Mendenhall Wetlands area, including perennial sowthistle (*Sonchus arvensis*), reed canarygrass (*Phalaris arundinacea*), Bohemian knotweed (*Fallopia x bohemica*), European bird cherry (*Prunus padus*), and European mountain ash (*Sorbus aucuparia*). These invasive plants are targeted because of their high invasiveness rank, relative ease of control, risk of spreading, and/or threat to important habitats. SAWC recently received a grant from the Alaska Sustainable Salmon Fund to manage Bohemian knotweed and reed canarygrass in the wetlands and several tributaries from 2020 to 2022.



Invasive plant infestations near the Mendenhall Wetlands and surrounding areas. High-priority species for management include Bohemian knotweed (yellow), European bird cherry (pink), reed canarygrass (green), European mountain ash (orange), and perennial sowthistle (blue). Some of these infestations have been eradicated.

Site Name: Mendenhall Golf Course

Project Location: The golf course is located on the NW edge of the Mendenhall Wetlands in Juneau, AK. Vehicle access is at the end of Industrial Blvd. (58.364042 N, 134.611846 W)

Wetland Type: (National Wetland Inventory¹ (NWI) codes)

- Estuarine Intertidal Emergent, Persistent/Unconsolidated Shore, Irregularly Flooded (E2EM1/USP)
- Palustrine, Emergent, Persistent, Temporarily Flooded (PEM1A)
- Palustrine, Emergent, Persistent, Seasonally Saturated (PEMa1B)

Watershed Name: Mendenhall Peninsula (USGS HUC14 name), Casa del Sol (local drainage)

AWC Code: 111-50-10490 (Casa del Sol Creek), with Chum salmon present, Coho salmon rearing, and Dolly Varden char rearing.

USGS-HUC: 19010301060612

Assessment Date(s): 5/2/19

Ownership Type: Private - Elizabeth and Thomas File

Site Characteristics

Background:

The Mendenhall Golf Course is located on a 96.5 acre parcel at the end of Industrial Blvd and borders the Mendenhall State Game Refuge to the north. It is located on high marsh and uplift meadows, a globally rare habitat type (Carstensen 2007), and Casa del Sol Creek (a.k.a. Pederson Hill Creek) meanders through the property from north to south. This creek has been listed as impaired by the AK Department of Environmental Conservation for bacteria. The vegetation is managed in many areas – mowing in “greens”, shrubs and trees have been removed, and the riparian area consists of native and invasive grasses to the edge of the stream. However, there are still areas of natural vegetation between the greens throughout the golf course. Although we surveyed the property early in the spring, we did see reed canary grass matted down and creeping buttercup already coming up in several areas. We are unaware of the economic profitability of the golf course, though it appears to have a small but dedicated following (<https://www.facebook.com/MendenhallGolfCourse/>). Some of the property to the west of the creek does not appear to be used for the golf course. The owners should be approached to determine if this area can be restored and/or conserved.

Overall Project Goal(s): Manage invasive species to prevent spread to the refuge; rehabilitate the riparian area; acquire a conservation easement for a part or all of the land.

Project Objectives:

1. Eradicate reed canarygrass, especially along the creek, to prevent its spread to the refuge.

¹ Juneau-area wetlands were mapped for the National Wetland Inventory using aerial imagery from the 1970's. These data have not been ground-truthed for accuracy. We have observed that NWI wetland types and boundaries are not highly accurate, but generally provide some good information about the types of wetlands in the assessment areas.

2. Plant native shrubs along the riparian area to limit erosion, shade out reed canarygrass, and cool the water.
3. Acquire a conservation easement on unused land or the whole parcel if/when the owners no longer want to run a golf course.

Project Type: Restoration and Enhancement, Conservation

Potential functions to be restored: Restored uplift meadow as habitat for mammals, birds, and invertebrates. Natural riparian functioning for fish, birds, and invertebrates.

Project Significance for Mitigation: Riparian restoration

Potential Barriers to Project Success: SAWC does not have any personal connections to the landowners, and sent them a letter Sep 19, 2019 but got no response. They also own a piece of uplift property that borders the refuge just SW of the golf course, and also did not respond to SEAL Trust's outreach in the past about putting a conservation easement on that land, suggesting they may not be amenable to restoration work on their property at this time. This said, Compensatory Mitigation as preservation and/or restoration at the site has the potential to provide an alternative form of revenue for the lightly visited golf course, and this should be communicated to the owners.

The land upslope of the property also has invasive species, especially reed canarygrass, and it may be necessary to re-treat invasive species on this property in the future if upstream sources are not addressed.

Contact Information: Thomas and Elizabeth File, 9167 Parkwood Dr., Juneau, AK 99801

Project Efficacy:

Green: (No obstacles)

X Yellow: (Potential obstacles based on private ownership, compliance order, etc.)

We have not been able to make meaningful contact with the owners, and lack of response to outreach over the years suggests they may not be very interested in pursuing restoration/conservation measures on their property.

Red: (Major obstacles that may be insurmountable in the mitigation process)

Site Maps



Aerial view of the Mendenhall Golf Course property.



Mendenhall Golf Course property and National Wetland Inventory wetland types (E2EM1/USP = Estuarine Intertidal Emergent, Persistent/Unconsolidated Shore, Irregularly Flooded; PEM1A = Palustrine, Emergent, Persistent, Temporarily Flooded; PEM1B = Palustrine, Emergent, Persistent, Seasonally Saturated).

Site photos



Managed fairways surrounded by natural vegetation (Sep 10, 2019; view looking north).



Casa del Sol Creek (aka Pederson Hill Creek) riparian area (Sep 10, 2019; view looking northeast).



Fireweed, grasses and other plants in a meadow to the south of the golf course property (Sep 10, 2019; view looking north).

Site Name: Fish Creek Estuary

Project Location: Fish Creek estuary is located on the NW side of Douglas Island where Fish Creek empties into the Mendenhall Wetlands. It can be accessed from the N. Douglas Highway (58.330755 N, 134.598901 W).

Wetland Types: (NWI codes)

- Freshwater pond, palustrine, unconsolidated bottom, permanently flooded, diked/impounded (PUBHh)
- Estuarine, Intertidal, Emergent, Persistent, Irregularly Flooded (E2EM1P)
- Estuarine, Intertidal, Emergent, Persistent/Unconsolidated Shore, Irregularly Flooded (E2EM1/USP)
- Estuarine, Intertidal, unconsolidated shore, regularly flooded (E2USN)
- Palustrine, Emergent, Persistent, Seasonally flooded, diked/impounded (PEM1ch)

Watershed Name: Fish Creek

AWC Stream ID: 111-50-10690 (Fish Creek), with Chum, Coho, Pink and Chinook salmon present, cutthroat trout present, and Dolly Varden char present.

USGS-HUC: 190103010710

Assessment Date(s): Jul, Dec 2019

Ownership Type: Public – ADNR and City and Borough of Juneau

Site Characteristics

Background:

The Fish Creek alluvial fan and estuary are partially contained in the Mendenhall State Game Refuge. Most of the rest of the area is owned by the city of Juneau, while the western spit is also owned by ADNR (see map below). The intertidal wetlands support low and high marsh grasses and sedges (including Lyngbye's Sedge and rye grass), which grade into uplift meadow and spruce forest. The area provides habitat for many types of fish and wildlife, including waterfowl, eagles and other raptors, bats, juvenile coho, and stickleback. There is a large breeding population of western toads in the east pond. Although not having protected status in Alaska, broadleaf arrowhead (*Sagittaria latifolia*), a rare plant in the state, has been found growing on the northeast edge of the pond.

The alluvial fan was mined for gravel in the 1960's and 1970's forming two borrow ponds separated from the tidelands and stream by dikes. The west pond's dike was breached during a 1984 flood, and the pond is now tidally influenced. It is used as a King salmon release site by Douglas Island Pink and Chum hatchery, and is an important recreational and sport fishing site for locals. The east pond remains hydrologically disconnected from tidal influence, but a small channel at the head of the pond is assumed to provide an ephemeral connection to Fish Creek during high flows. The east pond is a locally important breeding and rearing habitat for western toads. Small infestations of Bohemian knotweed have been eradicated near the parking lot and east pond and numerous reed canarygrass infestations are being treated with herbicide. The park receives moderate to heavy use, depending on the time of year, and is appreciated by dog walkers, bird watchers, waterfowl hunters, and anglers.

Overall Project Goal(s): create tidal connectivity to east pond while maintaining freshwater amphibian habitat; enhance aquatic habitat in east pond; enhance stands of new growth trees (i.e. Sitka spruce)

Project Objectives:

1. Breach the east pond and allow tidal influence.
2. Create more shallow water habitat in the east pond for macrophytes and invertebrate and juvenile fish habitat.
3. Thin new-growth stands of Sitka spruce to enhance structural and biological diversity by promoting understory growth.

Project Type: Restoration and enhancement

Potential Functions to be Restored: natural hydrologic connectivity and hydroperiods; fish habitat; upland habitat

Project Significance for Mitigation: Restore estuarine and tidal wetland area

Potential Barriers to Project Success: ADF&G will likely make final decisions about priorities and restoration strategies. The City of Juneau has an interest in improving access and trail infrastructure, not reducing human access. The east pond dike may fail in the near future, affecting any plans or restoration actions. The Juneau airport has not yet been engaged. There may be public objection to change in a high-use area.

Contact Information:

Roy Churchill, ADFG Mendenhall State Game Refuge Manager, roy.churchwell@alaska.gov, 907-465-4266

Michele Elfers, City Parks Manager, Michele.Elfers@juneau.org, 907-364-2390

Project Status as of 12/2019:

SAWC staff have been engaging with relevant ADFG and CBJ staff about the potential for restoration at this site. Both are amenable to exploring options. During the winter and spring of 2019, SAWC and ADFG staff conducted site visits to measure dissolved oxygen concentrations under ice and trap fish in the east pond, and to compare conditions in the east pond with the open west pond (trip reports available [here](#)). During the first visit, we brainstormed a variety of restoration options for the east pond. These ranged from complete removal of the dike and reconnection to the floodplain to creating or enhancing more limited connectivity (e.g. via the existing channel or a new culvert). During the summer of 2019, USFWS, CBJ, ADFG, and SAWC staff visited the site together to discuss options for restoration and managing use in ways that would be beneficial to people and the environment. We found that the range of potential restoration objectives was too great to develop a concept design. Subsequently, SAWC submitted a [grant proposal](#) to NOAA's coastal resilience program for a "feasibility" study that would bring stakeholders together to assess the ecological and social feasibility of restoration options and potentially settle on one option to pursue. The proposal outlines a timeline and process to establish restoration goals and objectives and engage stakeholders.

Project Efficacy:

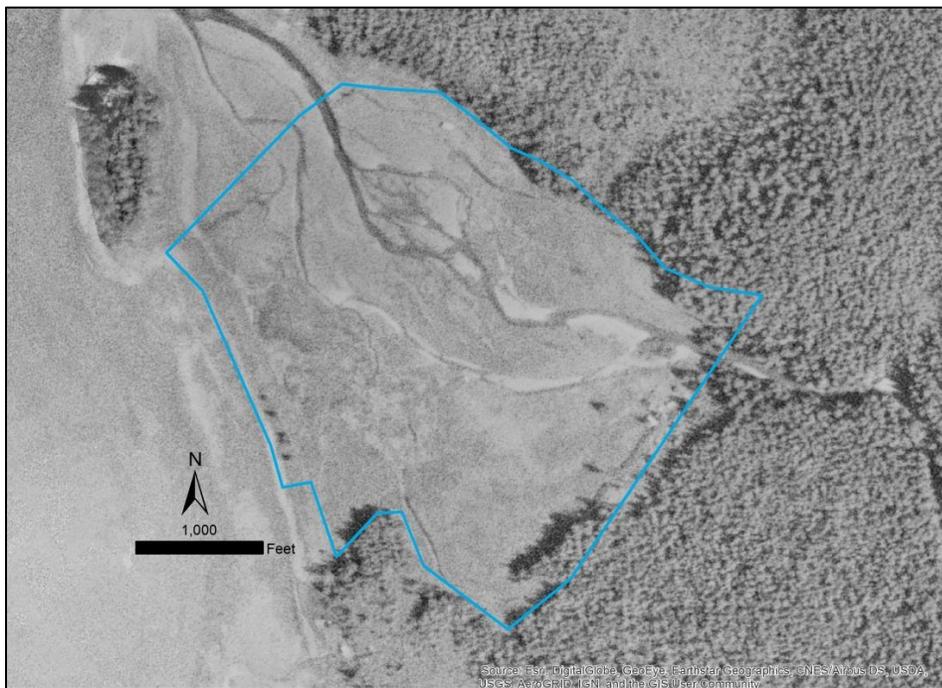
Green: (No obstacles)

X Yellow: (Potential obstacles based on private ownership, compliance order, etc.)

Feasibility study and further public engagement required.

Red: (Major obstacles that may be insurmountable in the mitigation process)

Site Maps



Fish Creek estuary aerial view. Current conditions (top) and pre-dredge ponds in 1949 (bottom).



Reed canarygrass infestations (green polygons and symbols) in the Fish Creek estuary area.

Site photos:



Intertidal area beyond the east pond, at high tide. (Dec 18, 2018; view looking northwest)



View of the East Pond from the parking lot area. (July 17, 2019; view looking northwest)



View of the east pond looking southeast to the parking lot from the dike. (July 17, 2019)



Panoramic view of the west pond from the east end. (July 17, 2019)



Eroding east pond dike along Fish Creek (July 17, 2019; view looking downstream).

Site Name: S&S/Duran Pond

Project Location: The S&S/Duran pond is located just NE of Egan Drive between Lemon and Switzer Creeks. (58.355493 N, 134.511490 W)

Wetland Type: (NWI codes)

- Freshwater pond, palustrine, permanently flooded, diked/impounded (PUBHh)
- Estuarine, Intertidal, Emergent, Persistent, Irregularly Flooded (E2EM1P)

Watershed Name: Lemon Creek

AWC Stream ID: NA. Lemon Creek is listed for chum salmon spawning, coho and pink salmon presence, and Dolly Varden presence. Switzer Creek is listed for chum, coho, pink, and sockeye salmon presence, Dolly Varden presence, and cutthroat trout rearing.

USGS-HUC: 190103010605

Assessment Date(s): Aug 13, 2019

Ownership Type: Private – Duran Construction Company, LLC.

Special property considerations: There is an expired US Army Corps of Engineers (USACE) permit for the property for gravel extraction that required post-project restoration.

Site Characteristics**Background:**

The Duran pond (previously owned by C. J. Schneider and known as the S&S pond) is an existing gravel extraction pit that covers approximately 9.4 acres. The gravel pit was first started in the 1960s, with the first ACE Permit issued in 1977 to mine gravel, with the provision that the area would be backfilled and restored to a tidally-influenced wetland area. The permit was subsequently updated and extended, with the [most recent permit](#) being issued in 2000. While this permit required concurrent restoration, little restoration occurred. Based on conversations with local USACE staff, upon the death of the previous owner (permittee), the USACE began operating as though there is no party responsible for the restoration. The current landowners have approached the USACE about getting a new permit to continue gravel extraction, but were told that they would have to do the restoration that was required in previous permits. There has been little/no activity at the site since. The pond remains deep (presumed to be 10-15 ft deep) and disconnected from the Lemon Creek and Switzer Creek floodplains by earthen dikes. The most recent permit for this site is linked here:

Overall Project Goal(s): Restore the pond to wetland; reconnect with the Switzer and Lemon Creek intertidal floodplains.

Project Objectives:

1. Fill the pond and convert it to emergent tidally influenced wetlands.
2. Remove the dikes separating the area from the Switzer and Lemon Creek floodplains.
3. Reconnect the area to the Mendenhall wetlands via two existing culverts under Egan Drive, and to Lemon Creek, and/or Switzer Creek.
4. Manage the area for fish and wildlife habitat in conjunction with the neighboring Kingfisher pond and ADNR lands.

Project Type: Restoration and enhancement

Potential Functions to be Restored: natural hydrologic connectivity and hydroperiods; fish habitat

Project Significance for Mitigation: Restore tidal wetland area and fish habitat. This may be one of the most significant coastal wetland restoration opportunities in Southeast Alaska.

Potential Barriers to Project Success: The property is privately owned and there are existing restoration requirements for the property, although the legal status of these is unclear, particularly if the land changed ownership again. If previous mitigation requirements are still applicable, functional lift beyond what is currently required may have to be realized for SAWC to be able to contribute to restoration through mitigation. Funding restoration through grant sources is uncertain because of existing restoration requirements.

Contact Information:

Duran Construction Company, LLC, PO Box 32634, Juneau, AK 99803

Randy Vigil (Army Corps of Engineers), Randal.P.Vigil@usace.army.mil

Status of Landowner Outreach: A letter was sent to Marciano Duran in the fall of 2019. He has been in touch with SAWC, and is interested in meeting on the property to discuss priorities and options. Mr. Duran canceled a scheduled site visit in October 2019.

Status of USACE Actions: During our September 10 meeting with local USACE staff, we were told that they are basically treating the property as if there is no responsible party/permittee. However, it was unclear if there were still legal requirements in place for the restoration that was part of the previous owner's permits. It was made clear that no new permits would be issued without a stipulation of full restoration of the site.

Project Efficacy:

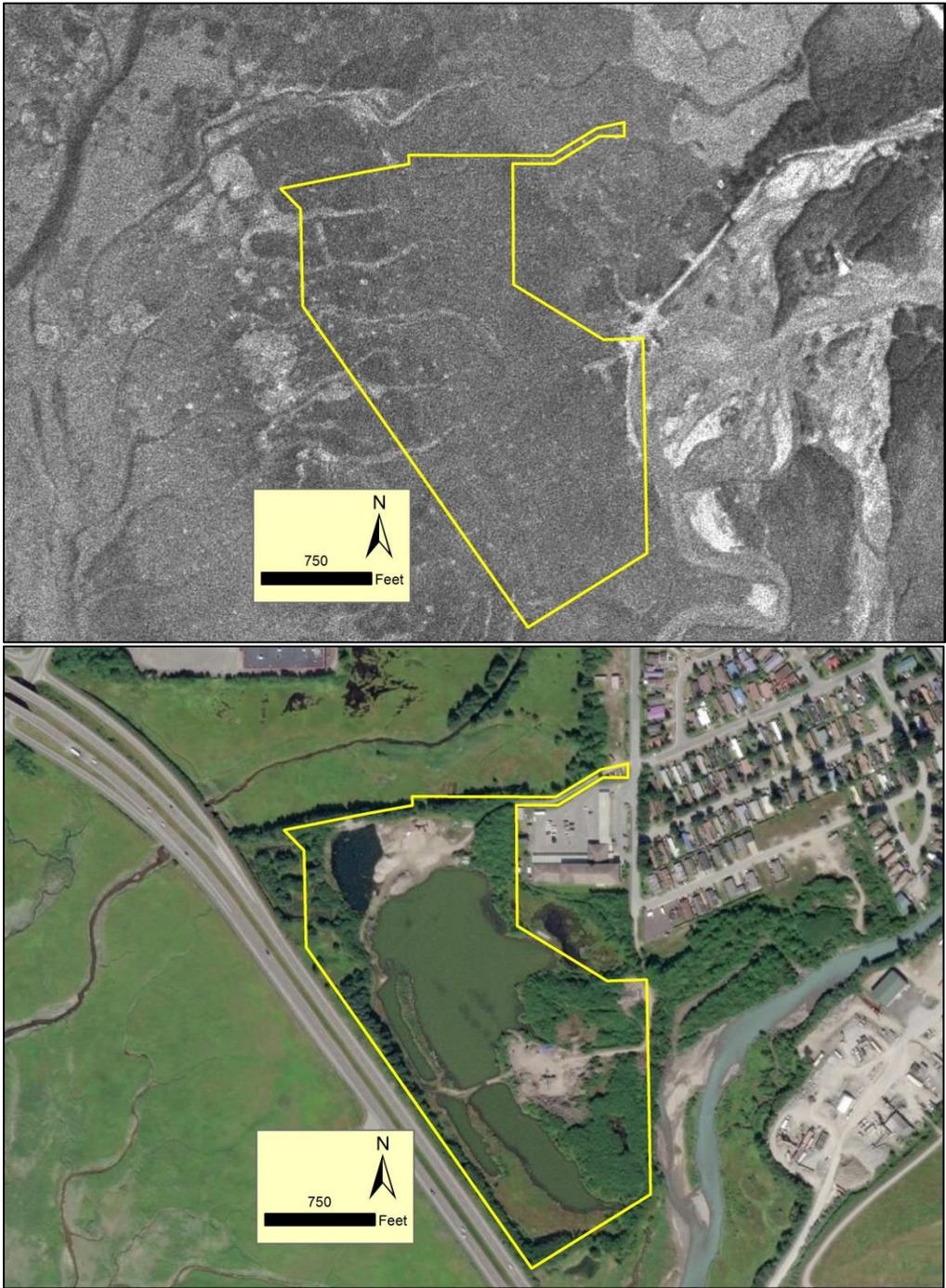
Green: (No obstacles)

Yellow: (Potential obstacles based on private ownership, compliance order, etc.)

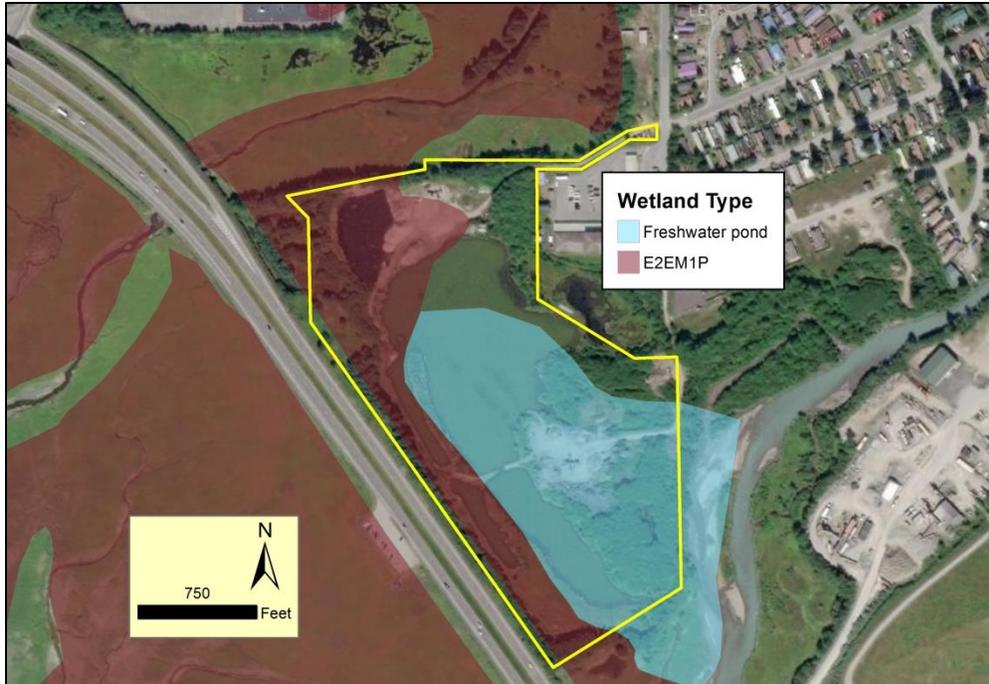
X **Red: (Major obstacles that may be insurmountable in the mitigation process)**

The uncertain legal status of the property related to the expired USACE permit complicates restoration at this site.

Site Maps



Duran Pond property boundary; current conditions (top) and 1949 (bottom).



Duran pond property boundaries with National Wetland Inventory wetland types. The “Freshwater Pond” wetland area was mis-identified as E1UBLh (Estuarine, Subtidal). E2EM1P = Estuarine, Intertidal, Emergent, Persistent, Irregularly Flooded.

Site photos



View of the Duran pond (background) from Kingfisher pond on CBJ property (foreground). (Aug 13, 2019; view looking west)



Northern portion of the Duran pond viewed from CBJ property on its NE side. (Aug 13, 2019)



Infrastructure on the north side of the Duran pond as viewed from CBJ property. (Aug 13, 2019)



Duran Pond, viewed from CBJ property on the north side. (Aug 13, 2019)

Site Name: Lower Switzer Creek

Project Location: Switzer Creek and surrounding wetlands and intact uplands between Glacier Highway and Egan Drive. (58.357030 N, -134.511364 W)

Wetland Types: (NWI codes)

- Estuarine, Subtidal, Unconsolidated bottom (E1UBL)
- Estuarine, intertidal, emergent, persistent, regularly flooded (E2EM1N)
- Estuarine, intertidal, emergent, persistent, irregularly flooded (E2EM1P)

Watershed Name: Switzer Creek

AWC Code: 111-40-10070 (Switzer Creek), with Chum, Coho, Sockeye, and Pink salmon present, cutthroat trout rearing, and Dolly Varden char present.

USGS-HUC: 190103010605

Assessment Date(s): December 17, 2019

Ownership Type: Private – S & H Tract S 1 LLC, S & S Development LLC, ADNR, R&M Engineering (now PDC Engineers)

Special property considerations: NA

Site Characteristics**Background:**

The lower reaches of Switzer Creek pass through meadow and marsh before entering the Mendenhall Wetlands proper on the south side of Egan Drive. Sometime prior to 1981, about 3,000 feet of channel downstream of Glacier Highway was relocated, apparently to construct a large fill pad. The fill pad was the site of a K-Mart store followed by a Wal-Mart store. The building is currently unoccupied. An abandoned roadbed transits the north end of the site. The relocated channel flows through about 28.5 acres of largely undeveloped land owned by three private entities and the ADNR. It appears that 600 feet of Switzer Creek downstream of the road was dredged and the spoils deposited on both sides of the channel. Mature Sitka spruce trees are growing on the spoil berm. Beaver constructed dams in the channel in 2019 and a dam was observed about 50 feet downstream of the road during the site visit.

Overall Project Goal(s): Restore and enhance stream channel and wetland habitat

Project Objectives:

1. Remove the abandoned roadbed. Consider using the roadbed material to fill Duran Pond.
2. Restore natural channel pattern and form to the relocated reach of stream. Use the channel upstream of Glacier Highway as a reference reach for designing a new channel.

Project Type: Restoration

Potential Functions to be Restored: stream and wetland habitat for aquatic species, including fish;

Project Significance for Mitigation:

Potential Barriers to Project Success: most of the area is currently in private ownership

Contact Information:

Marlene, Schneider, 7608 NORTH DOUGLAS HIGHWAY, JUNEAU, AK 99801

Chris Carpeneti (ADNR) chris.carpeneti@alaska.gov

PDC Engineers, 6205 Glacier Hwy., Juneau, Alaska 99801, 907.780.6060

Status of Landowner Outreach: Outreach ongoing.

Project Efficacy:

Green: (No obstacles)

X Yellow: (Potential obstacles based on private ownership, compliance order, etc.)

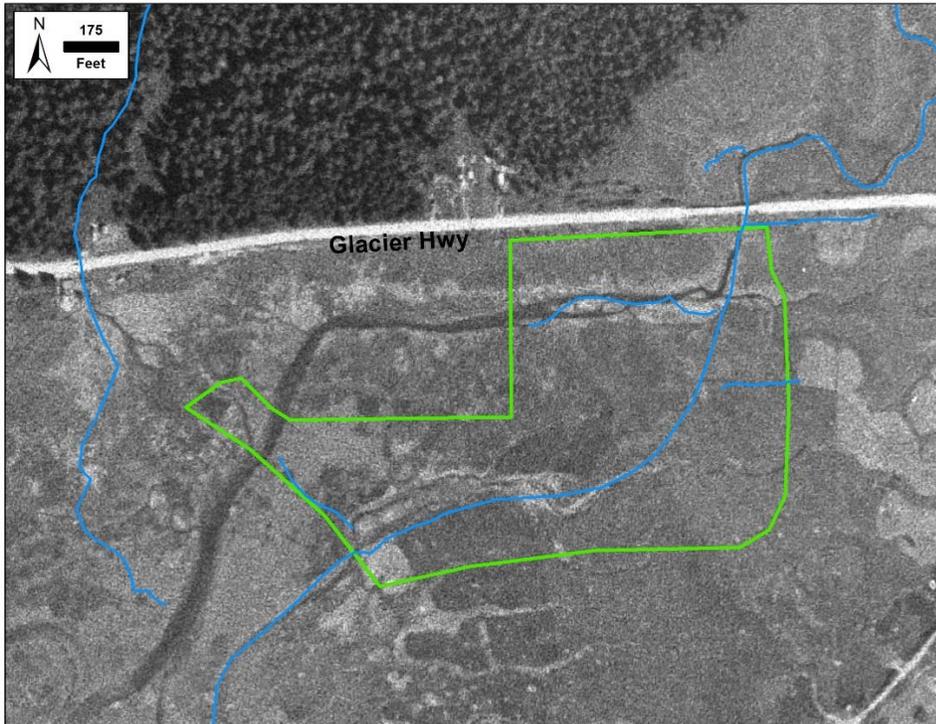
Most of this site is privately owned and future land development plans are not known. Landowners may be willing to sell this property because the presence of a salmon stream and wetlands will make development difficult in terms of constructability and regulatory constraints.

Red: (Major obstacles that may be insurmountable in the mitigation process)

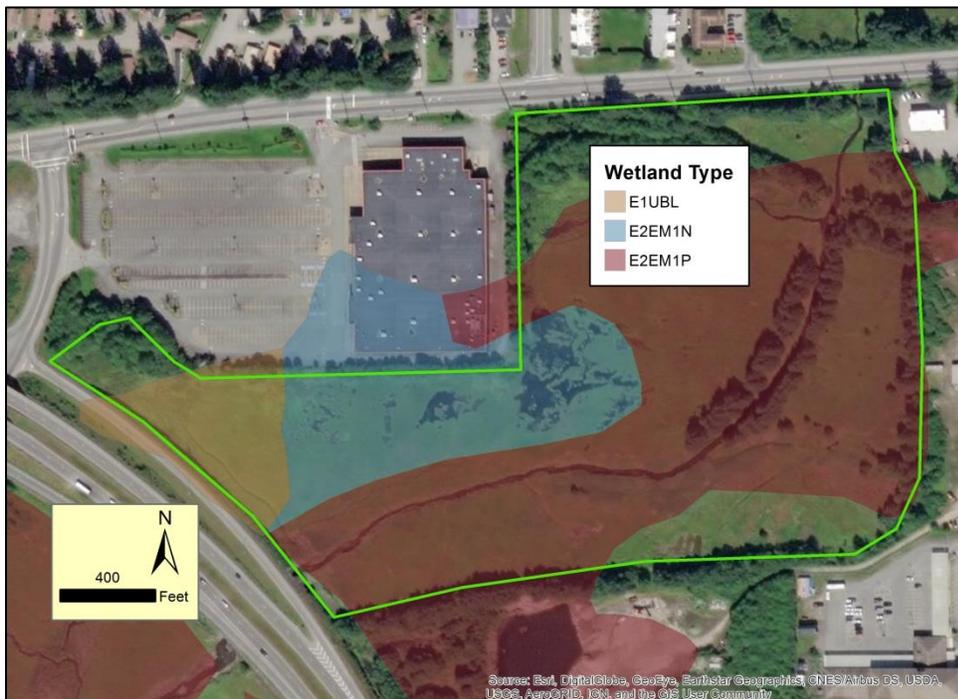
Site Maps:



Lower Switzer Creek wetlands between Glacier Highway and Egan Drive. The abandoned road is visible as a tree-lined feature arcing through the northern portion of the area.



Site boundary and existing anadromous stream channels overlain on 1949 imagery of the area. The elongated dark feature is the original Switzer Creek channel.



NWI wetland types in the lower Switzer Creek area: E1UBL – Estuarine, Subtidal, Unconsolidated bottom; E2EM1N – Estuarine, intertidal, emergent, persistent, regularly flooded; E2EM1P – Estuarine, intertidal, emergent, persistent, irregularly flooded.

Site Photos:



Aerial view of site looking northeast on April 14, 1981, after the Switzer Creek channel was relocated. Egan Drive is visible in foreground, Glacier Hwy. in mid-ground left, and fill pad in lower left.



Switzer Creek downstream of Glacier Highway looking west towards the K-Mart building in 1993. The relocated channel is at bottom of photo and flows from right to left. The abandoned channel is the slough extending towards K-Mart. The abandoned road is on photo right.



The relocated Switzer Creek channel looking downstream from the abandoned road in 1993. Sitka spruce trees in the foreground are growing on a spoil berm apparently left behind after the new channel was dredged. Mountains on Douglas Island are visible in the distance.

Site Name: North Twin Lake/Pioneer Marsh

Project Location: Pioneer Marsh (58.345318 N, 134.497858 W) and North Twin Lake (58.341354 N, 134.493481 W)

Wetland Type: (NWI codes)

- Freshwater emergent wetland, palustrine, temporarily flooded (PEM1A)
- Estuarine, intertidal, unconsolidated shore, regularly flooded, diked/impounded (E2USNh)

Watershed Name: NA

AWC Stream ID: NA

USGS-HUC: NA

Assessment Date(s): Aug 13, 2019; Nov 27, 2019

Ownership Type: ADNR, US Coast Guard, CBJ

Site Characteristics

Background: The construction of Vanderbilt Road and Egan Drive fragmented and dramatically altered wetlands in the northeast portion of the Mendenhall Wetlands (Vanderbilt Road to Salmon Creek). The roads, acting as dikes/dams, have isolated former estuarine wetlands from the greater Mendenhall Wetlands, preventing daily tidal inundation and draining, and eliminating roughly 110 acres of estuarine wetlands. Numerous small streams and groundwater seeps flowing into this area are impounded by the roads forming two bodies of freshwater – a marsh northeast of the Vanderbilt Road/Egan Drive intersection, locally known as Pioneer Marsh, and Twin Lakes, two shallow lakes connected by a short channel. North Twin Lake is also connected to Pioneer Marsh by a channel.

Lake levels in the marsh/lake complex are controlled by four structures. Two floodgates consisting of two stop-log weirs and two flap gates are located at the extreme north and south ends of the complex. The stop logs control water level in the lakes and marsh; the flap gates only allow water to exit the complex. Gated culverts are located under Egan Drive near the center of each lake. The gated culverts can be operated to drain or fill the lakes depending on tide levels.

The City and Borough of Juneau owns Twin Lakes and much of the adjacent uplands between the lakes and Glacier Highway, which are managed as a park. The lakes are used by river otter, beaver, and many species of waterfowl. Swimming, boating, and ice skating are popular activities on the lakes, particularly at South Twin Lake where there are restroom facilities, a playground, dock, and small beach. The Alaska Department of Fish and Game regularly stocks Twin Lakes to support a put-and-take fishery. The lakes are sometimes drained in winter to suppress dense growths of milfoil that interfere with fishing and other activities in summer months. ADFG sent milfoil samples to a lab for species identification in fall 2019, and identification determined it to be a native species (northern watermilfoil *Myriophyllum sibiricum*).

Pioneer Marsh is an 8-acre freshwater marsh and pond system on the east side of Vanderbilt Road near its intersection with Egan Drive. The southern half is owned by ADNR and the northern half is owned by the US Coast Guard. The marsh is connected to North Twin lakes by a narrow channel at the base of Egan Drive. Prior to the construction of Vanderbilt Road, Vanderbilt Creek flowed through the area. The area likely consisted of unvegetated tidal flats and salt marsh. Although reed canarygrass has invaded

Pioneer Marsh, the area contains several types of wetlands and plant communities, and supports a high diversity of bird species, including locally uncommon to rare species like red-winged blackbird, killdeer, and sora ([Armstrong](#), undated). Residents of the nearby Pioneer Home value the marsh for its wildlife and scenery.

The goal of this project is to create estuarine habitat in North Twin Lake (~20 acres) and Pioneer Marsh (~8 acres).

Overall Project Goal(s): Restore estuarine habitat

Project Objectives:

1. Construct a small earthen dam between North and South Twin Lakes. The purpose of the dam is to prevent water from flowing between the lakes after tidal flooding/drainage processes are restored to the north basin.
2. Allow free flow of tidal water between North Twin Lake, Pioneer Marsh, and the Mendenhall Wetlands by permanently opening water control structures at each water body.
3. Eradicate reed canary grass, Bohemian knotweed, and European bird cherry.

Stakeholders and landowners should be engaged to further define goals at this site, as there are a range of options for this site. For example, the degree of tidal influence to the system can be manipulated to match desired conditions. Water levels can be controlled by the log weir/flap gates, and use of the log weir and/or excavation of deeper water areas could ensure permanent water that could be quality juvenile salmon rearing habitat. This habitat is currently unavailable to salmon because of the gate structures. Alternatively, the gate system could be fully opened and the area would naturally become an intertidal wetland. An intertidal wetland at Norway Point (just north of Juneau Yacht Club) provides an ideal reference wetland for this prescription. It is bisected by Egan Drive but is connected to Gastineau Channel through a culvert.

Project Type: Restoration

Potential Functions to be Restored: hydrologic connectivity and hydroperiods; invertebrate, fish and wildlife habitat

Project Significance for Mitigation: Restore tidal wetland area and fish and bird habitat

Potential Barriers to Project Success: North Twin Lakes is a relatively high use area, and it may take some outreach to allay resident concerns and resistance to changing the pond to an intertidal wetland. If overall public response is negative or the desired ecological outcome is not achieved, the original conditions could be easily restored using the water control structures.

Contact Information: Chris Carpeneti (ADNR) chris.carpeneti@alaska.gov; Michele Elfers (CBJ) Michele.elfers@juneau.org;

Project Status: In a phone conversation, Chris Carpeneti indicated that ADNR would be open to restoration or enhancement projects brought to them, as this type of activity fits within their management plan. They do not “actively” manage the area otherwise. CBJ Parks and Recreation staff are aware of the above restoration concept, but have not formally responded. In early 2019, US Coast Guard staff did not respond to an email request for permission to manage invasive plants on their property.

Project Efficacy:

Green: (No obstacles)

X Yellow: (Potential obstacles based on private ownership, compliance order, etc.)

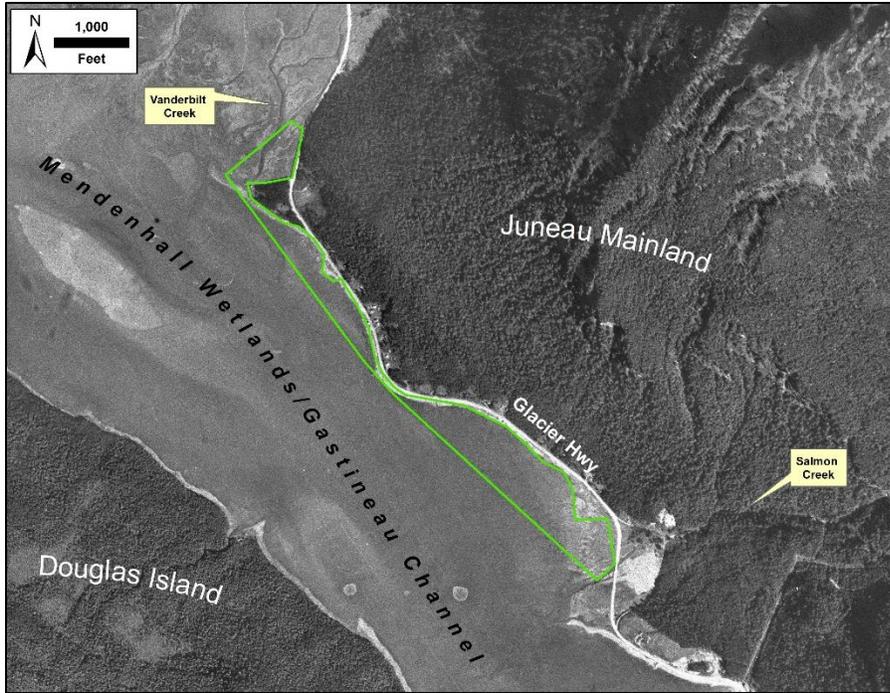
Public or landowner resistance to change, including the loss of a freshwater lake (i.e. aesthetics) and the loss of existing uses of the lake.

Red: (Major obstacles that may be insurmountable in the mitigation process)

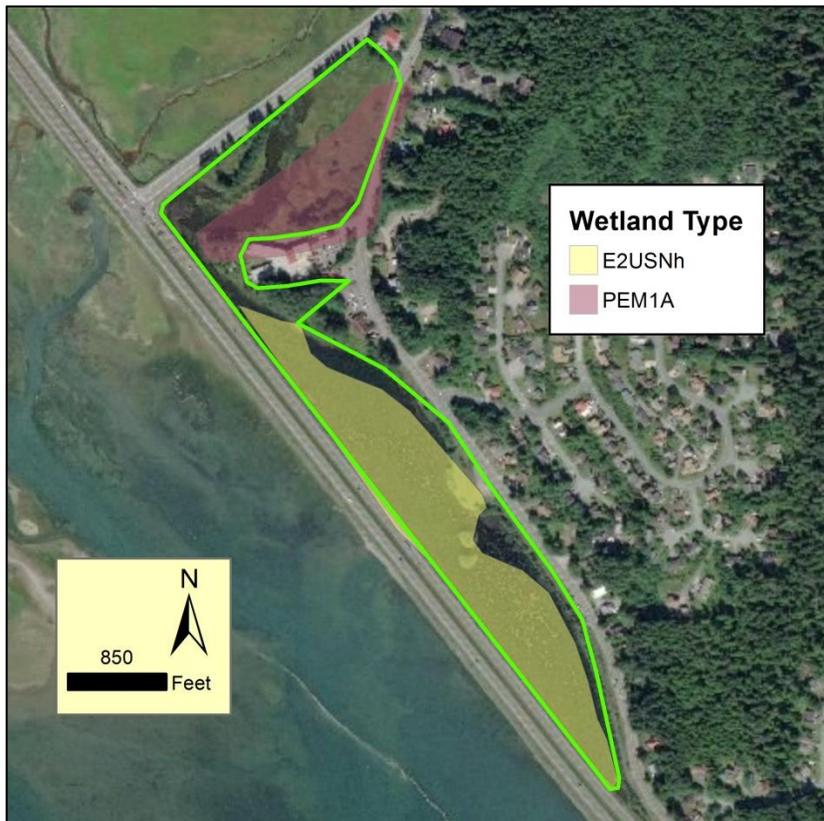
Site Maps



Twin Lakes and Pioneer Marsh. Yellow symbols indicate water control structures described in text.



Twin Lakes and Pioneer Marsh area in 1949.

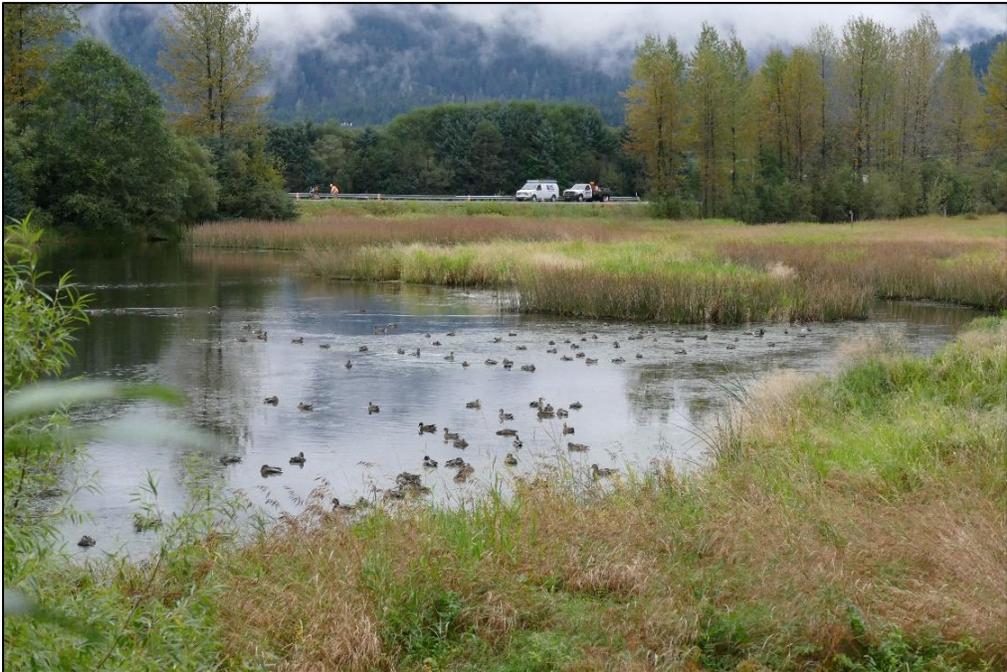


Wetland types within the assessment area. E2USNh - Estuarine, intertidal, unconsolidated shore, regularly flooded, diked/impounded; PEM1A - Freshwater emergent wetland, palustrine, temporarily flooded.



Invasive plant infestations in the Pioneer Marsh area: reed canarygrass (green), European mountain ash (magenta), Bohemian knotweed (yellow).

Site Photos



Waterfowl in Pioneer Marsh. View looking north towards Vanderbilt Road. Photo by Robert Armstrong.



A water-level control structure near the Egan Drive/Vanderbilt Road intersection at Pioneer Marsh. (Nov 27, 2019)



The south end of Pioneer Marsh looking south from the water-level control structure under Vanderbilt Road. View looking southeast. Conditions were very dry. (Aug 13, 2019)



A potential reference wetland at Norway Point (Just north of Juneau Yacht Club).



An example of an intertidal wetland that is bisected by Egan Drive but hydrologically connected to Gastineau Channel through a culvert. Located at Norway Point, just north of Juneau Yacht Club.

Site Name: Sunny Point Interchange/West Creek Area

Project Location: Former road bed east of West Creek and south of Egan Drive. (58.357781 N, -134.522682 W)

Wetland Type: Not currently wetland, formerly salt marsh

Watershed Name: West Creek

AWC Stream ID: 11-40-10050

USGS-HUC: 19010301060613

Assessment Date(s): Nov 26, 2019

Ownership Type: ADOT and ADNR

Site Characteristics**Background:**

Sunny Drive is a short road connecting Glacier Highway to a residential area on Sunny Point on the north side of the Mendenhall Wetlands. A portion of the road was relocated to the west during construction of the Sunny Point Interchange on Egan Drive. Although pavement was removed from the abandoned area, fill material remains at the site, which was likely originally salt marsh. Spruce, willow, alder and several forbs and grasses, including invasive reed canarygrass, have colonized the fill. This project will remove the fill material from a 0.7 acre area to restore meadow and high marsh habitat in the Mendenhall Wetlands. The type of habitat created will depend on the elevation of the site following removal of the fill.

Overall Project Goal(s): Restore habitat next to West Creek in the Mendenhall Wetlands.

Project Objectives:

1. Excavate and remove fill to match the elevation of adjacent areas. We estimate the volume of material to be approximately 2,910 (+/- 20%) cubic yards.
2. Revegetate as necessary with native species appropriate for the site.

Project Type: Restoration

Potential Functions to be Restored: upland and wetland wildlife habitat

Project Significance for Mitigation: Hundreds of acres of the Mendenhall Wetlands have been filled to build roads, houses, businesses and industrial areas. This former roadbed presents an opportunity to restore 0.7 acres to its natural state.

Potential Barriers to Project Success: This site has good access and no apparent barriers to success. The clean fill removed from the site will be hauled to a nearby location to reduce costs.

Contact Information: ADOT, ADFG

Project Status: undone

Project Efficacy: (as a potential mitigation site)

X Green: (No obstacles)

Landowners are likely amenable, access is straight forward, and we don't anticipate much public resistance.

Yellow: (Potential obstacles based on private ownership, compliance order, etc.)

Red: (Major obstacles that may be insurmountable in the mitigation process)

Site Map



Sunny Drive fill pad aerial view.



Spot elevations with a laser level and GIS were used to estimate the volume of material in the fill pad, approximately 2,910 (+/- 20%) cubic yards.

Site Photos



View of fill pad and West Creek looking southeast from the Sunny Point interchange on November 26, 2019.



View of fill pad and West Creek looking southeast from the Sunny Point interchange in August 2012.

Site Name: SEAL Trust Property northeast of Honsinger Pond**Project Location:** east of Honsinger Pond area and south of Egan Dr. (58.357180 N, -134.547768 W)**Wetland Types:** (NWI codes)

- Estuarine, Intertidal, Emergent, Persistent, Irregularly Flooded (E2EM1P)
- Palustrine, Emergent, Persistent, Seasonally flooded-tidal (PEM1R)
- Palustrine, Emergent, Persistent, Semi-permanently flooded-tidal (PEM1T)

Watershed Name: Mendenhall Wetlands**AWC Stream ID:** 111-50-10625 (Coho rearing)**USGS-HUC:** 19010301060613**Assessment Date(s):** November 26, 2019**Ownership Type:** Private (SEAL Trust) with conservation easement**Site Characteristics**

Background: SEAL Trust acquired 32-acres of private land on the north side of the Mendenhall Wetlands in 2018. The land has been protected with a conservation easement to mitigate for loss of adjacent wetlands that are being filled to facilitate land development. The parcel is located near the east end of Honsinger Pond. The SEAL Trust parcel is comprised of high marsh and meadow intersected by tidal channels and an anadromous stream that supports juvenile coho salmon. The salmon stream was relocated and straightened to route the flow around the pond. Non-native invasive plants, including paleyellow iris, creeping buttercup, and reed canarygrass occur in the area.

Overall Project Goal(s): Restore native plant communities and fish habitat.**Project Objectives:**

1. Eradicate invasive plants
2. Restore the natural planform to a 350-foot long reach of salmon stream and lengthen stream reach through meanders.

Figures below show a current and proposed planform of the stream. A small excavator would be used to excavate a new channel with meanders. Spoils would either be backfilled into the existing channel, transported offsite, or disposed of in the Honsinger Pond property. A small skidder with tracks or large rubber tires or a conveyor belt would be used to transport spoils. Machinery would use the abandoned road on the west end of the property to access the restoration site. Care would need to be taken to reduce any compaction on wetland soils by choosing the appropriate machinery, construction of temporary puncheon trails, and/or choosing the right time of year, weather, and tidal cycle. Stream cross section and pebble counts from natural downstream reaches or nearby streams would be used as reference conditions for the construction of the new channel. Vegetation would be restored in the construction area by transplanting plugs sourced from throughout the property.

Project Type: Restoration**Potential Functions to be Restored:** fish and wildlife habitat**Project Significance for Mitigation:**

Potential Barriers to Project Success: Sensitive habitat. Equipment used to restore the stream channel could damage adjacent wetland and meadow areas.

Contact Information: Allison Gillum (Southeast Alaska Land Trust), allison@setrust.net

Project Status: undone

Project Efficacy: (as a potential mitigation site)

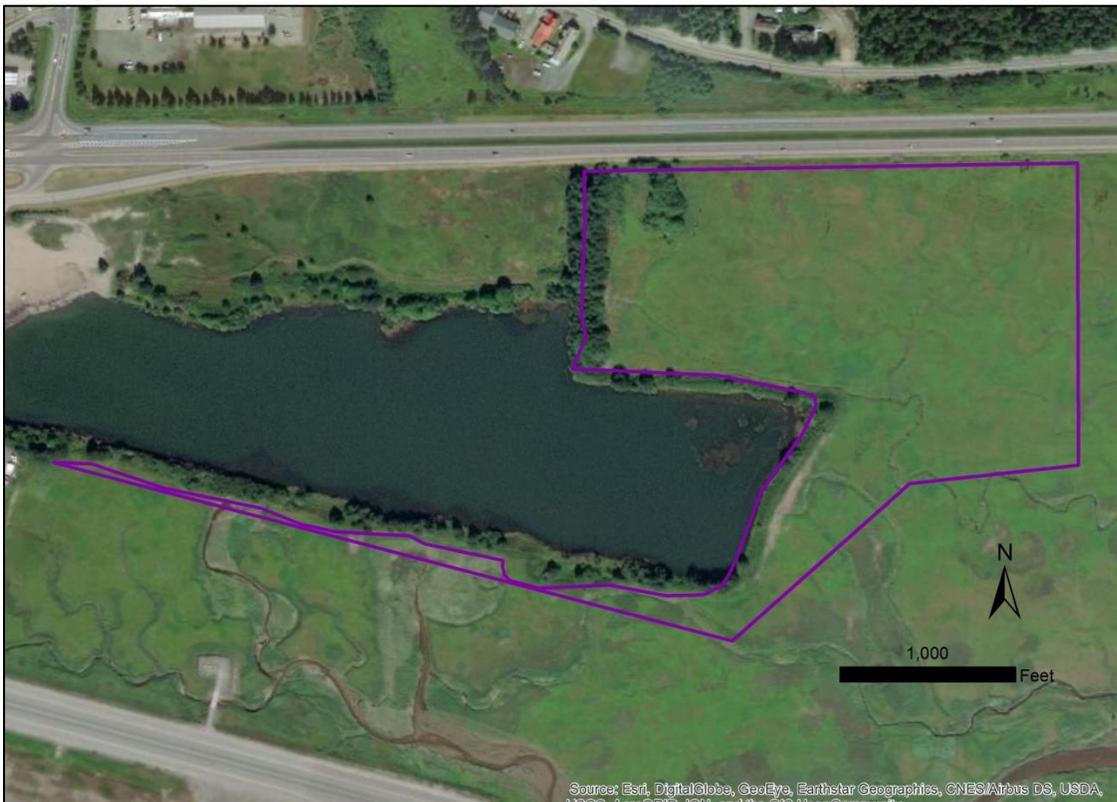
Green: (No obstacles)

X **Yellow: (Potential obstacles based on private ownership, compliance order, etc.)**

Landowner may not want to risk damage to habitat from heavy machinery used to restore the channel.

Red: (Major obstacles that may be insurmountable in the mitigation process)

Site Maps



SEAL Trust Property aerial view.



SEAL Trust property boundaries on aerial imagery from 1949.

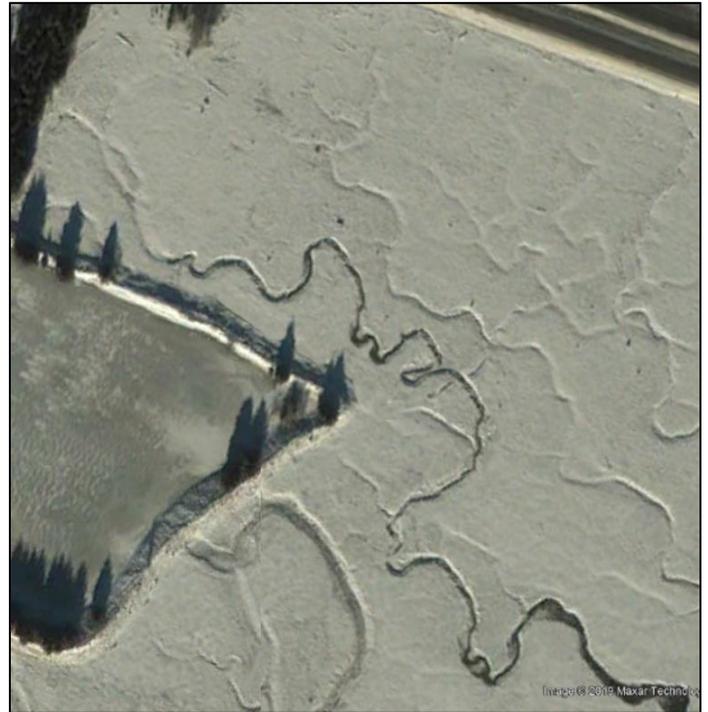


SEAL Trust property boundary and National Wetland Inventory wetland types.

Site photos:



A channelized reach of salmon stream on the northeast side of Honsinger Pond. View looking west on Nov. 26, 2019.



Current planform (left) and proposed planform (right) with more natural meanders and overall greater stream length.

Additional Impacts to the Wetlands and Streams

We identified several areas in Mendenhall wetlands that have been impacted by development that have a land status potentially compatible with restoration, but where uncertain restoration goals and/or questionable feasibility are limiting factors. They are briefly listed here for the benefit of future surveys.

Site Report

Juneau, AK

Site Name: Vanderbilt Creek

Location: 58.348791 N, -134.493362522682 W

Wetland Type: (NWI codes)

- Estuarine, intertidal, emergent, persistent, irregularly flooded (E2EM1P)
- Estuarine, intertidal, emergent, persistent, regularly flooded (E2EM1N)
- Estuarine, Intertidal, unconsolidated shore, regularly flooded (E2USN)

Watershed Name: Vanderbilt Creek

AWC Stream ID: 111-40-10125 (Chum spawning, Coho spawning and rearing, Pink spawning, Dolly Varden rearing)

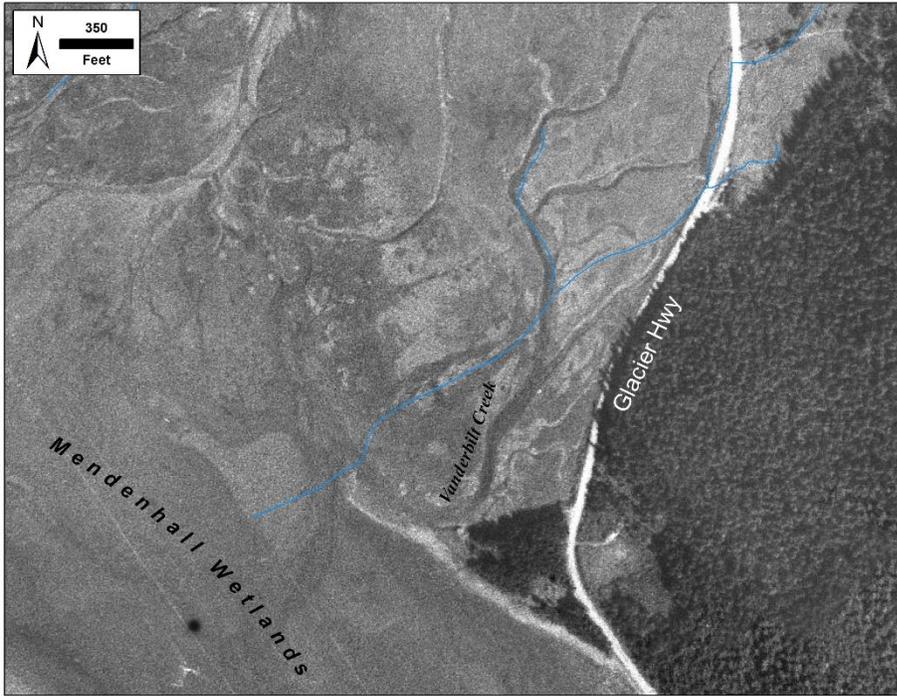
USGS-HUC: 19010301060613

Assessment Date(s): Aug 13, 2019

Landowner: Alaska Department of Natural Resources

Background: The lower portion of Vanderbilt Creek was relocated to accommodate development of the Western Auto shopping area, the Juneau Landfill, and Vanderbilt road. The created channel has some slight meanders and a relatively natural looking channel profile. Some of the remnant sloughs of the historic channel fill with water on a high tide. There is a straight line ditch connecting Vanderbilt Creek to Vanderbilt road, presumably to accommodate stormwater runoff from the road. There are also numerous concrete blocks in this tidal meadow that are remnants of a historic radio communication system. They have sizable footings that are not easily removed. The mouth of Vanderbilt Creek naturally flowed into what is now the Pioneer Marsh, but was cut off from this area by road construction. Enhancement of the site would be compatible with ADNR management plans, but any additional enhancement goals, objectives, and/or feasibility would need to be further defined before pursuing any action here.

Site Map



Vanderbilt Creek in 1949. Blue line is current stream channel.



Vanderbilt Creek today. Blue line is superimposed on above 1947 channel.

Site Name: Mendenhall River Mouth

Location: 58.360963 N, -134.606922 W

Wetland Type: (NWI codes)

- Palustrine, emergent, persistent, temporary flooded – tidal (PEM1S)
- Estuarine, intertidal, emergent, persistent, irregularly flooded (E2EM1P)
- Estuarine Intertidal Emergent, Persistent/Unconsolidated Shore, Irregularly Flooded (E2EM1/USP)
- Estuarine, Intertidal, unconsolidated shore, regularly flooded (E2USN)
- Estuarine, Subtidal, Unconsolidated bottom (E1UBL)

River mouth, intertidal wetlands, and estuary

Watershed Name: Mendenhall River

AWC Stream ID: 111-50-10500 (Chum, Coho, Chinook, Pink, Sockeye, cutthroat trout, Dolly Varden, and steelhead presence)

USGS-HUC: 190103010606, 190103010604

Assessment Date(s): November 26, 2019

Landowner: City and Borough of Juneau Airport

Background: The mouth of the Mendenhall River was dredged for gravel and fill material for construction of the airport and other infrastructure. An irregular shaped excavated pool is just northwest of the Juneau International Airport. It is separated by the Mendenhall River by a slight berm with an opening in which boats can pass through. It is used as staging area for hatchery pens and a nearby boat yard. The far NE and W sections of this open water area are not frequently used and could be evaluated for habitat enhancement. Spoils piles from the gravel extraction and former building pads have regrown into thick alder and an airport service road surrounds this filled area. It is unknown what the bottom profile/bathometer of the nearby pool is. Restoration or enhancement goals and objectives for this area have not been defined.

Site Maps



Mendenhall River mouth in 1949.



Mendenhall River mouth today.

Site Name: Ninemile Estuary Area

Location: 58.340200 N, -134.573525 W

Wetland Type: (NWI codes)

- Estuarine, intertidal, emergent, persistent, irregularly flooded (E2EM1P)

intertidal wetlands and estuary

Watershed Name: Ninemile Creek

AWC Stream ID: 111-50-10670 (Chum spawning, Coho rearing, Dolly Varden presence)

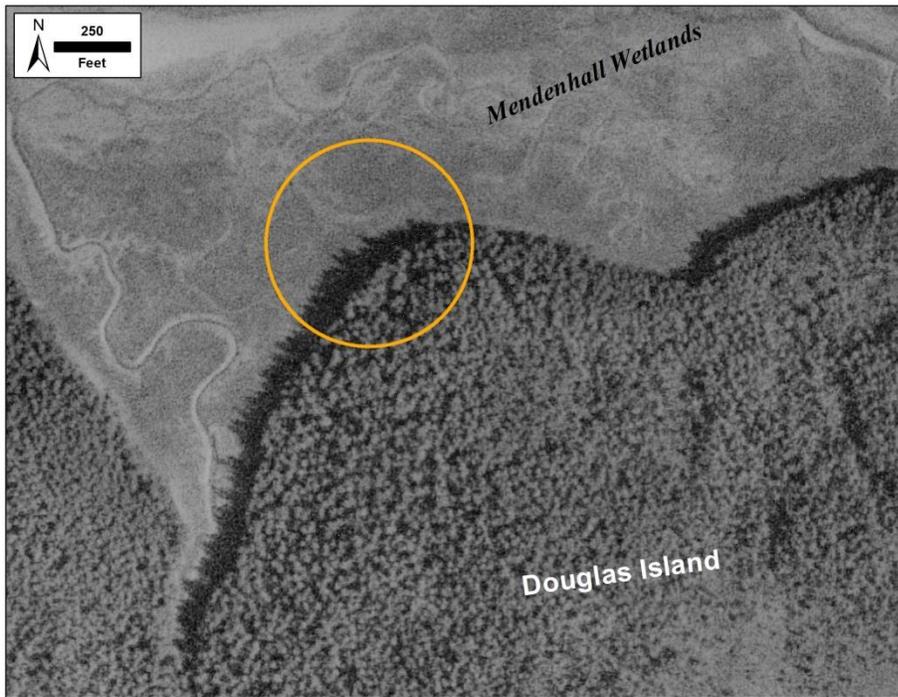
USGS-HUC: 19010301060613

Assessment Date(s): March 29, 2019

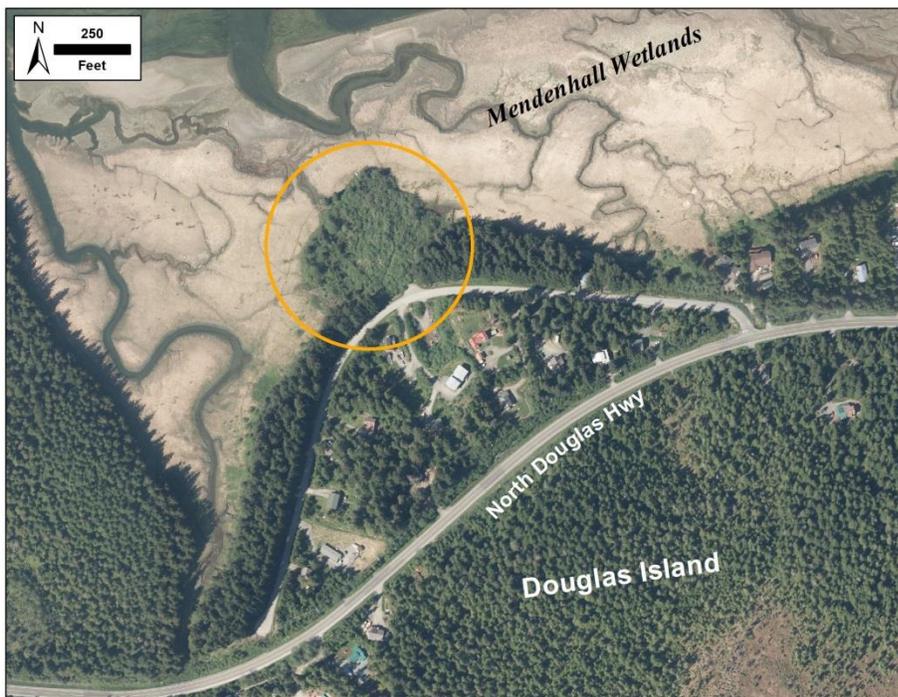
Landowner: Alaska Department of Natural Resources, Mendenhall Wetlands State Game Refuge

Background: Fill associated with a borrow pit was disposed of on intertidal wetlands just east of the Ninemile Creek Estuary on Douglas Island. A healthy growth of alder and shrubs are currently growing on the fill. The Alaska Department of Fish and Game did some small experimental excavations of this fill material over a decade ago. Sites were allowed to revegetate naturally. In the spring of 2019, the excavations, while small, were supporting healthy native wetland plant communities, including Lyngbyei sedge. While these experimental excavations did appear to be successful in restoring wetland habitat, cost and feasibility of backhauling this volume of material is limiting.

Site Maps



Ninemile Creek Estuary in 1949



Ninemile Creek Estuary today.

Citations

- Armstrong, Robert H., Richard L. Carstensen, Mary F. Willson, and Marge Hermans Osborn. (2009) The Mendenhall Wetlands, A Globally Recognized Important Bird Area. Nature Alaska Images. 80 pp.
- Armstrong, Robert H. (Undated) Twin Lakes and Pioneer Marsh. 17 pp.
- Carstensen, Richard. (2007) Coastal Habitats of Southeast Alaska, in A Conservation Assessment and Resource Synthesis for The Coastal Forests and Mountains Ecoregion in the Tongass National Forest and Southeast Alaska, eds JW Schoen and E Dovichin, Audubon Alaska and The Nature Conservancy, Anchorage, AK. Available online at https://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/alaska/seak/era/cfm/Documents/5.3_Coastal_habitats.pdf.
- Discovery Southeast (2004) GIS Mapping for Mendenhall Wetland State Game Refuge. Southeast Alaska Land Trust, Juneau, AK. March,. Available online at <https://www.southeastalaskalandtrust.org/pdf/accretion.pdf>.
- Hudson, John, Brian Maupin, and Kim Valverde. (Undated). Reed Canarygrass Inventory and Management Plan for the Mendenhall Wetlands State Game Refuge and adjacent areas. US Fish and Wildlife Service, Juneau Fish and Wildlife Field Office.