June 2023

Ebey Island Wildlife Area Unit Management Plan

Management Actions To Be Implemented Through 2033

Washington Department of FISH & WILDLIFE

Acknowledgements

Washington Department of Fish and Wildlife Staff

Planning Team Members

Loren Brokaw, Assistant Wildlife Regional Program Manager
Lindsey Desmul, Restoration Project Coordinator
Brian Boehm, Snoqualmie Wildlife Area Manager

Acknowledgement

Fenner Yarborough, Wildlife Regional Program Manager
Kurt Licence, District Wildlife Biologist
Belinda Rotton, Regional Lands Agent
Wendy Willet, Sergeant
Eryn Couch, Public Affairs
Snohomish/Island District Team

Plan Leadership

Joel Sisolak, Lands Planning, Recreation and Outreach Section Manager
Cynthia Wilkerson, Lands Division Manager
Janet Gorrell, Landscape Conservation Section Manager

Document Production and Mapping Support

Lindsey Desmul, Restoration Project Coordinator

Partners

Fen Research Team

Jeremy Shaw, Colorado State University
David Cooper, Colorado State University
Joe Rocchio, Department of Natural Resources
Tynan Ramm-Granberg, Department of Natural Resources
Irene Weber, Department of Natural Resources

Ducks Unlimited

CK Eidem, Regional Biologist
John Spolar, Regional Engineer

Acknowledgement

Tulalip Tribes
Diking District 1
Dan Bartelheimer, Sno Valley Farms

Snoqualmie Wildlife Area Advisory Committee

Name	Organization	City	Interest
Alan Bauer	Individual, Photographer	Fall City	Balance conservation and recreation
Rick Billeau	WA. Waterfowl Association	Marysville	Waterfowl habitat conservation
CK Eidem	Ducks Unlimited	Everett	Wetland conservation
Wayne Gullstad	Diking District 7	Mercer Island	Diking District Commissioner
Mike Hyde	Individual, Land Owner	Ebey Island	Hunter, Ebey Island landowner
Martha Jordan	NW Swan Conservation Association and Audubon	Everett	Conservation and birds
Rusty Milholland	Washington Farmland Trust	Seattle	Farmland conservation
Greg Osborne	Sportsman's Clubs	Snohomish	Everett and Snohomish sportsman's clubs
Tom Pedrierra	Individual, Hunter	Mercer Island	Ducks Unlimited, Pheasants Forever, RMEF
Marty Thenell	Bird Dog Clubs	Seattle	Sporting dog clubs

Ebey Island

Kelly Susewind, Director, Washington Department of Fish and Wildlife

Ebey Island Management Plan

Washington Department of FISH & WILDLIFE

June 2023

Table of Contents

Figures

Individuals who need to receive this information in an alternative format, language, or who need reasonable accommodations to participate in WDFW-sponsored public meetings or other activities may contact the Title VI/ ADA Compliance Coordinator by phone at 360-902-2349, TTY (711), or email (Title6@dfw.wa.gov).

List of Acronyms & Abbreviations

ADA	Americans with Disabilities Act
AMEC	AMEC Earth and Environmental Consulting
CSU	Colorado State University
DD1	Diking District 1
DNR	Department of Natural Resources (WA)
DU	Ducks Unlimited
ESA	Endangered Species Act
NOAA	National Oceanic and Atmospheric Administration
NPL	North Puget Lowlands
NRCS	Natural Resources Conservation Service
NWCB	Noxious Weed Control Board (WA)
PEM	Palustrine emergent
PFO	Palustrine forested
PPT	Parts per thousand
PSS	Palustrine scrub-shrub
USFWS	United States Fish and Wildlife Service
WDFW	Washington Department of Fish and Wildlife
WNHP	Washington Natural Heritage Program
YMCA	Young Men's Christian Association

Cover page photo credits
Left: Joe Rocchio
Top Right: Alan Bauer
Bottom Right: Alex Wirkkala

Title page photo credits
Left: Alan Bauer
Top Left and Top Middle: Scott Haydon
Top Right: WDFW

Chapter 1 Ebey Island Management Planning Overview

Introduction

The Washington Department of Fish and Wildlife (WDFW) manages 33 wildlife areas across Washington state, comprising more than one million acres of public property. These wildlife areas help WDFW uphold its mission statement "to preserve, protect and perpetuate fish, wildlife and ecosystems while providing sustainable fish and wildlife recreational and commercial opportunities." This becomes even more important in urban areas with growing human populations, like in western Washington. WDFW manages 3 wildlife areas in the northwest region of the state; Whatcom, Skagit, and Snoqualmie. Altogether, these wildlife areas contain 24 units and over 20,000 acres of property to protect fish and wildlife and their habitats as well as provide public access.

Ebey Island is part of the Snoqualmie Wildlife Area. When the 2018 Snoqualmie Area Wildlife Area Management Plan was created, one of the goals was to develop a Master Plan for Ebey Island that will include habitat restoration and recreational elements. This plan will fulfill that goal.

Statewide Vision

The statewide vision sets the agency expectations for the future state of all Washington Department of Fish and Wildlife's wildlife areas. Wildlife areas inspire and engage the citizens of Washington to care for our rich diversity of fish, wildlife and habitat. Management of these lands:

- Contributes to fish and wildlife conservation;
- Provides opportunities for fishing, hunting, wildlife viewing, and other outdoor recreation; and
- Supports public values of open space health and well-being, economic vitality and community character.

Purpose of the Plan

History of Acquisition

The Ebey Island Unit is part of the Snoqualmie Wildlife Area, and is made up of 1,285 acres of wetlands, managed croplands, and spruce forest. Acquisition of the property began in 1964 when WDFW purchased 420 acres of forested wetland on the eastern portion of the property using WDFW State Wildlife Funds. For nearly fifty years, this was WDFW's only property on Ebey Island. The largest acquisition took place in 2008 when 820 acres of grazed grassland was purchased with state Capital budget and United States Fish and Wildlife Service (USFWS) funds, primarily for wetland restoration. Together, these acquisitions provided a large, contiguous property that became a popular pheasant release site and waterfowl hunting location. The most recent property was purchased in 2017 on the north side of Ebey Island, providing increased public access and parking. Refer to Figure 1 for the entire WDFW ownership footprint.

2011 Feasibility Study

After 820 acres were purchased in 2008 with funds for restoration, a feasibility study was completed to investigate the technical and social feasibility of restoring estuarine functions to WDFW's Ebey Island property. A stakeholder advisory committee was convened and provided initial comments about the concerns, known constraints, and opportunities for beneficial project outcomes. AMEC Earth & Environmental (AMEC) was hired to develop a range of restoration alternatives, which were reviewed and critiqued by the advisory committee. WDFW selected two of the alternatives for more detailed investigation, after which AMEC explored the technical feasibility and the expected benefits of those alternatives to Endangered Species Act-listed Chinook salmon. Other aspects of feasibility such as flood control issues, impacts to existing transportation and utility infrastructure, social acceptability, and rough costs were also evaluated. One alternative was called the Long-Term Alternative because of the expected very long timeline that it would take to implement full restoration on all of WDFW property within the project area. The other alternative, called the Near-Term Alternative,

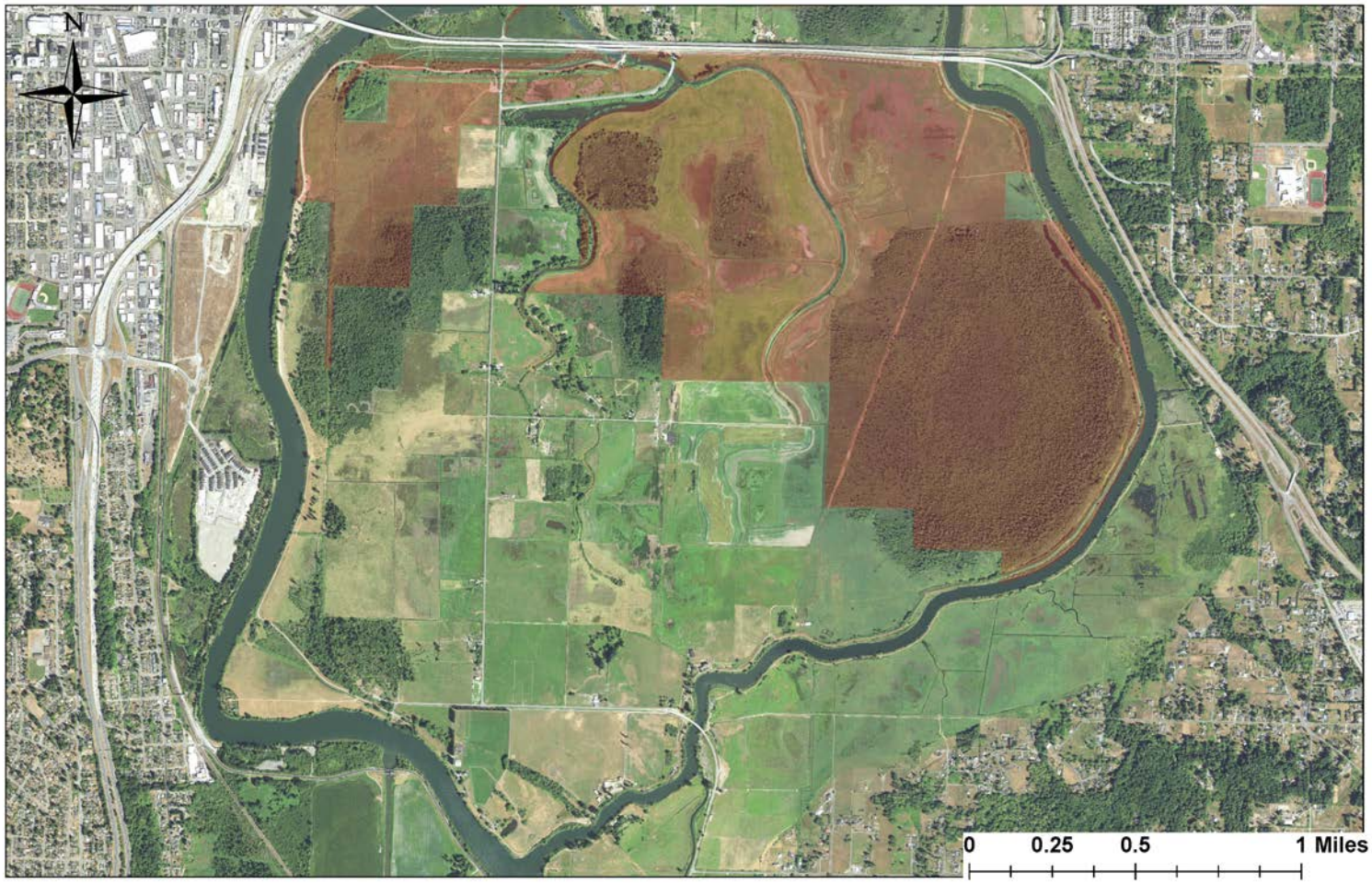


Figure 1- Red shaded area shows WDFW ownership on Ebey Island.

involved a combination of full tidal restoration, partial tidal restoration, and leaving land in its current condition to allow current land uses there to remain possible.

While restoration is technically feasible, the practical feasibility of restoring Chinook salmon habitat on WDFW holdings on Ebey Island was found to be low (Washington Department of Fish and Wildlife 2011). In large part, this was due to opposition from landowners, stakeholders, and Diking District 1 which manages the dike surrounding Ebey Island. Even partial restoration lacked support and did not reduce stakeholders' concerns about the project. Stakeholders and neighboring landowners wished to preserve the land for farming and maintain flood control and drainage functions on the island. Cost was also a major barrier. Construction costs alone for the Long-Term Alternative were estimated to be between $33 and 44 million, while the Short-Term Alternative construction costs were estimated between $16 to 25 million.

Habitat restoration on Ebey Island was put on hold after the feasibility study was released and remains on hold to this day. Management of WDFW property has largely remained unchanged in this time. While the present feasibility of meeting the Long-Term goal of restoring fish habitat on Ebey Island is low, Ebey Island can help to fulfill other aspects of WDFW's mission.

In 2020, WDFW received funding from both the Estuary and Salmon Restoration Program's Restoration and Protection grant and the National Oceanic and Atmospheric Administration's Community-Based Restoration Program grant to create a 10-year management plan for Ebey Island. The purpose of this plan is to describe the management practices necessary to improve habitat and recreation on the site in the near term while making progress toward the long term restoration goal. Management actions have been laid out by unit area (west, middle, and east lobes), and a broad range of recreational activities and habitat

features have been explored for each area depending on site conditions. Suggested management actions will be implemented through 2034, at which time the feasibility of tidal restoration will once again be examined.

Planning Partners

In late summer 2017, the state of Washington Natural Heritage Program (WNHP) through Washington Department of Natural Resources (DNR) completed a preliminary assessment of a forested wetland on Ebey Island which they named the Ebey Island Bog. Topographic and Lidar data showed the site to be domed (Rocchio 2019). This raised questions about how to characterize the site, its condition, and whether it could be restored. In 2019 WDFW contracted with WNHP and colleagues at Colorado State University to conduct a more in-depth assessment of the Ebey Island Bog and answer the above questions as part of the Ebey Island Management Plan.

Ducks Unlimited (DU) was hired in 2021 to support the development of conservation considerations and conceptual plans for the Ebey Island Unit integrating adjacent land use as practicable as part of the overall Ebey Island Management Plan. DU supported WDFW outreach efforts to stakeholders, holding meetings with landowners, diking district commissioners, and agricultural producers. The conceptual plans considered a combination of habitat, recreation, and agricultural goals on WDFW's Ebey Island Unit while considering adjacent land uses on 3,460 acres of surrounding properties on the island. Their findings were used by WDFW staff to draft management suggestions in Chapter 3 of this plan.

Public Outreach and Stakeholder Involvement Process

WDFW hired Triangle Consulting (Triangle) in April 2020 to facilitate the public outreach process that would help shape the Ebey Island Management Plan. Along with reaching out to all interested stakeholders and the broader public, Triangle also conducted one-on-one interviews with a small group of people who hold a considerable interest in what happens on Ebey Island. Triangle staff reached out to seven individuals identified by WDFW including neighboring landowners on Ebey Island, Diking District Commissioners, waterfowl hunters, conservation professionals, and agricultural producers (See Appendix I for the handout sent to stakeholders). Figure 2 shows a list of the questions asked during the interviews.

These interviews helped to shape the stakeholder workshop that took place on October 20th, 2022 (see Appendix II for a summary of responses). This listening session provided a space for back-and-forth conversation about what

Interview Question Guide

Introduction

1. Tell us about yourself and your role at the organization you represent?
2. How long have you been working in this role?
3. What is your connection to/ history with Ebey Island?
4. What perspective do you think that you can bring to this project?

Overall Goals and Objectives

1. What's your familiarity with the current and potential uses at Ebey Island? Would you like me to summarize the WDFW's work so far for you?
2. (If not covered in introduction) What is your interest in participating in the Ebey stakeholder process? How do you see your interests fitting in with others at the site?
3. If the Ebey process is successful, how will you know it? What would you look for?
4. (If not covered in introduction) Have you been involved in previous discussions/work related to Ebey Island? What was going well and what was not working?
5. What do you need in the way of information, communication, scheduling, other to participate effectively?
6. What concerns do you have regarding potential habitat restoration at Ebey Island?
7. Are there any current features of Ebey Island that you would like to see preserved? Or are there any current features of the space that you would like removed?

Process and Communications

1. Do you have a preference for a virtual or in-person stakeholder meeting? Who else should be invited?
2. What is your expectation for the role of the Facilitator, and WDFW staff?
3. Who else do you think I should speak to?
4. What else do you think the Facilitator needs to know to help the engagement process be successful?

Figure 2- Interview questions asked when interviewing several people prior to the workshop.

invited participants would like to see happen at Ebey Island. 25-30 invited guests participated in the Ebey Island workshop, which was facilitated by Triangle and began with presentations from WDFW and DU staff. Participants included Tulalip tribal members and employees, Ebey Island residents, hunters, bird watchers, paddlers, members of the Sustainable Lands Strategy, and conservation professionals. Participants were split into three listening groups: recreation and access, habitat and water management, and miscellaneous. Following the in-person workshop Triangle facilitated one more stakeholder meeting that was held virtually on November 16 and was open to the public. (See Appendix III for a breakdown of comments received during the workshop at each listening group and the public meeting.)

WDFW managers and staff alsoalso met with representatives of the Tulalip Tribes to understand their priorities for the estuary. They offered suggestions for increasing habitat availability and recommended against installing any permanent infrastructure that requires maintenance and invites further development. They also suggested creating an acquisition and funding strategy for when properties become available on Ebey Island.

Chapter 2 Current Wildlife Area Unit Description

Summary of the Wildlife Area Unit and Vicinity

The Ebey Island Unit is located south of the Highway 2 trestle and east of I-5 between the Snohomish River and Ebey Slough in the Snohomish River estuary. It is connected to the city of Everett via a paved trail meant for foot traffic that runs alongside the Highway 2 trestle. The 1,285-acre unit consists of approximately 420 acres of forested wetland and 820 acres of grassland and agricultural crops. The forested portion of the unit is one of the few remaining conifer-dominated wetlands in the Snohomish River estuary (more about this area under Current Conditions). The unit contains a mix of native coniferous and deciduous trees – including Sitka spruce, shrubs, wetland vegetation, and a mix of agricultural lands and fallow grasslands. Deadwater Slough, which spans the unit's length, divides the unit. A network of ponds, drainage ditches, and sand boils are present throughout the unit. A perimeter dike keeps tidal and river water out of Ebey Island and is managed independently of the Unit by the Diking District.

A Diking District is a Special Purpose District that is established to protect communities from flooding. Snohomish County Dike Improvement District No. 1 (DD1) provides maintenance of a flood-control diking system that surrounds the entirety of Ebey Island (both north and south of the Highway 2 trestle). DD1 is governed by an elected three-member Board of Commissioners, and manages all aspects of dike maintenance and repair, as well as drainage infrastructure on the island. Any habitat or recreation projects that require the use of or changes to the dike or drainage infrastructure require partnership with the Dike District.

Snohomish River Delta

The Snohomish basin is the second largest watershed in Puget Sound (1,856 square miles), consisting of the Snohomish, Skykomish, and Snoqualmie rivers and their tributaries. It is one of the primary salmon-producing river basins in the Puget Sound, and was designated as one of seven Resilient Lands and Waters in the nation by the federal government in 2015.

Tidal marsh in the lower Snohomish River provides important rearing habitat for Chinook salmon and other species. However, 90 percent of these historic habitats in the estuary were lost due to diking near the turn of the 20th century. This loss of rearing habitat is considered one of the primary factors limiting recovery of Chinook salmon, which are listed as threatened under the Endangered Species Act. The Snohomish Basin Salmon Recovery Forum has identified the restoration of tidally influenced habitat in the Snohomish River estuary as a priority for Chinook salmon recovery in the basin (Snohomish Basin Salmon Recovery Forum 2005).

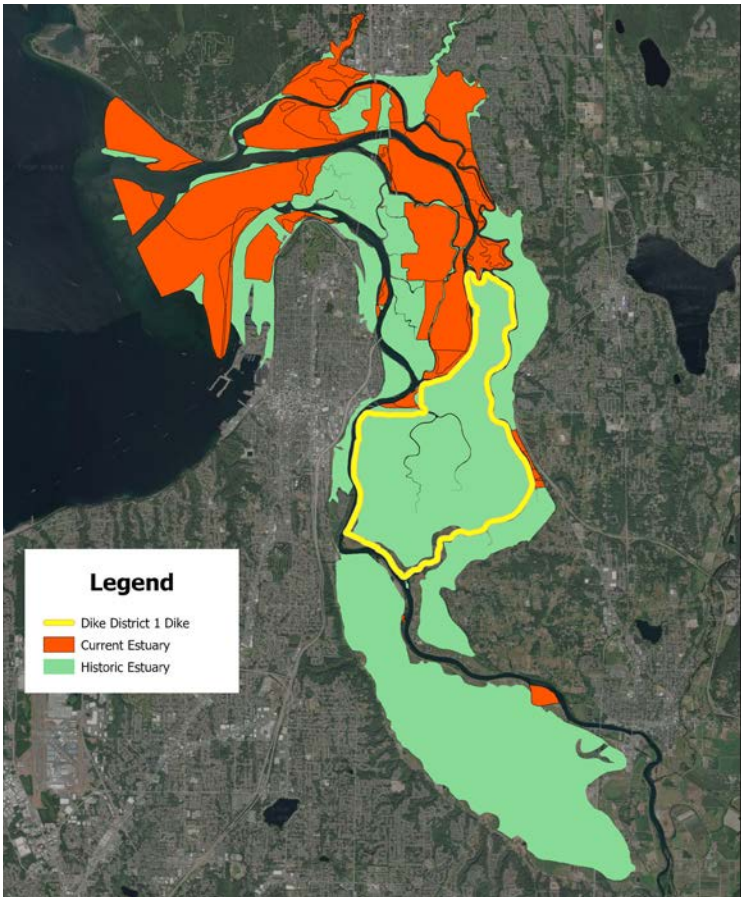


Figure 3- Current estuary in orange and historic estuary in green.

Ebey Island was historically categorized as freshwater tidal wetland, and waters around the project area have low salinity levels (between 0.5 and 5 parts per thousand [ppt]). This salinity level is extremely important for juvenile Chinook salmon, who spend time in low-salinity water as they adjust to the introduction of salt in their environment. Unfortunately, approximately 98% of this type of habitat has been lost in Puget Sound due to estuarine diking and filling, and past restoration has focused in much lower areas of the estuary. Restoring habitat in these low-salinity locations is particularly important for Chinook recovery. The diversity of salinity conditions within river deltas has been linked to increased marine survival rates. Therefore, it is important to provide more transitional salinity habitats within the estuary. If restored to tidal marsh, Ebey Island would provide much needed habitat in this transitional zone for Chinook salmon and other species.

All large estuary restoration projects that have been completed in the Snohomish River basin to date have been located on the sloughs rather than the mainstem of the river and more than 98% of all Chinook rearing habitat in the system lies in the lower estuary (refer to figure 3). In contrast, the mainstem Snohomish River contains only 4% of total habitat area in the system. Recent research has shown that targeting habitat restoration in the mainstem Snohomish River, specifically near Ebey Island, is an important next step in Chinook salmon recovery (Chamberlin 2022). Ebey Island is located at the intersection of the mainstem Snohomish River and the sloughs, including Ebey Slough, Union Slough, and Steamboat Slough and has been highlighted as a prime location for future tidal restoration.

Current Conditions

Wetlands

Ebey Island contains the largest remnant forested wetland in the Snohomish River estuary. In the middle of the 19th century, almost 20,000 acres of wetland existed in the estuary. By the end of the 20th century, only about 9% of the original freshwater wetlands remained. Ebey Island itself remained largely wetland habitat until it was diked sometime around the turn of the century, when county commissioners created Diking District 1 and contracted for the dike to be built around the perimeter of the island (Driscoll 1979). It is assumed that the freshwater wetlands that remain on Ebey Island currently exist because the area was sufficiently low that it did not drain, and thus was not cleared for agricultural purposes.

In 2019, WDFW contracted with WNHP and Colorado State University to conduct more in-depth research on site and determine whether the forested wetland on the eastern portion of Ebey Island is a large raised bog.The research team investigated the soils, hydrology, and vegetation of the wetland to clarify the site characteristics, including how it functions and

Figure 4 (top)- Sedge leaf sheaths from a soil core taken in the fen, likely hundreds to thousands of years old.
Figure 5 (bottom)- Vegetation in the center of the fen.
Photos courtesy of Joe Rocchio, DNR.

its potential for restoration. Hydrological and water chemistry measures indicated that the Ebey Island wetland is a peatland, but not a bog. The vegetation, hydrology, and water chemistry of the site all indicate it is instead a raised fen, likely supported by artesian groundwater from a confined regional aquifer.

Core samples taken from inside the fen led the team to hypothesize that the dome was derived from a vented sediment deposit, also known as a sand volcano. Vented sediment deposits produce circular domed features which are created by pressurized fluid or gasses escaping to the surface. These are formed by various phenomena including tsunami waves over confined aquifers (Bourgeois and Johnson 2001, Martin and Bourgeois 2012, Spiske 2020), rapid sediment deposition in estuaries (Roberts and Carney 1997), and pressure fluctuations in confined aquifers that create artesian springs (Holzer and Clark 1993). It is plausible that a large tsunami, or period of extreme sediment deposition and/or groundwater recharge, generated sufficient pressure fluctuations in the confined aquifer beneath the estuary to produce a vented sediment deposit of such unusual scale. The structure would have had to form and collapse several millennia ago to allow the development of peat bodies 3 to 8 m thick in the depression. Raised estuarine peatlands of this scale are uncommon within the region, and the site supports the largest remaining freshwater forested wetland within the Snohomish estuary. Any management actions considered on Ebey Island will be reviewed by the fen research team to make sure this rare feature is not negatively impacted by the actions proposed.

While the vegetation within the Ebey Island fen is comprised mostly of typical wetland shrubs including hardhack (*Spiraea douglasii*), salal (*Gaultheria shallon*), and sweetgale (*Myrica gale*), and trees such as western hemlock (*Tsuga heterophylla*), western red cedar (*Thuja plicata*), and shore pine (*Pinus contorta*), the area outside the fen is dominated by reed canary grass (*Phalaris arundinacea*). Reed canary grass is a non-native noxious weed in Washington state. It outcompetes native vegetation by creating large mats or stands of a single species. These monotypic mats of reed canary grass provide poor habitat for fish and wildlife species, and can cause drainage issues. Agricultural practices on site help reduce the spread of reed canary grass and widescale mowing may control its growth. These management actions will be considered further in Chapter 3.

Public Access

Public access barriers limit recreation opportunities on Ebey Island. Deadwater Slough, which spans the unit's length, divides the unit and makes approximately 300 acres of the middle lobe inaccessible without a boat. Visitors with a boat can cross the slough to access the middle lobe, and handheld boat launches to be constructed in 2023 will make boating across easier (refer to figure 6). However, visitors on foot will remain unable to access that portion of the unit.

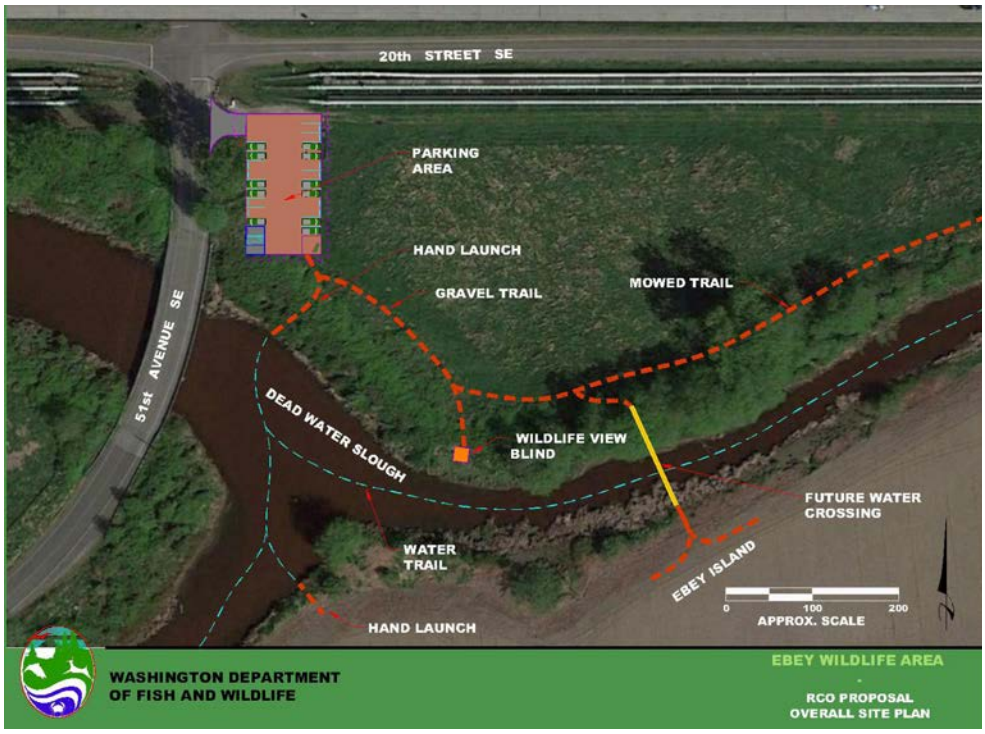


Figure 6- Drawings of upcoming WDFW access project on Ebey Island.

Until 2017, a lack of parking for the site was also a barrier. One parking lot is located on the west side of the property to access the western lobe of Ebey Island, near the intersection of Home Acres Road and 43rd Street SE. This parking lot is typically only open during waterfowl hunting season and closed for the remainder of year due to ongoing vandalization and illegal dumping problems. A second parking lot used to be located under the Highway 2 trestle on the east side of the property to access the eastern lobe. That parking lot has since been closed, again due to vandalization and illegal dumping. A third parking lot was acquired in 2017 on property off Home Acres Road. This parking lot is now the main access point for visitors to the middle and eastern portions of the property and is open year-round. The lot will be improved in summer 2023, adding gravel surfacing, better signage, access into the slough, and making it more ADA compliant.

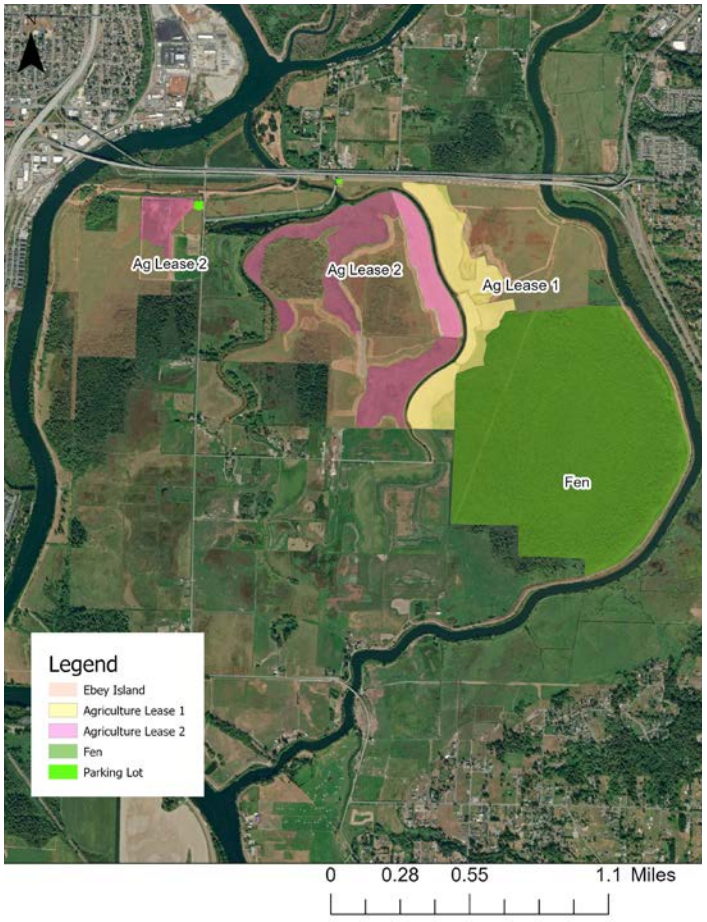


Figure 7- Map showing locations of parking lots, agricultural easements, and the fen on Ebey Island.

Recreation

Ebey Island is one of WDFW's two pheasant release sites in Snohomish County. The purpose of the pheasant program in western Washington is to provide upland bird hunting opportunity. This program encourages participation from new and seasoned hunters. Naturally sustained pheasant populations are limited in western Washington due to the cool wet climate and the lack of grain farming. Each year 35,000 to 40,000 pheasants are released on approximately 25 release sites. On Ebey Island they are released on both the west and east lobes of the unit. Pheasant hunters make up a large portion of recreational visitors that regularly use Ebey Island each year from late September through November 30th.

Waterfowl hunting is the other popular recreational activity on Ebey Island. Crops are grown on each lobe of Ebey Island with some left as forage after harvest to attract waterfowl. The large mats of reed canary grass, however, decrease the habitat opportunities for these birds and limits hunting access and success. Site conditions also limit hunting. Currently, there is no ADA accessibility on site, and uneven ground, the extensive ditch network, and the lack of connectivity to the middle lobe makes access difficult for all hunters.

Other recreational uses on Ebey Island include photography, non-motorized boating, and birding. Bird watching has seen a slight increase in the last couple of years on the unit but remains low compared to other nearby properties. There are many reasons for reduced non-consumptive recreation, including lack of access during non-hunting seasons, a lack of maintained trails or paths, and a general feeling of being unsafe on site when surrounded by nefarious activities such as dumping, vandalization, and drug use.

Agriculture

Agriculture is an integral part of the management practices on WDFW lands and provides multiple benefits for wildlife, habitat, and the local economy. It is an effective way to enhance forage and cover for wildlife, and provide weed control.

Department staff negotiate leases, develop farm plans in collaboration with lessees, and oversee farming

activities on leased sites to ensure outcomes are consistent with management objectives. These leases are designed to meet the needs of the agency, wildlife, farmer, and community.

Department staff work with the lessees to determine which crops are best for each agricultural lease. In certain areas, specific wildlife goals may be included in the decision, such as increased food and cover for birds, increased diversity on the landscape, or improved forage for deer.

Farming also provides economic benefits to local communities, and state revenue generated by agriculture contributes to the stewardship of WDFW wildlife areas. It also covers costs related to habitat protection and restoration, weed control, and maintenance for roads, trails, campsites, toilets, and signs.

When WDFW purchased the Ebey Island parcels in 2008 the land was used for cattle grazing. Grazing was phased out over the following few years and is no longer allowed on the unit per requirements of USFWS. Currently WDFW manages two agricultural leases on Ebey Island, both of which are farmed by the same farmer, totaling approximately 240 acres and lasting three years at a time. Lease 1 is located on the eastern lobe and is approximately 90 acres. Lease two has two parcels, one located on the middle lobe that is 130 acres and one located on the western lobe that is 10-20 acres (refer to figure 7 for approximate locations). The middle lobe has organic crop requirements. Each year the footprint of each crop area depends on the moisture level of the unit, and tilling can only occur in places where the ground is firm enough for farm equipment to travel. As such, the crop footprint can shrink and expand each year depending on the location. The middle lobe stays relatively stable at 130 acres, the eastern lobe fluctuates by approximately 20 acres, and the western lobe fluctuates by 10 acres.

These agricultural leases are vitally important to the management success of Ebey Island until tidal restoration of the unit is achieved. Such a vast amount of property can be difficult to maintain, especially following the ground disturbance of grazing activity for a number of years. WDFW depends on the planted crops (and crop cover during winter) to reduce the growth of noxious weeds like reed canary grass. Crops grown have included corn, barley, wheat, green beans, canola, and grass for hay as well as standing grass as a cover crop. Lessees are required to leave at least 10% of the leased cropland as wildlife habitat.

Figure 8- corn left standing on Ebey Island for wildlife forage. Photo courtesy of Alan Bauer.

Waterfowl and Migratory Birds

Ebey Island is in the North Puget Lowlands (NPL) planning ecoregion for waterfowl and shorebird management. It is the most important waterfowl region in western Washington. It includes the estuaries, shorelines, and the river valleys of four rivers, the Nooksack, Skagit, Stillaguamish, and Snohomish. This area contributes to approximately 45% of the wintering waterfowl objective for coastal Washington.

The NPL ecoregion supports over 388,000 wintering dabbling ducks, and nearly 50,000 diving ducks, including several high-priority waterfowl species. Wintering mallards typically exceed 225,000 birds. Over half a million ducks winter in the North Puget Lowlands Ecoregion with mallard, northern pintail, and American wigeon accounting for 67% of these birds. Nearly a third of the continental pintail population is now recorded in Alaska, and many of these Alaskan pintails rely on wetland habitats in the project area during migration. Three percent (3%) of the continental American wigeon

population winter here. 13,000 Pacific brant and 74,000 Wrangel Island snow geese benefit from protected tidelands and adjacent freshwater wetlands. Resident mallard, cinnamon teal, gadwall, blue-winged teal, wood ducks, and hooded mergansers will have access to improved breeding habitats.

Water

During some of their field surveys of drainage ditches and wetlands on Ebey Island, Ducks Unlimited (DU) staff observed that there are features called boils scattered around the Wildlife Area Unit and other property on the island. Boils, often called "sand boils", are caused when rising water levels on one side of a dike or levee create erosion inside, forcing sand within the dike outward. These boils are the result of a pressure difference on the outside of a dike versus the inside, creating upwellings ranging from small in size to quite large. In discussion with long-time Ebey Island landowners, DU staff learned that occasionally a cow falls into one of these boils and dies after becoming trapped. Farming equipment has also been lost on occasion.

These boils are believed to exist on the western lobe, the middle lobe, and particularly near the fen on the eastern lobe. However, exact locations of the boils are currently unknown on the wildlife area unit. A survey is recommended for visitor safety along with signs warning about the existence and danger of boils.

Along with the dike system, Diking District 1 also manages the drainage system, including ditches, tide gates, and a pump station. An intricate drainage ditch network was built throughout Ebey Island to make the land drier and easier to farm. Drainage on WDFW's property is primarily gravity-fed, and moves from the drainage ditches out to Deadwater Slough then through tidegates or the pumpstation to the mainstem of the Snohomish River. The pumpstation does not run year-round, but typically winter through spring in preparation for planting season.

In 2019, the Snohomish Conservation District released the Agricultural Resilience Plan where they looked at various reaches of agricultural communities in Snohomish County to determine their greatest future needs. One of the focus reaches was Diking District 1 and Ebey Island. Monitoring found that the biggest threat to agriculture on Ebey Island is rising ground water levels (Snohomish Conservation District 2019). Ground water on Ebey Island is directly tied to both Puget Sound and river flow, and with climate-impacted sea level rise it is expected to increase the water table level. The plan predicts that planting season will be pushed back as much as four weeks into the spring by 2050 due to wet conditions on site, even with a functional drainage system, tide gates, and pump station. To further exacerbate this problem, many of the existing ditches are clogged with mats of reed canary grass and are not functioning as efficiently or effectively as they should. Many if not all of the tide gates on Ebey Island are in disrepair. The existing pump infrastructure is old and is frequently being repaired or rebuilt. For improved control of water levels, the pumps should be replaced, however these pumps are not on WDFW-managed property and therefore outside of the Department's jurisdiction.

Figure 9- Frozen sand boil in a farm field in the Skagit Valley. Photo courtesy of John Wolden.

Chapter 3 Recommended Management Actions

Ebey Island Fen

The fen on Ebey Island has a series of drainage ditches running through and alongside it that are impacting the fen's health. Nearby tile drains and the dike surrounding the island are also having an effect. To what extent the fen is being impacted can not entirely be known without further research. Removing or blocking the ditches within the fen would probably be the most impactful first step towards restoring its hydrology. Removing active drains may allow the fen to remain saturated to the soil surface throughout the year. Ditches and tile drains adjacent to the fen probably have less impact and are of lower priority.

The fen research team suggests that the Ebey Island forested wetland merits consideration for a special conservation designation, such as a Natural Area Preserve or other designation recognizing its unusual hydrologic regime, ecosystem type, and landform. The site is the largest remnant of freshwater forested wetlands within the estuary and provides critical ecosystem services. The scale of the raised peatland is unique within the region. If their hypothesis that the site hosts a deep sediment vent allowing hydraulic connection to the regional aquifer is correct, the site constitutes a unique geologic feature.

The Statewide System of Natural Areas protect the best remaining examples of the state's ecosystems and significant populations of rare species (Washington Department of Natural Resources, 2022). DNR's Natural Heritage Program identifies and nominates new sites to be included in this natural area network based on their biodiversity features they support and the ecological integrity of the site. The natural areas network represents a legacy for future generations to appreciate and study Washington's natural heritage. If WDFW designates the Ebey Island fen as a Natural Area Preserve, it will be the second state managed natural area within Snohomish County.

Recommended Actions

Block all unmaintained drainage ditches alongside and within the fen.

Protect the fen with a Natural Area Preserve designation.

Managed Wetlands and Agriculture

Woody Wetlands

DU recommends preservation and careful expansion of woody wetlands into reed canary grass dominated areas. There are several stands of Palustrine Forested (PFO) and Scrub-shrub (PSS) wetlands not part of the fen, scattered throughout the Unit. These have not historically been farmed or otherwise utilized, which implies they were too difficult to drain and farm. These woody wetlands may be associated with boils. PSS and PFO wetlands provide wildlife habitat, biologic, and structural diversity. Recommended management goals should include maximizing edge habitat, enhancing structural and plant biodiversity, and controlling invasive vegetation.

Emergent Wetlands

DU recommends managing emergent wetlands throughout the site. Palustrine wetlands are regionally and nationally decreasing wetland types, in Western Washington the loss is greater than 90%. What remains is often imperiled by invasive reed canary grass which inhibits natural plant succession.

Succession refers to the changes in vegetation over time driven by disturbances and the maturation of plant species. Productive wetlands are typically dynamic, meaning that they change with seasonal and annual

Figure 10- Mats of reed canary grass and Himalayan blackberry on Ebey Island.

precipitation, flooding events, drought, and other natural disturbances. Wetlands that experience stable conditions over multiple years tend to become less productive and support fewer numbers of wildlife and plant biodiversity.

Palustrine Emergent (PEM) wetlands on the unit are highly degraded. Most of the non-farmed emergent wetland habitat is overrun with stable, invasive rank (tall) reed canary grass, which is a major threat to natural wetlands. It out-competes most native species as it forms large, single-species stands which have little wildlife habitat value. Its invasion can also cause siltation in irrigation ditches. (Washington State Noxious Weed Control Board 1995). Without intervention, reed canary grass dominance will persist for a long time.

Rank reed canary grass is poor habitat for waterfowl and most other wildlife even when seasonally flooded. WDFW manages its wildlife areas for the purpose of fish and wildlife habitat and recreational opportunities, and the presence of reed canary grass reduces both significantly. Management activities that control reed canary grass and mimic natural disturbance processes can increase and maintain wetland productivity to support wildlife.

The goal of active PEM wetland management is to periodically reset plant succession. Non-native plant communities can fulfill similar wetland functions. DU recommends that WDFW should prioritize wetlands dominated by early successional native plants or low-stature non-native plant communities (e.g., pasture, or cropland) or, at the very least, keep reed canary grass low to allow some native plants to survive and provide wildlife access to the wetland. Managers have three primary maintenance tools to manage wetland vegetation: mowing, water control, and agriculture.

Mowing

Mowing as much reed canary grass as possible is the single best enhancement technique on the unit. This is evident from the mowing on the Olympic Pipeline easement. The easement is mowed by the pipeline twice a year. In the easement native vegetation is visible, open water habitats are accessible, and mowed canary grass does not inhibit wildlife use as much as tall reed canary grass.

According to the Natural Resources Conservation Service (NRCS), reed canary grass should be mowed in late spring once the plant has new growth but before it goes to seed. Management at this time will reduce or eliminate spread by seed and will take the growth back at a time when the rhizome carbohydrate reserves are already depleted after putting energy into new growth following winter dormancy.

Future funding will need to be acquired as mowing needs develop or increase on site. Funding will

Figure 11- Mowing on the Olympic pipeline easement has reduced the growth of invasive vegetation and allowed native vegetation to take its place.

accommodate more staff and/or specialized machinery to make the task more feasible. In particular, a Marsh Master amphibious vehicle would increase the feasibility of large-scale mowing practices in wet conditions.

Water Control Structures

Water control facilitates wetland vegetation management. Managers need wetlands to be temporarily drained to mow, farm, or establish native plants. Following these management efforts, drainage can be blocked to hold water. Water control allows managers to create moisture conditions suitable for native plants or agriculture. When properly designed it can create seasonal ponding and mimics some of the disturbance needed for plant succession.

Each species of plant and wildlife adapted for living in wetlands responds differently to changes in water levels. With the aid of a water control structure, water levels in a managed wetland can be manipulated efficiently to promote specific conditions beneficial for specific habitats.

For the unit, DU proposes managing drainage using flashboard risers (refer to figure 12). In partnership with the Dike District, the structure would be placed in a lateral ditch or swale controlled by WDFW. This will allow managers to control water levels in the field seasonally impounding water without impacting neighbors. There are two suitable locations for low effort water control projects on the unit (refer to figure 13). One is located on the eastern lobe between highway 2 and the fen that is currently too wet to farm. The other is located in the middle lobe.

Agriculture

Agriculture functions as Palustrine Emergent habitat. Disturbance associated with farming maintains many beneficial wetland and habitat functions.
Migratory waterfowl and many other species rely specifically on emergent wetland habitat. During wintering periods, they predominately eat tubers, floating seeds, and biofilm. By late winter/early spring, waterfowl diets will transition towards higher protein sources, such as invertebrates. Early successional emergent wetlands tend to have more seed production and other foods for waterfowl and afford access to those food sources. Farms fulfill most of these same functions and are an economical way to achieve habitat outcomes.

Currently, less than 20% of the property is farmed. Improved drainage may increase the area available for agriculture. Wildlife-focused agriculture that mimics wetland processes should be incorporated into the unit. These practices are often referred to as moist-soil management.

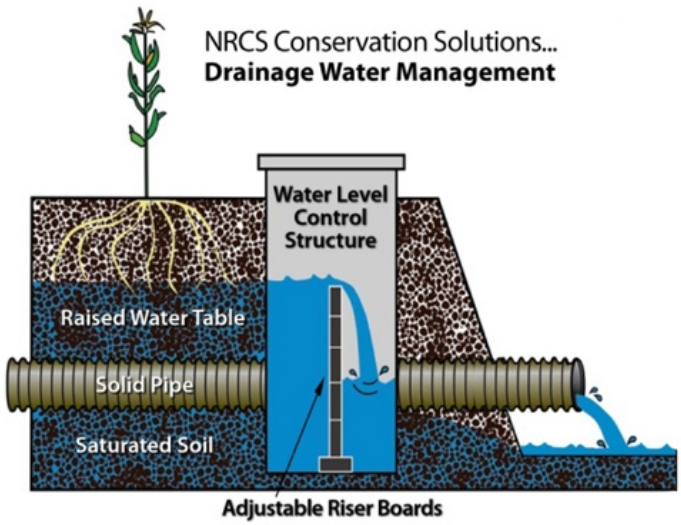


Figure 12- Diagram indicating how flashboard risers work to control water levels on site. Courtesy of NRCS.

Figure 13- Potential locations of water control structures and swales on Ebey.

Moist-soil management involves managing early successional, herbaceous vegetation that typically requires full sunlight to maximize growth and seed production. Thus, moist-soil management should be focused in areas with little or no woody vegetation and some amount of water control.

Moist-soil management is a blend of agriculture and wetland management. It is site specific and can use both native and non-native wetland plants and agricultural crops. Areas most suited for this practice are within an existing agricultural footprint or adjacent areas.

Recommended Actions

Mow reed canary grass.

Manage emergent wetlands and grasslands.

- Coordinate management with neighboring farms and duck clubs.
- Manage water in fields with new water control infrastructure and field sculpting.
- Coordinated pumping with dike district.
- Manage blackberry, reed canary grass, and undesirable trees in fields with periodic mowing, and prudent herbicide application.

Maintain agricultural leases as an important tool to maintain wetland functions.

Maintain Deadwater Slough and exiting drainage features.

Work closely with diking district on drainage infrastructure and dikes.

Education and Recreational Trails

In 2008, WDFW added 820 acres of property to the Ebey Island Unit for the purposes of habitat restoration and public education, with an intention to construct interpretive trails throughout the site. WDFW purchased the property from the YMCA, who at the time of acquisition expressed interest in conducting environmental education programs on the site as restoration moved forward. They have several centers within 5 miles of the site and public support to initiate a "no child left indoors" program in cooperation with WDFW. WDFW also hoped to develop interpretive trails and non-consumptive recreation opportunities with Snohomish County.

Shortly after acquisition was completed, WDFW moved into the feasibility study focusing on large-scale tidal restoration, and educational opportunities including interpretive trails fell in priority for site management. To date, there are no interpretive signs on the site, and low use of the unit for non-consumptive activities is directly attributable to the absence of a trail network.

One way to increase recreational access on Ebey Island is to build trails, avoiding active agriculture, hunting (if possible), and sand boils. Locations being considered for trails can be seen in figure 15. The trails proposed in the western lobe of the unit can easily be accessed from the parking lot near the intersection of Home Acres Road and 43rd Street SE. This would be a suitable location for one or two interpretive or educational trails, and

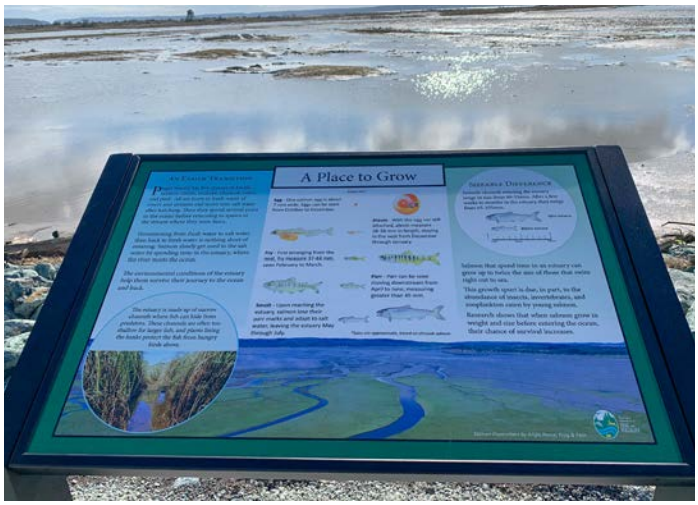


Figure 14- Example of a WDFW interpretive sign.

WDFW could partner with the YMCA or local public schools to get kids involved in learning about wetlands and restoration. Likewise, a trail could be created off the main parking lot to access the new handheld boat launch on Deadwater Slough, and the general area south of the Highway 2 trestle and north of the slough.

A third trail system could potentially be placed on the middle lobe, however there is no existing foot access. If walk-in access to the middle lobe is pursued, WDFW should consider including a temporary bridge structure across Deadwater Slough. If walk-in access is not considered, WDFW should put additional handheld boat launches in other areas along the slough for increased boating access.

Any trails or trail structures (i.e. bridges, boat launches, etc.) created on the unit would be designed to be temporary until tidal restoration becomes feasible. There would be limited to no paving. Other less permanent options for creating an ADA-compliant trail will be considered including, but not limited to, wood chips, gravel, or hog fuel.

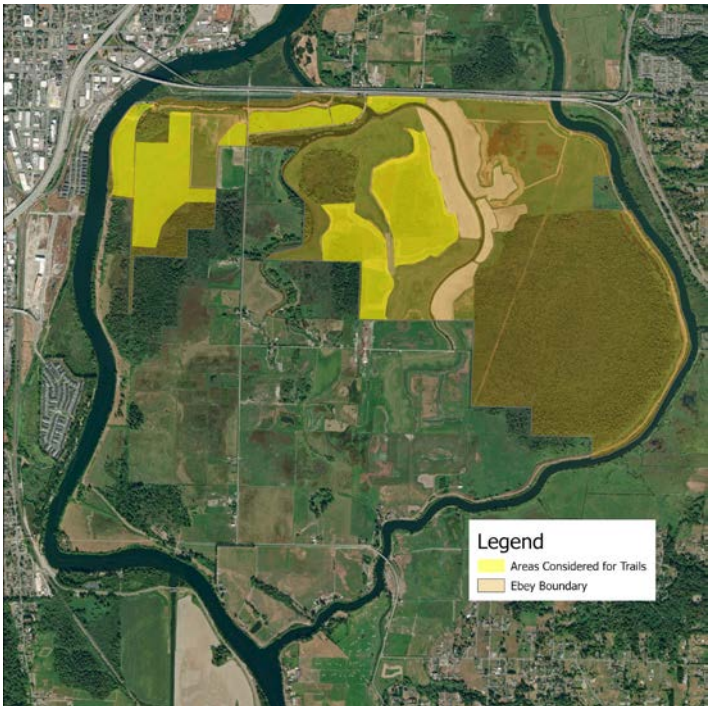


Figure 15- Areas highlighted in yellow will be considered for trail creation and expansion.

Signs

During the in-person listening session workshop and the virtual public meeting for the Ebey Island Management Plan, WDFW heard multiple comments about the need for more signs on the unit. Signs should focus on what activities, including hunting and other activities, are allowed on different areas of the unit at various times of the year. Signs should be posted at each parking area with maps directing where activities are allowed.

Signs should also remind visitors to be cognizant of neighbors and public property, including the dike, especially near the borders of the unit. Maps at each parking area will also help to delineate WDFW's property boundary. To enhance public safety, WDFW will also post signs warning visitors about sand boils on site.

Finally, WDFW could collaborate with the YMCA and multiple local school districts to develop educational signage. Interpretive signs could be put in multiple locations throughout the unit, describing the ecological importance of the Ebey Island fen, freshwater wetlands, estuaries, and the migratory Pacific Flyway. If pursued, WDFW's Communication and Public Engagement Team will be brought into the conversation to develop an educational strategy and interpretive sign production.

Figure 16- Current sign board in Ebey's main parking lot.

Recommended Actions

Mowed, graveled, or lightly maintained walking trails leading from each parking area to a feature of interest, i.e. wetland or birding location.

Trails focused on non-consumptive recreation should be kept away from active agriculture, hunting, and sand boils.

Interpretive signs will be placed along the trails discussing ecological features.

Signs highlighting allowable activities and locations of activities will be at each parking lot.

WDFW boundaries and the dangers of sand boils will be emphasized by signs.

Hunting

Hunting is the most popular activity on Ebey Island. By potentially increasing the agricultural footprint, the amount of seasonally ponded water, and the habitat complexity with native plants on the site, bird habitat will only improve thereby increasing waterfowl hunting opportunities. Rather than focus on extending the footprint of available hunting access on Ebey Island, WDFW should focus on increasing accessibility for public access along with improving bird habitat on site.

WDFW encourages everyone to experience recreation in Washington's wonderful outdoors. As such, it is recommended that Ebey Island management staff work with WDFW's ADA Advisory Committee to determine how to meet ADA compliance for some locations on the Ebey Island unit. Changes may include installing an ADA designated hunting and wildlife viewing blind, improving trail conditions for people with disabilities, and paving the parking lots (one of which is already underway).

Hunting opportunities already exist on all three lobes of Ebey Island, and that is expected to continue. Walk-in access will increase if a temporary foot bridge is put across Deadwater Slough, and for boaters when launches are installed. To further increase access, the potential for an additional parking lot has been identified by Ducks Unlimited research on the western lobe, located off the pump station access road (figure -). Permission for additional parking in this location would need to be approved by the Diking District.

If the Ebey unit becomes a more popular place for birding, WDFW will consider designating certain areas and trails for birding or hunting only. Birding-only trails will be located near roadways and other infrastructure in the "safety" zone where shooting is not allowed. This should help reduce conflict between the two activities.

Recommended Actions

Improve trail and blind access for ADA compliance.

Improve waterfowl habitat by:

- increasing the agricultural footprint;
- building seasonal ponds;
- managing reed canarygrass.

Improve overall site accessibility.

Reduce hunter/birder conflict.

Other Recreational Uses

The Ebey Island unit is large and can accommodate other uses in addition to education, birding, and hunting. WDFW will consider other recreational uses that align with the mission of the agency and welcomes recommendations from the public.

Chapter 4
Future Steps and Considerations

Goals, Recommended Actions, and Next Steps

This plan sets management priorities for the Ebey Island Wildlife Area Unit for the next 10 years. Regional and headquarters staff members, with input from the Snoqualmie Wildlife Area Advisory Committee and the public, collaboratively developed the goals, recommended actions, and next steps in this plan (Refer to Table 1).

Monitoring and Adaptive Management

Ebey Island unit goals and actions will be evaluated and updated annually with input from the wildlife area advisory committee and regional district team. The update will report progress on goals and identify any new actions to meet plan goals. Every two years, wildlife area staff will prepare a summary of management highlights and new issues published on the agency website. Further, over the term of the plan (10 years), the Ebey Planning Team will evaluate necessary funding required to successfully implement the plan and will identify and pursue appropriate funding sources.

Current Progress

While WDFW is still in the planning process on most of the goals and actions recommended in this management plan, some progress has been made to secure funding and improve access:

- In Summer 2023, the main parking lot is scheduled to be graveled, a trail from the parking area to Deadwater Slough will be mowed, two handheld boat launches will be created (one on each side of Deadwater Slough near the parking area) to improve access to the middle lobe and create a water trail, and a wildlife view blind will be installed.
- WDFW has received funding from NOAA's Transformational Habitat Restoration and Coastal Resilience 2023 – 2026 grant that can cover outreach related to the Ebey Island fen and some interpretive signs.
- WDFW applied for 2023-2025 Migratory Bird Stamp funding to cover the expenses of controlling reed canary grass and other invasive species through mowing and herbicide application, and to design and permit a water control structure with Ducks Unlimited.

Constraints

WDFW has obligations to the funders of past grant awards that helped the agency purchase the property. Federal dollars from the US Fish and Wildlife Service's National Coastal Wetlands Conservation Grant were used to purchase much of the property. The purpose of the grant was to acquire and protect wetlands in order to restore habitat and hydrologic connectivity to tidal sloughs on Ebey Island in the Snohomish River estuary. It was anticipated that any cattle grazing and farming on site would be discontinued and that the property would be restored to wetland habitat for Federally threatened Chinook salmon and other fish and wildlife species.

At some point in the future, WDFW will need to address the grant obligations and return the property on Ebey Island to tidal wetland to support Chinook salmon recovery. All management actions taken at this time will need to consider the limitations associated with this future use. WDFW is dedicated to managing the Ebey Island Unit for recreational activities as well as freshwater wetland habitat until the time when restoration is pursued. Over the next ten years of this management plan, WDFW will strive to make the unit safer and more accessible for recreation, and more suitable for wetland management and agricultural production.

Table 1 - WDFW goals, recommended actions, and next steps for Ebey Island Wildlife Area Unit.

Goal	Recommended Action	Next Steps	Notes
Protect and restore the fen	Block unmaintained drainage ditches alongside and within the fen.	Secure funding to design and permit. Coordinate with DNR fen team and dike district.	
	Evaluate potential to designate as a Natural Area Preserve.	Meet with WA Department of Natural Resources to understand the implications of this designation.	
Enhance wetlands for wildlife	Mow reed canary grass seasonally.	Secure funding for mowing, implement pilot project to assess effectiveness.	Applied for Migratory Bird Stamp funding, 2023
	Manage water in fields with new water control infrastructure and field sculpting.	Secure funding for design and permitting with Ducks Unlimited.	Applied for Migratory Bird Stamp funding, 2023
	Control blackberries and undesirable trees in fields with mowing and prudent herbicide application.	Secure funding for mowing, implement pilot project to assess effectiveness.	Applied for Migratory Bird Stamp funding, 2023
Maintain agricultural leases as a tool to control invasive vegetation	Coordinate pumping timing with the dike district.	Continue communications with dike district commissioners.	
	Support maintenance of drainage infrastructure by dike district.	Continue communications with dike district commissioners.	
Improve access and recreational experience for visitors	Add mowed, graveled, or lightly maintained walking trails from parking lots to a feature of interest.	Get input on trail locations from Snoqualmie Wildlife Area Advisory Committee. Secure funding to install and maintain trails.	Consider ADA compliance. Trails should avoid active agriculture and hunting locations if possible, to reduce conflicts.
	Add interpretive signs alongs trails and/or in parking lots discussing ecological features and/or other site information of interest.	Secure funding, design, and install signs. Get input on sign content from Snoqualmie Wildlife Area Advisory Committee.	
	Add signs that highlight allowed activities and location of activities in each parking lot.	Secure funding, design, and install signs.	Include safety information about sand boils.
	Complete project in the middle parking lot to add gravel, remove hazard trees, and add hand-carry boat launch into Deadwater Slough.	Implement construction of project funded by RCO State Lands Development Program.	Design and permitting are complete.
Progress toward long-term need for tidal restoration.	Consider acquiring neighboring properties as willing landowners become available.	Continue to engage with community, initiate WDFW land review process (Lands 2020) as opportunities arise.	
	Communicate clearly that interim management actions prior to tidal restoration are not permanent.	Include this information in all funding requests.	

References

Bourgeois, J., and S. Y. Johnson. 2001. Geologic evidence of earthquakes at the Snohomish delta, Washington, in the past 1200 yr. Bulletin of the Geological Society of America 113:482–494.

Chamberlin, J. 2022. Chinook Salmon Use of Tidal Delta Habitats: Synthesis for Snohomish Recovery Plan Revision. U.S. Department of Commerce, NOAA Contract Report NMFS-NWFSC-CR-2022-01.

Driscoll, A. L. 1979. Volime I: Summary Report. Page Snohomish Estuary Wetlands Study. Shapiro and Associates, Inc. Prepared for U.S. Army Corps of Engineers.

Holzer, T. L., and M. M. Clark. 1993. Sand boils without earthquakes. Geology 21:873–876.

Martin, M. E., and J. Bourgeois. 2012. Vented sediments and tsunami deposits in the Puget Lowland, Washington - differentiating sedimentary processes. Sedimentology 59:419–444.

Roberts, H. H., and R. S. Carney. 1997. Evidence of episodic fluid, gas, and sediment venting on the northern Gulf of Mexico continental slope. Economic Geology 92:863–879.

Rocchio, J. 2019. Ebey Island Bog. Washington Natural Heritage Program, Department of Natural Resources.

Snohomish Basin Salmon Recovery Forum. June 2005. Snohomish River Basin Salmon Conservation Plan. Snohomish County Department of Public Works, Surface Water Management Division. Everett, WA.

Snohomish Conservation District, 2019. Agriculture Resilience Plan for Snohomish County. Lake Stevens, Washington.

Spiske, M. 2020. The sedimentology and geometry of fine-grained tsunami deposits from onshore environments. Page Geological Records of Tsunamis and Other Extreme Waves. Elsevier Inc.

Washington Department of Fish and Wildlife. July 2011. Ebey Island Habitat Restoration Feasibility Study. Prepared by AMEC for Washington Department of Fish and Wildlife. Project No. 0-915-16971-0.

Washington Department of Natural Resources. 2022 State of Washington Natural Heritage Plan. 92 pp. Olympia, WA.

Washington State Noxious Weed Control Board. January 1995. Written Findings of the Washington State Noxious Weed Control board. https://www.nwcb.wa.gov/images/weeds/Phalaris_arundinacea.pdf

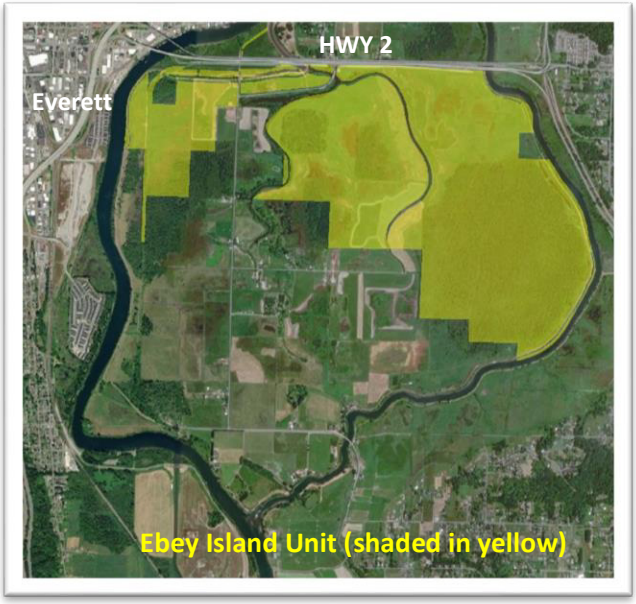
Appendices

Appendix I - Stakeholder Handout

Action planning on WDFW-owned land on Ebey Island

v. 5/25/21

WDFW owns 1,285 acres on Ebey Island in the Snohomish River Delta (the Ebey Island Unit), which is part of the broader Snoqualmie Wildlife Area. WDFW is gathering current information and stakeholder perspectives about the site to inform a multi-benefit plan for the Ebey Island Unit. WDFW's vision is that the Ebey Island Unit is actively used for hunting, agriculture, and recreation while also providing important habitat value. The plan will likely include elements that can be implemented within the next 10 years to help WDFW improve recreation, agriculture, support wildlife species and habitats, water management, and wetlands in the near term. The plan will also recognize a long term need to increase intertidal area on public land in the Snohomish River Delta, which includes the Ebey Island Unit.



Why make improvements on Ebey Island?

The Snohomish Delta, the second largest watershed in Puget Sound, is a critical ecosystem for local species, supports agriculture, and is home to thousands of acres of public land used for hunting and recreation. WDFW's Ebey Island Unit is a significant property in the Snohomish Delta because of its size and capacity to serve the many uses of the surrounding community. WDFW is interested in investing in the Ebey Island Unit to enhance this community asset.

How can you be involved?

WDFW is inviting stakeholders and the public to provide input on how to actively manage the land and make the Ebey Island Unit a more functional space for the many uses it has now and could have in the future. Feedback from stakeholders and the public will inform an actionable list of projects to pursue when future funding opportunities arise.

Proposed Engagement Process

WDFW is gathering input from stakeholders and the public by conducting:

- Preliminary stakeholder interviews to inform the design of stakeholder meetings.
- Four targeted stakeholder meetings co-hosted with a partner organization for each focus area: agricultural interests, ecosystem recovery interests, hunting and recreational interests, and residential interests.
- An online survey to collect public feedback.

For more information, contact:

Lindsey Desmul
Washington Department of Fish and Wildlife (WDFW)
Community Engagement Coordinator
lindsey.desmul@dfw.wa

Loren Brokaw
Washington Department of Fish and Wildlife (WDFW)
Restoration Projects Coordinator
Loren.Brokaw@dfw.wa.gov

Brian Boehm
Washington Department of Fish and Wildlife (WDFW)
Wildlife Area Manager
Brian.Boehm@dfw.wa.gov

Appendix II - Stakeholder Interview Summary

Ebey Island Unit Public Outreach
Stakeholder Assessment Interviews Conducted by Triangle Associates, Inc
v. August 5, 2021

Project Summary

The Washington Department of Fish and Wildlife (WDFW) is inviting stakeholders and the public to weigh in on how to activate the land and make the Ebey Island Unit a more functional space for the many uses it has now and could have in the future. Feedback from stakeholders and the public will inform an actionable list of projects to pursue when future funding opportunities arise.

Assessment Process Description

Triangle Associates held one-hour interviews with a range of stakeholders. The goal of these conversations was to provide a safe space where people could express a broad range of opinions.

The objectives of this engagement process included:

- Familiarize interviewees with WDFW's work at the site to date.
- Gain an understanding of the current range of stakeholder interests and their history of involvement in discussions/work at the site.
- Understand concerns regarding potential habitat restoration and current features stakeholders would like to see preserved or changed.
- Invite interviewees to participate in further stakeholder engagement and specify needs regarding communication, information, scheduling to make this effective.

Summary of Common Themes

This section provides a bulleted summary of recommendations to WDFW that Triangle heard from several stakeholders.

- The Unit is currently used and accessed by very few people, especially considering its proximity to Everett. The internal slough at the north end and private property at the south end make access difficult.
- Accessibility and infrastructure could be improved for hunting and recreation, specifically more bird blinds and more trail access to areas of island that are currently infrequently visited.
- Preserving agricultural use of the site was cited as a concern for multiple stakeholders.
- Updates to water control structures and controlling flooding is a concern for agriculture and recreation. Stakeholders noted the need to balance this with allowing natural processes to occur at the site.
- Salmon recovery was mentioned as a priority for future restoration.
- Protecting the Sitka spruce bog important to multiple stakeholders.
- All parties expressed interest/value in restoring/increasing habitat and watershed connectivity.
- All interviewees recognized a need to allow for multiple uses at the site.

Responses by Interest:

This section contains input summarized by the affiliation of the stakeholders. It includes input heard in phone conversations and in emails to the team.

Agriculture

Specific Input on Restoration/Development

- Flood control/drainage is a priority if agriculture is to continue at the Unit. Dike district tide gates need improvements to improve farming.
- Farming is not very profitable and is challenging in some areas due to drainage problems. Mud/water in some areas makes it messy and dangerous.
- Areas where farming is not allowed should be maintained for habitat and hunting grounds.
- Good opportunity for multi-benefit projects looking at agriculture and habitat restoration.
- Interest in a farm incubator program of about 20 acres with an educational component. Irrigation would be an issue; preference is for higher elevation part of the Unit.
- In the past, this site has had grazing animals on it. A return to grazing animals might be incompatible with water quality goals but considering how wet the land is it may be a more feasible agriculture use than crop farming.

Ecosystem Recovery

Tulalip Tribes

- The Tribes hope to see restoration of natural processes and prefers that WDFW not build new infrastructure at the site due to interference with ecological processes related to increased use/development.
- Maximizing habitat connectivity is a priority.
- The Tribes would like to engage in further stakeholder meetings as well as Government-to-Government consultation via one-on-one meetings with WDFW going forward.
- WDFW should consider planting to improve buffers along water bodies.

Recovery Organizations

- Would need to evaluate any plan from a conservation perspective before supporting. Projects that improve salmon habitat would be easiest to support.
- Recognizes the need to balance multiple uses and expressed desire to preserve farming on the island – mentioned the idea to allow a muted tidal connection, isolate some parts of drainage system. WDFW could update/improve drainage infrastructure to restrict flooding when needed to preserve agriculture.
- WDFW need to construct flood protection around the sitka spruce bog if floodplain restoration is conducted.
- Important to look at land as flood storage. Being able to store water in winter provides some small salmon recovery benefits.

Landowners/Neighbors

- The site is mainly used for hunting. It has a lot of potential for recreation (bird/wildlife watching, walking, etc.) but is very under-used.
    - Wildlife watching has potential with birds, beavers, otter present but getting to the wildlife is difficult given the low access to the internal parts of the site.
- Better infrastructure such as trails, signage, parking lots, etc. would make it more accessible for recreation.
    - Would like to see a footbridge to the "middle lobe" of the site.
- Blackberry removal is important from a restoration standpoint to improve access and habitat.
- Reconfiguring the land to flood is seen as prohibitively expensive.

Hunting/Recreation

- Increased utilization of the area in general would be a positive thing
- Would like to see increased recreation infrastructure such as parking lots, trails, and bird blinds.
    - One existing parking lot under the highway does not feel safe to leave a car in.
- Extending access to the west side and adding swales would bring in more birders as well as allow waterfowl hunters to access the area. Some birders use the area around the dikes, but improved infrastructure would bring more as well as improve wildlife viewing opportunities in general.
- Possible improvements for waterfowl hunting on east side include digging out small swales, adding a path or bridge. Hunters are supportive of the grant WDFW submitted to add a footbridge to improve access.
- Channeling water to certain areas not recommended because of elevation and heat.
- There is a recognition that water connectivity is important if it does not restrict hunting opportunity.

Appendix III - Ebey Island Workshop Participant Input

WDFW Ebey Island Land Use Workshop

October 20, 2022
6:00 – 8:00 p.m.
Everett, Washington

Feedback and Comments

Document Purpose: This document captures the written and verbal input shared by workshop participants during the breakout session. Participants self-selected into three separate discussion groups based on their primary interest in Ebey Island among the following categories:

1. Recreation, Hunting, and Access
2. Habitat, Water, and Vegetation Management
3. Other Topics*

**This group consisted mainly of landowners on Ebey Island*

** Some participants moved between groups to participate in more than one conversation.*

Group 1: RECREATION, HUNTING, AND ACCESS

Question for Discussion: what should WDFW know about your priorities for Ebey Island?	
Participant Comments	Commentor Name (if provided)
Transcribed directly from participants' written input:	
Crops need to be user friendly for the shareholders	
Bare dirt is not good for wildlife. Standing corn is not good for wildlife. Mowed grass to 4" is not good for wildlife	
Finger sloughs are choked	
Keep cover crops to hide waterfowl	
Concern about illegal activities and enforcement at public access	
Raised wetlands concerns – maintenance. Rebuild (move out and add angles) dikes on east side in certain areas – could compromise.	Dike Commissioner
Habitat Recreation – access barriers. Balance?	
Foot Bridge to middle section	
Ag – sharecropping vs self-managed crop selection – regulate harvest dates, changing markets, limited farmer base	
Water trail Site on Cascadia Marine Trak	
Transcribed from Flip Chart Notes:	
Better access for non-boat vehicles	

Footbridge to middle section	
Balancing recreation and habitat	
Type/quality of habitat impacts hunting	
State-managed cover crops (Skagit and Monroe have good examples)	
Clear guidelines in plan about what activities are allowed – and why	
Arrows left behind a concern	
Signage	
Cleaning ditches	
Developed access points for non-motorized boats and overnight sites	
Theft and vandalism a concern	
Regulate sharecroppers – stakeholder input on what gets planted	
What assessments have been done of user groups?	
Historical use for hunting	
Dumping and illegal activities a hazard	
Non-lead fishing sinkers	
Improved public access	
Question for Discussion: What other information or resources should WDFW consider when developing the plan for Ebey Island?	
Participant Comments	Commentor Name (if provided)
Transcribed directly from participants' written input:	
No-lead fishing on DFW lands	
Limited parking. Better signage for what's allowed	
What activities are or should be allowed, and whether they are compatible	

Group 2: HABITAT, WATER, AND VEGETATION MANAGEMENT

Question for Discussion: What should WDFW know about your priorities for Ebey Island?	
Participant Comments	Commentor Name (if provided)
Transcribed from participants' written input:	
Partnership between agencies to coordinate on canary grass removal – mowing	

Tribe: wildlife and water quality – biggest interest to not inhibit long-term actions, i.e. Tidal inundation	
Short term bird/water quality improvements. Long term need to maintain salmon/natural process/tidal inundation options	
Consider values of complimentary, cooperative management of habitat on County property to SE of Ebey Island where WDFW + County seek common habitat benefits and related human uses. Be aggressive with controlling/removing invasive blackberries to make way for habitat more valuable to wildlife.	
(1/2) RB – SCD. Dike District – tide gate + pumps are unreliable. It is in the best interest of WDFW and many others to support replacing this infrastructure. Past recipe for success elsewhere is to replace tide gates w/ones that improve drainage and improve fish passage (even regulated gates) coupled with fish-friendly pumps	
(2/2) Is there enough potential for muted tidal exchange on island to benefit fish or would this only help with wetland ecology + waterfowl	
DNR Fen – create a natural area	
Short term projects should not impact long term salmon/tidal inundation projects. Thanks!	Brett Shattuck

OPEN/OTHER TOPICS

Question for Discussion: What should WDFW know about your priorities for Ebey Island?	
Participant Comments	Commentor Name (if provided)
Transcribed from participants' written input:	
Trespassing from WDFW to neighbors. More people = more problems	
Walking trails	
Ag use: use and promote habitat/water quality BMPs that are appropriate for the site – working with Bartelheimer	
Priorities are more wildlife habitat and less people	
Fen seems like an amazing opportunity for WDFW and the region – a publicly owned protected property with a unique, very special habitat to highlight. Balance promoting a very cool habitat with protecting it from degradation from recreational use	
More enforcement officers	

Water management is a huge problem on Ebey island...both seasonal rains and flooding. Anything that can be done to manage water, hold it, send it back into river, sloughs would helpful.	
Responsible recreation – thinking about the Tulalip Tribes report about impacts of recreational use.	
Question for Discussion: What other information or resources should WDFW consider when developing the plan for Ebey Island?	
Participant Comments	Commentor Name (if provided)
Transcribed directly from participants' written input:	
Coordination with Chinook Marsh and DD13 (DD13, Snoho, etc)/ Swan's Trail Slough. Ag Resilience and Habitat Restoration work	
Improved Ag Drainage Infrastructure working in conjunction with habitat improvement as well. ie – moist soil mgmt. with DU.	
Agriculture could be utilized more for using prime cropland during dry seasons and opening up for waterfront hunting during wet seasons. This will help manage weeds and leave food for wildlife from crop residue.	
Ideally better deterrent, fencing, signs to prevent people from leaving WDFW property and trespassing on private property	
Envision Ed opportunities?	
Continuous agriculture benefits farmer and current users.	
Reed canary grass. Mow, mow, mow!	

Appendix IV - Ebey Island Virtual Meeting Public Input

Ebey Island Land Use Information Session

Questions, Feedback, and Discussion

WDFW Webinar, November 16, 2022

Loren Brokaw, Assistant Wildlife Program Manager, WDFW

Lindsey Desmul, Habitat Biologist, WDFW

Brian Boehm, Snoqualmie Wildlife Area Manager, WDFW

CK Eidem, Regional Biologist, Ducks Unlimited

Washington Department of FISH and WILDLIFE

Questions	Responses
What is the Fen?	A rare type of wetland where the composition of soil is mostly organic, in this case formed by groundwater instead of rainwater. Fens are peat-forming wetlands that rely on groundwater input and require thousands of years to develop and cannot easily be restored once destroyed. Fens are also hotspots of biodiversity. They often are home to rare plants, insects, and small mammals.
What is "The Snohomish"?	The Snohomish basin – in this case primarily the watershed. This is the way birds are counted.
Will the Fobes-Ebey Slough Dike Trail stay open?	The trail is on Snohomish County property. It is open and will continue to stay open. Snohomish County is planning some work on their property and WDFW cannot say whether the trail will remain open as that work is underway.
If the dike trail stays open, are there plans to post the hunting season months? Right now it's quite a surprise to encounter hunters in Fall after walking there all spring and summer.	Hunting season runs from October to January, mostly waterfowl hunters on Ebey. WDFW can work with Snohomish County to get more signs up notifying users during hunting season.
Birding is growing as an activity in Washington and Ebey Island has great potential for this activity. Will this type of wildlife watching be included in the plan?	Birding is being considered as part of this plan. WDFW is working to provide improved habitat for the huge variety of birds in the migration corridor and hopes the community will come to Ebey for bird watching.

Questions	Responses
The Fobes Rd wetland used to be great waterfowl area, then salmon restoration work was mandated. Now cattle and horses graze on west end (used to be wetland) and rest of wetland is seriously degraded.	
Are birding trails through the forest being considered?	The Fen is difficult to navigate through and hard to get to, partially due to the surrounding ditch network, making it not optimal for recreation.
Agree that the Fen is difficult to navigate from personal experience, although it is an interesting place. There is a pipeline running through it that is wide enough to walk. Access could be created using the pipeline and it could be valuable to citizens.	
Why does WDFW limit access to the west side of the island in the summer? People are interested in using it for many activities.	The west parking lot is common for illegal activity and is difficult for WDFW to manage.

Questions	Responses
Would WDFW consider prohibiting bird watching during waterfowl season? A large amount of Bird watchers are unaware of the hunting seasons and how waterfowl hunting works. This creates unsafe situations and hunter harassment. This is from multiple first hand experiences.	WDFW is not able to limit specific recreation activities in areas that are open for hunting.
What would the impacts to the vegetation and wildlife be if many people had access to this now remote area? Studies need to be done before you just open it up.....but it sounds like that is not likely in the foreseeable future.	
Will you be considering an ADA waterfowl access program on the northeast leg of Ebey island? There are very few in the north sound region. Can be done with low impact since there is already a gravel path on the dead water slough.	WDFW welcomes and encourages this type of input. Americans with Disabilities Act (ADA) access infrastructure will be considered as part of this plan.

Questions	Responses
The rarity of the fen sounds as if it's a prime item for educational info for the public.	WDFW hopes to explore the unique educational opportunities related to this as part of future planning and plans to work with partners to conduct further research on the Fen.
Spencer Island is posted for hunting down one trail and no hunting down another trail.	WDFW only owns the north section while Snohomish County owns the south section. This is the reason for the difference in hunting regulations.
Suggest that bird watcher wear red vests during hunting season.	
Regarding user conflict: Land is limited, and users need to maximize opportunities while minimizing conflict. Suggest having users create signs for each other to communicate what they are doing and why.	

Appendix V - Ducks Unlimited Ebey Island Management Memo

Date: May 5, 2023

To: Lindsey Desmul, Washington Department of Fish and Wildlife
From: C.K. Eidem, Ducks Unlimited

Subject: Ebey Island Unit wetland, habitat, and recreation opportunities

Washington Department of Fish and Wildlife (WDFW) is undertaking a planning process to improve public access, agricultural leases, wetlands, biodiversity, waterfowl, and wildlife habitats in the managed freshwater portion of the Snoqualmie Wildlife Area, Ebey Island Unit.

To that end, WDFW has contracted with Ducks Unlimited (DU) to make recommendations based on a review of existing information, field investigations, and a series of meetings with stakeholders and agency staff.

Throughout 2021 and 2022, C.K. Eidem, Regional Biologist, and John Spolar, Regional Engineer, interviewed members of the diking district, neighbors, farmers, and agency staff, participated in site visits, public meetings, and informal conversations, and reviewed existing information. This report is based on our findings.

Existing Conditions

Ebey Island is located just east of Everett, Washington in the Snohomish Delta. The 3,940-acre island is bounded by the mainstem Snohomish River on the west and by Ebey Slough on the east. WDFW's 1,280-acre Ebey Island Unit (the Unit) is located just south of the US-2 trestle that bisects the island and spans the Snohomish River floodplain (Figure 1). The Unit is a popular location for waterfowl and pheasant hunting as well as birding. Some of the property is also leased to local farmers to grow commercial crops and waterfowl forage.

Ebey Island is disconnected from river hydrology by a dike. The island is drained by a series of ditches and the two forks of Dead Water Slough. The island is subsided, and water is primarily drained through pumps and tide gates (Figure 2). Dikes, main ditches, and tide gates are owned and managed by Diking District 1. These structures are likely a total barrier to anadromous fish entering the island drainage network. DU's recommendations are limited to facilities and property under WDFW's ownership and control. This report assumes floodplain reconnection will not occur in the near future. Importantly, our recommendations do not include major investments that might make any future floodplain restoration more difficult.

The Unit is an irregular shape. The northern property line is 1.78 miles across. The property is functionally three areas divided by roads and sloughs. The Unit is served by two functional and sanctioned parking areas. The Unit is large and has the potential for improved wetland diversity and functions, wildlife habitat, farming, and recreation access.

The Unit is an urban wildlife area, proximate to a large population. There is a walking trail from Everett (population 112,912) to the Unit and easy access to I-5 and US-2. It is a major opportunity to have a wildlife area easily available to 4.1 million people in the Seattle Metropolitan Statistical Area. The Unit's proximity to urban areas represents an opportunity to provide public access to a wide variety of people from diverse backgrounds. Its location in an urban area makes it an important wildlife refuge; however, this makes it susceptible to negative urban influences such as dumping, camping, and other illicit activities.

The island is also a highly managed landscape. Natural wetland forming and maintaining processes have been interrupted, eliminated, and restricted. The historic human-induced disturbance regime, grazing, has also been eliminated (on WDFW land). That has allowed for degraded emergent wetland conditions from unchecked invasive plants. Where alternative disturbance regime has been maintained, such as agriculture or mowing, better, more diverse emergent wetland functions remain.

Habitat Types

The following is a brief discussion of habitat types across the Unit and general DUs recommendations for each habitat type.

Fen

The 470-acre Ebey Island Fen should be preserved and protected. Colorado State University and the Washington Department of Natural Resources (WA DNR) determined that the forest along the East of the Unit is a raised fen. Raised estuarine peatlands are very rare and this site represents the largest remaining freshwater forested wetland within the Snohomish Estuary. This feature warrants special consideration and care. Restoration priorities should be preservation, protection of offsite hydrology, and minimizing local hydraulic impacts to the fen. Projects elsewhere on the site should consider this feature and vet any potential actions with the peatland experts at WA DNR.

Boils

Ebey Island is known for 'boils' that are found throughout the island. DU recommends the identification and study of potential boils on the Unit. Sand boils or sand volcanoes occur when

water under pressure wells up through a bed of sand. The water looks like it is boiling up from the bed of sand, hence the name. These smaller features are like the fen and may be related. But the smaller boils appear to be tidally influenced where the fen is not. Longtime residents tell stories of cows and machines being swallowed up by boils. Boils may be associated with remaining forested areas and are known to occur in the south part of the Unit near the fen. Boils are a risk to managers, farmers, and visitors.

Woody Wetlands

DU recommends the preservation and careful expansion of woody wetlands into unmanageable reed canary grass-dominated areas. There are several stands of Palustrine Forested (PFO) and Scrub-shrub (PSS) wetlands not part of the fen, scattered throughout the Unit. These have not historically been farmed or otherwise utilized, indicating they were too difficult to drain and farm. These woody wetlands may be associated with boils. PSS and PFO wetlands provide wildlife habitat, biological, and structural diversity. Recommended management goals should include maximizing edge habitat and enhancing structural and plant biodiversity while controlling invasive vegetation.

Emergent Wetlands

DU recommends managing emergent wetlands throughout the site. Palustrine wetlands are regionally and nationally decreasing wetland types, in Western Washington the loss is greater than 90%. What remains is often imperiled by invasive reed canary grass which inhibits natural plant succession.

Succession refers to the change in vegetation over time driven by disturbances and the maturation of plant species. Productive wetlands are typically dynamic, in that they change with seasonal and annual precipitation, flooding events, drought, and other natural disturbances. Wetlands that experience stable conditions over multiple years tend to become less productive and support fewer numbers of wildlife and plant biodiversity.

Palustrine Emergent (PEM) wetlands on the Unit are highly degraded. Most of the non-farmed emergent wetland habitat is overrun with stable, invasive rank (tall) reed canary grass (*Phalaris arundinacea*), which is a major threat to natural wetlands. *It out-competes most native species as it forms large, single-species stands, out-competing other species. Dense stands have little wildlife habitat value. Its invasion can cause siltation in irrigation ditches.* (WA Noxious Weed Control Board). Reed canary grass-dominated wetlands are undesirable. They form monocultures and inhibit historic plant succession patterns. Without intervention, reed canary grass dominance will persist for a long time. Rank (tall) reed canary grass is undesirable habitat for waterfowl and most other wildlife, even when seasonally flooded. WDFW manages its

wildlife areas for the purpose of fish and wildlife habitat and recreational opportunities, and the presence of reed canary grass reduces both habitat and recreational values. Management activities that control reed canary grass and mimic natural disturbance processes can increase and maintain wetland productivity to support wildlife and facilitate recreation (Figures 3 & 4).

The goal of active PEM wetland management is to periodically reset plant succession. At least have non-native plant communities to fulfill similar wetland functions to native shorter-stature plant communities. Managers should prioritize wetlands dominated by early successional native plants or low-stature non-native plant communities (e.g., pasture, or cropland) or at the very least keep reed canary grass low to allow some native plants to survive and provide wildlife access to the wetland surface. Managers have three primary maintenance tools to manage wetland vegetation: **mowing, water control, and agriculture.**

Mowing as much reed canary grass as possible is the best single enhancement possible on the Unit. This is evident from the mowing on the Olympic Pipeline easement. The easement is mowed by the pipeline twice a year (Figure 3). In the easement native vegetation is visible, open water habitats are accessible, and mowed canary grass does not inhibit wildlife use as much as tall reed canary grass. The sheer size of the Unit also complicates the issue further since management of estimated 600 acres of reed canary grass may be daunting, but providing access to 600 acres of habitat is significant, accounting for almost half of the Unit.

According to Natural Resources Conservation Service (NRCS), reed canary grass should be mowed in late spring once the plant has new growth but before it goes to seed. Management at this time will reduce or eliminate the spread by seed and will take the growth back at a time when the rhizome carbohydrate reserves are already depleted after putting energy into new growth following winter dormancy.

Investing in mowing is our number one recommendation. Mowing at scale will require increased resources and likely specialized machinery. A Marsh Master amphibious vehicle with mowing attachments would increase the feasibility of large-scale mowing practices in wet conditions. (Figure 4)

Water Control facilitates wetland vegetation management. Without specialized equipment such as a Marsh Master, managers need wetlands to be temporarily drained to mow at the right time, farm, or create hydrological variety to establish early successional native plants. Then the drainage needs to be blocked to hold water to provide wetland hydrology. Water control allows managers to create moisture conditions suitable for native plants or agriculture,

when properly designed it can create seasonal ponding and mimics some of the disturbance needed for plant succession.

Each species of plant and wildlife adapted for living in wetlands respond differently to changes in water levels. With the aid of a water control structure, water levels in a managed wetland can be manipulated efficiently to promote specific conditions beneficial for specific habitat conditions.

For the Unit, we propose systems that would manage drainage using flashboard risers (Figure 4). The structure would be placed in a lateral ditch or swale controlled by WDWF. This will allow managers to control water levels in the field seasonally impounding water without impacting neighbors. There are three suitable locations for large low-effort water control projects on the Unit. (Figure 5)

Agriculture functions as PEM habitat and disturbance associated with farming maintains many beneficial wetland and habitat functions.

Migratory waterfowl and many other species rely specifically on emergent wetland habitats. During wintering periods, they predominately eat tubers, floating seeds, and biofilm. By late winter/early spring, waterfowl will transition their diets towards higher protein sources, such as invertebrates. Early successional emergent wetlands tend to have more seed production and other foods for waterfowl and afford access to those food sources. Agriculture fills most of the same functions and is an economical way to achieve positive habitat outcomes. Currently, less than 20% of the property is currently farmed. Improved drainage may increase the area available to farm.

General Recommendations

- Mow reed canary grass
- Manage emergent wetlands and grasslands
    - Model and coordinate management with neighboring farms and duck clubs
    - Manage water in fields with new water control infrastructure, field sculpting,
    - Coordinated pumping with Diking District 1
    - Manage blackberry, reed canary grass, and undesirable trees in fields with periodic mowing, prudent herbicide application, and consider grazing using smaller herbivores
- Agricultural lease important tool to maintain wetland functions
    - Restructure agricultural leases or consider hiring for farm services
- Maintain Deadwater Slough and existing drainage features

- Work closely with Diking District 1 on drainage infrastructure and dikes
    - Coordinate beaver management
    - Facilitate dike maintenance
- Clear signage and fences to prevent public access on dikes.
- Locate intensive recreation near existing parking areas and trails.
- Encourage more public use in problem areas to make use of under-utilized land near US-2, and minimize illegal activities
- Strategically Plant Trees and Shrubs
    - Enhance woodlots and forests with plantings and invasive control
    - Plant shrubs to create alleys in western fields to improve pheasant hunting
    - Plant trees to screen US-2
    - Consider public safety
- Enhance and restore wetland functions within the fen
    - Install ditch plugs
    - Relocate ditches
    - Coordinate with BP/Olympic Pipeline
- Identify, mark, and protect boils
- Subdivide the Unit into permanent management Units.

Management Units

Ducks Unlimited further divided the property into fifteen smaller Management Units of similar habitat and management potential (Figure 7). Below, each Unit is briefly described and followed by recommendations.

Unit 1, 22-acre is the high ground west of the wood chip access road. Potentially high-use grass field. Higher and drier than most of the wildlife area, this area is accessible and suitable for all public use. Recommended habitat goal is short grass.

- Mow
- Good candidate intensive use
- Very limitied wetland enhancements potential
- Pheasant hunting spillover, bird watching, walking

Unit 2, 76-acre is the field between wood chip-roads. Potentially high-use grass field. Seasonally wet, this area is accessible and suitable for public use. Recommended habitat goal is wet grass and PSS hedge rows for habitat diversity and cover.

- Mow
- Good candidate for intensive use

- Mange for pheasant hunting
- Recommend PSS strips for alley effect and cover with mowing between
- Potential managed wetland enhancement (PEM) with water control approx. 9 acres
    - Berm for wetlands likely needed
    - Evaluate drainage for better water control

Unit 3, 27-acre Agricultural Field between the parking area and wood chip road. Potentially high-use agricultural fields. Seasonally wet, this area is accessible and suitable for all public use. Recommended habitat goal agricultural fields.

- Mow
- Good farm potential
- Manage for waterfowl and pheasant hunting
- Good candidate for intensive use
- Potential managed working wetland enhancement with water control

Unit 4, 6-acre south of the west parking lot. This area has the potential as a managed wetland for birdwatching. This site is suitable for non-hunting public use due to the proximity of roads and infrastructure. Recommended habitat goal bird-centric managed wetland.

- Mow
- ADA Blind for birdwatching/photography
- Potential managed wetland enhancement (PEM) with water control 2 acre
- Berm walking path
- Hedges demark safety zone
- Parking Area
- Security fencing & signs

Unit 5a, 20-acre east of west parking north of 51st Ave and west of pump station access road. Recommend high-use area, and trail to connect the west parking lot to recommended future parking on the pump station access road. The wetland area is suitable for non-hunting public use due to the proximity of roads and infrastructure. Recommended habitat goal freshwater wetlands.

- Mow
- Non-hunting trail and blinds
- Managed wetland potential
- High-intensity uses
- ADA blind for birdwatching
- Trees to partially screen US-2
- Security fencing & signs

Unit 5b, 6-acre east of pumphouse access road. Recommend high-use area and extra parking. The drier site is suitable for high-intensity uses, and non-hunting public use due to the proximity of roads and infrastructure. Recommended habitat goal dry field and riparian plantings.

- Mow
- Very low wetland potential
- High-intensity use
- Security fencing & signs
- Hedge

Unit 6, 7-acre east of the middle parking lot. Recommend a high-use area and front porch of the wildlife area. The drier site is suitable for non-hunting public use due to the proximity of roads and infrastructure. Recommended habitat goal field and riparian plantings.

- Mow
- Blackberry management
- Riparian Plantings
- Trees to screen US-2

Unit 7, 150-acre agricultural footprint. Keep in active agriculture. Primary waterfowl and pheasant hunting area. Recommended habitat goal agricultural fields.

- Keep in Agriculture
- Investigate and post for boils

Unit 8, 84-acre the center of the middle lobe. The wetland concentric circles of PSS/PFO wetland, and PEM wetland. Recommended public use waterfowl and pheasant hunting, walking, and bird watching. PSS/PFO creates habitat diversity and edge habitat, and likely holds boils. DU does not recommend trails into the forest. Mow PEM wetland. Recommended habitat goal diverse freshwater wetland.

- Mow
- High potential for managed wetland
- Water control using middle east-west ditch
- Enhance forested wetlands by planting
- Investigate boils

Unit 9, 55-acre SW corner of the middle lobe. The wetland has both PSS/PFO and PEM habitats. Not a great candidate for water control because of potential impacts on neighbors. Recommended public use waterfowl and pheasant hunting, walking, and bird watching.

PSS/PFO creates habitat diversity and edge habitat, and likely holds boils. DU does not recommend trails into the forest. Mow PEM wetland. Recommended habitat goal diverse freshwater wetland.

- Mow
- Water control using the middle east-west ditch
- Enhance forested wetlands by planting
- Investigate boils
- Map/mow a safe route for walking loop from W. Fork to E. Fork Deadwater Slough

Unit 10, 35-acre of PSS/PFO wetland western edge of the lobe. Boil likely in the NE corner extending into ag fields. No management recommendations. Scientifically this area is interesting. Is it related to fen or is this a boil complex? Doesn't ever appear to be successfully farmed. Recommended habitat goal diverse freshwater wetland.

- Native planting and invasive control

Unit 11, 42-acre. Keep in active agriculture. Primary waterfowl hunting area. Recommended habitat goal agricultural fields.

- Keep in Agriculture

Unit 12, 134-acre of freshwater wetlands. Prime waterfowl hunting area. Recommended public use waterfowl hunting, walking, and bird watching. This area has the highest potential for managed freshwater improvements. A shallow swale network would enhance wetland functions by facilitating vegetation management. Recommended habitat goal early successional freshwater wetlands.

- Mow
- Manage for early successional PEM wetland function, waterfowl, and pheasant hunting
- High potential for managed wetland enhancement with water control
- Plant trees to screen US-2
- Drainage improvement north ditch to E. Fork dead water slough with a big crossing
- Gas Pipeline -avoid earthwork work near the pipeline
- Remove/break existing drain tiles
- Potential district re-alignment of dikes, borrow ditch likely will not affect wetlands or other potential projects
- Highest-potential managed wetland likely with berms and water control
- East of the pipeline mow only or reforest create either goose pasture or spruce forest
- Potentially fill the south ditch, it may not actually serve the intended purpose.

Unit 13, 14-acre wetland south of the ditch is a different character from Unit 12. Marginal farmland, closely connected to fen hydrology. Does not have the same wetland management potential as Unit 12. Recommend PEM habitat. Suitable for waterfowl hunting and passive recreation. Recommended habitat goal early successional freshwater wetlands.

- Mow
- Block drainage coming out of the fen
- A swale would improve drainage surface drainage in spring and summer and lower wet area in fall and winter
- Drainage improvements may push ag a little further east to allow for managed wetland

Unit 14, 24-acre of farmland and wetland west of the fen. Closely related to Unit 13, this unit can be farmed in some drier years and cannot in other wetter years. Recommend you farm what you can. The remainder, recommend PEM habitat. Suitable for waterfowl hunting and passive recreation. Some managed wetland potential with swales. Recommended habitat goal early successional freshwater wetlands.

- Mow
- Farm what you can
- Fen drainage ditches could be blocked maybe, probably better to dig a swale for surface water drainage in spring and summer and lower wet area in fall and winter.
- Need more information to maximize fen hydrology help overall drainage

Unit 15, 470-acre Ebey Fen. The habitat goal, be the best fen it can be.

- Protect fen hydrology
- Work with Diking District 1 beaver management on perimeter ditch
- Consider fen hydraulic enhancements
- Limit public access

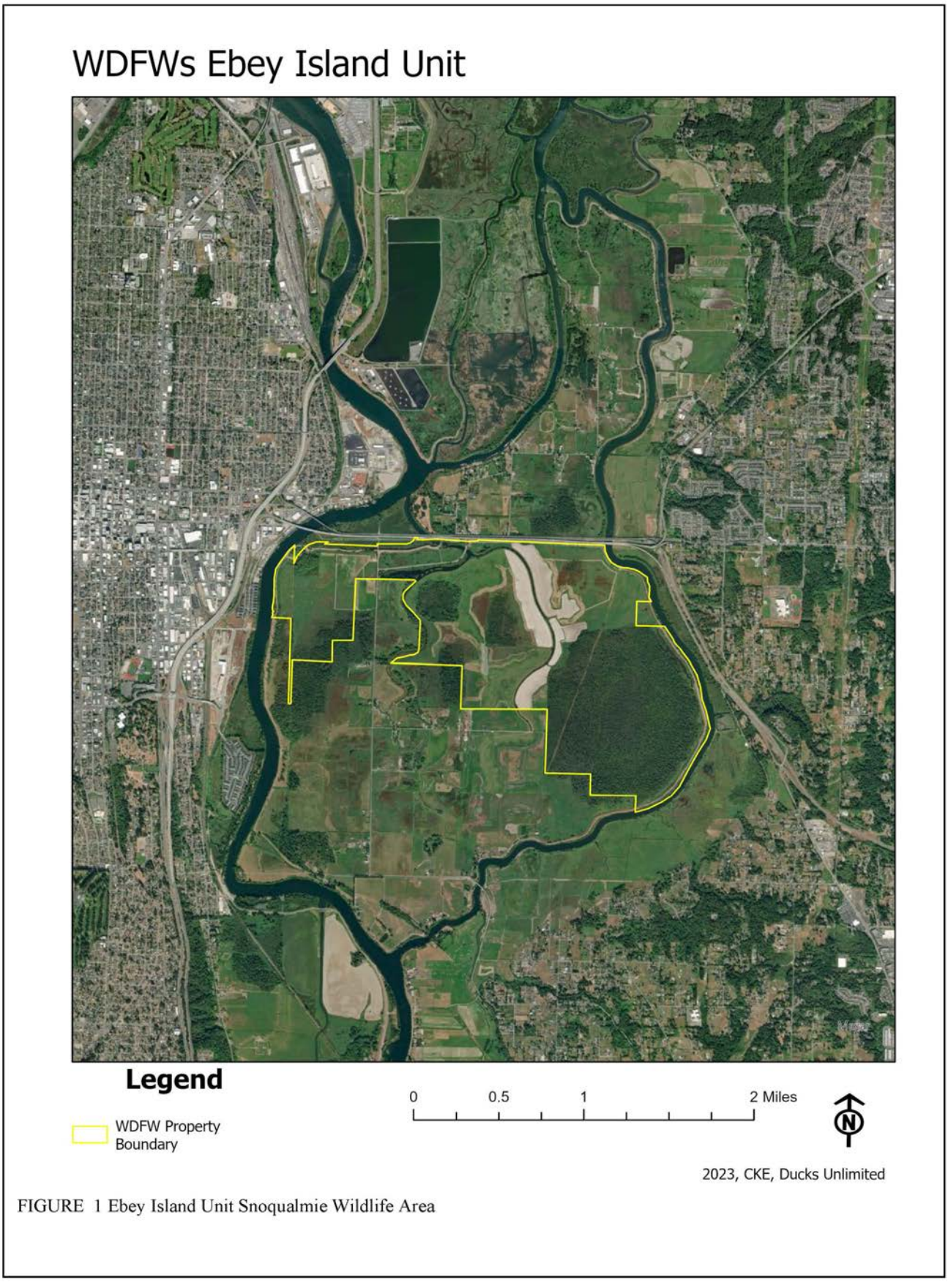


FIGURE 1 Ebey Island Unit Snoqualmie Wildlife Area

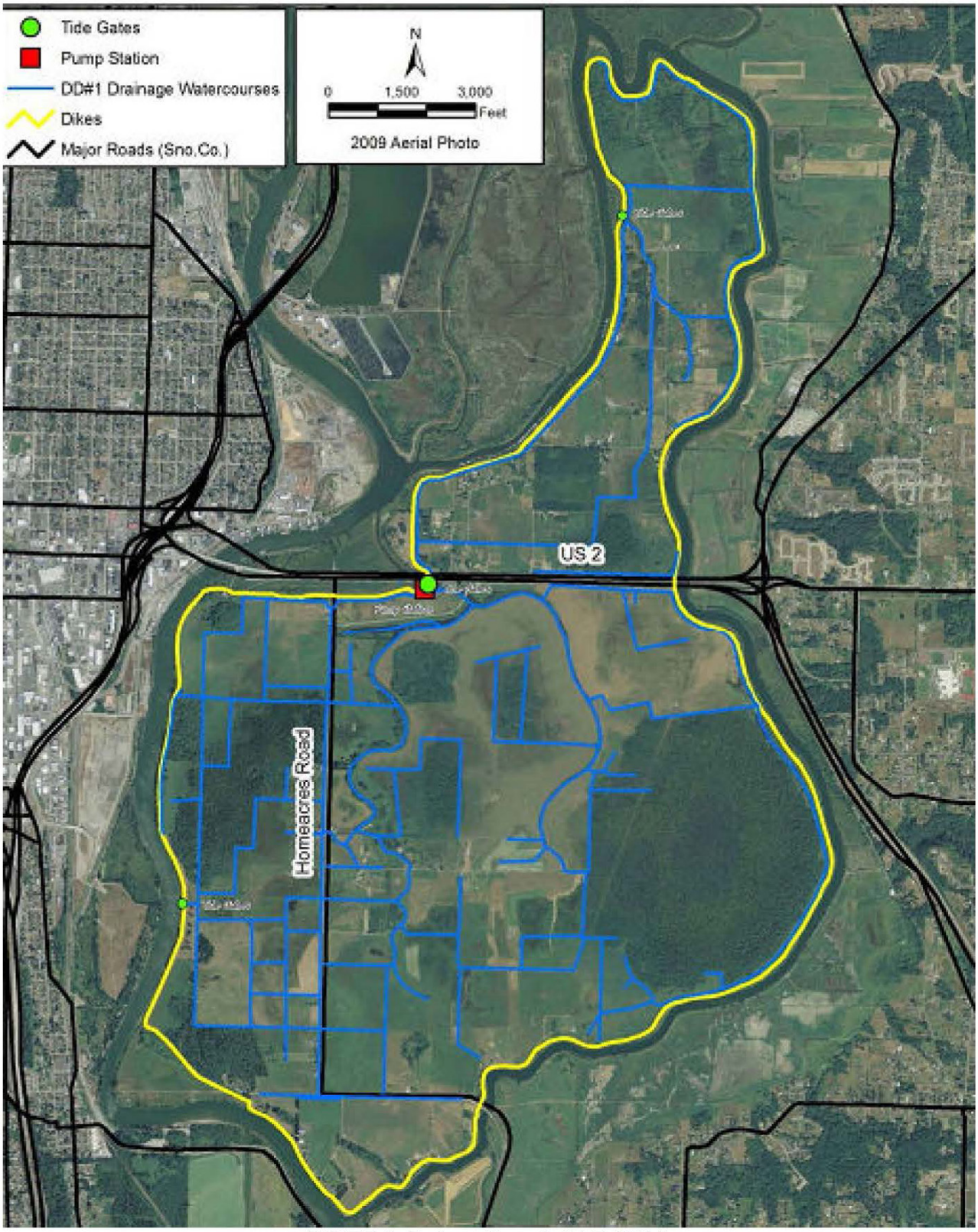


FIGURE 2 - Drainage Network (AMEC 2011)

Wetland habitat management using primarily agriculture. Prior to flooding.

Wetland habitat management using water control, and targeted mowing. Prior to flooding.

FIGURE 3 Examples of managed wetlands. Either of the above management regimes lead to palustrine emergent wetlands with more habitat diversity and wetland functions that result in conditions similar to the pictured seasonally flooded managed wetland.

Figure 4 Unmanaged reed canary grass (*Phalaris arundinacea*) wetlands summer and winter.

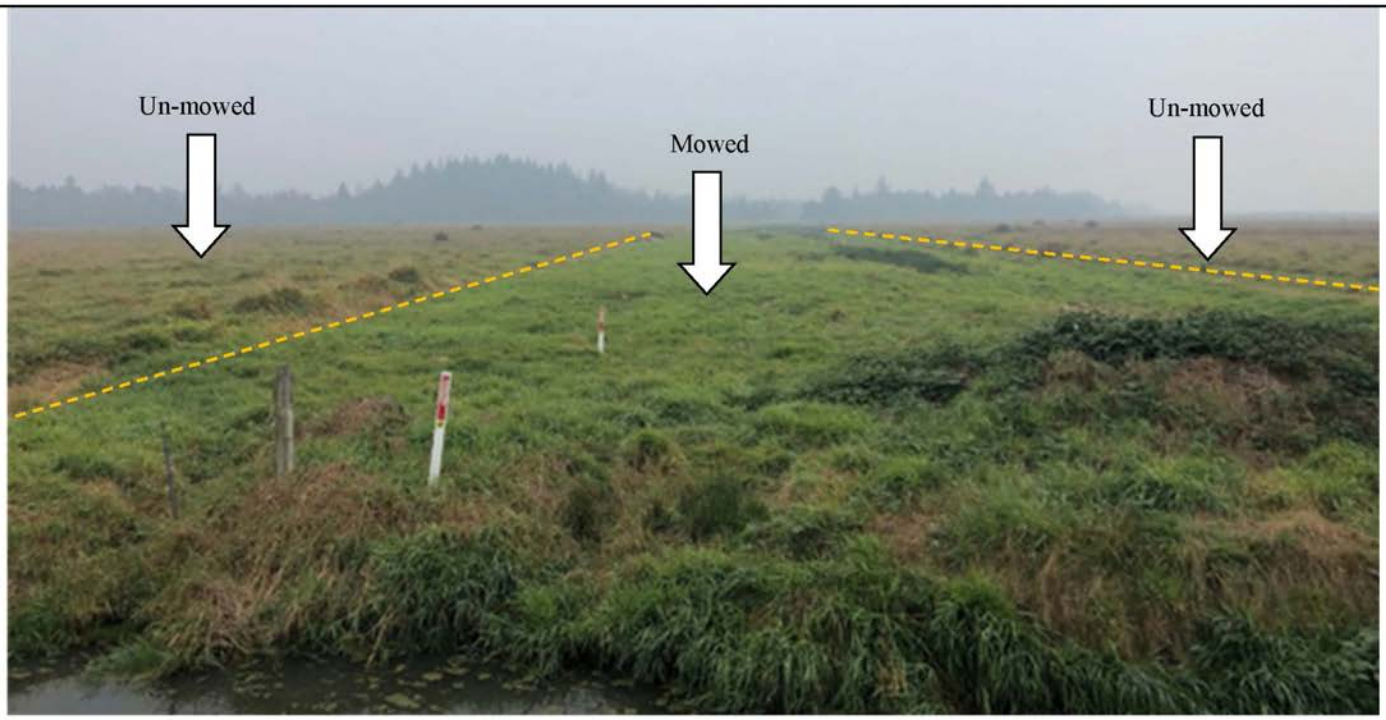


FIGURE 5 Mowed and un-mowed reed canary grass, October 2022, along the Olympic pipeline easement.

FIGURE 6 Water control structure managing water in working farmlands (holding water).

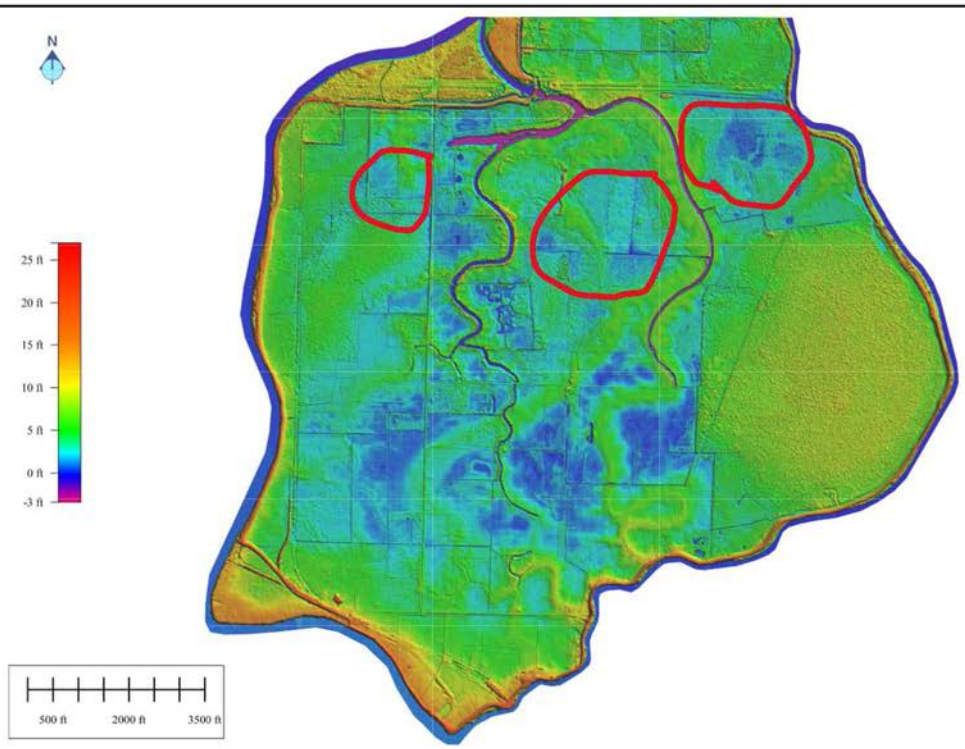


FIGURE 7 Elevation map with areas suitable for water control management projects circled in red.

FIGURE 8 WDFW Marsh Master in Chehalis Wildlife Area

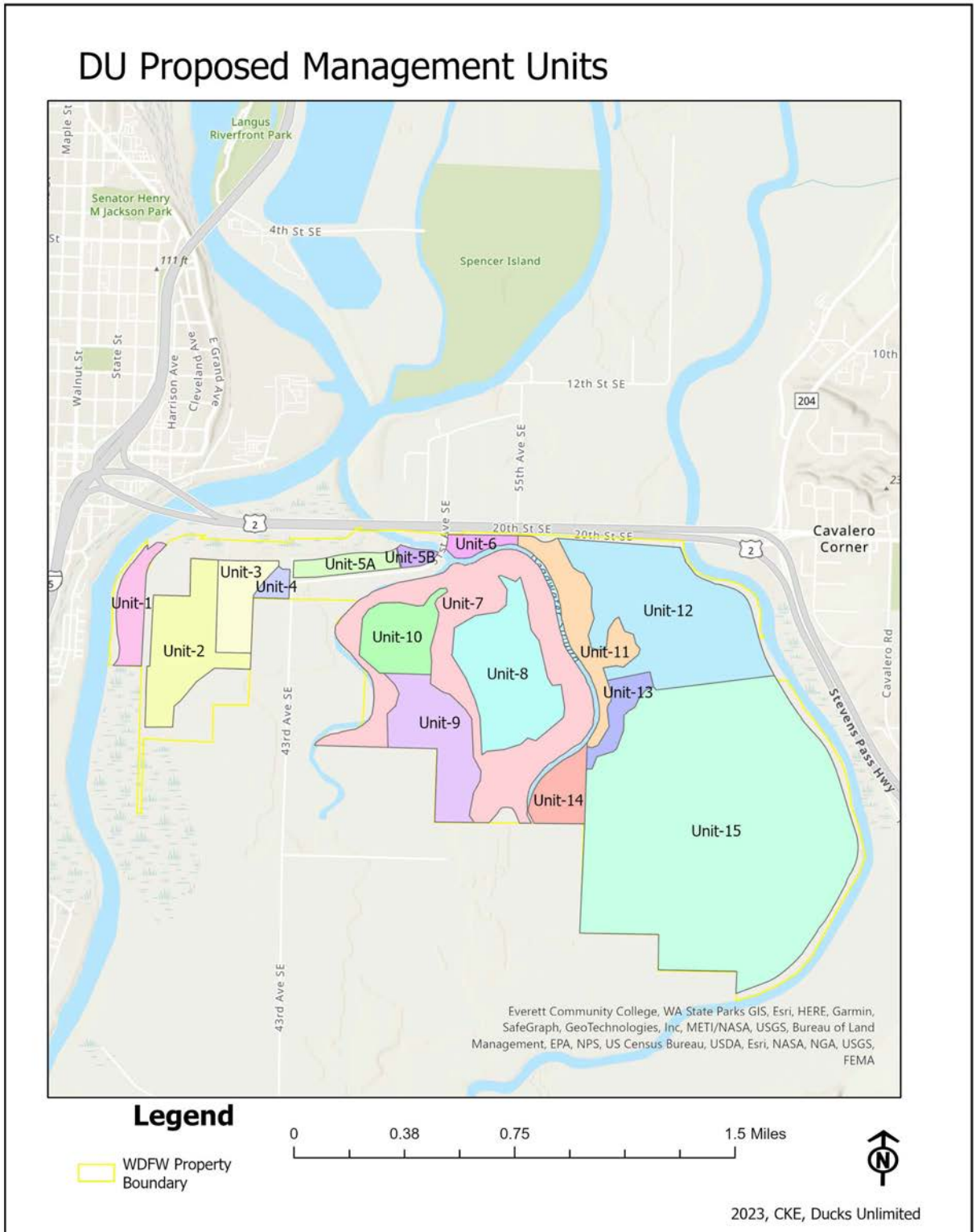


FIGURE 9 DU Proposed Management Units