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Skagit County Shoreline Needs Assessment
TECHNICAL REPORT

Prepared for:

Skagit County Marine Resources Committee
December 2024

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Prepared for:

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TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

1.0 INTRODUCTION

The Skagit County Shoreline Needs Assessment Project (the Project) was conducted to identify priority shoreline and nearshore locations that are good candidates for restoration actions to improve the ecological function of critical habitats. The project focused on the marine shorelines of Skagit County (the County) and relied on existing available data to characterize the ecological value and restoration potential of shoreline and nearshore locations.

The Skagit County Marine Resources Committee (Skagit MRC) regularly conducts nearshore and shoreline projects aimed at supporting marine habitats, water quality, and species. Common types of projects include armoring removal, beach nourishment, invasive species removal, and riparian vegetation restoration. The goal of this project was to provide the Skagit MRC with a tool to help in the identification of suitable sites and types of restoration projects throughout Skagit County.

1.1 Project Area

The project focused on the marine shoreline of Skagit County, from Skagit Bay north to Samish Bay, including the shorelines of Anacortes, Guemes Island, Cypress Island, and Sinclair Island (Figure 1). The riparian area (and therefore the landward extent of the project) was defined as 200 feet from the shoreline. This is consistent with the regulatory definition of the shoreline environment (per the Shoreline Management Act, RCW 90.58.030) and is ecologically meaningful for areas that would influence the quality of shoreline and nearshore habitat.

For ease of discussion and use of the project outputs, 7 shoreline reaches were defined throughout the County (as shown in Figure 1). These shoreline reaches are based on reaches defined for the 2014 version of the Skagit County Shoreline Master Program and represent distinct shoreline environments and locations throughout the County.

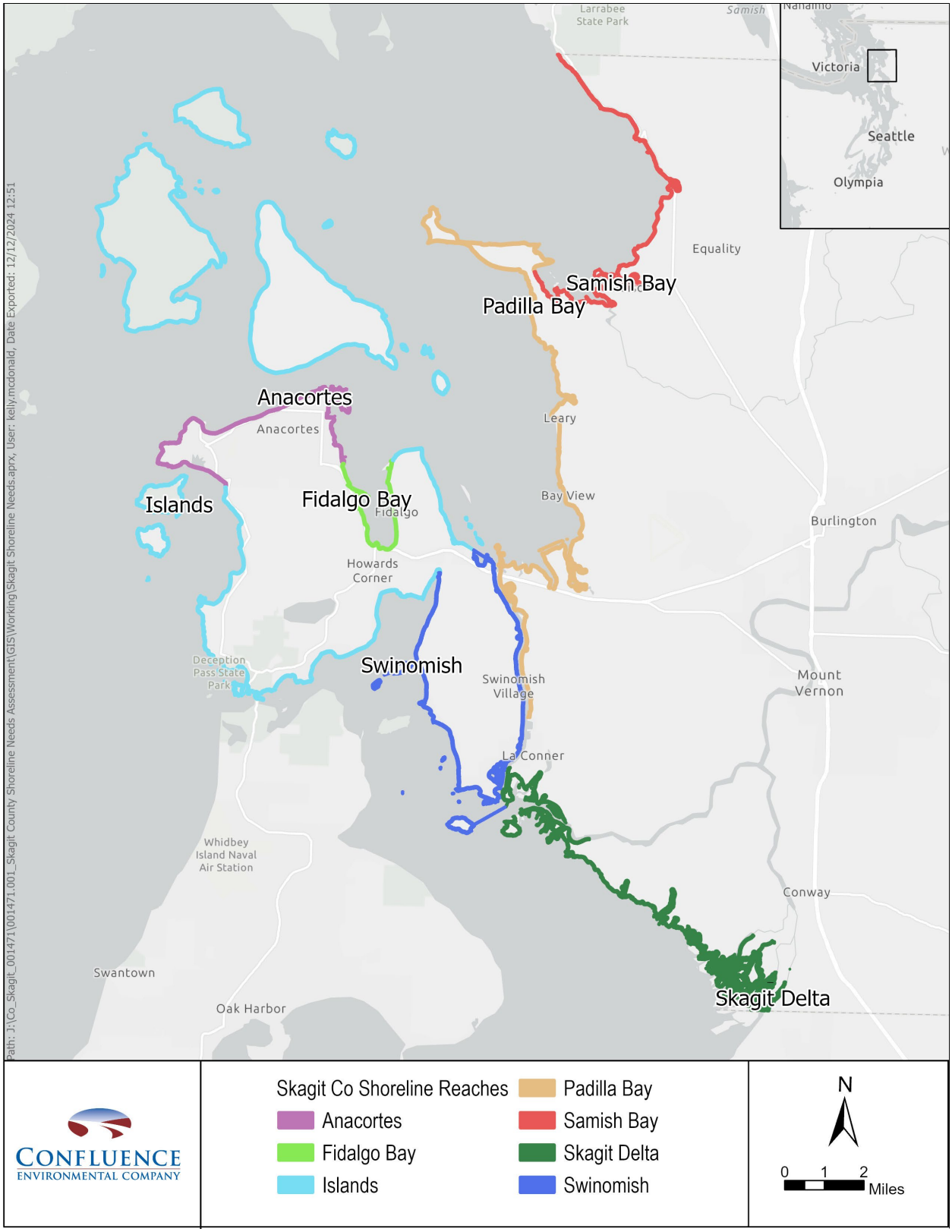

Figure 1. Geographic Scope of the Project

1.2 Previous Assessments in Skagit County

The Northwest Straits Commission and local Marine Resources Committees have a shared goal of protecting and restoring marine water, habitat, and species to achieve ecosystem health and sustainable resource use. The establishment of the Skagit MRC in 1999 coincided with a period of rapid growth in the use of Geographic Information Systems (GIS) to collect and organize environmental data. Prior to the widespread availability of GIS, data analyses and prioritization projects were conducted by resource agencies or university researchers. The availability of GIS combined with the interest of citizen-led groups in identifying conservation and restoration projects has led to greater demand for spatially driven analyses and tools. Therefore, initial work following the establishment of the Northwest Straits Commission and Skagit MRC focused on using GIS to compile, organize, and analyze nearshore habitat and resource datasets. In addition, several small-scale data collection efforts focused on collecting more comprehensive nearshore data to support identification and refinement of conservation and restoration opportunities.

Past assessments that focused on or included Skagit County nearshore ecosystems include:

Marine Ecosystem Analysis (MESA) Program (1978-81). This was a significant field study focused on collecting and compiling data about the Strait of Juan de Fuca and Strait of Georgia as part of a Federal Interagency effort led by the US Environmental Protection Agency. Numerous academic researchers and graduate students contributed to these data collection and evaluation efforts which describe 1) epibenthic zooplankton assemblages, 2) food web relationships, 3) intertidal and subtidal benthos, 4) intertidal and shallow subtidal data, 5) marine bird populations and 6) nearshore fish and macroinvertebrate assemblages. This data collection and evaluation effort did not lead to a set of conservation sites or priorities, but much of this data underlies the conceptual models for how the nearshore ecosystem in Skagit County functions. It is possible that some analyses and findings are only valid for the period when these data were collected, whereas other findings appear more durable over time.

Northwest Straits Nearshore Habitat Evaluation (2002). This was an initial compilation of available GIS data by the Northwest Straits Commission that resulted in the creation of habitat function scores that included both observations of species or habitat as well as habitat modifiers that indicated degradation or constraints on habitat function. This data compilation and analysis effort was intended to provide a baseline of data and conservation planning tools to support the work of individual MRCs. This project resulted in a technical report and associated hard copy maps. These materials were not readily usable to engage in public or landowner outreach.

Willamette Valley-Puget Trough-Georgia Basin Ecoregional Assessment (2004). Ecoregional assessments are an effort to identify important places for conserving native species and ecosystems. Skagit County is part of the Willamette Valley-Puget Trough-Georgia Basin

ecoregion, and this planning effort focused on compiling data about the occurrence of ecological resources and setting goals for the conservation of those resources. This was the first ecoregional planning effort that sought to combine marine and terrestrial resources into a single planning effort. Data about important ecological targets were summarized at a common unit or parcel scale and the most efficient way to meet goals for conservation of those resources led to identifying conservation targets which were mapped.

Northern Skagit County Bays and Shoreline Habitat Conservation and Restoration Blueprint – 2005 Update. (2006). This project was led by the Skagit MRC and updated a prior privately funded conservation planning tool that had been developed by People For Puget Sound. This effort sought to use available data and to incorporate new data collected as part of the project. Data collection involved reviewing then recently collected shoreline oblique photos to create a short list of possible conservation and restoration project. A technical review committee advised the authors in the development of priority indices to highlight areas that are likely important to resources of interest. This project was focused on using science-based planning tools to identify at least two projects for conservation and restoration actions in 2004 and 2005. Specifically, prior to this analysis, the MRCs had been solely collecting and analyzing data and this time-period represented a transition to on-the-ground restoration actions.

Puget Sound Nearshore Ecosystem Restoration Project (2012) This effort was co-led by staff from the Washington Department of Fish and Wildlife (WDFW) and the US Army Corps of Engineers (Corps) and included numerous leading academic and agency science staff. This project envisioned creating a restoration program throughout Puget Sound that would be eligible for Corps aquatic ecosystem restoration funding (similar to efforts that were undertaken to restore waterbodies such as the Everglades, Chesapeake Bay and the Great Lakes). This effort created an analysis framework that evaluated historic conditions and created datasets representing the historic conditions of Puget Sound's nearshore as part of an effort to identify and diagnose restoration needs through Puget Sound. This effort took a more expansive view of the nearshore environment and included adjacent watersheds. In addition to compiling and creating historic data and generating a strategic needs assessment that identifies both types and locations where function of the nearshore ecosystem is being constrained by anthropogenic imposed conditions, the project identified a list of 36 candidate restoration sites or opportunities and developed conceptual mitigation plans for those sites.

Beach Strategies for Nearshore Restoration and Protection in Puget Sound (2014-2023). This project was initiated because earlier shoreline mapping units had resulted in data where the spatial resolution was found to be too coarse and/or included gaps or errors that meant it was inadequate to support local governments and restoration planners. This state-funded update was focused on creating higher spatial resolution data for prioritizing the protection and restoration of Puget Sound beaches and bluffs, developing metrics to address sediment supply processes, forage fish spawning support and pocket beaches. This effort built upon and

systematically resolved shortcomings in data identified during the Puget Sound Nearshore Ecosystem Restoration Project and created end-user focused online mapping tools. This data analysis focuses on the physical form and function of shorelines to identify priorities.

1.3 Project Goals and Approach

The goal of this project, consistent with the overall goals of the Skagit MRC, is to identify project opportunities for shoreline restoration and protection to improve the ecological function of critical shoreline, estuarine, and nearshore habitats.

Within Washington State and Skagit County, there is a wealth of shoreline and nearshore geospatial data that captures elements of the ecological function and habitat quality of the shoreline environment. This project sought to consolidate that data and integrate it into a framework that could meaningfully consider the disparate data to inform restoration opportunities. The framework itself is based on the interests and goals of the Skagit MRC and incorporates scoring to value various data and information accordingly. Through the application of this framework, shoreline parcels and segments can be valued and prioritized based on the ecosystem processes, functions, and habitats in proximity. The framework is purposely designed to capture restoration opportunities and types of projects that would be of interest to the Skagit MRC. The project output therefore may not be consistent with the goals of other entities or organizations, and is not considered to represent an objective assessment of ecological value or quality.

2.0 INPUT DATA

Data were primarily assembled from public sources of spatial data within Washington. Many Washington state agencies, including the Department of Ecology (Ecology), WDFW, and the Department of Natural Resources (WDNR), host geographic information system (GIS) data repositories (Ecology 2024, WDFW 2024, WDNR 2024). These repositories allow publicly available data about biological and environmental factors to be downloaded and used within a GIS software. Additional data were obtained from the National Oceanic and Atmospheric Administration (NOAA) and other local, regional, and national organizations. Details of each dataset and how it was used within the framework are described below.

The prioritization framework described here was developed to the parcel level. This allowed for the identification of specific parcels and areas that are suitable for restoration projects. The parcel layer obtained from Skagit County contained all parcels within Skagit County. The first step was to select out the nearshore parcels by exporting just those parcels that were within the shoreline jurisdiction (200 feet from the Ordinary High-Water Mark (OHWM) or Mean Higher High-Water Mark (MHHW)). Following this step, it was clear that the layer included extraneous polygons and parcels, so a cleaning process was completed by deleting erroneous

parcels. The final parcel layer used in the framework development and scoring included 5,488 parcels along the shoreline of Skagit County.

Available data were divided into 2 main categories to assess the suitability of each parcel for restoration projects: ecological function and restoration potential. Ecological function data related to both the abiotic and biotic factors that affect the overall habitat quality near the parcel. Restoration potential data related to the inherent restoration opportunities near each parcel, considering things such as shoreline armoring and overwater structure presence. An additional category of data was assessed to quantify the feasibility of each parcel, considering things such as the ownership and accessibility of the parcel.

2.1 Ecological Function

The data included in this section were primarily obtained from state and federal agencies and describe both biotic and abiotic habitat characteristics that describe the total ecological function of a given parcel. WDFW has been conducting forage fish surveys to document the presence of Pacific sand lance (*Ammodytes hexapterus*), surf smelt (*Hypomesus pretiosus*), and Pacific herring (*Clupea pallasi*) spawning. Documented spawning is indicative of the presence of appropriate habitat, either recently or in the past. WDNR conducts both eelgrass (*Zostera marina*) and floating kelp surveys. Both eelgrass and kelp provide high quality nearshore resources for a variety of species. Data from the National Wetlands Inventory shows areas with tidal marsh or wetland habitat present, allowing us to determine parcels that are on or near wetland habitats that are important features of functioning nearshore habitats. Information from NOAA and the USGS was used to describe the location of a given parcel to any fish-bearing stream, or if the parcel was within 5-miles of a natal estuary. Streams are important habitat for nearshore species, and the 5-mile natal estuary buffer allows us to be consistent with NMFS' analysis of project impacts under the Salish Sea Nearshore Programmatic (WCRO-2019-04086). Land cover data from NOAA's Coastal Change and Analysis Program (C-CAP) was used to determine the amount of riparian habitat near each parcel. Shoretypes and erosion potential values delineated in the Beach strategies dataset were combined and attached to parcel data. These areas provide various ecosystem services, depending on the type of shoretype and level of erosion. This information can also be helpful in determining suitable restoration actions for a given area. Lastly, water and sediment quality data from Ecology's Water Quality Atlas was joined to determine the level of contamination to water and sediment near the parcel.

2.2 Restoration Potential

The data included in this section were used to determine the level of opportunity each parcel has for restoration. Data from the Puget Sound Ecosystem Restoration Project captured historic wetlands and past estuary extents. Parcels near these areas could benefit from actions that would restore these habitats. WDNR digitized overwater structures in Puget Sound, giving an indication as to any overwater structures that could be removed to improve light penetration

for vegetation or migratory corridors for fish. Beach armoring delineated in the Beach Strategies datasets highlight nearshore areas with hard shorelines armoring. Restoration actions that soften or remove hard shoreline armoring would be good for the habitat and species near there. Skagit County Assessor data tells us the presence of any structures near the shoreline, providing opportunities to increase riparian habitat and functions. WDFW maintains an active dataset describing stream barriers to anadromous fish. Parcels with stream barriers on them, or parcels with streams that have upstream fish barriers, would benefit from actions that increase fish passage. Lastly, a team from Washington Sea Grant and Coastal Geological Services recently completed a sea level rise risk analysis for all parcels in the Puget Sound area (Cite). Parcels with high risk from sea level rise impacts would benefit from restoration actions that help mitigate possible sea level rise effects.

2.3 Feasibility

Feasibility data includes property size, ownership, and value information from the Skagit County assessor's office and available beach access points. These data represent a few of the characteristics of a site that would need to be considered when determining the feasibility of a project in a given location. While there are likely to be other considerations, the datasets included here are those that are spatially explicit and GIS data was available. Other criteria that may need to be considered during a feasibility assessment include funding availability, permitting requirements, and potential project partners, among others.

3.0 PRIORITIZATION FRAMEWORK METHODS

The prioritization framework is a scoring framework developed to characterize the ecological value and habitat quality of nearshore locations in Skagit County, along with the potential or opportunity for restoration. This framework was developed specifically to identify possible restoration projects that the Skagit MRC could consider for implementation.

The overall prioritization framework incorporates three components that when combined characterize the ecosystem function of the site and describe the potential conservation value of conducting restoration at the site. The three components of the framework are: 1) ecological function, 2) restoration potential, and 3) feasibility. These three components would be considered in a stepwise fashion to identify potential locations and restoration actions based on locations with high scores. The scoring system was developed based on the overall project goals and input from the Skagit MRC and the project advisory group. Scoring is conducted for individual parcels and drift cell segments. These two types of data (polygon versus line; administrative versus environmental) allow for distinct but complementary presentations of the prioritization results. Additional details on the prioritization framework, criteria, and scoring are available in Appendix A.

The following sections provide the basis and background for the data included in each component of the prioritization framework, and the details for the associated scoring.

3.1 Ecological Function Score

The Ecological Function category incorporates data associated with the physical, chemical, and/or biological attributes of a site. Table 1 summarizes the data included in this category and the associated scoring rules. The maximum score is 50. Details on the rationale behind the scoring are provided below.

Table 1. Ecological Function scoring criteria and rules

Prioritization Attribute	Description	Maximum Score	Scoring
Forage fish spawning	Documented observation of sand lance, surf smelt, or herring spawning	6	6 → documented presence within 200 ft 0 → no documented presence or habitat
Eelgrass presence	Documented presence of eelgrass (*Zostera marina* or *Zostera japonica* combined) in proximity.	6	6 → documented presence within 200 ft 0 → no documented presence or habitat
Kelp presence	Documented presence of kelp (e.g., *Nereocystis luetkeana*, *Laminaria* spp.).	6	6 → documented presence within 200 ft 0 → no documented presence or habitat

Tidal marsh or wetland habitat	Current presence of tidal marsh or wetland habitat on the parcel or adjacent to shoreline segment.	3	3 → mapped wetland 0 → no
Proximity to natal estuary	Assesses whether the proposed location is within 5-mile buffer of salmonid natal streams.	2	2 → Within 5 miles of natal estuary 0 → >5 miles to stream
Distance to stream	Distance (as fish would swim) to nearest the stream (not necessarily natal stream).	4	4 → stream on parcel 2 → <0.5 miles to stream 0 → >0.5 miles to stream
Land cover	Considers the proportion of the upland/riparian area that is natural versus developed.	3	3 → majority of upland area is natural 0 → majority of upland area is developed
Shoretype and erosion potential	Potential for erosion of the shoreline based on fetch and shoretype. Dominant shoretypes include Pocket Beach (PB), Accretion Shoreform (AS), Feeder Bluff (FB), Feeder Bluff Exceptional (FBE), No Appreciable Drift (NAD), or Transport Zone (TZ).	8	8 → PB with erosion potential of 3-4 OR FB/FBE with erosion potential of 7-8 6 → PB with erosion potential of 5-6 4 → FB/FBE with erosion potential of 5-6 2 → AS or TZ 0 → NAD
Sediment quality	Based on data from the Washington Department of Ecology that captures assessed sediments under the Clean Water Act. Category 1 and areas that have not been assessed are considered to have high sediment quality. Category 5 represents the lowest quality.	6	6 → Category 1 or no data 4 → Category 2 or 3 2 → Category 4 0 → Category 5 (303(d) list)
Water quality	Based on data from the Washington Department of Ecology that captures assessed waters under the Clean Water Act. Category 1 and areas that have not been assessed are considered to have high water quality. Category 5 represents the lowest quality.	6	6 → Category 1 or no data 4 → Category 2 or 3 2 → Category 4 0 → Category 5 (303(d) list)

Forage fish, eelgrass, kelp, and tidal marshes or wetland habitat represent important parts of the Puget Sound ecosystem. Forage fish are prey for many species, including marine mammals, fish, and birds, and are a critical link within marine trophic systems. Spawning habitat for these species is necessary to ensure their continued presence in the ecosystem. Eelgrass and kelp are important rearing and foraging habitats for juvenile fish and other species. Tidal marshes and wetlands provide connection to terrestrial ecosystems that add necessary nutrients, sediment, and prey to estuarine and nearshore habitats. Documentation of these types of habitats in the available GIS data is indicative of the quality and value of the location. Additionally, proximity to natal estuaries or streams provides a sense of the likelihood of the site being utilized by juvenile salmonids during their outmigration. Riparian or upland land cover and the amount of development in proximity to the shoreline again suggests the likely quality of the site; areas with less development adjacent to the shoreline and more natural vegetation or land cover are likely functioning well as riparian habitat. Shoretype and erosion potential consider the physical processes at the location. In this case, a location would score highly if it is a pocket estuary with

low erosion potential or a feeder bluff with high erosion potential. Both of these types of sites are important but for different reasons and each warrant prioritization, if appropriate. Finally, documented water and sediment quality indicates whether a quality issue has been observed; locations with lower water or sediment quality are likely to be less valuable ecologically. Taken together, these data represent a range of ecological characteristics that help to characterize the overall value or quality of the site.

3.2 Restoration Potential Score

The Restoration Potential score considers data related to nearshore development and degraded conditions that could be restored. Table 2 summarizes the data included in this category and the associated scoring rules. The maximum score is 50. Details on the rationale behind the scoring are provided below.

Table 2. Restoration Potential scoring criteria and rules

Prioritization Attribute	Description	Maximum Score	Scoring
Historic wetlands	Historic wetlands and past estuary extents. When considering restoration opportunities, this data highlights locations that could be restored to a past high-value condition.	4	4 → yes, within 200 ft 0 → no
Presence of overwater structures	Considers whether overwater structures are present on the parcel or along the shoreline.	5	5 → yes, within 200 ft 0 → no
Armoring	Armoring identified along the shoreline.	5	5 → yes, within 200 ft 0 → no
Structures adjacent to shoreline	Presence of structures on the nearshore parcel.	5	5 → yes 0 → no
Stream barriers	Documented barriers to fish passage on the parcel/within the drift cell or upstream of an identified stream.	3	3 → stream barrier present 1 → barrier upstream 0 → no stream barrier
Sea level rise risk	Risk of the location being affected by sea level rise. May help to highlight locations where restoration actions could help mitigate effects of sea level rise.	3	3 → high 1 → med 0 → low

Available historic wetlands data capture locations where wetlands have been filled or degraded and where efforts could potentially restore prior functioning. The presence of overwater structures, armoring, or nearshore structures indicates areas where nearshore development has resulted in degradation of the nearshore or riparian habitat. Removal or modification of such structures could help to improve the ecological functioning. Stream barriers represent limitations on fish passage, likely upstream of the location directly considered in this assessment. However, incorporation of this information allows for recognition of the potentially degraded freshwater system and can inform the suitability of a location for restoration. Finally, sea level rise risk indicates whether the location is at a high, medium, or low risk for impacts

from sea level rise. In this case, restoration could help to mitigate the effects of sea level rise; further site-specific investigation would be necessary to determine if such efforts would be meaningful and feasible.

3.3 Feasibility Score

The Feasibility score considers data related to the feasibility of conducting a preservation or restoration project in a given location. Table 3 summarizes the data included in this category and the associated scoring rules. The maximum score is 25. Details on the rationale behind the scoring are provided below.

Table 3. Feasibility scoring criteria and rules

Prioritization Attribute	Description	Maximum Score	Scoring
Ownership	Private versus public ownership according to assessor's data.	10	10 → public ownership 0 → otherwise
Parcel size	Acreage of parcel according to assessor's data. Parcel size can capture the available area for a restoration project and may also have implications for feasibility.	5	5→>25 acres 4→10-25 acres 3→2-10 acres 2→1-2 acres 1→0.5-1 acres 0 →<0.5 acres
Parcel value	Assessed value according to assessor's data.	5	5→ <$8K 3→$8K-$300K 2→ $300k-$1M 0 → >$1M
Beach access	Proximity to public beach access point. Beach access is important for determining coordination requirements, especially if a project is relying on volunteer support.	5	5 → Access point on parcel 3 → Access point within 0.5 mile of parcel 0 → no nearby beach access

The data in this category was largely obtained from the Skagit County Assessor and considers the ownership, value, and size of the parcel where a project could be implemented. Beach access is also included, recognizing the importance of volunteers and community engagement in MRC projects. For this effort, the feasibility is presented as a final step in the process, and therefore feasibility scoring is not discussed in detail here. Following identification of high scoring locations in both the Ecological Function and Restoration Potential categories, the Skagit MRC would be able to review site-specific feasibility information to determine if the parcel details would challenge a project's completion.

3.4 Project Identification Process

The prioritization framework presented here is intended to be a tool for identifying potential restoration projects. The county-wide and data rich approach creates a tool that makes project identification more straightforward and less biased by site familiarity, user background, or

resource focus. The following discussion describes the intended process for applying the results of the prioritization to identify potential restoration or preservation projects. This process was used to identify the 5 potential high priority projects presented in Section 4.4.

The Ecological Function category incorporates available and meaningful data to characterize the value and quality of the habitat provided in a given location. Consideration of the scoring for this category would be the first step in identifying a potential location of high priority. Locations that score high for this category are considered to provide important ecosystem functions and have high quality habitat. This first step alone may identify appropriate locations for preservation. High scoring sites are already high functioning and acquisition of the property or establishment of a conservation easement could help to maintain the ecological value.

To identify a restoration project, the second step in the process would be to consider the scoring associated with the Restoration Potential category. This category incorporates available data on degraded conditions or historic conditions that could be restored. Locations that score high in this category include overwater structures, shoreline armoring, nearshore structures, or other characteristics that could be restored to a more natural condition. Restoration would be especially impactful in locations where there is already indication that the area provides high quality habitat. Therefore, considering locations that score high for both Ecological Function and Restoration Potential would be the highest priority and identify locations that are likely to have the greatest impact, if restored.

Once high priority locations are identified for preservation or restoration, the third step is to review the Feasibility category of data, which considers the practical elements of potentially completing a project in a certain location. While there are scores associated with the data to indicate if the location is likely to be suitable for a Skagit MRC project (e.g., small parcels score higher, locations far from beach access points score lower), review of the Feasibility considerations would be more of a manual process. With the sites identified as highest priority in the first two steps, a user would review the Feasibility score and underlying data to determine if a project would be practical and feasible.

Ultimately, as described above, this framework is a tool and requires the user to consider context and information beyond the scope of the tool to make a final decision. The tool was limited to available, spatially explicit data at a resolution that is meaningful to differentiate between locations along the Skagit County shoreline.

4.0 PRIORITIZATION FRAMEWORK RESULTS

A total of 5,488 nearshore parcels in Skagit County were assigned scores based on the prioritization framework. These nearshore parcels are part of 97 drift cells making up the marine shoreline of Skagit County. Scoring results are presented in both parcel (polygon) and drift cell (line) form to support different types of review (especially when considering

feasibility), but both datasets ultimately present the same results. The attributes and scoring details associated with these output datasets are provided in the data dictionary in Appendix B. Figure 2 provides a geographic overview of the prioritization scores. Prioritization scores shown in Figure 2 are displayed in four priority tiers based on Jenks natural breaks in the scoring for each parcel: highest, high, moderate, and low. These tiers combine the scoring for the Ecological Function category and the Restoration Potential category, therefore focusing the highest priority tier on locations that have high ecological function and high potential for restoration. The scoring breaks for each priority group are shown in Table 4. The Feasibility category is not incorporated into the scoring results presented in Figure 2, as feasibility is considered as a subsequent step, once high ecological value locations with restoration potential are identified. The results of the scoring for the Ecological Function and Restoration potential categories are summarized in Figure 3 and symbolized according to the prioritization tiers outlined in Table 4. These results highlight the range of scores in both of the categories and suggest that the prioritization framework is functioning as intended. That is, the framework is able to differentiate between parcels of higher or lower ecological function and higher or lower restoration potential. Parcels scoring in the top right corner of the graph are considered to be in the highest tier of the prioritization and would be the focus for further consideration.

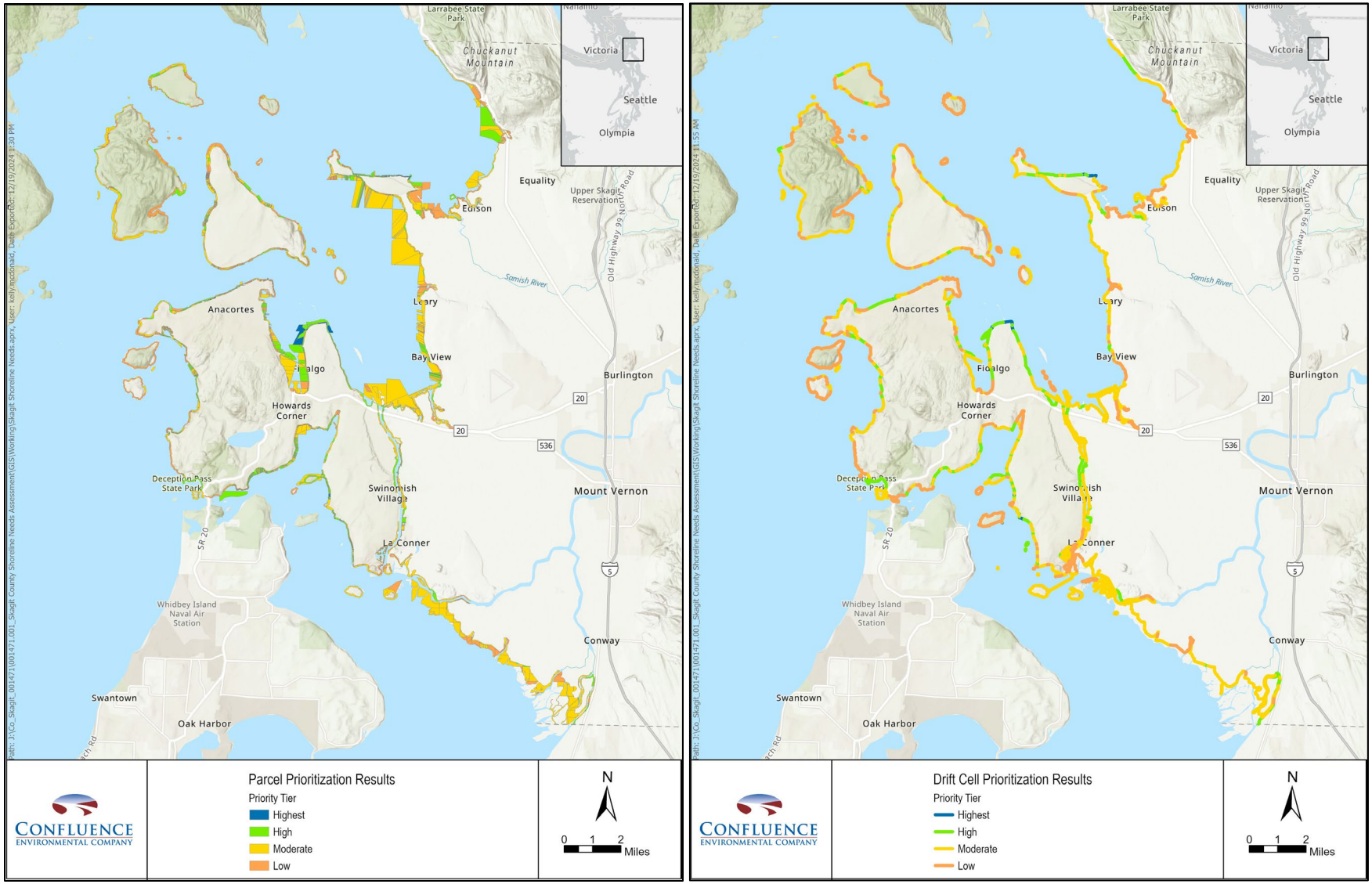

Figure 2. Overview of parcel and drift cell prioritization results

Table 4. Scoring breaks and tiers for the prioritization results

		Ecological Function (0-50 points)		
		Low (=<15)	Moderate [15-23)	High (>23)
Restoration Potential (0-25 points)	High (>15)	Moderate	High	Highest
	Moderate (8-15]	Low	Moderate	High
	Low (=<8)	Low	Low	Moderate

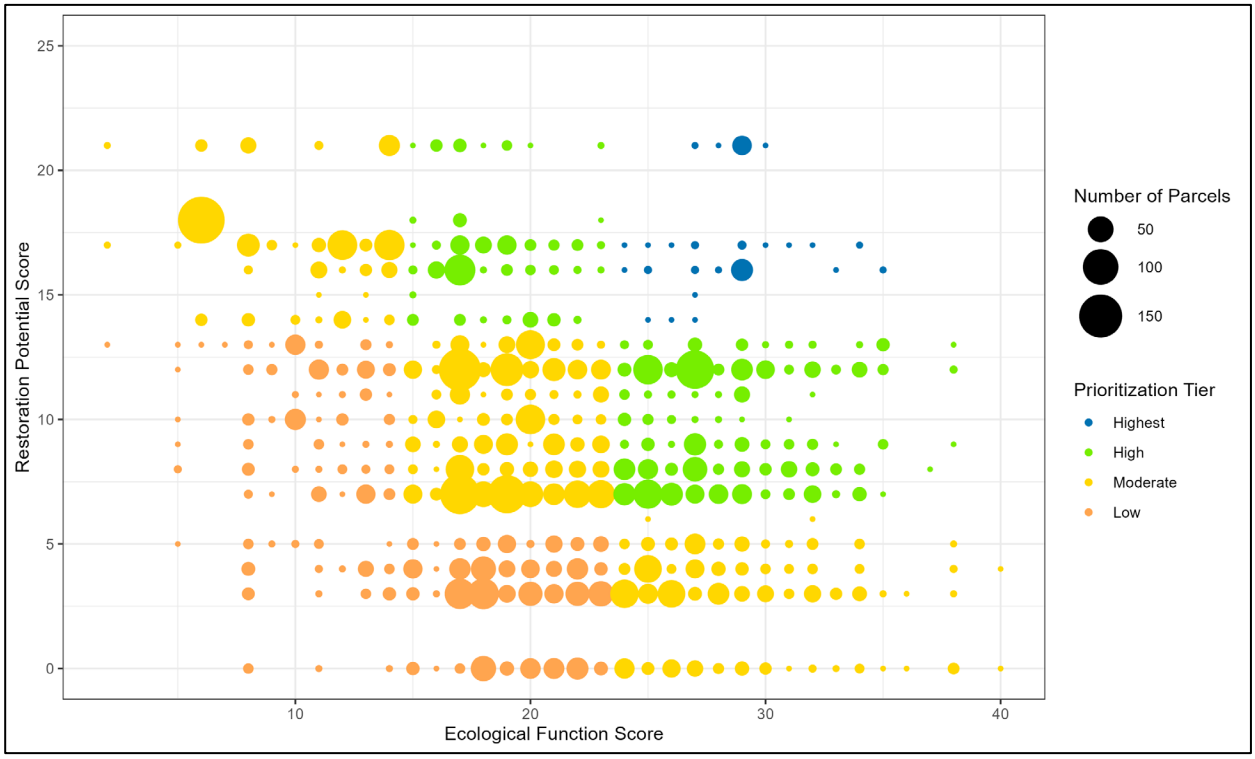

Figure 3. Prioritization results based on overall Ecological Function and Restoration Potential scores

4.1 Ecological Function Results

Actual parcel scores for the Ecological Function category varied between 2 and 40, with a mean of 20.32. As shown below in Figure 3, there is a good spread of the data along the x-axis, and the scoring framework was able to differentiate among parcels of varying ecological function. The spread of the data is a good indicator that the framework is functioning as intended; without a range of scores, it would not be possible to separate higher priority locations from lower priority locations. The results presented in Figure 2 also highlight geographic variation in the

results, giving the Skagit MRC multiple locations and focus areas in which to complete a project. Overall, the Ecological Function category scores provide valuable information to identify potential high quality project locations.

4.2 Restoration Potential Results

In the Restoration Potential category, actual parcel scores varied between 0 and 21, with a mean of 8.99. There is a good spread of data along the y-axis in Figure 3 below, suggesting that the scoring framework was able to differentiate among parcels with varying restoration potential. As noted above, the distribution of the data is a good indicator that the framework is functioning as intended and a suitable tool for identifying priority locations for a restoration project.

4.3 Feasibility Results

The results of the Feasibility analysis are intended to be used in a subsequent step, after high priority locations are identified based on the Ecological Function and Restoration Potential scoring. These data indicate whether a parcel size, value, and ownership would be suitable for pursuing a project. The results are not summarized here; the Skagit MRC would be able to review the data in the associated online map and/or geodatabase to determine whether a project would be feasible.

4.4 High Priority Locations

The following sections highlight specific locations in the highest or high priority tiers where the Skagit MRC may consider a restoration or preservation project. Each priority area was identified by systematically evaluating the prioritization results to identify areas where high priority areas were concentrated. A potential limitation to this approach is that it may not prioritize isolated individual parcels that may have high scores that are surrounded by lower priority parcels even though those individual parcels may represent high priorities. The identified locations provide examples and a guide for how the prioritization tool may be used by the Skagit MRC to identify project locations. While the locations and potential actions are conceptual at this phase, additional consideration of site-specific information and feasibility could lead to actionable restoration efforts.

4.4.1 Crandall Spit and March Point

The northern portion of March Point (from Crandall Spit on the west to an area just south of the northeast point of March Point) has been consistently identified by the Skagit MRC as a potentially important contributor to nearshore ecology and this analysis reaffirms that finding. Prior reports including the March Point Rapid Shoreline Inventory and Bays Blueprint (People for Puget Sound 2001, Bloch et al. 2006) identified this area as providing a combination of conservation and restoration opportunities. This area includes 3 of the 21 sites described in the

2005 Bays Blueprint (Bloch et al. 2006) including the West Side of March's Point above Crandall Spit, East side of March's Point, and Crandall Spit. The 2005 report identified these as sites that scored highly for marine bird habitat and forage fish models, and in the secondary tiers for beach sediment and juvenile fish habitat.

While there are obvious impacts to this area from development associated with the two refineries located on March Point, and the associated infrastructure including pipelines, piers and roads, the point has no residential development and limited recreational use due to increased security needs for refinery infrastructure since 2001. Therefore, the large industrial landowners and limited agricultural use of adjacent lands have limited development and human activity along shorelines near the point. The site includes estuarine wetlands, bird roosting/nesting areas, forage fish spawning habitat for herring, surf smelt and sand lance, eelgrass habitat, and may provide important foraging areas for juvenile salmonids.

This is an area of ongoing conservation and restoration focus. The Skagit MRC has also pursued successful Olympia oyster restoration efforts in Fidalgo Bay, growing the population from an initial seed set of approximately 50,000 in 2002 to more than 5.5 million in 2023 (Skagit MRC 2024). WDNR has designated tideland areas south of Crandall Spit to be part of the Fidalgo Bay Aquatic Reserve (WDNR 2019). The Northwest Straits Foundation is currently initiating efforts to map and mark eelgrass beds adjacent to this area as potential voluntary eelgrass protection areas.

Restoration and protection concepts for this area may include:

- Riparian planting around shore side of March Point Road
  - Shoreline habitat lacks shading or terrestrial prey (insect) sources in this area and increased riparian plantings will benefit beach spawning forage fish and may provide forage resources to fish and invertebrates that use the upper intertidal including juvenile salmon.
- Engagement with oil spill planning efforts
  - The area has oil spill risks due to its proximity to two oil refineries and their associated rail and marine transport networks. Engaging in oil spill planning and prevention efforts by identifying important resources to be protected in case of a spill and understanding the planning process would be beneficial. This may include consideration of spill potential and alternate routing for the pipeline connecting the Shell Pier to its refinery. The current routing is over intertidal and shoreline habitats for approximately 3,000 linear feet from south of Crandall Spit to the pier.
- Support strategic reduction of nearshore structures
  - Multiple boat ramps and parking areas are located in this area. Where possible, removing these or relocating these structures further upland and away from the

nearshore zone would provide the potential for natural processes to support shoreline processes. These structures appear to be in areas of historic estuarine wetland and shoreline riparian habitats that could be restored if removed.
    - Evaluating discharge pipes that area in the area and understanding the purpose and water quality implications of each outfall.
- Green crab monitoring
    - A green crab molt was detected at Crandall Spit in 2016, prompting increased monitoring in the area. Continued monitoring would help understand how and whether green crab are present in the area and what the impacts are to native species.
- Coordination with Fidalgo Bay Aquatic Reserve and Conservation Landowners
    - Consider proposing expanding the boundary to include, at minimum, all tidelands adjacent to Crandall Spit including a buffer north of the spit.
    - Adding bird monitoring sites that include Crandall Spit to complement those associated with the Weaverling Spit/Tommy Thompson Bike Path Trestle and other areas further south in Fidalgo Bay.
    - Adding signage or public information about the importance of Crandall Spit and associated wetlands to birds and fish.
    - Working to secure long-term conservation status for Crandall Spit and associated wetlands.

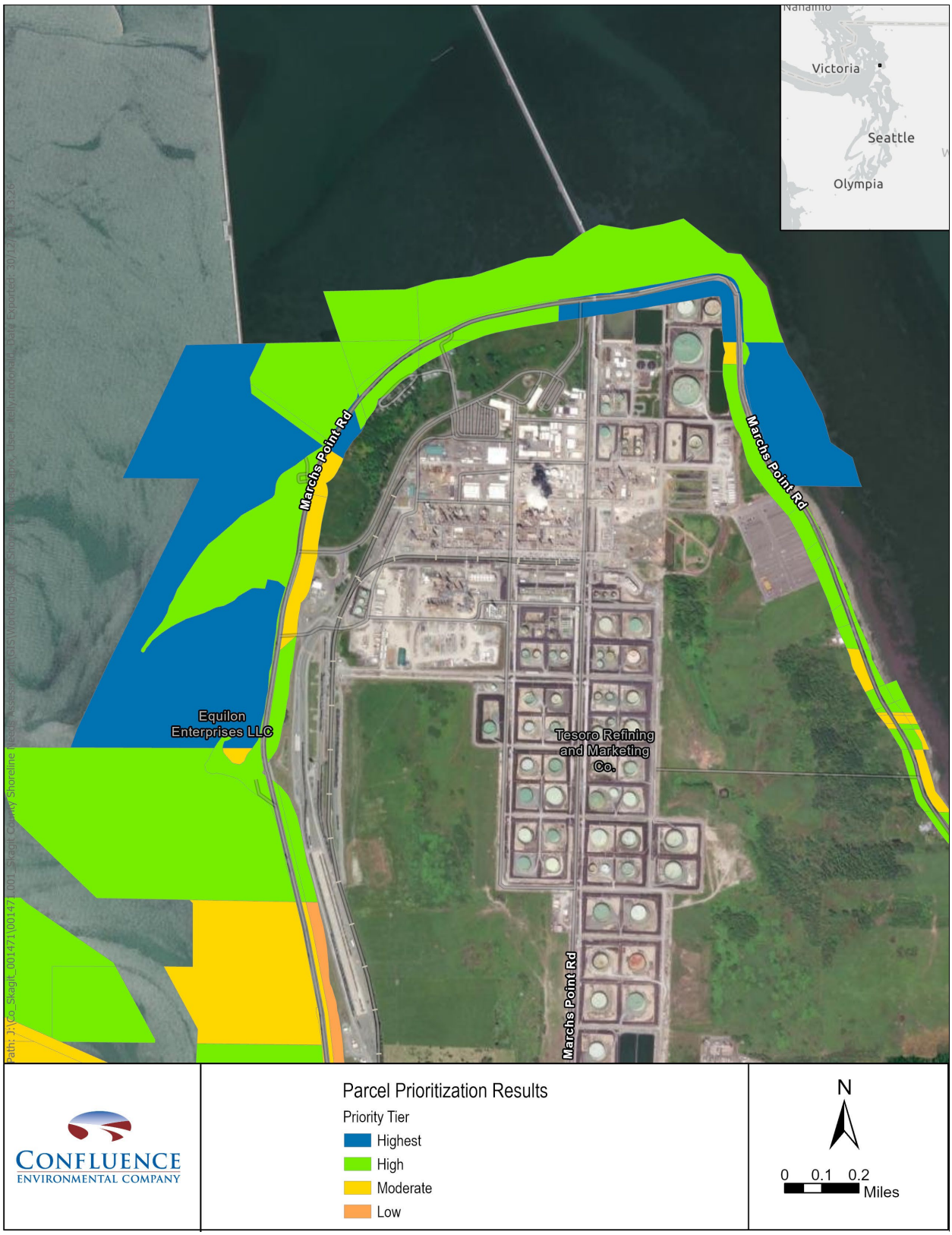

Figure 4. Crandall Spit and March Point high priority site

4.4.2 Samish Island and Outer Samish Bay

The northeast corner of Samish Island includes a stretch of low-bank shoreline adjacent to broad tideflats extending into Samish Bay that include the deepwater channel connecting to the Samish River. Prior reports including the Samish Island RSI and Bays Blueprint (Bloch et al. 2002 and Bloch et al. 2006) identified this area as providing a combination of conservation and restoration opportunities. Samish Bay is recognized by Washington Audubon as an important bird area that supports more than 220 species (Cullinan 2001). Many of these species are attracted by the expansive tideflats and eelgrass beds in this area, as well as the many nearshore species that use these habitats. Eelgrass beds in Samish Bay are the second largest in the state with more than 2,000 hectares (approximately 5,000 acres). This site represents an area where multiple resources are coming together: freshwater input and migration corridors to the Samish River, the outer edge of eelgrass beds associated with Samish Bay, and shorelines and riparian areas associated with Samish Island. Forage fish including beach spawning surf smelt and subtidal spawning herring are also documented to use this area. These diverse and highly productive resources come together at this site to create a site of high conservation interest and priority.

This area is also highly valued for human use with seasonal and year-round shoreline properties, boat moorage, and aquaculture. Many of these uses may be compatible with nearshore ecology, while others may constrain or prevent nearshore processes and functions.

Restoration and protection concepts for this area may include:

- Coordination with and education of shoreline landowners regarding the importance of nearshore habitats adjacent to their property and shore friendly development.
  - Existing bulkheads/shoreline armoring near the NE point.
  - Potential demand/interest in future shoreline armoring
  - Evaluation of lower impact boat docks/moorage
  - Riparian vegetation plantings
- Evaluation of sea level rise scenarios and potential impacts to
  - Shore spawning fish habitats
  - Eelgrass habitats
  - Aquaculture
  - Residential structures and infrastructure
- Coordination with landowners that own undeveloped shoreline just south of the Blue Heron Road/NE Point of Samish Island for long-term conservation of these shoreline areas.
- Development of a publicly accessible boat ramp and potential consolidation or removal of multiple private boat ramps.

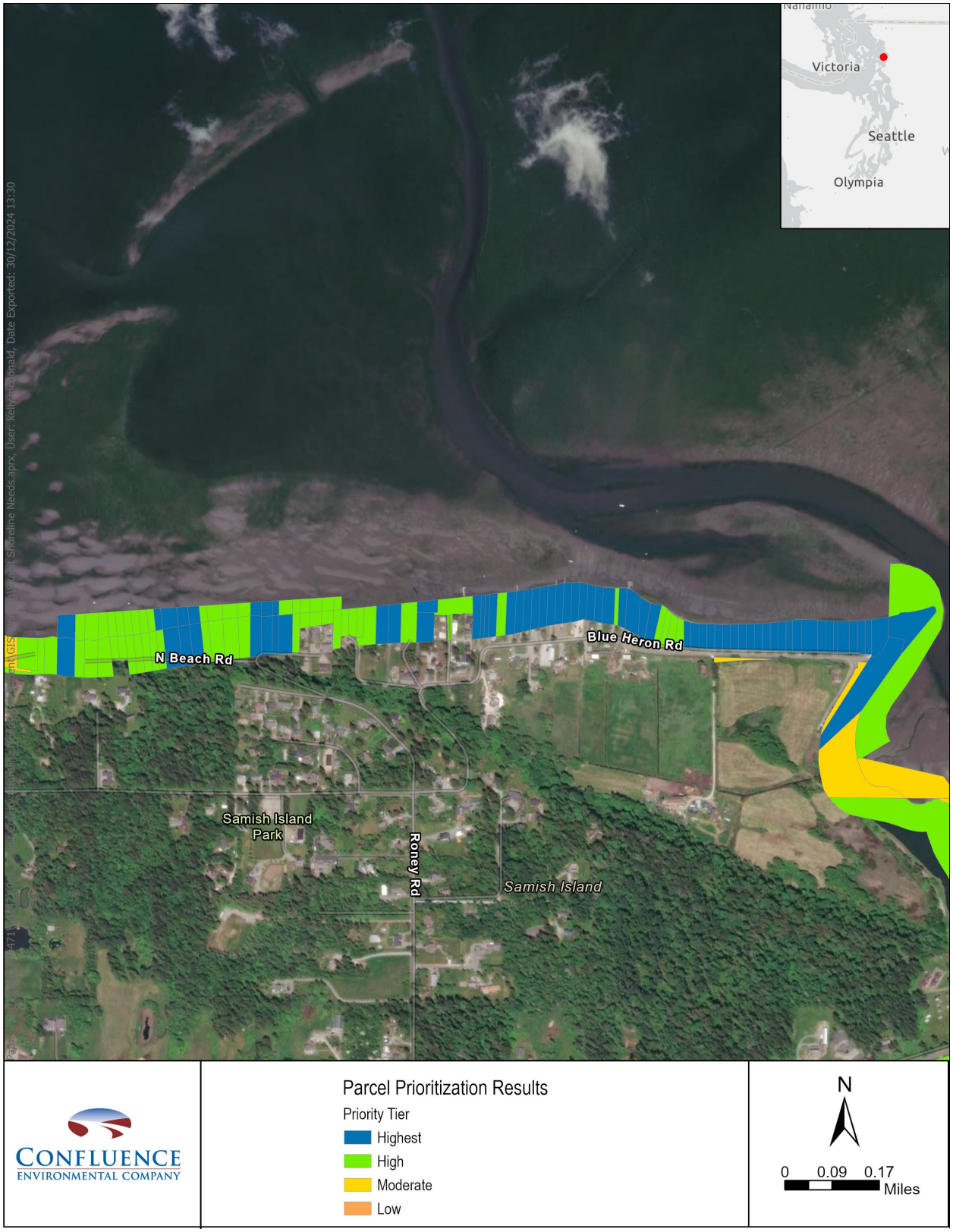

Figure 5. Samish Island and Outer Samish Bay high priority site

4.4.3 Gibralter/Campbell Creek Mouth

Campbell Creek drains the Campbell Lake Watershed into a portion of Similk Bay where Gibralter Road (formerly Erie Avenue) extends upland of the shoreline. This cove is near the southern extent of mapped herring spawning activity associated with the Similk Bay stock. The Skagit System Cooperative evaluated Campbell Creek for potential non-natal habitat use and detected juvenile Chinook salmon in the lower reaches of Campbell Creek (Beamer et al. 2013). The creek appears to discharge a significant amount of sediment to the nearshore as evidenced by its delta, a feature that appears in both current aerial photos and historic maps.

Restoration and protection concepts for this area may include:

- Further evaluation the fish passage status of Deception Road Culvert. Initial evaluation noted that the culvert span is less than current design guidance, however presence of driftwood creates downstream controls that facilitate fish passage. WDFW has been developing guidance for tidal culverts like this one and it should be re-evaluated with that guidance.
- Evaluation of non-natal habitat use of Campbell Creek by juvenile salmon.
- Reports indicate that Campbell Lake may be impacted by excess nutrients. It is unclear whether these nutrients are also impacting downstream habitats. Given the potential linkages between excess nutrient inputs and loss of eelgrass in some areas, this should be further evaluated.
    - Map and monitor eelgrass in Gibralter Cove vicinity
    - Work with Skagit County Surface Water Management and Lake Management District #3 to understand implications of nutrients in Erie and Campbell lakes on downstream habitats and ecosystems.
    - Work with Skagit County Surface Water Management and Lake Management District #3 to understand implications of algae and vegetation management using herbicides on downstream habitats and ecosystems.
- Coordination with and education of shoreline landowners regarding the importance of nearshore habitats adjacent to their property and shore friendly development.
    - Riparian vegetation plantings
    - Identification and reduction of nutrient inputs

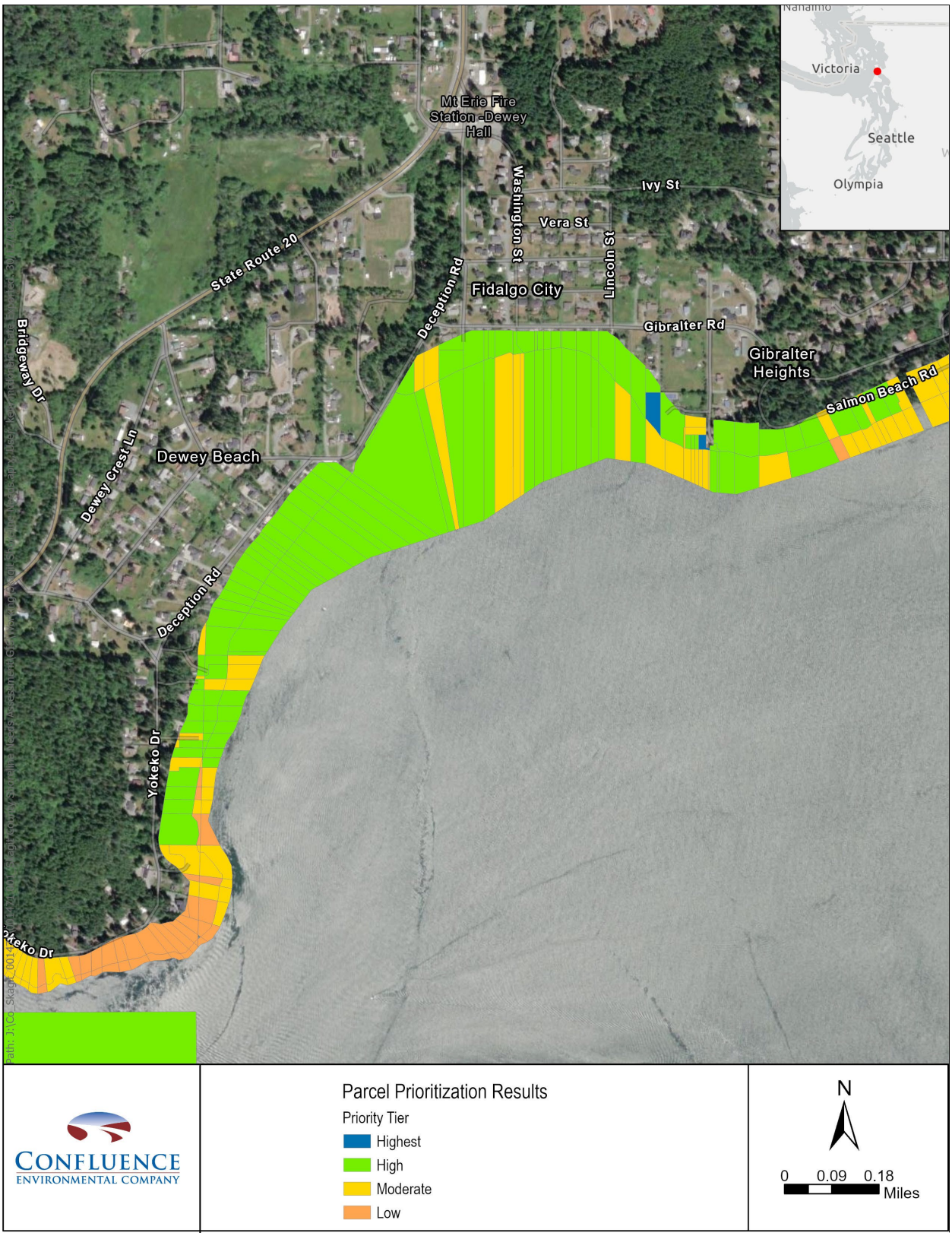

Figure 6. Gibralter/Lake Campbell Creek Mouth high priority site

4.4.4 Kiket Bay to Snee Oosh Point

The shorelines between Kiket Bay and Snee Oosh Point along the eastern shoreline just south of Similk Bay contain a high diversity of habitats that support nearshore species and resources. These start with the estuarine wetlands and a tombolo connecting the mainland to Kiket Island at the north, continue through the relatively intact tidal wetlands associated with Three Tree Point, and extend to the nearshore kelp communities and historic tidal wetland communities just south of Snee Oosh Point. These nearshore estuarine wetland communities are increasingly rare in the Salish Sea and estuarine wetland area has experienced the greatest loss and simplification due to development since the pre-contact period (Simenstad et al. 2011).

Restoration and protection concepts for this area may include:

- Partnership with Swinomish Indian Tribe to identify opportunities to support or partner for restoration near Kiket Island including:
  - Tombolo beach restoration
  - Clam gardening
- Support restoration and protection in Three Tree Point vicinity including:
  - Restoration of natural shoreline dynamics by addressing shoreline erosion, sediment loss and habitat degradation
  - Support native riparian plantings
  - Remove artificial structures along the shoreline and near creek mouths
- Support restoration and protection near Snee Oosh Point including:
  - Evaluate potential impacts of sea level rise on built and natural environment
  - Evaluate restoration potential for historic estuarine wetland associated with Snee Oosh beach.
  - Map kelp resources

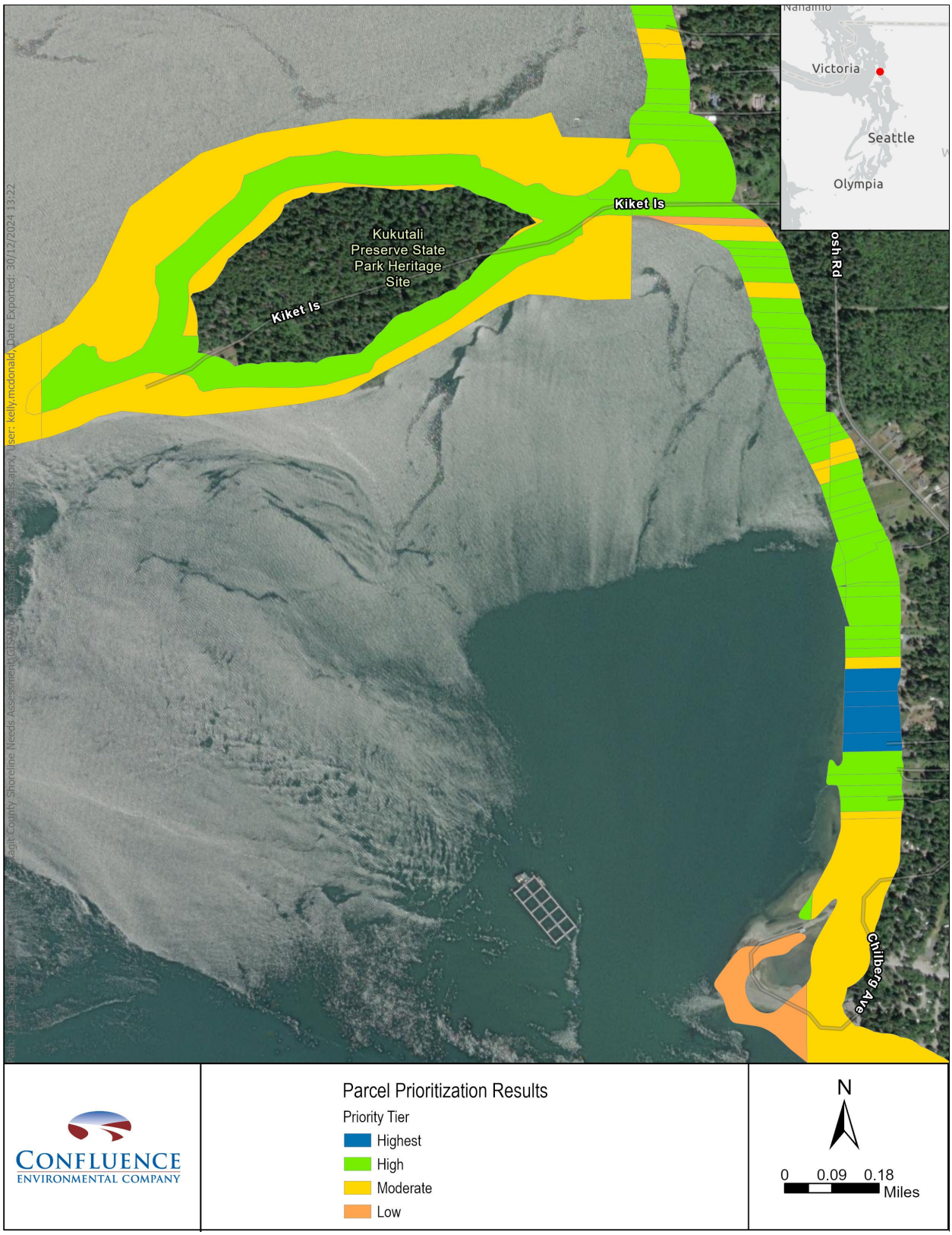

Figure 7. Kiket Bay to Snee Oosh Point high priority site

4.4.5 Cranberry Lake Creek Mouth Vicinity

Cranberry Lake Creek drains into Guemes Channel through a perched culvert that is a complete fish passage barrier. A combination of culverts extending approximately 1,000 feet managed by WSDOT and the City of Anacortes appear to connect the flow from Cranberry Lake to Guemes Channel. Non-natal streams and freshwater inputs are relatively rare in this area and would likely create a refuge point for juvenile salmonids. Nearshore habitat mapping suggest that eelgrass communities are present and stable along this stretch. A substantial maritime facility is just east of this area that may be interrupting ecological processes and shoreline species movement linking shorelines on either side of the facility.

Restoration and protection concepts for this area may include:

- Coordination with the City of Anacortes and WSDOT to evaluate potential culvert or stream channel restoration opportunities.
- Mapping/monitoring eelgrass habitat along this section of shoreline
- Mapping/monitoring nearshore fish movement through this area
- Engaging La Merced maritime facility to identify restoration opportunities and opportunities to link habitats up- and down-drift of their facility.

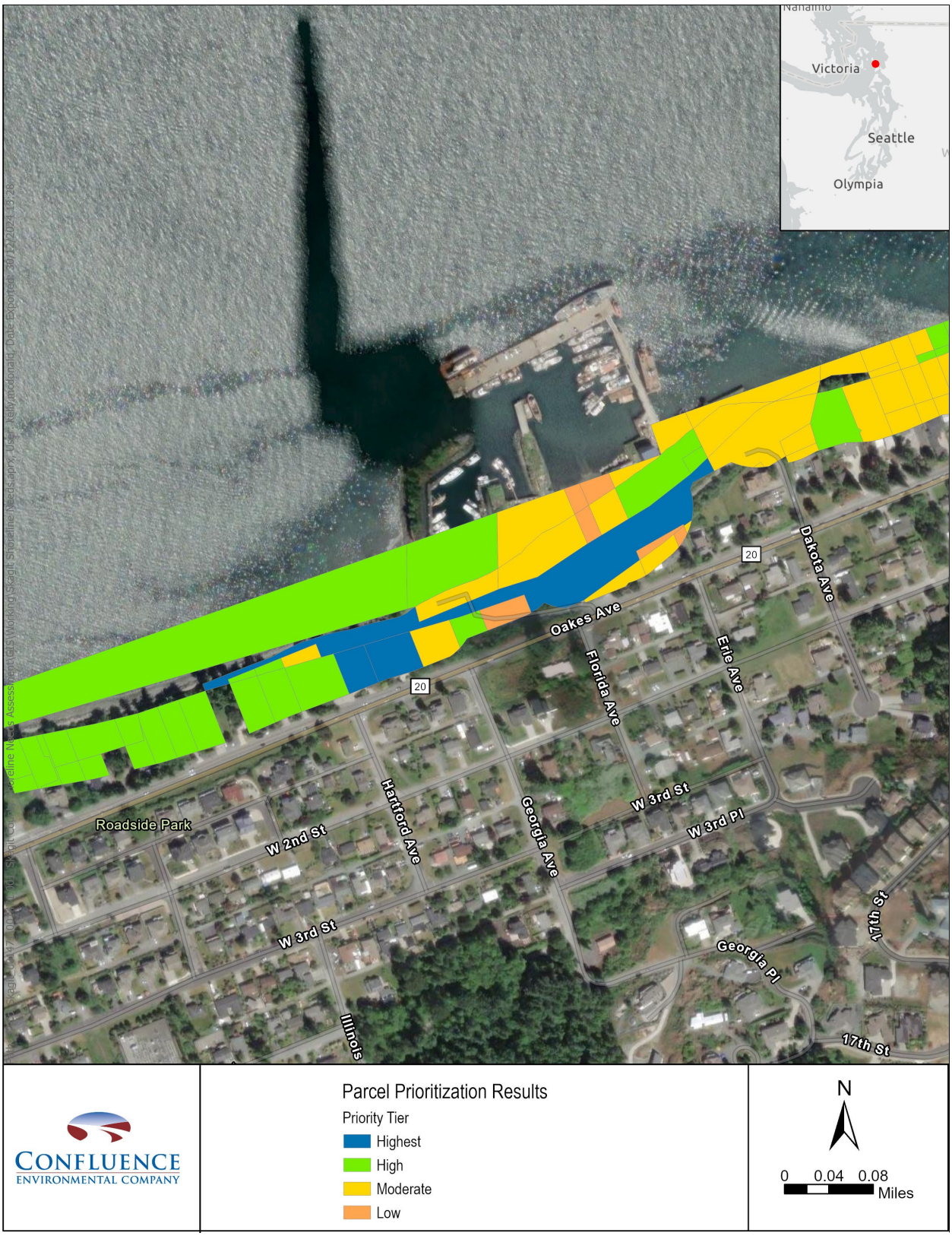

Figure 8. Cranberry Lake Creek Mouth Vicinity high priority site

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Appendix A
Prioritization Criteria

Table 1. Skagit Shoreline Needs Assessment Prioritization Framework and Process

Prioritization attribute	Description	Data Source	Maximum score	Scoring
STEP 1: Determine ecological value of the location by evaluating criteria associated with the type and quality of the habitat based on available data. *The sum of the scores in the Ecological Function category represents the "ecological value". Higher scores would indicate higher ecological value.*				
ECOLOGICAL FUNCTION				
Forage fish spawning	Documented forage fish spawning at location or nearby herring spawning. Consider beach spawners separately from herring. Documented spawning is indicative of the presence of appropriate habitat, either currently or in the recent past.	WDFW	6	6 → documented presence within 200 ft 0 → no documented presence or habitat
Eelgrass presence	Documented presence of eelgrass (*Zostera marina* or *Zostera japonica* combined) in proximity. Eelgrass documented habitat would provide high quality nearshore resources for a variety of species.	DNR	6	6 → documented presence within 200 ft 0 → no documented presence or habitat
Kelp presence	Documented presence of kelp (e.g., *Nereocystis luetkeana*, *Laminaria* spp.). Kelp documented would provide high quality nearshore resources for a variety of species.	DNR (Floating Kelp Forest Indicator)	6	6 → documented presence within 200 ft 0 → no documented presence or habitat
Tidal marsh or wetland habitat	Current presence of tidal marsh or wetland habitat on the parcel or adjacent to shoreline segment. Tidal marshes and wetlands are important features of functioning nearshore and riparian habitats.	NWI PSNERP	3	3 → mapped wetland 0 → no
Proximity to natal estuary	Assesses whether the proposed location is within 5-mile buffer of salmonid natal streams. NMFS is currently using a 5-mile buffer when assessing impacts of proposed projects, so this analysis is consistent.	NMFS	2	2 → Within 5 miles of natal estuary 0 → >5 miles to stream
Distance to stream	Distance (as fish would swim) to nearest the stream (not necessarily natal stream). Streams are important habitat for nearshore species and represent key connections to terrestrial ecosystems. Only type F (fish bearing) streams included.	Synthetic streams and/or Statewide Washington Integrated Fish Distribution, depending on coverage	4	4 → stream on parcel 2 → <0.5 miles to stream 0 → >0.5 miles to stream
Land cover	Considers the proportion of the upland/riparian area that is natural versus developed. NOAA's C-CAP dataset classifies land cover into one of 24 land cover types, including both developed and undeveloped types.	NOAA Coastal Change Analysis Program (C-CAP)	3	3 → majority of upland area is natural 0 → majority of upland area is developed
Shoretype and erosion potential	Potential for erosion of the shoreline based on fetch and shoretype. Dominant shoretypes include Pocket Beach (PB), Accretion Shoreform (AS), Feeder Bluff (FB), Feeder Bluff Exceptional (FBE), No Appreciable Drift (NAD), or Transport Zone (TZ). Locations score high if they are identified as a pocket beach and have a low potential for erosion or are identified as a feeder bluff with a high potential for erosion.	Beach Strategies	8	8 → PB with erosion potential of 3-4 OR FB/FBE with erosion potential of 7-8 6 → PB with erosion potential of 5-6 4 → FB/FBE with erosion potential of 5-6 2 → AS or TZ 0 → NAD
Sediment quality	Based on data from the Washington Department of Ecology that captures assessed sediments under the Clean Water Act: Water Quality Standards. Category 1 and areas that have not been assessed are considered to have high sediment quality. Category 5 represents the lowest quality.	Water Quality Atlas	6	6 → Category 1 or no data 4 → Category 2 or 3 2 → Category 4 0 → Category 5 (303(d) list)
Water quality	Based on data from the Washington Department of Ecology that captures assessed waters under the Clean Water Act: Water Quality Standards. Category 1 and areas that have not been assessed are considered to have high water quality. Category 5 represents the lowest quality.	Water Quality Atlas	6	6 → Category 1 or no data 4 → Category 2 or 3 2 → Category 4 0 → Category 5 (303(d) list)
		TOTAL	50	Higher scores indicate higher ecological value.

STEP 2: Identify restoration options at locations that would support ecological function. *Attributes in the Restoration Potential category would help to identify armoring removal, riparian restoration, overwater structure removal, and general shoreline restoration projects.*				
RESTORATION POTENTIAL				
Historic wetlands	The Puget Sound Nearshore Ecosystem Restoration Project captured historic wetlands and past estuary extents. When considering restoration opportunities, this data highlights locations that could be restored to a past high-value condition.	PSNERP	4	4 → yes, within 200 ft 0 → no
Presence of overwater structures	Considers whether overwater structures are present on the parcel or along the shoreline. Removal of overwater structures is a restoration action with high uplift potential.	DNR	5	5 → yes, within 200 ft 0 → no
Armoring	Armoring identified along the shoreline. Removal of armoring and creating a soft shoreline could improve shoreline functions.	Beach Strategies	5	5 → yes, within 200 ft 0 → no
Structures adjacent to shoreline	Presence of structures on the nearshore parcel. Potential removal of structures adjacent to the shoreline could improve riparian habitat and connectivity.	Skagit County Assessor	4	4 → yes 0 → no
Stream barriers	Documented barriers to fish passage on the parcel/within the drift cell or upstream of an identified stream. Removal of a stream barrier could be a restoration opportunity. This is also an important consideration if actions are being considered downstream of a stream barrier.	WDFW	3	3 → stream barrier present 1 → barrier upstream 0 → no stream barrier
Sea level rise risk	Risk of the location being affected by sea level rise. May help to highlight locations where restoration actions could help mitigate effects of sea level rise.	Puget Sound Parcel-scale Sea Level Rise Vulnerability Assessment	4	4 → high 1 → med 0 → low
		TOTAL	25	Higher scores indicate greater opportunity for restoration.

STEP 3: Consider the feasibility of restoration opportunities to narrow options and outline next steps. *The Feasibility category of attributes captures information related to the logistics of completing a restoration project in a location with high ecological value, as identified in Steps 1 and 2.*				
FEASIBILITY				
Ownership	Private versus public ownership according to assessor's data. This delineation was determined by searching for key terms in the ownership field (e.g., "state", "county") to identify publicly owned parcels. All other parcels are considered to be private.	Skagit County Assessor	10	10 → public ownership 0 → otherwise
Parcel size	Acreage of parcel according to assessor's data. Parcel size can capture the available area for a restoration project and may also have implications for feasibility. Scoring is based on the overall spread of parcel sizes and could be revised to capture sizes that are relevant for determining feasibility of a project (e.g., if projects are typically on parcels <5 acres, scoring could give more points to those parcels).	Skagit County Assessor	5	5→>25 acres 4→10-25 acres 3→2-10 acres 2→1-2 acres 1→0.5-1 acres 0 →<0.5 acres
Parcel value	Assessed value according to assessor's data. Scoring breakdown is based on the spread of parcel values and could be revised to capture costs relevant for determining the feasibility of a project.	Skagit County Assessor	5	5→ <$8K 3→$8K-$300K 2→ $300k-$1M 0 → >$1M
Beach access	Proximity to public beach access point. Beach access is important for determining coordination requirements, especially if a project is relying on volunteer support.	Ecology	5	5 → Access point on parcel 3 → Access point within 0.5 mile of parcel 0 → no nearby beach access
		TOTAL	25	Higher scores indicate greater feasibility.

Appendix B
Prioritization Tool Data Dictionary

Field Name	Source Data	Description
PARCELID	Skagit County Assessor Parcel Data	Parcel ID used to join Skagit County Assessor data with parcel geometries. Only parcels within the shoreline zone (200 feet of MHHW) were considered.
Owner_Name	Skagit County Assessor Parcel Data	Legal name of the parcel owner
OwnerAddress_1	Skagit County Assessor Parcel Data	Owner street address line 1
OwnerAddress_2	Skagit County Assessor Parcel Data	Owner street address line 2
OwnerAddress_3	Skagit County Assessor Parcel Data	Owner street address line 3
Owner_City	Skagit County Assessor Parcel Data	City for legal owner address
Owner_State	Skagit County Assessor Parcel Data	State for legal owner address
Owner_Zip	Skagit County Assessor Parcel Data	Zip code for legal owner address
Building_Value	Skagit County Assessor Parcel Data	Value of any and all buildings on property
Land_Use	Skagit County Assessor Parcel Data	Current land use designation for the parcel
Assessed_Value	Skagit County Assessor Parcel Data	Assessed value of parcel
Township	Skagit County Assessor Parcel Data	Township of parcel
Range	Skagit County Assessor Parcel Data	Range of parcel
Section	Skagit County Assessor Parcel Data	Section of parcel
Quarter_Section	Skagit County Assessor Parcel Data	Quarter section of parcel
VI_Score_Norm	Puget Sound Sea Level Rise Analysis (Washington	Total vulnerability of parcel to sea level rise. Score is a combination of the exposure and sensitivity of the parcel to sea level rise. Scores are

	Sea Grant and Coastal Geologic Services)	normalized across all parcels in the Puget Sound region and range from 0-20.
DCType	Beach Strategies (WDFW and Coastal Geologic Services)	Drift cell type or direction associated with the parcel. • "NAD" = No Appreciable Drift • "RtoL" = Right to left • "LtoR" = Left to Right
DCName	Beach Strategies (WDFW and Coastal Geologic Services)	Unique code/identifier for each drift cell.
DCCard	Beach Strategies (WDFW and Coastal Geologic Services)	ADD
Shoretype	Beach Strategies (WDFW and Coastal Geologic Services)	Shoretype of each drift cell • PB = Pocket Beach • PB-AR = Pocket Beach – Artificial • FBE = Feeder Bluff Exceptional • FB = Feeder Bluff • FB-T = Feeder Bluff, Tallus • TZ = Transport Zone • AS = Accretion Shorform • NAD-D = No Appreciable Drift – Delta • NAD-B = No Appreciable Drift – Bedrock • NAD-AR = No Appreciable Drift – Artificial • NAD-LE = No Appreciable Drift – Low Energy
ErosionPotential	Beach Strategies (WDFW and Coastal Geologic Services)	Erosion potential of each drift cell nearest to parcel, calculated as a function of shore type and fetch length (See Beach Strategies for details). Scores are between 1-8 where higher scores indicate greater erosion potential.
Listing_Cat5_Water	Water Quality Atlas (Washington State Department of Ecology)	Listing ID of Category 5 tested water near parcel. <Null> values indicate there are no category 5 waters within 200 feet of the parcel.

Parameter_Cat5_Water	Water Quality Atlas (Washington State Department of Ecology)	Parameter of Category 5 tested water near parcel. <Null> values indicate there are no category 5 waters within 200 feet of the parcel.
Listing_Cat4_Water	Water Quality Atlas (Washington State Department of Ecology)	Listing ID of Category 4 tested water near parcel. <Null> values indicate there are no category 4 waters within 200 feet of the parcel.
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Listing_Cat2_Water	Water Quality Atlas (Washington State Department of Ecology)	Listing ID of Category 2 tested water near parcel. <Null> values indicate there are no category 2 waters within 200 feet of the parcel.
Parameter_Cat2_Water	Water Quality Atlas (Washington State Department of Ecology)	Parameter of Category 2 tested water near parcel. <Null> values indicate there are no category 2 waters within 200 feet of the parcel.
Listing_Cat1_Water	Water Quality Atlas (Washington State Department of Ecology)	Listing ID of Category 1 tested water near parcel. <Null> values indicate there are no category 1 waters within 200 feet of the parcel.
Parameter_Cat1_Water	Water Quality Atlas (Washington State Department of Ecology)	Parameter of Category 1 tested water near parcel. <Null> values indicate there are no category 1 waters within 200 feet of the parcel.
Listing_Cat1_Sediment	Water Quality Atlas (Washington State Department of Ecology)	Listing ID of Category 1 tested sediment near parcel. <Null> values indicate there are no category 1 sediments within 200 feet of the parcel.
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Listing_Cat4_Sediment	Water Quality Atlas (Washington State Department of Ecology)	Listing ID of Category 4 tested sediment near parcel. <Null> values indicate there are no category 4 sediments within 200 feet of the parcel.
Parameter_Cat4_Sediment	Water Quality Atlas (Washington State Department of Ecology)	Parameter of Category 4 tested sediment near parcel. <Null> values indicate there are no category 4 sediments within 200 feet of the parcel.
Listing_Cat5_Sediment	Water Quality Atlas (Washington State Department of Ecology)	Listing ID of Category 5 tested sediment near parcel. <Null> values indicate there are no category 5 sediments within 200 feet of the parcel.
Parameter_Cat5_Sediment	Water Quality Atlas (Washington State Department of Ecology)	Parameter of Category 5 tested sediment near parcel. <Null> values indicate there are no category 5 sediments within 200 feet of the parcel.
Notes on water and sediment quality data: Due to the structure of the database, only exactly one water or sediment quality listing could be joined to the parcel/drift cell data. This means that there may be other parameters within the same category within 200 feet of the parcel.		
Wetland_Type	National Wetland Inventory (United States Fish and Wildlife Service)	Current wetland type intersecting with parcel.
Wetland_Acres	National Wetland Inventory (USFWS)	Size of wetland associated with parcel.
Upland_Percent_Cover	C-Cap Regional Land Cover (NOAA Office of Coastal Management)	Combined percent tree and shrub cover of upland parcel (if intertidal) or of the parcel itself (if upland). Calculated from C-Cap land cover raster data.
OWS_Type	Washington State Department of Ecology overwater structures marine waters	Type of overwater structure within 200 feet of parcel (Bridge, dock, etc.)
OWS_Decking	Washington State Department of Ecology overwater structures marine waters	Observation whether or not a structure decking was complete.

OWS_Complex	Washington State Department of Ecology overwater structures marine waters	Observation whether or not the overwater structure included multiple structure types (such as including both a building and a dock).
Historical_Wetland_Ty	Puget Sound Nearshore Restoration Project (WDFW)	Type of historical wetland found within 200 feet of parcel, if any. • EU = Euryhaline Unvegetated • OT = Oligohaline Transition • EM = Estuarine Mixing • TF = Tidal Freshwater
FeatureType	WDFW Fish Passage Geodatabase (Cite)	Type of fish passage barrier found on parcel, if any.
PercentFishPassableCode	WDFW Fish Passage Geodatabase (Cite)	Estimated percent of fish that can pass fish passage barrier found on parcel.ol
StreamName	NHD Flowline (United States Geological Survey)	Name of stream on parcel, if the stream is named and if a stream directly intersects with parcel.
StreamLength	NHD Flowline (USGS)	Length of stream intersecting with parcel.
ReachCode	NHD Flowline (USGS)	14 digit HUC code of stream intersecting with parcel.
StreamOrder	NHD Flowline (USGS)	Stream order of stream directly intersecting with parcel.
UpStream_Barrier_Type	WDFW Fish Passage Geodatabase	Type of fish barrier found upstream of stream reach intersecting with a parcel, or type of fish barrier found directly on parcel.
UpStream_Barrier_Passage_Percent	WDFW Fish Passage Geodatabase	Estimated percent of fish that can pass through barrier found upstream of stream reach intersecting with a parcel, or estimated percent of fish that can pass fish passage barrier found on parcel
Parcel_Acres	Calculated	Calculated area of parcel.
Beach_Access_Dist	Beach access points from Coastal Atlas (Department of Ecology)	Distance to nearest beach access point to parcels (in miles). Parcels that were greater than 0.5 miles from nearest beach access point have a distance of -1 miles.
Smelt_spawning	WDFW forage fish spawning survey data	True/False if smelt spawning has been documented 200 feet or less from parcel. 0 is coded as false and 1 as true.
SandLance_spawning	WDFW forage fish spawning survey data	True/False if sand lance spawning has been documented 200 feet or less from parcel. 0 is coded as false and 1 as true.
Herring_spawning	WDFW forage fish spawning survey data	True/False if herring spawning has been documented 200 feet or less from parcel. 0 is coded as false and 1 as true.

Armoring_presence	Beach strategies (WDFW)	True/False if beach armoring is present 200 feet or less from parcel. 0 is coded as false and 1 as true.
Public_ownership	Created	True/False if the parcel is publicly owned. 0 is coded as false and 1 as true. A parcel was assumed to be publicly owned if the owner's name from the Skagit County Assessor data had the strings "State" or "U.S.A."
OWS_SF	Ecology marine overwater structures	Square footage of overwater structure near parcel, if any. Null values indicate no overwater structure was found within 200 feet of the parcel.
Natal_Estuary_P	NOAA Natal estuary layer	True/False if a natal estuary is present within 200 feet of the parcel. 0 is coded as false and 1 as true.
Str_HlfMil	NHD Flowlines (USGS)	True false if a stream mouth is located within a half mile of the parcel "as the fish swims" (i.e. only paths to stream mouths entirely through water were considered).
Kelp_Presence	Washington Department of Natural Resources (WDNR) – Floating kelp indicator (online map)	True/False if a floating kelp bed is present within 200 feet of the parcel. 0 is coded as false and 1 as true.
Eelgrass_presence	Washington Department of Natural Resources (WDNR) – Puget Sound Eelgrass Monitoring Data Viewer	True/False if an eelgrass bed (both *Z.marina* and *Z. japonica*) bed is present within 200 feet of the parcel. 0 is coded as false and 1 as true.
Acr_score	Calculated/Created	Acreage of parcel according to assessor's data. Parcel size can capture the available area for a restoration project and may also have implications for feasibility. Scoring is based on the overall spread of parcel sizes and could be revised to capture sizes that are relevant for determining feasibility of a project (e.g., if projects are typically on parcels <5 acres, scoring could give more points to those parcels). Scoring: 5→>25 acres 4→10-25 acres 3→2-10 acres 2→1-2 acres 1→0.5-1 acres

		0 →<0.5 acres
Own_score	Calculated/Created	Private versus public ownership according to assessor's data. This delineation was determined by searching for key terms in the ownership field (e.g., "state", "county") to identify publicly owned parcels. All other parcels are considered to be private. Scoring: 10 → public ownership 0 → otherwise
Val_score	Calculated/Created	Assessed value according to assessor's data. Scoring breakdown is based on the spread of parcel values and could be revised to capture costs relevant for determining the feasibility of a project. Scoring: 5→ <$8K 3→$8K-$300K 2→ $300k-$1M 0 → >$1M
Bch_score	Calculated/Created	Proximity to public beach access point. Beach access is important for determining coordination requirements, especially if a project is relying on volunteer support. Scoring: 5 → Access point on parcel 3 → Access point within 0.5 mile of parcel 0 → no nearby beach access
FC_score	Calculated/Created	Sum of all feasibility scores (i.e. from Acr_score to Bch_score). Higher values indicate higher ecological value of parcel (max score of 25).
Hwt_score	Calculated/Created	The Puget Sound Nearshore Ecosystem Restoration Project captured historic wetlands and past estuary extents. When considering restoration opportunities, this data highlights locations that could be restored to a past high-value condition. Scoring:

		4 → yes, within 200 ft 0 → no
OWS_score	Calculated/Created	Considers whether overwater structures are present on the parcel or along the shoreline. Removal of overwater structures is a restoration action with high uplift potential. Scoring: 5 → yes, within 200 ft 0 → no
Arm_score	Calculated/Created	Armoring identified along the shoreline. Removal of armoring and creating a soft shoreline could improve shoreline functions. Scoring: 5 → yes, within 200 ft 0 → no
Bar_score	Calculated/Created	Documented barriers to fish passage on the parcel/within the drift cell or upstream of an identified stream. Removal of a stream barrier could be a restoration opportunity. This is also an important consideration if actions are being considered downstream of a stream barrier. Scoring: 3 → stream barrier present 1 → barrier upstream 0 → no stream barrier
Bui_score	Calculated/Created	Presence of structures on the nearshore parcel. Potential removal of structures adjacent to the shoreline could improve riparian habitat and connectivity. Scoring: 4 → yes 0 → no
SLR_score	Calculated/Created	Risk of the location being affected by sea level rise. May help to highlight locations where restoration actions could help mitigate effects of sea level rise.

		Scoring: 4 → high 1 → med 0 → low
RP_score	Calculated/Created	Sum of all restoration potential scores (i.e. from Hwt_score to SLR_score). Higher values indicate higher ecological value of parcel (max score of 25).
Fsh_score	Calculated/Created	Documented observation of sand lance, surf smelt, or herring spawning. Scoring: 6 → documented presence within 200 ft 0 → no documented presence or habitat
Veg_score	Calculated/Created	Documented presence of eelgrass (*Zostera marina* or *Zostera japonica* combined) in proximity. Scoring: 6 → documented presence within 200 ft 0 → no documented presence or habitat
Klp_score	Calculated/Created	Documented presence of kelp (e.g., *Nereocystis luetkeana*, *Laminaria* spp.). Scoring: 6 → documented presence within 200 ft 0 → no documented presence or habitat
Wet_score	Calculated/Created	Current presence of tidal marsh or wetland habitat on the parcel or adjacent to shoreline segment. Scoring: 3 → mapped wetland 0 → no
Est_score	Calculated/Created	Assesses whether the proposed location is within 5-mile buffer of salmonid natal streams.

		Scoring: 2 → Within 5 miles of natal estuary 0 → >5 miles to stream
Cov_score	Calculated/Created	Considers the proportion of the upland/riparian area that is natural versus developed. Scoring: 3 → majority of upland area is natural 0 → majority of upland area is developed
Str_score	Calculated/Created	Distance (as fish would swim) to nearest the stream (not necessarily natal stream). Scoring: 4 → stream on parcel 2 → <0.5 miles to stream 0 → >0.5 miles to stream
Sho_score	Calculated/Created	Potential for erosion of the shoreline based on fetch and shoretype. Scoring: 8 → PB with erosion potential of 3-4 OR FB/FBE with erosion potential of 7-8 6 → PB with erosion potential of 5-6 4 → FB/FBE with erosion potential of 5-6 2 → AS or TZ 0 → NAD
Sed_score	Calculated/Created	Based on data from the Washington Department of Ecology that captures assessed sediments under the Clean Water Act. Category 1 and areas that have not been assessed are considered to have high sediment quality. Category 5 represents the lowest quality. Scoring: 6 → Category 1 or no data 4 → Category 2 or 3

		2 → Category 4 0 → Category 5 (303(d) list)
Wat_score	Calculated/Created	Based on data from the Washington Department of Ecology that captures assessed waters under the Clean Water Act. Category 1 and areas that have not been assessed are considered to have high water quality. Category 5 represents the lowest quality. Scoring: 6 → Category 1 or no data 4 → Category 2 or 3 2 → Category 4 0 → Category 5 (303(d) list)
EF_score	Calculated/Created	Sum of all Ecological function scores (i.e. from Fsh_score to Wat_score). Higher values indicate higher ecological value of parcel (max score of 50).
EF_bin	Calculated/Created	Using Jenks natural breaks method, Low, Moderate, and High bins were defined using the total spread of ecological function scores (See Table 1 for breaks). Scores were then assigned into an appropriate bin.
RP_bin	Calculated/Created	Using Jenks natural breaks method, Low, Moderate, and High bins were defined using the total spread of restoration potential scores (See Table 1 for breaks). Scores were then assigned into an appropriate bin.
Priority	Calculated/Created	Total restoration priority level based on ecological function and restoration potential tiers (See Table 1 below).


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