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Abbreviation List

Abbreviation	Definition
BNSF	BNSF Railway Company
CAP	Continuing Authorities Program
Charter	AdaptSea Seattle Waterfront Resilience Partnership Working Group Charter



AdaptSea

Seattle Waterfront Resilience Partnership

Abbreviation	Definition
CoSMoS	Coastal Storm Modeling System
CRAG	Climate Resilience and Adaptation Group
CSO	Combined sewer overflow
DRCC	Duwamish River Community Coalition
DVP	Duwamish Valley Program
Ecology	Washington State Department of Ecology
ESA	Environmental Science Associates
FEMA	Federal Emergency Management Agency
MOU	Memorandum of understanding
NOAA	National Oceanic and Atmospheric Administration
NWSA	Northwest Seaport Alliance
Partnership	AdaptSea Seattle Waterfront Resilience Partnership
SODO	South of Downtown
SPU	Seattle Public Utilities
SWAN	Simulating Waves Nearshore
SWL	Stillwater level
TWL	Total water level
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
WAEMD	Washington Emergency Management Division
WSDOT	Washington State Department of Transportation



1 Introduction and Document Use

1.1 OVERVIEW

The AdaptSea Seattle Waterfront Resilience Partnership (Partnership) was established by the Port of Seattle in the fall of 2023 to develop a shared strategy to improve the resilience of Seattle’s waterfront infrastructure and transportation and freight corridors.

The City of Seattle passed new interim floodplain regulations starting in 2020, aimed at reducing vulnerability of waterfront assets to flooding from storm surge and sea level rise. The cost and complexity to implement these regulations presented unique and significant challenges for future maintenance and modernization of Port of Seattle infrastructure. Port of Seattle staff suggested that with careful consideration of the unique characteristics of port infrastructure and early close collaboration between City of Seattle and Port of Seattle staff, these regulations could be written to increase resilience while enabling the Port of Seattle to continue to carry out its core operations. Port of Seattle properties are interconnected with public infrastructure managed by the City of Seattle and King County, so investments in sea level rise resilience, including elevation of properties, needs to be coordinated with other infrastructure managers. Port of Seattle leadership recognized the need to collaborate in advance of future regulations and investments with the City of Seattle and other local governments that manage Seattle waterfront assets. The Port of Seattle’s Center of Expertise on Environment and Sustainability funded 3 years of facilitation and recommendations development amongst these partners, with the goal of eventually launching a long-term jointly funded formal partnership.

Seattle’s waterfront is the backbone of the region’s economy; its long-term integrity amid rising sea levels and intensification of seasonal storms is essential to preserving uninterrupted flow of people, goods, and services. Public waterfront asset owners, operators, and regulators must prioritize investments in waterfront infrastructure resilience to improve Seattle’s ability to withstand, pivot, and recover in the face of large-scale stressors, acute shocks, and transformative disruptions, including the effects of climate change.

Brief Timeline of the AdaptSea Seattle Waterfront Resilience Partnership

- The idea for the Partnership began when Port of Seattle leadership identified an opportunity to improve alignment with the City of Seattle on development and implementation of floodplain regulations. The Partnership is designed to help achieve mutual resilience goals while ensuring that the Port of Seattle can continue to serve its vital functions to support the regional economy.
- Port of Seattle staff collaborated internally and established an internal “steering committee” to develop a scope of work for the Partnership and identify potential partners.
- The Port of Seattle Center of Expertise on Environment and Sustainability funded the Partnership through its programmatic budget.
- In 2023, Port of Seattle staff met with waterfront asset managers and regulators, making the case for collaboration, and the Partnership was established.
- The Partnership held its first meeting on October 19, 2023.



Since 2023, the Partnership has focused on knowledge sharing and collaboration, both amongst the group and with representatives from related projects along the West Coast, with the following goals:

- Compiling and sharing ongoing, planned, and potential strategies and tools (including new policies and regulations associated with required comprehensive plan updates) to address sea level rise and waterfront resilience
- Coordinating, prioritizing, and phasing relevant projects along the waterfront, with a focus on action and implementation
- Facilitating engagement between the Partners on capital planning processes
- Positioning the Partners to collaborate and successfully compete for grants to fund projects of mutual interest that support waterfront resilience goals

Partners meet quarterly to further these goals, learn from subject matter experts, and share information across entities.

1.2 DOCUMENT ORGANIZATION

This Resilience Recommendations Report documents the work done to date by the Port of Seattle and its partners to identify opportunities for increased resilience efforts along the Seattle shoreline. The strategies and recommendations developed through Partnership meetings have been compiled and recommendations are presented for future coordinated efforts on research, data collection, and technical studies. The report also includes an implementation plan with prioritization and phasing of strategies and recommendations.

The aim of this document is to provide an overview of the modeling, coordination, and learning to date that can be used by the Partners and their leadership to support coordinated future allocation of funding and resources for sea level rise adaptation and risk reduction. This document and the accompanying StoryMap are tools that can support capital planning and prioritizations, as well as a reference for external funding pursuits.

- [Section 2](#) provides an overview of the Partnership including information on the AdaptSea Seattle Waterfront Resilience Partnership Working Group Charter (Charter), a list of participating entities and advisors, and a brief overview of discussion topics to date.
- [Section 3](#) overviews the sea level rise modeling performed by the Port of Seattle's consultant, Environmental Science Associates (ESA). This modeling and research has resulted in a repository of existing data and maps of hazard zones and waterfront assets, as presented in the AdaptSea Seattle Waterfront Resilience Supplemental StoryMap developed as part of this report.
- [Sections 4, 5, 6, and 7](#) describe the first four focus areas identified by the Partnership for closer examination. These include the southcentral waterfront, the stretch of shoreline between Myrtle Edwards Park and Centennial Park, the Interbay area, and the Duwamish Valley. This section also includes brief key findings from the AdaptSea initiative modeling results. Note these findings may differ from those of Partners' independent analyses.
- [Section 8](#) organizes the input and recommendations collected since 2023 and presents specific considerations and initiatives the Partnership has identified as potential next steps,



based on high-importance assets or complex and dynamic overlaps between jurisdictions. This section includes information on planned activities and deliverables anticipated for 2026 to further the collaborative process between the Partners and provides recommendations for potential funding opportunities and cost-saving measures.

- [Section 9](#) provides a list of references collected through the modeling process, as well as those shared during quarterly Partnership meetings.

Additional supporting information is also provided through the following appendices:

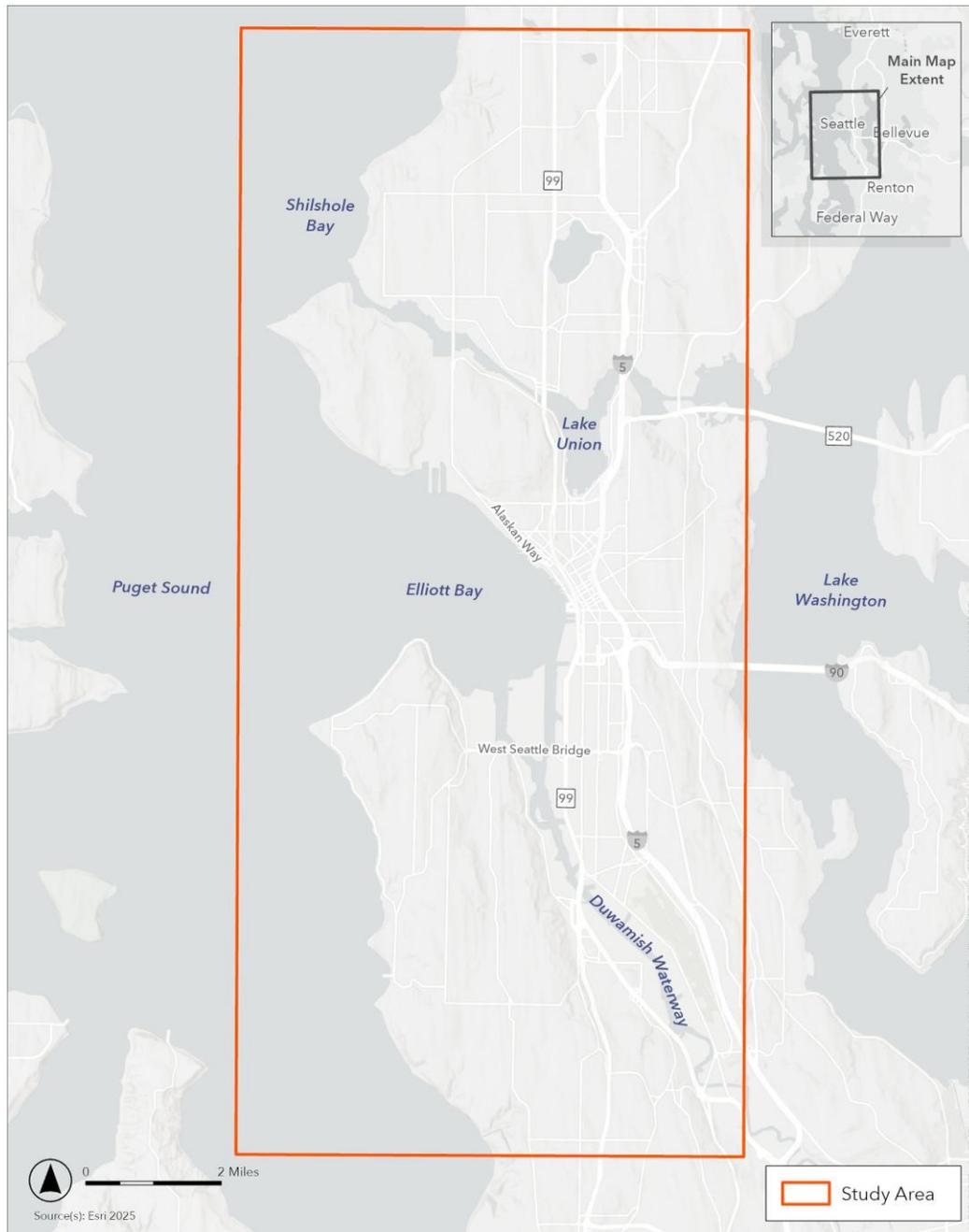
- **Appendix A:** AdaptSea Seattle Waterfront Resilience Partnership Working Group Charter
- **Appendix B:** Literature Review, Available Data, and Project Partners Memorandum
- **Appendix C:** List of Participating Partners (2023 to 2025)
- **Appendix D:** April 2025 Report Card
- **Appendix E:** Modeling Efforts and Results
- **Appendix F:** Resilience Recommendations Report StoryMap and Web App Users Guide
- **Appendix G:** 2026 Work Plan
- **Appendix H:** Potential Impacts and Physical Adaption Typologies by Focus Area



2 AdaptSea Seattle Waterfront Resilience Partnership Overview

As overviewed in [Section 1](#), the Partnership was created by the Port of Seattle to provide an opportunity for knowledge sharing across public entities that own assets along the Seattle waterfront. The geographic area concerning the Partnership is the Seattle marine and estuarine waterfront including Elliott Bay from Golden Gardens in the north to Duwamish River Mile 4.5 and around West Seattle to Brace Point (refer to Figure 1-1).

Figure 1-1 Geographical Overview Map





2.1 PURPOSE

The Partnership serves as a collaborative forum of Seattle waterfront stakeholders to develop a shared strategy for synchronizing investments and local regulatory approaches to improve the resilience of Seattle waterfront infrastructure and transportation/freight corridors. The Partners have a vested interest in the long-term resilience of the Seattle waterfront and transportation/freight corridors, as they prepare for climate change and sea level rise, as well as seismic hazards, tsunamis or seiches (large waves), intensified storms, and other environmental hazards. The Partners agree that the costs and effects of sea level rise and climate-related hazards are better managed through coordinated planning and capital investment toward a shared vision rather than through independent, siloed planning.

This Partnership is not a decisional body. Any specific projects defined or prioritized by this Partnership will still require separate authorization and public involvement processes per local, state, and federal regulations and separate entity policies.

The Charter was adopted on June 20, 2024, and is provided as Appendix A.

2.2 OUTCOMES

As described in [Section 1.1](#), the Partnership was founded by the Port of Seattle to provide an opportunity for knowledge sharing and collaboration. As part of this work, the Port of Seattle also committed funds to a literature review of best available science and regulatory frameworks, and modeling of sea level rise and wave flooding to map and predict impacts from sea level rise. The result of this research and modeling is presented in a literature review memorandum (Appendix B), this report, and an interactive webmapping system ([link](#)) which provides the hazard zones and identifies impacted waterfront assets including Port of Seattle-owned assets and those provided by Partners for inclusion.

A description of anticipated outcomes of future collaboration by the Partners is described in [Section 8.3](#) of this report.

2.3 MEMBERSHIP AND ROLES

The Partnership is a voluntary and collaborative group, focused on strategic planning and information sharing.

Partnership Members

The Partners represent key public agencies that own, regulate, or manage waterfront infrastructure and have a stake in resilience along Seattle's waterfront.

2023–2025 Work Products

- Charter (refer to Appendix A)
- Literature Review, Available Data, and Project Partners Memorandum (refer to Appendix B)
- Flood modeling, hazard maps, and asset analysis (refer to Appendix E)
- Resilience Recommendations Report (this document)
- AdaptSea Seattle Waterfront Sea Level Rise Resilience Supplemental [StoryMap](#).
- Progress Report Card (refer to Appendix B)
- 2026 Work Plan (refer to Appendix G)



These entities include the following:

- Port of Seattle
- City of Seattle (Seattle Public Utilities [SPU], Parks and Recreation, City Light, Office of Sustainability and Environment, Office of Planning and Community Development, Department of Transportation, Department of Construction and Inspections, Office of the Waterfront)
- King County Wastewater Treatment Division
- Washington State Department of Transportation (WSDOT; Northwest Region, Washington State Ferries)
- The Northwest Seaport Alliance (NWSA)

As the convening entity, the Port of Seattle plans and facilitates meetings, leads development and finalization of deliverables, and provides quarterly updates to Partners. Partners also share knowledge and data or present on specific topics at quarterly meetings as desired. A list of participating staff from each entity is provided as Appendix C.

Advisors

Additional entities and individuals were invited to participate in an advisory capacity, including, but not limited to, the following:

- Duwamish River Community Coalition (DRCC)
- Sound Transit
- Suquamish Indian Tribe
- Muckleshoot Indian Tribe
- Port of Olympia
- Port of Bellingham
- Port of Everett
- Washington State Department of Ecology (Ecology)
- Washington State Department of Commerce
- National Oceanic and Atmospheric Administration (NOAA)
- Washington Public Ports Association
- King County Flood Control District

Additional Coordination by Danielle Butsick (Port of Seattle)

Informational meetings:

- WA SeaGrant
- City of Seattle Climate Resilience and Adaptation Group (CRAG)
- SODO Business Improvement Area
- Port Authority of NY/NJ
- OneSF/ClimateSF (City of San Francisco)
- Whatcom County Sea Level Rise and Climate Planning
- Port of Bellingham
- Port of San Francisco
- Washington Emergency Management Division (WAEMD) Tsunami Program
- DRCC
- U.S. Environmental Protection Agency (USEPA; Lower Duwamish Waterway Cleanup)
- Manufacturing Maritime Industrial Association
- Ecology
- GreenTech Resilience Panel Discussion
- Seattle Times

Long-term coordination:

- Puget Sound Climate Preparedness Collaborative
- Duwamish River Sea Level Rise Working Group
- NWSA Resilient Gateway (formerly known as Vulnerability Assessment and Response Framework)



- South of Downtown (SODO) Business Improvement Area
- City of Seattle Office of Economic Development
- U.S. Army Corps of Engineers (USACE)

Advisors also include additional staff members from Partner organizations. Advisors present or provide feedback on specific topics as needed. Presentations from Advisors included a discussion of sea level rise projections and science by Ian Miller at Washington Sea Grant, presentations on flood protection planning and capital programs by the City of San Francisco OneSF and Climate SF staff, and a presentation from the DRCC on community sea level rise planning efforts. The WAEMD Tsunami Program also provided an overview of its work and its potential relevance to the Partners. The Port of Seattle provides quarterly updates to the Advisors, including meeting summaries and materials and upcoming meeting topics. The Port of Seattle shares information on AdaptSea with the Suquamish Indian Tribe and Muckleshoot Indian Tribe at quarterly coordination meetings.

2.4 QUARTERLY MEETINGS

Facilitated meetings have been held quarterly since October 2023. These virtual meetings include presentations, information sharing, and collaborative discussions. Active participation from all the Partners has led to successful coordination in sea level rise and Seattle waterfront resilience efforts, resulting in a stronger and more agile waterfront and transportation/freight network.

Meetings are led by an outside facilitator (Kate Snider of Floyd|Snider through March 2025; Rachel Gregg of ESA starting June 2025).

The following sections provide brief overviews of the information discussed during the quarterly Partnership meetings.

2.4.1 Overview of Meeting #1: October 19, 2023

At the inaugural meeting of the Partnership, Danielle Butsick, Senior Environmental Program Manager at the Port of Seattle, described the overall intent of the Partnership and the intention of the Port Commissioners and Environment and Sustainability leadership to prioritize a collaborative process to address waterfront resilience as a priority and not something the Port of Seattle can do alone. Each of the Partners then provided a short overview of their ongoing and planned resilience work. The group then discussed opportunities to collaborate on specific projects and policy updates.

A draft Charter was proposed by Port of Seattle staff, with an opportunity for Partners to provide feedback and proposed revisions. Partners were asked to take the Charter back to their organizations for internal review after the meeting. Port of Seattle staff met individually with Partners, including City of Seattle staff, to refine Charter language to be consistent with the messaging and goals of each organization. While the Port of Seattle's initial intent was for the Charter to be signed and formally adopted by Partner organizations, the group determined that a voluntary staff-level agreement was more appropriate and would facilitate the early phases of the Partnership, outlining shared goals and objectives. A more formal agreement could be explored in the future, when a work plan is defined and additional resources identified.



Port of Seattle staff held follow-up meetings with City of Seattle staff and King County Wastewater Treatment Division staff to further refine the goals and objectives for the Partnership. Port of Seattle staff also met with the SODO Business Improvement Area to brief staff on potential work of the Partnership and solicit feedback on priorities of SODO businesses related to sea level rise resilience.

2.4.2 Overview of Meeting #2: December 14, 2023

Ian Miller, Coastal Hazards Specialist with Washington Sea Grant, provided Partners with an overview of his and his collaborators' work, which provided sea level rise projections for coastal Washington and previewed updates to the U.S. Geological Survey (USGS) Coastal Storm Modeling System (CoSMoS) online mapping tool, which was made available for King County in November 2025.

The Partners also discussed edits to the draft Charter, and Lindsey Sheehan of ESA overviewed the sea level rise modeling and mapping conducted for the group under a contract with the Port of Seattle. She also shared an example of the Total Water Level (TWL) Calculator, an interactive spreadsheet that will be finalized as part of the modeling process. The Partners then provided input on the best sea level rise scenarios to use to be compatible with each entity's standard scenarios. It was requested that the maps be adaptive rather than stationary and that extreme tides be considered. Lindsey described the functionality of the TWL Calculator as a tool, where the user can adjust sea level rise projections to see flooding timelines and severity, while the hazard maps are less adjustable.

The Port of Seattle provided a case study demonstrating operational impacts of flood code compliance for the Port of Seattle's Pier 66 facility. A roundtable discussion was facilitated to learn any additional considerations from Partners for collaboration or discussion.

Port of Seattle staff held follow-up meetings with Partners, including WSDOT, to help define WSDOT's role in AdaptSea and to identify which teams could and should be represented. Port of Seattle staff also met with the Port Authority of New York and New Jersey to learn about its sustainability and resilience framework, which systematically builds sea level rise adaptation into capital planning.

Key Take-Aways from Meeting #2: Sea Level Rise Research

- **University of Washington:** 2018 [Projected Sea Level Rise for Washington State](#)
- **Intergovernmental Panel on Climate Change:** [Climate Change 2021: The Physical Science Basis](#)
- **NOAA:** [2022 Interagency Sea Level Rise Task Force Report](#)

2.4.3 Overview of Meeting #3: March 21, 2024

Pamela Braff, Director of Climate Programs, and Rich Hoey, Assistant City Manager, both from the City of Olympia, presented on the Olympia Sea Level Rise Response Collaborative. They overviewed formation of the collaborative, planning and strategizing efforts, and key lessons learned.



ESA staff provided an update on the modeling process and described the hazard assessment and mapping. Partners were asked to provide geospatial asset data for analysis with the hazard mapping. It was determined that modeling for 2 and 5 feet of sea level rise and for the 10- and 100-year coastal flood events would allow users to forecast near-term (2050–2090) and long-term (2075–2150) for a fairly frequent (10-year) and extreme event (100-year).

Sree Ramoju, Terminal Engineering Program Manager with the Washington State Ferries, presented on current work to address risk to waterfront assets, specifically the Bremerton vehicle transfer span replacement project.

The group also brainstormed potential focus areas, including Centennial Park/Myrtle Edwards Park, Duwamish Valley, Elliott Bay shoreline of Interbay, the north end of Alaska Way, and Pier 66 up to Myrtle Edwards Park.

Port of Seattle staff met with City of Seattle staff to discuss staff representation changes, upcoming changes to comprehensive plan policies, and ongoing work between the City of Seattle’s Office of Planning and Community Development with the Office of Emergency Management on hazard mitigation program grants.

Key Take-Aways from Meeting #3: Sea Level Rise Planning

City of Olympia

- Remember that sea level rise does not recognize jurisdictional boundaries.
- Develop near-, mid-, and long-term strategies.
- Start the resilience and adaptation process early to adapt strategies before flooding becomes more frequent.
- Use public property as much as possible for the physical adaptation strategies to lessen impacts to private owners.

Washington State Ferries

- Assets must function in current conditions and be flexible and adaptable to future sea level rise conditions (e.g., tidal ranges for transfer spans).
- Washington State Ferries is building new infrastructure to be adaptable and monitoring predictions and observed conditions to make decisions about adaptation.

2.4.4 Overview of Meeting #4: June 20, 2024

The final Charter was adopted at the opening of the meeting. ESA staff provided an update on the wave modeling and hazard mapping and previewed the additional 2D modeling to be performed.

The group then held a discussion on Focus Area 1: Southcentral Waterfront. Through these focus area discussions, the Port of Seattle hoped to identify areas at risk where adaptation strategies could be aligned, to consider optimal sequencing, and to determine where Partner entities could collaborate



to plan projects to be more effective and efficient. Information from these discussions, as well as follow-up communications between Port staff, Partners, and Advisors, is incorporated into the modeling and presented in Sections [4](#), [5](#), [6](#), and [7](#) of this report.

Maya Hayden, Environmental Scientist and Director of Outreach and Engagement at the USGS, and Kevin Befus of the University of Arkansas gave a presentation on how groundwater is being incorporated into the USGS's CoSMoS sea level rise data visualization tools. USGS and ESA staff provided summaries of the differences between CoSMoS's and ESA's modeling for AdaptSea. CoSMoS incorporates future projections of storm and dynamic wave conditions, while ESA's model uses recorded wind data to estimate wave conditions for the past 41 years. CoSMoS includes riverine modeling, while ESA's model focuses on coastal conditions. Both models include assumptions and cannot be expected to be fully accurate or predictive; however, the comparison of the two models will support validation of the data and will help highlight higher risk areas.

**Key Take-Aways from Meeting #4:
CoSMoS Groundwater Study**

- The USGS analyzed groundwater data to predict how subsurface conditions may be impacted by sea level rise.
- Mapping does have a level of uncertainty due to the varied makeup of the Seattle shoreline geology.
- Partners agreed sea level rise impacts from groundwater could have serious implications on buried or at-surface infrastructure and environmental caps at remediated sites.

2.4.5 Overview of Meeting #5: September 19, 2024

Melissa Higbee, Resilience Program Manager at the City of San Francisco's Office of Resilience and Capitol Planning, and Eric Vaughan, Program Manager at ClimateSF, provided a presentation on the coordination and governance for coastal flood resilience for the City of San Francisco. The Partners heard about the City of San Francisco's Hazards and Climate Resilience Plan, which serves as a strategic umbrella document for improving resilience city-wide. They also learned about [ClimateSF](#), a collection of unified city organizations coordinating principals, planning efforts, and capital funding that enhance climate resilience and seek to maximize efficacy, efficiency, and community benefits of needed public investments in these areas.

The group discussed Focus Area 2: Myrtle Edwards Park to Centennial Park. Discussions included an overview of the Port of Seattle-led coastal engineering study at Centennial Park (ESA 2024a, 2024b, 2025), the City of Seattle-led Elliott Bay Connections Project, and other assets within the focus area. Information from these discussions, as well as follow-up communications between Port of Seattle staff, Partners, and Advisors, is incorporated into the modeling and presented in [Section 5](#) of this report.

Port of Seattle staff held a follow-up discussion with Steven Reel, Deputy Program Manager for Engineering and Project Delivery in the Port of San Francisco Waterfront Resilience Program. City of Seattle staff had also met previously with City of San Francisco staff; Port of Seattle and City of Seattle staff debriefed on key learning points from the City of San Francisco. The City of San Francisco undertook some self-funded vulnerability analysis work and submitted a request through its



Congressional delegation for a “[CAP 103](#)” Feasibility Study. The Continuing Authorities Program (CAP) Section 103 is the Coastal Storm Damage Reduction authority through which the USACE can fund feasibility studies up to \$100,000 (if more than \$100,000, it is 50/50 cost share) to determine flood risk mitigation and federal interest in a project.

The USACE granted the funding, which was ultimately a \$20 million study, split 50/50 between the USACE and City of San Francisco. The Port of San Francisco funded significant outreach and engagement to ensure the plan had broad support for implementation. The City of San Francisco now has a \$13.5 billion plan, which includes seismic hazard mitigation due to intersecting risk for flood protection structures, with all projects matched 65% by federal funds. The benefit–cost assessment for the plan included comprehensive benefits, including environmental justice factors.

SPU sought CAP Section 205 funding for flood mitigation in the Duwamish Valley, most recently in 2020. The CAP Section 205 program focuses on small flood damage reduction projects in stream and riverine environments. A new study was not approved, due, at least in part, to the high risk of contamination and the need to build-in remedial work, which is out of scope for the USACE.

**Key Take-Aways from Meeting #5:
OneSF Program/ClimateSF**

- OneSF and Climate SF provide a model for coordinated governance for coastal flood resilience.
- The Port of San Francisco and all waterfront properties are owned and operated by the City of San Francisco.
- The USACE CAP 103 program funds feasibility assessments and planning for flood risk reduction; projects identified are eligible for 65% federal funding.
- The City of Seattle pursued CAP 205 funding, but the request was not approved.
- A San Francisco Waterfront [Flood Study](#) led to over \$13 billion worth of projects identified to improve seawall safety, including seismic risk reduction.

2.4.6 Overview of Meeting #6: December 12, 2024

Dante DiSabatino and Ethan Weller of the WAEMD Tsunami Program presented on the support and resources available from their division and shared visual simulations of tsunami water movement and wave amplitude. They also provided a list of funding opportunities WAEMD has identified to support infrastructure projects.

Partners then discussed assets and projects within Focus Area 3: Interbay. The group then worked to define the final focus area for 2025 and determined the Duwamish Valley was a priority area to address. Information from these discussions, as well as follow-up communications between Port of Seattle staff, Partners, and Advisors, is incorporated into the modeling and presented in [Section 6](#) of this report.

Danielle provided an overview of the Port of San Francisco discussion described in the previous section; the group was generally supportive of continuation of efforts to pursue CAP 103 funding through the USACE. One relevant lesson learned for the Partners to consider from the discussion with the Port of San Francisco is right-sizing the vulnerability assessment. The highly detailed and in-depth



vulnerability assessment was extremely costly and may not have driven different decisions and strategies than a less costly, higher-level study might have.

Partners shared upcoming project work and planning initiatives, and Danielle solicited input on a draft Partnership logo.

Key Take-Aways from Meeting #6: Tsunami Emergency Management

- WAEMD support for planning and response can also address sea level rise concerns.
- Seismic resilience should include considerations for lessening damage to infrastructure used during emergency responses.
- Additional funding pathways for sea level rise adaptation may be available through tsunami mitigation.

2.4.7 Overview of Meeting #7: March 13, 2025

Paulina López, Executive Director of the DRCC, presented on the group's priorities and current community actions, which include advocating for ongoing source control measures within the Lower Duwamish Waterway Superfund Site and providing input on how sea level rise is incorporated into the remediation, and supporting community goals around flooding, extreme heat, and mental and physical health. DRCC has submitted multiple comment letters to Ecology and the USEPA requesting that sea level rise considerations be incorporated into remedial design for cleanup projects and suggesting that nature-based solutions can be used to reduce flood risk and increase benefits for the environment and community.

The group then discussed assets and projects within Focus Area 4: Duwamish Valley. As part of this discussion, David Goldberg, Strategic Advisor at the City of Seattle Office of Sustainability and Environment, provided an overview of the Duwamish Valley Program (DVP). Information from these discussions, as well as follow-up communications between Port of Seattle staff, Partners, and Advisors, is incorporated into the modeling and presented in [Section 7](#) of this report.

Partners reviewed the draft 2025 Report Card (Appendix D). Partners then provided input on the outline for this Resilience Recommendations Report and associated StoryMap and expressed their goals for AdaptSea through 2026.



**Key Take-Aways from Meeting #7:
Duwamish River Community Coalition**

- DRCC could use support from Partners to back their requests to USEPA around climate considerations in project design.
- Planning initiatives should incorporate affected community in every level of decision making.
- DRCC is supporting community consideration of passive risk reduction, active risk reduction, and nature-based risk-reduction alternatives.
- Nature-based solutions in remediation reduce flood risk and increase benefits to the environment and the community.
- DRCC's discussions with community members have included relocation and buy-out models.
- DRCC is working with the University of Washington to identify root causes of the 2022 South Park floods (42 homes damaged) to present adaptation strategies and equity considerations to the City of Seattle.

2.4.8 Overview of Meeting #8: June 12, 2025

This meeting focused on providing updates on current sea level rise resilience work undertaken by the Partners and identifying future opportunities for collaboration and funding. Anthony Wenke of Ecology's Toxics Cleanup Program joined the meeting to discuss project synergies in the Lower Duwamish Waterway and opportunities to build a partnership that not only addresses sea level rise concerns, but also advances habitat restoration priorities and cleanup efforts. Ecology established a Bellingham Bay Action Team as a pilot project in 1996, in partnership with the Port of Bellingham and other public and Tribal entities. The Bellingham Bay Action Team collaborates on in-water projects that often have remediation, habitat restoration, public access, and flood storage benefits. The Partners expressed general interest in pursuing a similar model for the Duwamish River and Elliott Bay.

The Partners also discussed potential for a 2026 joint vulnerability assessment and considered potential pursuit of Ecology and Federal Emergency Management Agency (FEMA) grants to fund the vulnerability assessment and implementation of projects.

It was determined through these discussions that the vulnerability assessment should include topics such as hydraulic and capacity studies for wastewater systems, economic vulnerabilities, and development of codes and standards solutions that meet current and future adaptation needs. Rather than undertaking a new vulnerability assessment, which would be redundant with much of the work that individual Partners have already undertaken, the study should provide an overview of existing vulnerability data in order for Partner entities to prioritize areas of overlap.



**Key Take-Aways from Meeting #8:
Project Synergies**

- The [Comprehensive Strategy for Bellingham Bay](#) outlines major goals and describes projects and prioritization for projects with habitat, flood protection, remediation, and community benefits.
- The Bellingham Bay Action Team offers a model for consistent standards for cleanup, management, and resilience at sites within densely populated shorelines.
- A high-level vulnerability assessment that identifies overlapping priorities could be a framework for partnership with Ecology.

2.4.9 Overview of Meeting #9: September 11, 2025

The Partners shared updates on the proposed changes to the Shoreline Management Act and associated comment period. This included an overview of the changes most relevant for the Partnership: descriptions of sea level rise relative to shoreline development, added emphasis on nature-based solutions to shoreline modifications and stabilization work, and stricter long-term demonstration related to “no net loss” of shoreline ecological functions.

The Partners then discussed their comments on the draft Resilience Recommendations Report. Outcomes of this discussion, as well as edits made by the Partners, were incorporated into the second draft. The Partners also reviewed the outline for the StoryMap that accompanies the Resilience Recommendations Report and provided input on anticipated audience and uses.

The Partnership then transitioned into beginning to develop the 2026 Work Plan. Priorities identified by the Port and the Partners include the following:

- Development of a Joint Adaptation Framework to identify overlaps and opportunities for joint funding of projects or studies
- Support of a strategic and phased compliance process for codes and standards
- Implementation of a pilot project at a location important to all participating entities, working with Ecology to streamline the process and inform potential ongoing collaboration
- Workshop or symposium in late 2026 to share AdaptSea activities with members of leadership and other internal teams

**Key Take-Aways from Meeting #9:
Recommendations**

- Identification of a pilot project that involves as many Partners as possible and involves Ecology for streamlining could be an opportunity to test the Partnership model and seek joint funding.
- To gain further buy-in from organizational leadership, the Partners propose an in-person leadership workshop or symposium in 2026.



2.4.10 Overview of Meeting #10: December 11, 2025

The Partners shared current undertakings within their organizations and reviewed the newly released CoSMoS modeling for King County, including a brief walk-through comparison with AdaptSea modeling results. They also provided final input on the Resilience Recommendations Report and associated StoryMap and WebMap.

The Partners discussed plans for use of this report, with plans for a briefing to the Port Commissioners in early 2026. The Partners agreed the report will be a useful resource for this current sea level rise efforts (e.g., NWSA’s Resilient Gateway Program, City of Seattle’s Climate Action Plan).

The Partners then finalized their 2026 Work Plan, which is described in greater detail in [Section 8.3](#). Four key tasks were identified for prioritization in 2026:

- Joint Adaptation Framework
- Half-Day Symposium
- Talking Points for Partners
- Expanding/Reengaging Partners

Key Take-Aways from Meeting #10: 2025 Reporting and Next Steps

- The Resilience Recommendations Report, StoryMap, and WebMap will be made available on a new AdaptSea website, owned and maintained by the Port of Seattle. The website will increase awareness of the Partnership and support 2026 goals to expand participation and support through education and direct coordination with similar work groups.
- In 2026, the Partnership will develop a Joint Adaptation Framework, which will synthesize work completed by partners to date, identify gaps, and provide Partners with suggestions for implementation of strategies.



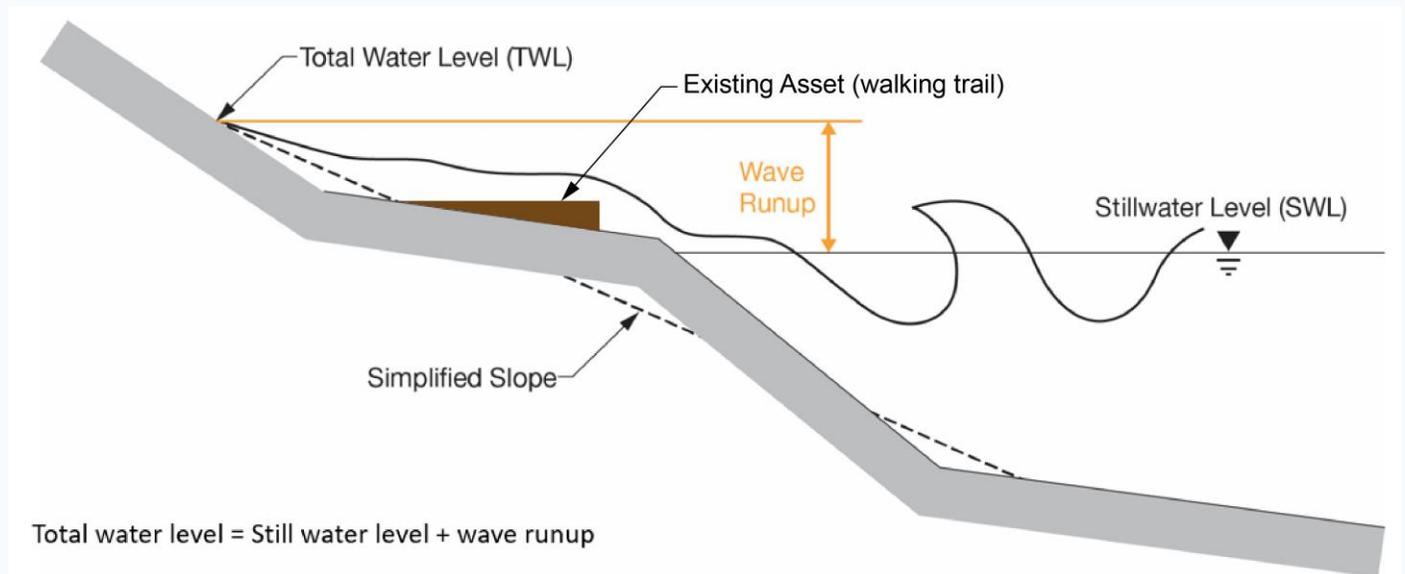
3 Modeling

Key Terminology

The following terms are used in the discussion of the hazard zone development and are shown in Figure 3-1:

- **Wave runup:** the inland vertical extent of waves as they break and run up the shore (Figure 3-1).
- **Stillwater level (SWL):** the elevation of the sea when there are no waves affecting it, including tides, storm surge, and regional effects such as the El Niño/Southern Oscillation (Figure 3-1).
- **Total water level (TWL):** the total elevation of the water surface where it meets land, including wave runup; $TWL = SWL + \text{wave runup}$ (Figure 3-1).
- **Return period:** the average amount of time between events, or the frequency at which a given event may occur (also known as a recurrence interval). For example, the 100-year event refers to a storm with a 1 in 100 (or 1%) chance of occurring annually, and an approximately 67% chance of being exceeded once in 100 years.
- **Asset:** any valuable resource, infrastructure, or entity that could be impacted by rising sea levels.

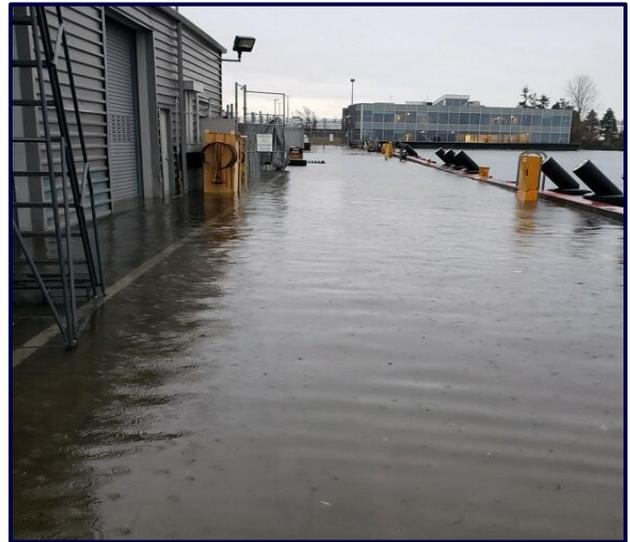
Figure 3-1 Visual Representation of Technical Terms





3.1 EXISTING CONDITIONS

The Seattle waterfront experiences mixed semidiurnal tides, or two daily high tides and two daily low tides of differing elevations. These daily tides also vary with the spring–neap tidal cycles, which occur approximately twice a month, as well as king tides, which are intensified tides that occur several times per year. King tides cause exceptionally high and low tides and are already causing flooding throughout Elliott Bay, such as in December 2022, when high tides caused acute failure of a bulkhead at Pier 17 and flooding of the pier surface (photo at right). King tides may be exacerbated when they occur simultaneously with low pressure storm systems. Table 3-1 presents the tidal datums for the NOAA Seattle tide gauge (Station #9447130).



Pier 17 Flooding, 2022. Source: Port of Seattle.

Table 3-1 Tidal Datums for Seattle

Tidal datum	Abbreviation	Seattle (#9447130)	
		feet MLLW	feet NAVD 88
Highest Observed Tide	Max Tide	15.12	12.78
Highest Astronomical Tide	HAT	13.30	10.96
Mean Higher High Water	MHHW	11.36	9.02
Mean High Water	MHW	10.49	8.15
Mean Tide Level	MTL	6.66	4.32
Mean Sea Level	MSL	6.64	4.30
Mean Low Water	MLW	2.83	0.49
North American Vertical Datum of 1988	NAVD 88	2.34	0.00
Mean Lower Low Water	MLLW	0.00	-2.34
Lowest Astronomical Tide	LAT	-4.31	-6.65
Lowest Observed Tide	Min Tide	-5.04	-7.38

Note: The tidal datums listed above are from the most recent tidal epoch: 1983–2001.

Source: NOAA Tides and Currents

The FEMA produces national Flood Insurance Rate Maps and Flood Insurance Studies for areas at risk of flooding based on current sea level. Within each community, FEMA defines base flood elevations, which represent how high water is likely to get during a 100-year coastal flood event (refer to Figure 3-1 and key terminology). Areas below the base flood elevation are at higher risk for flooding. When a building is constructed or replaced in a FEMA flood zone, most building types are required to be built 1 foot above the FEMA base flood elevation. In general, the City of Seattle uses similar



standards in its flood codes, with additional requirements for structural anchoring, construction materials and methods, and specific requirements for utilities in the floodplain.

3.2 SEA LEVEL RISE PROJECTIONS

In 2022, NOAA prepared a report titled Global and Regional Sea Level Rise Scenarios for the United States (Sweet et al. 2022). This study was based on downscaled outputs from the United Nations Intergovernmental Panel on Climate Change Sixth Assessment Report (2021).

Table 3-2 Sea Level Rise Projections for Seattle (in feet) (Sweet et al. 2022)

Year	NOAA 2022 Scenarios		
	Intermediate Low (82% probability) ¹	Intermediate (5% probability) ¹	High (<1% probability) ¹
2030	0.3	0.4	0.4
2040	0.5	0.5	0.7
2050	0.6	0.7	1.1
2060	0.8	1.0	1.8
2070	1.0	1.3	2.7
2080	1.2	1.7	3.7
2090	1.4	2.3	4.9
2100	1.6	2.9	6.0
2110	1.8	3.6	7.3
2120	2.0	4.1	8.4
2130	2.2	4.6	9.3
2140	2.4	5.1	10.1
2150	2.6	5.7	10.9

Notes:

2.0 feet sea level rise range

5.0 feet sea level rise range

¹ Assuming a global mean surface air temperature increase of 3.0 °C by 2081–2100.

Source: Adapted from Sweet et al. 2022; https://earth.gov/sealevel/us/sea-level-101/future-sea-level/diver-deeper/#exceedance_probability

Table 3-2, above, provides the projected sea level rise amounts for Seattle from NOAA (Sweet et al. 2022) for the period from 2030 to 2150 and for a range of scenarios. After discussion in the October 2023 meeting, two sea level rise amounts were chosen: near-term risk (2 feet of sea level rise) and a more conservative or longer-term risk (5 feet of sea level rise). Based on the NOAA projections, the near-term scenario of 2 feet of sea level rise is likely to occur around the end of the century (5% probability of occurring by 2085 and 82% probability of occurring by 2120), with the more risk-averse projections indicating it could occur as soon as 2060 to 2070 (<1% probability), highlighted in

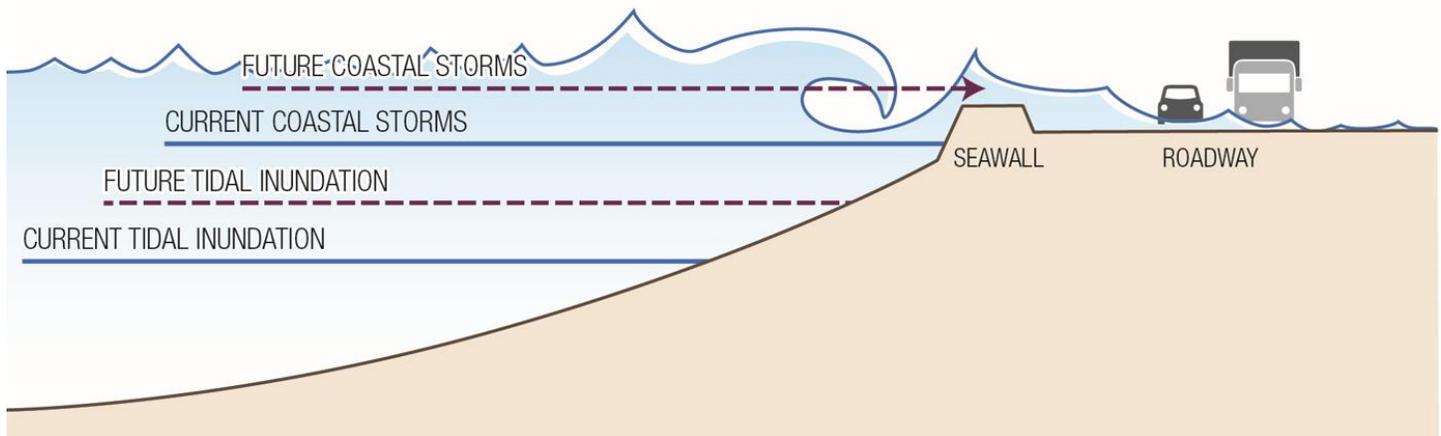


blue in Table 3-2. The longer-term scenario of 5 feet of sea level rise is likely to occur after 2150, but the more risk-averse projections indicate it could occur as soon as 2090 (<1% probability), highlighted in gold in Table 3-2.

3.3 HAZARD ANALYSIS

Global factors including glacial melt and thermal expansion are expected to create a permanent rise in ocean water levels that will shift the water's edge landward and upward, exacerbating flooding, as shown on Figure 3-2.

Figure 3-2 Example of Current and Future Inundation



Higher sea levels will also increase erosion of beaches and bluffs and increase wave attack at the toe of coastal bluffs, resulting in smaller buffers between assets and the water. Additionally, the combination of higher ocean water levels and erosion means that coastal storms will cause greater flooding and damage as waves are able to break closer to shore in deeper water. For Seattle's shoreline, these impacts from sea level rise will affect public beaches, private residences, infrastructure owned by the Port of Seattle and other public entities, and transportation networks.

This study analyzed coastal flooding. Other climate hazards related to sea level rise such as erosion and salinization were not assessed.

To assess impacts to the Seattle waterfront, "hazard zones," or the extent to which coastal flooding and waves are expected to occur, were mapped based on flood and wave modeling. Because the Port of Seattle started this study in 2023 and CoSMoS results were not yet available in King County (as of October 2025), modeling was done independently of the USGS's efforts. Once available, the Port of Seattle intends to compare the two models and update as needed. The USGS CoSMoS website is linked on the Port of Seattle's [AdaptSea website \(https://www.portseattle.org/programs/adaptsea-seattle-waterfront-resilience-partnership\)](https://www.portseattle.org/programs/adaptsea-seattle-waterfront-resilience-partnership) along with the inundation maps created as part of the AdaptSea initiative. Refer to [Section 2.4.4](#) for a brief comparison of the two products.

3.3.1 Flood Hazard Zone Development

The flood hazard assessment performed by the Port of Seattle and its consultant team involved a two-step modeling process to determine TWLs during the 10- and 100-year events with 2 and 5 feet of sea



level rise. The TWL was then mapped along the shoreline to show areas that would be inundated during those scenarios.

In the first modeling step, the TWL during a storm event is calculated using a representative and simplified shoreline slope rather than relying on the intricate site topography and bathymetry (Figure 3-1). This approach offers a less computationally intensive method that allows creation of a time series of TWLs (e.g., water elevations every hour for a 30-year period). This time series can then be used to determine the TWL recurrence interval (e.g., the 100-year event) at each location across the shore.

In the second modeling step, one specific event (rather than the whole time series) is identified based on the results of the first step to model specific sites in more detail. This event (e.g., the 1- or 100-year event) is then modeled using detailed site topography and bathymetry and more complex wave processes like wave reflection, diffraction, breaking, and dissipation to provide a more comprehensive and precise assessment of the flood extent.

The following sections offer a concise overview of the modeling steps applied for this report, while Appendix E provides a comprehensive analysis of the modeling efforts.

3.3.1.1 Step 1: Wave Modeling to Determine Total Water Levels: Regional Scale

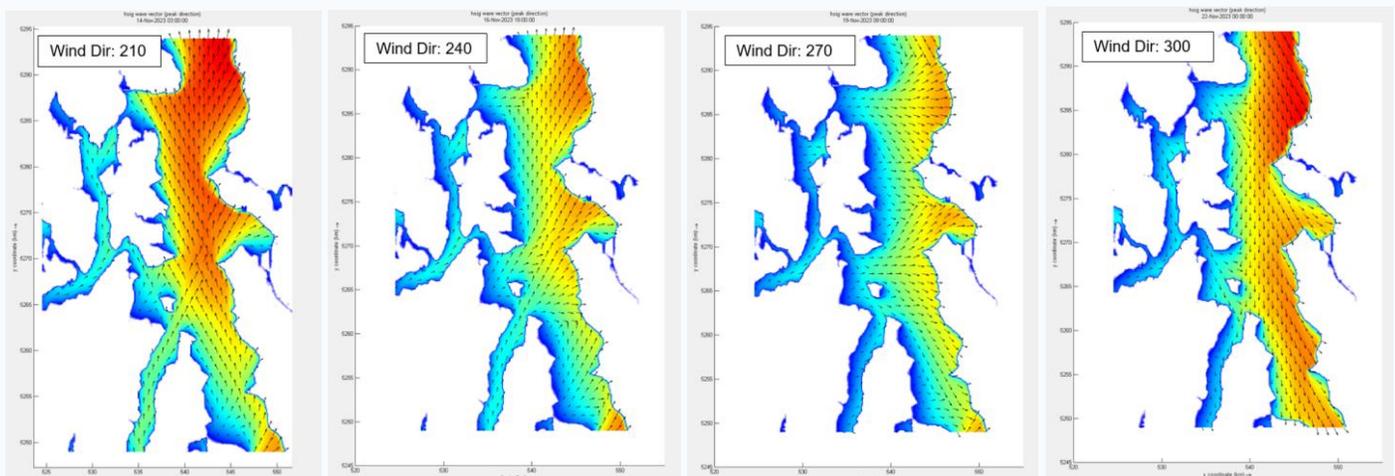
The Simulating Waves Nearshore (SWAN) model was used to simulate wave conditions in Puget Sound (Figure 3-3).

What Is the SWAN Model?

This two-dimensional model forecasts wave behavior in response to various factors such as wind speed, wind direction, water level, shoreline geometry, and bathymetry.

The SWAN model takes into account key wave processes, including wave generation, refraction, shoaling, and breaking. The SWAN model was implemented using the Delft3D modeling suite.

Figure 3-3 Wind Wave Example from SWAN Model

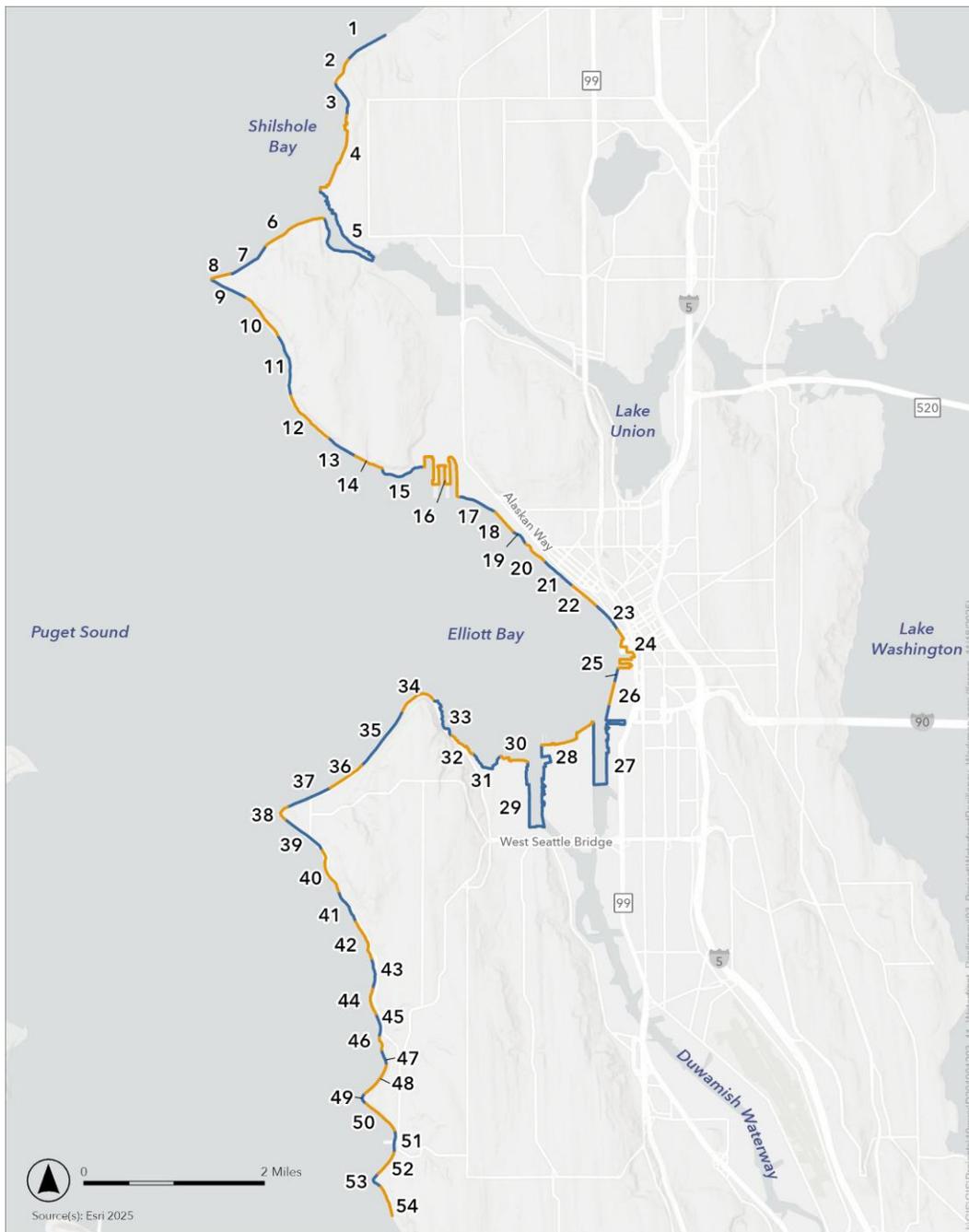




The SWAN model was used to develop a lookup table that associates wind velocity and direction with the corresponding wave parameters such as wave height, period, and direction for each offshore point.

Subsequently, this lookup table enabled the translation of a time series of wind speed and direction into a corresponding time series of wave characteristics. The derived wave height data were then used to calculate the return periods for wave heights at different offshore points. A total of 54 offshore points were used to extract these wave parameters around the entire Seattle shoreline (Figure 3-4).

Figure 3-4 Shoreline Segments Modeled in Step 1



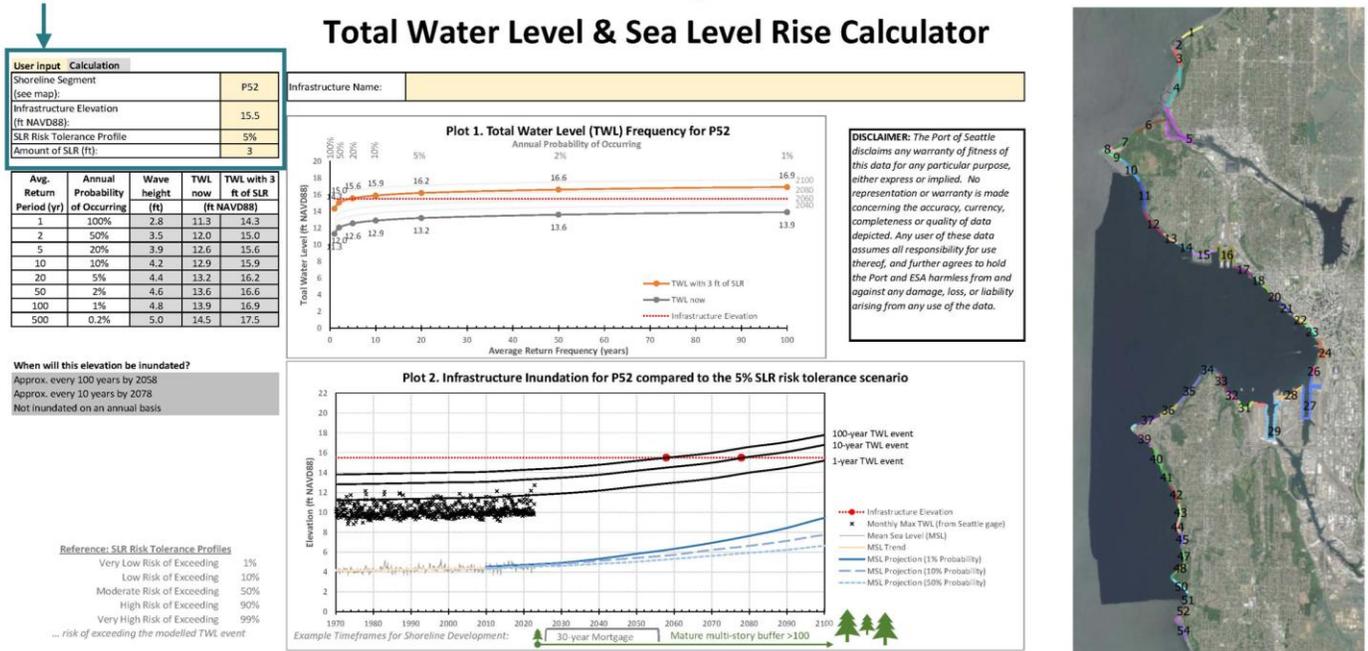


Using empirical equations, the time series of wave characteristics were used to calculate a time series of wave runup along the shoreline for each site based on a simplified shore slope. The shoreline segments were determined by areas of similar slope. The wave runup time series was then added to a time series of SWLs¹ to create a TWL time series. The derived TWLs were then used to calculate the return periods for TWLs at each offshore point.

The Seattle Total Water Level & Sea Level Rise Calculator downloadable Excel file in the Additional Resources section of the StoryMap provides the TWL results for each of the 54 shoreline segments. An example of the calculator output is provided in Figure 3-5.

Figure 3-5 Example Output from Total Water Level & Sea Level Rise Calculator

Output changes based on input related to chosen shoreline segment, sea level rise risk tolerance, and amount of sea level rise. Infrastructure elevation can be adjusted as well.

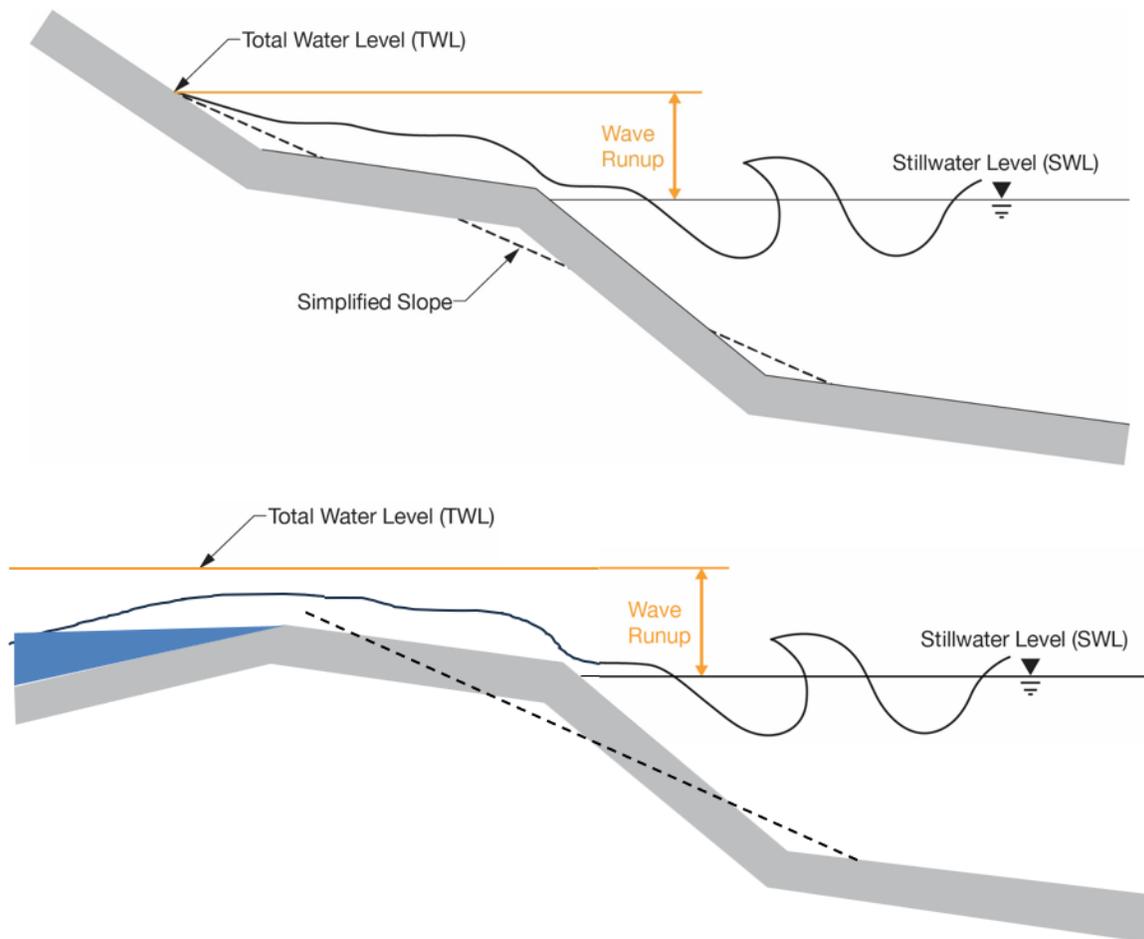


The Step 1 modeling often overestimated flooding extents, especially in cases where the inland elevations are lower than the shoreline. As shown in the bottom graphic of Figure 3-6, if the TWL is above the elevation of a berm or other high ground, the model assumes the area behind the berm would fill with water. However, if the SWL is not above the berm, only waves would overtop into this area and would likely not fill up as shown in the Step 1 model. As a result, water levels from Step 1 (and in the Seattle Total Water Level & Sea Level Rise Calculator) should be used with caution when evaluating flood extent.

¹ The SWL time series data were detrended for sea level rise since the NOAA Seattle tide gauge (Station #9447130) indicates approximately 3.3 inches of sea level rise have occurred during the 40-year period. This means that the values were raised by multiplying the historical sea level rise rate by the number of years before the present so that all values are comparable to today's sea level.



Figure 3-6 Step 1 Model Assumption Diagram



3.3.1.2 Step 2: Modeling to Determine Flood Extents: Local Scale

To provide a more accurate model of coastal flooding and extent, the 2D version of the XBeach model was used with the results from Step 1 defining what scenarios to run in Step 2. Four model extents were used to capture the waterfront, as shown in Figure 3-7.

Once the 10- and 100-year TWL elevations were identified in Step 1, specific events that result in this water level could be determined. Since TWL depends on both the SWL and wave runup, a 100-year event could be a combination of extreme waves with an average SWL or an extreme SWL (like during a king tide) and typical waves (or any scenario in between).

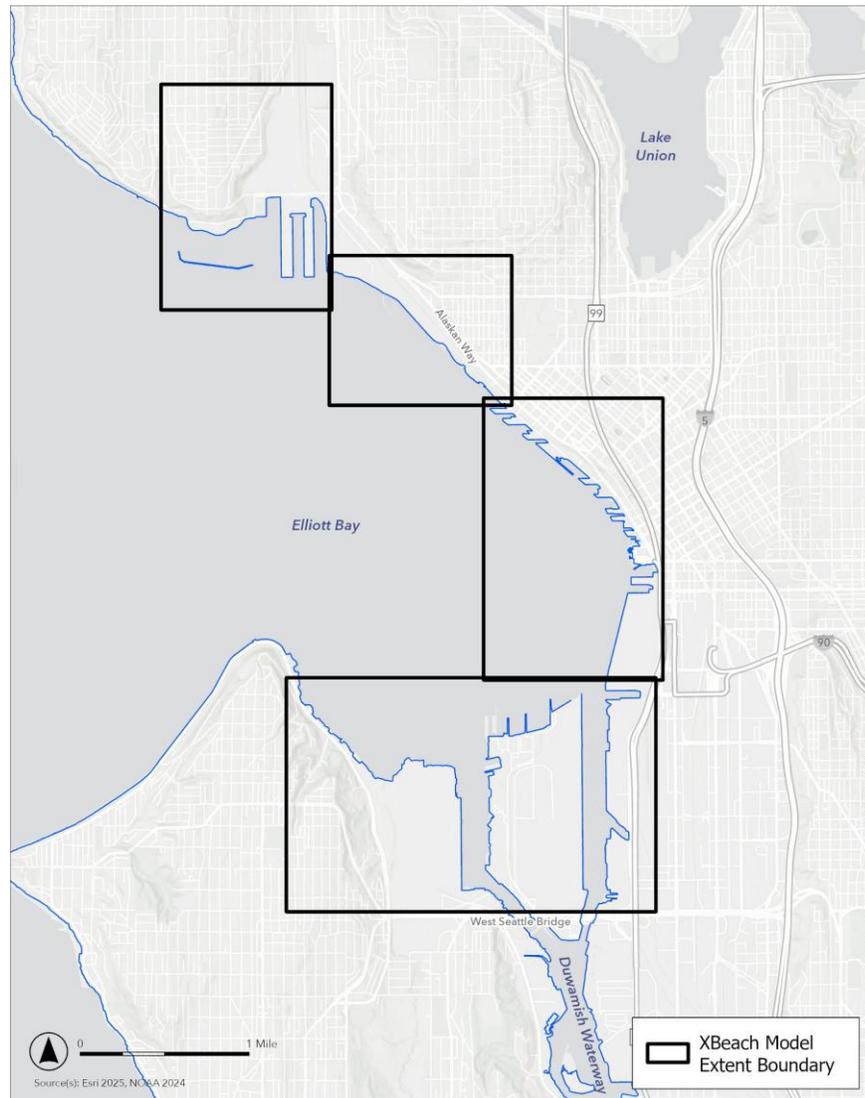
What Is the XBeach Model?

XBeach uses wave and water level inputs to model the transmittal of offshore waves inland and to estimate the landward extent of coastal flooding. XBeach is too computationally intensive to run for a whole time series and is more appropriate for analysis of specific events.

Note that XBeach does not include morphodynamic changes to the shoreline. XBeach is not a FEMA-approved modeling product and is not to be used for regulatory purposes. Modeling results are for informational and general planning purposes only.



Figure 3-7 XBeach Model Extents



It should be noted that an event with a 100-year SWL coinciding with a 100-year wave was not considered, as this event would be more extreme than a 100-year storm event (Garrity et al. 2007).

Upon reviewing the combinations of 1- and 100-year SWLs with 1- and 100-year wave heights, it was concluded that the 1-year wave height paired with 10- and 100-year SWL provided the most suitable scenarios for defining practical conditions.

XBeach was then run using the determined wave height and SWL for each site and each scenario (10- and 100-year event for 2 and 5 feet of sea level rise). The model results are presented in the hazard maps in the AdaptSea Seattle Waterfront Resilience Supplemental [StoryMap](#).

3.4 GENERAL FINDINGS

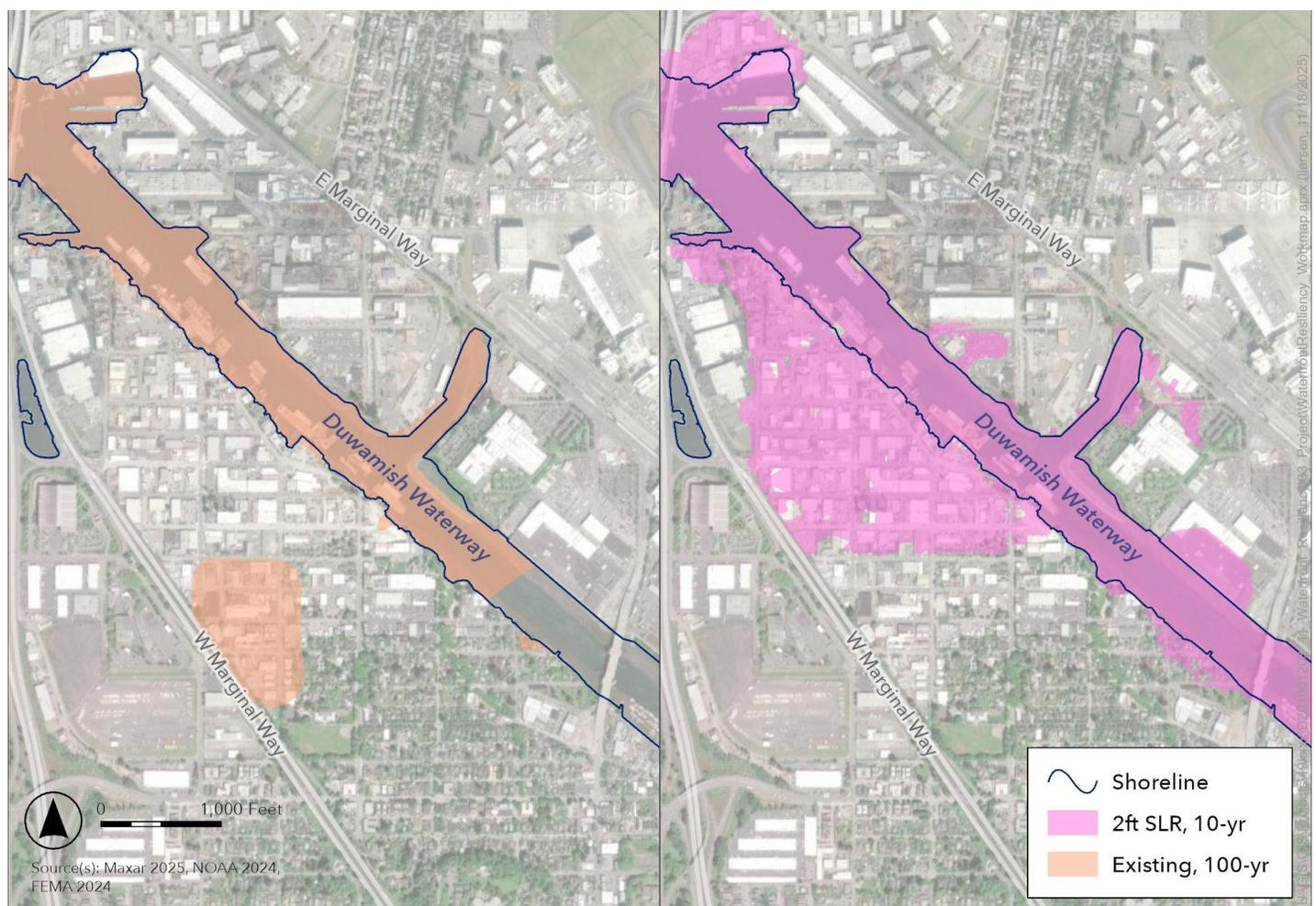
In several cases, the existing conditions mapping (based on the FEMA 100-year event flood maps) shows piers in the flood zone, even though these areas are not expected to flood during the 100-year



event. This is because FEMA did not account for the elevated pier structures in its floodplain modeling. The Port of Seattle is currently working with FEMA to update the flood maps and remove Terminal 91 and Pier 66 from the floodplain. Further modeling has shown that there are other Port facilities mapped in the floodplain that are not expected to flood during the existing conditions 100-year flood (ESA 2024b).

In general, the 10-year event showed nearly as much flooding as the 100-year event for each sea level rise scenario, with only minor additional flooding for the 100-year event. Additionally, for all the focus areas described in [Section 3.5](#), the 10-year event with 2 feet of sea level rise showed greater flooding than the existing conditions for a 100-year event (except for at some of the piers, as noted above). This is shown in Figure 3-8, which depicts inundation extent in existing and future conditions within Focus Area 4. This means that the 100-year event today will have a 10% chance of occurring each year (10-year event) with 2 feet of sea level rise (between 2060 and 2100). Similarly, the 10-year event with 5 feet of sea level rise showed more flooding than the 100-year event with 2 feet of sea level rise.

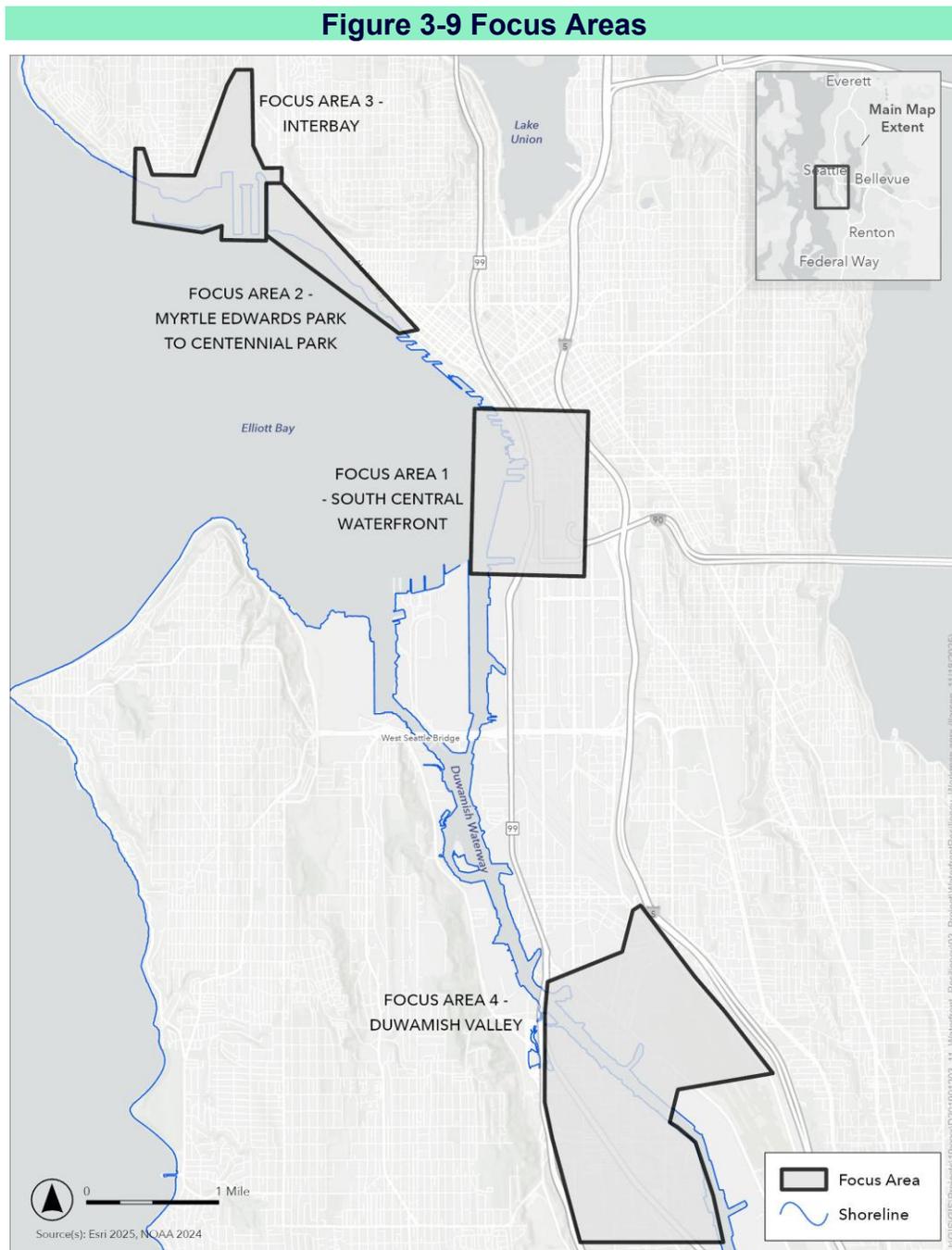
Figure 3-8 Existing Conditions 100-Year Event (FEMA) and 2 Feet Sea Level Rise 10-Year Event





3.5 IDENTIFICATION OF FOCUS AREAS

The Partners identified four focus areas for further discussion between June 2024 and March 2025. These include the southcentral waterfront, the stretch of shoreline between Myrtle Edwards Park and Centennial Park, the Interbay area, and the Duwamish Valley. These focus areas are described in detail in Sections 4, 5, 6, and 7. Figure 3-9 shows the location of the four focus areas. While boundaries are shown in these figures, they are meant to be “soft boundaries.” Discussion of adjacent and nearby assets was encouraged while identifying these focus areas and is included in the following sections.





The Port of Seattle and the Partners chose to focus on these high-use, multijurisdictional areas as test cases to identify collective strategies to reduce climate and sea level rise risk while identifying opportunities for co-benefits and collaboration. Partners indicated interest in having multiple typologies reflected in the focus areas, including parks and habitat areas, mixed public and private ownership, and industrial lands. At quarterly meetings, the Partners discussed representative existing or planned projects and assets in each focus area. Major asset inventories in the following sections are not exhaustive; they are meant to be illustrative of infrastructure types present in each focus area. The asset inventories, along with narrative operational, management, and capital planning context, are meant to guide identification of overlaps and intersections between Partner assets, facilitating discussion and collaboration.

The asset inventory information collected through these discussions, and GIS data where available, was added to an AdaptSea Seattle Waterfront Resilience Supplemental StoryMap as a way to spatially identify any areas where adaptation strategies could be aligned, to consider optimal adaptation sequencing, and to plan projects to be more effective and efficient. An additional goal of this process was to begin developing strategies for joint funding or capital investments that the Partners could coordinate around.

3.6 DEVELOPMENT OF STORYMAP

As a companion document to this report, the Port of Seattle and consultant team developed the AdaptSea Seattle Waterfront Resilience Supplemental StoryMap. The StoryMap is intended as a tool for the Partners to use for the planning, prioritization, and budgeting of sea level rise resilience efforts. The StoryMap is publicly available to provide adaptation decision-making support and guidance for other waterfront asset owners and operators.

AdaptSea Seattle Waterfront Resilience Supplemental StoryMap



Users can access an interactive, web-based narrative combining maps, text, images, and other media that communicates the Port of Seattle's project information in a clear and engaging format. It includes a WebMap that illustrates current and potential future inundation extents and asset risk integrated with descriptive content and multimedia to provide context. The StoryMap is designed for easy navigation, with sections highlighting different components of the project. Appendix F provides information on accessing and using the StoryMap.



4 Focus Area 1: Southcentral Waterfront

4.1 DESCRIPTION

Focus Area 1 spans approximately 1.3 miles along the shoreline of downtown Seattle from Union Street at the north, to S Massachusetts Street at the south, and east to Maynard Avenue S. Figure 4-1 provides an overview of Focus Area 1 and key assets, as well as inundation scenarios for 2 and 5 feet of sea level rise.

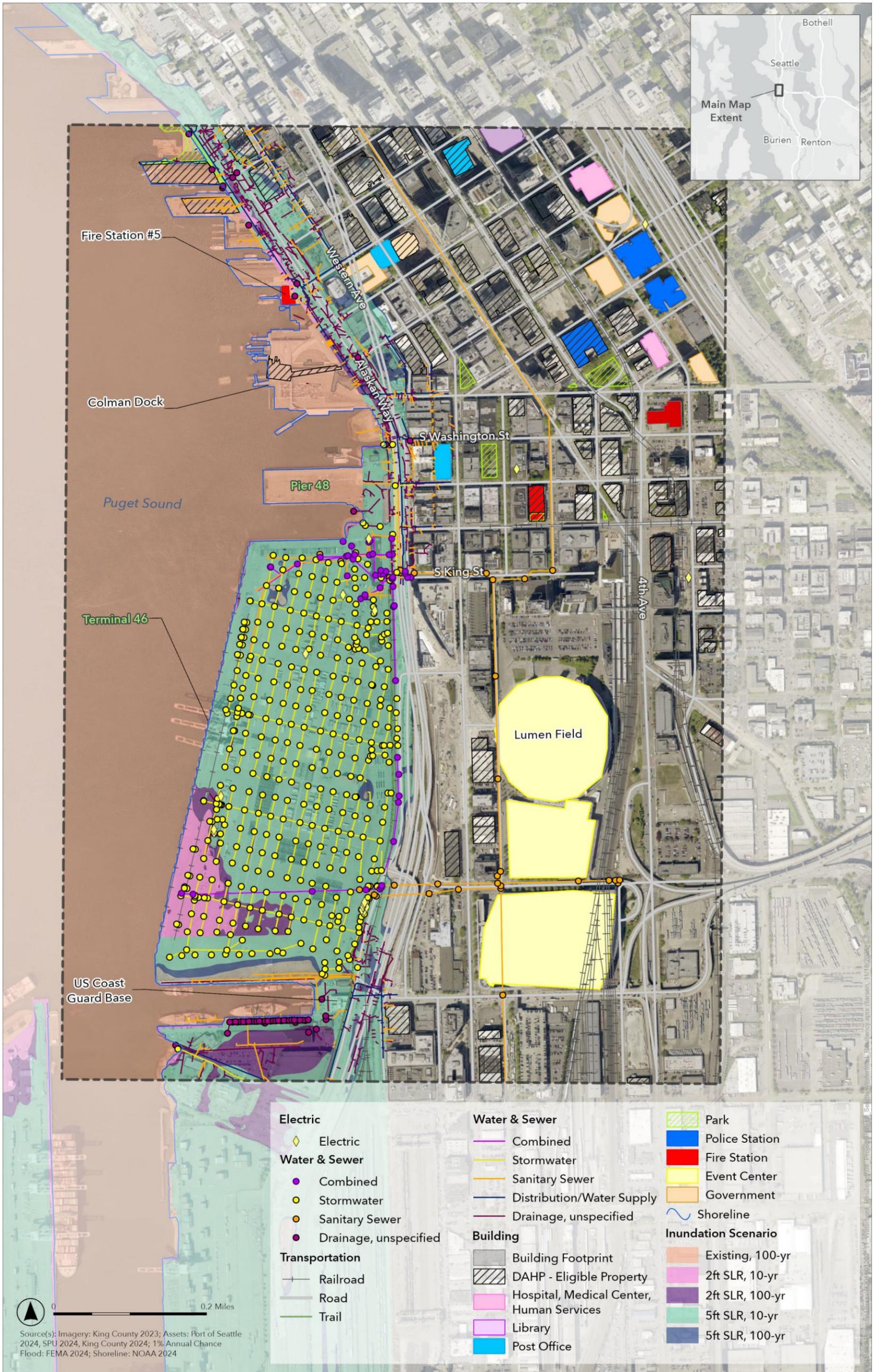


This area was chosen due to its concentration and intersection of major assets for the Port of Seattle, NWSA, City of Seattle, and WSDOT, as well as its connectivity to critical downtown utilities and transportation networks supporting Port of Seattle operations, commerce, and freight movement. The Southcentral Waterfront Focus Area contains the City of Seattle seawall, public piers, and the Alaskan Way corridor; WSDOT's Colman Dock; King County combined sewer overflows (CSOs) and regulator stations; and the Terminal 46 cargo terminal (NWSA) and North Pier (Port of Seattle). Immediately to the north of this focus area are Port of Seattle headquarters offices and one of its two cruise terminals. This focus area represents an area with mixed public and private ownership, with some industrial lands (Terminal 46).

Under existing conditions, Terminal 46 is not expected to flood during the 100-year event. The FEMA maps show flooding of the piers to the north, but as described in [Section 3.4](#), the FEMA maps did not include the existing pier structures in their models for the 2020 remapping effort, so these results are inaccurate. The 1995 FEMA flood maps, which did consider the piers, show no flooding on the piers to the north of Terminal 46 within Focus Area 1.



Figure 4-1 Focus Area 1



Learn more about the scenarios and their impact to the assets described in this report here:
<https://storymaps.arcgis.com/stories/87ac7f92cde44895bb2cf13683fa1852>



4.2 KEY ASSETS WITHIN FOCUS AREA

Fire Station #5

Fire Station #5, located north of the ferry terminal, is owned by the City of Seattle. The station was redeveloped after completion of the Alaskan Way Seawall Project and included seismic upgrade and historical renovation. Sea level rise planning was not a major element of the upgrade. A pile reinforcement project was completed in 2021 to increase resilience to floating debris and logs during storms and flood events. Hanging and exposed utilities were caged for added protection. This work was prompted in part by removal of the old Colman Dock, as removal of the dock led to added exposure for the pier. Simultaneously, from 2021 to 2022, a floating dock was replaced, and a new ramp was installed to move with tidal fluctuations. Neither element was elevated to accommodate sea level rise, only reinforced structurally to withstand additional loading and debris strikes.

With 2 feet of sea level rise, Fire Station #5 is at risk of flooding during the 10-year event. Any larger events or rise in water level would cause additional flooding.

Colman Dock

WSDOT owns and operates the Colman Dock facility on Alaskan Way. The new terminal became operational in 2022, and final elements are nearing completion. Colman Dock is built at a fixed height that matches the pre-existing terminal elevation. WSDOT will potentially raise a safety barrier around the edge of the site to address near-term sea level rise. According to conversations with City of Seattle staff, sea level rise projections were not explicitly considered when the new Colman Dock or Alaskan Way seawall projects were planned. Future planned projects for the ferry terminal include replacing and refurbishing cable-operated towers at Slips 1 and 2 and overhead loading at Slip 2. WSDOT also has a tentative plan to run a marine cable for Slips 1 and 2 and a project to coat uncoated piles that have been affected by corrosion.

The northernmost ferry access road is at risk of flooding during a 10-year event with 2 feet of sea level rise. During the 100-year event, all except the southernmost ferry access road are at risk of flooding. With 5 feet of sea level rise, the 10-year event is expected to flood the entire pier, as well as Alaskan Way, cutting off access to the ferries.

Pier 48

Pier 48, formerly owned by the Port of Seattle, is currently owned by WSDOT. There are a variety of public and private entities interested in the future of Pier 48, including Tribes for whom the site holds special historical significance. The pier serves as overflow parking and laydown space for WSDOT when needed, but due to its deteriorated condition does not have regular operations. The Port of Seattle worked with WSDOT to identify a potential habitat mitigation project at Pier 48, but the project stalled due to regulatory challenges. With 2 feet of sea level rise, the 10-year event is expected to cause some minor flooding from the south while most of the pier would be inundated during the 100-year event. With 5 feet of sea level rise, the entire pier would be inundated during the 10-year event.

Terminal 46

Terminal 46 is managed and operated by the NWSA, along with other cargo properties owned by the Port of Seattle, within the framework of the governing documents of the NWSA. A substantial portion of the terminal is built on State-Owned Aquatic Lands managed by the Washington State Department of Natural Resources. The north end of the property (Terminal 46 North Pier) is not licensed to the



NWSA (i.e., it is owned and remains managed and operated by the Port). The terminal is constructed with timber piles; the Port of Seattle is currently looking at potential repair or replacement options and evaluating potential uses. There are other maintenance projects planned for the terminal, and the Port of Seattle has identified a number of sea level rise concerns and considerations. Due to seismic constraints and contamination, any redevelopment or change in use for Terminal 46 will entail significant effort and costs.

With the 2 feet of sea level rise scenario, the southwest end of Terminal 46 is at risk of flooding. During the 100-year event with 2 feet of sea level rise, the southwest portion of the terminal is at risk of flooding; the 10-year event with 5 feet of sea level rise could cause flooding of most of the terminal, with water crossing over Alaskan Way and up to Western Avenue north of Yesler Way. Any larger events or rise in water level would cause additional flooding.

U.S. Coast Guard Base

The U.S. Coast Guard (USCG) facility to the south of Terminal 46 is being remediated and reconfigured; as of the publication of this report, the USCG has leased a portion of the south end of Terminal 46 to act as “swing space” as portions of their wharf and basin are rebuilt. The USCG is exploring expansion of its base to homeport additional USCG vessels in the future. An Final Environmental Impact Statement was issued in 2024 and a Record of Decision is expected in 2026. The entire south facility is at risk of flooding during the 10-year event with the 2 feet of sea level rise scenario; expansion to Terminal 46 exposes USCG assets, including those planned for reconfiguration or redevelopment, to flooding as described above.

Roadways

Seattle Department of Transportation owns and maintains Alaskan Way and the seawall. The top elevation of the new Alaskan Way Seawall is approximately 16.1 feet above sea level, which is the same height as the old wall. Approximately half of the old seawall was replaced from S Washington Street to Virginia Street in 2019. Climate projections at the time of the design showed that with a maximum of 4 feet of sea level rise by 2100, there could be an overtopping of about 3 inches during high tide, which was determined by Seattle Department of Transportation to be an acceptable risk (refer to next paragraph for risk with storm events). The design is an adaptable gravity-based design, which would allow the wall to be raised in the future without compromising its structural integrity. The road itself, at about the same elevation as the wall, slopes inland so that any water that overtops the seawall drains into the stormwater system.

There is still approximately 1 mile of the old wall existing between Virginia Street to Broad Street, which dates back approximately 100 years. There is no funding yet for the design or construction of the remaining mile of the wall; the City of Seattle has applied for federal climate resilience grant funding (which was not awarded) and has put a small amount of seed funding for design in a levy this year. Environmental permitting was done for the whole length, and permits were renewed for another 10 years; however, due to the time elapsed and new science available, it is likely that most of the environmental analyses will have to be updated for the second phase.

During the 100-year event with 2 feet of sea level rise, Alaskan Way (within the Focus Area) is at risk of flooding, with water crossing up to Western Avenue north of Yesler Way. This would include inundation of several buildings between the two roads as well.



With 5 feet of sea level rise, the 10-year event would cause flooding all the way to Lumen Field from S King Street south. During the 100-year event, flooding would reach 4th Avenue.

Utilities

King County regional wastewater utilities in the Focus Area include King Street and Kingdome Regulator Stations, which have medium and high vulnerability to sea level rise in 2100, respectively, based on a King County vulnerability assessment. Both facilities may be exposed to direct coastal flooding and saltwater inflow in the future. They are not critical facilities within the combined sewer system. The Regulator Stations are associated with uncontrolled CSOs. A design process is underway as part of the Mouth of the Duwamish Wet Weather Facilities project to bring the CSOs into compliance. This project is largely outside the Focus Area but it is reasonable to predict some work and alteration of King Street Regulator and Kingdome Regulator would be required.

During the 100-year event with 2 feet of sea level rise several Port of Seattle marine substations and flow control points would be at risk of flooding. Any larger events or rise in water level would also cause flooding.

During initial discussions about focus areas, the Partners divided the Central Waterfront into the north section (Pier 66 to Myrtle Edwards Park) and the south section, which became Focus Area 1: Southcentral Waterfront. Due to time constraints, and the Partners' prioritization of multiple representative focus area typologies, the north section, which contains the Port of Seattle headquarters offices at Pier 69 and one of its three cruise terminals at Pier 66, was not included as a focus area. It should be noted that in addition to Pier 69 and Pier 66, multiple key Partner assets exist in this northern section. Its exclusion from the focus area discussions should not imply that these assets are any less important than those within the focus areas. The northern section of the Central Waterfront was included in the Focus Area 1 coastal storm modeling extent. Key assets in the north section are discussed in the modeling results for Focus Area 1.

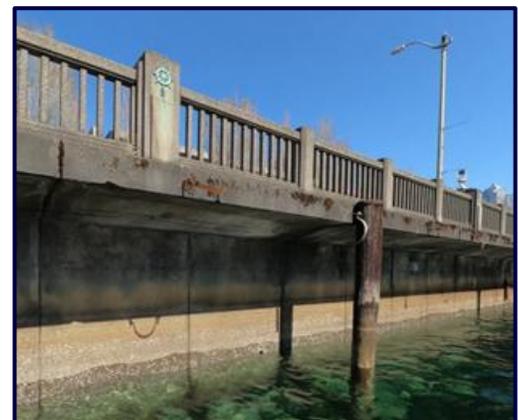


Riprap along the Duwamish River

4.3 RELEVANT PHYSICAL ADAPTATION TYPOLOGIES

The following physical adaptation typologies were presented by ESA, or discussed by Partners, during quarterly meetings for consideration by the Partners in future adaptation strategy development. These potential techniques could be appropriate within the Focus Area 1 context, accounting for the location and extent of potential flooding projected in the AdaptSea coastal storm modeling.

- Shoreline protection devices such as riprap or walls (pictured at right; e.g., WSDOT's potential safety barrier at Coleman Dock, mentioned above).



Sea wall north of Pier 66. Source: Ecology et al. <https://arcgis.earthviews.com/puget-sound-home.html>



- Elevating, floodproofing, or wetproofing buildings and infrastructure (e.g., adding parking lots to the first floor of buildings, moving electrical facilities to upper floors, adding platforms in critical areas)
- Multifunction or integrated flood protection, such as horizontal levees
- Managed retreat through abandoning nearshore buildings and creating natural barriers to assets currently upland

Given the extent of investment in infrastructure in this focus area, protection and accommodation would be considered priority approaches. It is important to note that these typologies may be appropriate for certain properties within the focus area but may not be appropriate for others, depending on community priorities, site context, and planning work already completed or underway. These physical adaptation typologies should be considered among the suite of adaptation approaches, which include protection, accommodation, and managed retreat.

4.4 CONSIDERATIONS FOR COORDINATED EFFORTS

The following considerations for collaboration were put forward during group discussion at the June 2024 meeting:

- Federal policy can drive public investments. Major projects and project components are often prioritized as a result of regulatory mandates or funding to implement federal policies and executive orders. An example of this is seismic risk reduction. The Partners could monitor policy changes and identify strategic opportunities to advance adaptation work.
- The City of Seattle Office of Sustainability and Environment intends to update the Sustainable Building Policy in the coming year; this will likely include addressing sea level rise in more detail. There may be opportunities to engage Partners or share strategies.
- City of Seattle Parks and Recreation is undertaking a coastal park land study to inventory habitat resources and opportunities within its shoreline parks. This information could inform planning for nature-based solutions to sea level rise and flooding risk.
- Some of the infrastructure along this section of the waterfront has been recently redeveloped. Funding and regulatory approval for major improvements to adapt to sea level rise in these already updated areas are going to be challenges.
- Adjusting project scope or design to address sea level rise midway through design could impact project budget and public support. Conversely, the public is likely to reject major infrastructure projects that are not built to accommodate sea level rise. The Partnership could consider how to make incremental changes while still advancing more comprehensive strategies.
- Where local regulations require elevation, those requirements can apply to the whole structure (including piers or terminal properties), rather than the isolated improvement. Typically, Port of Seattle operations require level ground for movement of vehicles, freight, and other materials, so if one part of a facility is raised, everything on property needs to be raised to maintain operational functionality. The practical and funding implications of this are significant and affect long-term strategy and land use considerations.



AdaptSea Seattle Waterfront Resilience Partnership

- There could be a benefit to bringing private landowners and businesses into the sea level rise adaptation conversation, both to lessen impacts to their properties and potentially as an avenue for more funding opportunities.
- Key public assets in the area include port and transportation facilities that are water-dependent and rely on Seattle's deep harbor infrastructure. Water-dependent facilities cannot retreat from the water or avoid being directly located on the shoreline. The Partners could consider this context when designing sea level rise adaptation strategies.



5 Focus Area 2: Myrtle Edwards Park to Centennial Park

5.1 DESCRIPTION

Focus Area 2 spans approximately 1.6 miles along the shoreline of downtown Seattle from Centennial Park near the Expedia Group property in the north to Myrtle Edwards Park in the south. Figure 5-1 provides an overview of Focus Area 2 and key assets.

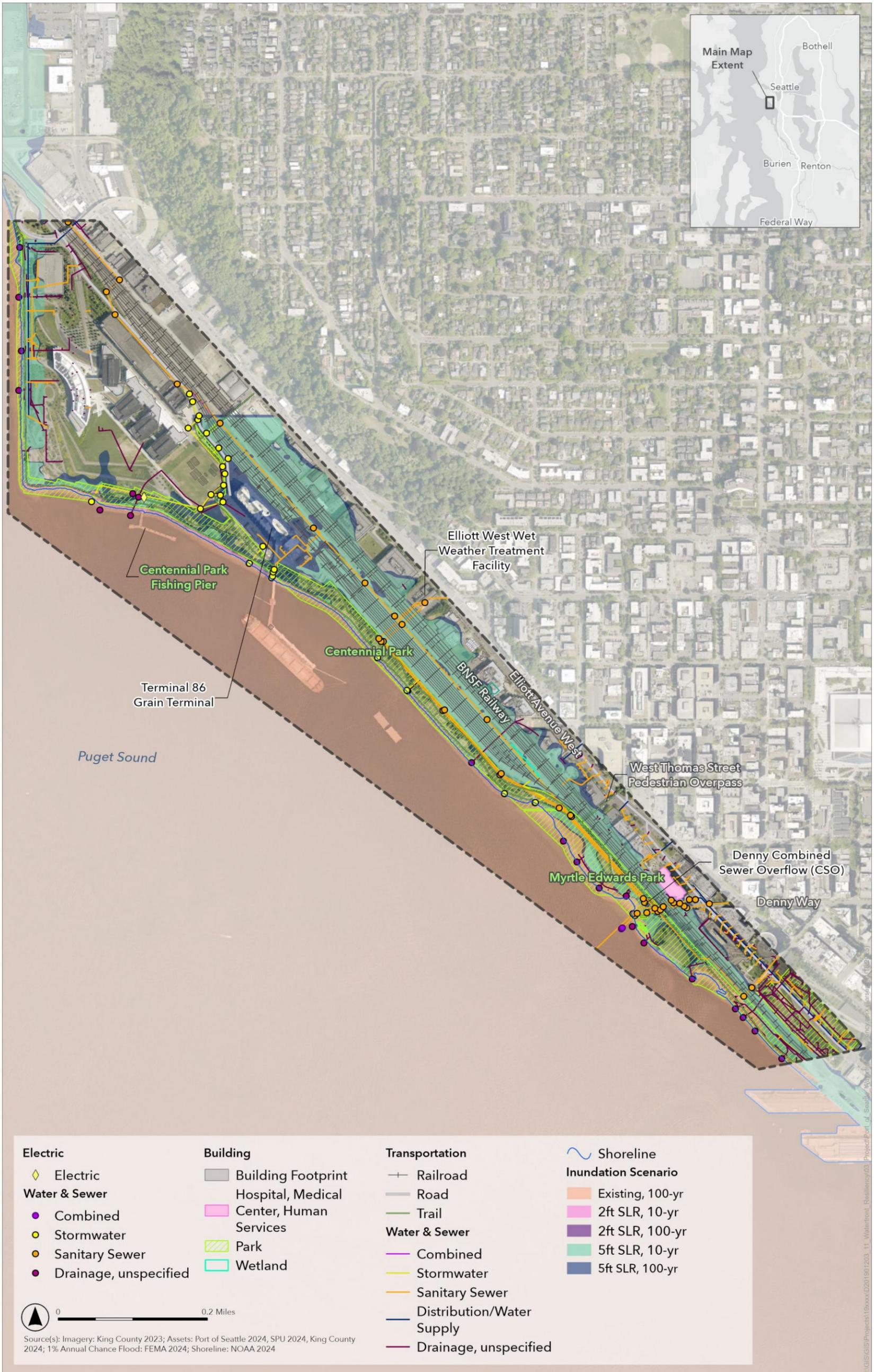


This area was chosen due to its current flooding and erosion impacts and anticipated future flooding, as well as its importance as a community recreational hub and greenway. It represents the parks and habitat areas typology. It hosts important King County wastewater treatment and conveyance infrastructure and is one of the Port of Seattle's most significant community assets. The City of Seattle, Port of Seattle, and private investors will complete a substantial redevelopment project, Elliott Bay Connections, affecting a large section of this focus area in advance of the FIFA World Cup, to be hosted in Seattle in 2026.

Under existing conditions, the northwestern corner of the shoreline across from Terminal 91, a small distance for the entire length of Centennial Park, and parts of Myrtle Edwards Park are expected to flood during the 100-year event. Flooding in a park is typically considered low vulnerability because parks are non-critical, flexible-use areas where temporary inundation generally does not threaten public safety, infrastructure, or essential services. Their open space can also provide flood storage and buffer adjacent developed areas.



Figure 5-1 Focus Area 2



Learn more about the scenarios and their impact to the assets described in this report here:
<https://storymaps.arcgis.com/stories/87ac7f92cde44895bb2cf13683fa1852>



5.2 KEY ASSETS WITHIN FOCUS AREA

West Thomas Street Pedestrian Overpass

The Seattle Department of Transportation owns and maintains the West Thomas Street Overpass, which spans Elliott Avenue West and BNSF Railway Company (BNSF) tracks. The footings of the overpass and waterward entrance may be inundated during the 10-year event with 5 feet of sea level rise.

Centennial Park

The Port of Seattle owns Centennial Park, an 11-acre park just southeast of Terminal 91. Formerly known as Elliott Bay Park, it includes extensive trails that are part of the Elliott Bay Connections Project and the Olympic Sculpture Park. The Port recently completed a Coastal Process Assessment and Alternatives Analysis to identify reaches of the beach with similar on-site conditions and to develop alternatives for adaptation to address persistent coastal erosion. It was determined that the shoreline here may remain functional (providing park access) under existing conditions up to the year 2100; however, some reaches will face frequent inundation and erosion by 2070. There are opportunities to pull the shoreline back, add a tidal bench, or create a small natural beach for water access. The Port of Seattle is working with the Washington Department of Fish and Wildlife to accommodate replacement of the fishing pier, which has been closed due to safety hazards associated with the pier's structure and utilities. An area north of the grain terminal was recently stabilized using nature-based techniques as part of the Port of Seattle's Sustainable Shorelines bankline inspection and repair program. The survey identified areas of failing hard armor, which were replaced with anchored large wood, topsoil lifts, and riparian plants.

Terminal 86 Grain Terminal

The Port of Seattle owns the Terminal 86 Grain Terminal, a facility only accessible by rail. The property includes a stormwater conveyance system, which transports stormwater from the conveyance line to an upland bioswale. The Port of Seattle recently performed a conditions assessment on the piling and identified the need for rehabilitation. Due to the pier's elevation, it would not likely be affected by sea level rise in the modeled scenarios. The most sensitive infrastructure is the concrete and steel superstructure above the piling, which could experience corrosion of rebar, spalling, and delamination if regularly exposed to seawater. The piles themselves are relatively resilient. However, access and transport to and from the Grain Terminal could be impacted by the railroad flooding, which is expected to occur during the 10-year event with 5 feet of sea level rise.

The Port of Seattle has partnered with Seattle City Light on a [Waterfront Clean Energy Strategy](#), which considers additional electrical infrastructure investments needed to ensure capacity for future investments. It included modeling for the Terminal 86 facility, considering spot loads for locomotives; however, at this time there is no significant new loading anticipated at Terminal 86. This area is not anticipated to see significant new demand, so existing infrastructure is expected to be sufficient.

Myrtle Edwards Park

The City of Seattle owns Myrtle Edwards Park, a 4.8-acre public park located just south of Centennial Park, which is managed by Seattle Parks and Recreation. The Elliott Bay Connections Project initially proposed a berm between the high beach and low beach. However, the park does not contain any critical infrastructure, so the City of Seattle evaluated more creative ways to address sea level rise, potentially including avoidance or minimization of hard infrastructure. The final Elliott Bay Connections



Project design modified the original berm concept to increase the beach setback and increase floodable area. Myrtle Edwards Park will be inventoried for habitat resources and opportunities as part of a coastal assessment funded by a grant from the U.S. Department of Commerce. All 11 miles of the City of Seattle’s shoreline parks will be included in the study.

Elliott Bay Connections Project

The City of Seattle is leading the Elliott Bay Connections Project, which will restore, connect, and revitalize public parks along the Elliott Bay waterfront from the Beach at Expedia Group to the Seattle Aquarium at Pier 62. Most of the updates focus on adjusting trail alignment and planting, but select areas may have more intensive treatment that will address sea level rise. For example, the current design for the north beach in Myrtle Edwards Park includes regrading, new riprap, large wood, at-grade improvements, and play features. A public amenities building is currently proposed in Centennial Park. The building will be built outside the projected 100-year flood zone for 2100, and there are opportunities to adjust other areas of the shoreline or move the top of bank to support the longevity of the building.

Utilities

King County regional wastewater utilities in the focus area include conveyance lines to West Point Treatment Plant, the Elliott West Wet Weather Treatment Facility, and the Denny Way Regulator Station. The Denny Way Regulator Station may be exposed to direct coastal flooding and saltwater inflow in the future. The facility is moderately vulnerable to saltwater inflow as its overflow weir invert is below the projected water surface elevation under approximately 2 feet of sea level rise (the 2100 50% likelihood scenario considered for the King County vulnerability assessment) but is protected by a flap gate. The ground surface elevation adjacent to the facility is below the projected water surface elevation for approximately 2 feet of sea level rise with storm surge so the facility is considered highly vulnerable to future flooding. The regulator station is a critical facility within the combined sewer system, managing flows into the Elliott Bay Interceptor from the Lake Union Tunnel and the local sewershed. The Elliott West Wet Weather Treatment Facility is not projected to be exposed to sea level rise in 2100. There are planned improvements to the facility for CSO compliance.

The lift station at the Centennial Park fishing pier is at risk of flooding with the 10-year flood with the 5 feet of sea level rise scenario.

There are plans to address the City of Seattle’s Vine Street Basin CSO, with construction in approximately 2029.

5.3 RELEVANT PHYSICAL ADAPTATION TYPOLOGIES

The following physical adaptation typologies were presented by ESA, or discussed by Partners, during quarterly meetings for consideration by the Partners in future adaptation strategy development. These potential techniques could be appropriate within the Focus Area 2 context, accounting for the location and extent of potential flooding projected for this area in the AdaptSea coastal storm modeling.

- Adding a berm at the back of the park spaces to protect roads, railroad lines, and businesses but allow flooding in park spaces
- Setting the shoreline back, adding a tidal bench, or creating a beach for wave attenuation



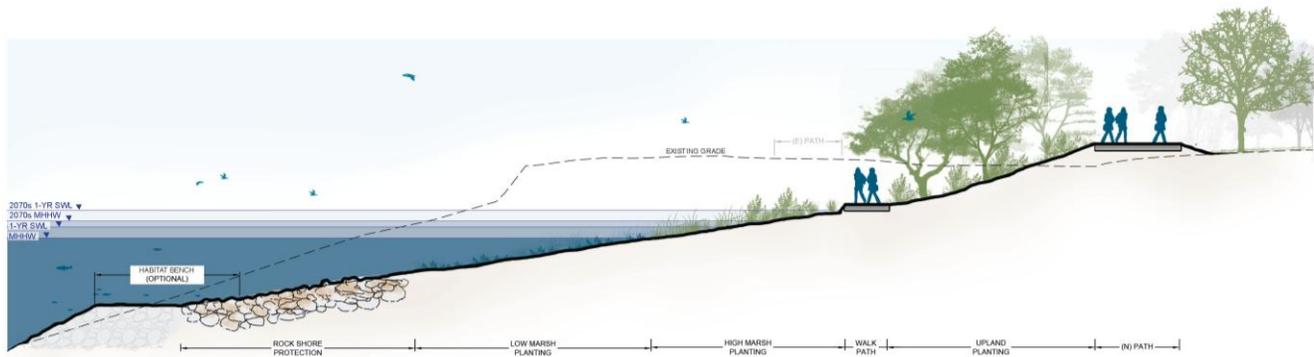
- Replacing failing hard armor with nature-based solutions, including large wood and plantings, where feasible
- Adding a floodgate across the railroad line (pictured at right)
- Adding or increasing the height of a seawall
- Raising the Elliott Bay Trail with floodable park and beach space waterward of the trail



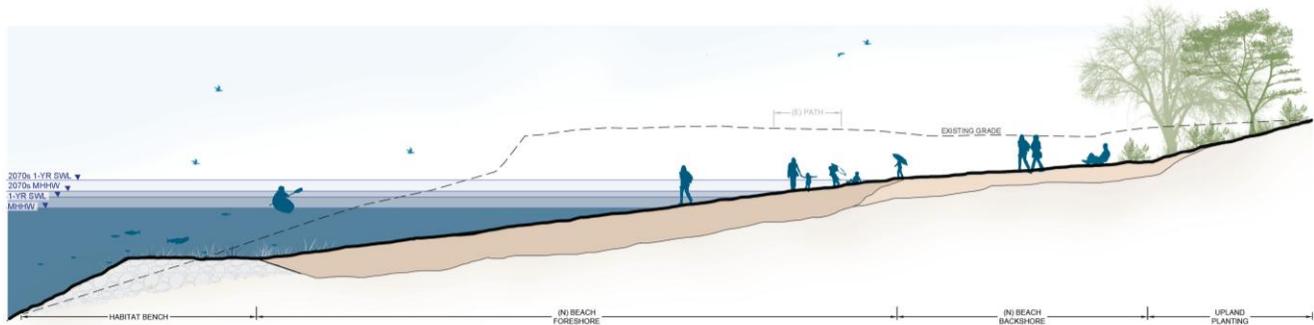
Floodgate across railroad.
Source: BNSF. <https://www.bnsf.com/news-media/railtalk/service/hurricaneida.html>

Figure 5-2 depicts an example shoreline stabilization treatment for Centennial Park, as developed in 2024.

Figure 5-2 Preliminary Shoreline Stabilization Treatment



Treatment: Tidal Bench (not to scale)



Treatment: Beach Grading (not to scale)

Note: figure content is preliminary. ESA 2024

It is important to note that these typologies may be appropriate for certain properties within the focus area but may not be appropriate for others, depending on community priorities, site context, and planning work already completed or underway. These physical adaptation typologies should be considered among the suite of adaptation approaches, which include protection, accommodation, and managed retreat.



5.4 CONSIDERATIONS FOR COORDINATED EFFORTS

The following considerations for collaboration were put forward during group discussion at the September 2024 meeting:

- The Port of Seattle and City of Seattle could continue to coordinate on the Elliott Bay Connections Project and other park and trail projects in this focus area. The Partnership can help to facilitate information exchange and advocate for nature-based solutions that improve salmon habitat and sea level rise adaptation while promoting public access. The multibenefit approach will be important in seeking funding.

The Partners could explore performing habitat evolution modeling to understand the effects of changing coastal conditions and support project design and decision-making.

- Researchers are exploring potential reuse of riprap to restore kelp forests. The Partners could consider ways to support this research or pilot projects and other innovative approaches to improve intertidal areas.
- Contaminated soils and sediments are a concern throughout the Seattle waterfront. The Partners could support research to determine if the former Unocal Site or the Olympic Sculpture Park impact Myrtle Edwards Park due to contaminated stormwater or overflow storm events.



6 Focus Area 3: Interbay

6.1 DESCRIPTION

Focus Area 3 spans approximately 1.6 miles along the shoreline of Seattle from 32nd Avenue W at the west, to 15th Avenue W at the east. Figure 6-1 provides an overview of Focus Area 3 and key assets.

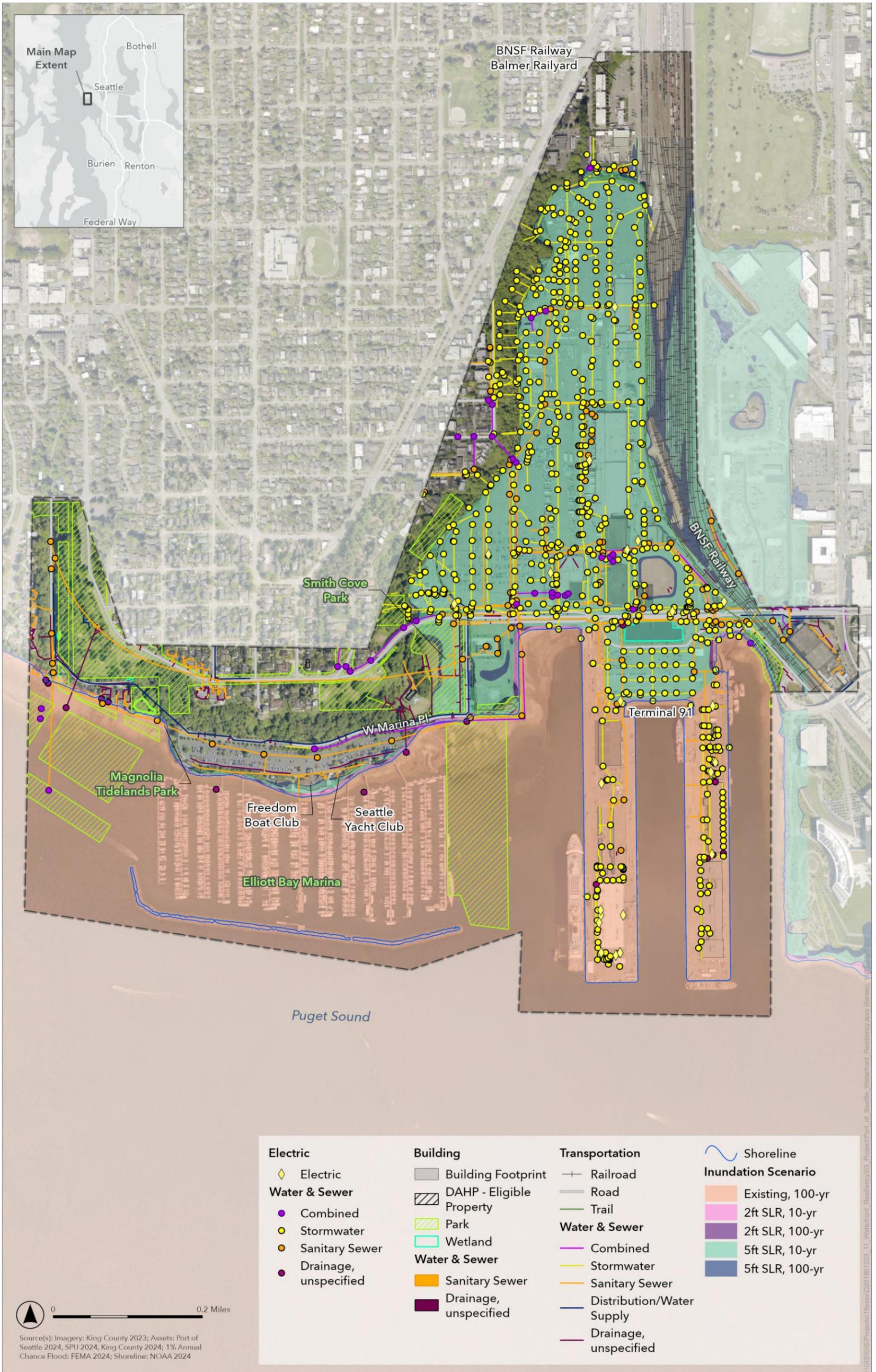


This area was chosen to represent the large industrial lands typology and also includes parks and habitat areas and mixed public and private land ownership. It contains one of the Port of Seattle's largest and most diverse properties at Terminal 91 and hosts important King County wastewater conveyance to the West Point Treatment Plant. The proximity to Magnolia Bluff, aging stormwater infrastructure, and drainage issues all make this a complex area to manage. Partner organizations have undertaken multiple current or near-term modernization and redevelopment projects in this focus area, including at Port of Seattle's Terminal 91 property, the City of Seattle's Smith Cove Park, and King County South Magnolia CSO Storage Tank.

Under existing conditions, some flooding is expected along West Marina Place at Smith Cove Park and at Magnolia Tidelands Park during the 100-year event. The FEMA 100-year flood maps show inundation of Terminal 91. However, as described in [Section 3.4](#), FEMA did not include existing pier structures in the 2020 remapping effort; additional modeling for the Port of Seattle has shown that Terminal 91 is not expected to flood during the existing conditions 100-year flood (ESA 2024b).



Figure 6-1 Focus Area 3



Learn more about the scenarios and their impact to the assets described in this report here:
<https://storymaps.arcgis.com/stories/87ac7f92cde44895bb2cf13683fa1852>



6.2 KEY ASSETS WITHIN FOCUS AREA

Terminal 91

The Port of Seattle owns Terminal 91, which houses Smith Cove Cruise Terminal, cold storage facilities, Port Police dive operations, and large processor vessels that are part of the North Pacific Fishing Fleet. The site is a formerly used defense site and has a significant legacy of contamination from past industrial uses. The Port of Seattle's Stormwater Utility is working on a number of upland redevelopment projects at the site to improve wastewater management and reduce ponding and localized flooding. Projects include replacing retaining walls at the end of their service life, installing catch basins, performing vegetation management, and addressing sheet flow management on the roadways. The planned Sound Transit Ballard Link Extension is likely coming through this area, with a station at the West Gaylor Street Flyover, which is a major site access point for Port of Seattle tenants. This upcoming project has the potential to substantially impact access and operations at the site, potentially impacting already limited access into and out of the site.

Piers 90 and 91 at Terminal 91 were initially included in the most recently published FEMA 100-year regulatory floodplain, limiting the Port of Seattle's ability to undertake certain modernization projects. The Port of Seattle worked with FEMA to adjust the regulatory 100-year flood map. Portions of Piers 90 and 91 have been removed from the 100-year regulatory floodplain because these areas were constructed on fill, and the Port is coordinating with FEMA to remove the overwater sections.

Terminal 91, including upland areas, is expected to flood during the 10-year event with the 5 feet of sea level rise scenario.

Elliott Bay Marina

The private Elliott Bay Marina is located west of Terminal 91 and includes the Freedom Boat Club and the Seattle Yacht Club Elliott Bay Outstation. The buildings at the marina, including the Freedom Boat Club and Seattle Yacht Club, are expected to flood during the 10-year event with 5 feet of sea level rise. Access to the marina would also be impacted during this event due to flooding of West Marina Place at Smith Cove Park. Sea level rise may also impact access ramps and floating infrastructure with limited vertical range and could cause more frequent overtopping of the breakwater, which could result in storm damage to the docks and boats.

Smith Cove Park

Seattle Parks and Recreation manages Smith Cove Park. The City of Seattle is nearing completion of design and permitting for expansion of the park to include a new playfield, off-leash area, sport courts, and shoreline access. Phase 2 of the project will include softening the shoreline by incorporating nature-based stabilization techniques and adding a bioretention area.

A small area of the park along the eastern shore is expected to flood during the 10-year event with 2 feet of sea level rise. With 5 feet of sea level rise, this same storm would inundate the entire park, including access in and out of the park.

BNSF Railway Balmer Railyard

The BNSF Railway Balmer Railyard, adjacent to the east of Terminal 91 and abutting the BNSF and Union Pacific rail lines, is used for rail car offloading and repair. According to Port of Seattle Real Estate staff, this property is currently for sale, although due to potential contamination concerns BNSF



is not actively marketing it. If the property transitions to a new owner, it could see redevelopment in the future. As an adjacent landowner and major economic development driver in the region, the Port of Seattle may be able to influence some aspects of any future redevelopment.

Portions of this property could be flooded during the 10-year storm event with 5 feet of sea level rise.

Utilities

SPU is evaluating outfalls in this area for backflow risk. The SPU pump station at the east end of Magnolia Tidelands Park will be updated in 2029. Updates will consist primarily of mechanical and electrical upgrades, with seismic and sea level rise risk assessments to follow.

King County regional wastewater utilities in the focus area include the Elliott Bay Interceptor, the Interbay Pump Station, and the South Magnolia Wet Weather Storage Facility at Smith Cove. These facilities are exposed to direct coastal flooding and saltwater inflow. The Interbay Pump Station has a low vulnerability and the South Magnolia Wet Weather Station has a high vulnerability based on the King County vulnerability assessment.

The South Magnolia Wet Weather Storage Facility and conveyance infrastructure could be inundated during the 10-year storm event with 5 feet of sea level rise scenario.

6.3 RELEVANT PHYSICAL ADAPTATION TYPOLOGIES

The following physical adaptation typologies were presented by ESA, or discussed by Partners, during quarterly meetings for consideration by the Partners in future adaptation strategy development. These potential techniques could be appropriate within the Focus Area 3 context, accounting for the location and extent of potential flooding projected for this area in the AdaptSea coastal storm modeling.

- Locating berms at the back of parks
- Raising trails along the shoreline to prevent inland flooding
- Raising Alaskan Way and West Marina Place
- Extending floating dock piers to allow for higher water levels (pictured at right)
- Raising the breakwater to protect the marina
- Raising piers and structures
- Installing permanent, removable, or retractable seawalls (pictured at right)

It is important to note that these typologies may be appropriate for certain properties within the focus area but may not be appropriate for others, depending on community priorities, site context, and planning work already completed or underway.



Guide piles allow docks and other floating infrastructure to move up and down with changing water levels. Source: <https://www.mass.gov/orgs/office-of-fishing-and-boating-access>



Removable flood wall in City of Mount Vernon. Source: <https://www.knxx.org/environment/2021-11-17/downtown-mount-vernon-spared-as-rivers-surge-and-inundate-region>



These physical adaptation typologies should be considered among the suite of adaptation approaches, which include protection, accommodation, and managed retreat. Additionally, strategies such as raising piers and structures may come with increased costs or considerations of the surrounding landscape.

6.4 CONSIDERATIONS FOR COORDINATED EFFORTS

The following considerations for collaboration were put forward during group discussion at the December 2024 meeting:

- Redevelopment of Terminal 91 and adjacent properties may introduce new opportunities for the Partners to coordinate on adaptation strategies.
- Rising groundwater levels due to sea level rise is a significant concern in this area. Partners could investigate potential adaptation strategies for impacts of rising groundwater, informed by the findings of the King County/USGS groundwater modeling efforts.
- Liquefaction is a significant risk in this area and may be exacerbated by higher sea levels and groundwater levels. Partners could work together to understand the seismic and flooding risks in this area to inform future development given its significance to the local and regional economy.
- Partners could explore advocating for additional research on potential instability and soil saturation risks on or near Magnolia Bluff.



7 Focus Area 4: Duwamish Valley

7.1 DESCRIPTION

Focus Area 4 spans approximately 2.4 miles of the Duwamish Waterway from S Michigan Street and Corson Avenue S in the north to the Duwamish Greenbelt at the south, and from W Marginal Way and State Route 509 at the west to Airport Way S at the east. Figure 7-1 provides an overview of Focus Area 4 and key assets.



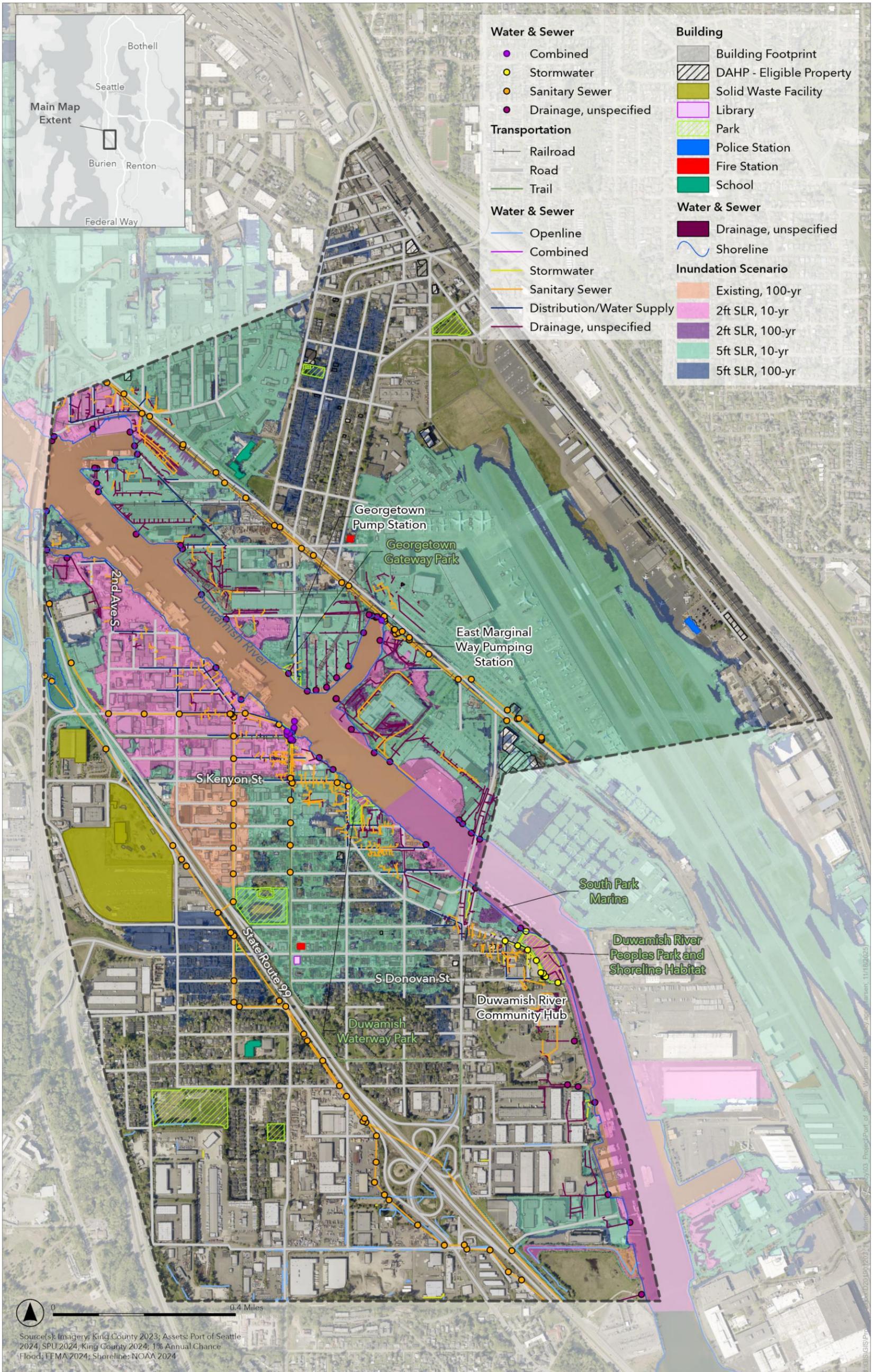
This area represents the mixed private and public land ownership typology; it has uniquely complex land ownership. While most of the area is within the City of Seattle, portions (the “sliver by the river”) are in unincorporated King County or the City of Tukwila. This area was chosen due to its significant public infrastructure, existing serious flood issues, and presence of communities impacted by environmental justice issues. Ongoing initiatives that address climate resilience and seismic risks in the area offer opportunities for the Partnership to facilitate information exchange, amplify benefits, and improve outcomes. Examples include the City of Seattle’s DVP, Port of Seattle’s Duwamish Valley Community Equity Program, and WSDOT’s seismic risk assessments and upcoming Statewide Resilience Improvement Plan. SPU has invested over \$100 million in stormwater drainage and conveyance infrastructure; King County Wastewater Treatment Division recently completed its Georgetown Wet Weather Treatment Station and will soon complete the West Duwamish Wet Weather Storage Tank; and the Port of Seattle has just completed a Parks Management Strategy to increase relevance of its Duwamish Valley parks and public access sites.

Contaminated soils and sediments are a significant concern in this focus area. The Duwamish Valley includes portions of the Lower Duwamish Waterway Superfund Site and numerous upland cleanup sites managed by both Ecology and the USEPA. The Partners identified the Duwamish Community Coalition and Ecology as key Advisors for this focus area.

Under existing conditions, the FEMA regulatory floodplain map shows flooding in the industrial area of South Park during the 100-year event.



Figure 7-1 Focus Area 4



Learn more about the scenarios and their impact to the assets described in this report here:
<https://storymaps.arcgis.com/stories/87ac7f92cde44895bb2cf13683fa1852>



7.2 KEY ASSETS WITHIN FOCUS AREA

Duwamish River Peoples Park and Shoreline Habitat

The 14-acre Port of Seattle-owned Duwamish River People’s Park and Shoreline Habitat is located on the western shoreline of the Duwamish River. After purchasing the property in 1999, the Port of Seattle undertook a remedial project to restore the site to “unrestricted use.” In partnership with the South Park community, the Port of Seattle designed and built its first credit-generating habitat restoration site along with public access features. With completion of the habitat restoration project, the Port of Seattle made its first sale under its mitigation banking line of business, generating revenue to be reinvested in future habitat restoration in the Duwamish estuary. A condition of regulatory agencies granting approval for the habitat credits is that the Port of Seattle must monitor and maintain ecological function of the site.

By design, the site is regularly inundated with the tides, providing locally significant flood storage capacity in addition to intertidal marsh and riparian ecological functions. The habitat site was designed to accommodate limited sea level rise over time, with habitat zones designed to migrate landward as frequently inundated areas expand. However, significant sea level rise within the required monitoring period could lead to increased inundation time and eventually change ecological conditions, potentially compromising credits. Significant sea level rise coupled with storm events could also cause damage or closures of the public access components.

Roadways

This area of Interstate 5 has been identified as a seismic risk area through the WSDOT Master Plan, which has in part led to a focus on resilience for WSDOT assets.

The City of Seattle Office of Planning and Community Development is leading a planning effort with the community and other agencies called Reconnect South Park, which is exploring the future of State Route 99 to improve transportation access, health, safety, and economic opportunity for the people who live and work in South Park and the Duwamish Valley. This project is designed to assess transportation and land use options that improve mobility, strengthen local businesses, and create a safer, more connected community while ensuring long-term neighborhood opportunity and stability.

These projects could be an opportunity to consider potential co-benefits, including climate and sea level rise adaptation measures. These could consist of improved drainage infrastructure and stormwater management, enhanced accessibility, and flood protection in addition to seismic resilience.

Many of the local roads in the industrial area of South Park from 2nd Avenue S to S Kenyon Street are at risk of flooding during the 10-year storm event with 2 feet of sea level rise. State Route 99, as well as local roads down to S Donovan Street, are at risk of flooding during the 10-year event with 5 feet of sea level rise.

Utilities

King County regional wastewater utilities in the focus area include wastewater conveyance, several pump stations and regulator stations, the Georgetown Wet Weather Treatment Station, and a future West Duwamish Wet Weather Storage Tank. Future sea level rise was incorporated into design of the Georgetown Wet Weather Treatment Station and the future West Duwamish Wet Weather



Storage Tank, which will be constructed as early as 2026. King County is currently looking into flow rerouting with sewer separation solutions in the area around the 8th Avenue South Regulator Station.

Modeling for the AdaptSea initiative shows that the property on which the West Duwamish Wet Weather Storage Tank will be built could be inundated during a 10-year storm event with 5 feet of sea level rise. King County’s design for this project includes a berm to protect the site from inundation.

SPU has completed construction of the South Park Pump Station, which will send stormwater runoff to the Duwamish Waterway during high tide events when the storm drain system cannot drain by gravity. In doing so, the pump station will reduce flooding on roads that have a formal stormwater collection system (including catch basins and inlets). The pump station and surrounding landscaping were designed for future sea level rise. The station will work in unison with the [South Park Drainage and Roadway Partnership](#) project to reduce flooding in the South Park lower industrial basin. SPU is also designing a water quality treatment facility along the Duwamish River in the industrial area of South Park. The facility will remove a variety of pollutants common in urban stormwater runoff from a 240-acre drainage basin that discharges into the Duwamish River. The 3-acre riverfront property for the South Park Water Quality Facility will also anchor sea level rise adaptation efforts in the area.

Due to flooding impacts of recent years, SPU deploys a 1-mile-long sandbag berm along the South Park shoreline every November. This response strategy, initiated after the December 2022 flooding, is funded by the King County Flood Control District. The berm, along with a detailed emergency response protocol, is SPU’s ongoing responsibility to manage high-tide flooding in South Park pending a more permanent sea level rise adaptation solution.

Lower Duwamish Waterway Superfund Site

The Lower Duwamish Waterway Superfund Site is a 5-mile segment of the Duwamish River that flows between Georgetown and South Park. The USEPA is leading this effort, but source control measures are in place and monitored at properties along the river. Sea level rise will likely impact how groundwater flows into the river. Partners are in coordination with Ecology, USEPA, and the DRCC as appropriate on opportunities to enhance the shoreline during and after cleanup.

Commercial Waterway District (CWD) Upland Slivers

The navigable portions of the Lower Duwamish Waterway were historically maintained by the Former Commercial Waterway District #1 of King County (“CWD”). The simplified way that the right-of-way boundaries were drawn, as compared to the channel that was actually dredged, left multiple narrow “slivers” of upland property between the river and upland properties. When the CWD was dissolved by the State Legislature in 1963, the Port of Seattle was named as successor to its assets. The slivers are narrow, often steep, and challenging for habitat restoration due to complex regulatory challenges and potential conflicts with upland development. The Port of Seattle does not retain exclusive rights to develop these slivers and does not currently have plans to undertake a systematic habitat restoration program; however, they do provide limited opportunities for habitat and nature-based flood protection strategies.

Duwamish Waterway Park

Duwamish Waterway Park is a City of Seattle park property in South Park. It was recently renovated and a new play area was installed in 2022. The City purchased an adjacent 1-acre expansion site, located at 1024 S Elmgrove Street with the support of the community in 2021, and Seattle Parks and



Recreation and the DVP have engaged community members in a site planning process to consider priorities for developing open space and community-supportive nonprofit spaces, increasing access to the Duwamish River, restoring aquatic habitat, creating a network of connected open spaces along the Duwamish River, and expanding opportunities for cultural activities and uses for the site. These parcels are part of an Ecology cleanup site. Planning for remediation and development of the expansion site offers an opportunity to consider sea level rise resilience.

Portions of the site are at risk of flooding during the 10-year event with 2 feet of sea level rise.

Community Support

The DVP, run by the City of Seattle’s Office of Sustainability and Environment in partnership with SPU and other City of Seattle departments, works to align City of Seattle projects with community priorities to advance environmental justice and equitable development. The DVP currently consists of two major focus areas: implementing the [Duwamish Valley Action Plan](#) and exploring the establishment of a [Duwamish Valley Resilience District](#). As part of the resilience work, the DVP is working with community-based organizations and individuals to conduct sea level rise planning and climate resilience initiatives in ways that are community-driven and center residential and industrial priorities.

The Port Commission’s Resolution 3767, the Duwamish Valley Community Benefits Agreement, establishes the Duwamish Valley Community Equity Program. The agreement commits the Port of Seattle to investing in healthy communities, economic prosperity, and community collaboration. The Port of Seattle also runs the Duwamish River Community Hub in South Park, where community members can receive job training and resources and support. In past flood events, the Duwamish River Community Hub also served as an emergency response center, providing space for affected community members to receive donations of food and clothing and offering electricity and internet access.

In parallel to the City of Seattle’s sea level rise work with community, the DRCC leads discussions with residential communities about sea level rise and flooding risks in South Park, familiarizing community members with nature-based risk-reduction strategies. Strategies are designed to respond to findings of DRCC’s root cause analysis for the December 2022 flooding in South Park. Examples include elimination of risk through buy-outs and natural floodplain restoration, “passive” risk reduction through improved stormwater management, and “active” risk reduction through vegetated flood protection levees. DRCC’s work provides the Partners with insight into community priorities for sea level rise adaptation and flood protection and can help ensure that public projects address community concerns.

Duwamish River Sea Level Rise Memorandum of Understanding

The City of Seattle, King County, Port of Seattle, and the NWSA signed a Duwamish River Sea Level Rise memorandum of understanding (MOU) in 2024. The MOU recognizes the unique sea level rise risks in the Duwamish Valley and commits members to developing coordinated multibenefit solutions to sea level rise, pursuing joint funding opportunities, and investing in shared messaging and mapping products. This initiative is distinct from AdaptSea, as it focuses specifically on the Duwamish River and aligns with the DVP and the Duwamish Valley Community Benefits Commitment. It is currently led and facilitated by King County Executive Climate Office staff; however, if AdaptSea becomes a formal partnership in the future, the Partners could consider incorporating this initiative as a subcommittee of the Partnership.



7.3 RELEVANT PHYSICAL ADAPTATION TYPOLOGIES

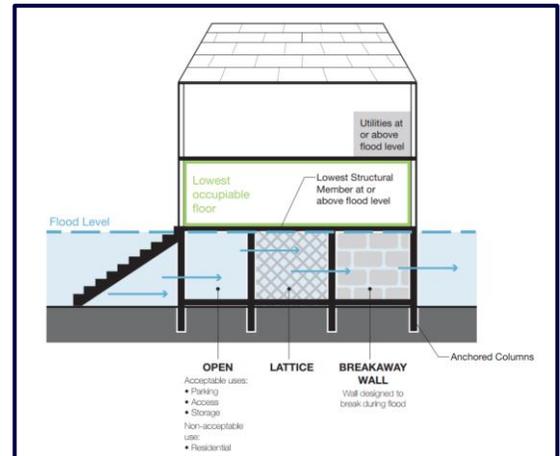
The following physical adaptation typologies were presented by ESA, or discussed by Partners, during quarterly meetings for consideration by the Partners in future adaptation strategy development. These potential techniques could generally be appropriate within the Focus Area 4 context, accounting for the location and extent of potential flooding projected for this area in the AdaptSea coastal storm modeling.

- Constructing a river wall
- Raising structures (pictured at right)
- Removing structures and restoring floodplain
- Removing structures and building a levee (pictured at right)

It is important to note that these typologies may be appropriate for certain properties within the focus area but may not be appropriate for others, depending on community priorities, site context, and planning work already completed or underway. These physical adaptation typologies should be considered among the suite of adaptation approaches, which includes protection, accommodation, and managed retreat.

For example, the City of Seattle’s DVP convened a community advisory group composed of residential and business stakeholders in South Park and Georgetown to evaluate adaptation strategy alternatives. The group agreed that adaptation strategies should ensure businesses and residents can thrive in place, and they should deliver equitable and multibenefit outcomes such as green infrastructure; habitat restoration; public access and community spaces; and maritime, industrial, and green economy businesses and jobs. The two elements of the proposed strategy include the following:

1. **Lead with infrastructure on City of Seattle properties.** Locate flood infrastructure along City of Seattle rights-of-way and SPU’s facilities at the Pump Station and South Park Water Quality Facility. This enables solutions that:
 - Address critically low bank street ends;
 - Allow implementation without acquisition;
 - Leverage funded projects;
 - Connect with work along rights-of-way; and
 - Prioritize salmon habitat, whenever possible.
2. **Complement with partnerships on adjacent waterfront parcels.** Industrial maritime businesses are a critical component of the industrial sector and cannot relocate. Partnerships allow for:
 - Private adaptation approaches that reflect operational needs;
 - Opportunities to collaborate on shared objectives (e.g., shoreline, street edges); and



Floodable building. Source: ESA



Example levee cross-section with public access. Source: ESA



- Compliance with existing and upcoming changes to critical areas and shoreline regulations, which increasingly address sea level rise.

When evaluating potential physical adaptation typologies, the Partners could incorporate these priorities developed through the DVP and other community-based work on adaptation strategies.

During the March 2025 quarterly meeting, DRCC shared with the Partners that they have discussed the idea of managed retreat through buy-outs with a nonprofit organization focused on connecting impacted community members and municipalities for potential property purchase. No funding or other resources have been identified to undertake a buy-out program, and any such initiatives would need to take into account community priorities.

7.4 CONSIDERATIONS FOR COORDINATED EFFORTS

The following considerations for collaboration were put forward during group discussion at the March 2025 meeting:

- The City of Seattle could consider continuing its effort to persuade the USACE to perform a more comprehensive flood protection feasibility study in the area under the CAP 205 program (refer to [December 12, 2024, meeting notes](#)). With support of the Partners, the City of Seattle could explore whether CAP 103 or other federal programs could offer alternative viable paths to USACE engagement in Duwamish Valley sea level rise adaptation. A comprehensive feasibility study could offer opportunities for federal funding for flood protection strategies. The Partners could support this effort where possible through advocacy and development of technical resources to support the request.
- The Duwamish River Sea Level Rise MOU is an opportunity for a subset of the Partners to focus sea level rise planning work in the Duwamish Valley. If AdaptSea becomes a formal partnership with ongoing funding and facilitation support, the Partners could consider absorbing the MOU into its body of work as a subcommittee focused on sea level rise adaptation in the Duwamish Valley.
- King County is working with the USGS to expand the groundwater study discussed at the [June 20, 2024, meeting](#), with additional data collection and modeling in the Duwamish Valley. Findings will provide insight into existing conditions and potential future groundwater levels under sea level rise scenarios. The Partners could support this effort with funding, shared use of groundwater wells, and other means as appropriate and use its findings to identify potential groundwater impacts to previously remediated sites and environmental caps.
- As the City of Seattle conducts technical analysis and explores 2% to 5% (conceptual) design of flood management infrastructure reflecting the proposed approach developed with community input over the past few years, there are opportunities to create partnerships that produce potential floodplain and habitat restoration.



8 Recommendations

The work done through the Partnership to date has focused on data collection related to current assets, known impacts due to sea level rise, and ongoing or planned upgrades to properties. A primary goal was to establish a common operational picture between agencies, in many cases building on previous work completed independently by Partners. Modeling performed by the Port of Seattle and its consultants combine available existing data and provide a clear picture of the potential exposure of Partners' assets to modeled future sea level rise and wave runup.

8.1 RECOMMENDATIONS BY FOCUS AREA

The following subsections provide brief overviews of potential opportunities for collaboration between the Partners. More detailed descriptions of considerations within the four focus areas can be reviewed in Sections [4.4](#), [5.4](#), [6.4](#), and [7.4](#).

8.1.1 Seattle Waterfront-Wide Recommendations

The following partnering strategies could be considered Seattle waterfront-wide:

- Identify opportunities to engage or share strategies with the City of Seattle Office of Sustainability and Environment related to incorporating sea level rise in the Sustainable Building Policy updates.
- Facilitate information exchange and advocate for nature-based solutions that improve salmon habitat and sea level rise adaptation while promoting public access. The multibenefit approach will be important in seeking funding.
- Undertake studies to support better understanding of groundwater impacts due to sea level rise.
- Continue to discuss the practical and funding implications of elevation requirements on industrial and commercial properties, such as piers or terminal properties, and how they affect long-term strategy and land use considerations.
- Monitor policy changes and identify strategic opportunities to advance adaptation work.
- Continue to work internally to identify potential funding for recently redeveloped infrastructure, as funding and regulatory approval for major improvements to adapt to sea level rise in these already updated areas are going to be challenges.
- Make incremental changes to prepare for sea level rise that lays the groundwork for more comprehensive strategies.
- Invite private landowners and businesses into the sea level rise adaptation conversation.
- Perform habitat evolution modeling to understand the effects of changing coastal conditions and support project design and decision-making.
- Support kelp forest research or pilot projects and other innovative approaches to improve intertidal and shallow subtidal areas.



8.1.2 Focus Area 1: Southcentral Waterfront

All of the area-specific considerations for Focus Area 1 can be applied Seattle-wide, and are included in [Section 8.1.1](#), specifically the fourth through seventh bullets.

8.1.3 Focus Area 2: Myrtle Edwards Park to Centennial Park

Partnering strategies in Focus Area 2: Myrtle Edwards Park to Centennial Park could include the following:

- Continue coordination (especially between the Port of Seattle and City of Seattle) on the Elliott Bay Connections Project and other park and trail projects in this focus area. This project includes opportunities for multibenefit climate adaptation, including shoreline stabilization to reduce erosion, habitat restoration, and flood storage.
- Support research to determine if there could be contaminated stormwater impacts from the former Unocal Site or Olympic Sculpture Park on Myrtle Edwards Park during stormwater overflow events. Stormwater overflow (the release of untreated stormwater when treatment facilities become overwhelmed) may become more likely as climate change increases the frequency of severe weather events.

8.1.4 Focus Area 3: Interbay

Partnering strategies in Focus Area 3: Interbay could include the following:

- Look for opportunities to coordinate on adaptation strategies through any redevelopment of Terminal 91 and adjacent properties.
- Work together to understand the seismic and flooding risks in this area to inform future development given its significance to the local and regional economy.
- Support additional research on potential instability and soil saturation risks on or near Magnolia Bluff and incorporate findings into planning work as appropriate. This may include leveraging research underway associated with USGS CoSMoS modeling, which investigates cliff stability in the Puget Sound, including the Magnolia Bluff.
- Work together to identify creative solutions to addressing higher groundwater levels resulting from sea level rise. Groundwater is a particular concern in this area; elevating buildings and utilities is one adaptation strategy, but it comes with many costs and technical challenges.

8.1.5 Focus Area 4: Duwamish Valley

Partnering strategies in Focus Area 4: Duwamish Valley could include the following:

- Support the City of Seattle in its effort to persuade the USACE to perform a more comprehensive flood protection feasibility study through the CAP 205, CAP 103, or other appropriate federal risk-reduction programs.
- Consider assessing the feasibility of absorbing the MOU into the AdaptSea body of work as a subcommittee focused on Duwamish Valley resilience, if AdaptSea becomes a formal partnership with sustained funding and facilitation support. The Duwamish River Sea Level



Rise MOU consists of a subset of the Partners focusing on sea level rise planning work in the Duwamish Valley.

- Use findings from the USGS groundwater study when available to identify potential groundwater impacts to previously remediated sites and environmental caps.
- Acknowledge that there are long-standing efforts within the Duwamish Valley community to address sea level rise, including nature-based flood protection and flood storage systems; risk-reduction interventions; and—where appropriate—community-driven elimination of risk through managed retreat and buy-out programs. Seek to support these community-led efforts and consider environmental justice as a potential co-benefit for adaptation strategies.
- Identify and act on opportunities to create partnerships that produce potential floodplain and habitat restoration, as the City of Seattle conducts technical analysis and explores conceptual design of flood management infrastructure reflecting the proposed approach developed with community input over the past few years.

8.2 PROGRAMMATIC RECOMMENDATIONS

8.2.1 Continuation of Funding

The Port of Seattle has dedicated funding to continue the Partnership in 2026. This funding supports continuation of facilitated quarterly meetings and one-on-one coordination between Partners as needed. During the June 2025 meeting, the Partners discussed potential opportunities for deeper collaboration through the Partnership.

A work plan for 2026 was developed during the September and December 2025 meetings and is attached as Appendix G.

The Partners could continue to explore options for joint ownership of AdaptSea and its future work products, including potential joint funding and facilitation. This could include pursuit of formal interagency agreements expanding on the existing Charter and clearly articulating shared organizational objectives and each Partner's roles and responsibilities.

8.2.2 Joint Adaptation Framework

The Partners began to outline a Joint Adaptation Framework that would pull from each entity's vulnerability assessments, identifying areas of overlap and intersecting risks. The Joint Adaptation Framework could include a "menu" of cost-effective strategies, timelines, and triggers. The framework would provide near-term strategies that can be incorporated opportunistically and long-term strategies that will require time and resources to implement. These strategies can protect waterfront assets, such as hard protection or living shorelines; provide accommodations for sea level rise, such as retrofitting existing structures and better managing stormwater and flooding; manage retreat where appropriate, by limiting new development, relocating vulnerable assets, and promoting floodable open spaces; or provide a hybrid of strategies. It could also evaluate general costs and benefits of joint strategies. Through this framework, the adaptation strategies put forward in the plan can be used on a range of projects implemented jointly or by individual Partners, from new or large-scale adaptation projects to ongoing maintenance or modernization projects with a small adaptation component.



The Joint Adaptation Framework could be structured in a way that highlights shared solutions and promotes action and implementation. The framework might also identify opportunities to expedite projects through updates to codes, policies, and practices. Examples include phased or alternative compliance strategies for large public infrastructure that emphasize long-term adaptation pathways.

Through this Joint Adaptation Framework, current data gaps for the Partners can be identified. Focused technical studies could explore economic vulnerability, hydraulic system capacity, and supporting or conflicting local and federal codes and standards. The USGS groundwater study is an early example of collaboration on technical studies to support decision-making, funded by King County and the Port of Seattle.

This Resilience Recommendations Report and the related StoryMap serve as a first step in the Joint Adaptation Framework, with continued collection of monitoring data and observations planned for 2026 to reassess immediate resilience response needs.

8.2.3 Hazard Mitigation and Response Planning

The Partners identified an opportunity to better collaborate on hazard mitigation planning to improve project eligibility for federal hazard mitigation and other grant funding programs. The City of Seattle will update its All Hazards Mitigation Plan in 2027; this is an opportunity for the Partners to engage more deeply in the process to identify mutually beneficial hazard mitigation projects. Inclusion of additional departments' and agencies' perspectives could improve the utility of the plan and help to identify co-benefits and synergies between ongoing and parallel initiatives. In particular, Partners could endeavor to expand participation beyond emergency management teams to include climate adaptation and infrastructure planning disciplines.

The Partners identified a need to identify common goals and priorities for planning response and recovery during natural disasters and other emergency responses. This includes identification of necessary upgrades to infrastructure that will support response and recovery efforts after a significant event, which could include an earthquake, significant storm or flood event, tsunami, or human-caused disaster. Sea level rise is one of many hazards that could compromise critical public infrastructure that the community will rely on to support response and recovery efforts.

This work will be furthered in 2026 and will be supported by the identification of priority projects in the Joint Adaptation Framework.

8.2.4 Project Synergies along the Lower Duwamish River

AdaptSea coordination highlighted significant overlap between Partners' initiatives on the lower Duwamish River, including contaminated soil and sediment remediation, habitat restoration, parks and public access, and bankline stabilization work. Some of this work is already being carried out in collaboration between subsets of Partner organizations, particularly contaminated soil and sediment remediation work. This area could provide ample opportunities for a demonstration project to showcase potential efficiencies of combined efforts and funding streams for multibenefit projects.

The Partners have explored several partnering structures as potential models for formal collaboration, including the structures used by the Olympia Sea Level Rise Response Collaborative (as discussed at the [March 21, 2024, meeting](#)) and the Bellingham Bay Action Team and [Comprehensive Strategy for Bellingham Bay](#) (as discussed in the [June 12, 2025, meeting](#)). However, the current state of resource



limitations and organizational alignment first call for one or more demonstration projects to generate momentum and showcase the advantages of a multiagency approach that combines funding streams and project benefits. The Partners could identify early opportunities to collaborate on specific multibenefit projects with resilience and sea level rise adaptation components; Gateway Park North/8th Avenue S and SPU's South Park Water Quality Facility are compelling examples.

There may be an opportunity in the future to explore a more formal Partnership structure for projects in the Lower Duwamish Waterway and Elliott Bay. A modified approach drawing from the Bellingham Bay and Olympia models, tailored to the Partnership, could offer a structure to collectively prioritize projects, provide consistent oversight, and coordinate design and implementation of multibenefit projects. Ecology could also be a collaborator, as Ecology staff continues to gauge interest in an Ecology-facilitated Duwamish River and Elliott Bay partnership, albeit in the absence of dedicated funding or resources. In the near-term, however, the Partners could strive to identify discrete multibenefit projects to demonstrate the utility of project-based partnerships.

8.2.5 Codes and Standards

One of the main drivers for the Port of Seattle initiating the Partnership was to facilitate conversation with the City of Seattle around codes and standards, particularly in advance of code updates that might affect Partners' ability to maintain or modernize their infrastructure. Major regulatory frameworks with sea level rise planning or adaptation elements include floodplain code and Shoreline Master Program regulations. These are administered by the City of Seattle. Federal and state requirements, including those administered by FEMA, the CZMA, and the Shoreline Management Act, could be considered in interagency discussions regarding codes and standards.

The Partners recognize that there are ways to improve resilience over time, even within capital constraints. There may be opportunities for the Partners to work together to investigate the feasibility of phased, strategic compliance for major public infrastructure projects. It would be important to establish key milestones and deadlines under this framework. This approach could prioritize high-risk and high-consequence assets and use an adaptation pathways model to implement measures over time, with adjustments and further investment driven by data and observations. This strategy could be considered by the Partners either independently through MOUs or as part of the Joint Adaptation Framework.

8.2.6 Project Funding Opportunities

The Partners will continue to identify opportunities to collaborate on upcoming state and federal funding opportunities that support adaptation efforts. Due to constrained resources at the state level and changing priorities at the federal level, funding strategies will need to seek opportunities to align adaptation work with unconventional funding sources. A near-term opportunity for funding may be through Ecology's Shoreline Master Program grants, which are focused on providing resources to local governments for developing sea level rise vulnerability assessments and adaptation strategy development.

8.2.7 Data Collection and Sharing

The Partners will continue to share studies and data collected as part of individual efforts to address sea level rise. Information gathered in independent studies could be used to support internal decision-



making and create compelling narratives to gain support and funding for adaptation work. These data could also be explored as opportunities to quantify and highlight economic benefits of adaptation; economic benefits may include increased revenue or operational benefits, in addition to reducing vulnerabilities from flooding impacts to businesses and industries along the waterfront.

8.2.8 Best Practices: New Adaptation Techniques and Strategies

As new adaptation techniques and technologies become available, the Partnership offers an opportunity to share these concepts and examples of real-world applications. It also provides a forum to explore demonstration projects and share best practices and lessons learned.

One example of a new technique for consideration is multifunction or integrated flood protection structures, including horizontal levees. These may be used in low-lying areas along shorelines where there is sufficient setback to install a floodable space to support infiltration. They typically include a combination of engineered structures and nature-based solutions and can provide coincident benefits including flood water retention and habitat resources.

Context is critical in implementing these types of strategies; the southcentral waterfront and other similarly “built-up” environments may be more constrained than others for incorporating these techniques.

8.3 2026 WORK PLAN IMPLEMENTATION

The 2026 Work Plan is provided as Appendix G of this report. The following tasks were identified for prioritization in 2026.

Joint Adaptation Framework

As the Partnership moves into 2026, the goal will be to take the data and models developed through this report and identify a range of solutions that can be integrated into planned upgrades or implemented on their own. The Port of Seattle and its consultants will develop a Joint Adaptation Framework, which will offer a menu of potential adaptation strategies for one focus area, to be selected by the Partners. The focus area may or may not be one of the four covered in this report. The Joint Adaptation Framework document will synthesize work that has been completed independently by the Partners to date and will identify gaps and provide Partners with suggestions for collaboration on implementation of adaptation strategies.

The Partnership may also identify triggers for implementation of adaptation strategies and create multiple options for each type of impact. Appendix H begins this process, by breaking down each focus area by asset and highlighting potential impacts and physical adaptation typologies. This matrix will be further developed and refined in 2026.

Half-Day Symposium

The Port of Seattle will host a half-day symposium at the end of Quarter 3, 2026, to bring together the Partners and senior leadership and decision-makers from each organization. The goal of the event will be to highlight the importance of coupling climate mitigation strategies with focused climate adaptation programs, ahead of the projected sea level rise timelines. The Partners will also share ideas for continued collaboration and coordinated regulatory and funding efforts, including development of new policies and strategies responsive to the upcoming Shoreline Management Act updates.



Talking Points for Partners

The Partners will develop a set of talking points that can be used by each organization to advocate for policy change and promotion of adaptation in regional forums. Transportation policy will be a particular focus of this initiative. The Partners have highlighted a regional bias for climate mitigation (mode shift, emissions, and greenhouse gas reduction initiatives) in transportation policy and planning without a commensurate emphasis on infrastructure adaptation. Climate mitigation is crucial but requires a corresponding acknowledgment of the need to adapt infrastructure to the effects of climate change already underway. Development of shared talking points will provide an opportunity to highlight how the Partnership's work overlaps with and complements other local initiatives and will potentially create new pathways for collaboration. These talking points can also be used to expand the Partnership, by more explicitly involving transportation agencies and private property owners (refer to next task).

Expand or Reengage with Partners

The Partners will work to reengage with the Seattle Department of Transportation and Seattle Department of Construction and Inspections. Both are critical to the Partnership's long-term success and, due to organizational priorities, have been unable to fully participate in later phases of the Partnership. The Partnership could also benefit from strategic expansion to reflect a greater emphasis on transportation infrastructure resilience. Important regional transportation-oriented organizations are Puget Sound Regional Council and Sound Transit. The Partners will consider ways to effectively engage with these organizations to advocate for investments in sea level rise adaptation in important transportation corridors supporting Seattle's waterfront. Private property owners and industry representatives are important stakeholders as well; the Partners will also look for ways to meaningfully include members of the private sector in AdaptSea initiatives. The talking points referenced in the previous section will be a key strategy for maintaining consistent and meaningful messaging in expanding AdaptSea's reach and relevance.



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