

Final Portland Harbor Programmatic EIS and Restoration Plan

Volume 2 of 2

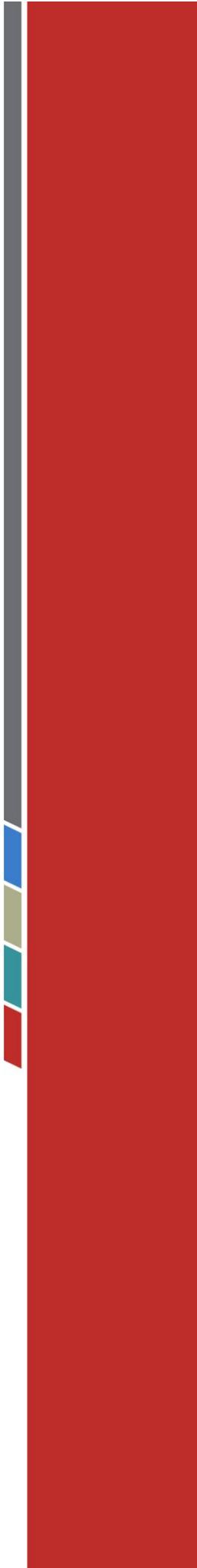
Prepared by
National Oceanic and Atmospheric Administration

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Appendix A

Ecological Restoration Portfolio



PORTLAND HARBOR

Natural Resource Trustee Council



Ecological Restoration Portfolio

The Portland Harbor Natural Resource Trustee Council is engaged in restoration planning to develop a suite of restoration opportunities that may compensate for the liability of potentially responsible parties of the Portland Harbor Superfund Site. In order to develop this suite of restoration opportunities or “restoration portfolio”, the Trustee Council developed criteria for identifying and evaluating potential ecological restoration sites in 2008. These criteria address habitat features and attributes for several potentially injured species, including salmon, lamprey, sturgeon, bald eagle, osprey, spotted sandpiper, and mink. These criteria are used to evaluate a site’s ability to provide habitat “lift” in terms of benefits to potentially injured species in Portland Harbor by comparing existing condition to potential restored condition.

The Trustee Council has identified potential restoration sites within the Portland Harbor NRDA Study Area (RM 0.8-12.3), and outside of the Study Area. To identify potential restoration sites inside the Study Area, the Trustee Council reviewed restoration opportunities identified in the City of Portland’s River Plan (2008), and the City of Portland’s draft Ecosystem Restoration General Investigation Study (2005). The Trustee Council screened these opportunities against the ecological restoration criteria developed in 2008, conducted site visits, and applied institutional knowledge of the Trustees and their technical staff. A few additional sites (not identified in City documents) were also identified and screened against the criteria. As a result of this effort, 25 restoration opportunities within the Study Area have been identified by the Trustee Council as having potential to provide significant habitat improvement for potentially injured natural resources in Portland Harbor, and are included in this restoration portfolio.

In 2009, an expert panel was convened by the Trustee Council to discuss ecological restoration priorities and opportunities outside of the Study Area in the lower Willamette River system. This panel identified a “broader focus area” where restoration will be most likely to provide benefit to Portland Harbor’s potentially injured species. In 2010 and 2011, the Trustee Council hosted a series of meetings with potential community partners and potentially responsible parties to help identify restoration opportunities in Portland Harbor’s broader focus area. Following the meetings, community organizations and members proposed nearly forty sites in the area. From summer 2010 through fall 2011, the Council’s Restoration Committee conducted site visits and evaluations of the proposed sites. The proposed sites in the Broader Focus Area were screened against the Trustee Council’s ecological restoration criteria (2008) to determine whether they could produce habitat “lift” for potentially injured species in Portland Harbor. As a result, 21 potential projects in the Broader Focus Area are included in this portfolio.

This list represents an initial inventory of restoration opportunities, and is not intended to be comprehensive or exclusive of opportunities that may be identified in the future. In addition, there is no obligation on the part of landowners to allow restoration work to take place at any particular site. Attachments to this list include: an overview map showing the location of each site on the river; a brief description of each site, including conceptual restoration treatments and their anticipated benefits; and a conceptual figure for each site. Specific quantitative value or restoration credit that may be generated by any of these projects will ultimately be determined using Habitat Equivalency Analysis. Federal Trustees will complete all required consultations and other permitting under the National Environmental Policy Act, the Endangered Species Act, the Clean Water Act and other statutes before project implementation begins.

**Restoration Sites in the
Study Area**

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**Restoration Sites in the
Broader Focus Area**

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Ecological Restoration Portfolio Site Locations

Portland Harbor Natural Resource Trustee Council



Restoration Sites in the Study Area

ALBINA YARD

Landowner: Union Pacific Railroad, Port of Portland, Oregon Department of State Lands

Site description: The Albina Yard site is located at river mile 10.75 on the northeast bank of the Willamette River. The existing shoreline is a mix of rock, unclassified fill, natural beach, and vegetated rip rap. There is only a thin strip of associated shallow in-water habitat. The uplands are heavily developed and dominated by impervious surfaces. Vegetation on the site is limited to a narrow strip of woods and non-native shrubs along the riverbank.

Proposed restoration: Restoration at this site could include improving bank conditions by reducing bank hardening; creating an undulating shoreline; creating additional shallow in-water habitat; and increasing the amount of native vegetation and large wood along the river bank and in the floodplain.

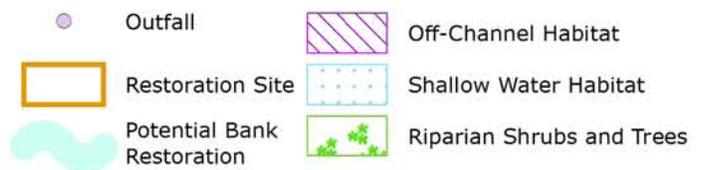
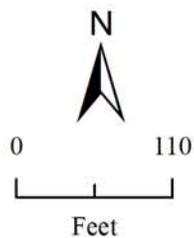
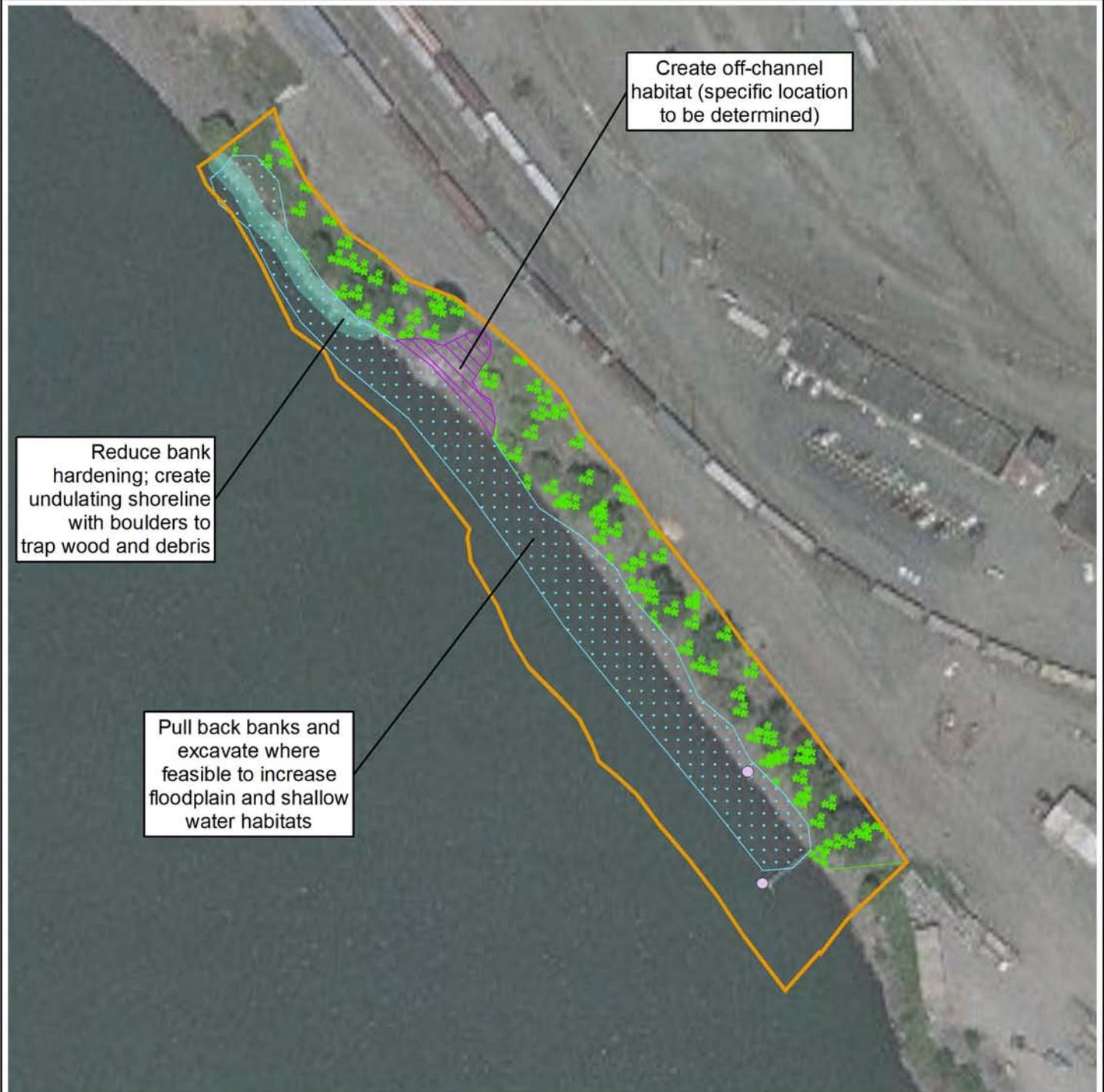
Benefits: Replacing the hardened banks with a more gently sloped and vegetated shoreline would allow for the accumulation of more wood, adding further complexity and sediment retention ability to the system. Juvenile salmon, lamprey, and sturgeon prefer complex habitats that provide cover and feeding stations. Shallow areas serve as important hunting areas for bald eagles, osprey, spotted sandpiper, mink and other species. Native vegetation provides food and cover for a variety of species and makes perch sites available for native birds. Natural beaches also serve as foraging areas for mink and staging areas for spotted sandpiper and other migratory birds.

Feasibility: The land is owned by the Port of Portland. There are no known permitting issues. Once constructed, the project would be largely self-sustaining.

Other constraints/considerations: Railroad tracks are present that constrain the potential area of the restoration project. The plan for the North Portland Greenway Trail indicates that the trail will pass through the site. If the trail is constructed immediately adjacent to the river bank, the amount and quality of riparian habitat that could be restored at the site will be limited.

Albina Yard

Map prepared for Portland Harbor
Natural Resource Trustees



This map represents conceptual fish and wildlife habitat restoration opportunities which have been screened against criteria developed by the Portland Harbor Natural Resource Trustees. Further analysis of this site will occur to determine the feasibility, cost, and habitat value of the restoration concepts on a finer scale. This map was prepared using a geospatial database provided by the City of Portland's Bureau of Environmental Services.

ALDER POINT

Landowner: Alder Creek Lumber Co., Oregon Department of State Lands

Site description: The Alder Point property is a 51-acre site at the southern tip of Sauvie Island near river mile 3.0 and the confluence of the Willamette River with the Multnomah Channel. The property has been filled and partially developed for industrial uses. A levee divides the site into two sections. Some beach habitat with accumulated large wood habitat is present along the eastern end of the site riverward of the levee. A forested riparian area is present between the beach and the developed portions of the site. The remainder of the site has been cleared of vegetation and has historically been used for lumber processing and storage.

Proposed restoration: Restoration efforts at this site could include regrading the river banks to create a shallower slope, increasing interaction between the river and the floodplain. Restoration could also include adding native vegetation to floodplain and upland areas. Additional restoration options could also include removing portions of the private levee and restoring a diversity of riparian, marsh, mud flat and off-channel habitats across the site.

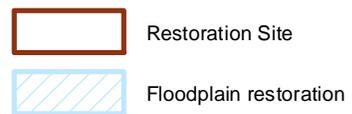
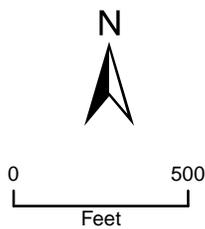
Benefits: Off-channel, shallow, slow moving waters provide refuge and productive foraging areas for lamprey and juvenile salmon. Shallow areas can also serve as important hunting areas for bald eagles, osprey, spotted sandpiper, mink and other species. Natural beaches serve as foraging areas for mink and staging areas for spotted sandpiper and other migratory birds. Regrading the shoreline will reconnect this area to its historic floodplain and encourage the use of off-channel areas by fish. Adding native vegetation along the banks will improve habitat complexity, increase sediment retention, provide an invertebrate food source for fish and some wildlife, and create perching and nesting habitat for birds and other animals.

Feasibility: Although the levee bordering the site is not a U.S. Army Corps of Engineers levee, there may be concerns and issues associated with a change in flood protection caused by breaching or removal of the levee. The project will need to be coordinated with the Sauvie Island Drainage District. There are no other known permitting issues. The project would ultimately be largely self-sustaining. Although significant contamination issues have not been identified at this site, the site's history of industrial use suggests that contaminants may need to be addressed during implementation.

Other constraints/considerations: This site is unique because of its size and proximity to other good quality habitat (Miller Creek, Joslin, and PGE properties). There may be some possibility of physically connecting this project to a restoration project at the Joslin site, which could increase the amount and quality of restored habitat.

Alder Point

Map prepared for Portland Harbor
Natural Resource Trustees



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ASH GROVE CEMENT/PORT OF PORTLAND

Landowners: Ash Grove Cement Co., Port of Portland property leased to Georgia-Pacific Consumer Product, Northwest, LLC

Site description: This site is an upland area located about 1,100 feet east of the Willamette River near river mile 3.25. The area identified for potential restoration is vacant, but appears to be cleared and filled for future industrial use. It is roughly 26 acres in size. A large building exists between the site and the river, but there is potential for wildlife connectivity to the river and east toward the Columbia Slough through the Rivergate Corridor. It is possible that portions of the property were historically wetlands and within the 100-year floodplain. An access road and railroad spurs are located in an east-to-west orientation through the site.

Proposed restoration: Restoration at this site could include revegetation and adding large wood and snags to restore native habitat and structure to the site. Wetland habitats could be restored or created on a portion of the site. Access road and railroad spurs on the property do not appear to pose significant risk to wildlife due to the low traffic volume and speed, although if relocation were deemed feasible that could provide some added benefit. Fences placed across the property could be removed or opened to allow for wildlife passage throughout the site and to adjacent habitats. If the use and treatment of stormwater runoff from the adjacent building and parking areas can be improved to minimize and avoid any adverse effects on the potential restoration site, stormwater-related measures should be included in the restoration plan.

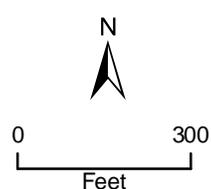
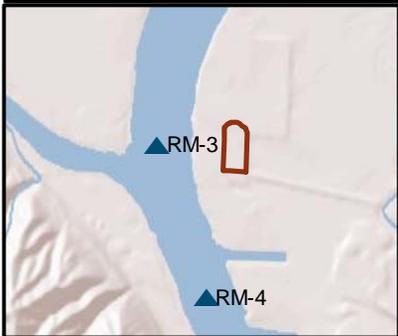
Benefits: The site could be turned from a vacant area with virtually no native vegetation and little wildlife habitat value to a patch that could expand on a larger habitat area to the south (i.e., the Rivergate Corridor), which also serves as a wildlife corridor to other important habitats. Larger, well connected habitats better support wildlife populations than smaller isolated habitats by providing more resources, supporting larger numbers of individuals, and facilitating genetic interchange. Mature trees and snags at the site could provide perching opportunities for bald eagle and osprey, and emergent wetlands could provide habitat for spotted sandpiper. Other birds, mammals, reptiles and amphibians could also use the site.

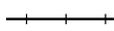
Feasibility: The land is zoned for industrial use, although it has been vacant of structures for many years. There are no known contaminant concerns at the site. There are no known permitting issues. Once constructed, the project would be largely self-sustaining.

Other constraints/considerations: It may be beneficial to incorporate wildlife crossing signage, and potentially other measures, to promote safety for wildlife that need to cross roads and railroad tracks to reach other habitats in the vicinity.

Ash Grove Cement

Map prepared for Portland Harbor
Natural Resource Trustees



-  Revegetation
-  Wetland restoration or creation
-  Wildlife corridor
-  Restoration site
-  Willamette River Miles
-  Railroad Track

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BALCH CREEK CONFLUENCE

Landowner: Port of Portland, Sause Brothers, Portland Fire Bureau, Oregon Department of State Lands

Site description: The Balch Creek Confluence site is located at river mile 9.85 along the west bank of the Willamette River. Balch Creek is currently in a culvert and discharges to an alcove off the river. Part of the alcove is occasionally dredged to maintain access to a fireboat dock, which reduces shallow in-water habitat in the alcove. The northern side of the alcove has some beach and shallow water habitat. The banks of the alcove are steep with a thin strip of mostly non-native riparian vegetation and are classified by ODFW as vegetated rip rap. The site is surrounded by industrial development.

Proposed restoration: Restoration at the site could include “daylighting” Balch Creek near the alcove; separating the combined sewer overflow and industrial stormwater runoff from Balch Creek; constructing a confluence pool to create off-channel wetland habitat; vegetating the riparian areas along Balch Creek and the confluence area; adding complexity to shallow water habitat by adding large wood. The option of moving the boat dock into deeper water to eliminate the need for maintenance dredging could also be evaluated for feasibility.

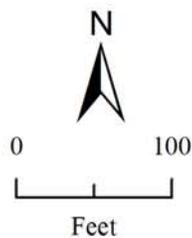
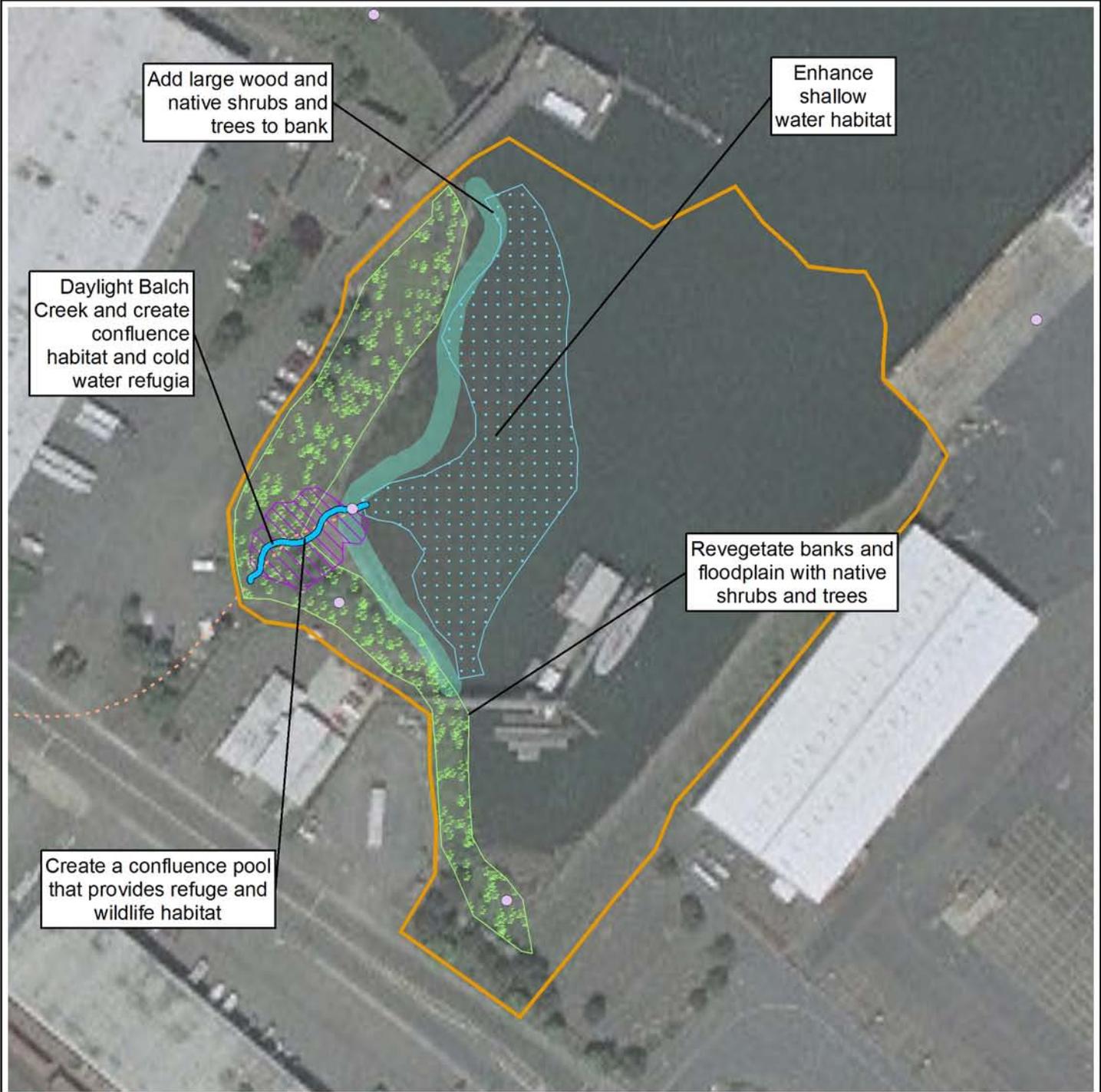
Benefits: Naturally sloped, vegetated stream banks increase floodplain connectivity and habitat diversity. Adding large wood and other habitat features would create more complex habitat, which is preferred by juvenile salmon, lamprey, and sturgeon because it provides cover and feeding stations. Off-channel, shallow, slow moving waters, like the proposed wetland and “daylit” stream, gather wood and provide refuge and productive foraging areas for lamprey and juvenile salmon. Shallow areas can also serve as important hunting areas for bald eagle, osprey, spotted sandpiper, mink and other species. Emergent and shrub wetlands provide shelter and a prey source for lamprey and salmon, as well as native birds, reptiles and amphibians. Riparian vegetation provides trees for bald eagle and osprey perching opportunities, and cover and foraging areas for mink and other species. The diversion of stormwater from the creek would directly benefit water quality.

Feasibility: Remediation of sediment would be necessary prior to restoration. The site is owned by private and public entities. There are no known permitting issues. Minor ongoing maintenance of plants and hydrology may be required.

Other constraints/considerations: Balch Creek Confluence site offers a rare opportunity to restore the mouth of a tributary on the mainstem Willamette. This project would be even more effective if the Portland Fire boat were moved into deeper water closer to the main channel of the river. The upstream portion of Balch Creek would remain in a culvert, limiting connectivity.

Balch Creek Confluence

Map prepared for Portland Harbor
Natural Resource Trustees



-  Outfall
-  Piped Stream Segment
-  Restoration Site
-  Potential Bank Restoration
-  Potential Channel Restoration
-  Off-Channel Habitat
-  Shallow Water Habitat
-  Revegetation

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CATHEDRAL PARK

Landowner: City of Portland Parks and Recreation, Oregon Department of State Lands

Site description: The site is located at river mile 5.75. Cathedral Park's shore is classified as beach and some driftwood is present. The uplands are largely dominated by a grass field and a large parking lot. There is also a significant strip of woodland habitat containing large cottonwood trees and managed herbaceous vegetation. A boat ramp extends from the parking lot into the open water and that portion of the shoreline is composed of non-vegetated rip rap. Near the center of the shoreline there appears to be a section of shallow in-water habitat.

Proposed restoration: Restoration will likely include increasing vegetation and wood to restore riparian areas and upland habitat and creating off-channel wetlands at the mouth of the swale.

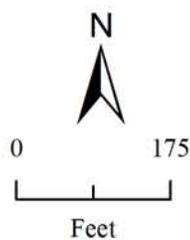
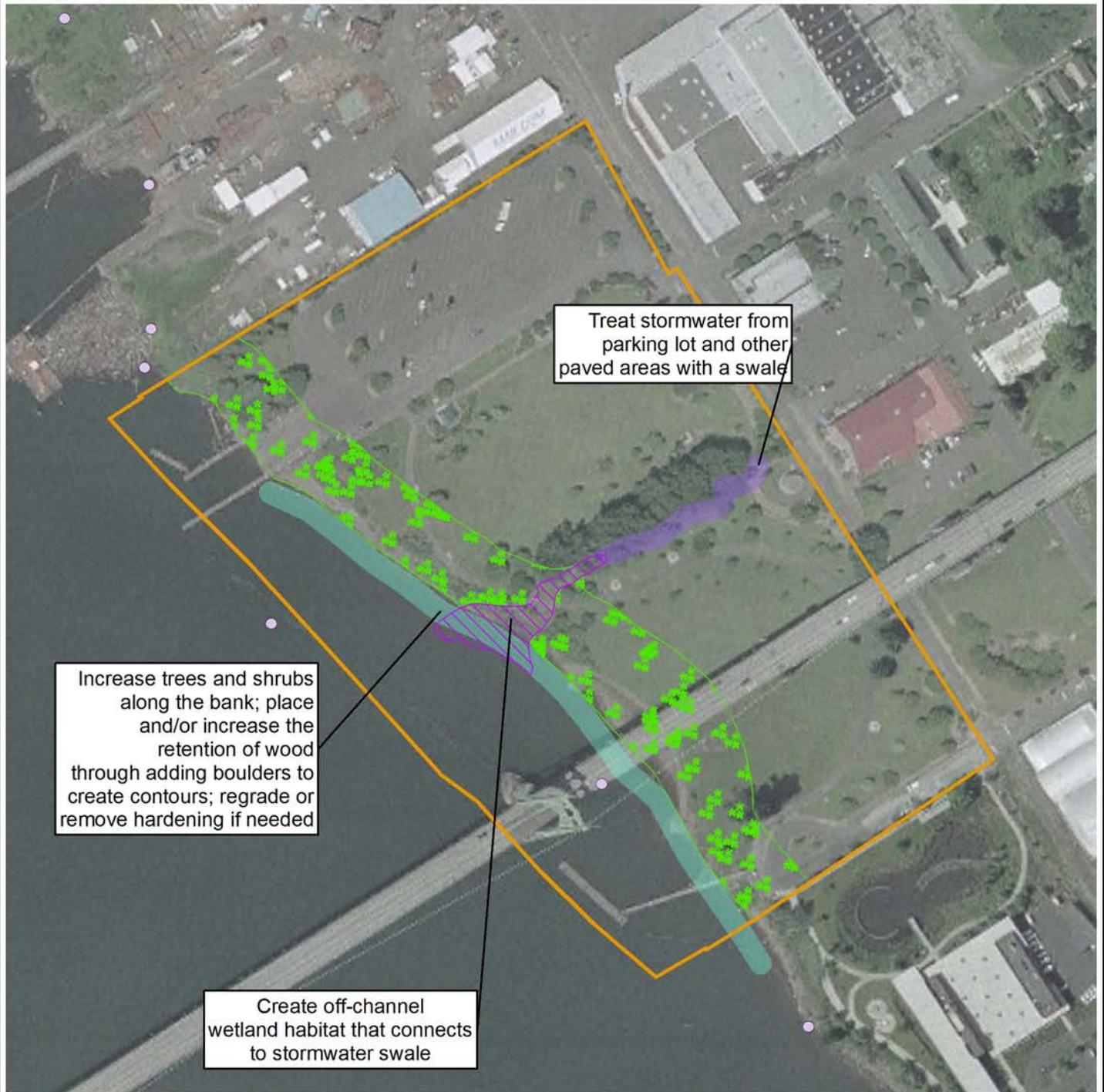
Benefits: Beach habitats sustain rich invertebrate populations; consequently they are important foraging areas for spotted sandpiper, mink, and a variety of other organisms. Naturally sloped, vegetated stream banks increase floodplain connectivity and habitat diversity. Adding large wood and other habitat features would create more complex habitat, which is preferred by juvenile salmon, lamprey, and sturgeon because it provides cover and feeding stations. Off-channel, shallow, slow moving waters gather wood and provide refuge and productive foraging areas for lamprey and juvenile salmon. Restoring native vegetation to the site would improve wildlife habitat.

Feasibility: The land is publicly owned. Portland Parks and Recreation is willing to build and maintain the project, though there would be a significant amount of human access and potential disturbance. There are no known permitting obstacles at this time. Minor ongoing maintenance of the stormwater facility will be required.

Other constraints/considerations: The Portland Parks and Recreation Department's preference that the park be focused on recreation rather than habitat as illustrated in the Cathedral Park Master Plan will likely limit opportunities to fully implement potential restoration actions at the site.

Cathedral Park

Map prepared for Portland Harbor
Natural Resource Trustees



-  Outfall
-  Restoration Site
-  Potential Bank Restoration
-  Stormwater Swales
-  Off-Channel Habitat
-  Riparian Shrubs and Trees

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CENTENNIAL MILLS

Landowner: City of Portland, Portland Development Commission, Oregon Department of State Lands

Site description: The Centennial Mills site is located at river mile 11.4 on the west bank of the Willamette River. The riverbank is steeply sloped and classified as pilings, vegetated rip rap and unclassified fill. There appears to be some shallow in-water habitat along the shore. Tanner Creek is piped throughout most of the Northwest Industrial Area and meets the Willamette River at a stormwater outfall in the center of this site. The site itself is mostly impervious (81.4%) with a small strip of shrubs along the river bank on the southeastern half.

Proposed restoration: Potential restoration activities at this site could involve rerouting and “daylighting” the end of Tanner Creek; creating off-channel and confluence habitat; treating stormwater discharge from the Tanner outfall in a stormwater wetland; regrading and revegetating the river banks and floodplain; and removing buildings and other infrastructure from the property.

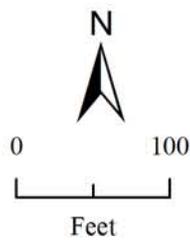
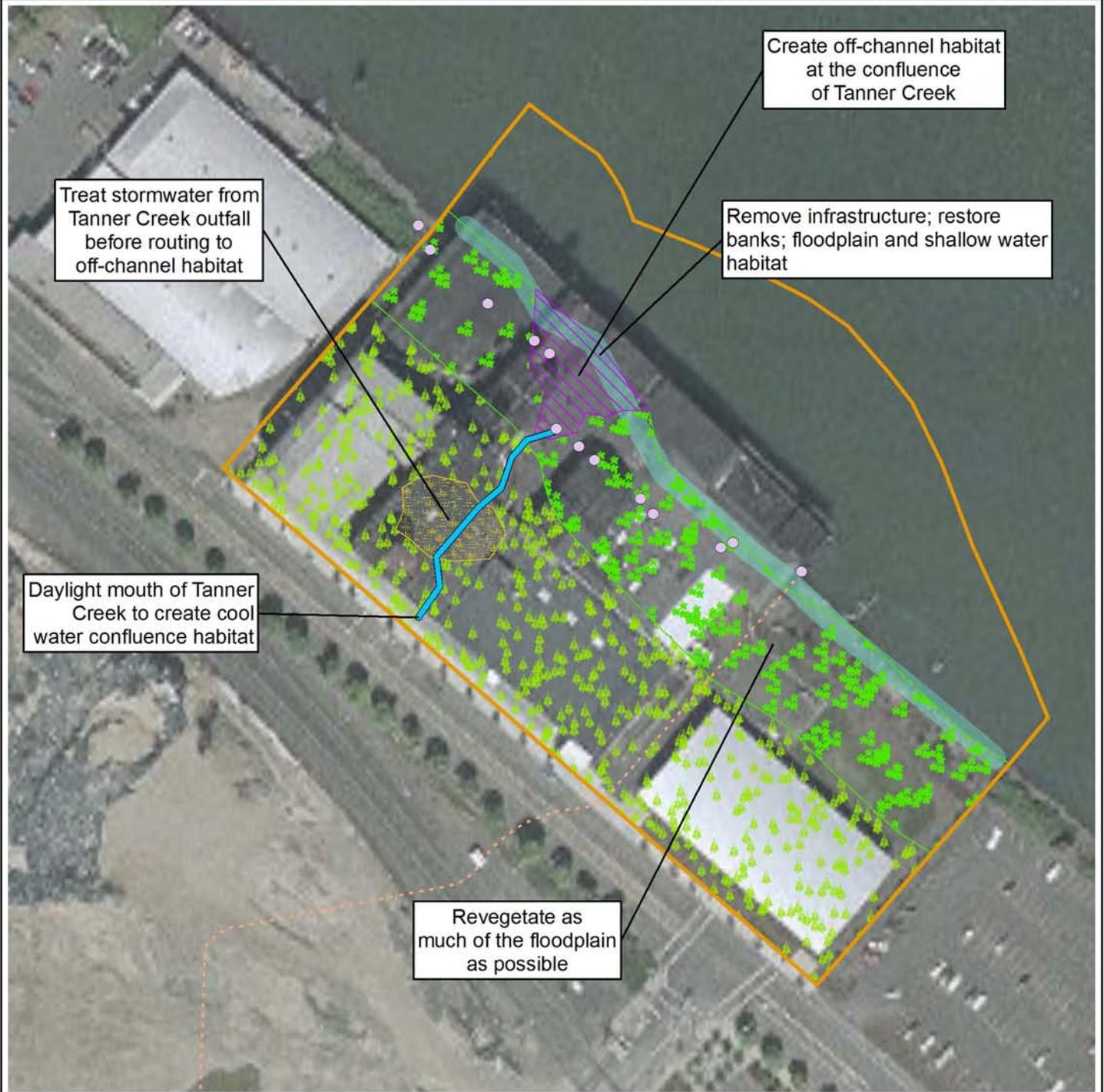
Benefits: Rerouting and “daylighting” the creek will improve habitat complexity, enhancing the habitat for salmon, lamprey, sturgeon, and terrestrial species. Creating additional tributary and wetland habitat will increase off-channel areas used by lamprey and juvenile salmon. Shallow areas can also serve as important hunting areas for bald eagles, osprey, spotted sandpiper, mink and other species. Native vegetation provides an invertebrate food source, cover, perching, and nesting habitat for birds and other animals. Natural beaches and shallow wetlands also serve as foraging areas for mink and staging areas for spotted sandpiper and other migratory birds. Restoring the stream and wetland will reconnect this area to its historic floodplain and also enhance habitat complexity by encouraging the use of off-channel areas by fish. Treatment of the stormwater in a swale will directly improve water quality.

Feasibility: The land is publicly owned. The site has been declared a historical site. After restoration is completed, minor ongoing maintenance of the stormwater treatment features will be required.

Other constraints/considerations: This site is rare and significant because of the potential to restore the mouth of a tributary on the mainstem Willamette River. Development options for the property are currently being considered and the site’s designation as a historical property may limit the restoration options at the site.

Centennial Mills

Map prepared for Portland Harbor
Natural Resource Trustees



- | | | | |
|--|-------------------------------|--|---------------------------|
| | Outfall | | Off-Channel Habitat |
| | Piped Stream Segment | | Stormwater Wetland |
| | Restoration Site | | Riparian Shrubs and Trees |
| | Potential Bank Restoration | | Upland Vegetation |
| | Potential Channel Restoration | | |

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DOANE CREEK / RAILROAD CORRIDOR

Landowner: Siltronic, Burlington Northern Santa Fe Railway, Atofina Chemicals Inc., Oregon
Department of State Lands

Site description: The Doane Creek site is located at river mile 7, extending from the shoreline just upstream of the Burlington Northern Railroad Bridge to the uplands along Highway 30, and includes a 7 acre wetland known as North Doane Lake. A riparian forest borders Doane Lake. Doane Creek is a stream that originates in Forest Park. The stream is piped under HWY 30, in an open channel for about 1600 ft., and then piped again until it connects to the river through an outfall. The shoreline is natural beach south of the bridge and rip rap to the north. There are some areas of shallow in-water habitat along the beach. Heavy contamination upstream of the site has resulted in contamination of Doane Lake.

Proposed restoration: Restoration at the Doane Creek site could include several components: creating high quality habitat at the confluence; “daylighting” the piped sections of Doane Creek; restoring connectivity for fish and wildlife between the site and Forest Park; enhancing shoreline and riparian habitat by removing rip rap, regrading, and replanting with native vegetation; replanting upland areas of the site with native vegetation; and creating more shallow in-water habitat.

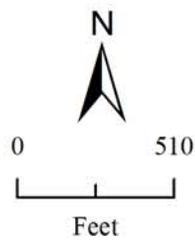
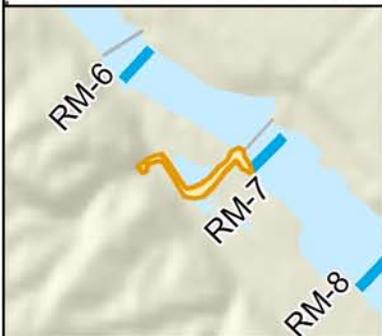
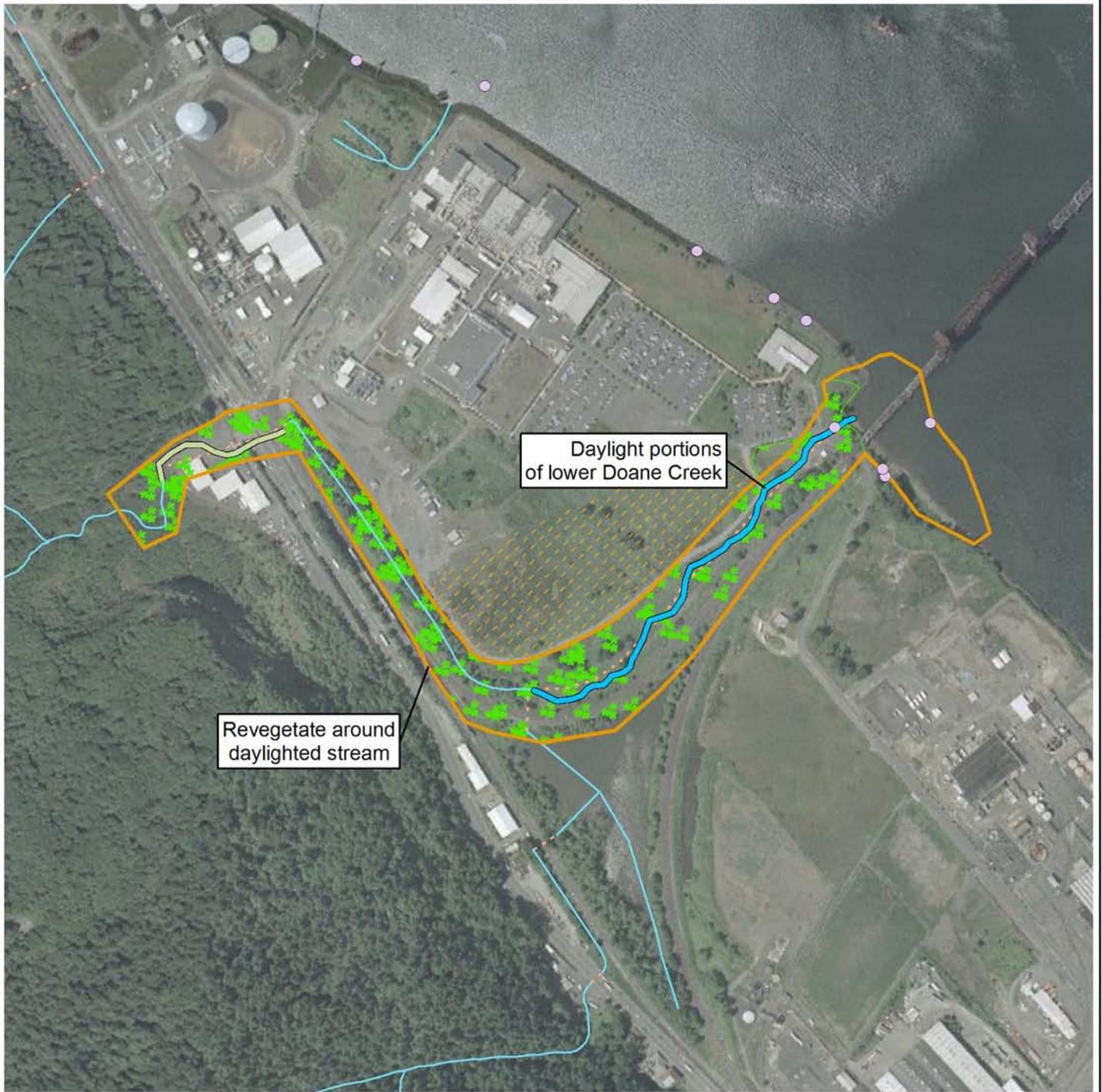
Benefits: Realigning and “daylighting” the creek and addressing fish passage barriers will improve habitat complexity and connectivity, enhancing the habitat for salmon, lamprey, sturgeon, and terrestrial species. Creating additional tributary and wetland habitat will increase off-channel areas for use by lamprey and salmon. Shallow areas can also serve as important hunting areas for bald eagles, osprey, spotted sandpiper, mink and other species. Native vegetation would provide food, cover, and nesting habitat for birds and other animals. Natural beaches and shallow wetlands serve as foraging areas for mink and staging areas for spotted sandpiper and other migratory birds. Restoring the stream will reconnect this area to its historic floodplain and provide off-channel habitat.

Feasibility: The timeline for sediment/creek remediation is unknown; remediation must be completed before restoration begins. Opportunities to restore passage for fish and wildlife between the site and Forest Park need to be evaluated. The land is privately owned and it is not known if the owner is willing to allow restoration at the site. There may be permitting issues, especially associated with the railroad. A significant amount of effort would be necessary to monitor and maintain the modified hydrology and plantings.

Other constraints/considerations: The site already provides a connection between Forest Park and the Willamette River and good quality beach habitat. It is somewhat unique in its potential to provide benefits to a wide range of species.

Doane Creek-Railroad Corridor

Map prepared for Portland Harbor
Natural Resource Trustees



-  Outfall
-  Stream
-  Piped Stream Segment
-  Restoration Site
-  Potential Revegetation Area
-  Potential Channel Restoration
-  Alternate Channel Routing
-  Revegetation
-  Riparian Shrubs and Trees
-  Wetland Creation

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JOSLIN PROPERTY

Landowner: Private - Jeff Joslin; Oregon Department of State Lands

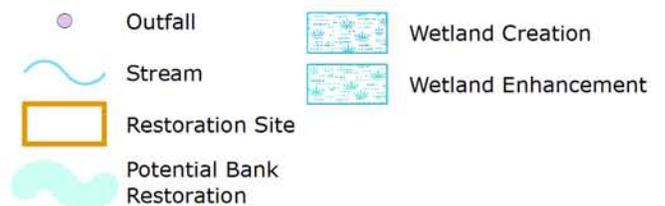
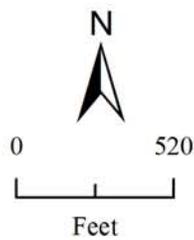
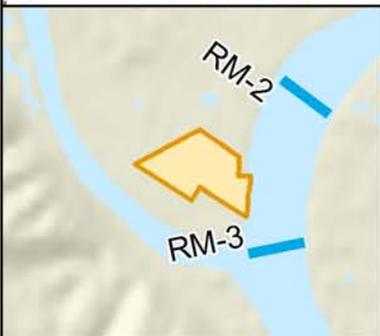
Site description: The Joslin property is located at river mile 2.5 near the confluence of the Willamette River with the Multnomah Channel. The property is 118 acres. Some shallow in- water habitat is present at the site adjacent to the leveed river bank. Some large wood has accumulated along the beach.

Proposed restoration: Restoration at this site could involve removing the existing dikes and constructing set back dikes along the property line; regrading the river banks to make a shallower slope; and adding native vegetation and large wood to the shoreline to supply more habitat structure. If moving the levee is not feasible, the site provides the opportunity for enhancement of a large wetland upland of the levee.

Benefits: Off-channel, shallow, slow moving waters provide refuge and productive foraging areas for lamprey and juvenile salmon. Shallow areas can also serve as important hunting areas for bald eagles, osprey, spotted sandpiper, mink and other species. Native vegetation provides an invertebrate food source, cover, perching, and nesting habitat for birds and other animals. Natural beaches serve as foraging areas for mink and staging areas for spotted sandpiper and other migratory birds. Moving the dike and regrading the shoreline will reconnect this area to its historic floodplain and encourage the use of off-channel areas by fish. Adding large wood and native vegetation along the banks will improve habitat complexity, increase sediment retention, and provide an invertebrate food source for fish and some wildlife.

Feasibility: Moving the levee involves significant feasibility issues that would have to be thoroughly investigated during the planning and engineering of the site. The private landowner is willing to have the property restored. There are no known permitting issues. The project would be largely self-sustaining.

Other constraints/considerations: This site is unique because of its size and proximity to other good quality habitat (Miller Creek and PGE properties). There is no known imminent threat of development.



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LINNTON NEIGHBORHOOD

Landowner: Linnton Plywood Association, Babcock Land Co LLC, RK Storage & Warehouse Inc., Oregon Department of State Lands

Site description: The Linnton Neighborhood site is located at river mile 4.6. It is an industrial property that contains an inactive plywood company. There is shallow water habitat along the shoreline in two inlets. The shoreline is mostly classified as beach and is generally in good condition. The center of the site has a particularly high bank consisting of native rock. One section at the north end is rip rap. There is a strip of trees between the shoreline and the developed upland. Several seasonal streams that once crossed the property currently run through pipes and culverts.

Proposed restoration: Restoration at this site could include several components: regrading and revegetating the shoreline to improve the quantity and quality of beach habitat; regrading and adding wood to increase the quantity and quality of shallow water habitat; “daylighting” the streams that cross the property to create new tributary habitat; restoring fish and wildlife passage from the site to Forest Park; excavating nearshore areas to create off-channel riparian habitat; removing overwater structures and remnants of industrial buildings; and restoring native vegetation to the site.

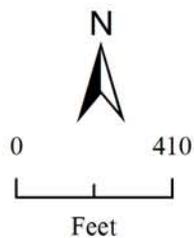
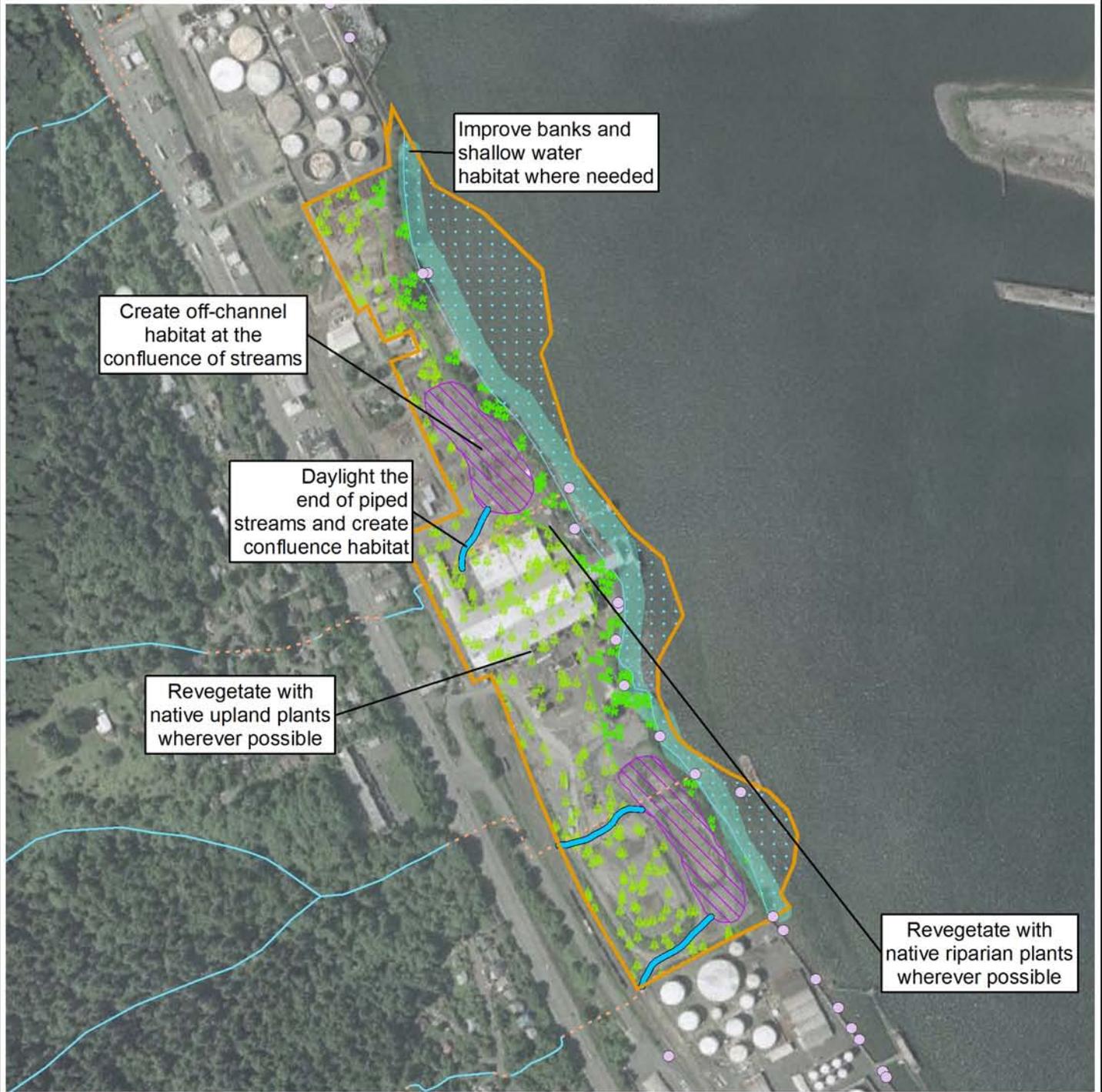
Benefits: “Daylighting” the piped streams on this site and restoring passage will provide fish and wildlife access to shallow, complex habitat, and return floodplain function to this mostly impervious site. Increased floodplain connectivity also enhances habitat complexity and encourages the use of off-channel areas by salmon and lamprey. Shallow areas also serve as important hunting areas for bald eagles, osprey, spotted sandpiper, mink and other species. Vegetation and wood provide cover and feeding stations for various species while contributing to improved water quality. Beach habitats sustain rich invertebrate populations; consequently they are important foraging areas for spotted sandpiper, mink, salmon and a variety of other organisms.

Feasibility: The land is in private ownership and is currently for sale. There is significant development pressure, as it is currently zoned for river-industrial use. Many members of the Linnton community are strongly supportive of restoration at the site. If off-channel habitat is developed, it will require a minor amount of ongoing maintenance.

Other constraints/considerations: The north and south parts of the site are owned by different entities. It is possible that only half of the site would be restored, though it would be preferable to restore the whole site. This is a unique site because of the presence of beach habitat and because of the opportunity to connect to clear, cold water from Forest Park streams.

Linnton Neighborhood

Map prepared for Portland Harbor
Natural Resource Trustees



- | | | | |
|--|----------------------------|--|-------------------------------|
| | Outfall | | Potential Channel Restoration |
| | Stream | | Off-Channel Habitat |
| | Piped Stream Segment | | Shallow Water Habitat |
| | Restoration Site | | Riparian Shrubs and Trees |
| | Potential Bank Restoration | | Upland Vegetation |

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MARCOM

Landowner: Langley St Johns LLC, Port of Portland, Oregon Department of State Lands

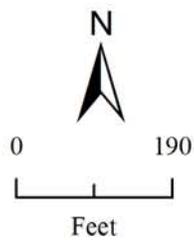
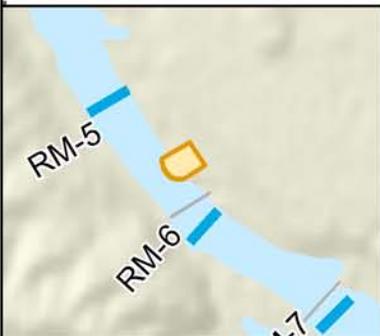
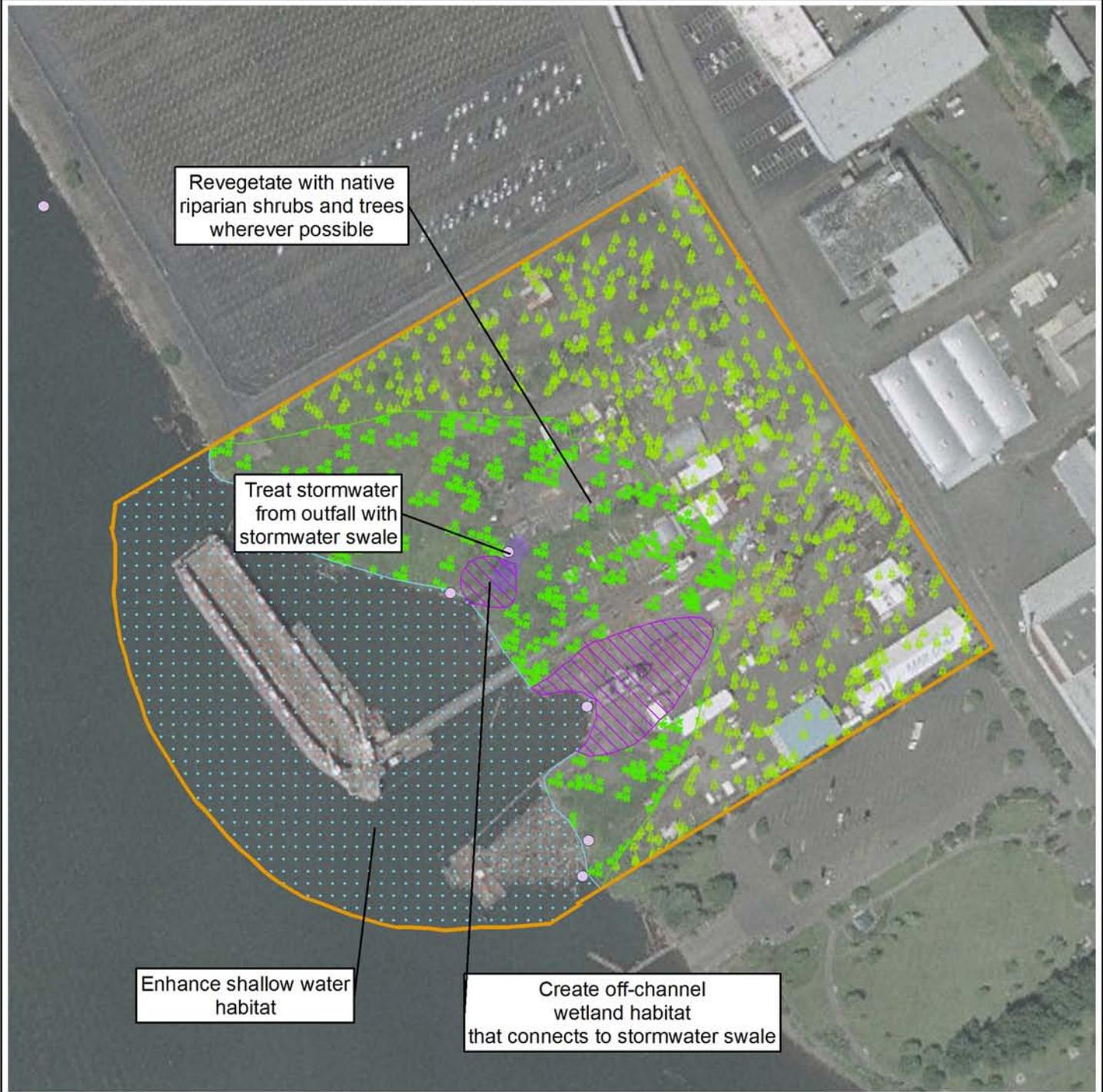
Site description: The MarCom site is located at river mile 5.5 on the east bank of the Willamette River. The riverbank is classified as beach and accumulates large wood. The north end of the site has been paved. There is currently good quality beach habitat present at the site. There is limited shallow in-water habitat along the shore. The banks and upland area are vegetated sparsely. A boat launch, slag, and other remains of industry are currently present at the site. Cathedral Park is located just south of the MarCom site, providing for potential habitat connectivity.

Proposed restoration: Restoration at this site would likely include several components: construction of a bioswale; creation of off-channel wetland habitat; revegetation of the entire site with native species; and removal of infrastructure. Stormwater runoff from upland areas, which currently enters the river through an outfall, would be treated by the bioswale and the constructed wetlands.

Benefits: Wetlands provide off-channel, shallow water refuge habitat for salmon and lamprey. Shallow areas can also serve as important hunting areas for bald eagles, osprey, spotted sandpiper, mink and other species. Native vegetation will provide food and cover for a variety of species of fish and wildlife, and perching and nesting opportunities for bald eagle, osprey, and other birds. Treating the stormwater runoff in the swale and wetland will directly improve water quality.

Feasibility: Department of Environmental Quality-led remedial actions were scheduled to begin summer 2008; restoration cannot begin until after the remediation is completed. The property is privately owned and it is unknown if the owner is willing to allow the property to be restored. Minor long-term maintenance would be required to manage the stormwater facilities.

Other constraints/considerations: There is already significant wood accumulation and floodplain habitat at the site. The threat of the site being developed is significant. The north portion of the site has been purchased by the Port of Portland and the south portion is going through source control with DEQ. The southern portion of the property is currently for sale.



-  Outfall
-  Restoration Site
-  Potential Bank Restoration
-  Stormwater Swales
-  Off-Channel Habitat
-  Shallow Water Habitat
-  Riparian Shrubs and Trees
-  Upland Vegetation

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MILLER CREEK CONFLUENCE

Landowner: Frevach Land Co., Lucky Landing LLC, Oregon Department of State Lands, others

Site description: The Miller Creek site is located at river mile 3.2 along the Multnomah Channel. Miller Creek itself is routed under a railroad bridge, and then through a series of baffles before becoming a narrow steep-sided channel and draining to a marina, which is in an alcove off of Multnomah Channel. Another creek also flows from the upstream property to the marina. The remainder of the site includes riparian habitat with vegetation and an area that has been filled. There is also a small stretch of unclassified shoreline and there appears to be shallow in-water habitat along the Multnomah Channel. There is no apparent development in most of the site, except for a portion of the site that extends across the highway and railroad, and a section of road that leads to the marina.

Proposed restoration: Restoration efforts at this site would likely involve several components: fish and wildlife passage enhancement in Miller Creek under the railroad tracks; relocation of Miller Creek so that it flows directly into Multnomah Channel; and addition of large wood and native vegetation along Miller Creek and throughout all open areas on the site.

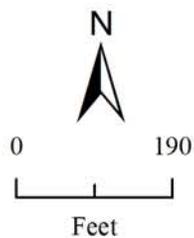
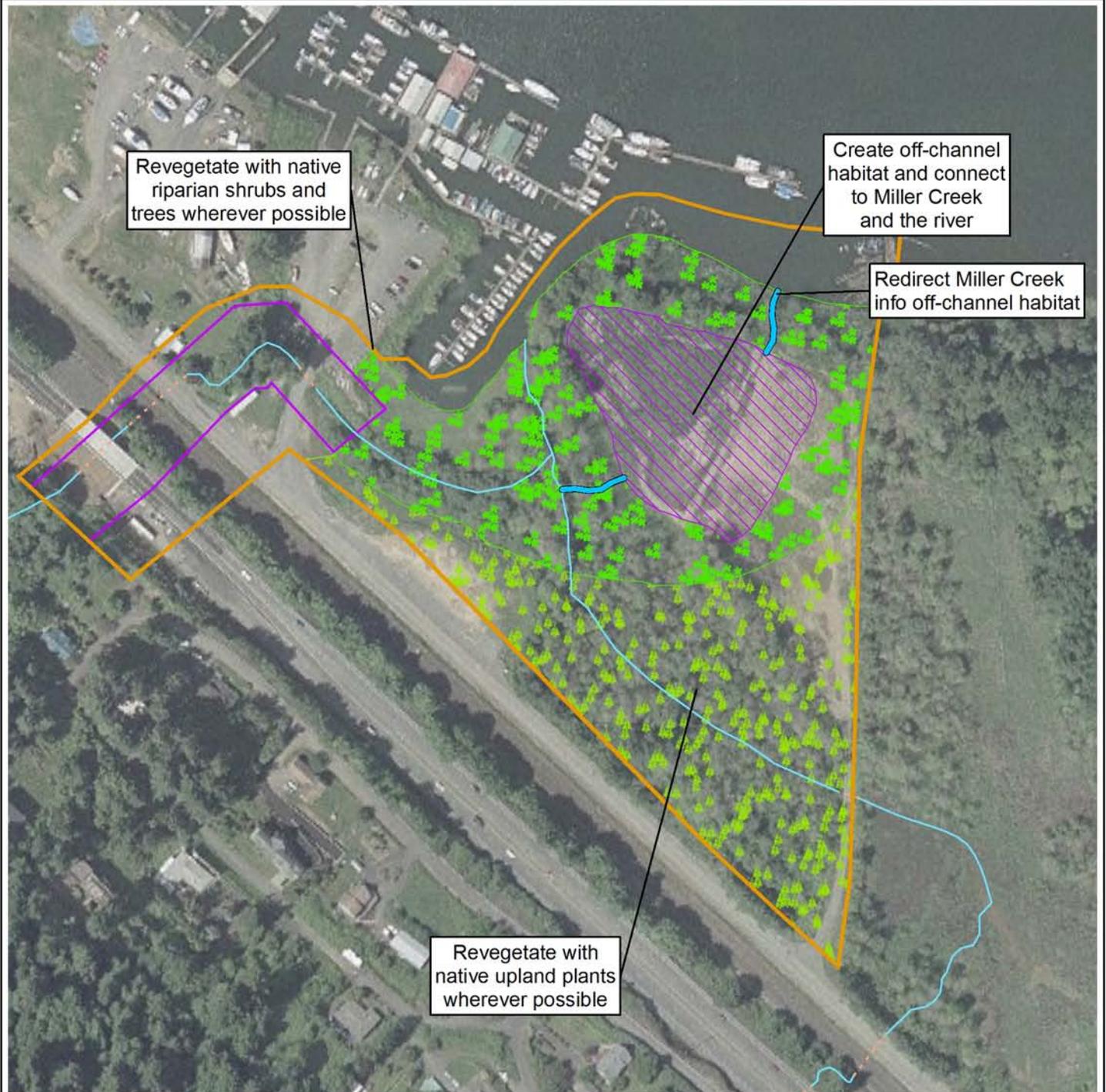
Benefits: Realigning the creek, improving passage, and adding native vegetation and large wood will improve habitat connectivity and quality, enhancing the habitat for salmon, lamprey, sturgeon, and terrestrial species. Forested areas would provide large trees for perching and nesting opportunities for bald eagle, osprey and other birds. Creating additional tributary and wetland habitat will increase off-channel areas with shallow in-water habitat used by lamprey and salmon. Shallow areas can also serve as important hunting areas for bald eagles, osprey, spotted sandpiper, mink and other species. Restoring the stream and wetland will reconnect this area to its historic floodplain and also enhance habitat complexity by encouraging the use of off-channel areas by fish and wildlife.

Feasibility: The land is privately owned and one of the landowners has expressed unwillingness to allow restoration on the property. There are no known permitting issues. Because of hydrologic changes, minor on-going maintenance would be required.

Other constraints/considerations: Miller Creek is unique because the entire upper watershed is well-forested, it is one of the least impacted watersheds within the City of Portland, and because it is the only location where coho salmon are believed to spawn in the Portland Harbor study area.

Miller Creek Confluence

Map prepared for Portland Harbor
Natural Resource Trustees



- | | | | |
|--|-------------------------------|--|---|
| | Outfall | | Off-Channel Habitat |
| | Stream | | Passage Improvement and Channel Restoration |
| | Piped Stream Segment | | Riparian Shrubs and Trees |
| | Restoration Site | | Upland Vegetation |
| | Potential Channel Restoration | | |

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OWENS-CORNING FLOODPLAIN

Landowner: Owens-Corning, GATX Storage Terminals, Oregon Department of State Lands

Site description: The Owens Corning site is located at river mile 4 on the west side of the Willamette River. The northern half of the shoreline is classified as vegetated riprap while the southern half is beach. There appears to be some shallow in-water habitat. A strip of vegetation borders the shoreline and there is a larger patch of sparse vegetation present in the south end of the site. Though the southern vegetated area is sparse, it provides some habitat connectivity between the river and Forest Park. According to the Willamette River Natural Resource Inventory Report, bobcat have been sighted foraging on the beach in this area. No streams currently run through the site. Drainages that once crossed the site are diverted to the north and south of the site through pipes.

Proposed restoration: Restoration at this site could involve several components: reconnecting a seasonal stream to the river and potentially the uplands; removing rip rap from the shoreline away from the facility; regrading and revegetating the shoreline and floodplain; and creating additional off-channel habitat.

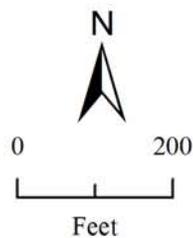
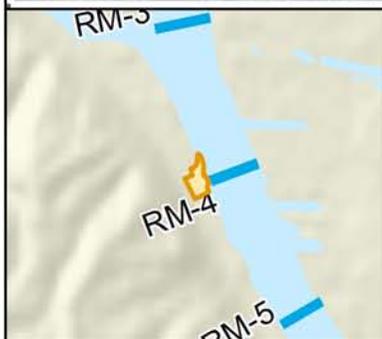
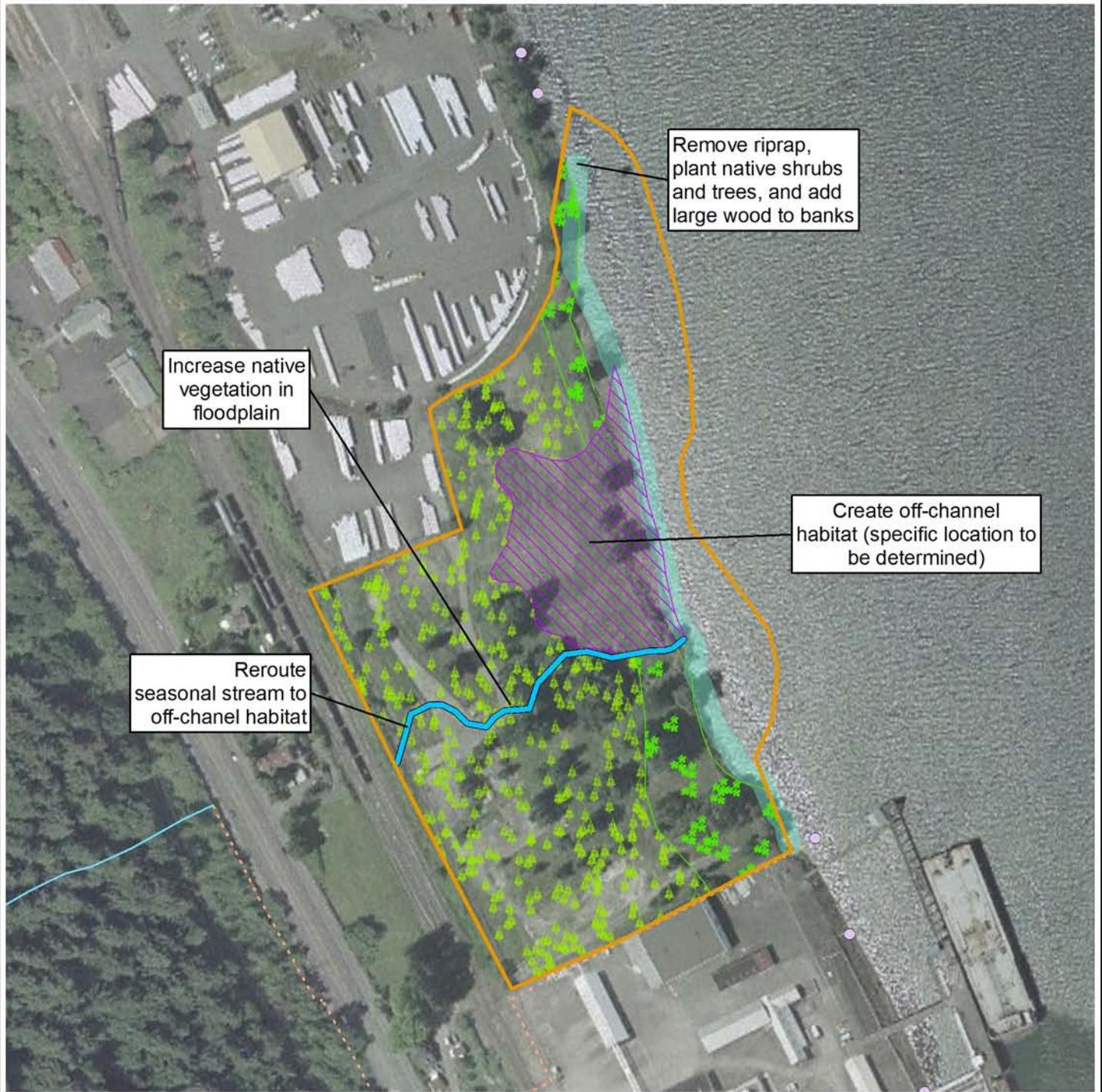
Benefits: Naturally sloped, vegetated stream banks increase floodplain connectivity and habitat diversity. Replacing the rip rap with a sloped shoreline will allow for the accumulation of wood, trapping sediment and adding further complexity to the system. Juvenile salmon, lamprey, and sturgeon prefer complex habitats that provide cover and feeding stations. Low gradient tributaries provide suitable spawning and rearing habitat for salmon. Shallow areas can also serve as important hunting areas for bald eagles, osprey, spotted sandpiper, mink and other species. Native vegetation will provide food and cover for a variety of species. Mature forested areas provide large trees that can serve as perch and nesting sites for bald eagle, osprey, and other birds.

Feasibility: The land is privately owned and the owner has expressed willingness to restore part of the site. The site is zoned industrial, so there may be some minor permitting issues. The plantings and modified hydrology will require minor maintenance. Homeland Security prevents planting along the bank riverward of the facility because petroleum tanks are present.

Other constraints/considerations: The site provides one of the few opportunities to enhance floodplain and off-channel areas in the industrial reach. The property owner has indicated that they are not likely to develop the vacant portion of the site.

Owens-Corning Floodplain

Map prepared for Portland Harbor
Natural Resource Trustees



- | | | | |
|--|----------------------------|--|-------------------------------|
| | Outfall | | Potential Channel Restoration |
| | Stream | | Off-Channel Habitat |
| | Piped Stream Segment | | Riparian Shrubs and Trees |
| | Restoration Site | | Upland Vegetation |
| | Potential Bank Restoration | | |

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PGE

Landowner: Portland General Electric, Oregon Department of State Lands

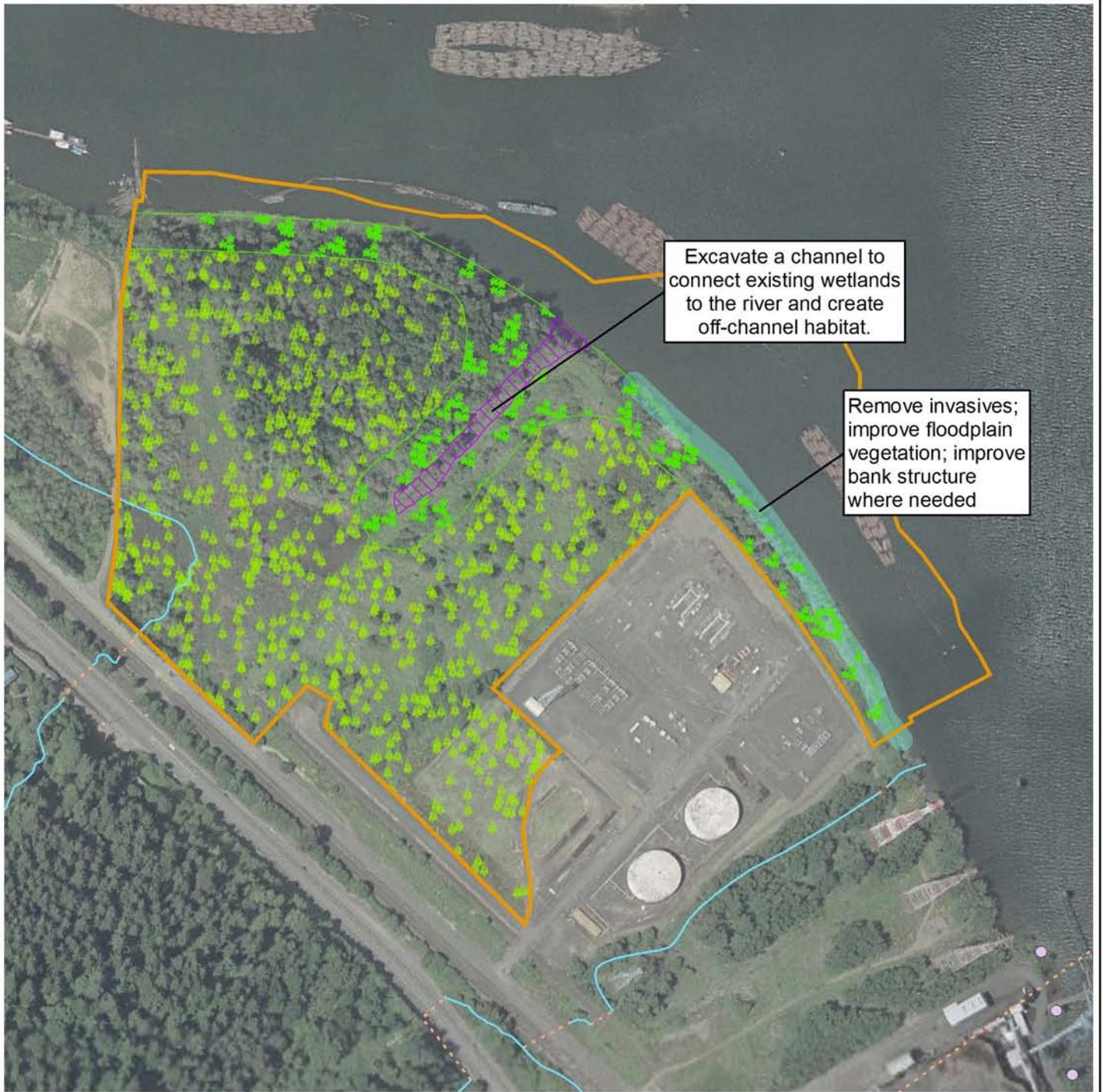
Site description: The PGE site is located at river mile 3.2, at the confluence of the Willamette River and Multnomah Channel. The site contains the Harborton Wetlands, a remnant black cottonwood and ash floodplain forest wetland area that provides good quality off-channel habitat, floodplain function, and habitat connectivity between the river and Forest Park. The banks of these wetlands are natural beach with some vegetation on the edges. The shoreline appears to transition to shallow in-water habitat along the site. The site also contains a small piece of terrestrial habitat that is covered by invasive vegetation, pavement and structures.

Proposed restoration: Restoration at this site could include several components: excavating from the river to the middle of the site to connect the wetlands to the river; redirecting the stream running through the southwest corner of the site to connect with the newly created wetlands; improving the river bank at the south end of the site; removing invasive plants and replanting native vegetation in the forested wetland, floodplain, and upland areas; and remove pavement, fill and structures wherever possible.

Benefits: Off-channel and tributary waters are some of the most productive rearing sites for salmon. Shallow areas can also serve as important hunting areas for bald eagles, osprey, spotted sandpiper, mink and other species. Natural beaches and shallow wetlands also serve as foraging areas for mink and staging areas for spotted sandpiper and other migratory birds. Native vegetation will provide food and cover for a variety of species while reducing erosion and enhancing water quality. The structural diversity, snags, and large wood that may be enhanced in the forested portion of the site provide valuable habitat complexity for terrestrial species. Revegetation would provide large trees for perching and nesting opportunities for bald eagle, osprey and other birds.

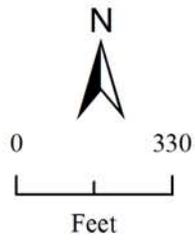
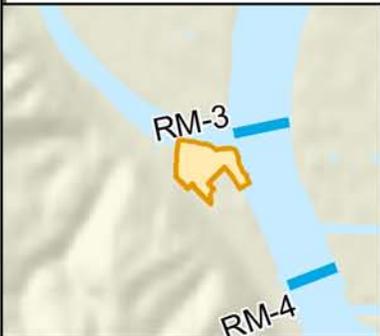
Feasibility: The land is privately owned and it is anticipated that the owner may be willing to allow restoration on the property. There are no known permitting issues. The plantings and wetlands would require minor ongoing maintenance.

Other constraints/considerations: The PGE site is rare because it is an undeveloped site in good condition. Its location at the confluence of the Willamette River and Multnomah Channel is unique. There is no known imminent threat of the property being developed. Restoration at this site would need to be coordinated closely with restoration plans at the adjacent Miller Creek site.



Excavate a channel to connect existing wetlands to the river and create off-channel habitat.

Remove invasives; improve floodplain vegetation; improve bank structure where needed



- Outfall
- ~ Stream
- - - Piped Stream Segment
- ▭ Restoration Site
- ~ Potential Channel Restoration
- ▨ Off-Channel Habitat
- Riparian Shrubs and Trees
- Upland Vegetation
- ~ Potential Bank Restoration

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POWERLINE CORRIDOR

Landowner: Portland General Electric, US Government powerline easement, Oregon Department of State Lands

Site description: The Powerline Corridor site is located at river mile 3.4 on the west side of the Willamette River, just south of Multnomah Channel. An intermittent stream flows down from Forest Park and through the site. Most of the stream is natural, open channel, except where it flows through culverts below HWY 30, the railroad, and a service drive close to its confluence with the river. The stream then flows into a small forested wetland area, which contains trees, shrubs, and herbaceous vegetation. The wetland is separated from the Willamette River by a raised berm. The shoreline is vegetated beach, with some apparent shallow in-water habitat at the north end.

Proposed restoration: Restoration of the site could include removing the berm where the last segment of the creek is piped; lowering the grade in the bermed area; adding large wood to the stream and beach; revegetating the floodplain areas with native plant species and removing invasive plants; planting native trees and shrubs in upland areas; and planting native plants, including wapato, in the wetlands.

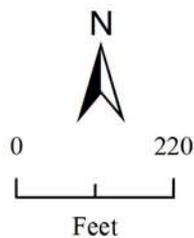
Benefits: Off-channel and tributary waters are some of the most productive rearing sites for salmon. Shallow areas can also serve as important hunting areas for bald eagles, osprey, spotted sandpiper, mink and other species. Natural beaches and shallow wetlands also serve as foraging areas for mink and staging areas for spotted sandpiper and other migratory birds. Large wood creates habitat complexity for juvenile salmon, lamprey, and sturgeon that use them for cover and feeding stations. Native vegetation will provide food and cover for a variety of species while reducing erosion and enhancing water quality. Mature trees will provide perching and nesting opportunities for bald eagle, osprey, and other birds.

Feasibility: The land is privately owned. There are no known permitting issues. The plantings and created wetlands would require minor ongoing maintenance.

Other constraints/considerations: The habitat provides a rare opportunity to connect an existing forested wetland to the Willamette River. The existing beach, wetland, and forest patches already provide good quality habitat in this heavily developed area; it is important that any restoration plan includes protection of these functioning habitats. When planting vegetation in the southwest corner of the site, special consideration must be taken because an engineered cap is in place.

Powerline Corridor

Map prepared for Portland Harbor
Natural Resource Trustees



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POWERLINE CORRIDOR CROSSING

Landowners: Portland General Electric, US Government powerline easement, Metro, City of Portland

Site description: The Powerline Corridor Crossing site is contiguous with the Powerline Corridor site, which is located at river mile 3.4 on the west side of the Willamette River, just south of Multnomah Channel. An intermittent stream flows from Forest Park and through the site. Most of the stream is mapped as natural, open channel, except where it flows through culverts under HWY 30, the railroad, and a service drive close to its confluence with the river. This project area could potentially be used to improve connectivity for wildlife by creating a movement corridor between Forest Park and the Willamette River through the Powerline Corridor site.

Proposed restoration: Wildlife passage could potentially be improved from Forest Park to the Powerline Corridor site by installing wildlife crossing signs along Marina Way (a road with low traffic volume) and installing a crossing under HWY 30 to allow safe wildlife movement between Forest Park and the Willamette River. The crossing could follow the location of the stream corridor, and could potentially improve the quality and availability of aquatic habitat for fish that use the downstream reach in the Powerline Corridor site.

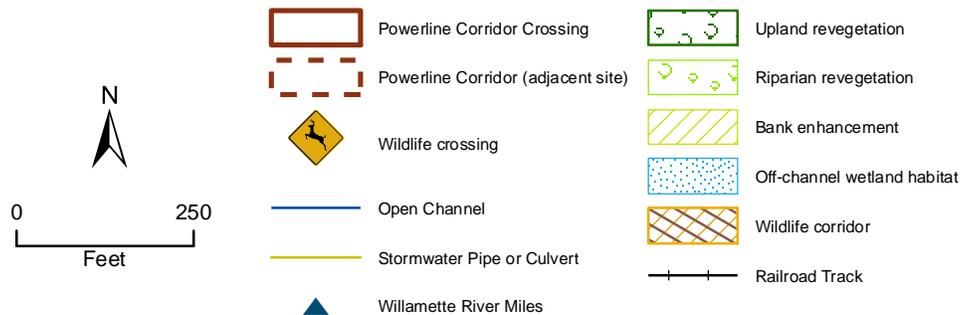
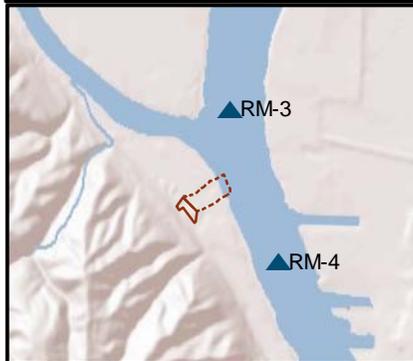
Benefits: The site may offer a rare opportunity to facilitate wildlife movement between Forest Park and the Willamette River in an area where the distance between the two is relatively short. Small mammals such as mink may be able to use the corridor to locate resources such as food, cover and den sites that would not otherwise be accessible. Upstream areas that are currently inaccessible to salmonids could potentially become available and provide some refugia during the wet season.

Feasibility: Building a crossing under HWY 30 and establishing a corridor that includes several parcels, another road and a railroad track will require the involvement and support of multiple landowners and stakeholders. The feasibility of constructing a crossing under HWY 30 and the potential benefits for fish and wildlife likely to result from possible design alternatives will need to be more fully evaluated. Permitting related to work involving HWY 30 is likely to be challenging, although there are no known fatal flaws.

Other constraints/considerations: The site provides a rare opportunity to provide a potential connection between Forest Park and the Willamette River for fish and wildlife.

Powerline Corridor Crossing

Map prepared for Portland Harbor
Natural Resource Trustees



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SALTZMAN CREEK

Landowner: Genstar Roofing, Kinder-Morgan, GATX Terminals, Atofina Chemicals, Oregon Department of State Lands

Site description: The Saltzman Creek site is located at river mile 7.5 on the edge of Willbridge Cove. Saltzman Creek itself runs in culverts through most of the site. There is a small amount of riparian vegetation currently on site, and 55.5% of the site is currently impervious. The shoreline contains beach and mudflat habitat and is in good condition. There appears to be very little shallow in-water habitat currently. The site contains some contaminated sediment, which is being at least partially remediated.

Proposed restoration: Restoration at this site could include several components: excavating and regrading the shoreline to a shallower slope; revegetating the shoreline and river banks with native riparian vegetation; and adding large wood to the shoreline and river banks.

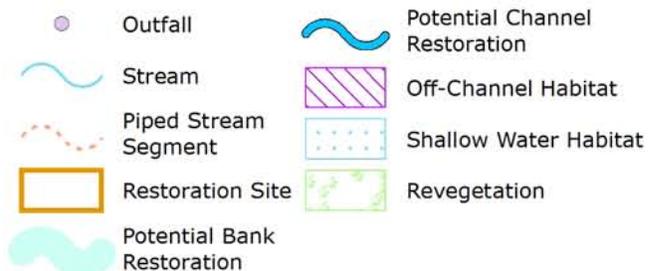
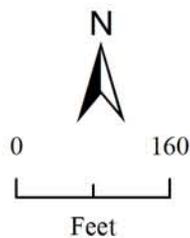
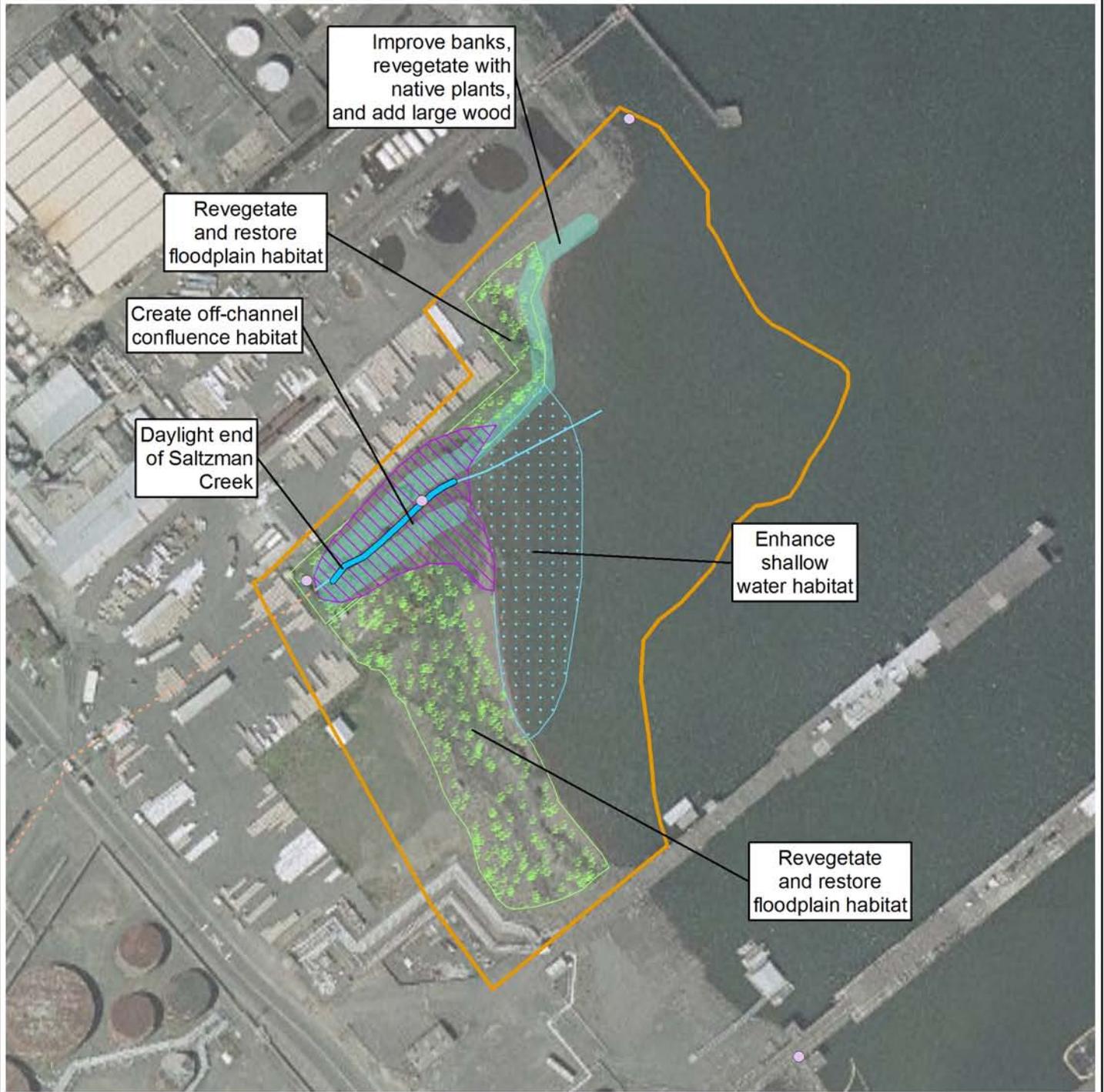
Benefits: Shallow, low velocity, complex shoreline habitat is crucial for salmon rearing. Shallow areas can also serve as important hunting areas for bald eagles, osprey, spotted sandpiper, mink and other species. The habitat structures created by vegetation and wood provide cover and feeding stations for a variety of species while contributing to improved sediment retention and water quality. Beach habitats sustain rich invertebrate populations; consequently they are important foraging areas for spotted sandpiper, mink, and a variety of other organisms.

Feasibility: The extensive storage and transport of petroleum products has the potential to impact habitat functions, and should be carefully evaluated for potential impacts on restoration and water quality within Saltzman Creek. There are no known permitting issues. Minor ongoing maintenance would be required to stabilize new vegetation and modified hydrology.

Other constraints/considerations: The existing confluence area is unique because it provides a cool water confluence and off-channel habitat. There is threat of the site of being developed for commercial or industrial use.

Saltzman Creek

Map prepared for Portland Harbor
Natural Resource Trustees



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SOUTH RIVERGATE CORRIDOR

Landowner: Oregon-Washington Railroad, Port of Portland, City of Portland, Portland General Electric, Time Oil Co., Oregon Department of State Lands

Site description: The South Rivergate Corridor site is located near river mile 3.3. It provides a vegetated corridor connecting the Willamette River, Multnomah Channel, Forest Park, the Lower Columbia Slough, and Smith and Bybee Lakes. The shoreline is designated as beach and accumulates large wood. Active dredging of the Willamette River causes a steep drop off from the shore, with little adjacent shallow in-water habitat. There is evidence of erosion and scour along the riverbank. In the upland portion of the site there are multiple seasonal and year-round wetlands and associated vegetation. The Portland General Electric (PGE) power line corridor runs along the site.

Proposed restoration: Restoration options at the site are restricted to wildlife uses and would be focused on preserving existing habitat features. Restoration at this site is likely to include planting native vegetation to enhance the wetlands and to support wildlife habitat connectivity within the corridor, as well as planting native vegetation along the banks and uplands.

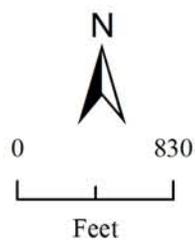
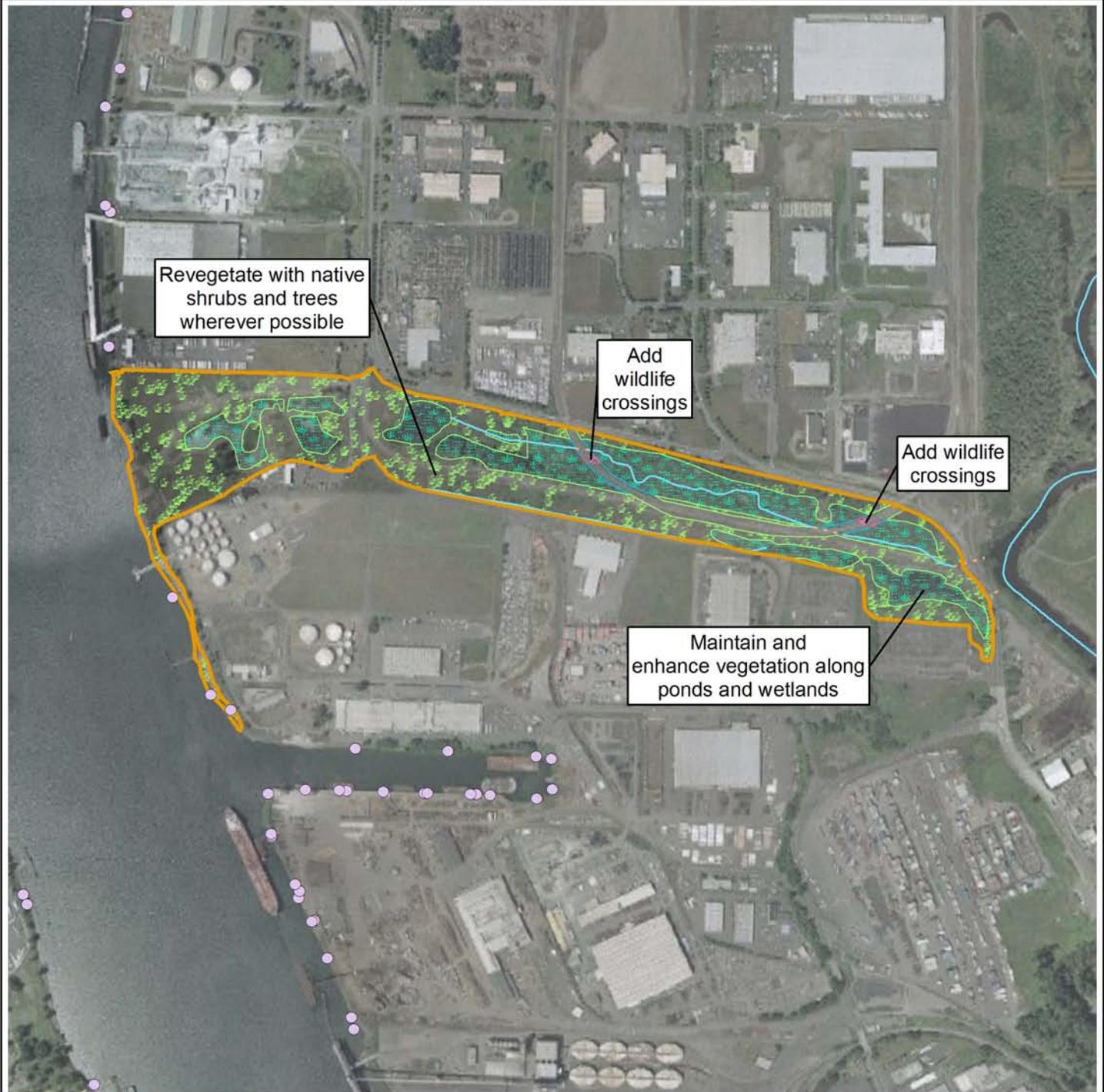
Benefits: Revegetation of the corridor would provide a wildlife movement corridor to the Rivergate wetlands. Enhancement of wetlands will provide foraging habitat for spotted sandpiper, mink and other wildlife species.

Feasibility: The site is currently zoned as industrial. The project would be largely self-sustaining.

Other constraints/considerations: The Rivergate Corridor supports a variety of wildlife, in addition to providing habitat connectivity between multiple significant habitats on both sides of the Willamette. Planting of large trees at the site will be restricted due to the presence of power lines on the site. Part of this area has been used for past mitigation under section 404 of the Clean Water Act. Protection and restoration activities should occur outside of past mitigation project footprints whenever possible.

South Rivergate Corridor

Map prepared for Portland Harbor
Natural Resource Trustees



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STEEL HAMMER

Landowner: Steel Hammer Properties, LLC, Oregon Department of State Lands (note: could expand to parcel across street)

Site description: This site includes two parcels that are 9.23 and 1.25 acres in size, totaling 10.48 acres. It is located between the Portland Water Pollution Lab by Cathedral Park and Willamette Cove. The site appears to be filled and graded. The majority of the site has been paved and is used as an outside storage area for steel products. There are no buildings or other structures on the site. Beach habitat with large woody debris and vegetation on the shoreline looks fairly natural from aerial photos, although large rock and boulders have been used to armor the bank, which is steeply sloped. About a quarter of the area is in the 100-year floodplain according to MetroMap.

Proposed restoration: Riparian, upland, and potentially shoreline and floodplain habitats at the site could be restored by removing pavement and fill material, regrading or benching the banks, improving soils and revegetating with native species. Snags and additional large wood could be installed to provide structure that would further enhance the value of native habitat.

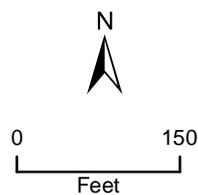
Benefits: Habitat at the site is currently limited to the beach and narrow riparian corridor along the shoreline. Vegetation could be restored to provide a more functional riparian zone and associated upland habitat. The banks could be sloped back or benched to increase the flood capacity and frequency of flooding on the site, and to facilitate growth of riparian vegetation. The site is in a prime location to improve connectivity between publicly-protected greenspaces (i.e., Cathedral Park and Willamette Cove) and provide additional habitat where there are very few remnants. Larger, well-connected habitats better support wildlife populations than smaller isolated habitats by providing more resources, supporting larger numbers of individuals, and facilitating genetic interchange. Mature trees and snags at the site could provide perching opportunities for bald eagle and osprey. The beach and shallow water habitats at this site could be used by spotted sandpiper and salmonids. Other birds, mammals, reptiles and amphibians are also likely to use the site.

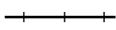
Feasibility: Sandblasting grit and PCBs may occur on the site, and are contaminant concerns that should be further evaluated and addressed as needed.

Other constraints/considerations: The Clean Water Act, Section 404 permit history could be researched to see if there is a wetland restoration opportunity at the site. Portland Parks and Recreation has expressed interest in potential bank work adjacent to the Greenway Trail, but the site has not been identified for its restoration potential in the City's draft River Plan (as of 11/09). The site is adjacent to the Portland Water Pollution Lab; there may be interest in expanding public use into this site if and when restoration or a land use change occurs.

Steel Hammer

Map prepared for Portland Harbor
Natural Resource Trustees



- | | | | |
|---|------------------------|---|-----------------------|
|  | Restoration site |  | Upland revegetation |
|  | Railroad Track |  | Riparian revegetation |
|  | Willamette River Miles |  | Bank benching |

This map represents conceptual fish and wildlife habitat restoration opportunities which have been screened against criteria developed by the Portland Harbor Natural Resource Trustees. Further analysis of this site will occur to determine the feasibility, cost, and habitat value of the restoration concepts on a finer scale. This map was prepared, in part, using geospatial databases provided by the City of Portland's Bureau of Environmental Services. (2/12/10)

SWAN ISLAND BEACH NORTH

Landowner: Port of Portland, Oregon Department of State Lands

Site description: The Swan Island Beach North site is located at river mile 9.5. Swan Island is a heavily developed and active industrial area. There are two segments of the site's shoreline classified as beach with adjacent shallow water habitat. These vegetated beaches appear to be in good condition and are known to accumulate large wood, an uncommon occurrence within Portland Harbor. These beach areas are interspersed among banks treated with vegetated rip rap. There is a strip of shrubs and trees separating the shoreline from the developed upland.

Proposed restoration: Restoration at this site would likely involve several components: removing rip rap from the river bank; replanting the river bank where possible with native vegetation; and regrading the stream bank and shoreline to create shallow in-water habitat.

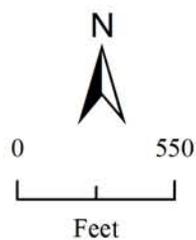
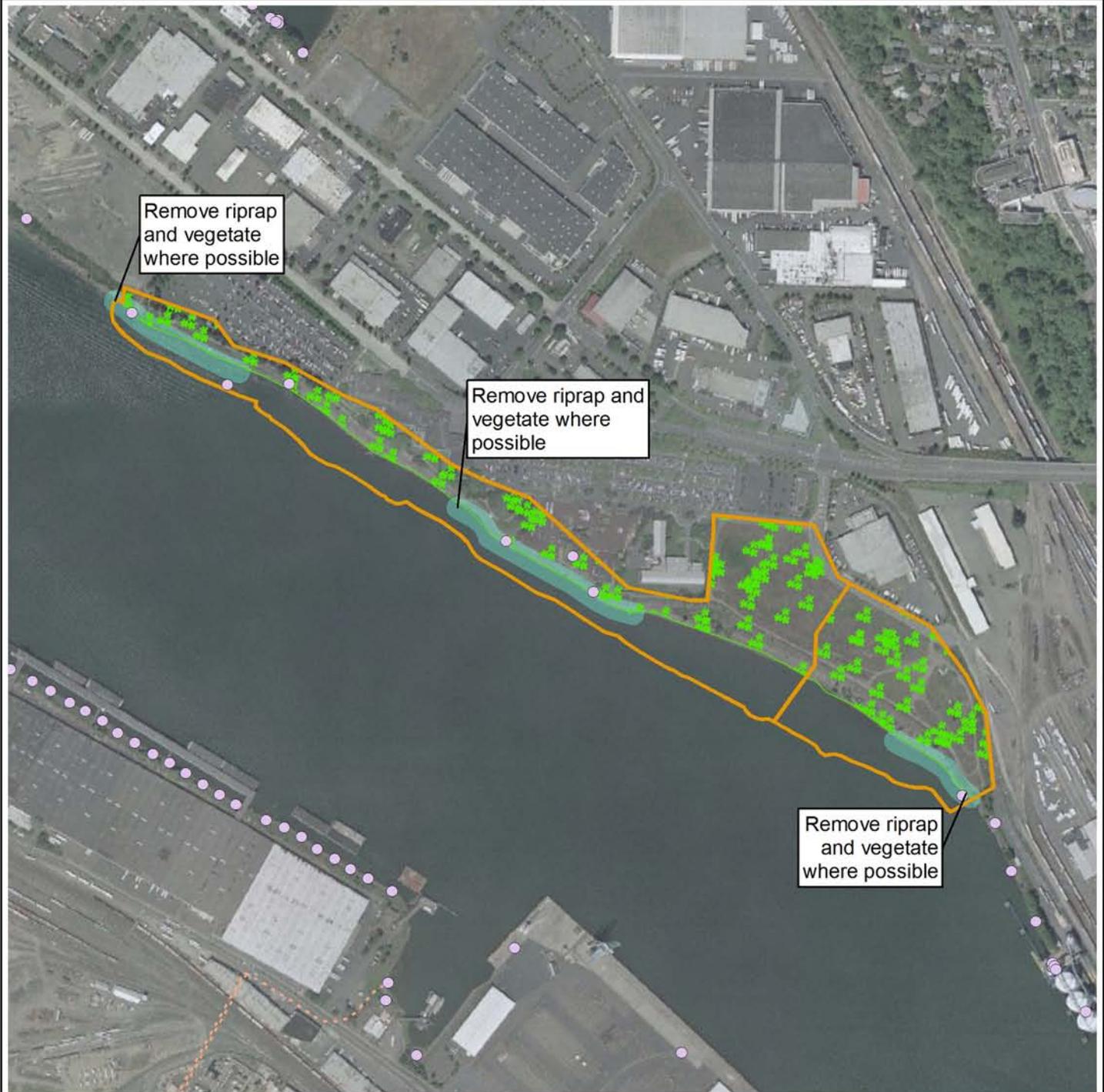
Benefits: Beach habitats sustain rich invertebrate populations; consequently they are important foraging areas for spotted sandpiper, mink, and a variety of other organisms. Naturally sloped, vegetated stream banks increase floodplain connectivity and habitat diversity. Replacing the rip rap with a sloped shoreline will allow for the additional accumulation of wood, adding further complexity to the system. Juvenile salmon, lamprey, and sturgeon prefer complex habitats that provide cover and feeding stations. Shallow areas serve as important hunting areas for bald eagles, osprey, spotted sandpiper, mink and other species. Native vegetation will provide food and cover for a variety of species and could include the addition of perch and nesting sites for bald eagle, osprey and other native birds.

Feasibility: There are no known permitting issues. The project itself would be largely self-sustaining and require little maintenance.

Other constraints/considerations: Restoration potential at this site is highly constrained by developed uplands.

Swan Island Beach

Map prepared for Portland Harbor
Natural Resource Trustees



-  Outfall
-  Piped Stream Segment
-  Restoration Site
-  Potential Bank Restoration
-  Potential Channel Restoration
-  Riparian Shrubs and Trees

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SWAN ISLAND BEACH SOUTH

Landowner: City of Portland, Oregon Department of State Lands

Site description: The Swan Island Beach South site is located at river mile 9.75 on the east side of the Willamette River. Swan Island is a heavily developed and active industrial area. Half of the shoreline is classified as beach with adjacent shallow water habitat. This vegetated beach appears to be in good condition and is known to accumulate large wood. The other half of the shoreline is treated with vegetated rip rap or unclassified fill. The riverbank slopes are extremely steep. There is a strip of shrubs and trees separating the riverbank from the developed upland.

Proposed restoration: Restoration at this site could involve removing rip rap from the river bank; replanting the river bank and floodplain with native vegetation; and excavating and regrading the shoreline to increase the amount of floodplain, flood storage, and shallow water habitat.

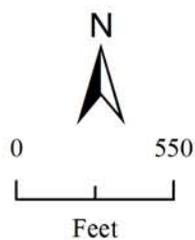
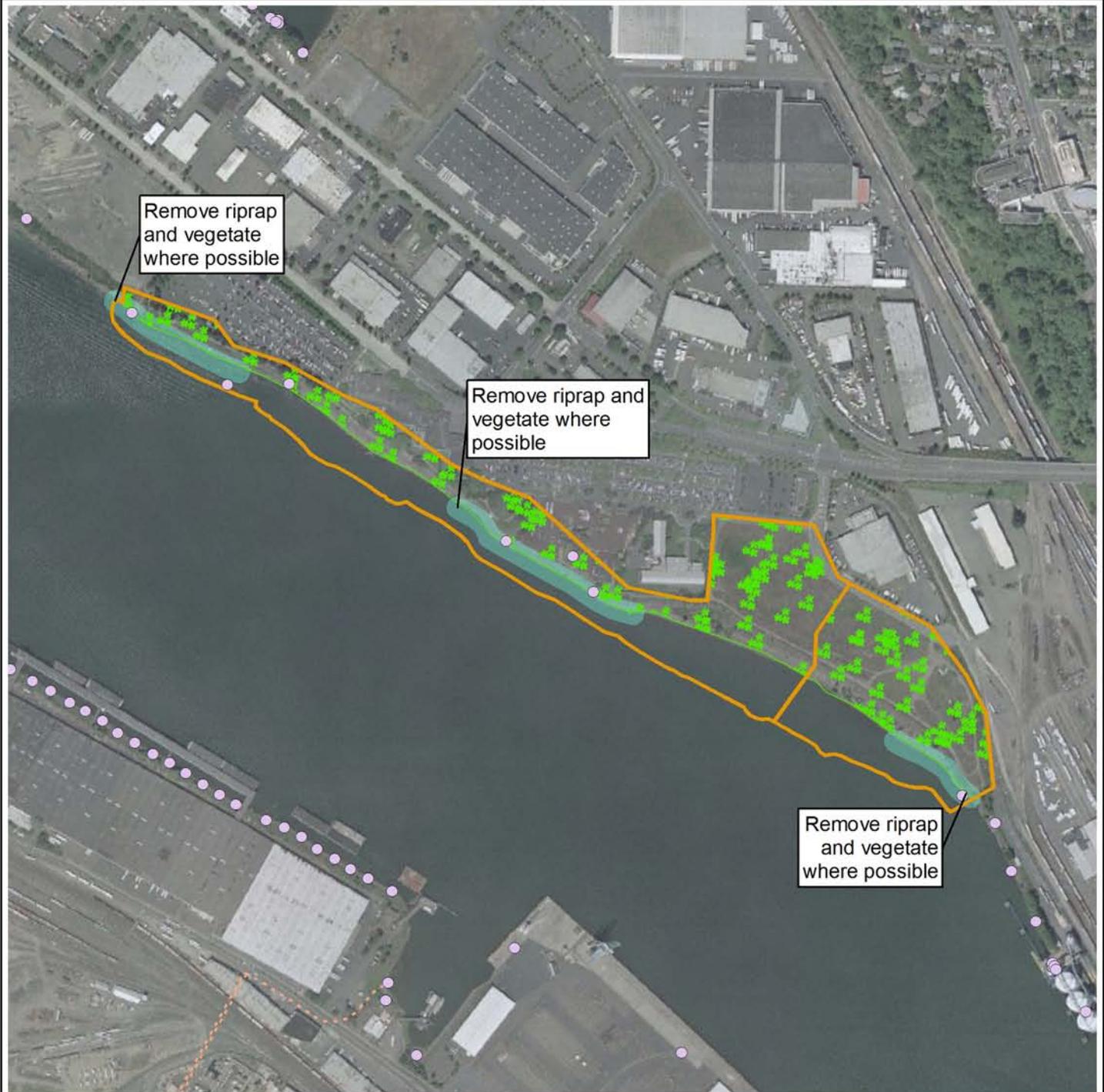
Benefits: Beach habitats sustain rich invertebrate populations; consequently they are important foraging areas for spotted sandpiper, mink, and a variety of other organisms. Naturally sloped, vegetated stream banks increase floodplain connectivity and habitat diversity. Replacing the rip rap with a sloped shoreline will allow for the accumulation of wood, adding further complexity and sediment retention to the system. Juvenile salmon, lamprey, and sturgeon prefer complex habitats that provide cover and feeding stations. Shallow areas serve as important hunting areas for bald eagles, osprey, spotted sandpiper, mink and other species. Native vegetation will provide food and cover for a variety of species and could include the addition of perch and nesting sites for bald eagle, osprey and other native birds.

Feasibility: The site is in public ownership. There are no known permitting issues. The project itself would be largely self-sustaining and require little maintenance.

Other constraints/considerations: The site currently accumulates wood. Altering the bank slopes would require moving the greenway trail.

Swan Island Beach

Map prepared for Portland Harbor
Natural Resource Trustees



-  Outfall
-  Piped Stream Segment
-  Restoration Site
-  Potential Bank Restoration
-  Potential Channel Restoration
-  Riparian Shrubs and Trees

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SWAN ISLAND LAGOON

Landowner: City of Portland, Port of Portland, Anchor Park LLC, ATC Leasing Co., Becker Land LLC, North Basin Watumull LLC, Oregon Department of State Lands

Site description: The Swan Island Lagoon site begins at river mile 9 and is a heavily developed, active industrial area. Riparian cover along the banks is fragmented by active river industrial uses (including boat ramps and docks), and some rip rap. Some areas of the bank support a well-established stand of black cottonwoods. A beach area at the end of the lagoon is associated with a wetland that potentially contains wapato vegetation. Invasive vegetation dominates much of the shoreline, particularly in a vacant parcel at the southeast end. There is shallow water habitat along the shores and at the end of the lagoon.

Proposed restoration: Restoration at the lagoon site would be focused on the vacant lot at the end of the lagoon and could include improving the bank by removing rip rap and invasive plants; protecting and enhancing native vegetation; improving shallow water habitat by adding large wood; excavating the floodplain to create a seasonal wetland; and treating stormwater runoff from the parking lots and boat ramp before it enters the lagoon. Protecting the existing stand of cottonwood trees along the side of the lagoon could also be a priority.

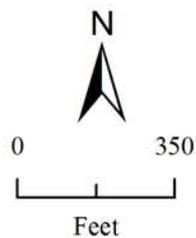
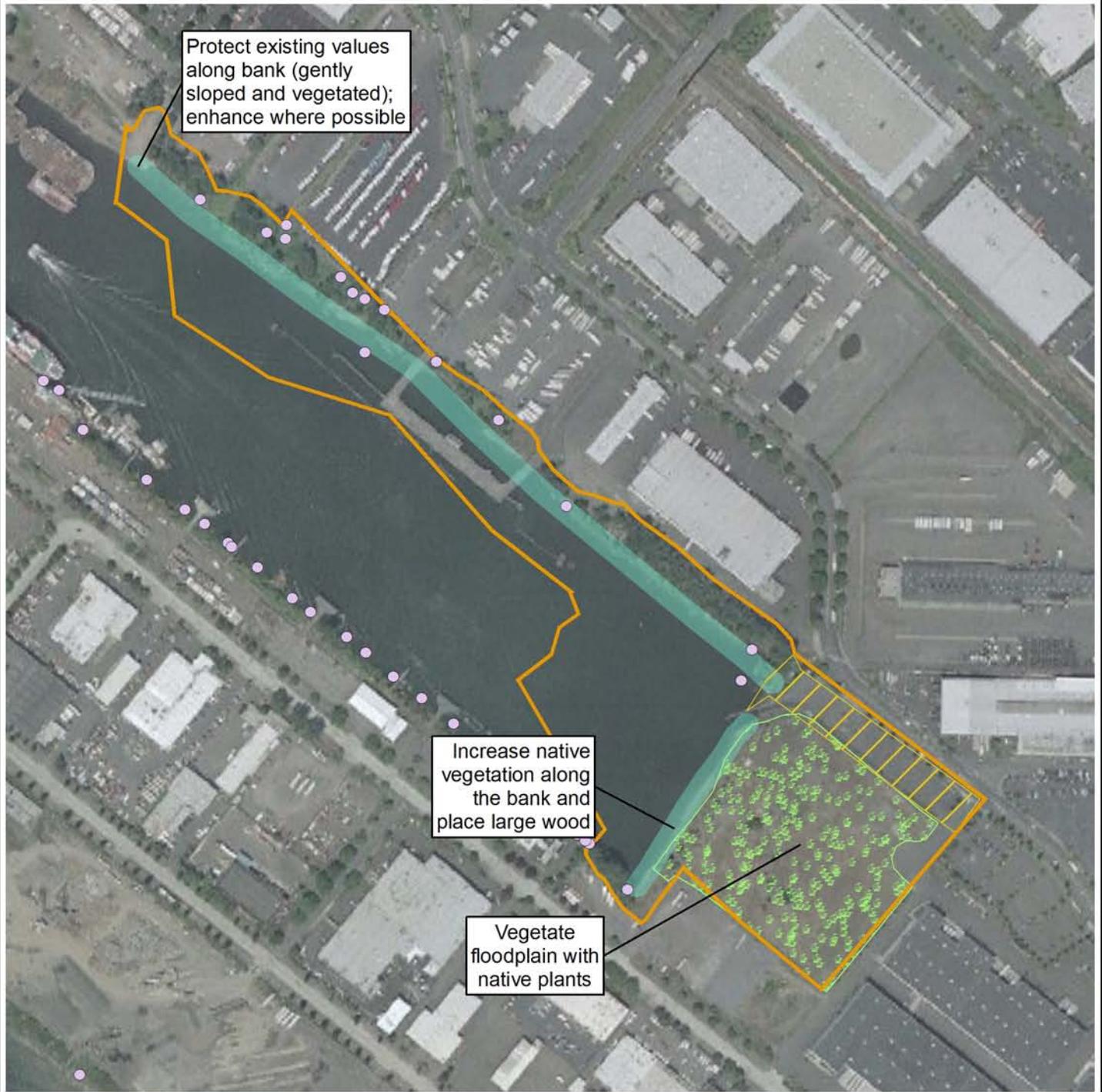
Benefits: Beach habitats sustain rich invertebrate populations; consequently they are important foraging areas for spotted sandpiper, mink, and a variety of other organisms. Naturally sloped, vegetated stream banks increase floodplain connectivity and habitat diversity. Juvenile salmon, lamprey, and sturgeon prefer complex habitats that provide cover and feeding stations. Off-channel, shallow, slow moving waters like lagoons gather wood and provide refuge and productive foraging areas for lamprey and juvenile salmon. The seasonal wetland would also provide shelter and a prey source for lamprey and salmon. Shallow areas can also serve as important hunting areas for bald eagles, osprey, spotted sandpiper, mink and other species. Native vegetation will provide food and cover for a variety of species. Treating the stormwater runoff will directly improve water quality in the lagoon.

Feasibility: Some contamination cleanup will be necessary before restoration begins. The property is owned by a variety of entities, both public and private. There are no known permitting issues. Restoration efforts would require minor maintenance for plantings and hydrology.

Other constraints/considerations: The Swan Island Lagoon is the largest off-channel area in the industrial reach. The existing beach habitat is a unique feature in the area. Boat launches create a challenge for maintaining habitat values. The opportunity to restore the floodplain portion of this site may be lost if the City sells its land.

Swan Island Lagoon

Map prepared for Portland Harbor
Natural Resource Trustees



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TERMINAL 5

Landowner: Port of Portland, Oregon Steel Mills Inc., Oregon Department of State Lands

Site description: The Terminal 5 site is located between river miles 2 and 3. The site is currently owned and used by the Port of Portland for industrial purposes. Most of the bank is comprised of beaches, along which the Port has planted some native trees and shrubs. Very limited shallow in-water habitat is present along the shoreline, but the channel and port are periodically dredged to maintain passage. Between the bank and the industrial uplands, remnant bottomland forest is present. A 6-acre forested wetland is located at the southern end of the site. The wetland is separated from the river by a berm and lies outside the flood area. A security fence running north-south through the forested property limits access to these habitats for some animals.

Proposed restoration: Preserving the existing habitat features would be a focus of efforts at this site. Restoration activities could include excavating in the south end of the site to expand the wetland; planting native vegetation; removing invasive plant species; and adding large wood to the site.

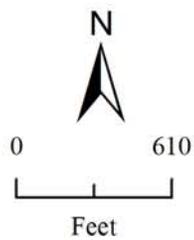
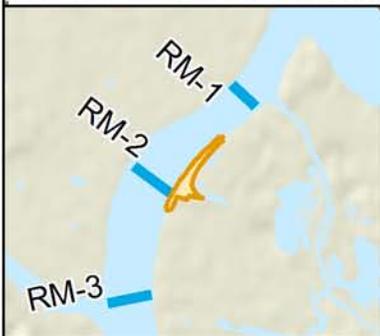
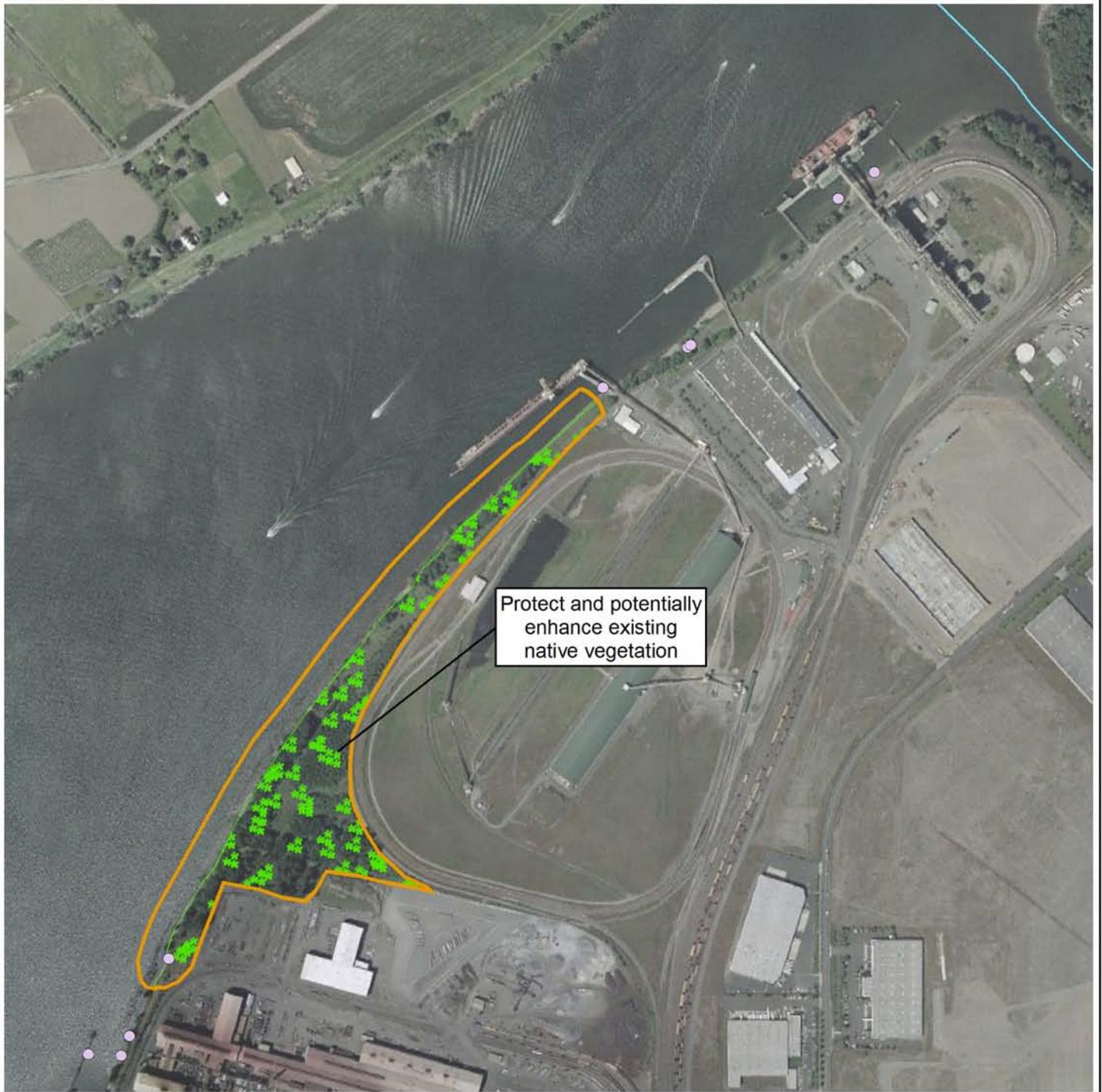
Benefits: Naturally sloped, vegetated stream banks increase floodplain connectivity and habitat diversity. Juvenile salmon, lamprey, and sturgeon prefer complex habitats that provide cover and feeding stations. Emergent and shrub wetlands provide shelter and a prey source for lamprey and salmon, as well as spotted sandpiper, mink and other wildlife species. Native vegetation and wood provide cover and feeding stations for various species while contributing to improved water quality.

Feasibility: There may be limitations on amount and type of vegetation that can be planted at the site because the site is an active terminal. There are no known permitting issues. The invasive plant removal portion of the restoration plan would require minor ongoing maintenance.

Other constraints/considerations: Forest, wetland, and beach habitats are rare in the Portland Harbor study site. Protecting these areas from further development and enhancing them with restoration will ensure they continue to provide valuable habitat. The Terminal 5 site contains a variety of valuable habitat features uncommon in industrial reaches of the Willamette River.

Terminal 5

Map prepared for Portland Harbor
Natural Resource Trustees



-  Outfall
-  Stream
-  Restoration Site
-  Riparian Shrubs and Trees

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WILLAMETTE COVE

Landowner: Metro, City of Portland, Oregon Department of State Lands

Site description: The Willamette Cove site extends from river mile 6 to 6.5. Existing footpaths criss-cross the southern half of the site, the compacted soil impedes growth of vegetation and contributes to erosion. The site is contaminated in several locations and would need to undergo cleanup prior to restoration. The shoreline is classified as beach, vegetated rip rap and unclassified fill bank. The beach varies in width from 5 to 40 feet, is littered with debris and rubble, and is steeply graded for much of the site. Invasive vegetation dominates the site, though stands of Pacific willow, Pacific madrone, and black cottonwood are present. The cove has significant shallow water habitat, but the function of this area is severely limited by the McCormick and Baxter remedial cap.

Proposed restoration: Restoration activities that could occur at the site include creating off-channel habitat; removing rip rap along the shoreline; pulling back the river banks and expanding shallow in-water habitat and floodplain; and revegetating the site where possible with native vegetation.

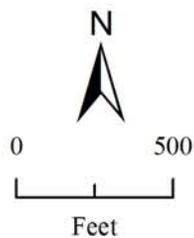
Benefits: Naturally sloped, vegetated stream banks increase floodplain connectivity and habitat diversity. Juvenile salmon, lamprey, and sturgeon prefer complex habitats that provide cover and feeding stations. Off-channel, shallow, slow moving waters gather wood and provide refuge and productive foraging areas for lamprey and juvenile salmon. Shallow areas can also serve as important hunting areas for bald eagles, osprey, spotted sandpiper, mink and other species. Natural beaches and shallow wetlands also serve as foraging areas for mink and staging areas for spotted sandpiper and other migratory birds. Native vegetation will provide food and cover for a variety of species while reducing erosion and enhancing water quality. Mature trees will provide perching and nesting habitat for bald eagle, osprey and other native birds.

Feasibility: Remedial actions need to be completed at the property before restoration can begin. There are planned recreational uses for the site that may conflict with maximizing the benefits of ecological restoration. There are no known permitting issues. The project would be largely self-sustaining.

Other constraints/considerations: This property is a rare backwater site; it offers a rare opportunity for creating off-channel habitat with few infrastructural constraints and has exceptional potential for wildlife enhancements. Any restoration options should consider preservation of the remedial cap. It is currently zoned for green space.

Willamette Cove

Map prepared for Portland Harbor
Natural Resource Trustees



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Restoration Sites in the Broader Focus Area

BOARDMAN CREEK

Landowner: Private property owners, Beaverbrook Homeowners Association, Oak Lodge Sanitary District, Oregon Department of State Lands

Site Description: Boardman Creek meets the Willamette River near River Mile 23 on the east side of the river. The 13,000 foot creek runs through a highly urbanized part of Clackamas County, including the towns of Jennings Lodge and Gladstone, Oregon. There are currently three deteriorating culverts at the downstream end of Boardman Creek, about 1000 feet from its confluence with the Willamette River. Two of the culverts are located at the same crossing under River Road and the third culvert is buried beneath Walta Vista Court. Salmon and steelhead have been documented just downstream of the undersized culverts, which form a complete fish passage barrier. The riparian areas between the culverts and down to the confluence area are degraded, further limiting the water quality and habitat within the stream.

Proposed Restoration: Restoration at the site would include removing the culverts and replacing them with two single-span bridges. Restoration would also include enhancing the 300 feet of riparian habitat between the culverts and looking for opportunities to enhance riparian habitat and instream habitat complexity downstream to and including the confluence with the Willamette River. Replacing the Boardman Creek culverts will open 6000 feet of stream to fish and wildlife passage from the Willamette River up to McLoughlin Boulevard.

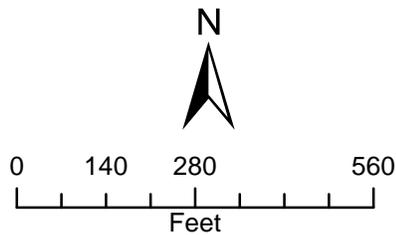
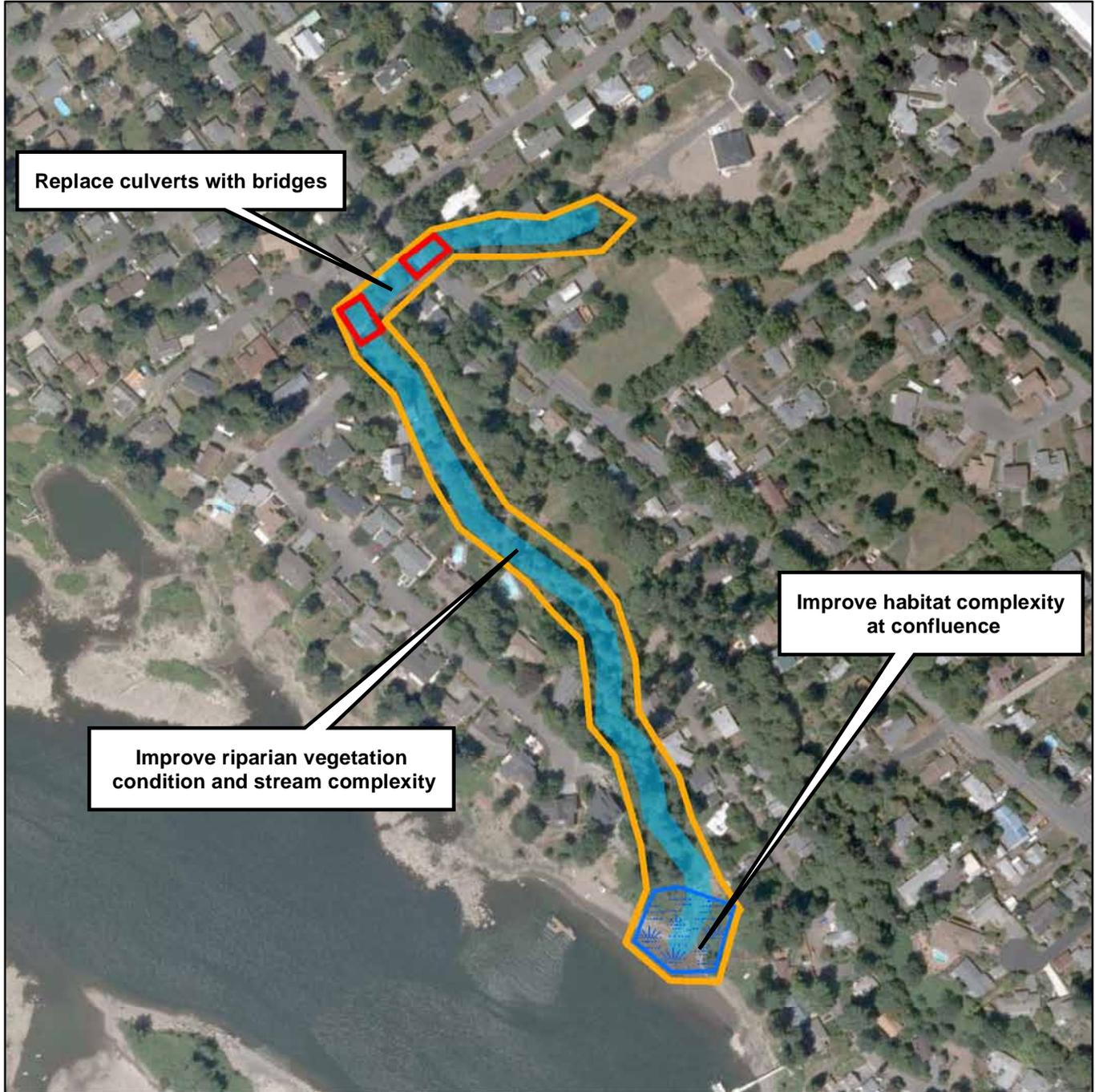
Benefits: This project would allow access for threatened and endangered salmonids as well as lamprey, and improve connectivity for mink and other wildlife species to over a mile of tributary habitat. This project will also improve instream habitat quality and complexity, improve access to off-channel habitat as refuge from the Willamette River during high flows, improve floodplain connectivity, and improve riparian habitat by restoring native vegetation. The riparian buffer will also improve water quality at the site.

Feasibility: The site includes a mix of public and private ownerships, so coordination among the various landowners will be necessary. The Oak Lodge Sanitary District has already completed an alternatives analysis and preliminary engineering work for the project and has chosen replacing the three culverts with two single span bridges as the most appropriate solution for fish and wildlife, flooding, and infrastructure concerns at the site.

Other Constraints/Considerations: The Oak Lodge Sanitary District was recently awarded a Nature in Neighborhoods Grant from Metro to finance part of the project

Boardman Creek

Map Prepared for Portland Harbor
Natural Resource Trustees



-  Culvert area
-  Restoration Site
-  Channel Restoration
-  Confluence Enhancement

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CEDAR ISLAND AND MAINLAND

Landowner: City of West Linn, Oregon Department of State Lands

Site Description: Cedar Oak Park, which contains a public boat ramp maintained by the City of West Linn, is located on the west side of the Willamette River at River Mile 23. The park contains a 4-acre riparian forest with a relatively intact overstory. The park also contains approximately 1,600 linear feet of gently sloping beach along the west shore of the Willamette. Cedar Island is located in the Willamette River adjacent to the park. The island was extensively mined in the past for sand and gravel, and is currently a 14-acre horseshoe-shaped island around a 20-acre central lagoon open at the downriver end. Most of the lagoon is 20 feet deep, though there is a central high spot that is only 15 feet deep, and a small hole that is 35 feet deep.

The City of West Linn purchased the island in the early 1990's, restored native habitat, and installed underwater structures in the lagoon for warm-water fish (i.e., bass, crappie, bluegill) habitat. The eastern arm of the island was developed for passive recreation, with trails and fishing platforms overhanging the lagoon. A seasonal footbridge connects the upper end of the island to the adjoining mainland at Mary S. Young State Park. The western arm was restored for native habitat only, with the intent of limiting recreational access near residential development. Since the mid-1990's, invasive vegetation has reclaimed much of the island.

Proposed Restoration: Riparian habitat could be restored on Cedar Island and on the mainland at Cedar Oak Park, including invasive species removal and native plantings. Removal of the existing in-water structures would reduce habitat for invasive warm water fish. Habitat complexity could be enhanced on the beaches along the main and side channels.

Benefits: Adding complexity to the beaches in the Cedar Island lagoon would provide refugia and habitat for migrating salmonids (particularly juveniles) and other native fish species. Removing the existing in-water structures from the lagoon would reduce habitat for invasive warm-water piscivores.

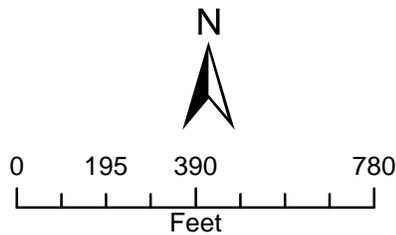
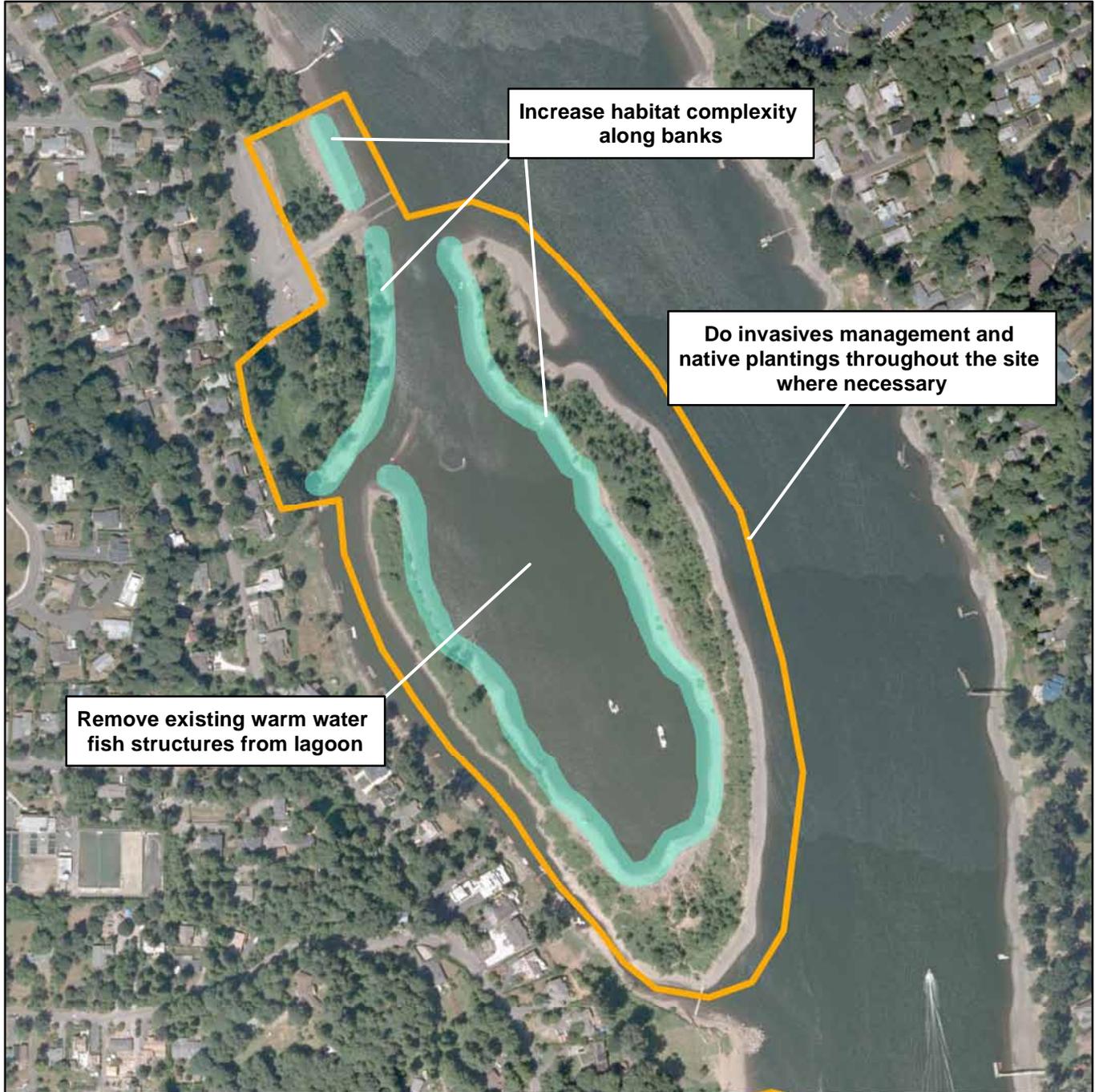
Restoring the native riparian plant community on the island would provide valuable feeding and breeding habitat for native terrestrial wildlife species as well as migratory birds and promote connectivity to other habitats near the confluence of the Willamette and Clackamas Rivers. In addition, a healthy native riparian vegetation community stabilizes stream banks, reduces and/or captures sediment flows, cycles nutrients and provides a source of large wood for adjacent and downstream areas.

Feasibility: The island and park are publicly owned and managed by the City of West Linn Parks & Recreation Department. A 1992 site assessment concluded that there was "no indication" of significant soil and/or groundwater contamination.

Other constraints/considerations: Annual high water events present engineering challenges and liability concerns for habitat elements like large woody debris.

Cedar Island and Mainland

Map Prepared for Portland Harbor
Natural Resource Trustees



-  **Restoration Site**
-  **Potential Bank Restoration**

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COTTONWOOD BAY SHORELINE

Landowners: City of Portland, Avalon Hotel Owners, LLC, Cameron Oregon Properties, Shorenstein Properties, LLC, Lex Associates, Inc., Old Town Investors, LLC, State of Oregon, T&E Investments, Association of Unit Owners of Bowen Property Management Company, Oregon Department of State Lands

Site description: Cottonwood Bay is located at river mile 16.2 along the west bank of the Willamette River. Most of the 4.5-acre area is privately owned. However, a small portion is owned and managed as a natural area by the City of Portland Bureau of Parks & Recreation. The project site is a group of coves and inlets with riparian cottonwood and willow stands found along an otherwise unvegetated and developed shoreline. The site is located across the river from Ross Island and has been found to have significant fish use by the City of Portland's Willamette Fish Study.

Proposed restoration: Restoration at this site could include creation of a low floodplain bench by removing fill, a concrete ramp, and riprap. Restoration could also include regrading or reconfiguring the bank where possible. The quality of the vegetation in floodplain and riparian areas could be improved by removing invasive species and planting natives, particularly in the understory. Large wood placement along the shore and in shallow water would increase complexity and help create resting areas for juvenile salmon. Treating stormwater runoff from upland parking lots would help prevent contamination of restored habitat by reducing pollutant loading.

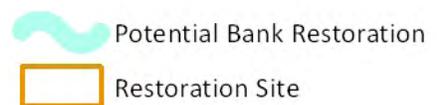
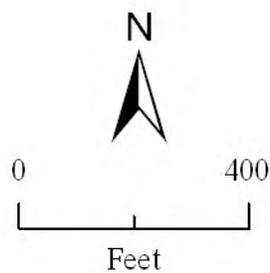
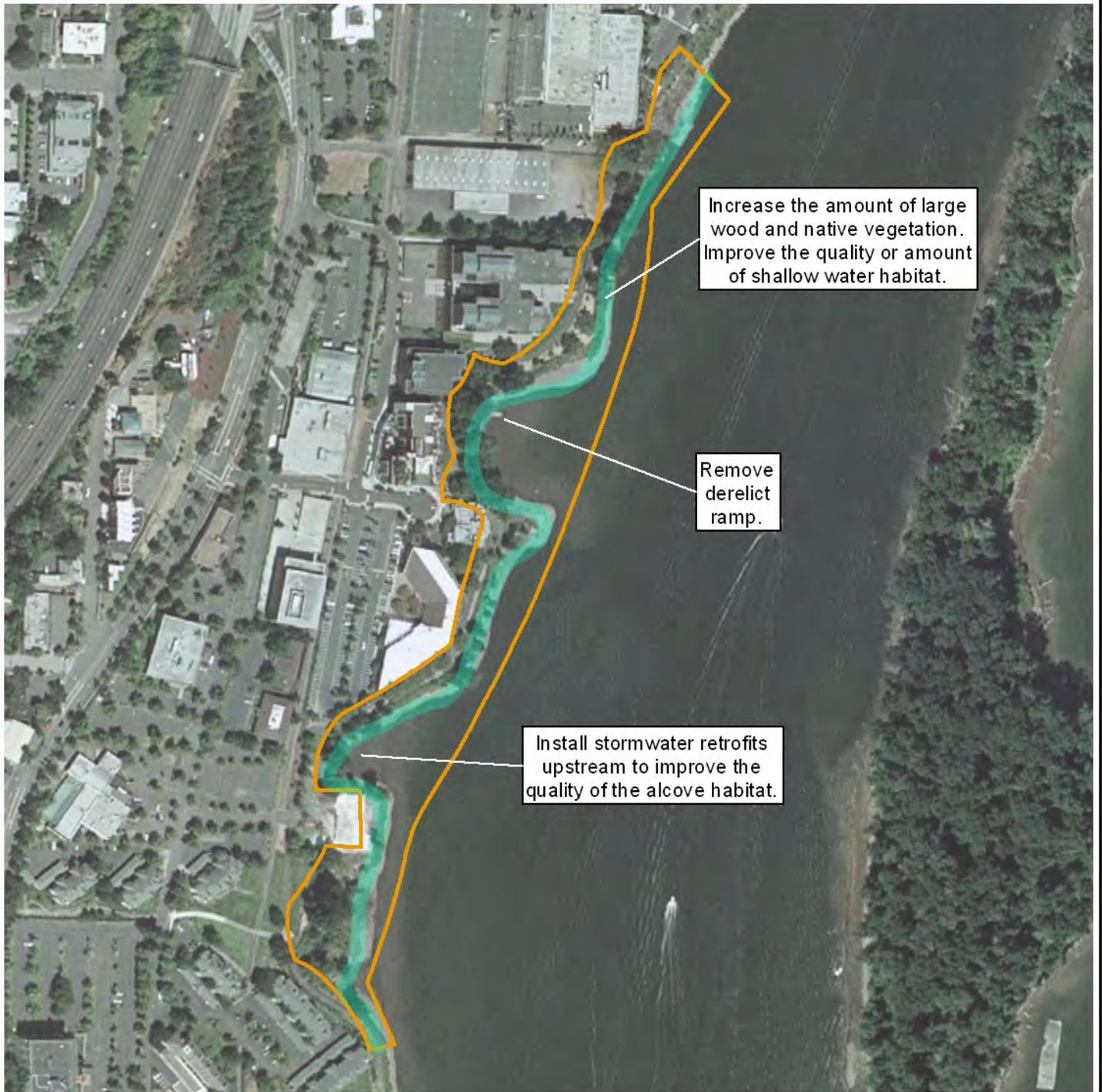
Benefits: Improvements in nearshore aquatic habitat, banks and floodplain would improve rearing and refuge habitat for fish species listed as threatened or endangered under the Endangered Species Act, including juvenile Chinook salmon, and enhance important foraging habitat and movement corridors for native wildlife such as mink. Improving riparian vegetation would help stabilize stream banks, capture sediment in stormwater runoff, support natural hydrologic processes and nutrient cycling, provide perching trees for birds such as eagle and osprey, and provide a source of woody materials to the river. This site presents an opportunity to enhance habitat in conjunction with other nearby habitats including Willamette Park, Ross Island, and Oaks Bottom Wildlife Refuge.

Feasibility: The site is owned by multiple private and public entities. The project would require permission and cooperation of multiple landowners. Concerns raised by nearby residents include tree maintenance, potential for hazard of falling trees/limbs, and view restrictions. These concerns could have major impacts on the potential function of the site for perching and nesting habitat for eagles and osprey.

Other constraints/considerations: Restoration actions could support and complement proposed restoration at South Waterfront. Upland development limits the degree of floodplain reactivation that may be possible at the site.

Cottonwood Bay

Map prepared for Portland Harbor
Natural Resource Trustees



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ELK ROCK ISLAND/SPRING PARK

Landowner: City of Milwaukie (Spring Park); City of Portland, GRS Properties, DLS Properties and other private owners (Elk Rock Island), Oregon Department of State Lands

Site description: Spring Park is a 6-acre site located on the east bank of the Willamette River at approximately river mile 19. Spring Park is largely undeveloped and is currently maintained by the North Clackamas Parks and Recreation District (NCPRD) as a natural area. A large unmapped wetland is located in its center, and the remainder of the site is composed of riparian forest and grasslands. Portions of the site are composed of geologically significant bedrock. A large population of invasive species, including blackberry, knotweed, clematis, English hawthorn, reed canary grass, common tansy, English ivy and Norway maple, currently inhabit the site.

Elk Rock Island is a 15-acre island park located in the main channel of the Willamette River at river mile 18.9. The island is accessible by foot at low water from Spring Park and by boat at all river levels. The island contains exposed rock, emergent wetlands, and riparian and upland forest which provide diverse habitats for a wide range of bird, mammal, reptile, amphibian and invertebrate species. Plants rare to the Portland metro area that may occur on the island include Pacific yew, Tiger lily, Cluster lily and Rattlesnake plantain. Oregon white oak woodlands and savanna habitats are also present on the island. Dominant tree species are black cottonwood, bigleaf maple, Douglas fir, and Oregon white oak.

Proposed restoration: Restoration at this site could include placement of large wood on the banks and shallow water areas. Acquisition of properties or easements along the off-channel alcove would allow for enhancement of this habitat. Rock outcrop and riparian vegetation could also be protected and improved. Removal of invasive species and planting native vegetation, which would improve remnant oak habitat, is also a possibility. The Spring Park path system which currently traverses the wetland habitat in the park could be relocated out of the wetland or elevated to protect and improve wetland function and natural hydrologic flow.

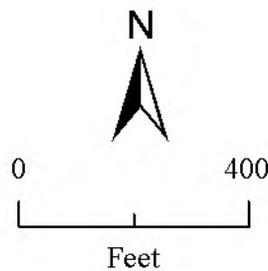
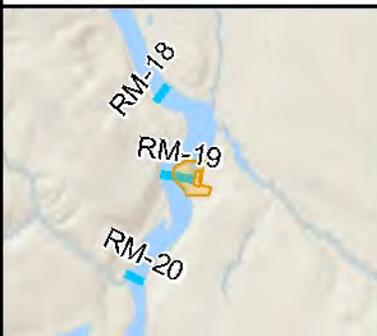
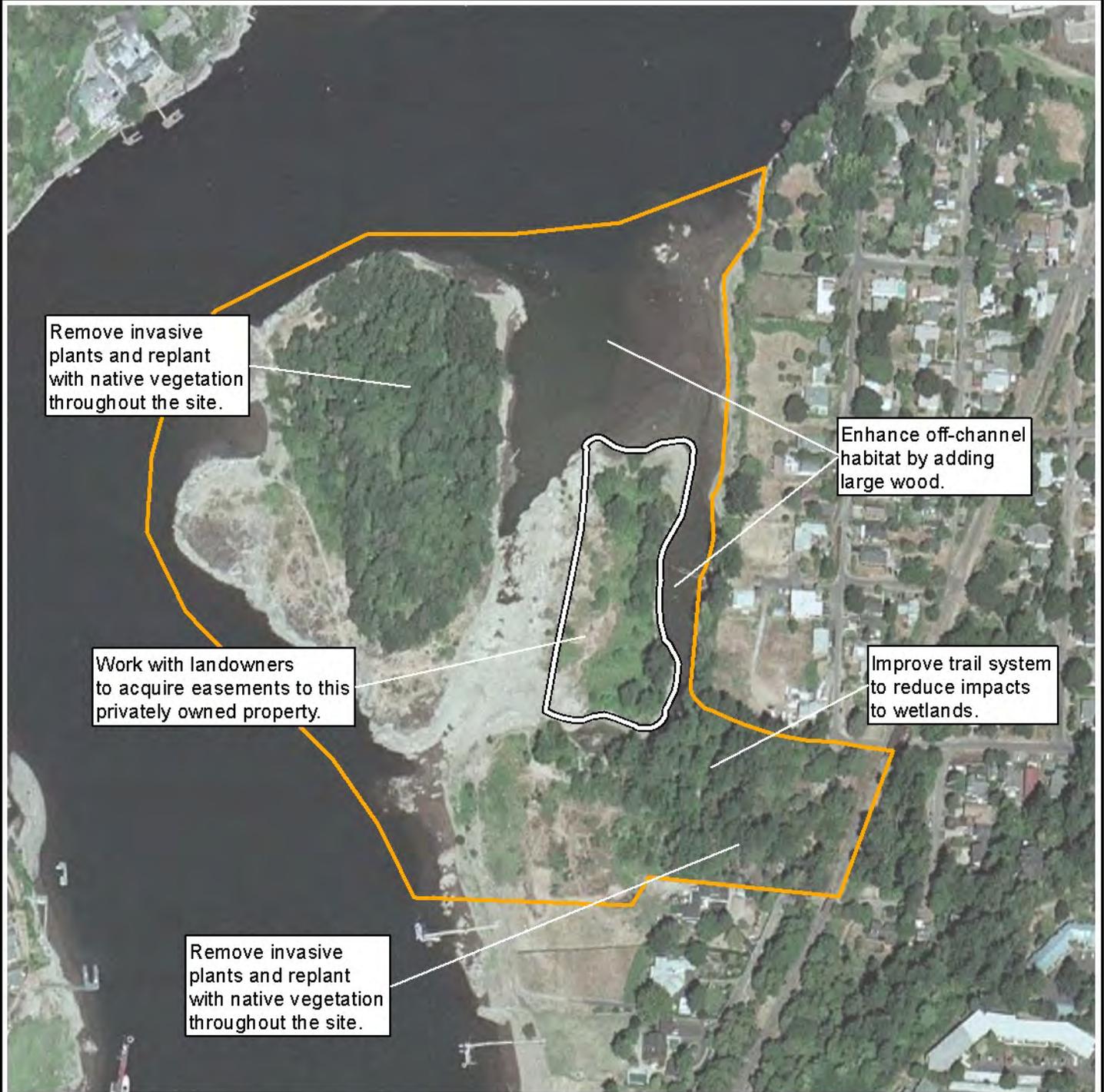
Benefits: This project will improve water quality through increased canopy cover and decreasing sedimentation caused by overuse. Establishing a healthy tree canopy will decrease water and soil temperatures, provide perching and possible nesting areas for birds such as osprey and bald eagles, and increase large woody debris recruitment over time. Re-routing or improving the user-created path at Spring Park out of the large wetland area in the middle of the site will improve habitat for wetland plant and wildlife species. Placement of large woody debris will increase habitat structure on the beach and in shallow water areas. Invasive species removal and native revegetation and protection will increase the habitat value of upland forest areas.

Feasibility: Private ownership of portions of Elk Rock Island would require permission and coordination from multiple landowners. Restoration work at Spring Park would require the project to be approved through a land use planning process at the City of Milwaukie.

Other constraints/considerations: A high level of human disturbance would limit the ecological benefits of the project to fish and wildlife.

Elk Rock Island/Spring Park

Map prepared for Portland Harbor
Natural Resource Trustees



This map represents conceptual fish and wildlife habitat restoration opportunities which have been screened against criteria developed by the Portland Harbor Natural Resource Trustees. Further analysis of this site will occur to determine the feasibility, cost, and habitat value of the restoration concepts on a finer scale.

HOLGATE SLOUGH

Landowners: Metro, City of Portland, Ross Island Sand and Gravel, Portland Transit Company, Oregon Department of Transportation, Union Pacific Railroad Co., Oregon Department of State Lands, private property owners

Site description: Holgate Slough is located at river mile 14.2 along the east bank of the Willamette River, on the east side of Ross Island. As the only true side-channel in the area, Holgate Slough is an important component of the Oaks Bottom-Ross Island complex, one of the most diverse habitat complexes within the lower river with an extensive amount of shallow water and off-channel habitat. The site varies in width, and is constrained in some areas. In the more constrained areas, banks are unstable. In other areas, overhanging banks and vegetation are stable. Debris litters parts of the site. Mature riparian trees and a mix of native and non-native understory plants are the dominant vegetation type in the project area.

Proposed restoration: Proposed restoration at this site includes improving bank composition where banks have been eroded and steepened, to provide better habitat for fish species and to improve water quality. Protecting banks from boat wakes will maintain restored habitat in the long term. In addition, bank work would increase the connectivity of the floodplain within the riparian area. Removal of invasive species and increasing vegetation overall in the floodplain could also be accomplished. Large wood placement along the floodplain and riparian areas would add in-stream complexity. Litter and debris along the bank would be removed.

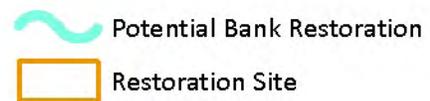
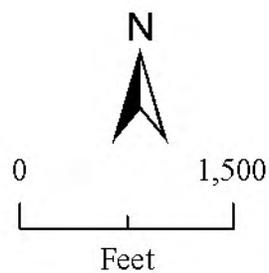
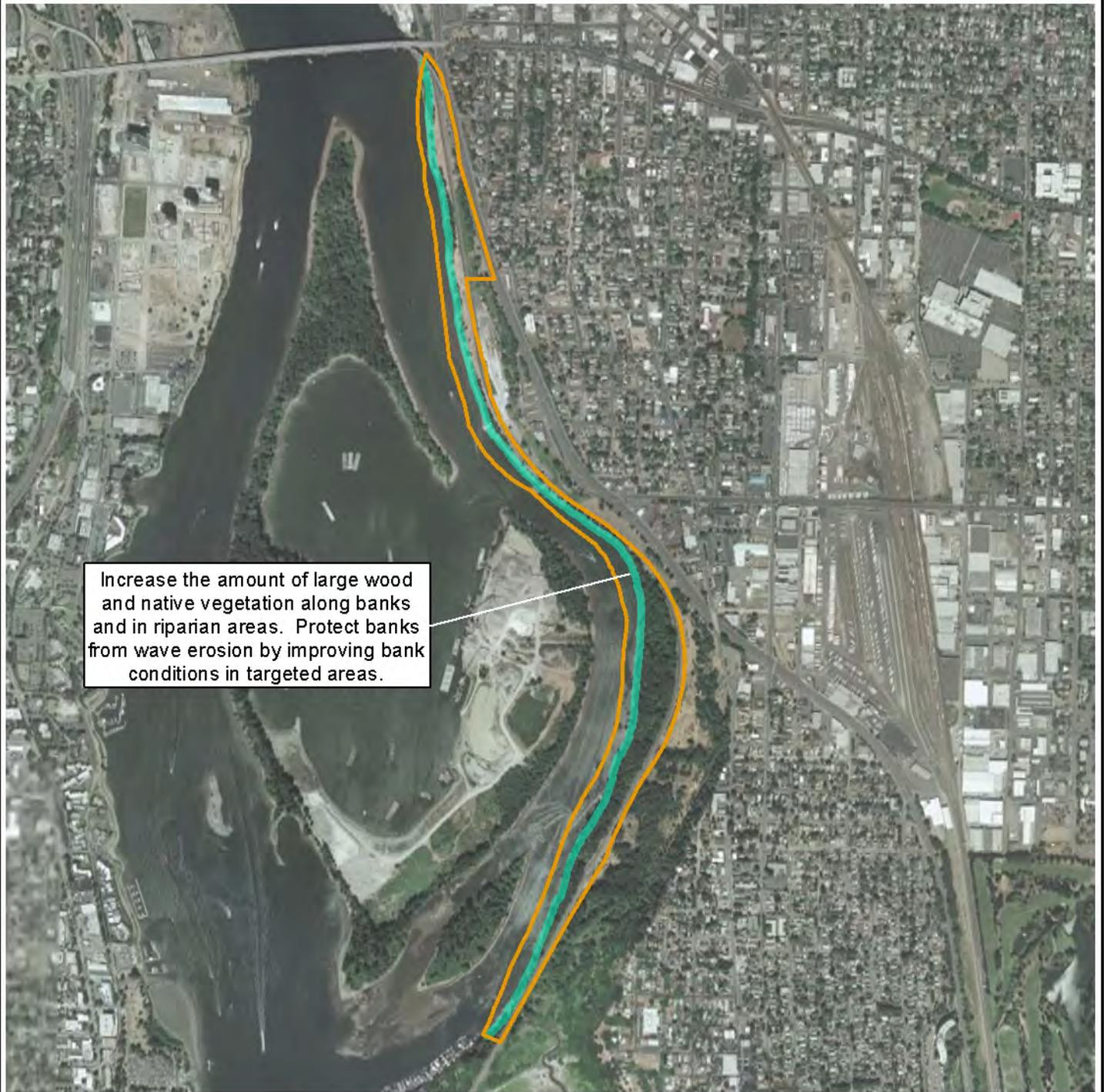
Benefits: Improvements in nearshore aquatic habitat, riparian areas and floodplain connectivity would improve rearing and refuge habitat for fish, and enhance important feeding, breeding, and nesting habitat for native wildlife. Improving riparian vegetation and placing large wood in the floodplain and riparian areas would help stabilize stream banks, capture sediment in stormwater runoff, support natural hydrologic flow processes and nutrient cycling, and provide a source of woody materials to the river. Links between Holgate Slough, Oaks Bottom and Ross Island would have cumulative benefit for various species, particularly where shorelines are preserved in a natural or semi-natural condition with overhanging vegetation, undeveloped banks, and large wood.

Feasibility: Much of the land is publicly owned, but the site is constrained by steepened banks. Infrastructure includes the Springwater Trail and the Ross Island access way. Highway 99 is in close proximity. Recreational use, including illegal camping, may limit the ecological benefits that could be provided through restoration at the site.

Other constraints/considerations: Restoration at this site could be coordinated with restoration efforts at nearby Oaks Bottom and Ross Island lagoon.

Holgate Slough

Map prepared for Portland Harbor
Natural Resource Trustees



This map represents conceptual fish and wildlife habitat restoration opportunities which have been screened against criteria developed by the Portland Harbor Natural Resource Trustees. Further analysis of this site will occur to determine the feasibility, cost, and habitat value of the restoration concepts on a finer scale.

KELLEY POINT PARK

Landowner: City of Portland, Oregon Department of State Lands

Site description: Kelley Point Park is located on the east bank of the Willamette River at its confluence with the Columbia River and at the mouth of the Columbia Slough. This is a Portland city park managed as a natural area by Portland Parks and Recreation. The banks at the site are in a more natural state than many other sites along the lower Willamette River with extensive beaches along the length of the shoreline. The majority of the park is forested with significant native vegetation, although some invasive species are interspersed with the native flora.

Proposed restoration: Restoration at this site could include removing fill to increase connections to the floodplain and excavation to recreate shallow water and off-channel backwater habitat for salmonids and other native species. Large wood placement along the shore would enhance fish benefits. Increasing native plant vegetation and invasive species removal will help restore riparian habitat and link it to upland habitat in the park. This site has excellent connectivity to a number of nearby habitats, and contains one of the few large remnants of historic bottomland hardwood forest communities along the Portland riverfront.

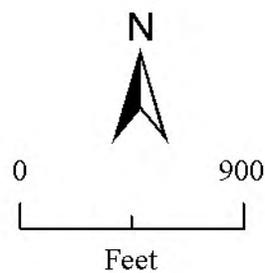
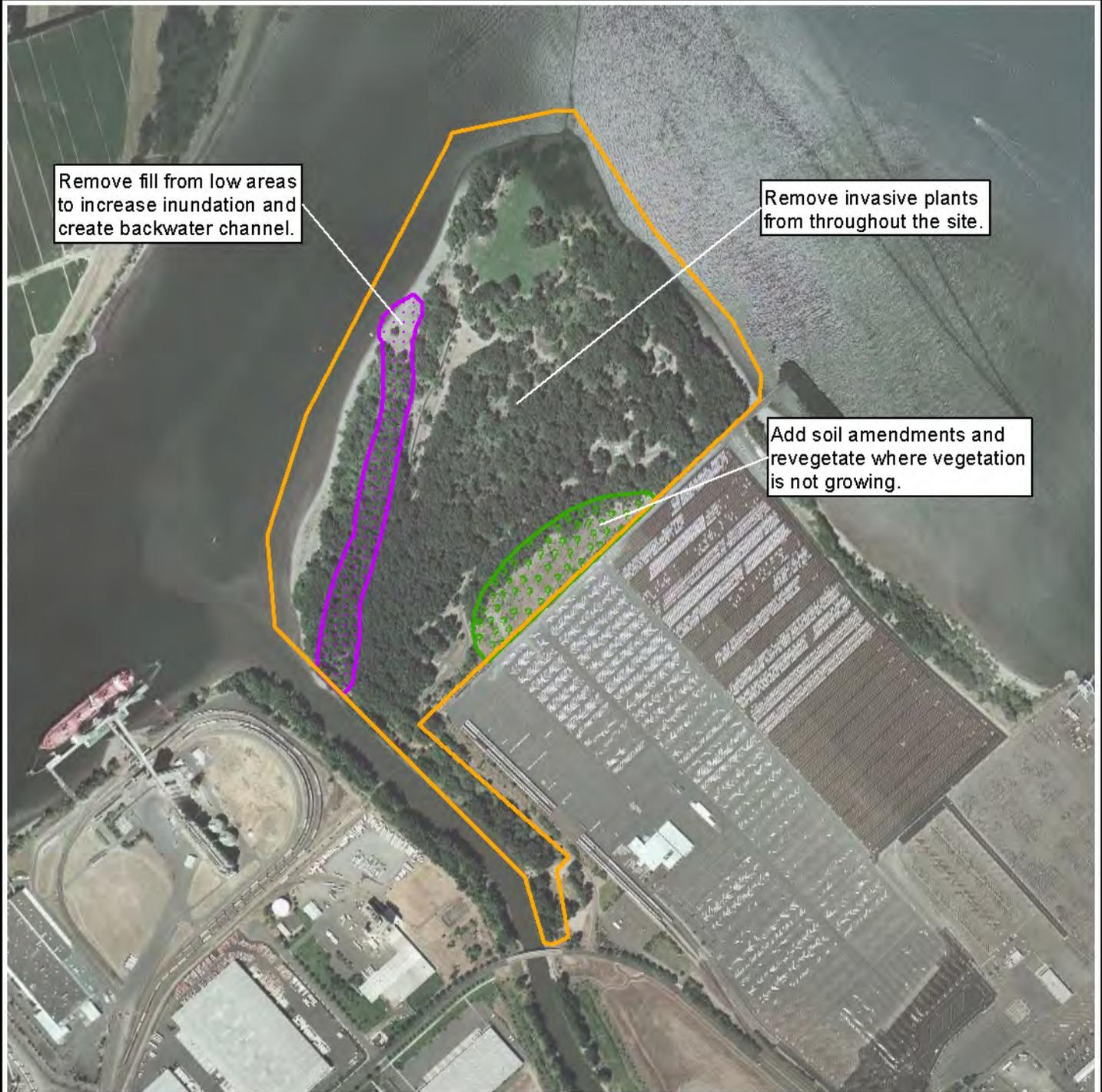
Benefits: Improvements in nearshore aquatic habitat, banks and floodplain would improve an already valuable rearing and refuge habitat for native fish species and breeding and nesting habitat for native wildlife species at the confluence of two major rivers. A number of salmonid species from both the Willamette and Columbia rivers likely utilize habitat at this site during various life stages. Recent restoration near the mouth of the Columbia Slough at the south end of the site may provide additional benefits for fish and terrestrial species. Improving riparian vegetation would help stabilize stream banks, capture sediment in stormwater runoff, support natural hydrologic flow processes and nutrient cycling, and provide a source of woody materials to the river. Terrestrial species likely utilize this habitat patch to travel to other suitable habitat, making it part of an important wildlife movement corridor as well as a distinct habitat patch.

Feasibility: There is no known contamination at the site and the project could be implemented immediately. There is some human disturbance associated with recreation at this city park. Recreation needs may also create some minor permitting obstacles. The site is in public ownership with a willing landowner.

Other constraints/considerations: This site is a high value site because of its location at the confluence of the Willamette and Columbia rivers, which also makes it a unique site. The site also has excellent connectivity with other restoration sites, but may present some design challenges due to multiple user groups (e.g. boating, park users).

Kelley Point Park

Map prepared for Portland Harbor
Natural Resource Trustees



- Restoration Site
- Backwater Channel Creation
- Revegetation

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KELLOGG DAM REMOVAL

Landowner: City of Milwaukie, Oregon Department of Transportation, Oregon Department of State Lands, private property owners

Site description: This site is located on the east side of the Willamette River at river mile 18, upstream of the Portland Harbor Study Area and immediately south of downtown Milwaukie. Kellogg Dam was originally constructed to power a grist mill in 1858 and has been reinforced several times since then. The dam is a significant barrier to fish passage on Kellogg Creek. Behind the dam sits Kellogg Lake, a 14-acre warm water reservoir with average depths ranging from 1 to 3 feet.

Proposed restoration: Restoration at this site would include the removal of a dam on Kellogg Creek, a major tributary of the Willamette River, and draining Kellogg Lake. This project would restore tributary, wetland and native riparian habitat, including creation of an approximately .75-mile meandering stream channel within the former lake bed, control of exotic, invasive plant communities, planting of native vegetation, and placement of large woody debris structures.

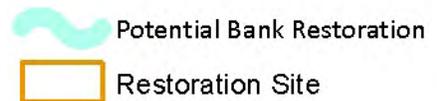
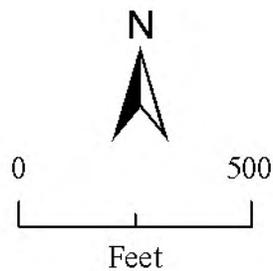
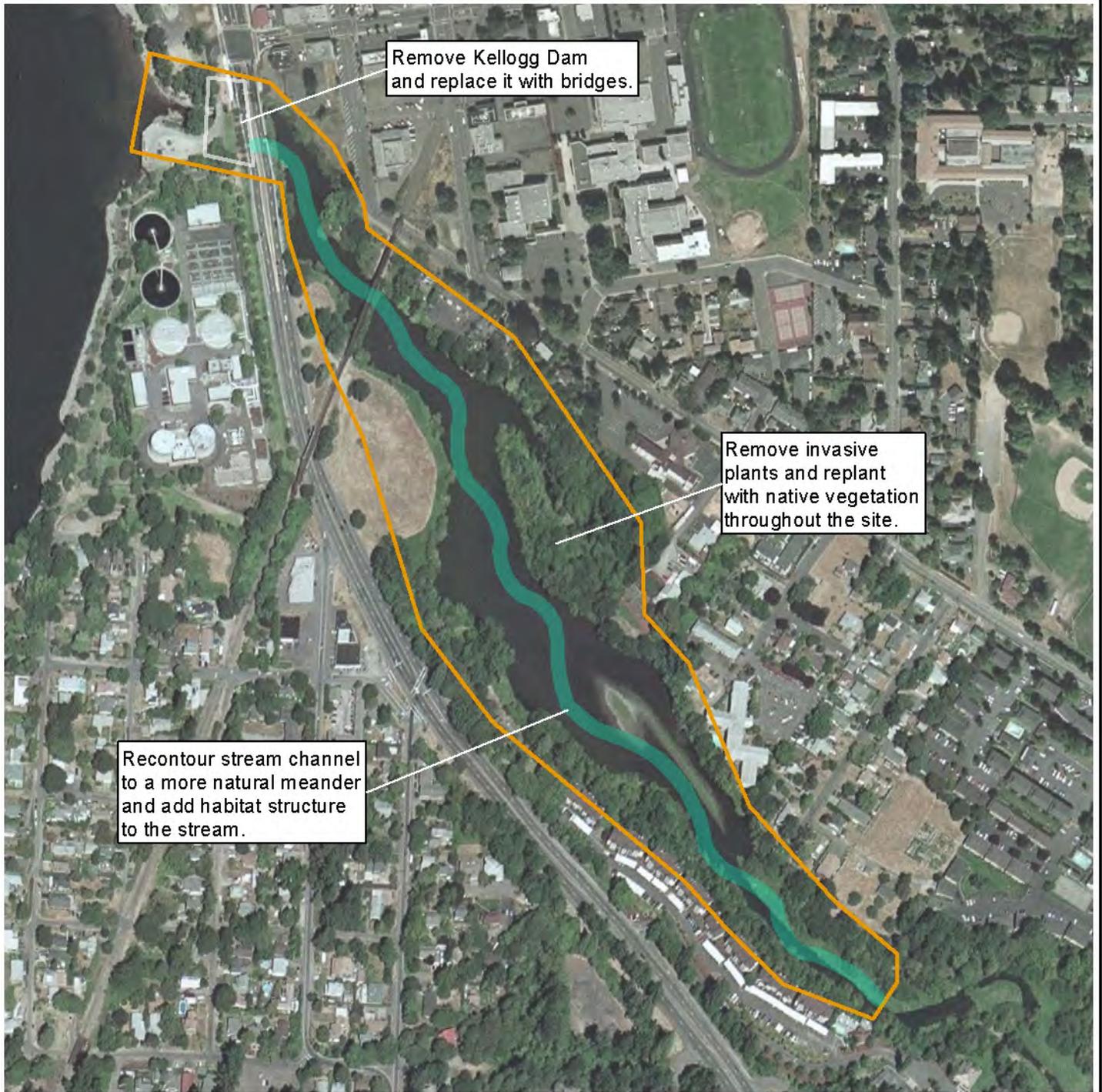
Benefits: Dam removal would open up fish access to the lower 5-mile extent of Kellogg Creek and provide partial passage to the upper reaches of the Kellogg-Mt. Scott watershed (a total of 9 miles of passage), increasing the availability of shallow water and off-channel habitat. Drainage of Kellogg Lake would eliminate a known detriment to salmonid populations by reducing water temperatures and predation concerns. Management of contaminated sediments in the lake could decrease risks to fish and wildlife and improve overall water quality. Habitat enhancements within the lake bed would provide cold-water rearing and refuge areas for juvenile coho and spring Chinook and would create new floodplain capacity. The cold water springs surrounding the site may also contribute unique habitat for terrestrial and aquatic species. Removal of invasive plant species and revegetation with native species would provide diverse habitats for native macro-invertebrate, amphibian and wildlife communities. The site is adjacent to Milwaukie's developing, transit-oriented South Downtown and could provide public education and recreation benefits in addition to habitat benefits.

Feasibility: The site is in public ownership and the landowner is supportive of the restoration work. In 2002, the U.S. Army Corps of Engineers (Corps) detected contaminants in lakebed sediments above the guidelines adopted for use in the Dredge Material Evaluation Framework and DEQ's Level II screening values at multiple sample points. Sediment management would be necessary as part of the restoration effort. Highway 99E sits atop the dam and transportation upgrades may be necessary if the dam is removed. In addition, a sanitary sewer line, which sits on the lakebed one-half mile above the dam, would need to be relocated. TriMet's Light Rail Transit crossing will be built over the lake just upstream of Hwy 99E, adjacent to an active Union Pacific Rail Road trestle, adding infrastructure considerations to the project.

Other constraints/considerations: The Corps has re-initiated a feasibility study, which will likely be completed in 2011. Project design could commence in 2011 with the possibility for in-water construction in 2013. A number of private landowners currently border the lakebed; the City of Milwaukie is actively working with these landowners to address potential concerns about the project and continue to build community support.

Kellogg Dam Removal

Map prepared for Portland Harbor
Natural Resource Trustees



This map represents conceptual fish and wildlife habitat restoration opportunities which have been screened against criteria developed by the Portland Harbor Natural Resource Trustees. Further analysis of this site will occur to determine the feasibility, cost, and habitat value of the restoration concepts on a finer scale.

MARY S. YOUNG STATE PARK

Landowner: Oregon Parks and Recreation Department (managed by City of West Linn Parks and Recreation), Oregon Department of State Lands

Site Description: Mary S. Young State Park (MSY Park) is a 128-acre park located along the Willamette River in West Linn. There are nearly 8 miles of trails in the park, along with athletic fields, parking lots and a pet exercise area. Over 90 acres of MSY Park are forested, primarily with Douglas fir and Western hemlock and a riparian zone of black cottonwood, mixed willow species, and red twig dogwood. Invasive English ivy is found throughout much of the upland areas, although the city and local volunteer groups are working to remove it. Invasive species such as Armenian blackberry and reed canary grass are found in the riparian zone.

Several small creeks, including Mary S. Young Creek and Turkey Creek, flow through MSY Park to their confluences with the Willamette River. The Oregon Department of Fish and Wildlife has found juvenile Chinook and coho salmon in Mary S. Young Creek. The shoreline at MSY Park retains its natural contour, and alternates between sandy beaches and basaltic outcrops. These outcrops form a small lagoon at the downriver end of the shoreline and protect the beaches at the upriver end of the shoreline.

Proposed Restoration: Restoration at this site could include enhancing shoreline complexity along the beach and in the lagoon area and removal of non-native vegetation and native plantings within the riparian areas. In addition, there is an opportunity to reconnect a side channel of the river and regrade the floodplain upstream of the lagoon. Finally, replacing the culvert along Mary S. Young Creek and restoration of the creek to its original channel is also a possibility.

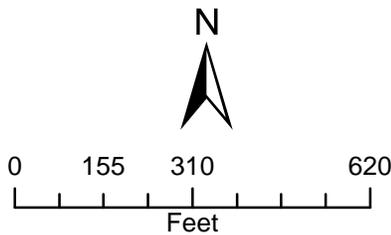
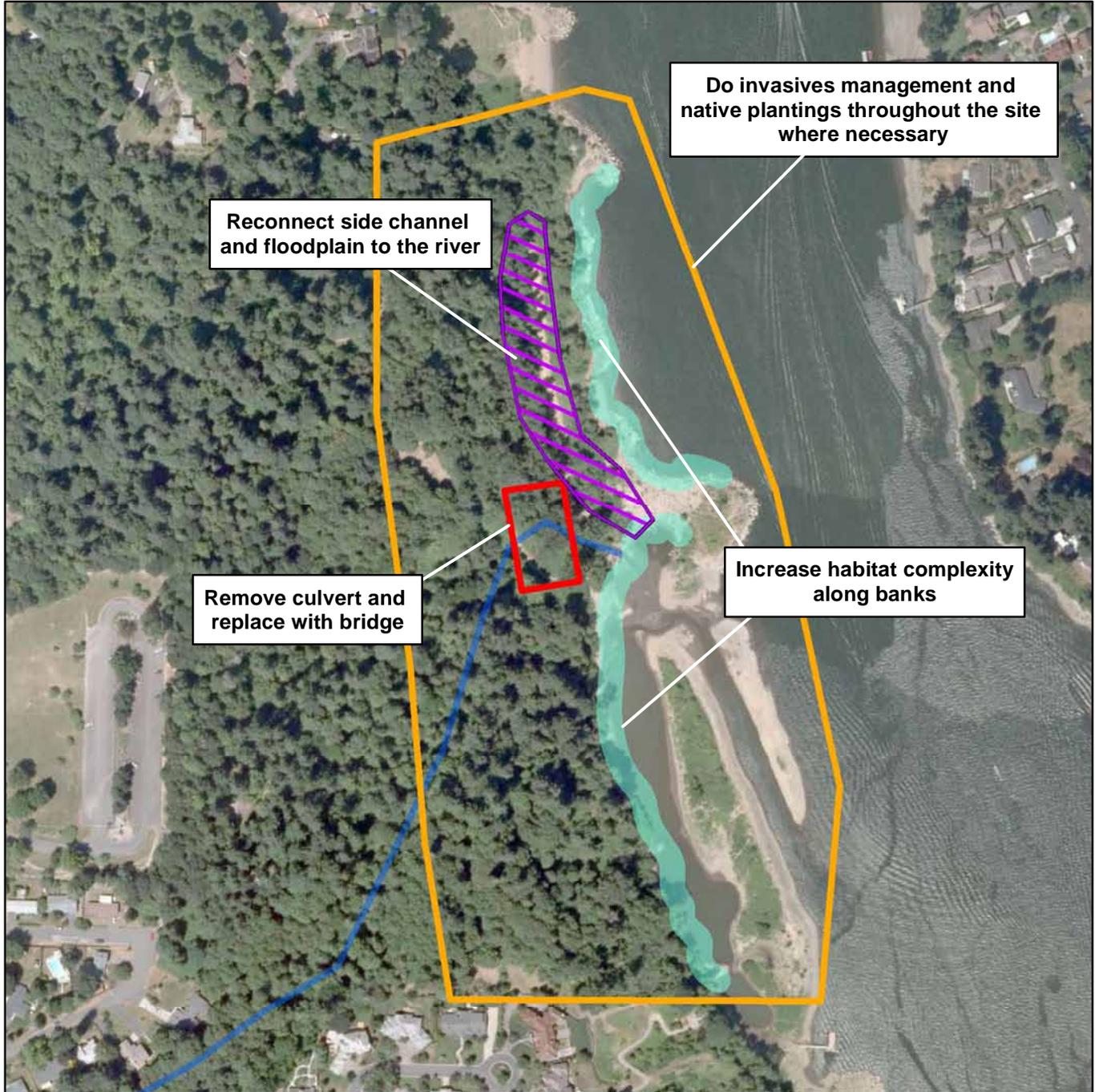
Benefits: Reconnecting side channels and floodplains to the main channel are among the most effective restoration strategies to benefit juvenile Chinook salmon as they provide off-channel refugia during high river flows. Replacing culverts, restoring the creek's original channel form, and enhancing habitat complexity along the Willamette shoreline and in the lagoon would provide additional refugia and habitat for migrating salmonids (particularly juveniles) and other native fish and wildlife species. Restoring the native plant community along the riparian corridor would provide valuable feeding, dispersal, and breeding habitat for native terrestrial wildlife species as well as migratory bird species near the confluence of the Willamette and Clackamas Rivers. In addition, a healthy native riparian vegetation community stabilizes stream banks, reduces and/or captures sediment flows, cycles nutrients and provides a source of large wood for adjacent and downstream areas.

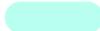
Feasibility: Project site is publicly owned and already protected as a natural area. Site was previously a private estate; no known contamination issues are present. Replacement of a pipeline that runs through part of the site is in the planning stages. Timing of restoration at the site must take these activities into consideration and avoid the pipeline during any excavation work.

Other constraints/considerations: Part of the restoration area is currently used as an off-leash area for dogs. Appropriate restrictions may be necessary to ensure riparian restoration and plantings are not disturbed by park users including off-leash pets.

Mary S. Young State Park

Map Prepared for Portland Harbor
Natural Resource Trustees



-  Culvert area
-  Off-Channel Habitat
-  Restoration Site
-  Potential Bank Restoration

This map represents conceptual fish and wildlife restoration opportunities which have been screened against criteria developed by the Portland Harbor Natural Resource Trustees. Further analysis of the site will occur to determine the feasibility, cost, and habitat value of the restoration concept at a finer scale.

MCCARTHY CREEK

Landowner: Private property owner, Oregon Department of State Lands

Site Description: McCarthy Creek is a 12.2-mile tributary on the west side of Multnomah Channel. USDA Natural Resources Conservation Service manages a 127-acre wetland conservation easement that includes the mouth and lower ~2500 feet of McCarthy Creek, extensive wetlands and bottomland hardwood forest. The creek on this property was relocated when the railroad was constructed. Currently the stream channel is incised, the stream banks are steep, and the entire site is overrun by reed canary grass and other invasive species. A culvert confines the channel about 1200 feet from the confluence. There are two water control structures on the site which regulate water levels for a wetland restoration site on a neighboring property. The site is often inundated during high flows and spring freshets. Beaver, river otter, salmon, and other fish and wildlife species are known to use McCarthy Creek and the emergent wetlands and forested habitats that surround it. The site is adjacent to the 417-acre Burlington Bottoms Wetland Mitigation Site and across Multnomah Channel from Oregon Parks and Recreation Department's 156-acre Wapato Access Site.

Proposed Restoration: Restoration at this site would focus on enhancement of McCarthy Creek to improve in-stream habitat quality, floodplain connectivity, and riparian habitat quality and function. Stream restoration activities would include enhancing the confluence of McCarthy Creek with Multnomah Channel, re-grading the stream banks where the channel is entrenched, and removing the concrete culvert. Large wood structures would be added to restore habitat complexity. Increased inundation, removal of invasive species such as reed canarygrass and re-vegetation would enhance and promote expansion of the existing riparian, forested and emergent wetland habitats.

Benefits: Juvenile salmonids will benefit from the increased availability of high-flow refuge habitat, increased habitat structure and complexity, and increased food inputs from restored riparian zone and wetlands. Reshaping and replanting the stream banks would reduce sedimentation in the creek and enhance water quality for the benefit of fish and wildlife. In the long term, beaver and other wildlife species would benefit significantly from new sources of food, wood and cover generated from a healthy riparian forest community.

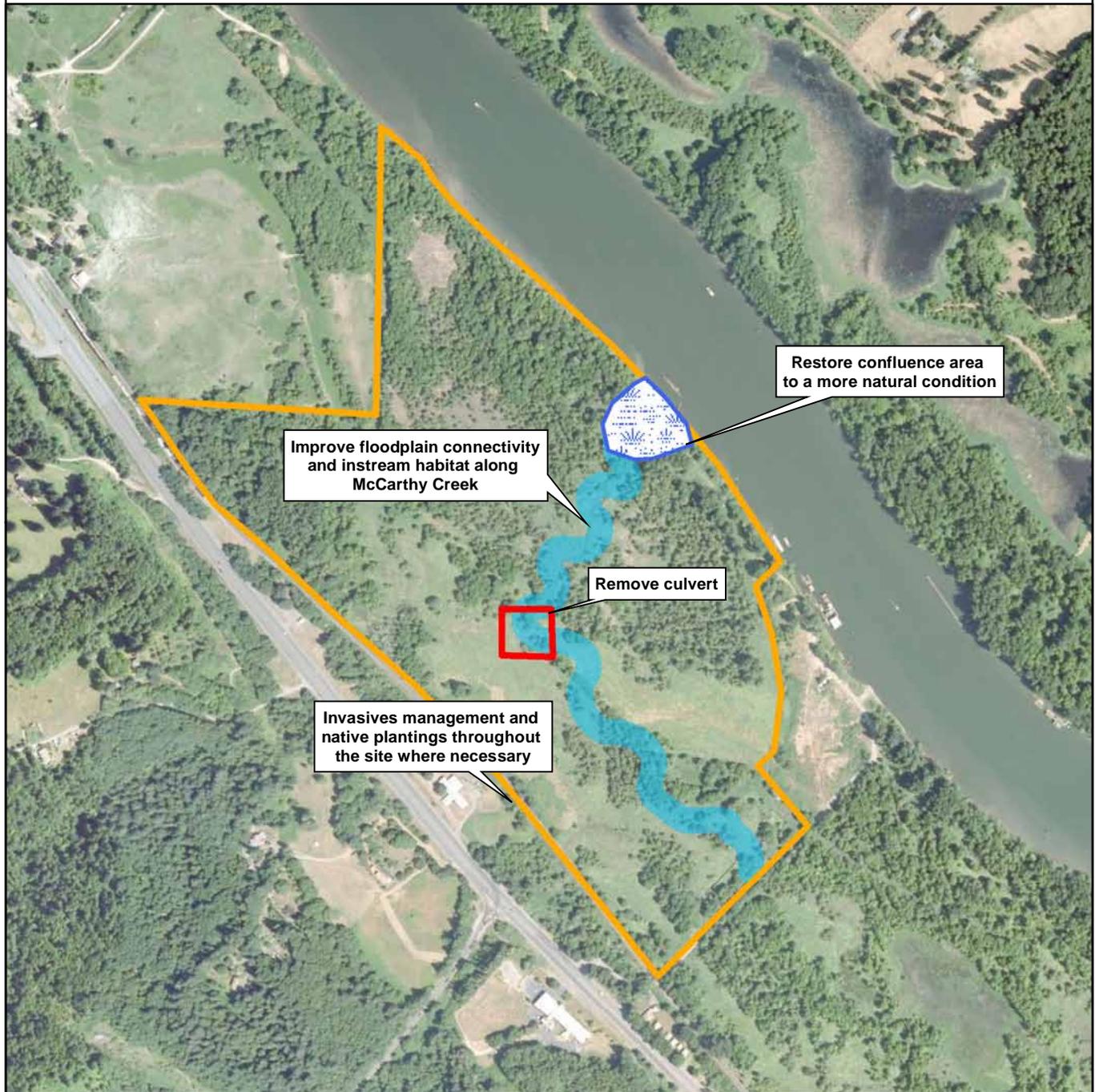
Feasibility: Multiple re-vegetation efforts have been attempted at this site with little success. The reed canary grass is persistent and the beaver are hungry for a food source. Re-vegetation will require careful site preparation, appropriate plant species selection, extensive maintenance as well as beaver exclosures.

Other Constraints/Considerations: Currently there is significant utilization of the site by beaver and red legged frogs. Care must be taken to avoid impacts to these and other species during construction. Hunting access is allowed at the site. This use is protected by the conservation easement already in

place on the site. There may be other aspects of the existing easement that need to be taken into consideration during restoration planning and implementation.

McCarthy Creek

Map Prepared for Portland Harbor
Natural Resource Trustees



0 250 500 1,000 Feet

-  Confluence Enhancement
-  Culvert area
-  Restoration Site
-  Channel Restoration

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OAKS AMUSEMENT PARK/OAKS CROSSING

Landowners: Oaks Park Association, City of Portland, Metro, Oregon Department of State Lands

Site description: Oaks Amusement Park is located at river mile 16 on the east bank of the Willamette River. The park area adjacent to the river consists of a low riparian zone lined with native and invasive vegetation that averages approximately 40 feet in width. Upslope, the bank is lined with a fence and walking path that serves as the boundary of the amusement park. The low floodplain willow thicket wetland is submerged at high flows and may serve as high water refuge habitat. Oaks Crossing is a riverfront park located at river mile 16.25 of the Willamette River with significant beach, bottomland forest and wetland habitat within the floodplain. These sites are located in close proximity to the Oaks Bottom wildlife area.

Proposed restoration: Restoration at Oaks Amusement Park and Oaks Crossing could include enhancing the area's existing native plant community by removing invasive plants, and increasing the amount of wood on the banks and in shallow water channel areas. At Oaks Crossing, there is the potential to investigate the feasibility of creating off-channel habitat. At Oaks Amusement Park, there may be an opportunity to reconfigure some banks to increase the amount of floodplain and flood storage, and to create shallow and off-channel habitat.

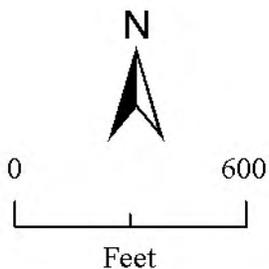
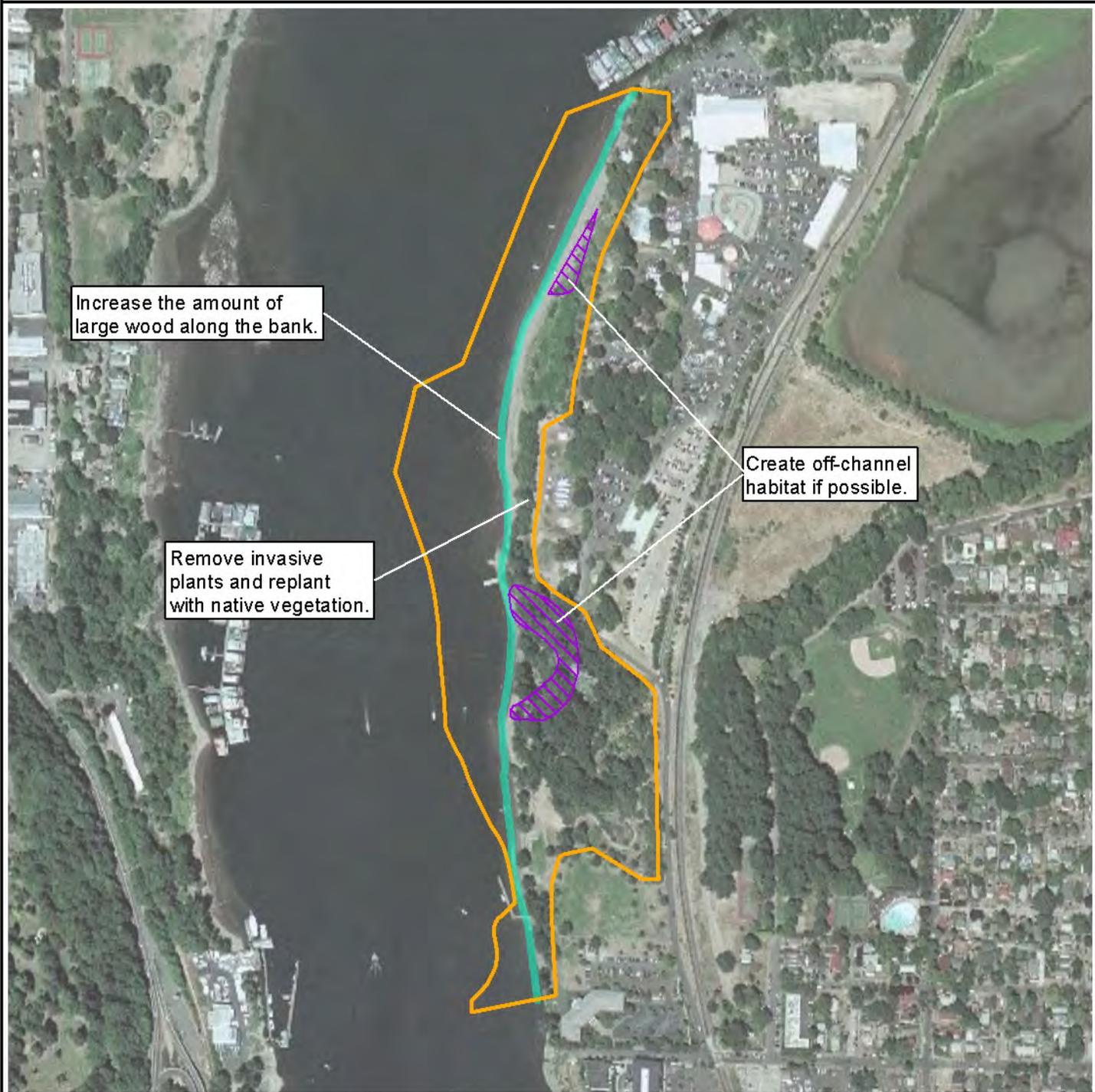
Benefits: Improvements in nearshore aquatic habitat, riparian areas and floodplain connectivity would improve rearing and refuge habitat for fish species and enhance important feeding, breeding and nesting habitat for native wildlife. Off-channel, shallow, slow moving waters provide refuge and productive foraging areas for lamprey and juvenile salmon. Improving riparian vegetation would help stabilize stream banks, capture sediment in stormwater runoff, support natural hydrologic flow processes and nutrient cycling, and provide a source of woody materials to the river.

Feasibility: Existing infrastructure at Oaks Crossing includes power lines and towers, boat docks, piers, parking lots and roads. This infrastructure may limit opportunities for significant bank improvements.

Other constraints/considerations: Oaks Amusement Park is privately owned and landowner willingness is unknown at this time. Recreational use associated with the park may affect or limit the ecological benefits provided by restoration at the site.

Oaks Amusement Park Shoreline & Oaks Crossing

Map prepared for Portland Harbor
Natural Resource Trustees



-  Potential Bank Restoration
-  Restoration Site
-  Off-Channel Habitat

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OAKS BOTTOM WILDLIFE REFUGE HABITAT ENHANCEMENT

Landowner: City of Portland, Oregon Department of State Lands

Site description: Oaks Bottom Wildlife Refuge is a 170-acre city owned property comprised of meadows, wetlands and bottomland forest on the eastside of the Willamette River at river mile 15.5, just north of the Sellwood Bridge. The site presently provides habitat for a number of bird, amphibian, mammal and invertebrate species, but is largely disconnected from the river. Significant populations of invasive plant species, including purple loosestrife, currently inhabit the site. Nutria, an invasive mammal, is also present at the site.

Proposed restoration: Restoration at this site would include replacing an existing culvert and water control structure with a larger box culvert to enhance fish passage and provide a greater connection between the wetlands and the Willamette River by improving the flow of river water in and out of the refuge. There is also potential to excavate tidal slough channels and enhance wetlands habitats at the southern end of the refuge. Restoration would include removal of invasive vegetation and replanting with native species.

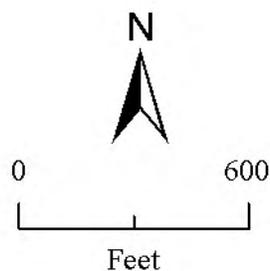
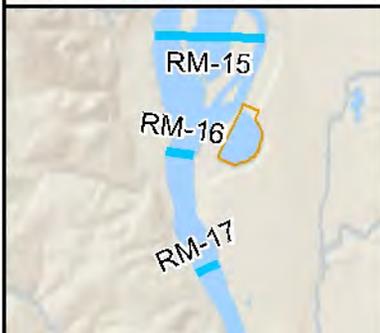
Benefits: The site is the largest remaining natural area within the lower Willamette River floodplain and provides important habitat for fish and wildlife. Improved hydrologic connection would enhance rearing and refugia habitat for salmonids by establishing a more significant connection between refuge wetlands and the mainstem Willamette, increasing the flow of water and decreasing water temperature. Native revegetation would help stabilize stream banks and provide a source of woody debris to the river. The addition of large woody debris in the off-channel area will provide significant amounts of instream habitat structure for salmonids and lamprey. This site also provides an opportunity for connectivity with proposed restoration at nearby sites, including Ross Island Lagoon and Holgate Slough. Mammals including mink, otter, and beavers utilize the site and will benefit further from the addition of large wood. Maintaining beaver activity is important to create slower water forage sites for mink and otter. Daily tidal influence will increase shorebird forage areas. Eagles and osprey already utilize the area for locating food sources that will be maintained or increased with greater connectivity to the river.

Feasibility: The site is in public ownership and has a willing landowner. Contaminants in wetland sediment and the continued addition pollutants from stormwater from outfalls will continue to impact water quality at the site. Parts of the site were previously used as a landfill, and the continuing impacts of landfill-related contaminants are not known. Clean up of significant persistent contamination (DDT is of notable concern) should occur prior to project implementation.

Other constraints/considerations: Project funding is pending through the U.S. Army Corps of Engineers. Some funding has already been secured through the U.S. Fish and Wildlife North American Wetlands Conservation Act program. The project is also scheduled to receive City capital funds for project construction.

Oaks Bottom Wildlife Refuge Habitat Enhancement

Map prepared for Portland Harbor
Natural Resource Trustees



- Replacement culvert
- Potential Channel Restoration
- Restoration Site

This map represents conceptual fish and wildlife habitat restoration opportunities which have been screened against criteria developed by the Portland Harbor Natural Resource Trustees. Further analysis of this site will occur to determine the feasibility, cost, and habitat value of the restoration concepts on a finer scale.

OREGON YACHT CLUB WILDLIFE HABITAT

Landowners: Oregon Yacht Club, City of Portland

Site description: The Oregon Yacht Club is located at river mile 15.75 on the east bank of the Willamette River, abutting Oaks Bottom Wildlife Refuge. Although some filling and bank alterations have occurred in the past, this site is primarily vegetated floodplain with no apparent structures. A houseboat community is located just offshore. The riparian zone at this site ranges from 100-200 feet in width. Mature trees with native/non-native understory comprise most of the area, with some disturbed and bare areas across the site. The site's close proximity to significant natural areas such as Oaks Bottom Wildlife Refuge and Ross Island increases the value of habitat protection and improvement on this property for wildlife and aquatic species.

Proposed restoration: Restoration at this site could include removing invasive plants and increasing the amount and quality of vegetation in floodplain and riparian areas. Filled and disturbed areas could be restored. Snags and downed large wood could be increased along the banks and throughout the floodplain.

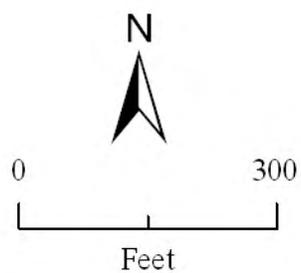
Benefits: This site could be protected and maintained as a natural area. Improvements in the banks and floodplains would enhance important feeding, breeding and nesting habitat and movement corridors for native wildlife. Improving riparian vegetation would increase the quality and quantity of wildlife food and cover, help stabilize stream banks, capture sediment in stormwater runoff, support natural hydrologic flow processes and nutrient cycling, and provide a source of wood material to the river and to floodplain and riparian habitats. Mature patches of trees exist on the site that can provide perching and nesting opportunities for bald eagle and osprey.

Feasibility: Implementation of this project will require the permission and cooperation of the Oregon Yacht Club (landowner has indicated willingness to allow some level of restoration). The amount of aquatic species-related restoration may be limited by the need to protect existing terrestrial habitat and to ensure an attractive nuisance is not created if sediments along the shoreline are contaminated. The proximity of houseboats may preclude the addition of large wood, or require that the wood be stabilized so that it does not threaten the houseboats.

Other constraints/considerations: The presence of houseboats may constrain the extent to which potentially mobile large wood could be incorporated into project design. Current human uses at the site should be further evaluated and addressed in a restoration plan for the area.

Oregon Yacht Club

Map prepared for Portland Harbor
Natural Resource Trustees



 Restoration Site

This map represents conceptual fish and wildlife habitat restoration opportunities which have been screened against criteria developed by the Portland Harbor Natural Resource Trustees. Further analysis of this site will occur to determine the feasibility, cost, and habitat value of the restoration concepts on a finer scale.

PORT OF ST. HELENS NATURAL AREA

Landowner: Port of St. Helens, Oregon Department of State Lands

Site description: The site is located in Scappoose Bay. Currently, a portion of the site is under industrial use, but a significant amount of natural area remains on the property. Habitat types include approximately 20 acres of freshwater tidal emergent wetland, 6 acres of tidally influenced scrub-shrub wetland, 14 acres of forested wetland (5 acres tidally influenced), and 4 acres of oak woodland. Dominant vegetation in the wetlands includes black cottonwood, willow, reed canary grass, and carex. Yellow flag iris and Himalayan blackberry are also present. Much of the emergent wetland has been hydrologically altered by the installation of a drainage ditch, which has allowed reed canary grass to develop into a large mat across much of the wetland. Nine acres of the forested wetland have been hydrologically altered by road fill surrounding the wetland, preventing normal tidal influence.

Proposed restoration: Restoration opportunities could include removal and control of exotic, invasive plants; restoring the emergent wetland by removing the drainage ditch and creating off-channel habitat; and installing large wood within the emergent and scrub-shrub wetlands. Restoration could also include laying back the banks of the stream channel and planting with native, riparian vegetation.

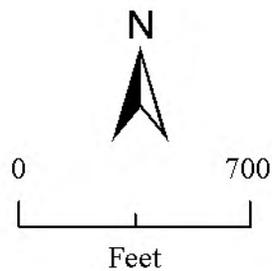
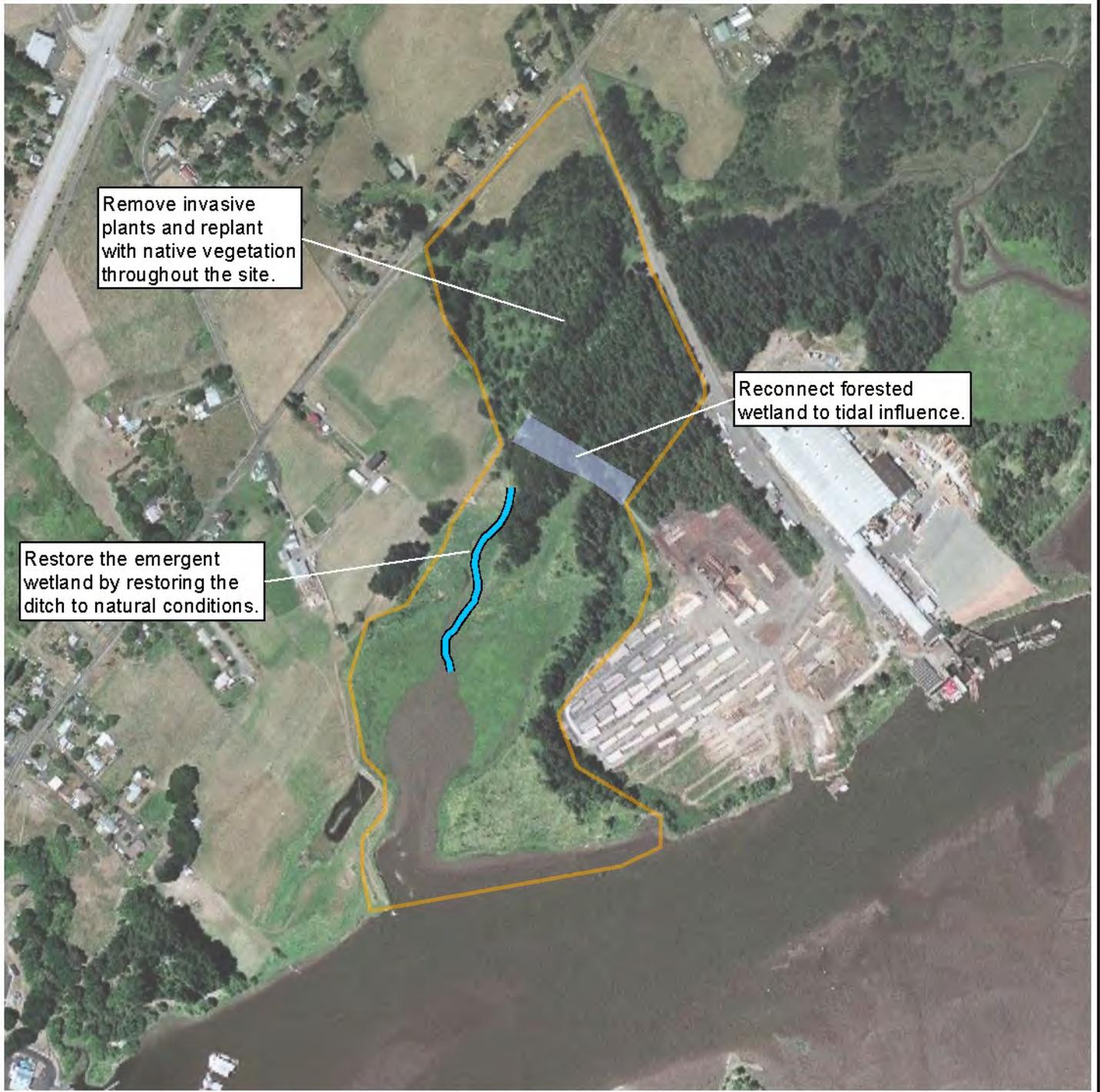
Benefits: Naturally sloped, vegetated stream banks increase floodplain connectivity and habitat diversity. Off-channel, shallow, slow moving waters provide refuge and productive foraging areas for lamprey and juvenile salmon. Shallow areas can also serve as important foraging areas for spotted sandpiper, mink and other species. Riparian vegetation provides trees for bald eagle and osprey perching and nesting opportunities, and cover and foraging areas for mink and other species.

Feasibility: The land is publicly owned. The Port of St. Helens is interested in restoring and/or enhancing the natural areas for fish and wildlife. There are no known permitting obstacles at this time. Minor ongoing maintenance of invasive vegetation at the site will be necessary.

Other constraints/considerations: Part of the area is used as a Port access point for large trucks; any restoration design will need to accommodate this function.

Port of St. Helens Natural Area

Map prepared for Portland Harbor
Natural Resource Trustees



-  Potential Channel Restoration
-  Restoration Site
-  Forested Wetland

This map represents conceptual fish and wildlife habitat restoration opportunities which have been screened against criteria developed by the Portland Harbor Natural Resource Trustees. Further analysis of this site will occur to determine the feasibility, cost, and habitat value of the restoration concepts on a finer scale.

POWERS MARINE PARK, RIVERVIEW CEMETERY AND CULVERTS

Landowner: City of Portland, Tri-Met, Lewis and Clark College, Riverview Cemetery Association of Portland, Union Pacific Railroad (leased to City of Portland), Oregon Department of State Lands

Site description: This proposed restoration site is located at river mile 16.8 on the west side of the Willamette River. Powers Marine Park is a 15-acre riverfront park with beach habitat and a connected floodplain with an extensive stretch of shallow water habitat along the shore. The park is a mixture of conifer and bottomland forest types, including mature Douglas fir and black cottonwood trees. Several large snags exist within the forested area. The Riverview Cemetery property is located across Highway 43 from Powers Marine Park. This property consists of approximately 185 acres of undeveloped contiguous forestland. The health of this forest is threatened by significant invasive plant species. Seven streams, which provide year round cold water to the Willamette River, flow through Riverview Cemetery, under Highway 43, and through Powers Marine Park to the river. Five are perennial and two are seasonal or intermittent. These streams all flow through a short section of culverts under Highway 43, the railroad corridor and a portion of the Powers Marine Park pedestrian trail. The culverts are undersized, poorly functioning and, in some cases, failing. The culverts also act as aquatic connectivity barriers to fish and other aquatic organisms.

Proposed restoration: Restoration at this site could include acquisition of available portions of the Riverview Cemetery property, removing invasive plant species such as English ivy that is threatening forest health, revegetation of disturbed areas with native species, protecting trees and snags, enhancing shallow-water and creating off-channel habitat, establishing wood jams or other habitat structures and enhancing stream confluences. Replacing or upgrading the seven culverts for wildlife passage and enhanced tributary and riparian habitat is also a possibility.

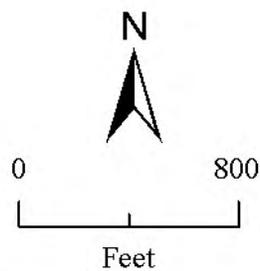
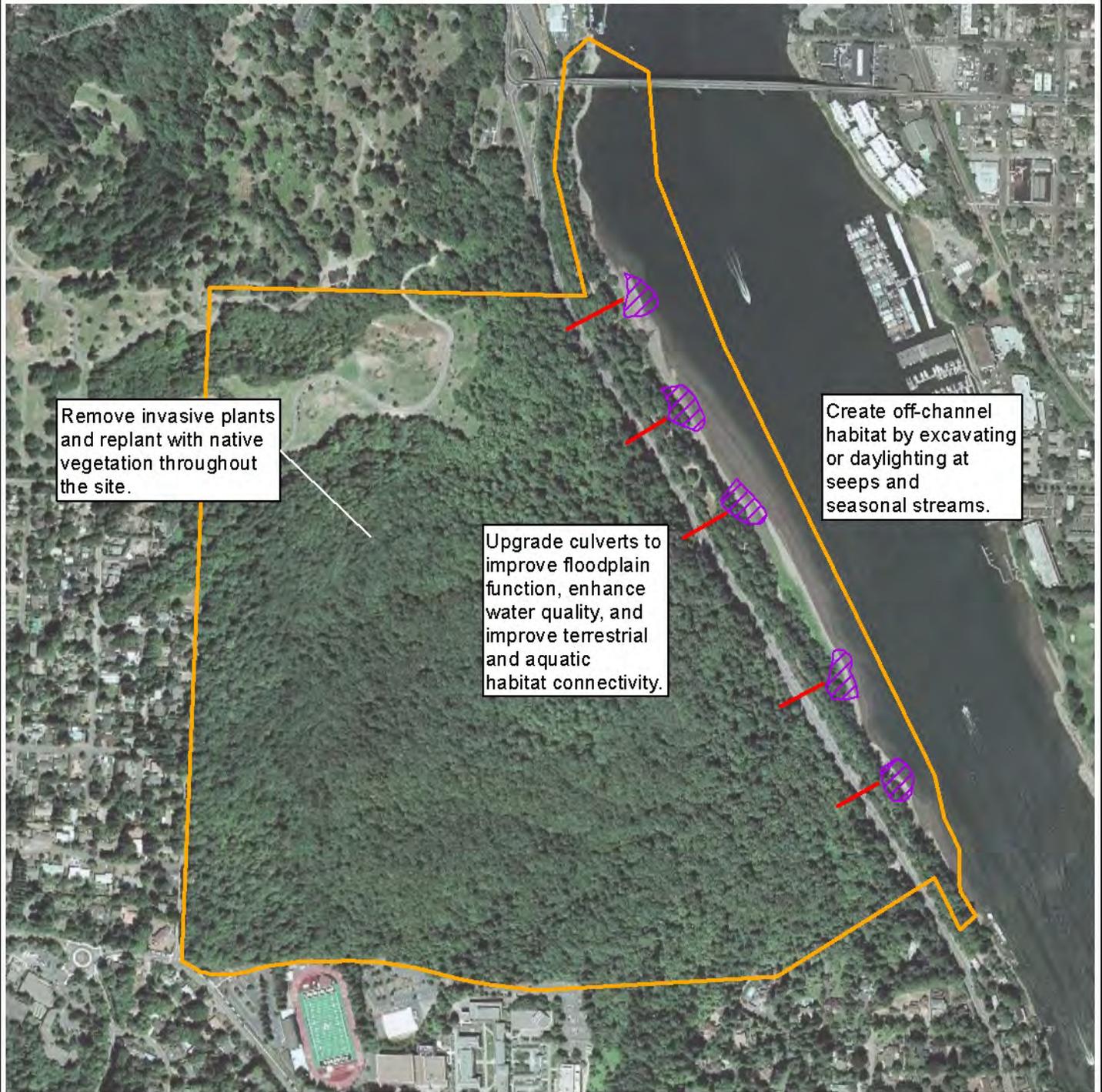
Benefits: Improvements in nearshore aquatic habitat, banks and floodplain would improve rearing and refuge habitat for salmonids and other native fish species as well as feeding and breeding habitat for terrestrial species. Upgrading or replacing culverts could increase off channel habitat, floodplain connectivity, water quality, and connectivity to upland habitat. Acquisition, protection and restoration of the cemetery property and restoring connectivity to the river could benefit wildlife such as mink by connecting upland and riverine habitats, protecting and improving nesting and breeding habitat for birds, and restoring a movement corridor that is currently non-functional because of Hwy 43.

Feasibility: The project site has no known contamination issues and can be implemented immediately. Conflicts between habitat improvements, maintenance, and human uses may be less at this park than other riverfront parks due to lower levels of use.

Other constraints/considerations: Multiple landowners would be involved. Full support and willingness of all landowners would be necessary to project implementation.

Powers Marine Park, Riverview Cemetery & Culverts

Map prepared for Portland Harbor
Natural Resource Trustees



- Culverts
- Restoration Site
- Off-Channel Habitat

This map represents conceptual fish and wildlife habitat restoration opportunities which have been screened against criteria developed by the Portland Harbor Natural Resource Trustees. Further analysis of this site will occur to determine the feasibility, cost, and habitat value of the restoration concepts on a finer scale.

RINEARSON CREEK NATURAL AREA

Landowner: City of Gladstone, Robinwood Riverie Property Association, Cottonwood Homeowners Association, Rinearson Creek Homeowners Association, River Cove Association, Oregon Department of State Lands, private property owners

Site description: Rinearson Creek is a short perennial tributary to the Willamette River located at river mile 24. The creek is just downstream of the City of Gladstone's Meldrum Bar Park, which provides approximately 30 acres of riparian and bottomland forest along the river. An earthen dam and water control structure are located on Rinearson Creek near its confluence with the Willamette River. The dam creates an impoundment, which has altered hydrology and blocks fish passage. The impoundment is infested with a variety of invasive plant and wildlife species that thrive in the stagnant system, including English ivy, yellow flag iris, red eared slider turtles, and bullfrogs. A small population of western painted turtles also resides in the area. Downstream of the dam, the creek has been altered by an auxiliary channel excavated between the historic creek channel and Meldrum Bar.

Proposed restoration: A coalition of landowners, neighbors, local government agencies, and environmental groups has initiated an effort to identify potential restoration options at the site. Restoration at this site could involve removing the existing earthen dam, filling in the auxiliary channel, excavation to remove sedimentation from the historic channel, recontouring the stream channel to a more natural meander, and adding large woody debris to the restored channel. Restoration could include creation of seasonal and perennial emergent wetland and open water habitats. Invasive vegetation would be removed and the riparian habitat and associated uplands replanted with native vegetation. The restoration design would likely include pond habitat in some portion of the site to support ongoing turtle conservation work.

Benefits: Removal of the dam and excavation of the historic channel would restore fish passage to Rinearson Creek up to the natural barrier (waterfall) and improve off-channel habitat for rearing, resting and foraging juvenile salmon and lamprey. Off-channel habitat is severely lacking in this stretch of the Willamette River. Removal of the dam would also create seasonal emergent wetland habitat for macroinvertebrates and native amphibians. Shallow water areas with large woody debris could also improve foraging habitat for a variety of wildlife species; open water habitat will benefit osprey and bald eagle, while seasonal drying of wetlands may benefit shore birds. Hydrology in the downstream reach of the creek would be restored to more historical conditions due to dam removal and filling of the auxiliary channel, which would improve water quality by decreasing algal blooms and reducing water temperatures, and restore sediment transport processes.

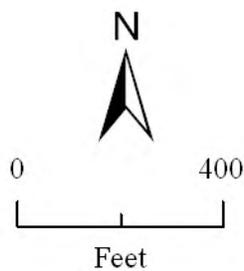
Feasibility: There is no known opposition to restoration at this site among affected landowners; however, any restoration actions implemented downstream of the dam will require cooperation of that HOA. Given the longstanding interest of the coalition, any restoration project(s) should be coordinated with the various stakeholders and coalition members. The coalition is in the process of securing funds to

conduct a feasibility study of restoration options at the site. The study is expected to be complete in 2011.

Other constraints/considerations: The dam was originally built as mitigation for filling of wetlands at the headwaters of Rinearson Creek in 1997 pursuant to a Clean Water Act Section 404 permit. It has since been determined that the original goals of the permit were never achieved as the dam has not been managed as originally intended. Further discussion is needed with the U.S. Army Corps of Engineers in regards to the permit. Potential sediment contamination issues have not been explored; these may be addressed in the feasibility study described above.

Rinearson Creek Natural Area

Map prepared for Portland Harbor
Natural Resource Trustees



This map represents conceptual fish and wildlife habitat restoration opportunities which have been screened against criteria developed by the Portland Harbor Natural Resource Trustees. Further analysis of this site will occur to determine the feasibility, cost, and habitat value of the restoration concepts on a finer scale.

SCAPPOOSE BAY MARINA

Landowner: Port of St. Helens, Oregon Department of State Lands

Site description: The site is located on Scappoose Bay near the mouth of Multnomah Channel. A 5-acre natural area with a trail is located adjacent to the Scappoose Bay Marina. Various native floodplain plant communities inhabit the natural area, as well as some invasive species, including reed canary grass. A raised trail, built on fill material, meanders through the natural area. This trail, including an undersized culvert that bisects the trail, restricts tidal flow to and from these wetlands.

Proposed restoration: Restoration at this site could include installation of a bridge to replace an undersized culvert to improve tidal flow to and from the wetlands and provide off-channel habitat. Alternatively, or in conjunction with culvert replacement, the trail could be elevated onto a boardwalk along the waterfront of the natural area to further improve tidal flow, creating a full connection to the floodplain and off-channel habitats. Invasive species removal and native re-vegetation is also recommended.

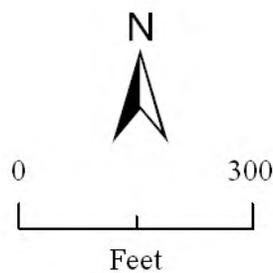
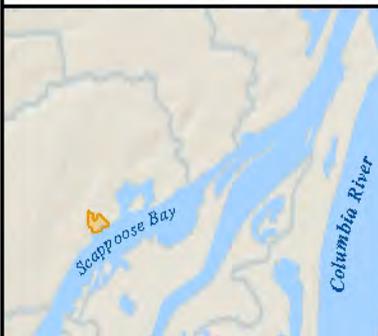
Benefits: Water quality could be improved by reconnecting the river with the floodplain. Benefits would be maximized if the trail was elevated as a boardwalk and fill was removed. Replacing the undersized culvert or elevating the trail on a boardwalk would also significantly increase off-channel habitat providing feeding, rearing and refugia for native fish. Increased off-channel habitat would also provide salmon with a refuge from extreme conditions within the river and a place to escape larger piscivorous fish during migration. The reconnection of the wetland to the river would also provide foraging habitat for mink.

Feasibility: The Port of St. Helens supports restoration of fish and wildlife habitat at the site. The extent of support for creating a full boardwalk trail is unknown.

Other constraints/considerations: The trail through the site is presently used for recreational hiking, wildlife viewing, etc. Although an elevated boardwalk would reduce the structural impacts of the trail on habitat at the site, heavy recreational use of the area could limit the ecological benefits provided to fish and wildlife.

Scappoose Bay Marina

Map prepared for Portland Harbor
Natural Resource Trustees



- Restoration Site
- Fill Material
- Culvert Area

This map represents conceptual fish and wildlife habitat restoration opportunities which have been screened against criteria developed by the Portland Harbor Natural Resource Trustees. Further analysis of this site will occur to determine the feasibility, cost, and habitat value of the restoration concepts on a finer scale.

SOUTH WATERFRONT SHORELINE

Landowners: Zidell Marine and ZRZ Realty Company, River Campus Investors, North Macadam Investors, OHSU, T&E Development, The Landing at Macadam LLC, OSF International Inc., Oregon Department of State Lands

Site description: South Waterfront is a major 130-acre redevelopment project located at river mile 14, south of downtown and bounded by the Marquam Bridge and Hamilton Street. The site includes 6,500 linear feet of Willamette riverfront; it represents the last major underdeveloped area within Portland's Central City. The land directly adjacent to the river is proposed for protection as the South Waterfront Greenway Natural Area Park. The remainder of the area is currently in various stages of redevelopment for high-density residential and commercial uses. Limiting habitat factors include: disconnection of the river from the floodplain, hardened banks, loss of riparian vegetation, invasive species, degraded channel conditions, and a lack of large wood.

Proposed restoration: Restoration at this site could include reducing bank slopes; reducing bank hardening; improving the connection between the river and the floodplain; increasing shallow water habitat; increasing the amount and quality of vegetation in riparian and floodplain areas; and increasing the amount of large wood on the shoreline and in shallow areas.

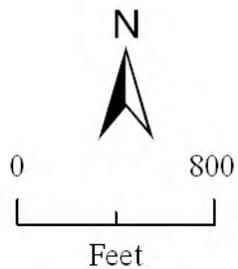
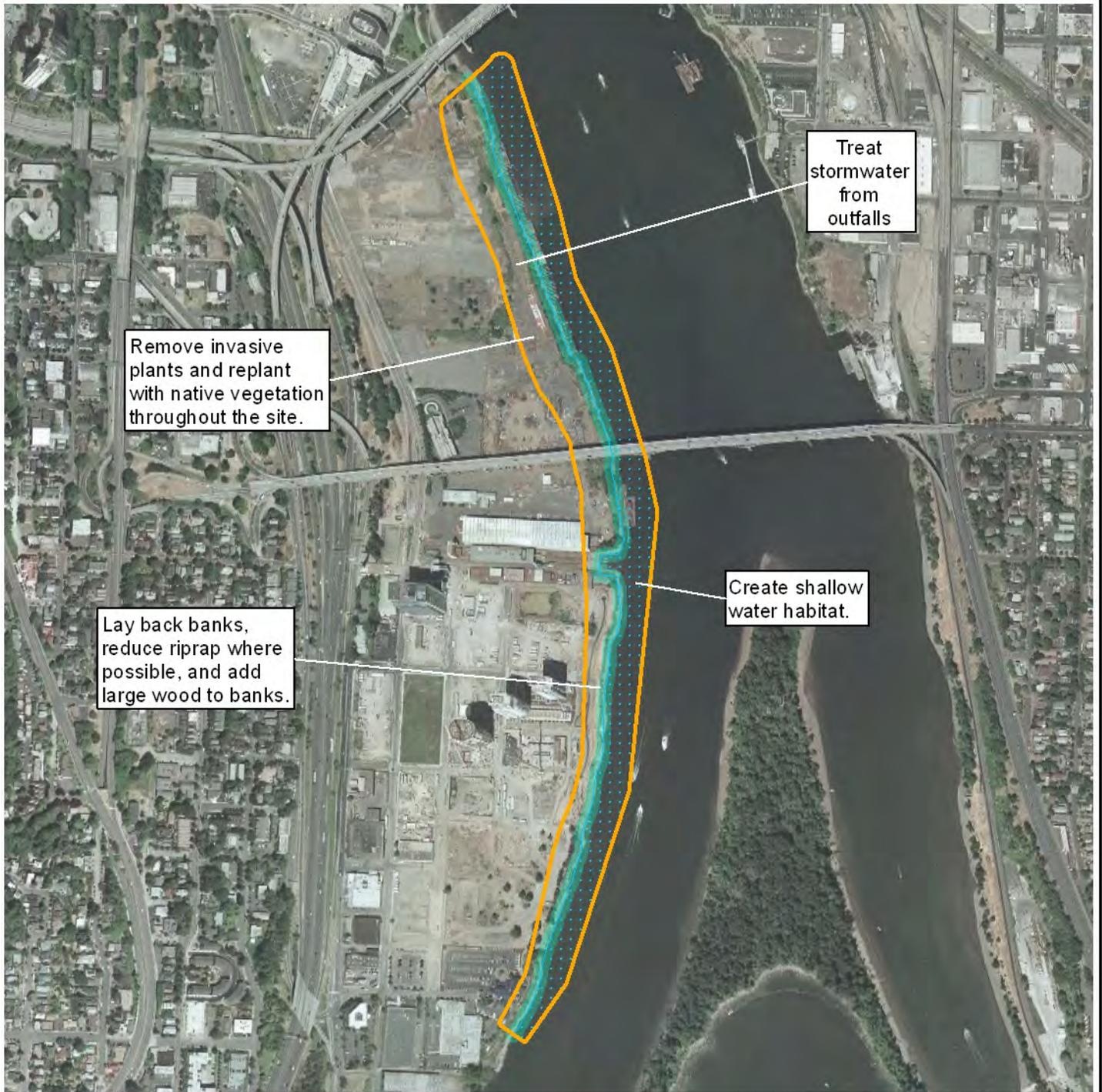
Benefits: Improvements in nearshore aquatic habitat, banks and floodplain would improve rearing and refuge habitat for salmonids and enhance important feeding, breeding and nesting habitat for native wildlife. Improving riparian vegetation would help stabilize stream banks; support natural hydrologic flow processes and nutrient cycling; and provide a source of wood material to the river. The benefits of restoration at this site would be amplified by its connectivity to Ross Island and the Oaks Bottom Wildlife Refuge.

Feasibility: Constraints on restoration at this site include infrastructure at the Zidell facility; adjacent high-density urban redevelopment; demand for recreational access and river views; and a long history of environmental contamination from industrial uses.

Other constraints/considerations: A number of DEQ Environmental Cleanup Sites exist in close proximity to this site. Restoration at this site may be delayed by design and permitting considerations related to cleanup actions.

South Waterfront

Map prepared for Portland Harbor
Natural Resource Trustees



-  BFA_shorelines
-  Restoration Site
-  Shallow Water Habitat

This map represents conceptual fish and wildlife habitat restoration opportunities which have been screened against criteria developed by the Portland Harbor Natural Resource Trustees. Further analysis of this site will occur to determine the feasibility, cost, and habitat value of the restoration concepts on a finer scale.

TRYON CREEK HIGHWAY 43 CULVERT REMOVAL

Landowner: Oregon Department of Transportation, Metro, multiple infrastructure rights of way (ODOT, City of Lake Oswego, railroad)

Site description: The Tryon Creek culvert is located under Highway 43 approximately 1,000 feet upstream of the confluence of Tryon Creek and the Willamette River at river mile 20. The 400-foot long, 80-year old concrete box culvert is a partial barrier to endangered fish species migrating from the Willamette River into the Tryon Creek State Natural Area and the Tryon Creek watershed. The culvert/road is a complete barrier to lamprey migration into Tryon Creek and terrestrial wildlife species with the exception of birds. Recently, some action has been taken to improve passage and restore habitat in the immediate confluence of Tryon Creek below the culvert, but the height, length and slope of the culvert cause it to remain a significant passage barrier.

Proposed restoration: Restoration at this site would include removal of the existing culvert under Highway 43 and daylighting Tryon Creek, restoring fish and wildlife movement from the river up the tributary. Transportation upgrades would include bridging Highway 43 and the rail lines and realigning the roadway over the newly restored stream channel. Restoration would include restoration of stream banks to natural slope and planting with native vegetation.

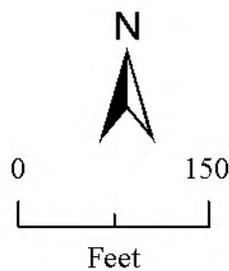
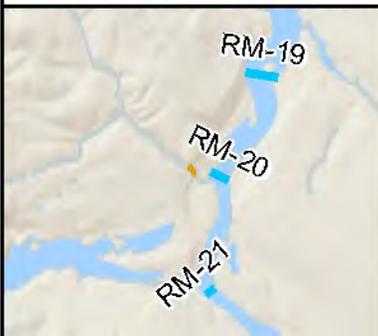
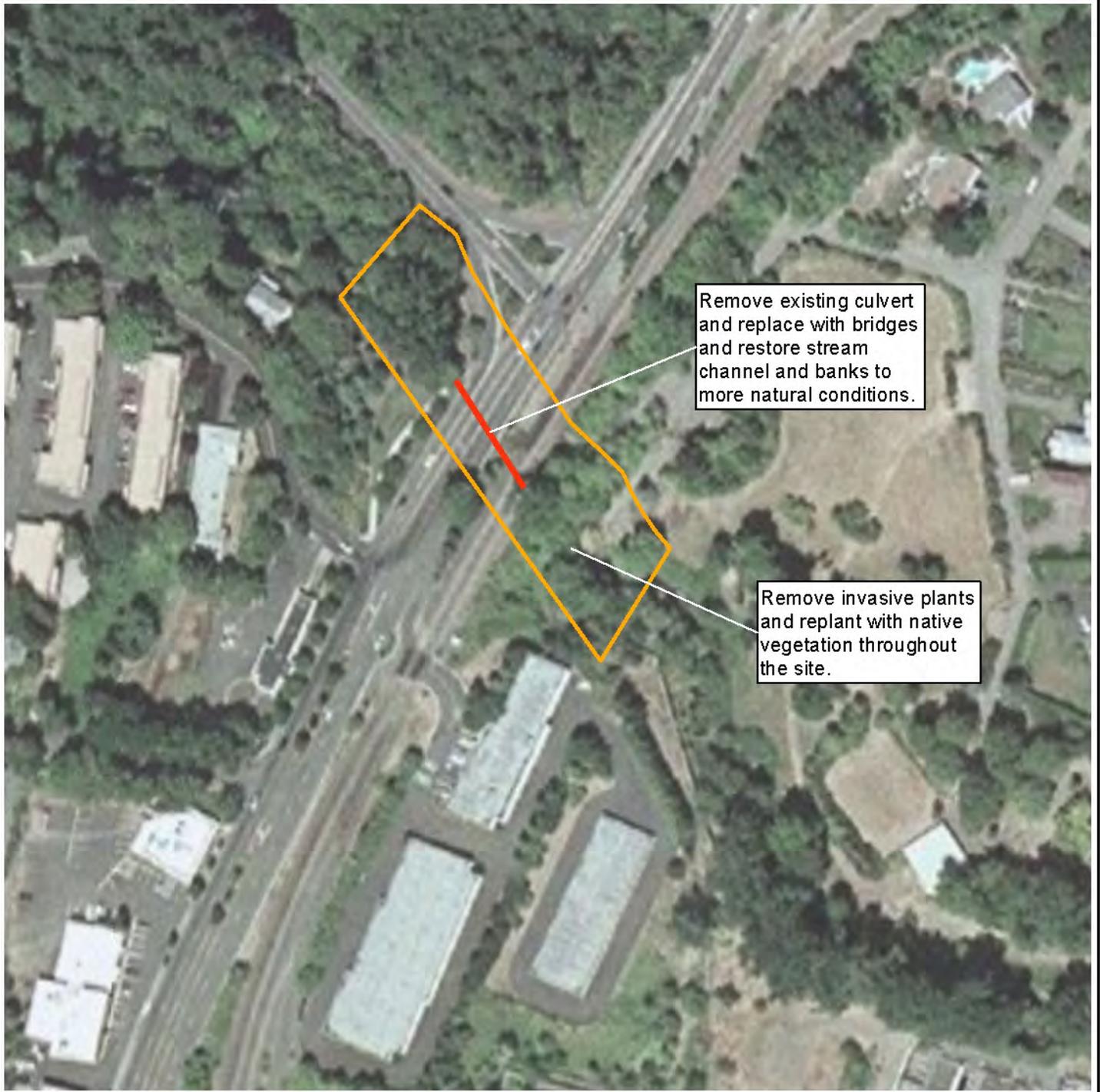
Benefits: This project would improve access for threatened and endangered salmonids, as well as mink and other wildlife species and provide access for lamprey to a major Willamette River tributary. The 645-acre Tryon Creek State Natural Area is one of the largest contiguous high quality habitats within the city of Portland. The project will also improve stream and stream bank habitat, quality and complexity, improve access to off-channel habitat as refuge during high flows, improve floodplain connectivity, and improve riparian and upland habitat by restoring native vegetation.

Feasibility: The site is in public ownership. The project was the subject of a study conducted by the City of Lake Oswego through a Greenspaces Grant that involved numerous partners and stakeholders including agency representatives and technical experts. This award led to the 2007 Tryon Creek @ Hwy 43 Culvert Alternatives Analysis, which outlines some of the feasibility issues and other aspects of this potential project.

Other constraints/considerations: The need to replace the culvert with a bridge that can accommodate Highway 43 as well as the rail lines may pose permitting challenges. Other infrastructure and land use planning projects that affect the project area should also be considered.

Tryon Creek Highway 43 Culvert Removal

Map prepared for Portland Harbor
Natural Resource Trustees



- Culvert
- Restoration Site

This map represents conceptual fish and wildlife habitat restoration opportunities which have been screened against criteria developed by the Portland Harbor Natural Resource Trustees. Further analysis of this site will occur to determine the feasibility, cost, and habitat value of the restoration concepts on a finer scale.

WAPATO ACCESS SITE

Landowner: Oregon Parks and Recreation Department, Oregon Department of State Lands

Site Description: Wapato Access is an approximately 156-acre natural area located on Sauvie Island along Multnomah Channel. The site is outside of the Army Corps constructed levee system. The banks of Multnomah Channel are naturally high at this site, likely due to natural deposition, forming a natural levee that inhibits fish and all but the highest flood waters from accessing the site. As a result, juvenile salmonids cannot access the wetland during the majority of the period (November – June) when off-channel habitat and flow refuge is most critical. The existing wetlands and lake edges have low habitat complexity and portions of the floodplain and upland areas are dominated by non-native, invasive plants that further limit the site’s functionality as habitat for juvenile salmonids and wildlife.

Proposed Restoration: Restoration at this site would focus on restoring the hydrologic connection and enhancing the capacity of the site to provide rearing and high-flow refuge habitat for juvenile salmonids. A new connection between Multnomah Channel and site would be excavated to enhance the hydrologic connection and provide access for juvenile salmonids to use the lake for rearing and refuge during high flows, increasing the frequency and duration of inundation of the site. Large wood structures would be added to restore habitat complexity. Increased inundation, removal of reed canarygrass and planting riparian vegetation will promote expansion of emergent wetland plant communities. Upland invasive species treatment and establishment of native oak savannah are also planned at this site.

Benefits: The project will create juvenile salmonid access to up to 50 acres of off-channel and wetland habitat intermittently with seasonal high river flows and tidal fluctuations. Juvenile salmonids will benefit from the increased availability of high-flow refuge habitat, as well as increased habitat structure and complexity, and increased food inputs from a restored vegetated zone and adjacent upland forest. Multiple wildlife species would benefit from the restoration of a native emergent wetland plant assemblage. Slow, shallow, open water habitat with greater fish presence will provide increased forage areas for bald eagles, mink, and otter.

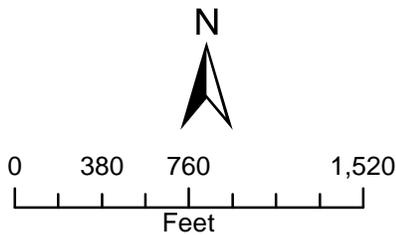
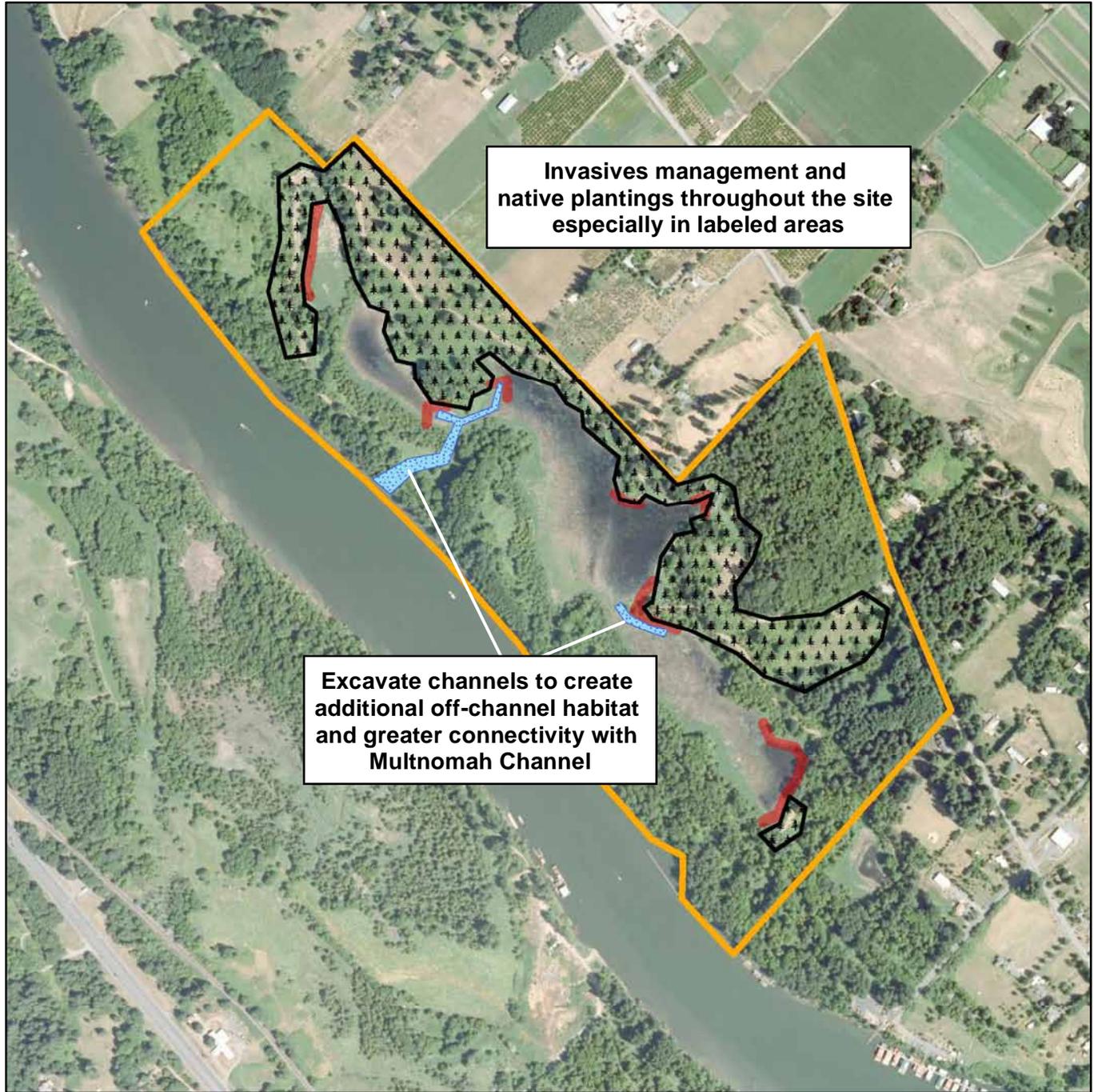
Feasibility: The land is publicly owned and there are no known obstacles related to zoning, permitting, or contamination issues. A dirt and gravel path surrounds the existing pond, and public access is permitted; public access would have to be managed in a way that protects restored habitat, particularly while riparian plantings are becoming established. The feasibility of a flow-through channel at the site (rather than a single channel connecting the wetland to the main channel) should be explored; this may help address concerns about water temperature and the potential for fish stranding.

Other Constraints/Considerations: There is significant utilization of the site at present by non-native bullfrogs, so potential predation on juvenile salmonids must be considered. Bullfrog eradication may need to be included as a project component. The impacts of introducing non-native carp present in the Multnomah Channel needs to be analyzed. Carp dig up aquatic vegetation and decrease water quality.

This area appears to be one of the few that do not presently have carp and therefore has the potential to have high quality aquatic vegetation including wapato, a plant that often disappears after carp introduction. Baseline monitoring is underway to characterize avian, amphibian and turtle use of the site to help inform restoration designs in order to gage how changes in waterflow and timing may affect those species. The embankments at the southeast and northwest ends of the existing wetlands may need to be moderately enhanced to ensure that there are no impacts to neighboring private properties.

Wapato Access Site

Map Prepared for Portland Harbor
Natural Resource Trustees



- Restoration Site
- Channel excavation
- Invasive Removal and Native Planting
- Addition of Large Wood

This map represents conceptual fish and wildlife restoration opportunities which have been screened against criteria developed by the Portland Harbor Natural Resource Trustees. Further analysis of the site will occur to determine the feasibility, cost, and habitat value of the restoration concept at a finer scale.

WEST HAYDEN ISLAND

Landowner: Port of Portland, Portland General Electric Company, Oregon Department of State Lands

Site description: Hayden Island is located in the Lower Columbia River just east of the confluence with the Willamette River. The island is part of a significant regional network of natural areas that provide habitat for migrating birds and many other species. Hayden Island is bisected by the Burlington Northern Santa Fe Railroad line. The western half of the island is 800+ acres of relatively undeveloped land located within the 100-year floodplain. Much of West Hayden Island is vegetated; it supports one of the largest stands of cottonwood-ash bottomland forest on the Lower Columbia with an understory of native and non-native plants. There are also meadows, wetlands, open sandy fill areas, beach and shallow water areas. West Hayden Island supports a variety of mammal, bird, reptile, amphibian, and insect species. Forest habitat provides nesting, roosting, and perching locations for a number of bird species. Salmon and lamprey migrate past Hayden Island to upstream spawning grounds. Lamprey larvae may use nearshore areas around the island as they have been found in similar habitats nearby.

Proposed restoration: Potential restoration actions include the development and restoration of hydrologic connections between and across the island's interior and the Columbia River, connecting existing wetlands to the river, and addressing invasive species on the island. Potential actions could include excavating a portion of the current dredge spoil site to create an off-channel aquatic habitat and a series of grass and shrub habitat areas. The large interior wetland could be seasonally connected with a new channel that would cross the island, similar to a historic channel previously present on the island. Removal of obsolete rock groins and other manmade features could enhance floodplain connectivity. Finally, all of the forested area on the island could be treated to manage the spread of invasive species and to support natural recruitment in the forested areas. Additional grassland and wetland restoration actions have been proposed for other parts of the island.

Benefits: In-channel islands are unique landforms that provide a highly diverse array of habitats and functions for fish and wildlife. Restoration of shoreline, shallow water and off-channel habitats provides resting and rearing areas for salmon and lamprey; natural beaches and shallow areas can serve as important foraging areas for spotted sandpiper, mink and other species, and as staging areas for spotted sandpiper and other shorebirds. Native vegetation will provide food and cover for a variety of species while reducing erosion and enhancing water quality. The structural diversity, snags, and large wood that may be enhanced in the forested portion of the site provide valuable habitat complexity for terrestrial species. Revegetation would enhance opportunities to develop large trees and forested areas for perching and nesting for bald eagle, osprey and other birds. The project will improve floodplain connectivity, which will help restore fluvial processes that help create and maintain certain habitat types.

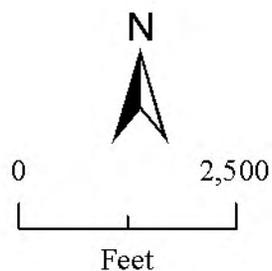
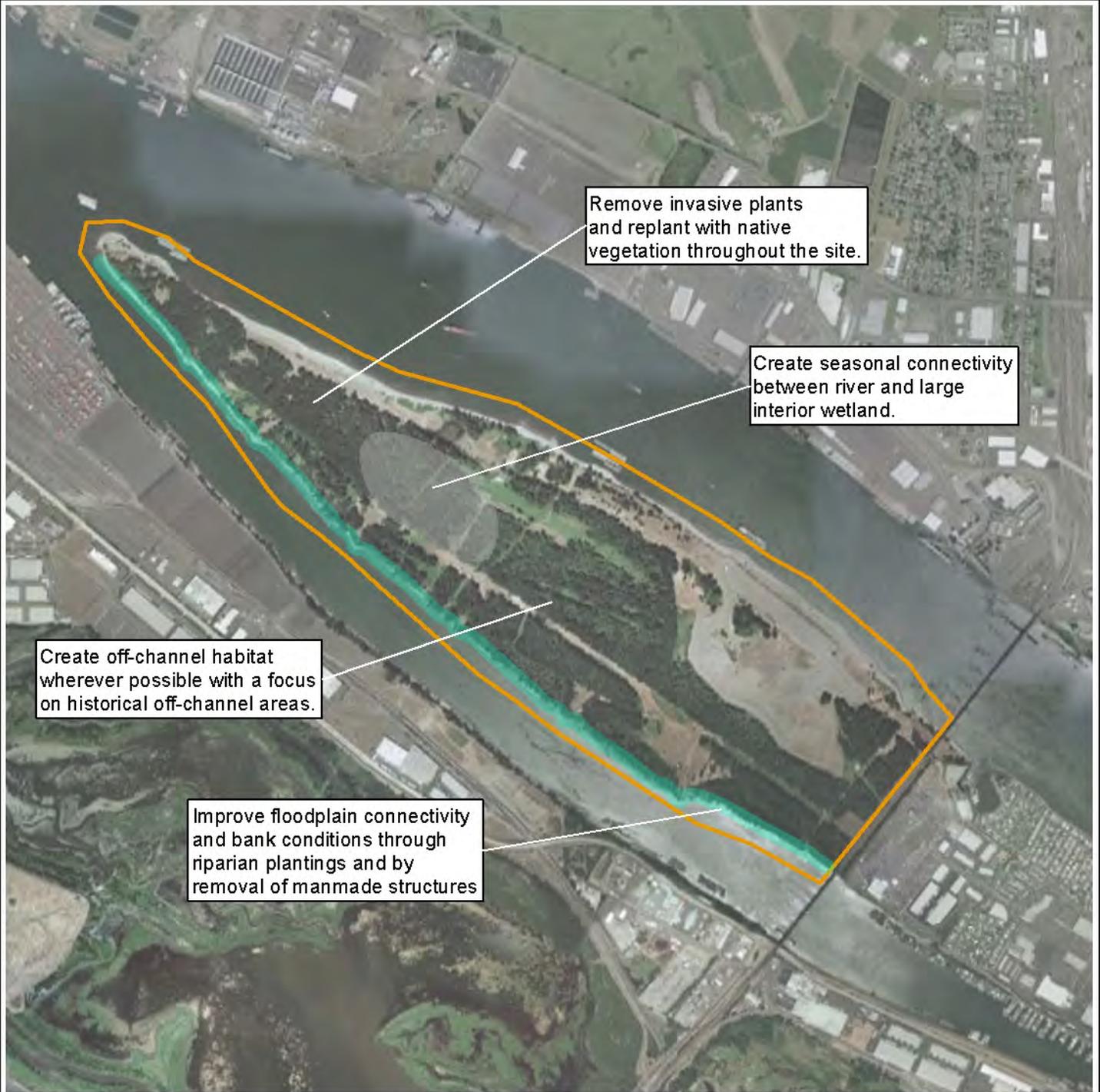
Feasibility: The Port of Portland has proposed development of a 300-acre portion of West Hayden Island. This development would require annexation and re-zoning of the area by the City of Portland, which has convened a Technical Panel to evaluate the current habitat value of the island. Although

restoration of portions of West Hayden Island may provide habitat value, this restoration could be impacted by the type and scale of activities associated with development that may eventually take place (for example, a rail loop or spur). Recreation at the site could also limit or impact ecological benefits. In terms of technical feasibility of the proposed restoration actions, the altered hydrologic regime of the Lower Columbia and Willamette rivers due to regional dam operations is the most significant constraint to restoration.

Other constraints/considerations: The Port has developed a suite of potential restoration designs on 500 acres of West Hayden Island. For purposes of this evaluation, the Trustees considered the potential “lift” provided by restoration of all 800 acres, recognizing that the entire area may not ultimately be available for restoration. This approach to evaluating the island’s restoration potential does not represent a Trustee Council position on the question of re-zoning the island for development.

West Hayden Island

Map prepared for Portland Harbor
Natural Resource Trustees



-  Potential Bank Restoration
-  Restoration Site

This map represents conceptual fish and wildlife habitat restoration opportunities which have been screened against criteria developed by the Portland Harbor Natural Resource Trustees. Further analysis of this site will occur to determine the feasibility, cost, and habitat value of the restoration concepts on a finer scale.

WILLAMETTE PARK

Landowner: City of Portland, Oregon Department of State Lands

Site description: Located at river mile 15.75 on the west bank of the Willamette River, Willamette Park is a 26-acre hybrid park that has both developed uses (boat ramp and dock, soccer fields, etc.) and natural areas that include wetlands, bottomland hardwood forest, beaches, mudflats, and rock outcrop islands. The site contains about 2,000 linear feet of riparian zone. Limiting habitat factors include hardened and steepened banks, disconnected floodplain, high human use, and untreated stormwater from the parking lot and boat launch.

Proposed restoration: The open spaces along the riverbank provide opportunities to restore steepened and hardened banks, widen the riparian corridor and to create shallow water habitat. Restoration at this site could include reducing bank slope and reducing the amount of hardened banks; improving the connection between the river and the floodplain; increasing the amount of shallow water habitat; increasing functional riparian and floodplain areas; and increasing the amount of large wood. There may also be opportunities to create off-channel habitat.

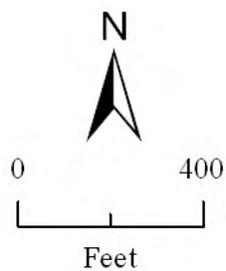
Benefits: Some portions of Willamette Park have excellent existing shallow water habitat that can be used as a reference for other shallow water restoration projects. The mudflats and rock outcrop islands provide unique habitat for shorebirds and fish. Improvements in riparian and nearshore aquatic habitats, banks and floodplains would improve rearing and refuge habitat for salmonids and enhance important feeding, breeding and nesting habitat for native wildlife. Increasing and improving riparian vegetation would increase available habitat and help stabilize stream banks; capture sediment in stormwater runoff; support hydrologic flow processes and nutrient cycling; and provide a source of woody material to the river.

Feasibility: Recreational use of the park, including the desire of park users for views of and access to the water from the park, is a key challenge to effective habitat restoration. In addition, restoration design will need to carefully avoid impacts to existing good-quality shallow water/mud flat habitat at the park.

Other constraints/considerations: BES is currently designing stormwater treatment retrofits for two areas in the park. These projects would address stormwater from the boat launch and large parking areas.

Willamette Park

Map prepared for Portland Harbor
Natural Resource Trustees

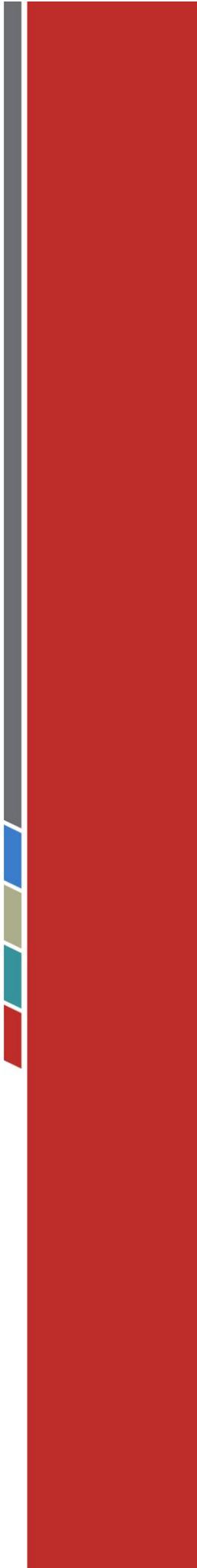


- Restoration Site
- Off-Channel Habitat
- Revegetation

This map represents conceptual fish and wildlife habitat restoration opportunities which have been screened against criteria developed by the Portland Harbor Natural Resource Trustees. Further analysis of this site will occur to determine the feasibility, cost, and habitat value of the restoration concepts on a finer scale.

Appendix B

Federally Listed Species



FEDERALLY LISTED SPECIES

Species that are listed under the Endangered Species Act (ESA) and that may occur within the project area are listed below (Table B-1).

Table B-1. Federally Listed Species Potentially Found within the Project Area

Common Name	Scientific Name	Listing Status	Critical Habitat
Fish			
Lower Columbia River (LCR) coho salmon	<i>Oncorhynchus kisutch</i>	T - 6/28/05; 70 F.R. 37160	3/25/16 81 F.R. 9251
Snake River Chinook salmon (spring/summer)	<i>O. tshawytscha</i>	T - 6/28/05; 70 F.R. 37160	10/25/99; 64 F.R. 57399
Snake River Chinook salmon (fall)	<i>O. tshawytscha</i>	T - 6/28/05; 70 F.R. 37160	12/28/93; 58 F.R. 68543
Upper Willamette River (UWR) Chinook salmon	<i>O. tshawytscha</i>	T - 6/28/05; 70 F.R. 37160	9/2/05; 70 F.R. 52630
Upper Columbia River (UCR) Chinook salmon	<i>O. tshawytscha</i>	E - 6/28/05; 70 F.R. 37160	9/2/05; 70 F.R. 52630
LCR Chinook salmon	<i>O. tshawytscha</i>	T - 6/28/05; 70 F.R. 37160	9/02/05; 70 F.R. 52630
Snake River sockeye salmon	<i>O. nerka</i>	E - 6/28/05; 70 F.R. 37160	12/28/93; 58 F.R. 68543
Columbia River chum salmon	<i>O. keta</i>	T - 6/28/05; 70 F.R. 37160	9/2/05; 70 F.R. 52630
Snake River steelhead	<i>O. mykiss</i>	T - 1/5/06; 71 F.R. 834	9/2/05; 70 F.R. 52630
UCR steelhead	<i>O. mykiss</i>	T - 6/18/09 court decision	9/2/05; 70 F.R. 52630
Middle Columbia River (MCR) steelhead	<i>O. mykiss</i>	T - 1/5/06; 71 F.R. 834	9/2/05; 70 F.R. 52630
LCR steelhead	<i>O. mykiss</i>	T - 1/5/06; 71 F.R. 834	9/2/05; 70 F.R. 52630
UWR steelhead	<i>O. mykiss</i>	T - 1/5/06; 71 F.R. 834	9/2/05; 70 F.R. 52630
Columbia River Bull Trout	<i>Salvelinus confluentus</i>	T - 6/10/98; 63 F.R. 31647	10/18/10; 75 F.R. 63898
Southern Distinct Population Segment (DPS) of green sturgeon	<i>Acipenser medirostris</i>	T - 4/07/06; 71 F.R. 17757	10/09/09; 74 F.R. 52300
Southern DPS eulachon	<i>Thaleichthys pacificus</i>	T - 3/18/10; 75 F.R. 13012	P - 1/5/11; 76 F.R. 515

Common Name	Scientific Name	Listing Status	Critical Habitat
Mammals			
Columbia River DPS of Columbian white-tailed deer	<i>Odocoileus virginianus leucurus</i>	E - 3/11/1967; 32 F.R. 4001	None Designated
Birds			
Streaked Horned Lark	<i>Eremophila alpestris strigata</i>	T - 11/4/13; 78 F.R. 61451	NA
Western DPS of yellow-billed cuckoo	<i>Coccyzus americanus</i>	T - 11/3/14; 79 F.R. 59991	NA
Plants			
Willamette daisy	<i>Erigeron decumbens decumbens</i>	E - 1/25/00; 65 F.R. 3875	NA
Bradshaw's desert parsley	<i>Lomatium bradshawii</i>	E - 9/30/88; 53 F.R. 38448	None Designated
Nelson's checker-mallow	<i>Sidalcea nelsoniana</i>	T - 2/12/93; 58 F.R. 8235	None Designated
Water howellia	<i>Howellia aquatilis</i>	T - 7/14/94; 59 F.R. 35860	None Designated
Kincaid's lupine	<i>Lupinus sulphureus kincaidii</i>	T - 1/25/00; 65 F.R. 3875	NA
Golden paintbrush	<i>Castilleja levisecta</i>	T - 6/11/97; 62 F.R. 31740	None Designated

E = listed as endangered; T = listed as threatened; P= proposed
NA = Critical habitat has been designated but not within the project area.

Below are brief descriptions of these listed species.

Lower Columbia River Coho Salmon

The LCR coho salmon evolutionarily significant unit (ESU) is listed as threatened under the ESA. The LCR ESU includes all naturally spawned populations of coho salmon in the Columbia River and its tributaries in Washington and Oregon, from the mouth of the Columbia River upstream to and including the Big White Salmon and Hood Rivers. This ESU also includes naturally spawned populations of coho salmon in the Willamette River up to Willamette Falls, Oregon (70 F.R. 37160). The ESU includes three major population groups (MPGs) and 24 historical populations. There are 25 artificial propagation programs for coho in this ESU.

LCR coho salmon primarily use the Columbia and Willamette Rivers within the project area for migration, holding, and rearing. LCR coho typically enter small, freshwater streams beginning in September or October, with the onset of fall freshets, and spawn from October to January. Outmigrating juveniles are present within the project area from mid-February to

mid-September, with peak juvenile outmigration occurring between April and June (CRC 2009; Carter et al. 2009).

Wild LCR coho salmon have been in decline for the last 75 years. Returns of wild coho have fallen from historical highs of 600,000 or more fish (Chapman 1986) to as low as 400 fish in 1996 (Chilcote 1999).

Limiting factors for LCR coho salmon are listed below (NMFS 2008a):

- Habitat degradation (including tributary hydropower development)
- Hatchery effects
- Fishery management and harvest decisions
- Predation

For populations originating in tributaries below Bonneville Dam, migration and habitat conditions in the main stem and estuary have been affected by dams and hydropower flow operations as well as habitat degradation caused by development and other land uses (NMFS 2008a).

Critical Habitat

Critical habitat was designated for LCR coho salmon on March 25, 2016 (81 F.R. 9251), and includes the Columbia River from the mouth to the confluence with the Hood River, as well as stream reaches in tributary subbasins. Designated critical habitat is present within portions of the project area in the Columbia River and North Portland Harbor.

The following PCEs are present in the project area: freshwater spawning, freshwater rearing, freshwater migration, and estuarine areas. These PCEs are generally in poor condition due to altered channel morphology and stability, lost and/or degraded floodplain connectivity, loss of habitat diversity, excessive sediment, degraded water quality, increased stream temperatures, reduced stream flow, and reduced access to spawning and rearing areas (NMFS 2008a).

Snake River Chinook Salmon (Spring/Summer)

The Snake River Chinook salmon ESU is listed as threatened under the ESA and includes all naturally spawned populations of spring/summer-run Chinook salmon in the mainstem Snake River and the Tucannon River, Grande Ronde River, Imnaha River, and Salmon River subbasins (70 F.R. 37160). There are 15 artificial propagation programs for Chinook salmon in this ESU.

Within the project area, Snake River Chinook salmon are present in the Columbia River and North Portland Harbor during upstream adult migration and downstream juvenile outmigration. Adult spring-run Chinook salmon migrate through the project area from approximately mid-February until the first week of June; adults classified as summer-run Chinook salmon migrate through the project area from June through approximately mid-September (NMFS 2005). Juveniles outmigrating to the ocean are potentially present in the project area between approximately February and August (CRC 2009; Carter et al. 2009).

Overall, average abundance of this ESU has been stable or increasing over the last 20 years. However, average abundance over the most recent 10-year period (1994 to 2004) is below the thresholds identified as the minimum for low risk (ICTRT 2007). Abundance for most populations declined to extremely low levels in the mid-1990s, increased to levels near the

recovery abundance thresholds for a few years in the early 2000s, and is now at levels intermediate to those of the mid-1990s and early 2000s.

Limiting factors for Snake River spring/summer-run Chinook salmon include the following (NMFS 2008a):

- Federal and private hydropower projects
- Predation
- Harvest
- Poor passage through the estuary
- Ocean conditions
- Degraded tributary habitat

Although hatchery management is not identified as a limiting factor for the ESU as a whole, hatchery impacts may be a factor for a few individual populations (NMFS 2008a; ICTRT 2007).

Critical Habitat

Critical habitat was designated for Snake River spring/summer-run Chinook salmon on October 25, 1999 (64 F.R. 57399). The critical habitat designation includes the Columbia River rearing/migration corridor which connects the ESU to the Pacific Ocean and includes portions of the project area (Columbia River and North Portland Harbor).

The following primary constituent elements (PCEs)²⁴ occur within portions of the project area (Columbia River and North Portland Harbor): juvenile migration corridors and adult migration corridors. Essential features of the juvenile migration corridor include substrate, water quality, water quantity, water velocity, cover/shelter, food, riparian vegetation, space, and safe passage conditions.

The migration corridor is considered to have a high conservation value for rearing and migrating juveniles and migrating adults. The PCEs are generally degraded due to lack of adequate pool and riffle channel structure in tributaries, high summer water temperatures, low flows, poor overwintering conditions due to loss of floodplain connection, and high sediment loads (NMFS 2008a).

Snake River Chinook Salmon (Fall Run)

The Snake River fall-run Chinook salmon ESU is listed as threatened under the ESA and includes all naturally spawned populations of fall-run Chinook salmon in the mainstem Snake River below Hells Canyon Dam, and in the Tucannon River, Grande Ronde River, Imnaha River, Salmon River, and Clearwater River subbasins (70 F.R. 37160). There are four artificial propagation programs for Chinook salmon in this ESU.

Adult and juvenile Snake River fall-run Chinook salmon use the Columbia River and North Portland Harbor for upstream adult migration and holding and for juvenile outmigration. Upstream-migrating adults are potentially present within the project area from approximately July to November (CRC 2009; NMFS 2005a). Juveniles outmigrating to the

²⁴NMFS biologists develop a list of PCEs for listed species relevant to determining whether appropriate habitat are consistent with the ESA Section (3)(5)(A) definition of “critical habitat” and the implementing regulation at 50 Code of Federal Regulations (C.F.R.) 424.12(b).

ocean are present in the project area between approximately June and October (CRC 2009; Carter et al. 2009).

Data for the most recently published 10-year period (1994-2004) for this ESU show an average abundance of 1,273 returning adults; this number is below the 3,000 natural spawner average abundance threshold that has been identified as a minimum for recovery (NMFS 2008a).

Limiting factors for this ESU include the following:

- Mainstem hydroelectric projects in the Columbia and Snake Rivers (NMFS 2008a)
- Predation
- Harvest
- Hatchery effects
- Ocean conditions
- Poor tributary habitat

Critical Habitat

Critical habitat was designated for Snake River fall-run Chinook salmon on December 28, 1993 (58 F.R. 68543). The critical habitat designation includes the Columbia River rearing/migration corridor, which connects the ESU to the Pacific Ocean and includes the Columbia River and North Portland Harbor within the project area.

The following PCEs occur within in the project area: juvenile migration corridors and adult migration corridors. Essential features of the juvenile migration corridor include substrate, water quality, water quantity, water velocity, cover/shelter, food, riparian vegetation, space, and safe passage conditions.

The Columbia River migration corridor is considered to have a high conservation value for rearing and migrating juveniles and migrating adults. The PCEs are generally degraded due to hydropower systems on the Snake and Columbia Rivers that cause high juvenile mortality, altered seasonal temperature regimes, and a reduction in spawning and rearing habitat associated with the mainstem lower Snake River hydropower system (NMFS 2008a).

Upper Willamette River Chinook Salmon

The UWR Chinook salmon ESU is listed as threatened under the ESA and includes all naturally spawned populations of spring-run Chinook salmon in the Clackamas River and in the Willamette River, and its tributaries, above Willamette Falls, Oregon, as well as seven artificial propagation programs (70 F.R. 37160).

The ESU is made up of seven historical populations: Clackamas, Molalla/Pudding, Calapooia, North Santiam, South Santiam, McKenzie, and the Middle Fork Willamette. Of these, significant natural production now occurs only in the Clackamas and McKenzie subbasins; the other naturally spawning populations are small and are dominated by hatchery-origin fish (NMFS 2008a).

Chinook salmon in this ESU use portions of the project area as a rearing and migration corridor. Adult Chinook salmon are present in the project area from approximately late February through early May (Myers et al. 1998). Juveniles may be present within the project area at any time of year and use the project area to rest, forage, and find refuge from high flows in the Columbia.

Abundance of UWR spring-run Chinook salmon is extremely depressed (McElhany et al. 2007). Historically, this run may have exceeded 275,000 fish (Myers et al. 1998). Most of the natural-origin populations in this ESU have very low current abundances (less than a few hundred fish), and many have been largely replaced by hatchery production. The current abundance of naturally produced fish is less than 10,000 fish, and only the McKenzie and Clackamas River populations contribute significantly to this estimate (NMFS 2008a). Long- and short-term abundance trends are negative (NMFS 2008a). This ESU has been characterized as having a high risk of extinction (McElhany et al. 2007).

Limiting factors for UWR Chinook salmon include the following (NMFS 2008a):

- Habitat loss and degradation
- Hatchery effects
- Fishery management and harvest decisions
- Predation
- Dams and other barriers which influence sedimentation, flows, temperatures, and water quality

Critical Habitat

Critical habitat was designated for UWR Chinook salmon on September 2, 2005 (70 F.R. 52630), and is present within portions of the project area (in the Columbia River near its confluence with the Willamette River at Kelley Point).

The project area contains three PCEs: freshwater migration, freshwater rearing, and estuarine areas. The migration corridor is considered to have a high conservation value for rearing and migrating juveniles and migrating adults. The PCEs are generally degraded due to lack of adequate pool and riffle channel structure in tributaries, high summer water temperatures, low flows, poor overwintering conditions due to loss of floodplain connection, and high sediment loads (NMFS 2008a).

Upper Columbia River Chinook Salmon

The UCR spring-run Chinook salmon ESU is listed as endangered under the ESA. This ESU includes all naturally spawned populations of Chinook salmon in all accessible river reaches in the mainstem Columbia River and its tributaries upstream of Rock Island Dam and downstream of Chief Joseph Dam in Washington, excluding the Okanogan River (70 F.R. 37160). All of the existing three subpopulations (one subpopulation is extinct) migrate through the project area. There are six artificial propagation programs for Chinook salmon in this ESU.

Within the project area, adult and juvenile UCR Chinook salmon are present in the Columbia River and North Portland Harbor during upstream adult migration, downstream juvenile outmigration, holding, and rearing. Upstream-migrating adults are present in the project area from approximately mid-January to mid-September (CRC 2009; NMFS 2005a). Juveniles outmigrating to the ocean are present in the project area from mid-February through August (CRC 2009). Rearing juveniles may be present within the project area year round.

Most subpopulations in this ESU experienced a significant decline in abundance in the mid-1990s, followed by an increase to levels above or near the recovery thresholds in the early

2000s, and have since reached levels intermediate to those of the mid-1990s and early 2000s (NMFS 2008b).

The key limiting factors for this ESU include the following (NMFS 2008a):

- Hydropower projects
- Predation
- Harvest
- Hatchery effects
- Degraded estuary habitat
- Degraded tributary habitat

Ocean conditions, which have also affected the status of this ESU, generally have been poor over the last 20 years and have improved only recently (NMFS 2008a).

Critical Habitat

Critical habitat was designated for UCR spring-run Chinook salmon on September 2, 2005 (70 F.R. 52630). The critical habitat designation includes the Columbia River rearing/migration corridor, which connects the ESU to the Pacific Ocean and includes portions of the project area (the Columbia River and North Portland Harbor).

The project area contains three PCEs: freshwater migration, freshwater rearing, and estuarine areas. The Columbia River rearing/migration corridor is considered to have a high conservation value for rearing and migrating juveniles and migrating adults. Dams, diversions, roads and railways, agriculture (including livestock grazing), residential development, and forest management continue to threaten the conservation value of critical habitat for this species in some locations in the upper Columbia Basin (NMFS 2008a).

Lower Columbia River Chinook Salmon

The LCR Chinook salmon ESU is listed as threatened under the ESA and includes all naturally spawned populations of Chinook salmon from the Columbia River and its tributaries that occur from the river's mouth at the Pacific Ocean, upstream to a transitional point between Washington and Oregon east of the Hood and White Salmon Rivers (70 F.R. 37160). The geographic extent of this ESU also includes the Willamette River to Willamette Falls, Oregon, with the exception of spring-run Chinook salmon in the Clackamas River. There are 17 artificial propagation programs for Chinook salmon in this ESU.

LCR Chinook salmon exhibit three life-history types: early fall runs (tules); late fall runs (brights); and spring runs. Fall runs historically (e.g., presettlement) occurred throughout the entire range of the ESU, while spring runs historically occurred only in the upper portions of basins with snowmelt-driven flow regimes (e.g., western Cascade Crest and Columbia Gorge tributaries).

LCR Chinook salmon use the Columbia River within the project area for migration, holding, and rearing, and they use the Willamette River for rearing and migration (StreamNet 2003). Thus, LCR Chinook salmon are likely to be present within the project area year round.

Adults of the fall runs migrate through the project area from August to December on their way to spawn in large mainstem tributaries. Upstream-migrating adults of the spring run are

present from February to June on their way to spawn in upstream and headwater tributaries (CRC 2009; NMFS 2005a).

The fall-run Chinook salmon outmigration typically peaks between May and July, although juveniles are present through October (CRC 2009; Carter et al. 2009). Spring-run (stream-type) Chinook salmon juveniles, which typically rear in higher elevation tributaries for a year before outmigrating, begin downstream migration as early as mid-February and continue through August; they are most abundant in the Columbia River estuary (generally defined as the lower Columbia River between Bonneville Dam and the mouth) between early April and early June (Carter et al. 2009).

Of the available data for this ESU, abundance estimates are low, and many of the long- and short-term abundance trends are negative. Natural production of Chinook salmon in the lower Columbia River Basin is generally considered to be substantially reduced compared to historical levels (Myers et al. 1998), and in some cases, natural runs have been effectively replaced by hatchery production. The abundance of fall-run Chinook salmon is currently much higher than that of spring-run Chinook salmon in this ESU (NMFS 2008a). Accessible stream habitat has been reduced from historical conditions by hydroelectric projects in some tributaries, leading to the extirpation of some populations. This ESU was determined to have a high to very high risk of extinction (McElhany et al. 2007).

Limiting factors for this ESU include the following (NMFS 2008a):

- Habitat degradation (e.g., hydropower development)
- Hatchery effects
- Fishery management and harvest decisions
- Predation from piscivorous birds (e.g., Caspian terns and cormorants), piscivorous fish (e.g., pikeminnow), and marine mammals (e.g., seals and sea lions)

LCR Chinook salmon populations began declining in the early 1900s due to habitat changes and harvest rates. For populations originating in tributaries below Bonneville Dam, migration and habitat conditions in the main stem and estuary have been affected by dams and hydrosystem flow operations. Tributary habitat has also been degraded by development and other land uses. And, hatchery production for this ESU has reduced the diversity and productivity of natural populations (NMFS 2008a).

Critical Habitat

Critical habitat was designated for LCR Chinook salmon on September 2, 2005 (70 F.R. 52630), and includes the Columbia River from the mouth to the confluence with the Hood River, as well as stream reaches in tributary subbasins. Designated critical habitat is present within portions of the project area in the Columbia River and North Portland Harbor.

The following PCEs are present in the project area: freshwater spawning, freshwater rearing, freshwater migration, and estuarine areas. These PCEs are generally in poor condition due to altered channel morphology and stability, lost and/or degraded floodplain connectivity, loss of habitat diversity, excessive sediment, degraded water quality, increased stream temperatures, reduced stream flow, and reduced access to spawning and rearing areas (NMFS 2008a).

Snake River Sockeye Salmon

The Snake River sockeye salmon ESU is listed as endangered under the ESA and includes all anadromous and residual sockeye salmon from the Snake River Basin, Idaho, as well as artificially propagated sockeye from the Redfish Lake captive propagation program (70 F.R. 37160).

Both adults and juveniles use portions of the project area for migration, holding and resting. Adult Snake River sockeye salmon are present within portions of the project area, especially within the Columbia River and North Portland Harbor during upstream migration in June and July (CRC 2009).

Sockeye salmon juveniles rear in freshwater lakes for 1 to 3 years prior to migrating to the ocean, and primarily use the lower Columbia River as a migration corridor (Carter et al. 2009). Juvenile outmigration occurs from April to mid-September; the limited information available indicates that sockeye salmon outmigration through the project area peaks in May (CRC 2009; Carter et al. 2009).

At the time of listing in 1991, Snake River sockeye salmon had declined to the point that there was no longer a self-sustaining, naturally spawning anadromous population. This has been the largest factor limiting the recovery of this ESU, important in terms of both risks due to catastrophic loss and potentially to genetic diversity. It is not yet clear whether the existing population retains sufficient genetic diversity to successfully adapt to variable conditions that occur within its natural habitat (NMFS 2008a).

Critical Habitat

Critical habitat was designated for Snake River sockeye salmon on December 28, 1993 (58 F.R. 68543), and is present within portions of the project area in the Columbia River and North Portland Harbor. The designation includes the Columbia River rearing/migration corridor, which connects the ESU with the ocean and intersects the project area.

The following PCEs occur within the project area: juvenile migration corridors and adult migration corridors. Essential features of the juvenile migration corridors include substrate, water quality, water quantity, water velocity, cover/shelter, food, riparian vegetation, space, and safe passage conditions.

The Columbia River migration corridor is considered to have a high conservation value. This corridor is used by rearing and migrating juveniles and migrating adults. The Columbia River estuary is an essential area for juveniles and adults making the physiological transition between life in freshwater and marine habitats (NMFS 2005a). The PCEs are generally limited by passage barriers (especially during periods of high summer temperatures) in the mainstem lower Snake and Salmon Rivers and high sediment loads in the upper reaches of the mainstem Salmon River (NMFS 2008a).

Columbia River Chum Salmon

The Columbia River chum salmon ESU is listed as threatened under the ESA and includes all naturally spawned populations of chum salmon in the Columbia River and its tributaries in Washington and Oregon, including the Willamette River (70 F.R. 37160). There are 16 historical populations in three major population groups in Oregon and Washington between the mouth of the Columbia River and the Cascade crest. There are three artificial propagation programs for chum salmon in this ESU.

Columbia River chum salmon use portions of the project area for migration, holding, rearing, and spawning. Upstream migrating adults are present in the project area from approximately mid-October through mid-January (CRC 2009; NMFS 2005a).

Historically, chum salmon primarily spawned in the Columbia River main stem and lower tributary reaches, exhibiting a preference for microhabitats with hyporheic flow (McElhany et al. 2007). The vast majority of 2002 chum salmon spawning occurred in the Grays River (downstream of the project area) and Lower Gorge tributaries (upstream of the project area), and in the mainstem Columbia River between the Interstate 205 bridge and the Bonneville Dam. Currently, the majority of spawning occurs on the Washington side of the Columbia. The only documented spawning locations in Oregon are occurrences of redds in the mainstem Columbia near McCord Creek and Multnomah Falls (both upstream from the project area) (McElhany 2005).

Chum salmon generally spawn between early November and mid-January with chum salmon fry spending very little time in fresh water, beginning their migration soon after emerging (Tomaro et al. 2007). Rearing in the lower Columbia River occurs from December through mid-March in off-channel areas (e.g., accessible areas of small tributaries, backwater areas, and other low-velocity refugia). Outmigrating fry are present from February through May (CRC 2009; NMFS 2005a), peaking from mid-April through mid-May (Carter et al. 2009).

Historical returns of Columbia River chum salmon are estimated to be over a million fish in some years (McElhany 2005). In recent years, returns have been limited to a few hundred to a few thousand, returning mainly to the Washington side of the Columbia River (McElhany 2005).

Limiting factors for Columbia River chum salmon include: mainstem and tributary hydropower development (e.g., loss of historical spawning habitat; availability of spawning habitat for the mainstem population), migration and habitat conditions in the lower Columbia River and the estuary, and degradation of tributary habitat (NMFS 2008a).

Critical Habitat

Critical habitat was designated for Columbia River chum salmon on September 2, 2005 (70 F.R. 52630), and is present within portions of the project area in the Columbia River and North Portland Harbor.

PCEs present in the project area include freshwater spawning, freshwater migration, freshwater rearing, and estuarine areas. In the lower Columbia River and its tributaries, major factors affecting PCEs are altered channel morphology and stability, lost and/or degraded floodplain connectivity, loss of habitat diversity, excessive sediment, degraded water quality, increased stream temperatures, reduced stream flow, and reduced access to spawning and rearing areas (NMFS 2008a).

Snake River Steelhead

The Snake River steelhead salmon DPS is listed as threatened under the ESA and includes all naturally spawned anadromous steelhead populations below natural and man-made impassable barriers in tributaries in the Snake River Basin of southeast Washington, northeast Oregon, and Idaho (71 F.R. 834). There are six artificial propagation programs for steelhead in this DPS.

Snake River steelhead are generally classified as summer-run, based on their adult run timing patterns. Adults use the Columbia River within the project area for migration and holding, and

are present between June and October (CRC 2009). Juveniles of this DPS tend to rear higher in the watershed than steelhead that occupy lower tributaries of the Columbia River. Outmigrating juveniles are present in the project area from March to late June (CRC 2009).

Overall, the abundance of Snake River steelhead has been stable or increasing for most populations during the last 20 brood cycles. However, most populations in this DPS were determined to have a high long-term (100-year) risk of extinction (ICTRT 2007).

Key limiting factors for Snake River steelhead include the following (NMFS 2008a):

- Hydropower projects
- Predation
- Harvest
- Hatchery effects
- Poor ocean conditions
- Degraded tributary habitat

Critical Habitat

Critical habitat was designated for Snake River steelhead on September 2, 2005 (70 F.R. 52630). The critical habitat designation includes the Columbia River rearing/migration corridor, which connects the DPS to the Pacific Ocean and includes portions of the project area (the Columbia River and North Portland Harbor).

The project area contains the following PCEs: freshwater migration, and estuarine areas. The Columbia River rearing/migration corridor is considered to have a high conservation value for rearing and migrating juveniles and migrating adults. The Columbia River estuary is an essential area for juveniles and adults making the physiological transition between life in freshwater and marine habitats (NMFS 2005a). The PCEs are generally degraded due to mortality from the mainstem dams, lack of adequate pool and riffle channel structure in tributaries, high summer water temperatures, low flows, poor overwintering conditions due to loss of floodplain connection, and high sediment loads (NMFS 2008a).

Upper Columbia River Steelhead

The UCR steelhead DPS is listed as threatened under the ESA and includes all naturally spawned anadromous steelhead populations below natural and man-made impassable barriers in tributaries in the Columbia River Basin upstream from the Yakima River, Washington, to the Canadian border (NMFS 2008a). There are six artificial propagation programs for steelhead in this DPS.

UCR steelhead are entirely summer-run fish and use the Columbia River within the project area for migration and holding. Returning adults are present in the project area from May through October. Juveniles tend to rear higher in the watershed than steelhead juveniles from the Lower and Middle Columbia River DPSs (CRC 2009; NMFS 2005a). Outmigrating juveniles are present in the project area from approximately March to late June (CRC 2009).

Abundance for most populations in this ESU declined to extremely low levels in the mid-1990s, increased to levels above or near the recovery abundance thresholds in a few years in the early 2000s, and is now at levels intermediate to those of the mid-1990s and early 2000s.

Abundance since 2001 has substantially increased for the DPS as a whole. All populations in this DPS were determined to have a high long-term (100-year) risk of extinction (ICTRT 2007).

The key limiting factors and threats for this DPS include the following (NMFS 2008a):

- Hydropower projects
- Predation
- Harvest
- Hatchery effects
- Degraded tributary habitat
- Poor ocean conditions
- Degraded estuary habitat

Critical Habitat

Critical habitat was designated for UCR steelhead on September 2, 2005 (70 F.R. 52630). The critical habitat designation includes the Columbia River rearing/migration corridor, which connects the DPS to the Pacific Ocean and includes portions of the project area (Columbia River and North Portland Harbor). The project area contains the following PCEs: freshwater migration and estuarine areas.

The Columbia River rearing/migration corridor is considered to have a high conservation value for rearing and migrating juveniles and migrating adults. The Columbia River estuary is an essential area for juveniles and adults making the physiological transition between life in freshwater and marine habitats (NMFS 2005a). Factors such as dams, diversions, roads and railways, agriculture (including livestock grazing), residential development, and forest management threaten the conservation value of the PCEs in the project area (NMFS 2008a).

Middle Columbia River Steelhead

The MCR steelhead DPS is listed as threatened under the ESA and includes all naturally spawned anadromous steelhead populations below natural and man-made impassable barriers in tributaries from above the Wind River, Washington, and the Hood River, Oregon, upstream to (and including) the Yakima River, Washington (71 F.R. 834). There are seven artificial propagation programs for steelhead in this DPS.

MCR steelhead are predominantly summer-run fish and use the Columbia River within the project area for migration and holding. Returning adults in this DPS are present in the project area from May through October (CRC 2009). Outmigrating juveniles are present within portions of the project area from approximately March to June (CRC 2009).

Abundance for most populations in this DPS was relatively high during the late 1980s, declined to low levels in the mid-1990s, and increased to levels similar to the late 1980s during the early 2000s. On average, when only natural production is considered, most of the populations in this DPS have replaced themselves (NMFS 2008a). Most populations in this DPS have a low or moderate long-term (100-year) risk of extinction; however, one population has very low risk and five populations have high risk (ICTRT 2007).

Limiting factors for MCR steelhead include the following (NMFS 2008a):

- Mainstem hydropower projects
- Degradation and loss of tributary habitat
- Water storage projects
- Predation
- Hatchery effects
- Harvest
- Poor ocean and estuary conditions

Critical Habitat

Critical habitat was designated for MCR steelhead on September 2, 2005 (70 F.R. 52630), and is present within portions of the project area in the Columbia River and North Portland Harbor.

PCEs present in the project area include freshwater migration and estuarine areas. The critical habitat designation includes the Columbia River migration corridor which connects the DPS with the ocean. The corridor is considered to have a high conservation value for rearing and migrating juveniles and migrating adults. PCEs in the project area are limited by degradation of tributary habitat conditions, dams, water diversions, roads and railways, agriculture (including livestock grazing), residential development, and forest management in some locations in the upper Columbia River Basin (NMFS 2008a).

Lower Columbia River Steelhead

The LCR steelhead DPS is listed as threatened under the ESA and includes all naturally spawned anadromous steelhead populations below natural and man-made impassable barriers in tributaries to the Columbia River between (and including) the Cowlitz and Wind Rivers in Washington, and the Willamette and Hood Rivers in Oregon (71 F.R. 834). There are 10 artificial propagation programs for steelhead in this DPS.

In the lower Columbia River Basin, migrating adult steelhead can occur within portions of the project area year round. Steelhead can be classified into summer and winter runs. Of the 25 extant populations in this DPS, six are summer runs and 19 are winter runs. Returning adults of both runs are 4 to 6 years of age. Summer-run steelhead return to the Columbia River between May and October and require several months in fresh water to reach sexual maturity and spawn. Spawning typically occurs between January and June (CRC 2009; NMFS 2005a). Winter-run steelhead return to the Columbia River between November and May as sexually mature individuals that spawn shortly after returning to fresh water (CRC 2009; NMFS 2005a).

LCR steelhead use the Columbia River within the project area for migration, holding, and rearing and use the Willamette River mainly for rearing and migration. Steelhead typically rear in freshwater tributaries for 1 to 4 years prior to outmigration and spend limited time rearing in the lower mainstem Columbia River (Carter et al. 2009).

Outmigrating juvenile winter-run steelhead are present in the project area from mid-February through November; outmigrating juvenile summer-run steelhead are present in the project area from March to September (CRC 2009). Juvenile steelhead abundance in the Columbia River estuary peaks between late May and mid-June (CRC 2009; Carter et al. 2009).

Wild steelhead in the lower Columbia Basin, although depressed from historical levels, are generally thought to occur in most of their historical range (McElhany et al. 2007). However, many of the populations in this DPS are small, and many of the long- and short-term trends in abundance of individual populations are negative to severely negative. Most populations of LCR steelhead have a high risk of extinction (McElhany et al. 2007).

Limiting factors for this DPS include the following (NMFS 2008a):

- Habitat degradation (including tributary hydropower development)
- Hatchery effects
- Fishery management and harvest decisions
- Predation

Tributary habitat has been degraded by extensive development and other effects of changing land use. This has adversely affected stream temperatures and reduced the habitat diversity needed for steelhead spawning, incubation, and rearing. All populations are affected by habitat degradation in the Columbia River main stem and estuary (NMFS 2008a).

Critical Habitat

Critical habitat was designated for LCR Steelhead on September 2, 2005 (70 F.R. 52630), and is present within portions of the project area in the Columbia River and North Portland Harbor.

The project area contains the following PCEs: freshwater rearing, freshwater migration, and estuarine areas. The critical habitat designation includes the Columbia River rearing/migration corridor, which is considered to have a high conservation value. This corridor connects the DPS with the Pacific Ocean and is used by rearing and migrating juveniles and migrating adults. The Columbia River estuary is an essential area for juveniles and adults making the physiological transition between life in freshwater and marine habitats (NMFS 2005a). The PCEs within the project area are of generally poor quality due to altered channel morphology and stability, lost and/or degraded floodplain connectivity, loss of habitat diversity, excessive sediment, degraded water quality, increased stream temperatures, reduced stream flow, and reduced access to spawning and rearing areas.

Upper Willamette River Steelhead

The UWR steelhead DPS is listed as threatened under the ESA and includes all naturally spawned winter-run steelhead populations below natural and man-made barriers in the Willamette River and its tributaries from Willamette Falls upstream to the Calapooia River (inclusive) (71 F.R. 834).

Steelhead in this DPS use portions of the project area as a rearing and migration corridor. Steelhead of this DPS are late-migrating winter-run steelhead, entering fresh water primarily in March and April and entering the mouth of the Willamette River from March through May (Busby et al. 1996). Juvenile outmigration past Willamette Falls occurs between early April and early June (Howell et al. 1985), with migration peaking in early to mid-May. Steelhead juveniles generally migrate away from the shoreline and enter the Columbia via the Multnomah Channel rather than the mouth of the Willamette River.

Population counts of this DPS have been reduced from historical levels, caused in part by the alteration and reduction of spawning and rearing habitat associated with hydropower

development. All populations migrate through and rear in the Willamette River and are relatively small, with the recent mean abundance of the entire DPS at less than 6,000 (Good et al. 2005). Based on recent analyses of the population criteria, the species risk of extinction is moderate, with the highest risk category being genetic diversity (McElhany et al. 2007).

Limiting factors for UWR steelhead include the following (NMFS 2008a):

- Habitat loss and degradation
- Tributary hydropower development
- Hatchery effects
- Fishery management
- Harvest decisions
- Predation

Habitat has been particularly degraded in the lower reaches of tributaries to the Willamette River by the reduction of channel complexity associated with the removal of large wood debris to improve navigability (NMFS 2009).

Critical Habitat

Critical habitat was designated for UWR Steelhead on September 2, 2005 (70 F.R. 52630). The designation includes a rearing and migration corridor connecting the DPS with the Pacific Ocean. The corridor extends from the mouth of the Columbia River to the Willamette River at its confluence with the Clackamas River. PCEs present in the project area include freshwater migration and estuarine areas. The PCEs are generally degraded due to lack of adequate pool and riffle channel structure in tributaries, high summer water temperatures, low flows, poor overwintering conditions due to loss of floodplain connection, and high sediment loads (NMFS 2008a).

Columbia River Bull Trout

The Columbia River bull trout DPS is listed as threatened under the ESA and includes the entire Columbia River Basin within the United States, with the exception of the Jarbidge River in Nevada. The Columbia River distribution includes all tributaries in Oregon and Washington downstream of the Snake River confluence near the town of Pasco, Washington (63 F.R. 31647).

Bull trout in the lower Columbia River below Bonneville Dam primarily inhabit tributary systems, including the Lewis, Klickitat, and Hood Rivers (USFWS 2002). Within the Hood River system, bull trout spawn in the headwater creeks and use the mainstem Hood River for migration to and from the mainstem Columbia River (USFWS 2002).

Current bull trout abundance, spatial distribution, and temporal use of the mainstem Columbia River have not been thoroughly documented. Bull trout exhibit both anadromous and resident (or fluvial) life histories; however, bull trout in the lower Columbia River Basin are thought to be only that of the resident life-history form, remaining in creeks and tributaries throughout their life cycle. Current information does not support anadromous populations occurring in the mainstem Columbia River; however, the Lower Columbia Recovery Team considers the mainstem Columbia River to contain core habitat for foraging, migrating, and overwintering, which may be important for full species recovery to occur (USFWS 2002).

Based on historical data collected since 1941, bull trout could potentially be present within portions of the project area. However, based on the locations and numbers of bull trout documented in the lower Columbia River, the number of bull trout that may occur would likely be very limited.

Limiting factors for bull trout include the following (USFWS 2002):

- Habitat degradation and fragmentation
- Migratory barriers (e.g., dams)
- Degraded water quality
- Angler harvest and poaching
- Entrainment into diversion channels and dams
- Introduced nonnative species

Land and water management activities impacting bull trout populations and habitat also include forest management practices, livestock grazing, agriculture, road construction and maintenance, mining, and urban and rural development (USFWS 2002).

Critical Habitat

Critical habitat was designated for Columbia River bull trout on September 26, 2005 (70 F.R. 56211). Critical habitat was subsequently revised and redesignated on October 18, 2010 (75 F.R. 63898). The lower Columbia River within the project area is included in the revised designation of critical habitat. The following PCEs of critical habitat are present within the project area: migratory habitats, an abundant food base, complex river environments and processes, suitable water temperatures, suitable river flows and sufficient water quality and quantity such that normal growth and survival are not inhibited. Limiting factors referenced above generally have resulted in the degradation of bull trout PCEs.

Southern DPS of Green Sturgeon

The Southern DPS of green sturgeon is listed as threatened under the ESA (71 F.R. 17757). This DPS includes coastal and Central Valley California populations south of the Eel River, with the only known spawning population in the Sacramento River (71 F.R. 17757). Adults and subadults from this DPS migrate up the coast and use coastal estuaries, including the lower Columbia River, for resting and feeding during the summer.

Green sturgeon are potentially present within portions of the project area from mid-May until September (CRC 2009). However, suitable habitat (i.e., estuarine areas with higher salinity and an abundance of preferred prey species) for this species is extremely limited within the project area. Historically, southern DPS green sturgeon were not found in the Willamette River and none has been found in surveys of the Willamette River (NMFS 2009).

Some studies suggest that, based on commercial catch rates, all west coast sturgeon have experienced approximately an 88 percent decline in abundance since the late 1800s (Adams et al. 2002). Limited data are available that exhibit a negative trend in juvenile green sturgeon abundance (71 F.R. 17757). Rates of green sturgeon harvested (in pounds) in Columbia River commercial landings are available but do not indicate trends (Adams et al. 2002). Assessing Southern DPS green sturgeon abundance in the Columbia River is complicated by the fact that green sturgeon are harvested from the Southern DPS as well as the Northern DPS (which is not protected under the ESA). Since it is unknown to what extent either DPS is part of the

Columbia River summer concentrations and their associated fisheries, it is impossible to differentiate the harvest impact between the two DPSs (Adams et al. 2002).

The primary limiting factors for recovery of the Southern DPS of green sturgeon are the degradation of overall habitat quality and the significant reduction of spawning habitat across the range of the species; current spawning habitat is limited to portions of the Sacramento River below the Keswick Dam. Because the Sacramento River contains the only known green sturgeon spawning population in this DPS, the concentration of spawning adults in one river places the DPS at risk of catastrophic events. Spawning habitat in other portions of the species' historical range has been significantly modified by land use and water diversions and/or is not accessible (71 F.R. 17757).

Critical Habitat

Critical habitat was designated for the green sturgeon Southern DPS on October 9, 2009 (74 F.R. 52300). The critical habitat designation includes the Columbia River up to RM 46 (downstream of the project area).

Southern DPS Eulachon

The Southern DPS of eulachon has been listed as threatened under the ESA (75 F.R. 13012). The Southern DPS of eulachon consists of populations that spawn in rivers south of the Nass River in British Columbia, up to and including the Mad River in California. Within the range of the Southern DPS, major production areas or core populations for this species include the Columbia River (74 F.R. 10857).

The majority of the eulachon production south of the U.S./Canadian border is in the Columbia River Basin; the largest and most consistent spawning runs in the basin occur in tributaries of the Columbia River from RM 25 to RM 146 (including the project area). The timing of adult entry into the Columbia River system is highly variable. This is particularly evident for the Sandy River that provides the last significant spawning area for eulachon upstream of the project area.

Eulachon spawn in the lower Columbia River Basin soon after entry (January through May). Outmigration (larval drift) in the lower Columbia River generally occurs between February and mid-June, peaking in February and March (73 F.R. 13187). However, larval presence in the project area can be expected to be as variable by month and year as the adult returns indicate for the Sandy River.

Available catch and effort information indicate an abrupt decline in eulachon abundance in the early 1990s, with no evidence that the population has since rebounded. The primary limiting factor identified for eulachon is changes in ocean conditions due to climate change. Changes in air and surface temperatures associated with climate change are likely to modify freshwater, estuarine, and marine habitats of this species by affecting peak flows that influence freshwater temperatures and spawning, affecting the distribution and abundance of prey species (e.g., zooplankton) and redistributing eulachon predators (piscivorous birds [e.g., gulls, terns], sea lions, and sturgeon) and competitors (e.g., Pacific hake).

Additional limiting factors include the effects of dams and water diversions on freshwater systems and reductions in water quality in freshwater systems. Alteration of the natural hydrograph of river systems reduces the magnitude of spring freshets with which eulachon have evolved. Dams can also impede or alter bedload movement, changing the composition of river substrates important to spawning eulachon (74 F.R. 10857). Degradation of water

quality in spawning habitat due to elevated water temperatures and chemical contaminants is a potential, yet undocumented, limiting factor to recovery.

Critical Habitat

Critical habitat for the Southern DPS of eulachon was proposed on January 5, 2011 (76 F.R. 515), designated on October 20, 2011, and took effect on December 19, 2011 (76 F.R. 65324). This designation includes the Columbia River from its mouth upstream to Bonneville Dam (RM 146). Designated critical habitat for this species is present in the project area in the Columbia River on the Oregon side from Hayden Island to the confluence with Multnomah Channel.

Columbia River DPS of Columbian White-tailed Deer

Columbia River DPS of Columbian white-tailed deer is federally listed as endangered under the ESA in the Columbia River area (Clark, Cowlitz, Pacific, Skamania, and Wahkiakum Counties, Washington, and Clatsop, Columbia, and Multnomah Counties, Oregon) (32 F.R. 4001).

When this species was first listed under the ESA, low population numbers and habitat loss and conversion were the two primary threats. Although the Columbia River population has increased since it was listed, the population still faces the following threats:

- Potential for major floods that breach levees on the lower Columbia River
- Hybridization with black-tailed deer
- Collisions with cars
- Parasites
- Disease (e.g., foot rot, which has been found in the lower Columbia River population) (ODFW 1995)

Columbian white-tailed deer utilize wet prairie and lightly wooded bottomlands or tidelands along streams and rivers; woodlands are particularly attractive when interspersed with grasslands and pastures (NatureServe 2010). Columbian white-tailed deer are locally common in the bottomlands and prairie woodlands of the lower Columbia River and Willamette River Basins (NatureServe 2010).

Critical Habitat

Critical habitat has not been designated for this species.

Streaked Horned Lark

The streaked horned lark is a federally listed as threatened under the ESA. Streaked horned larks inhabit large open grassland, sparsely vegetated beaches and islands, and agricultural fields. The streaked horned lark was historically found from southwestern British Columbia to the Rogue River Valley in Southern Oregon, but in recent years, it has declined sharply in its range. Currently, the streaked horned lark is known to breed in large areas with low/sparse grassy vegetation on prairie remnants, airports, beaches, accreted lands, dredge spoil islands, industrial sites, agricultural land, pasture, grass habitat, and mudflats in scattered locations in western Washington and Oregon (USFWS 2016). A key attribute of habitat used by larks is open landscape context. Recent studies indicate that sites used by larks are generally found in open (i.e., flat, treeless) landscapes of 300 acres or more, but may be smaller if adjacent fields or open water provide open landscape context. A few nesting locations have been

documented throughout the Willamette Valley and lower Columbia River area. At least one of these occurs within the North Portland Industrial Area, about 1 mile outside of the SSA (Pearson and Altman 2005; ORNHIC 2009).

Critical Habitat

Critical habitat was designated for this species on October 3, 2013 (78 F.R. 61506), but is not present in the project area.

Yellow-billed Cuckoo

The western DPS of yellow-billed cuckoo is federally listed as threatened under the ESA. During breeding, yellow-billed cuckoos prefer large continuous willow and cottonwood stands in riparian zones of rivers. Historically, the yellow-billed cuckoo bred throughout much of North America; however, within the last 50 years the species' distribution west of the Rocky Mountains has greatly declined. Yellow-billed cuckoos have always been rare in Oregon; however, they have become even rarer with the loss of large riparian zones along the Willamette and Columbia Rivers. The last confirmed breeding records in Oregon are from the 1940s (USFWS 2016).

Critical Habitat

Critical habitat was designated for this species on August 8, 2014 (79 F.R. 48547), but is not present in the project area.

Willamette Daisy

The Willamette daisy (*Erigeron decumbens* var. *decumbens*) is federally listed as endangered under the ESA. Currently the range of the daisy is limited to the southern end of the Willamette Valley (NatureServe 2010). Because the project area is outside the daisy's current observed range, it is highly unlikely for there to be any occurrence of the Willamette daisy. However, a plant survey for Willamette daisy is recommended.

Critical Habitat

Critical habitat was designated for Willamette daisy on October 31, 2006 (71 F.R. 63862), but is not present within the project area. Critical habitat units are depicted for Benton, Lane, Linn, Marion, and Polk Counties, in Oregon (71 F.R. 63862).

Bradshaw's Desert Parsley

Bradshaw's desert parsley (*Lomatium bradshawii*) is federally listed as endangered under the ESA. Currently the range of Bradshaw's desert parsley is limited to the southern end of the Willamette Valley and to Clark County, Washington (NatureServe 2010). Because the project area is outside Bradshaw's desert parsley's current observed range, it is highly unlikely for there to be any occurrence of Bradshaw's desert parsley. However, a plant survey for Bradshaw's desert parsley is recommended.

Critical Habitat

Critical habitat has not been designated for this species.

Nelson's Checker-mallow

Nelson's checker-mallow is federally listed as threatened under the ESA. Most sites occur in the Willamette Valley of Oregon, from southern Benton County northward through the central and western Willamette Valley to central Washington County (NatureServe 2010). Nelson's checker-mallow habitats are often native prairie remnants and include old cemeteries, fencerows, edges of plowed fields adjacent to wooded areas, margins of streams, sloughs, ditches, drainage swales, hay fields, and fallow fields. It is also known to occur along roadsides at stream crossings where nonnative plants, such as reed canarygrass (*Phalaris arundinacea*) and blackberry (*Rubus armeniacus*), are present (NatureServe 2010). These habitat types may be present within the project area, thus, a plant survey for Nelson's checker-mallow is recommended.

Critical Habitat

Critical habitat has not been designated for this species.

Water Howellia

Water howellia is federally listed as threatened under the ESA. Water howellia grows submerged, rooted in bottom sediments of ponds and sloughs as well as former river oxbows with margins of deciduous trees and shrubs (NatureServe 2010). Habitats include areas inundated by spring rains and snowmelt runoff and typically dry out by the end of the growing season. The plants also tend to root in the shallow water at the edges of deeper ponds that are (at lower elevations) surrounded by deciduous trees (NatureServe 2010). Habitat suitable for water howellia may be present within the project area, thus a plant survey is recommended.

Critical Habitat

Critical habitat has not been designated for this species.

Kincaid's Lupine

Kincaid's lupine is federally listed as threatened under the ESA. Kincaid's lupine occurs in small populations with remnant stands of native grassland and is widely scattered. A primary threat is heavy infestations of alien plants; past threats include agriculture and urbanization (NatureServe 2010). Habitat suitable for Kincaid's lupine may be present within the project area, thus a plant survey is recommended.

Critical Habitat

Critical habitat was designated for Kincaid's lupine on October 31, 2006 (71 F.R. 63862), but is not present within the project area. Critical habitat units are depicted for Benton, Lane, Polk, and Yamhill Counties in Oregon (71 F.R. 63862).

Golden Paintbrush

Golden paintbrush is federally listed as threatened under the ESA. Golden paintbrush occurs in upland prairies, flat grasslands, and on grassy bluffs in typically well-drained soils of glacial origin. In Oregon, golden paintbrush historically occurred in the Willamette Valley in Linn, Marion and Multnomah Counties; however, the species is believed to be extirpated in Oregon as the habitat has been changed or modified by urbanization or agriculture as well as succession of prairies and grasslands to forest (USFWS 2015).

Critical Habitat

Critical habitat has not been designated for this species.

Appendix C

Preferred Plant List

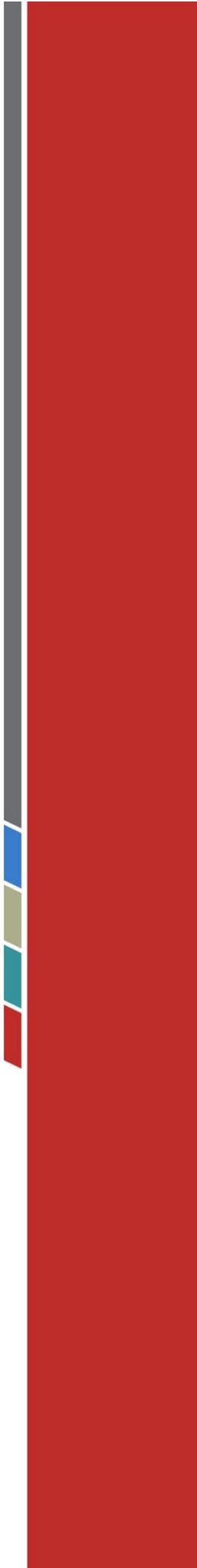


Table C-1. Portland Harbor Native Plants Restoration List

Scientific Name	Common Name	Status	Grouping	Elevation	Availability of Stock	Ease of Establishment	Historic Presence
<i>Abies grandis</i>	Grand fir	Native	Wetland, Riparian, Forest, Forest Slope	Low to Mid Elevation	Good	Good	Uncommon
<i>Acer circinatum</i>	Vine maple	Native	Forest, Forest Slope, Grassland	Low to Mid Elevation	Good	Good	Moderate
<i>Acer macrophyllum</i>	Bigleaf Maple	Native	Forest/Thicket	Low to Mid Elevation	Good	Good	Common
<i>Achillea millefolium L.</i>	Yarrow	Native	Grassland, Thicket	Low to High Elevation	Good	Good	Common
<i>Adiantum pedatum</i>	Maidenhair Fern	Native	Riparian, Forest, Forest Slope, Rocky	Low to Middle Elevation	Good	Moderate	Uncommon
<i>Allium acuminatum</i>	Hooker's Onion	Native	Open Forest, Rocky, Grassland	Low Elevation	Good	Good	Uncommon
<i>Allium cernuum</i>	Nodding Onion	Native	Open Forest, Rocky, Grassland	Low Elevation	Good	Good	Uncommon
<i>Alnus rhombifolia</i>	White Alder	Native	Riparian	Low to High Elevation	Good	Good	Uncommon
<i>Alnus rubra</i>	Red Alder	Native	Riparian, Forest, Forest Slope	Low Elevation	Good	Good	Common
<i>Amelanchier alnifolia</i>	Serviceberry, Saskatoon	Native	Forest, Forest Slope, Thicket	Low to Mid Elevation	Good	Good	Moderate
<i>Angelica arguta</i>	Sharptooth angelica	Native	Wetland, Riparian	Low to Mid Elevation	Good	Probably best from seed	Common
<i>Angelica spp.</i>	Angelica	Native	Riparian	Low to High Elevation	Good	Probably best from seed	Common

Scientific Name	Common Name	Status	Grouping	Elevation	Availability of Stock	Ease of Establishment	Historic Presence
<i>Apocynum cannabinum</i>	Dogbane (Indian Hemp)	Native	Grassland, Thicket	Low to High Elevation	Moderate	Good	Uncommon
<i>Aquilegia formosa</i>	Red Columbine	Native	Riparian, Forest, Meadow, Rocky	Low to High Elevation	Good	Good	Uncommon
<i>Arbutus menziesii</i>	Pacific Madrone	Native	Rocky	Low to Mid Elevation	Good	Hard	Moderate
<i>Arctostaphylos uva-ursi</i>	Kinnikinnick	Native	Forest, Forest Slope, Rocky, Riparian	Low to High Elevation	Good	Moderate	Moderate
<i>Asarum caudatum</i>	Wild Ginger	Native	Forest, Forest Slope	Low to Mid Elevation	Good	Moderate	Moderate
<i>Brodiaea hyacinthia</i>	Hyacinth Brodiaea	Native	Meadow, Forest Slope, Rocky	Low Elevation	Good	Good	Uncommon
<i>Camassia quamash</i>	Camas	Native	Wetland, Meadowland	Low to Mid Elevation	Good	Good	Uncommon
<i>Carex obnupta</i>	Slough Sedge	Native	Wetland, Riparian	Low Elevation	Good	Good	Common
<i>Carex pellita</i>	Woolly Sedge	Native	Wetland, Riparian, Meadow	Low to High Elevation	Review	Review	Review
<i>Carex</i> spp.	Sedges	Native	Wetland	Low to High Elevation	Good	Good	Common
<i>Carex vesicaria</i>	Inflated Sedge	Native	Wetland, Riparian	Low to Mid Elevation	Review	Review	Review
<i>Cicuta douglassi</i>	Douglas' Water-Hemlock	Native	Wetland, Riparian	Low to Mid Elevation	Review	Review	Review
<i>Claytonia perfoliata</i>	Miner's lettuce	Native	Riparian, Forest	Low to Mid Elevation	Review	Review	Moderate
<i>Clinopodium douglasii</i>	Yerba buena	Native	Riparian	Low to High Elevation	Review	Review	Review

Scientific Name	Common Name	Status	Grouping	Elevation	Availability of Stock	Ease of Establishment	Historic Presence
<i>Cornus canadensis</i>	Bunchberry dogwood	Native	Riparian, Forest, Thickets, Meadows	Low to High Elevation	Good	Moderate	Moderate
<i>Cornus nuttallii</i>	Pacific Dogwood	Native	Riparian, Forest, Thickets, Forest Slope	Low Elevation	Good	Moderate	Moderate
<i>Cornus sericea</i> ssp. <i>sericea</i>	Red Osier Dogwood	Native	Wetland, Riparian, Thicket	Low to Mid Elevation	Good	Good	Common
<i>Cornus stolonifera</i>	Red Osier Dogwood	Native	Wetland, Riparian, Thicket	Low to Mid Elevation	Good	Good	Common
<i>Corylus cornuta</i>	Beaked Hazelnut	Native	Forest, Forest Slope, Thicket	Low to Mid Elevation	Good	Good to moderate	Moderate
<i>Crataegus douglassii</i>	Black hawthorn	Native	Thickets, Grasslands	Low to Mid Elevation	Good	Good	Moderate
<i>Delphinium menziesii</i>	Menzies' Larkspur	Native	Grasslands, Meadows, Thickets	Low to Mid Elevation	Good	Good	Uncommon
<i>Delphinium</i> spp.	Larkspur	Native	Riparian, Forest, Thickets, Meadows	Low to High Elevation	Good	Good	Uncommon
<i>Eleocharis palustris</i>	Creeping Spike-Rush	Native	Wetland, Riparian	Low to Mid Elevation	Good	Moderate	Review
<i>Eleocharis</i> spp.	Spike Rush	Native	Emergent, Wetland, Riparian	Low to Mid Elevation	Good	Moderate	Review
<i>Epilobium angustifolium</i>	Fireweed	Native	Grasslands	Low to Mid Elevation	Good	Good	Common
<i>Eriophyllum lanatum</i>	Common Woolly Sunflower, Oregon Sunshine	Native	Rocky	Low to Mid Elevation	Good	Good	Uncommon
<i>Fragaria vesca</i>	Woodland Strawberry	Native	Riparian, Forest, Grassland	Low to High Elevation	Good	Good	Moderate

Scientific Name	Common Name	Status	Grouping	Elevation	Availability of Stock	Ease of Establishment	Historic Presence
<i>Fragaria virginiana</i>	Wild Strawberry	Native	Riparian, Forest, Grassland	Low to High Elevation	Good	Good	Common
<i>Fraxinus latifolia</i>	Oregon Ash	Native	Riparian, Wetland, Thickets	Low to High Elevation	Good	Good	Common
<i>Galium aparine</i>	Cleavers	Native	Riparian, Forest, Thickets	Low to Mid Elevation	Review	Review	Review
<i>Galium boreale</i>	Small Bedstraw	Native	Riparian, Forest, Thickets, Rocky	Low to High Elevation	Good	Good	Moderate
<i>Galium triflorum</i>	Sweet Scented Bedstraw	Native	Wetland, Riparian	Low to Mid Elevation	Good	Good	Moderate
<i>Gaultheria shallon</i>	Salal	Native	Forest, Forest Slope, Rocky, Thickets	Low to Mid Elevation	Good	Good to moderate	Common
<i>Goodyera oblongifolia</i>	Rattlesnake Plantain	Native	Forest	Low to Mid Elevation	Good	Good	Uncommon
<i>Heracleum lanatum</i>	Cow parsnip	Native	Riparian, Forest	Low to High Elevation	Good	Good	Common
<i>Holodiscus discolor</i>	Oceanspray	Native	Forest, Forest Slope, Thicket	Low to Mid Elevation	Good	Good	Common
<i>Howellia aquatilis</i>	Water Howellia	Native	Aquatic, Wetland	Low to Mid Elevation	Poor	Unknown	Uncommon
<i>Juncus effusus</i>	Soft Rush	Native	Wetland, Riparian	Low to Mid Elevation	Good	Good	Common
<i>Juncus spp.</i>	Rushes	Native	Wetland, Riparian	Low to High Elevation	Good	Good	Common
<i>Ledum glandulosum</i>	Western Labrador tea	Native	Riparian, Thickets	Low to Mid Elevation	Good	Moderate, alkaline soils, bogs	Uncommon

Scientific Name	Common Name	Status	Grouping	Elevation	Availability of Stock	Ease of Establishment	Historic Presence
<i>Ledum groenlandicum</i>	Bog Labrador tea	Native	Riparian, Thickets	Low to Mid Elevation	Good	Moderate, alkaline soils, bogs	Uncommon
<i>Linnaea borealis</i>	Twinflower	Native	Forest, Forest Slope	Low to High Elevation	Good	Low to moderate	Uncommon
<i>Lomatium</i> spp.	Lomatium	Native	Grassland, Rocky	Low to Mid Elevation	Good	Moderate	Uncommon
<i>Lonicera ciliosa</i>	Orange Honeysuckle	Native	Forest, Thicket	Low to High Elevation	Good	Moderate	Moderate
<i>Lonicera involucrata</i>	Black Twinberry	Native	Wetland, Riparian, Grassland	Low to High Elevation	Moderate	Good	Moderate
<i>Lupinus</i> spp.	Lupine	Native	Grassland	Low to High Elevation	Good	Good	Varies by variety
<i>Lysichiton americana</i>	Skunk cabbage	Native	Wetland, Riparian	Low to Mid Elevation	Good	Good	Uncommon
<i>Mahonia (Berberis) aquifolium</i>	Tall Oregon grape	Native	Forest, Forest Slope	Low to Mid Elevation	Good	Good	Moderate
<i>Mahonia (Berberis) nervosa</i>	Dull (Low) Oregon Grape	Native	Riparian, Forest	Low to High Elevation	Good	Moderate	Moderate
<i>Malus fusca</i>	Pacific Crabapple	Native	Forest, Riparian, Thickets	Low to Mid Elevation	Good	Good	Moderate
<i>Mentha arvensis</i>	Field Mint	Native	Wetlands, Riparian, Thickets	Low to Mid Elevation	Good	Good	Common
<i>Mimulus guttatus</i>	Sticky monkeyflower	Native	Riparian	Low to High Elevation	Good	Moderate	Moderate
<i>Nuphar polysepalum</i>	Yellow pond lily, wocas	Native	Wetland Submerged	Low to Mid Elevation	Good	Good	Moderate

Scientific Name	Common Name	Status	Grouping	Elevation	Availability of Stock	Ease of Establishment	Historic Presence
<i>Oemleria cerasiformis</i>	Indian Plum, Osoberry	Native	Open Forest, Riparian	Low to Mid Elevation	Good	Good	Common
<i>Osmorhiza occidentalis</i>	Western sweet cicely	Native	Forest	Low to Mid Elevation	Review	Review	Review
<i>Oxalis oregana</i>	Wood Sorrel	Native	Forest, Open Forest, Riparian	Low to Mid Elevation	Good	Good	Common
<i>Perideridia gairdneri</i>	Gairdner's Yampah	Native	Thickets, Meadows	Low to Mid Elevation	Review	Review	Uncommon
<i>Philadelphus lewisii</i>	Mock Orange	Native	Forest, Forest Slope, Thicket	Low to Mid Elevation	Good	Good to moderate	Uncommon
<i>Physocarpus malvaceus</i>	Pacific Ninebark	Native	Riparian, Forest	Low to Mid Elevation	Good	Good	Common
<i>Populus balsamifera</i>	Black Cottonwood	Native	Wetland, Riparian	Low to Mid Elevation	Good	Good	Common
<i>Potentilla anserina</i>	Silverweed	Native	Riparian	Low to Mid Elevation	Good	Good	Moderate
<i>Potentilla</i> spp.	Silverweed, Cinquefoil	Native	Riparian	Low to High Elevation	Good	Good	Uncommon
<i>Prunus emarginata</i>	Bitter Cherry	Native	Riparian, Forest, Forest Slopes, Thickets	Low to Mid Elevation	Good	Moderate	Uncommon
<i>Prunus virginiana</i>	Chokecherry	Native	Riparian, Forest, Thicket	Low to Mid Elevation	Good	Good	Uncommon
<i>Pseudotsuga menziesii</i>	Douglas-fir	Native	Forest, Forest Slope	Low to High Elevation	Good	Good	Common
<i>Pteridium aquilinum</i>	Bracken Fern	Native	Riparian, Forest, Forest Slopes, Meadow	Low to High Elevation	Review	Review	Review
<i>Quercus garryana</i>	Oregon White Oak	Native	Forest, Grassland	Low Elevation	Good	Good to moderate	Moderate

Scientific Name	Common Name	Status	Grouping	Elevation	Availability of Stock	Ease of Establishment	Historic Presence
<i>Rhamnus purshiana</i>	Cascara	Native	Riparian, Forest, Forest Slope	Low to Mid Elevation	Good	Good	Common
<i>Ribes</i> spp.	Currants	Native	Riparian, Forest, Forest Slope, Thicket, Meadow	Low to High Elevation	Good	Good to moderate by species	Moderate
<i>Rosa</i> spp.	Wild rose	Native	Riparian, Forest, Forest Slope, Thickets	Low to Mid Elevation	Good	Good to moderate	Common
<i>Rubus idaeus</i>	Wild raspberry	Native	Thickets, Open Forest	Low to Mid Elevation	Good	Good	Uncommon
<i>Rubus leucodermis</i> Blackcap	Black Raspberry, Thimbleberry	Native	Thickets, Open Forest	Low to Mid Elevation	Good	Good	Uncommon
<i>Rubus parviflorus</i>	Thimbleberry	Native	Riparian, Forest, Forest Slope	Low to High Elevation	Good	Good	Moderate
<i>Rubus spectabilis</i>	Salmonberry	Native	Riparian, Forest	Low to High Elevation	Good	Good to moderate	Moderate
<i>Rubus ursinus</i>	Trailing blackberry	Native	Thickets, Open Forest	Low to Mid Elevation	Good	Good	Common
<i>Sagittaria latifolia</i>	Wapato	Native	Wetland, Riparian; Submerged	Low Elevation	Good	Good	Uncommon
<i>Salix</i> spp.	Willow	Native	Wetland, Riparian, Forest	Low to High Elevation	Good	Good	Common
<i>Sambucus</i> spp.	Elderberry	Native	Riparian, Forest, Forest Slope, Thicket	Low to Mid Elevation	Good	Good to moderate	Moderate
<i>Satureja douglasii</i>	Yerba Buena	Native	Open Forest, Thickets, Rocky	Low to Mid Elevation	Good	Good	Uncommon
<i>Schoenoplectus acutus</i> , <i>Scirpus acutus</i>	Tule, Hard-stemmed bulrush	Native	Wetland, Riparian	Low to Mid Elevation	Good	Good	Common

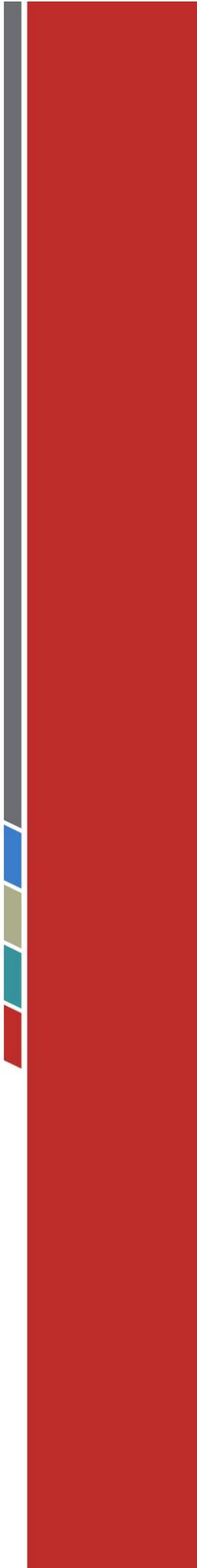
Scientific Name	Common Name	Status	Grouping	Elevation	Availability of Stock	Ease of Establishment	Historic Presence
<i>Sidalcea nelsoniana</i>	Nelson's Checkermallow	Native	Wet meadow, Forest edge, Riparian	Low to Mid Elevation	Good	Good	Uncommon
<i>Sium suave</i>	Hemlock water parsnip	Native	Wetland, Riparian	Low to Mid Elevation	Review	Review	Review
<i>Smilacina racemosa</i> large	False Solomon's seal	Native	Wetland, Forest, Forest Slope, Thicket	Low to High Elevation	Good	Moderate	Moderate
<i>Smilacina stellate</i> small	False Solomon's seal	Native	Forest	Low to High Elevation	Good	Moderate	Moderate
<i>Solidago canadensis</i>	Canada Goldenrod	Native	Grasslands, Meadowland	Low to Mid Elevation	Good	Good	Moderate
<i>Spiraea douglasii</i>	Douglas Spirea	Native	Wetland, Riparian, Thicket	Low to Mid Elevation	Good	Good	Moderate
<i>Symphoricarpos albus</i>	Snowberry	Native	Forest, Forest Slope, Thicket	Low to Mid Elevation	Good	Good	Moderate
<i>Taxus brevifolia</i>	Western Yew, Pacific Yew	Native	Forest, Forest Slope	Low to Mid Elevation	Good	Good	Uncommon
<i>Thalictrum occidentale</i>	Western Meadow Rue	Native	Forest	Low to High Elevation	Good	Good	Review
<i>Thuja plicata</i>	Western Red Cedar	Native	Wetland, Riparian, Forest	Low to Mid Elevation	Good	Moderate	Moderate
<i>Tricholoma populinum</i>	Mushroom	Native	Forest, Forest Slope, Open Forest	Low to High Elevation	Review	Review	Varies by variety
<i>Tsuga heterophylla</i>	Western Hemlock	Native	Forest, Forest Slope, Riparian	Low to Mid Elevation	Good	Moderate	Moderate
<i>Urtica dioica</i>	Nettle	Native	Riparian, Thickets, Meadow, Open Forest	Low to High Elevation	Good	Good	Common
<i>Vaccinium</i> spp.	Huckleberry	Native	Forest, Forest Slope	Low to High Elevation	Good	Low to moderate	Uncommon

Scientific Name	Common Name	Status	Grouping	Elevation	Availability of Stock	Ease of Establishment	Historic Presence
<i>Veratrum viride</i> Hellebore	Indian hellebore, False	Native	Riparian, Thickets, Meadows, Open Forest	Low to High Elevation	Good	Good	Uncommon
<i>Veronica Americana</i> Brooklime	American Speedwell	Native	Wetland, Riparian	Low to Mid Elevation	Good	Good	Uncommon
<i>Veronica anagallis- aquatica</i>	Water Speedwell	Native	Wetland, Riparian	Low to High Elevation	Review	Review	Review
<i>Viola canadensis</i>	Canada Violet	Native	Riparian, Forest	Low to Mid Elevation	Review	Review	Review
<i>Xanthium strumarium</i>	Cocklebur	Native	Riparian, Thickets	Low to Mid Elevation	Review	Review	Review
<i>Zigadenus spp.</i>	Death camas	Native	Meadow, Grasslands	Low to Mid Elevation	Good	Good	Uncommon

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Appendix D

Monitoring Framework



Portland Harbor NRDA Monitoring and Stewardship Framework

1.0 Purpose of this Framework

The purpose of this monitoring and stewardship framework is to (1) provide a summary of the Portland Harbor Natural Resource Trustee Council's (Trustee Council's) monitoring and long-term stewardship expectations, requirements and mechanisms for obtaining full restoration value at Natural Resource Damage Assessment (NRDA) restoration sites for the Portland Harbor Superfund Site (Portland Harbor); and (2) provide minimum standards for performance of Portland Harbor NRD restoration projects. The minimum performance standards have been developed with input from local restoration practitioners and are therefore considered to be reasonably achievable for projects in and around Portland Harbor. Any proposed adjustments to these standards would need to be strongly supported by site-specific conditions or circumstances, and would require comprehensive review and approval by the Trustee Council.

In order to increase consistency between projects and efficiency in reviewing proposed site specific performance plans, the Trustee Council has created an outline that should be followed to facilitate review (Appendix A). Site-specific lamprey monitoring will be designed and conducted by the U.S Fish and Wildlife Service (USFWS). The general plan and framework for lamprey monitoring is included in Appendix B.

The Trustee Council's Monitoring and Stewardship Framework includes the following components:

- Overview of the NRDA Restoration Approach at Portland Harbor (Section 2.0)
- Performance Period Monitoring Plan and Performance Standards (Section 3.0)
- Long-term Stewardship Framework (Section 4.0)
- Trustee Council Oversight (Section 5.0)
- Monitoring and Stewardship Funding (Section 6.0)
- References (Section 7.0)
- Site Specific Performance Plan Outline (Appendix A)
- Lamprey Monitoring Plan (Appendix B)¹
- Portland Harbor Native Plants List (Appendix C)

¹ The lamprey monitoring plan is a separate document because it addresses compensation for lost use of tribal resources, and site-specific detailed monitoring plans and monitoring activities will be developed and conducted by USFWS.

2.0 Overview of the NRDA Restoration Approach at Portland Harbor

2.1 Project Types likely to Be Implemented

Off-channel habitats and the river's active channel margin² (ACM) have been identified as the highest priorities for restoration by the Trustee Council. In addition, shorelines and riparian zones, especially those adjoining off-channel habitat and contiguous upland habitats, are targeted habitat priorities because of their ability to support fish and wildlife and their ecological connections to aquatic habitats. River margins, including shorelines and their riparian zones, are dynamic, diverse habitats over a broad range of river flows. That diversity is a key component of productive stream ecosystems (Hill et al. 1991, Gore 1985, Poff et al.1997). In small tributary streams and off-channel habitats, riparian areas provide food, shade and cover for both aquatic and terrestrial animals, and enhance bank stability. In large rivers, vegetation on channel banks and floodplains increases hydraulic roughness, which in turn decreases channel conveyance and augments sedimentation (Kouwen and Unny 1973). Finally, vegetation increases the cohesion of bank sediments, thus influencing bank erosion and overall bank stability (Thorne 1990). Restoration actions that will improve the quantity or quality of these priority habitat types are likely to include levee removal and modification, dam removal, culvert removal or replacement, and restoration or creation of off-channel, ACM, and shallow water habitats. In addition, invasive plant removal and revegetation with native species will be a component of most project types.

2.3 Goals for Restoration

The Trustee Council's overall goal is to restore, rehabilitate, replace, or acquire the equivalent of those natural resources injured as the result of hazardous substance and oil releases within the Portland Harbor Superfund site. Restoration projects implemented as a result of this process will restore habitats that:

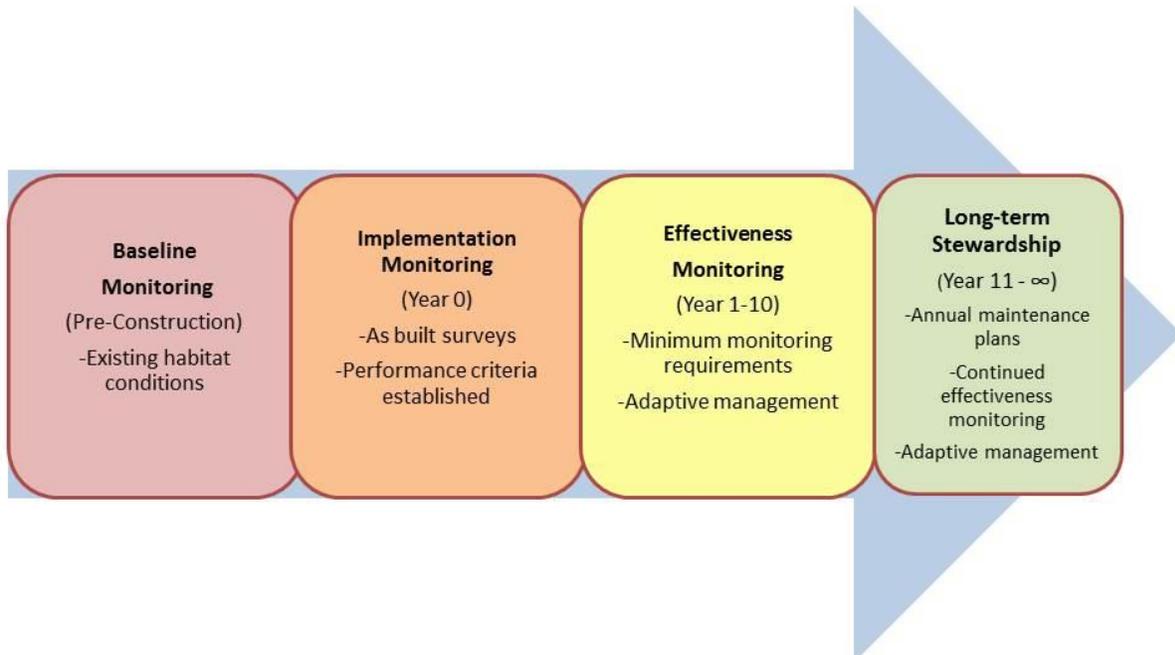
- Move towards normative hydrology.
- Restore floodplain function, including off-channel habitat for multiple species.
- Reestablish floodplain and riparian plant communities.
- Improve aquatic and riparian habitat conditions.
- Improve river margin habitat (increase complexity in river margins).
- Restore habitat that provides ecological value at the landscape scale (i.e., by providing connectivity, increasing habitat patch size, improving patch shape to provide more interior habitat, reducing distances between different patches of habitat and other factors).

² The portion of the river's edge that is at the interface of unwetted shoreline and shallow water, and occurs from the Ordinary High Water (OHW) mark to Ordinary Low Water (OLW).

2.4 Phases of Monitoring and Stewardship

As depicted in Figure 1, monitoring and stewardship of restoration sites in Portland Harbor will be divided into four phases. The first three phases make up the performance period, during which each site will be thoroughly monitored to ensure that it is on a trajectory toward full habitat function. The performance period will include baseline, implementation, and effectiveness monitoring phases, and will be guided by the site-specific performance plan. Once a project has met its performance criteria and the performance period is over, the long-term stewardship phase will begin. Long-term stewardship will involve activities such as regular site visits, maintenance, ongoing effectiveness monitoring, and other tasks required to maintain project effectiveness and full functionality in perpetuity. The monitoring plan for lamprey, presented in Appendix B, extends for a period of 20 years. It will begin during the performance period and end during the long-term stewardship phase.

Figure 1: Portland Harbor NRDA Site Monitoring and Stewardship Model.



3.0 Performance Period Monitoring and Performance Standards

3.1 Performance Period Monitoring Plan

The performance period monitoring plan is intended to guide the collection of data at Portland Harbor restoration sites. Monitoring data will be collected at the restored sites and compared to site-specific reference conditions, if applicable. Baseline monitoring will occur before project work occurs at the site to document pre-restoration conditions. Implementation and effectiveness monitoring will take

place during an initial performance period of 10 years, or as needed until performance standards are met, followed by a less intense level of monitoring associated with long-term stewardship activities.³

Monitoring related to performance standards: Implementation and effectiveness monitoring will be used to ensure that projects are constructed as designed and that they meet site-specific performance standards. The monitoring data collected at the sites will be used to determine the following:

- Was the project constructed according to its final design? Are any adjustments necessary to achieve desired site conditions as described in the restoration plan for the site?
- Did the constructed restoration project create the quantity and quality of fish and wildlife habitat that were proposed?
- Is the restoration site meeting its interim performance standards (IPs)?
- Have the performance standards been met? If so, is the site ready to move into the long-term stewardship phase?

Monitoring related to NRDA restoration goals: In order to determine whether the Trustee Council's overall restoration program goals for Portland Harbor are being met, additional monitoring will be performed at restoration sites that is not related to site-specific performance standards. This monitoring information will indicate whether the suite of restoration projects are facilitating increased utilization by injured fish and wildlife species, and will identify broader trends in the creation and restoration of habitat in the area. Monitoring results will *not* tier to individual project performance standards that must be met by the end of the performance period. Monitoring data collected under this heading will be used to:

- Verify that target fish and wildlife species are using the restored sites.
- Detect trends in species use of restored sites.
- Identify other environmental factors that could be influencing performance and species utilization of the restored sites (e.g., water quality).

3.2 Monitoring Parameters

Each site will be monitored for a specific set of parameters depending on the habitat types restored and the monitoring questions and performance standards associated with those habitat types. Table 1 provides the potential monitoring parameters and indicates which should be monitored for each habitat type. In addition, photographs should be taken at established points on a regular schedule to provide qualitative documentation of the site's progression. Monitoring parameters will be selected to verify that the goals and objectives of the project have been achieved and the performance standards have been met. The Trustee Council will work with the project implementer to determine which parameters will be monitored at each site based on the parameters and applicable habitats shown in Table 1, and will document the performance standards and monitoring parameters in a site-specific performance plan.

³ The monitoring plan for lamprey, presented in Appendix B, extends for a period of 20 years.

3.3 Performance Standards

There will be an initial period of performance during which the project implementer is required to work with the Trustee Council to ensure that a project is on a positive habitat trajectory and is likely to meet project goals and performance standards within the specified period. Implementation and effectiveness monitoring results will be compared to performance standards to determine when a project is considered a success and can move into the long-term stewardship phase. Table 1 indicates which of the monitoring parameters the Trustee Council considers performance standards. A subset of these performance standards will be applied to each project (based on the habitat types being restored) and will be documented in the site-specific performance plan. The minimum performance standards that have been approved to date for geomorphic/structural habitat elements and vegetation are described in sections 3.3.1 and 3.3.2. Minimum performance standards for sediment, site hydrology and hydraulics, and water quality will be determined on a site basis where they are applicable.

If, at any time during the performance period, the project is not meeting its interim performance standards, appropriate adaptive management actions will need to be implemented to ensure the project obtains a trajectory that will meet the performance standards by the end of the performance period.

Table 1: Monitoring plan for Portland Harbor restoration projects

Project Types					Tributary Habitat	Off-Channel Habitat	Active Channel Margin	Shallow Water Habitat	Beach Habitat	Riparian Habitat	Upland Habitat		
Monitoring Questions	Performance Standard?	Monitoring Attributes	Monitoring Techniques	Sampling Frequency/Timing									
Geomorphic/Structural Habitat Elements													
<ul style="list-style-type: none"> Were as many habitat elements placed on site as proposed in designs? Are habitat elements being retained on site? (retention rate will be site specific) 	Yes	Large wood (LW), downed wood, snags, and boulder and brush piles	Habitat Survey	Once a year after wet season; Post-construction, Years 1,3,5,7, and 10	X	X	X	X	X	X	X		
<ul style="list-style-type: none"> Is the total quantity of side-channel and ACM habitat that was created being retained over time? 	Yes	Water depth	Survey a longitudinal profile		X	X	X	X					
		Stream gradient				X							
		Width to depth ratio	Survey established cross- sections		X								
		Elevational stability	Survey established cross-sections		X	X	X	X	X				
		Sediment accretion	Sediment accretion stakes			X	X	X	X				
<ul style="list-style-type: none"> How much mink and bald eagle habitat was restored along the shorelines? 	No	Length of shoreline and amount of shallow water and riparian habitats.	Topographic survey Habitat maps	Pre-construction baseline, as built and Year 10	X	X	X	X	X	X	X		
<ul style="list-style-type: none"> For fish passage projects, was the project completed as designed and does it meet state and federal fish passage criteria? For off-channel projects, are the fish able to enter and exit the site? 	Yes	Fish Passage Barriers (Egress and Ingress)	Survey jump heights/visual survey	Once a year after wet season; Years 1 through 10	X	X							
Hydrology and Hydraulics													
<ul style="list-style-type: none"> What is the total area of the site that is inundated by the river during periods of high flow? 	Yes	Lateral extent of flooding	Cross-section survey, water levels, aerial photos, and river flow data	Once a year after wet season; Years 1,3,7, and 10	X	X	X	X	X	X			

Project Types					Tributary Habitat	Off-Channel Habitat	Active Channel Margin	Shallow Water Habitat	Beach Habitat	Riparian Habitat	Upland Habitat	
Monitoring Questions	Performance Standard?	Monitoring Attributes	Monitoring Techniques	Sampling Frequency/Timing								
Sediment												
<ul style="list-style-type: none"> Was the sediment composition appropriate for the habitat type at the time of construction? Is there a shift in sediment composition over time? 	Yes	Substrate size and composition	Pebble counts, cores, grab samples, visual observations	Once a year after wet season; Years 1,3,5,7, and 10	X			X	X			
Vegetation												
<ul style="list-style-type: none"> Is vegetation developing in a way that will ultimately generate a native assemblage of appropriate vegetation types? 	Yes	Percent cover by type (shrubs, trees, herbaceous, bare ground)	Transect, quadrat sampling, photo points, and aerial photos	Post-planting (Year 1) and then yearly at end of growing season through Year 5, and Years 7 and 10			X			X	X	
		Percent survival										
		Percent native versus non- native										
Water Quality												
<ul style="list-style-type: none"> Is water quality at the site improving over time and comparable to an appropriate reference condition? 	No	Temperature	Temperature probe with data logger	Continuous		X						
		Dissolved oxygen	Dissolved oxygen sensor	Once a month years 1 and 2 and during summer other years through year 10		X						
		Other site specific parameters	TBD	TBD	X	X	X	X				
Fish and Wildlife												
<ul style="list-style-type: none"> Are native fish using the newly restored habitat? What size salmonids and lamprey are using the site? 	No	Species presence/absence	Snorkel surveys, beach seining, or trapping	Twice monthly from February through May; Years 1, 3, 5, 7, and 10	X	X	X	X	X			
		Size of salmon and lamprey										
<ul style="list-style-type: none"> What birds are using the site? Do changes in the bird assemblage, diversity and abundance at the site indicate that habitat quantity and quality have improved? 	No	Relative abundance/diversity/species	Bird surveys: point counts	Three times (approximately monthly) within each habitat type during breeding season; Pre- construction baseline, and Years 1, 3, 5, and 10			X	X	X	X	X	
		Habitat usage										

Project Types					Tributary Habitat	Off-Channel Habitat	Active Channel Margin	Shallow Water Habitat	Beach Habitat	Riparian Habitat	Upland Habitat
Monitoring Questions	Performance Standard?	Monitoring Attributes	Monitoring Techniques	Sampling Frequency/Timing							
<ul style="list-style-type: none"> Are bald eagles using the site? If so, how often and for what activities? 	No	Bald eagle presence/absence at the site; frequency of site use, behavior and habitat elements used	Site surveys for eagle use and behavior during the breeding season; habitat metrics (acreage of potential foraging habitat restored)	Weekly from mid- December through August; Pre-construction baseline), and Years 3, 5, 7, and 10.		X	X	X		X	X
<ul style="list-style-type: none"> Are mink using the newly restored habitat? Has mink abundance at the site increased? 	No	Presence/absence; abundance	Camera traps with scent stations within 50-feet of waterway, walking surveys for track, scat, den sites	Twice monthly for 3 months of the spring-summer to include mid-April through mid-July at a minimum; Pre-construction baseline, and Years 3,5,7, and 10	X	X	X	X	X	X	X
		Habitat usage with GPS data on locations									
<ul style="list-style-type: none"> Has the benthic macroinvertebrate community improved? 	No	Benthic invertebrate species, abundance and diversity/richness	Macroinvertebrate surveys, lab identification	Once a year during late Spring/Fall, Pre-construction baseline (where applicable) and Years 1, 2, 5, 7 and 10	X						

3.3.1 Geomorphic/Structural Habitat Elements

This performance standard will use topographic surveys, aerial photography, hydrology, hydraulics and visual site inspections to verify that the total quantity of ACM and side channel habitat is being maintained, that there are no barriers to fish entering or exiting the site, and that structural habitat features were installed as designed and are being retained.

A minimum of 3 to 4 pieces of large woody debris (“LWD”) will be installed within the active channel margin per acre (i.e., along the created channels and within the marsh, mudflat, and scrub-shrub habitats). Performance for LWD will be based on retention of pieces and/or natural recruitment, and the following standards will be used:

- Years 1, 2, 3, 5, 7, and 10: woody debris will have an 80% retention rate including naturally recruited material.

If the amount of LWD on-site fails to meet performance standards in Years 1, 2, 3, 5, 7 or 10 and if existing conditions and hydraulics will allow the retention of replacement materials, LWD will be installed within the ACM and off-channel habitats to achieve the targeted density.

In habitat types above the OHWL (non-ACM habitats), structural habitat elements in the form of debris piles, downed wood/logs, and rock piles will be installed at a minimum of 3 to 4 elements per acre.

Failure to meet the following performance standards at the site would trigger a project review with Trustee Council representatives to determine what, if any, adaptive management actions are necessary:

- Identification of any fish passage barriers.
- Changes of more than 10% in ACM and side channel habitat acreages from the as-built surveys.
- Changes of more than 20% in ACM or off-channel habitat depths from the as-built surveys. Channel depths will be measured from the OHWM.

3.3.2 Vegetation

Establishment of native vegetation at the restoration site is anticipated to result from both active planting and volunteer recruitment. Identification of non-native plant species will be based on the current Oregon Department of Agriculture (ODA) Noxious Weed list and the Portland Plant List (September 2011). Non-native species for the purposes of performance evaluation include the most updated versions of following:

- Species on the ODA Noxious Weed List
- Species on the Portland Plant List (Rank A, B, and C)

The most recent versions of the ODA and City of Portland lists will be used. All lists described above will serve as tools to identify and target species for treatment.

In addition, certain plants are classified as “early detection and rapid response” (EDRR) species. These species are newly identified non-native, invasive species that require a more aggressive approach to eradicate them. Multnomah County and the associated Soil and Water Conservation Districts (SWCDs) have identified ‘EDRR weeds’ in collaboration with neighboring counties to create a united approach to detection and eradication. The four County Cooperative Weed Management Area organizations work together to update the list periodically. As of May 2014, there are 19 species on the East and West

Multnomah SWCDs lists (ESWCD 2014 and WSWCD 2014) that are not widespread and will be treated as soon as detected, with the overall goal being total eradication from the restoration site. The most current version of these two lists will be used to determine which species will require this level of response effort.

In order to meet the performance standards described below, the project implementers should consider the following when designing their planting plans:

- Plant Selection: It is important that native plants and seed stock appropriate for the restoration site be used during revegetation work. Plants on the Trustee Council's "Portland Harbor Native Plants Restoration List" should be used and local stock should be identified and sourced.
- Planting Density: Mortality of some plants is expected during the first year. In order to achieve the stem densities described in the vegetation performance standards below, additional plants should be installed and plants should be replaced in subsequent years as needed. Based on other restoration projects in the area, planting densities for newly established habitats between 2,000 to 2,600 plants per acre of riparian, scrub-shrub, and upland habitats are likely to result in appropriate densities over time. It is recommended that the ratio of shrubs to trees planted initially should be 50% shrubs to 50% trees in the riparian and 60% shrubs to 40% trees in the upland.
- Soil: Ensuring that the soil conditions are conducive to native plant growth is critical to restoration success. If soils are imported or on-site soils are amended to promote plant growth, the following considerations and standards should be implemented:
 - Inorganic/organic and agronomy sampling should be performed whether the material is to be imported from off-site or has been stockpiled from material on-site.
 - Any imported material should be weed free; measures should be taken to avoid the relocation of on-site material if it contains a substantial seed bank of weed seeds.
 - Imported material should meet the State of Oregon's "Clean Fill" requirements as defined in OAR Chapter 340, Divisions 93, 94, 95, 96 and 97.
 - American Society of Agronomy analytical methods should be used to determine whether the parameters of organic matter, pH, electrical conductivity, sodium absorption ratio, soil texture, cation exchange capacity, and plant available levels of N, P, and K in the material are suitable for planting (SSSA 1996, Munshower 1993).
 - Soil amendments may be added as needed and compost proposed for use should also meet appropriate standards for plant growth (USCC 2001, CCQC 2001).

Vegetation performance standards will verify whether or not the native revegetation and invasive plant management in the ACM, riparian, and upland areas are developing toward a positive trajectory. Soon after the site is planted, the number, type, and location of plants installed will be documented. This documentation will be considered Year 1 of vegetation monitoring. Subsequent vegetation surveys should be completed at the end of the growing season in years 2 through 5, year 7, and year 10. A plan describing the monitoring methods to be used at the site will be prepared by the project implementer

and provided to the Trustee Council for review. The following are specific vegetation targets, which if not met, will trigger Trustee Council review to determine whether adaptive management actions are necessary:

Emergent Marsh (ACM)

Per a site-specific planting plan, 5,000 plug plantings of native vegetation per acre will be installed throughout any restored marsh habitat to facilitate the establishment of emergent marsh vegetation. It is anticipated that this habitat type will partially vegetate naturally by volunteer recruitment. Throughout the monitoring period, diversity of plant species in emergent marsh habitat should include at least 5 species of herbaceous plants. An herbaceous species will count towards diversity if there is at least 5% cover and it is in at least 10% of the monitored plots for the habitat type. The following performance standards will be used to assess the successful establishment of emergent marsh vegetation:

Year 2- 5:

- Cover :
 - $\geq 30\%$ native herbaceous
 - $\leq 10\%$ non-native herbaceous
 - The remaining percentage of cover can be made up of bare ground, rocks or native herbaceous.

Year 7

- Cover :
 - $\geq 50\%$ native herbaceous
 - $\leq 10\%$ non-native herbaceous
 - The remaining percentage of cover can be made up of bare ground, rocks or native herbaceous.

Year 10

- Cover :
 - $\geq 70\%$ native herbaceous
 - $\leq 10\%$ non-native herbaceous
 - The remaining percentage of cover can be made up of bare ground, rocks or native herbaceous.

Riparian Forest, Scrub-Shrub and Upland Forest

Newly established riparian forest, scrub-shrub, and upland forest habitats will be planted with 2,000-2,600 native woody plantings per acre and the use of seed or plugs as needed in the understory, to facilitate the establishment of vegetative communities with multiple structural layers.

Establishment of forested habitat vegetation will require active management to ensure that plant densities and percent cover performance criteria are met. The following performance standards will be used to assess successful vegetation establishment within the riparian, scrub shrub, and upland forest:

Years 2-5:

- A minimum of 1,200 native woody stems per acre.

- For riparian forest and upland forest habitats, at least 3 native tree species and 5 native shrub species.
- For scrub-shrub habitats, at least 5 native shrub species.
- Cover (during the first 5 years, trees/shrubs will be excluded from percent cover):
 - $\geq 10\%$ native herbaceous
 - $\leq 30\%$ non-native herbaceous
 - The remaining percentage of cover can be made up of bare ground, rocks or native herbaceous.

Year 7:

- Cover:
 - $\geq 55\%$ native woody species
 - $\geq 10\%$ native herbaceous
 - $\leq 20\%$ non-native herbaceous
 - $\leq 5\%$ non-native shrubs
 - The remaining percentage of understory cover can be made up of bare ground, rocks, native shrubs or native herbaceous.

Year 10:

- Cover:
 - $\geq 80\%$ native woody species
 - $\geq 10\%$ native herbaceous
 - $\leq 20\%$ non-native vegetation

Volunteer recruitment of native trees and shrubs in the riparian and upland habitats may be credited towards the density per acre performance standard. If the density rates fall below the required performance standards, the project implementer will consult with the Trustees regarding the precise plan for replanting. Replanting will be conducted during the appropriate season following monitoring.

Oak Woodland

In oak-dominated habitats, 500 native woody plantings per acre will be maintained or installed to facilitate the establishment of native woody vegetation that is likely to develop approximately 30-60% oak canopy cover over time (likely after the performance period). Establishment of oak-dominated upland forest vegetation will require active management to ensure that plant species survival and percent cover performance criteria are met. Throughout the monitoring period, diversity of plant species in oak-dominated forest habitat should be at least 1 species of tree (Oregon white oak) and 4 species of shrubs. A species will count towards diversity if there is at least 5% cover and it is in at least 10% of the monitored plots. The following performance standards will be used to assess successful oak woodland vegetation establishment:

Year 2-5:

- Density of shrubs and trees will be at least 500 shrubs/trees per acre. During the first 5 years trees and shrubs will be excluded from percent cover. Density of trees and shrubs will no longer need to be measured after year 5.

- Cover:
 - $\geq 25\%$ native herbaceous,
 - $\leq 15\%$ non-native herbaceous
 - The remaining percentage of understory cover can be made up of bare ground, rocks or native herbaceous.

Year 7:

- Cover :
 - $\geq 40\%$ native woody species, including Oregon white oak as the dominant tree species.
 - $\geq 30\%$ native herbaceous
 - $\leq 10\%$ non-native herbaceous
 - $\leq 5\%$ non-native shrubs
 - The remaining percentage of understory cover can be made up of bare ground, rocks native shrubs or native herbaceous.

Year 10

- Cover
 - $\geq 50\%$ native woody species, including Oregon white oak as the dominant tree.
 - $\geq 35\%$ native herbaceous
 - $\leq 5\%$ non-native herbaceous and shrubs
 - The remaining percentage of understory cover can be made up of bare ground, rocks native shrubs or native herbaceous.

Volunteer recruitment of native trees and shrubs in the oak-dominated upland forest planting areas may be credited towards the density per acre performance standard; however, very little natural recruitment of oak trees is expected to occur over the short-term. If the density rates fall below the required performance standards, the project implementer will consult with the Trustee Council or its designee(s) regarding the precise plan for replanting. Replanting will be conducted during the appropriate season following monitoring.

3.4 Monitoring Plan Study Design

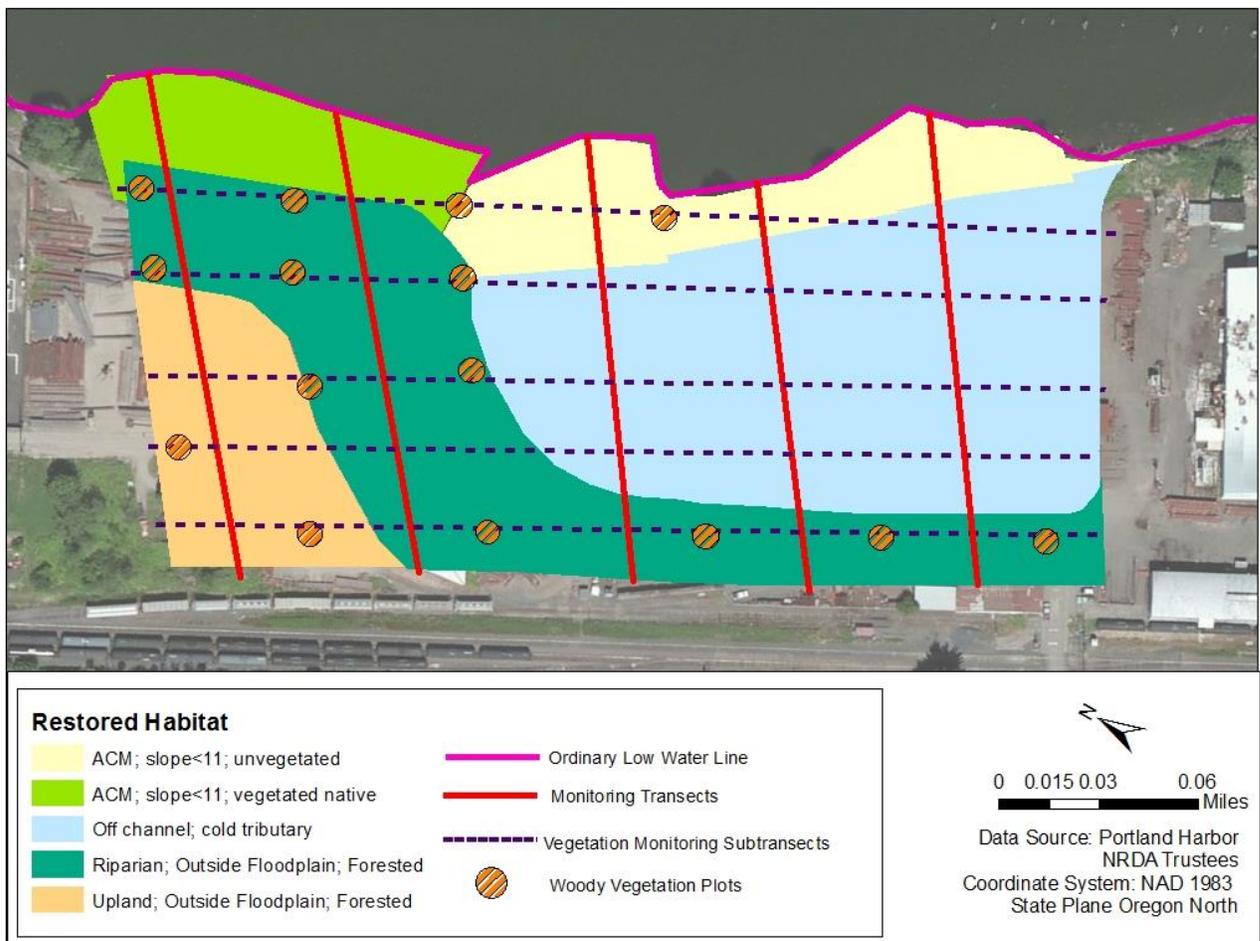
Each site will have a unique monitoring sampling design that is documented in a site-specific performance plan. It is recommended that each restoration site be divided into 100-meter sections that are oriented perpendicular to the floodplain axis. Within these 100-meter sections, sampling transects should be selected and sampled consistently each monitoring year to document changes at the site over time. The transects should be at fixed intervals from a random starting point according to the following guidance:

- Sites less than 300 meters long measured parallel to the flood plain axis (spanning 3 or fewer sections) will have a minimum of one sampling transect.
- Sites 300 to 600 meters long will have a minimum of 3 sampling transects, spaced at 100-meter intervals.
- Sites 600 to 1,000 meters long will have a minimum of 5 sampling transects spaced at 100-meter intervals.
- Sites greater than 1,000 meters in length will have a minimum of 5 sampling transects spaced at 200-meter intervals.

- More transects may be required if a restoration site contains multiple habitat types that are not adjacent (e.g., upland forest, active channel margin).

In some circumstances, sampling will be concentrated on transects proximal to expected changes, for example, near a culvert replacement or dike breach. Fixed reference points relative to the transects should be selected for vegetation plots, water level sensors/manual measurements, and cross section endpoints. Channel cross section endpoints, if applicable, should be sited along the transect at locations proximal to the restoration action and near the expected boundary of post-restoration mean low water and high-tide inundation. Figure 1 demonstrates an example of how a site should be divided.

Figure 1. Example monitoring transects and vegetation monitoring subtransects



Monitoring Related to Performance Standards:

Geomorphic/Structural Habitat Elements

Monitoring of the site's geomorphic features will allow the Trustee Council to determine whether the site was constructed as it was designed and that the designs resulted in the type and quantity of habitat that was anticipated. These monitoring results will also inform any adaptive management

decisions that are needed during the performance period to make the project self-sustaining in the long-term. The results from this monitoring will be compared to the site-specific performance standards and reference conditions.

Numbers of structural habitat elements such as in-stream wood, downed wood, rock piles, brush piles, and snags will be documented post-construction to verify that the items were maintained or placed according to the designs. Naturally recruited wood can be counted toward meeting these standards.

The results of structural habitat element monitoring will be compared to a site-specific performance standard and will be used along with other physical site measurements to determine if any adaptive management actions are needed to increase structural habitat elements, particularly large woody debris retention rates; depending on the project, it may be appropriate for all wood to be mobile at the site.

For fish and wildlife passage projects, as-built surveys will be conducted to verify that the site meets passage criteria appropriate for the site. In subsequent monitoring years, visual observations, photos, and survey data will be used to ensure that the site is passable during the periods of time intended by the project design.

For most restored habitat types, a professional surveyor will complete a topographic survey of the entire site. During subsequent sampling events, elevation measurements will be completed at transects, which will be established based on the protocol described above. A marker such as capped PVC pipes should be used to permanently mark transect endpoints (proximate to ordinary low water river boundary and to property boundary). In addition, if the site is to contain multiple restoration habitat types (e.g., constructed side-channel, ACM) a marker will be placed at habitat transition points along the line of the transect. All transect marker locations should also be recorded using a GPS so that the station can be reestablished if the marker is lost. In addition, elevations should be surveyed at other important site features such as water quality and water level instruments and at the location of vegetation sample plots.

Hydrology and Hydraulics

In the lower Willamette River, water level variation in tributary habitat, off-channel habitat, ACM, and shallow water habitat is a function of stream or river flow and tidal fluctuations. Many of the proposed restoration projects will result in reconnection of off-channel and floodplain habitats. For these restored habitat types, it will be important to monitor water levels and the extent and duration of floodplain inundation during high flows.

Water level data should be georeferenced to the site-specific topographic data and to specific river discharge levels (i.e., ordinary high water [OHW], ordinary low water [OLW] and, if applicable, high and low tide at mean low water [MLW] and flood stage). Water level information and topographic information combined can be used to determine inundation periods. Water levels can be measured either with continuous water level records (pressure transducer) and/or manually as part of the cross-sectional survey. If water level sensors are used, only one is needed and it should be installed at one of the physical transect locations.

Extent of floodplain inundation at flood stages relevant to the presence of target species should be determined if one of the project's goals is to improve floodplain connectivity. Cross section and water level measurements will be used to calculate area of floodplain inundation. A qualitative measurement of floodplain inundation can also be made by documenting elevations of debris lines and other

evidence of high water events during cross section surveys at established transects and by reviewing aerial photos.

Sediment

Sediment composition monitoring will only be a performance standard where a project goal is creation or modification of a specific type of sediment composition. Sediment samples should be collected and analyzed for grain size composition and compared to a performance standard determined based on the goals of the project and reference conditions. Samples should be collected at established transects or in areas of expected change and georeferenced to the topographic survey.

Vegetation

Vegetation will be sampled at all sites where the project goal includes establishment, enhancement, or conservation of vegetation. Sampling will be completed in all types of vegetation assemblages within the site. Results of the monitoring will be compared to site-specific percent cover, survival, percent native species, and non-native species targets based on reference conditions to determine if the performance standards are being met. Non-native plant species will be based on the current Oregon Department of Agriculture (ODA) Noxious Weed list and the Portland Plant List (Rank A, B, and C lists). The lists are regularly updated, and the most recent versions will be used.

Early Detection and Rapid Response Species will also be identified during the sampling. The current lists from the East and West Multnomah SWCDs (ESWCD 2014 and WSWCD 2014) will be used to determine the species that meet these criteria.

Sampling Methods

Sampling plots should be established along a straight line (sub-transects) perpendicular to the established physical transects with sub-transects spaced at a fixed interval with a randomly selected starting point. Number of plots, plot size, shape, and spacing will depend on the type of dominant vegetation at the site. For example, 1m² plots are usually used for herbaceous plant communities (Thom et al. 2002), belt transects for shrubs (Havens et al. 2003), and 10-meter circular plots for riparian forest and upland forest (Roegner et al 2009). The details of the sample plot layout for a given site will be determined in the site-specific performance plan.

Table 2, which is adapted from Oregon Department of State Lands Routine Monitoring Guidance for Vegetation (ODSL 2009), can be used for an initial estimate the number of plots that will be needed by vegetation and habitat type.

Table 2. Minimum number of vegetation plots by vegetation and habitat type

Vegetation Types	Habitat Types	Number of Plots: Habitat type Up to 2 acres	Number of Plots: Habitat type >2 to 5 acres	Number of Plots: Habitat type >5 acres
Herbaceous	Emergent marsh, vegetated ACM, riparian, and upland	10	20	30
Shrub and Trees	Vegetated ACM, riparian, and upland	5	10	15

Monitoring Related to NRDA Restoration Goals:

Photo Monitoring

Photo points should be established at regular intervals along transects or other locations that would be suitable for documenting qualitative changes in site conditions for all habitat types that are being restored.

Water Quality

Water quality data should be collected at sites where the goal of the project includes improvements to water quality. If temperature is being monitored it is recommended that it be monitored continuously with a sensor and data logger. The sensor should be placed near one of the established physical transects and should be georeferenced. Other parameters such as dissolved oxygen should be collected at each established transect. These monitoring results will be compared to an appropriate reference condition.

Fish

Fish monitoring will be conducted at restoration sites to verify that the sites are being used by the target species. Where feasible, snorkel surveys, beach seining, or trapping of off-channel and tributary habitats will be conducted to determine presence or absence of juvenile salmonids and other native fish species. Snorkeling, where visibility allows, is the preferred method for confirming fish presence. If snorkeling is not feasible, seining or trapping methodologies may be approved (pursuant to a Section 7 consultation for ESA-listed salmonids); once fish presence is confirmed, sampling methods involving handling of ESA-listed fish will be discontinued. During the sampling the observer will attempt to estimate abundance and average size of any salmonids present. Generally, sampling for native fish should take place two times per month from February through May during years 1, 3, 5, 7, and 10. Lamprey monitoring will also be conducted by the USFWS to verify whether lamprey are using the sites and to enhance understanding of juvenile lamprey habitat preferences. Appendix B provides the details of the general lamprey monitoring plan. USFWS and the Tribal Trustees will develop a site-specific lamprey monitoring plan for each accepted restoration site.

Birds

Bird monitoring can be used to help validate project effectiveness by indicating changes in habitat structure and function, which tend to be reflected by associated changes in aquatic and terrestrial fauna and flora. Rather than monitoring a wider suite of wildlife species, birds were selected for several reasons: they are relatively cost-effective to monitor; birds are likely to be present on every site both before and after project construction; responses to on-the-ground changes can be readily documented; and trends in bird communities can be used to help confirm and communicate the outcomes of restoration projects to stakeholders, including the general public.

By conducting bird surveys, bird species and assemblages can be related to factors such as the availability and quality of various habitat types and trends that may be in response to restoration activities. Bird monitoring is also considered a surrogate for more detailed vegetation-based habitat monitoring. The vegetation monitoring outlined in Table 1 does not fully assess certain structural features that comprise functioning habitat. Vegetation monitoring that could assess functioning habitat would be time consuming and costly due to the amount of data and associated staff time associated with it. Bird monitoring is an effective way to gather information about habitat function.

Bird monitoring data will be collected pre-construction to document baseline conditions, and then

post-construction in years 1, 3, 5 and 10. The data will be used to document species occurrences, proportionate species abundances, species richness, and how bird assemblages change over time. Habitat that is becoming established and increasing in function for fish and wildlife should reflect an increasing number of bird species or detections of more sensitive species as habitats become more extensive, complex and suitable. It may be expected for some habitat types (i.e. ACM) that species richness reaches a plateau in earlier years of monitoring. Species richness in some other habitat types is likely to continue increasing (i.e. riparian forest) long after the 10-year monitoring period ends.

The site-specific monitoring plan will depend on what is found to be feasible and appropriate by the monitoring entity and Trustee Council representatives using guidance such as that found in Huff et al. 2000. Survey methods will involve point counts on transects or otherwise positioned throughout the site as needed to ensure all habitat types that will be impacted or restored are represented. Bird sampling will occur at least three times during the peak breeding season, generally spread out during the period between May 15 through the end of June. The locations of habitats both before and after the site is restored should be considered when establishing point count locations to ensure baseline conditions at the site can be compared with conditions that develop post-construction. Transects may be established that parallel the river, stream or other aquatic habitats or may be co-located with transects for other monitoring parameters, as appropriate.

Bald Eagle

Monitoring will determine bald eagle presence/absence, frequency of use and activity type, (e.g., perching, foraging and nesting activity) if present, and detect changes in these factors and use at the restoration sites over time. Data will be collected pre-construction to document baseline conditions and post-construction during years 3, 5, 7 and 10. Bald eagle use, and particularly foraging opportunities, are expected to increase as a result of the restoration activities and have a positive effect on bald eagle productivity.

Site-specific monitoring methods will depend on what is found to be feasible and appropriate by the monitoring party and Trustee Council representatives. Recommended methods include identifying an appropriate number and location(s) of monitoring stations that can be used to document bald eagle use of the entire site both pre- and post-construction. It may be acceptable to use just one station if a suitable location can be identified. The station(s) can be located either on-site or off-site, and should be placed at the least intrusive (i.e., least likely to affect bald eagle behavior) vantage point(s) for observing bald eagle use at the project site. Monitoring should occur once a week for a total of two hours per day, varying between dusk and dawn on different sampling days from mid-December through August.

Mink

To measure mink response to the restoration projects, restored miles of shoreline, associated riparian habitat width (or acreage equivalent) and the number of structures installed that can provide den sites should be tracked. The sampling methods will depend on what is found to be feasible by the monitoring entity and Trustee Council representatives. Recommended methods include camera traps, which are non-invasive to the animal, and scent stations to lure animals into camera view, as they are mostly nocturnal and secretive. Scent stations with remote cameras should be installed and operated on each restoration site to detect presence/absence of mink before and after the project. Although mink will not be handled or marked, it may be possible to identify individuals based on their unique frontal markings or other physical features that can be observed in camera photos in order to document numbers of mink observed. Detecting juveniles traveling with adults will be possible through use of remote cameras.

Mink monitoring should take place pre-construction, and during years 3, 5, 7 and 10. Monitoring should take place at least twice a month for at least 12 weeks of the spring and summer, including the period from mid-April through mid-July at a minimum, and should take place in the same locations as the pre-construction monitoring, or as close as possible. Visual surveys for tracks, scat and den sites should be conducted in potential use areas during camera trap data collection and maintenance visits, or at least twice per month. Documentation of observed signs of mink should include GPS locations.

Benthic Macroinvertebrates

Benthic invertebrates will be collected and identified to determine richness and the types of macroinvertebrates that are present as indicators of habitat health. A habitat health index has not been developed for the mainstem Willamette River so benthic macroinvertebrate sampling will only be conducted at tributary sites. The number and locations of samples will depend on the specifics of the site location and will be identified in the site specific performance plan; data will be compared to reference conditions.

3.5 Data Analysis

The monitoring data will be analyzed using a combination of statistical and graphical analysis depending on the data type and the monitoring question being answered. Some parameters such as fish passage will be compared to a set of criteria (e.g. state and federal fish passage criteria). Other parameters such as vegetation will require additional statistical analysis to determine if performance standards are being met. The details of the data analysis will be determined *a priori* and will be specific to the habitat or species under evaluation. Success will be measured based on biological or statistical significance, as appropriate. For example, bald eagle monitoring will include collecting behavioral observations during distinct time periods to determine if the frequency of use at a site increases after restoration compared to baseline conditions or over time as the restoration develops. Table 3 shows the likely analysis methods for the different categories of monitoring parameters.

Table 3: Likely analytical methods for groups of monitoring parameters.

Parameter	Analysis Method
Geomorphic/Structural Features	Compare to as-built surveys using graphical and GIS analysis.
Hydrology	Graphical time series and analysis of aerial photos.
Sediment	Compare grain size distribution to site designs.
Vegetation	Graphical comparison and statistical analysis based on before-after-control-impact paired series (BACIPS) study design/minimal recovery repeated measures design.
Water Quality	Graphical time series with comparison to Willamette River or Multnomah Channel as a reference site.
Fish	Graphical time series of abundance and size frequency histograms for salmonids.
Birds	Graphical or statistical comparison of species richness values; develop species lists; tabulate numbers of individuals observed for each species detected to determine relative abundance.
Bald Eagles	Comparison of presence/absence data, categorical behavioral observations and changes in type and frequency of use to identify trends in use over time.
Mink	Tabulate mink camera passes (single or multiple individuals) observed by remote cameras. Record presence of juveniles observed by remote cameras. Identify individuals to the extent possible by unique frontal markings or other features observed on mink in photos.
Benthic Invertebrates	Tabulate numbers and types; compare to appropriate index.

3.6 Data Management and Reporting

At the completion of each sampling effort, data will be entered and stored in a project specific database and geodatabase provided by the Trustee Council/NOAA. Whenever possible, monitoring data will be georeferenced and spatial information will be stored in the geodatabase. The field forms will be created to be compatible with the database in order to reduce the possibility of error during data entry.

3.7 Adaptive Management Framework

Each compensatory restoration project in Portland Harbor will have established final performance standards, which must be met by the end of the 10-year performance period in order to receive full restoration credit. In order to track progress toward attainment of the final performance standards, each project will also have interim performance standards (IPs) established for monitored parameters at intervals throughout the 10-year period. It is expected that a project that is consistently meeting its IPs is very likely to meet its final performance standards at the 10-year mark. A project that is not consistently meeting its IPs may be at risk of failing to meet its final performance standards, which may result in a reduction of the project's final credit value.

The use of IPs will provide timely information to the Trustee Council and project implementers (PIs) about the trajectory of habitat development that is taking place at the project site. Small adjustments

made early in the performance period may help avoid the need for larger-scale, more expensive course corrections later on. The Trustee Council has identified IPSs that are good indicators of performance, can be easily measured, and for which there are adaptive management measures that can be applied within the performance period.

Some IPSs will change over the 10-year monitoring period, reflecting expectations about progressive habitat development. See Section 3.3.2 for an example of progressive (i.e., interim performance) standards for riparian forest habitat.

Some IPSs will be constant throughout the 10-year performance monitoring period. For example, a project that removes a fish-blocking culvert to provide passage for salmon and other species will be expected to meet the standard of passability each year following project implementation. This IPS, therefore, will not be graduated, but will remain static throughout the monitoring period.

The Trustee Council anticipates that during the performance period, monitoring data may occasionally indicate that the project is not meeting one or more of its IPSs. Failure to meet the success milestones indicates that a basic restoration goal is not being met, and will trigger discussions and potential investigations regarding possible causes. Adjustments may need to be taken to ensure that the project is on track to meet its final performance standards.

Monitoring data showing that a project is not meeting its IPSs will trigger a consultation among Trustee Council and PI representatives. Possible causes for the non-conformance will be discussed. Supplemental monitoring data (i.e., data from monitoring not tied to performance standards, such as water quality) will be examined for information that would help identify the cause of the non-conformance. Assumptions about appropriate plant species, elevation, and other design factors will be reexamined and the project's performance standards adjusted if new information suggests this is appropriate. The PI will, in consultation with the Trustees, conduct an investigation of the reasons for the non-conformance, addressing:

- Can the cause of the non-conformance be identified?
- Is it technically feasible to modify or adjust the physical, chemical, or biological feature(s) of the habitat, or regulate operation or maintenance of the habitat, such that a parameter could subsequently achieve an acceptable level of development?
- What is the projected success and cost of the proposed modification?

Results of the investigation will determine modifications that may need to be implemented by the PI. If remedial measures are judged by the Trustee Council and the PI to be feasible and cost-effective, the PI will implement such measures, upon the Trustee Council's written recommendation. The Trustee Council has identified contingency measures by habitat attribute that are most likely to be recommended for implementation. Table 4 describes types of adaptive management actions that are likely to be taken to address performance issues by habitat type.

In order to ensure that funds are available to maximize the project's potential benefit, the PI will be required to place funds into a contingency fund (25% of habitat-related construction costs) for the purpose of implementing necessary adaptive management actions. Both the PI and the Lead Administrative Trustee will be signatories to the fund, so funds can only be released with approval of both parties. Adaptive management actions, jointly identified by the Trustee Council and PI, will be funded through the contingency account. At the end of the 10-year performance period, if the project meets its performance standards, any unspent funds can be returned to the PI by agreement of both parties.

In some cases, despite the implementation of adaptive management measures jointly identified by the Trustee Council and the PI, a project may fail to meet one or more of its final performance standards at the end of the 10-year performance period. This could result from one or more factors, including those related to design and construction, and those related to large-scale environmental events (100-year flood, earthquake, etc.). If the project has not met one or more of its performance standards at the end of the 10-year period, the PI will be required to implement adaptive management actions identified by the Trustee Council, to be funded with remaining contingency funds; these actions will be selected to maximize the project's benefit in light of limiting factors (including "acts of God" and events beyond the PI's control).

If the project has not met all of its performance standards after all contingency funds have been expended, but has met 90% or more of its' final performance standards, the PI will not be required to implement any further adaptive management actions, and release of the final 10% of credit can take place for a total of 100% credit released. Any further adaptive management actions deemed necessary by the Trustee Council will be funded through the Long-Term Stewardship Endowment, and carried out by the long-term steward. If the project has *not* met its performance standards after all contingency funds have been expended, and the project has met less than 90% of its' final performance standards, the PI will have the following two options:

- 1) the PI may allocate additional funds to adaptive management actions designed to help the project meet its performance standards; or
- 2) the PI may accept a reduction in the project's total credit value, to reflect lower-than- anticipated project performance. If the PI has already released more credit than the project provided (for example, if the PI has released 90% of credit and the project has only met 80% of performance standards), the PI will be required to produce the difference (in this example, 10% of the credit) through additional restoration on-site, through restoration at another site, or by purchasing credits from another restoration project.

If the Trustee Council and PI agree that a project has not met one or more of its performance standards because the standard is not attainable (because of individual project circumstances, or because of new information indicating that the selected standard was not appropriate for the site), the site will be re-surveyed and one or more new, site-appropriate standards will be identified. A revised credit estimate will be developed if the adjustment alters the amounts and/or types of habitat that the project is expected to provide. An adjustment of this type may trigger additional performance monitoring beyond the original 10 year performance period.

Table 4: Example site issues and adaptive management responses

Performance Standard	Example of Potential Problem	Example Adaptive Management Response
<i>Geomorphic/Structural Habitat Elements</i>		
At least X% of large wood and other critical habitat features that are placed in tributary, off-channel, active channel margin, riparian, and upland habitats will be retained.	More than X% of the large wood that was placed on site in the side channel has drifted away and no new wood has replaced it.	Review site configuration to determine if any structural changes could be made to help retain wood. If solution is found then additional wood should be placed.
Total area of side channel and active channel margin habitat will not change more than +/- X% from as built conditions	The site begins to silt in over a several year period and there continues to be a trend toward overall shallower depths that reduces the quantity of total ACM and side channel habitat.	Review monitoring results to determine if structural changes such as reconfiguring channel openings or addition of large wood structures are needed.
	Substantial erosion is occurring where the side channel connects to the Willamette River, Columbia River or Multnomah Channel.	
There will be no barriers to fish passage in or out of a site	Entrances to the site become silted in and cause fish stranding or block fish access.	Review monitoring results and project designs to determine if structural changes are necessary to maintain access.
<i>Hydrology and Hydraulics</i>		
These features will be comparable to an appropriate reference site and will not change more than +/- X% from as built conditions	Quantity of floodplain reconnection during high flows that was proposed was not created.	Review other physical monitoring results to determine the likely reason the habitat is not functioning as designed.
<i>Sediment Composition</i>		
Sediment composition will be comparable to an appropriate reference condition and remain consistent with project design.	A restored tributary or beach site becomes heavily silted.	Review physical monitoring data to determine what is causing the shift in sediment composition and determine what the appropriate solution is.
<i>Vegetation</i>		
Vegetation parameters will be site specific and comparable to reference conditions, if applicable.	Newly installed plants are not becoming established and thriving because of soil conditions or unsuitable hydrology. Plants are being grazed on by geese and animals using the site.	Amend the soil with an appropriate growing medium; review plant list and ensure species are suitable for site conditions, revegetate as needed.
	Invasive plants begin to crowd out natives.	Install exclusion fencing until plants can become established. Institute a more aggressive invasive plant removal program.

4.0 Long-term Stewardship Framework

Long-term stewardship refers to described monitoring, maintenance, and adaptive management at a restoration project in perpetuity. At Portland Harbor, long-term stewardship will begin after a ten-year performance period of active monitoring and maintenance. The performance period will end when the Year 10 performance standards have been met or when the project implementer and the Trustee Council agree that the establishment period is complete, whichever occurs first. Long-term stewardship will involve tasks such as:

- Regularly scheduled site visits to observe and document site conditions
- Managing invasive vegetation
- Maintaining fences and gates
- Ensuring any public uses are appropriate and any illegal or incompatible uses are addressed
- Long-term monitoring of parameters such as vegetation survival
- Clean-up and debris removal
- Maintaining positive relationships with adjacent landowners and interested community members
- Any other tasks required to maintain project effectiveness and full functionality of a given NRDA restoration project.

The goal of long-term stewardship is to ensure that a restoration project continues to meet the goals and objectives for that restoration project in perpetuity. In addition to active stewardship of the site through the types of activities listed above, the Trustee Council requires that the Project site's conservation features be permanently, legally protected prior to the end of the 10-year performance period.

4.1 Need for Long-term Stewardship

The Habitat Equivalency Analysis (HEA) model used to calculate ecological credit for a NRDA restoration project assumes that a given site will continue to provide ecological benefit to injured resources at least 300 years into the future. In practice, a variety of natural and anthropogenic phenomena threaten the ecological value of a project throughout its existence. Newly disturbed soils may activate a fallow seed bank that includes invasive species. Major flood events may occur 5, 15, or 50 years after a project is installed and severely alter habitat element locations, elevations, or features. Decades in the future, project ownership or land ownership may be questioned or challenged by new land uses, new community members, or shifting management priorities. A long-term stewardship plan, a stewardship fund, and permanent legal protection of the property are needed to ensure that a restoration project's ecological integrity is maintained in perpetuity.

4.2 Stewardship Roles and Selection of Roles.

The Trustee Council has identified up to six roles that may be involved in long-term stewardship at a given Portland Harbor NRDA restoration project:

- Long-term steward
- Conservation easement holder
- Stewardship fund manager
- Landowner

- Project implementer
- Trustee Council

Certain roles will vary by project. For example, the landowner(s) will likely be different at each site. In other cases the same entity may serve a role for multiple or all restoration projects. For example, the Trustee Council has expressed a preference towards having a single entity serve as the long-term steward or stewardship fund manager for all Portland Harbor NRDA restoration projects.

4.2.1 Long-term Steward

The long-term steward is the entity responsible for monitoring and maintaining the restoration site after the 10-year performance period ends or the 10-year performance standards are met, into perpetuity. The steward will conduct ongoing on-the-ground monitoring and maintenance activities such as regular site visits, invasive species management, fence maintenance, and trash clean up. The steward will also be responsible for administrative activities such as development of the long-term stewardship plan (prior to beginning on-the-ground stewardship activities), development of annual maintenance plans, and reporting to the Trustee Council. The steward will also be expected to coordinate with the easement holder, landowner, stewardship fund manager, and others as needed. Adequate funding to cover the steward's responsibilities will be provided by the stewardship fund.

Steward Selection

The steward will be determined by the Trustee Council in cooperation with the landowner and conservation easement holder. This decision will be made before the long-term stewardship phase begins. Likely candidates for the role of steward may be the landowner or a third-party group, such as a non-profit organization with a natural resource conservation-oriented mission and restoration project management expertise. Although there may be significant temptation to allow various project implementers, landowners, or potentially responsible parties to provide long-term stewardship at individual restoration projects, the Trustee Council has a strong preference towards employing a single, outside entity to provide long-term stewardship services at all Portland Harbor NRDA restoration projects to ensure objectivity, maximum efficiency, and consistency among the projects. The initial agreement between the Trustee Council and the steward may be termed in order to allow for a trial period to make sure that the steward is a proper fit for the needs of the restoration project. The steward may choose to subcontract with other organizations for work crews, specialized technical assistance, or other activities as needed.

4.2.2 Conservation Easement Holder

The conservation easement holder (easement holder) shall be an organization qualified under ORS 271.715 (3) to hold a conservation easement. The easement holder's duties may include, but are not limited to the following tasks: Receive conveyance of a permanent conservation easement; Perform annual conservation easement monitoring to ensure that the terms of the easement are not violated; Coordinate with the Trustee Council, landowner, project implementer, long-term steward, and stewardship fund manager; Conduct enforcement or legal defense of the easement as required by circumstances at the restoration project; Report to the Trustee Council and partners on compliance with terms of the conservation easement and use of stewardship funds. Adequate funding to cover the cost of holding a conservation easement for a Portland Harbor NRDA restoration project will be provided by the stewardship fund. To minimize risk, the Trustee Council recommends that easement holders investigate the possibility of getting insurance to support easement enforcement. Terrafirma is an

example of an insurance program available to Land Trust Alliance members.

Conservation Easement Holder Selection

Prior to the end of the performance period, the restoration project will be permanently protected with a conservation easement. A permanent easement holder shall be approved by the Trustee Council, in cooperation with the landowner and project implementer, prior to the close of the 10-year performance period or before the performance standards are met, whichever occurs first. Once the permanent easement holder is approved, a conservation easement deed running with the land and restricting the uses of the restoration project consistent with the restoration plan, performance standards, and conservation values expressed therein will be recorded to ensure the protection of a restoration project in perpetuity.

In limited cases, a deed restriction may be used in lieu of a conservation easement to protect the conservation value of a restoration project. Such instances may include projects where the property is publically owned, owned by a conservation-missioned organization, or other instances where the conservation values of the property are already otherwise reasonably protected in perpetuity. A deed restriction may also be required during the performance period as an interim method of land protection until a conservation easement can be secured for the property.

4.2.3 Stewardship Fund Manager

The Stewardship Fund Manager (fund manager) manages the long-term stewardship fund. This entity will be responsible for managing the stewardship fund as a non-wasting fund that accrues sufficient interest to finance annual stewardship activities in perpetuity. The fund manager will be responsible for providing financial documentation and reporting to the Trustee Council on a regular basis. The fund manager will be expected to coordinate with the steward and easement holder for each restoration project. If the steward and easement holder for a given project are different entities, the fund manager may need to track and disperse funds to these entities separately. Given the Trustee Council's preference to pool stewardship funds from all Portland Harbor NRDA restoration sites into a single fund, the fund manager may also need to track expenses and income across multiple projects.

Stewardship Fund Manager Selection

The Trustee Council will select a fund manager before the long-term stewardship phase begins. Likely candidates for the role may be a non-profit organization with a natural resource conservation-oriented mission and stewardship fund management expertise or a third party investment management and advisory firm. The Trustee Council has a strong preference towards employing a single, outside entity to provide stewardship fund management services for all Portland Harbor NRDA restoration projects to ensure objectivity, maximum efficiency, and consistency among the projects.

4.2.4 Landowner

The entity or entities that hold fee title to the land where the restoration project is occurring. Some projects may have more than one landowner, potentially including the Department of State Lands, which owns submerged and submersible land underlying most navigable streams and rivers, in most cases up to the ordinary high water line. The landowner(s) will need to work closely with the project implementer, easement holder, and steward to clarify roles and responsibilities, allow access, and coordinate activities during the long-term stewardship phase of the project. The Trustee Council requires that sufficient legal protections be put in place prior to restoration project implementation

or during the project performance period to ensure that the conservation values of the property will be sustained if land ownership changes in the future.

4.2.6 Project Implementer

The project implementer is the entity implementing the restoration project to compensate for natural resources damages from the Portland Harbor Superfund site. The project implementer is responsible for the project during the 10 year performance period and will be an essential contributor during the transition phase when an easement holder, steward, and stewardship fund manager are selected. Unless the project implementer also serves in one of the other roles outlined here, the project implementer's role will be limited during the long-term stewardship phase of the project.

4.2.5 Trustee Council

The Portland Harbor Natural Resource Trustee Council (or its designee) will provide oversight of Portland Harbor NRDA restoration projects during the long-term stewardship phase. See section 5.0 for more details on the Trustee Council's role.

4.3 Long-Term Stewardship Tasks

Long-term stewardship tasks at Portland Harbor NRDA restoration projects will likely include:

Monitoring may take place on a more frequent basis (e.g. quarterly) in the early stages of site stewardship and be scheduled less frequently (e.g. annually) after a site has proven to need less maintenance. Some parameters from the original monitoring and maintenance plan at the site may warrant data collection beyond the initial 10-year performance period. These may be specific to habitat types that take greater than 10 years to establish (such as upland forests), individual species that may take longer to show a response at the site level (such as lamprey), or other factors that require less frequent monitoring over a longer period of time (such as contamination from upland or upstream sources). The monitoring plan for lamprey extends for a period of 20 years after project implementation and will be led by the USFWS and/or the Tribal Trustees throughout its duration. All sites will likely require ongoing assessment of native and invasive vegetation. The easement holder may monitor property boundaries and look for violations of the easement requirements. Thorough and consistent methods for data collection should be used. Monitoring results will be shared with the Trustee Council or its designee(s) on an annual basis. This task will include labor, transportation, and field equipment associated with conducting monitoring.

Maintenance

Maintenance and adaptive management actions will be specified in the site-specific long-term stewardship plan and annual maintenance plan. These actions will likely include habitat maintenance activities such as invasive species treatment, native vegetation planting, and other activities specific to site conditions. These actions will also include general maintenance such as fence repair or construction, trash and debris removal and disposal, and maintaining signage. The steward may employ staff, contracted crews, or volunteers to address maintenance and adaptive management concerns. This task will include on-site management and labor, contracting, supplies for maintenance (e.g. plantings, mulch, equipment, disposal fees) and travel.

Program Management

The Trustee Council has a strong preference towards employing a “portfolio approach” to long-term stewardship services at all Portland Harbor NRDA restoration projects to ensure objectivity,

maximum efficiency, and consistency among the projects. This would require the steward and fund manager to coordinate all long-term stewardship activities occurring across all sites. Whether the sites are managed as a portfolio or individually, management of the long-term stewardship program for a site or sites will include tasks such as supervision of **employees, contract negotiation with work crews or scientists conducting long-term effectiveness monitoring, development of scopes of work, management of subcontracts, and providing or contracting technical assistance.** Program management will also require timely communications with the Trustee Council or its designee(s) and other stakeholders, and possibly identification of additional partnerships or opportunities that may leverage the value and benefit of the Portland Harbor restoration projects. Included in this task are a portion of office supplies, computers, etc., commensurate with the percent of time the steward devotes to Portland Harbor tasks (as opposed to other projects). In addition, items needed for operations such as insurance, accounting, and contracting, would be included in this task. This task will also include fiscal management of the long-term stewardship fund for all of the Portland Harbor NRDA restoration projects.

Community Relations and Enforcement

The long-term viability of a restoration site is dependent upon a community that understands and supports the project and contributes towards site stewardship. The steward, easement holder, or landowner may not notice all of the potential issues that threaten a site through occasional site visits. Encroachment onto the site by livestock or other domestic animals, illegal trespassing by humans, or large accumulations of human-derived trash and debris due to dumping or after a storm might each be most quickly observed (and consequently dealt with) by an informed and concerned community. Positive community relations among the landowner, easement holder, steward, neighbors, and broader community will be essential so that such issues are dealt with quickly and thoroughly. This task might include labor for regularly scheduled community meetings, presentations to interested audiences, volunteer involvement, and email, flyers, posters, telephone, or in-person communications.

On occasion there will likely be need to enforce the conservation easement. Trespassing, dumping, or other illegal activities may occasionally occur at the site and require coordination with legal authorities, neighboring landowners, and project partners. This task may include labor and fees associated with reporting violations of the conservation easement to the landowner, easement holder, legal authorities, the Trustee Council or its designee(s), and others as well as the costs of labor and supplies for responding to or repairing the violations.

Reporting, Documentation, and Data Management

All entities involved with long-term stewardship will provide documentation of monitoring, adaptive management, and stewardship tasks to the Trustee Council or its designee(s) and other interested parties on a regular basis. At a minimum, the documents outlined in Table 5 will be provided to the Trustee Council or its designee(s) as they are developed or on an annual basis, depending on their frequency. In addition, restoration site information and data should be made available to the general public in the form of a website, online database, and/or online mapping feature so that the general public can access information about the site and stay involved in events such as work parties and community discussions.

Site-Specific Long-term Stewardship Plan- The steward will develop a site-specific long-term stewardship plan for each restoration site in order to maintain the site's full functionality using the effectiveness monitoring results, adaptive management techniques employed during the first 10 years of a site's performance, and the initial site assessment. The plan should include a

schedule for site visits, monitoring activities, anticipated maintenance needs, and provide a framework for decision-making should an unexpected event occur (e.g. trespass, arrival of a new invasive species). The plan should outline and define the types of maintenance actions anticipated at the site that will be included in the annual maintenance plan for the portfolio of projects as well as describe the approach that will be used to prioritize stewardship actions among sites each year. Development of the plan may also involve defining staff or stakeholder roles, identifying subcontracting mechanisms that could be used at the site, and establishing a process for regular documentation and reporting.

Annual Maintenance Plan- Potential maintenance and adaptive management needs identified during site visits, monitoring data review, or through other methods will be documented for all restoration sites within the Portland Harbor portfolio on an annual basis. This list of potential actions will be prioritized and form the basis of an annual maintenance plan. Identifying individual priorities by considering them in the context of the needs of the entire portfolio ensures the most effective use of limited resources. This task will include maintenance plan development, review among various stakeholders, and plan distribution.

Table 5: Required documentation for long-term stewardship activities at Portland Harbor.

Product	Purpose	Frequency	Individual Site or Portfolio?
Site Assessment	Describe baseline condition of site when long-term stewardship begins.	One time	Site
Stewardship Plan	Provides prioritization methodology and actions among sites.	Once at the beginning and then update periodically as needed.	Site and Portfolio
Maintenance Plan	Describes each year's activities based on priority actions.	Annual	Portfolio

Monitoring Report	Provides current condition information and management and maintenance recommendations for the following year.	Annual	Site
Fiscal Report	Document interest accrual, spending, and overall standing of long- term stewardship fund.	Annual	Site and Portfolio
Notification of Enforcement Issue	Notify the Trustee Council or its designee of enforcement issue and whether assistance is needed to resolve the problem.	As needed	Site

5.0 Trustee Council Oversight

During the performance period, the Trustee Council will oversee monitoring of all restoration projects implemented in the Portland Harbor NRDA case whether implemented by PRPs or by third party developers. The Trustee Council will work with project implementers to develop a site-specific monitoring plan for the performance period and the long-term stewardship period. During the performance period, the Trustee Council will review monitoring results, validate that the projects are meeting their performance standards, and work with the steward and project implementers to develop site-specific long-term stewardship plans.

During the long-term stewardship phase of the project, the Trustee Council or its designee(s) may review and oversee regular reporting of effectiveness monitoring results, site visits, maintenance activities, qualitative monitoring results (observational and photographic), enforcement issues, financial management, adaptive management activities, and descriptions of community involvement that will be provided to the Trustee Council or its designee by the steward.

6.0 Monitoring and Stewardship Funding

Monitoring during the performance period will be funded directly by the project implementer. During the long-term stewardship period, the costs for maintenance and monitoring will be paid for by a stewardship fund established during the performance period for this purpose. Since the long-term function of a restoration site cannot be ensured without long-term stewardship, credit for a site will not be given unless costs of long-term stewardship are included in a project's budget. Long-term stewardship funds will be transferred to a stewardship fund and invested such that it will provide sufficient funds for management in perpetuity. The stewardship fund will be overseen by a third party fiscal manager (stewardship fund manager described in section 4.2.3).

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Appendix A: Site Performance Plan Outline

Section 1.0 Project Overview

- 1.1 Site Description
 - 1.1.1 Location
 - 1.1.2 History
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- 1.2 Existing Conditions
 - 1.2.1 Habitat
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- 1.3 Description of Restoration Activities
 - 1.3.1 Demolition (if any)
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Section 2.0 Goals and Objectives

- 2.1 Project Goals and Objectives
 - 2.1.1 Goal 1
 - 2.1.1.1 Objective 1
 - 2.1.1.2 Objective 2
 - 2.1.2 Goal 2
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Section 3.0 Monitoring Questions (See Table 1 of Framework for examples)

- 3.1 Performance Standards Questions
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Section 4.0 Performance Standards

- 4.1 Geomorphic/structural habitat elements
- 4.2 Hydrology and Hydraulics
- 4.3 Sediment
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 - 4.4.1 Emergent Marsh
 - 4.4.2 Riparian, Scrub-shrub, and Upland Forest
 - 4.4.3 Oak Woodland

Section 5.0 Other Parameters to Be Monitored

- 5.1 Native Fish
- 5.2 Pacific Lamprey
- 5.3 Bird Assemblages
- 5.4 Mink
- 5.5 Bald Eagles
- 5.6 Water Quality

Section 6.0 Monitoring Study Design

- 6.1 Photo Monitoring
- 6.2 Geomorphic/structural habitat elements
- 6.3 Vegetation
- 6.4 Fish monitoring
- 6.5 Wildlife monitoring
- 6.6 Water quality

Appendix B. Lamprey Monitoring Plan

Introduction

The Portland Harbor Natural Resource Trustee Council Tribal Working Group (TWG) has found sufficient evidence that lamprey have been injured due to the release of hazardous substances in Portland Harbor to require compensation for these injuries. While restoration of habitat will most likely benefit lamprey as well as other species, additional compensation is appropriate to offset the lost services provided by lamprey due to their unique importance to tribes. Injury to lamprey ammocoetes due to contamination was identified through preliminary toxicity testing performed by the Trustee Council. The lost use of lamprey due to contamination was identified through interviews with Tribal members. During two workshops with Tribal and Trustee lamprey experts, the TWG learned that not enough is known about the types of habitat that lamprey prefer in large river systems or what habitat features would be most beneficial to design effective restoration projects targeted at benefiting lamprey. The TWG, with the help of the lamprey experts, decided that the best use of resources at this time is to incorporate a comprehensive lamprey monitoring program into the harbor-wide restoration monitoring plan, as well as detailed lamprey monitoring at each specific restoration site, rather than design restoration projects specifically for the benefit of lamprey. The objectives of this program are to evaluate how the restoration projects designed to benefit salmon and other species also benefit lamprey, and to gather data about habitat use by lamprey ammocoetes that may be used by the Tribal Trustees and others in the future to improve the design of restoration projects for lamprey.

Description of Lamprey Monitoring Plan

This over-arching lamprey monitoring plan is based on a set of monitoring goals and objectives (see Table B.1) that were developed by Trustee lamprey experts over two workshops held in the fall of 2011. This monitoring plan was developed to simultaneously monitor the impact of restoration actions on juvenile lamprey populations and health in Portland Harbor, and gather information about juvenile lamprey life history, biology, and habitat requirements that may be used by the Trustees in the future to design and evaluate lamprey restoration projects. This component differs from the general restoration monitoring and stewardship plan in that the lamprey monitoring continues for a period of 20 years.

The plan presented here represents a generalized approach for monitoring at individual restoration sites, reference sites, and harbor-wide study sites. While the goals and objectives will be consistent across study sites, site-specific conditions may result in slight modifications to the plan as outlined in this document (e.g., in terms of metrics collected, or methodology used). The specific study design for monitoring at each individual site will be outlined in a detailed site-specific monitoring plan.

Table B.1. Lamprey restoration monitoring goals and objectives

Goal	Objective
Evaluate how individual projects affect lamprey and their habitat	Determine occupancy by lamprey
	Determine where lamprey colonize within a site (habitat preference)
	Characterize genus and life history stage that colonized
	Determine health of lamprey observed in each location
Evaluate harbor-wide impact of restoration projects on Pacific lamprey	Evaluate colonization between sites
	Evaluate harbor-wide changes and trends
	Describe changes in ecosystem health (e.g., ecosystem diversity index)
Evaluate information from monitoring to inform future restoration work	Evaluate and use information to inform future restoration actions

Monitoring metrics and timing

A series of specific monitoring metrics will be measured to confirm locations where lamprey are found and to characterize habitat conditions where lamprey are observed. Some of the metrics that will be monitored for lamprey overlap with the general restoration monitoring metrics.

However, because lamprey are very different from other biota, the overlap between the lamprey monitoring plan and the general restoration monitoring and stewardship framework is not extensive. In most cases, the metrics collected as part of the lamprey monitoring effort need to be co-located with lamprey sampling. To maximize efficiencies, the Trustee Council will use the data collected as part of the lamprey monitoring plan for the general restoration monitoring and stewardship effort as much as possible. Table B.2 presents the lamprey monitoring metrics and the years in which monitoring will occur. It also indicates the overlap between the lamprey monitoring plan and the general restoration monitoring and stewardship framework, which will improve cost efficiency.

Table B.2. Lamprey monitoring metrics and data collection times

Metric	Years monitored	
	Restoration and reference sites	Harbor-wide
Presence/absence – probabilistic; standard effort; influence of habitat on sampling (e.g., conductivity, large woody debris, depth); time series over the course of monitoring	Pre-implementation, years 1–5, 10, 15, 20	Pre-implementation, ^c mid-point (years 9-11), end-point (years 18-20)
Relative abundance	Pre-implementation, years 1–5, 10, 15, 20	Pre-implementation, ^c mid-point (years 9-11), end-point (years 18-20)
Grain size and grain type ^a	Pre-implementation, years 1–5, 10, 15, 20	Pre-implementation, ^c mid-point (years 9-11), end-point (years 18-20)
Depth of sediment, changes in grain size with depth ^a	Pre-implementation, years 1-5, 10, 15, 20	
Sediment compactness	Pre-implementation, years 1-5, 10, 15, 20	
Sediment contaminant concentrations ^a	Pre-implementation, years 1, 10 ^b	
Organic content	Pre-implementation, years 1–5, 10, 15, 20	
Water column temperature – time series ^a	Pre-implementation, years 1–5, 10, 15, 20	Pre-implementation, ^c mid-point (years 9-11), end-point (years 18-20)
Water depth	Pre-implementation, years 1–5, 10, 15, 20	
Water velocity – water column	Pre-implementation, years 1–5, 10, 15, 20	
Water velocity – at substrate surface	Pre-implementation, years 1–5, 10, 15, 20	
Presence and type of aquatic vegetation	Pre-implementation, years 1–5, 10, 15, 20	
Turbidity	Pre-implementation, years 1–5, 10, 15, 20	
Conductivity	Pre-implementation, years 1-5, 10, 15, 20	

Table B.2. Lamprey monitoring metrics and data collection times

Metric	Years monitored	
	Restoration and reference sites	Harbor-wide
Habitat complexity (e.g., number of transitions from fast to slow-moving water)	Pre-implementation, years 1-5, 10, 15, 20	
Detritus	Pre-implementation, years 1-5, 10, 15, 20	
Length of lamprey	Pre-implementation, years 1-5, 10, 15, 20	
Weight of lamprey	Pre-implementation, years 1-5, 10, 15, 20	
Identify fish genera	Pre-implementation, years 1-5, 10, 15, 20	
Qualitative health assessment (e.g., record lesions)	Pre-implementation, years 1-5, 10, 15, 20	
Life history stage (ammocoete, macrophthalmia, adult, egg/redd)	Pre-implementation, years 1-5, 10, 15, 20	
Compare spatial distribution data across sites	Pre-implementation, years 1-5, 10, 15, 20	
Characterization of Type I habitat	Pre-implementation, years 1-5, 10, 15, 20	

Notes:

- a. Metric overlaps with general monitoring and stewardship program. Data collected as part of the lamprey monitoring program will be used for general monitoring and stewardship purposes as well.
- b. Contaminant concentrations are not expected to change rapidly over 10 years. However, if monitoring data indicate that contaminant concentrations have changed or if an event occurs that could lead to recontamination, sediment contaminant data will be collected more frequently as needed.
- c. Pre-implementation monitoring has already been completed for the harbor-wide sampling metrics (e.g., Jolley et al., 2012; Silver et al., Undated), and therefore the Trustees will rely on this work completed by the USFWS to characterize the pre-implementation baseline conditions.

The experts recommended monitoring lamprey for 20 years, with the goal of capturing data for one to two complete generations. Pre-implementation monitoring will be conducted to the extent practical at each restoration site (i.e. to the extent there is existing lamprey habitat pre-restoration). At some restoration sites, monitoring data may be available from other sources (e.g., existing USFWS or other agency studies). Where available and appropriate, these data

will supplement pre-implementation monitoring. Lamprey are expected to colonize habitats rapidly. Therefore, the experts recommended that monitoring be conducted on a yearly basis for the first five years, and every five years thereafter (see Table B.2). Sediment contaminant concentrations will be monitored less frequently – during pre-implementation and in years 1 and 10– than other metrics because this parameter is not likely to change quickly and the analyses are relatively expensive. Sediment contaminants will be monitored more frequently if there is a reason to suspect that contaminant levels at a site are causing adverse impacts, or if there is a release nearby or other event (e.g., flood or earthquake) that could cause recontamination at a restoration site.

In addition to the metrics measured in the field, three metrics will be evaluated using the data collected during monitoring: detection probability, occupancy, and diversity. Each of these parameters will be evaluated after field sampling has been completed for each sampling year for restoration project sites, reference monitoring sites, and harbor-wide sampling sites. The detection probability is calculated as the proportion of sampling units that are occupied.

Occupancy is a statistical evaluation of presence or absence of lamprey; using these data and the detection probability, this metric represents the probability that a sampling unit is occupied when a lamprey was not detected at a given location. Diversity will be calculated as part of the general restoration monitoring and stewardship framework and will help track the effect of restoration of total species diversity.

Monitoring locations

Lamprey monitoring will occur at three primary types of locations: restoration project sites, reference monitoring sites, and harbor-wide monitoring sites.

Restoration project sites

Lamprey will be monitored in off-channel wet areas and areas that are deeper than ordinary low water (5.1 feet North American Vertical Datum of 1988) at each restoration project site. At each site, sampling locations will be developed using methods previously devised by the USFWS (Jolley et al., 2012; Silver et al., Undated). These methods have been used in past studies to sample in areas of particular interest that are comparable in size to the restoration projects anticipated. The number of samples collected will depend on the number of distinct habitat types being created or restored in the restoration project (e.g., a project that creates an off channel alcove and restores a tributary stream channel would have two different types of lamprey habitat).

Reference monitoring sites

Reference monitoring sites will be used to assist in interpreting the results from monitoring of restoration project sites. Without reference information, it will not be possible to evaluate whether improvements to habitat associated with the restoration actions are responsible for observed changes in lamprey habitat usage or part of broader trends. Each restoration site will have a paired reference monitoring site, based on the BACI (Before-After- Control-Impact monitoring approach; Smith et al., 1993) method. BACI is a statistically sound monitoring method that uses paired sites and pre-implementation monitoring to evaluate the effects of a

restoration (or other) action in an area, while controlling for outside factors that may also influence the success of a project (e.g., hydrologic conditions, temperature, basin-wide population dynamics).

The reference monitoring sites will be selected by lamprey experts and will be located in or near the Portland Harbor study area. Sampling locations within each reference site will be developed using the same methods and frequencies as for the restoration sites. Where appropriate, the same reference monitoring site may be used for more than one restoration project with similar types of lamprey habitat.

Harbor-wide monitoring sites

To evaluate harbor-wide effects of restoration projects on lamprey health and population, a harbor-wide survey will be conducted at regular intervals throughout the 20-year monitoring period. These surveys will be completed less frequently than regular restoration project and reference site monitoring. The harbor-wide monitoring will be conducted throughout the

Portland Harbor study area and surrounding area using a statistically sound sampling method developed by the USFWS for past surveys of lamprey populations in the Willamette River (Jolley et al., 2012; Silver et al., Undated). A randomized set of sampling locations will be selected based on a statistical grid of the harbor. The metrics identified in Table B.2 will be included in the harbor-wide monitoring effort but the frequency will differ.

Harbor-wide monitoring will be completed at two future times: at the mid-point of the lamprey monitoring timeline and at the end of the monitoring period. A previous survey by the USFWS will be relied on to characterize baseline (i.e., pre-implementation) conditions. To help reduce uncertainty caused by inter-annual variability, each of the three sampling events will occur over a three-year period:

- Pre-restoration implementation: previous work by the USFWS will be used; new data do not need to be collected (e.g., Jolley et al., 2012; Silver et al., Undated)
- Mid-point sampling will occur in years 9, 10, and 11⁴
- End-point monitoring will occur in years 18, 19, and 20.

Methods

Individual sampling locations will be identified according to the randomized sampling technique used by the USFWS in their previous lamprey surveys conducted in Portland Harbor (Jolley et al., 2012; Silver et al., Undated).

Lamprey ammocoete sampling will be conducted using electroshocking techniques consistent with those used in previous USFWS lamprey sampling studies in Portland Harbor (Jolley et

⁴ Where year 1 is the first year a restoration project is implemented in Portland Harbor.

al., 2012; Silver et al., Undated). In water shallow enough to wade (approximately < 3 feet), backpack shocking equipment and techniques will be used. In water too deep to wade (approximately > 3 feet), a deep-water electroshocking boat and techniques will be used.

Length, weight, genus, health (e.g., presence of lesions), and life history stage will be determined for lamprey collected by electroshocking (Table B.2.).

Habitat data (Table B.2) will be collected at each sampling location. Sediment samples will be collected at a sub-set of sampling locations and sent to an outside laboratory to analyze for dissolved oxygen content, grain size and type, and contaminant concentrations. Other habitat metrics identified in Table B.2 will be collected as appropriate (not all metrics will be collected for harbor-wide sampling or in deep- water conditions), including sediment depth, sediment compactness, water column temperature, water depth, water velocity, presence of aquatic vegetation, turbidity, conductivity, and presence of Type I habitat. These data will be collected at the same time as fish sampling and using standard techniques and equipment, as described in the general restoration monitoring and stewardship plan and in previous USFWS surveys. The details of the sampling plan will be developed by the group implementing the monitoring (e.g., USFWS) and will be reviewed by lamprey experts to ensure that appropriate techniques are used.

References

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Appendix C: Portland Harbor Native Plants Restoration List

Scientific Name Of Stock	Common Name	Status	Grouping	Elevation	Availability Of Stock	Ease Of Establishment	Historic Presence
<i>Abies grandis</i>	Grand fir	Native	Wetland, Riparian, Forest, Forest Slope	Low to Mid Elevation	Good	Good	Uncommon
<i>Acer circinatum</i>	Vine maple	Native	Forest, Forest Slope, Grassland	Low to Mid Elevation	Good	Good	Moderate
<i>Acer macrophyllum</i>	Bigleaf Maple	Native	Forest/Thicket	Low to Mid Elevation	Good	Good	Common
<i>Achillea millefolium</i> L.	Yarrow	Native	Grassland, Thicket	Low to High Elevation	Good	Good	Common
<i>Adiantum pedatum</i>	Maidenhair Fern	Native	Riparian, Forest, Forest Slope, Rocky	Low to Middle Elevation	Good	Moderate	Uncommon
<i>Allium accuminatum</i>	Hooker's Onion	Native	Open Forest, Rocky, Grassland	Low Elevation	Good	Good	Uncommon
<i>Allium cernuum</i>	Nodding Onion	Native	Open Forest, Rocky, Grassland	Low Elevation	Good	Good	Uncommon
<i>Alnus rhombifolia</i>	White Alder	Native	Riparian	Low to High Elevation	Good	Good	Uncommon
<i>Alnus rubra</i>	Red Alder	Native	Riparian, Forest, Forest Slope	Low Elevation	Good	Good	Common
<i>Amelanchier alnifolia</i>	Serviceberry, Saskatoon	Native	Forest, Forest Slope, Thicket	Low to Mid Elevation	Good	Good	Moderate
<i>Angelica arguta</i>	Sharptooth angelica	Native	Wetland, Riparian	Low to Mid Elevation	Good	Probably best from seed	Common
<i>Angelica</i> spp.	Angelica	Native	Riparian	Low to High Elevation	Good	Probably best from seed	Common
<i>Apocynum cannabinum</i>	Dogbane (Indian Hemp)	Native	Grassland, Thicket	Low to High Elevation	Moderate	Good	Uncommon
<i>Aquilegia formosa</i>	Red Columbine	Native	Riparian, Forest, Meadow, Rocky	Low to High Elevation	Good	Good	Uncommon
<i>Arbutus menziesii</i>	Pacific Madrone	Native	Rocky	Low to Mid Elevation	Good	Hard	Moderate
<i>Arctostaphylos uva-ursi</i>	Kinnikinnick	Native	Forest, Forest Slope, Rocky, Riparian	Low to High Elevation	Good	Moderate	Moderate
<i>Asarum caudatum</i>	Wild Ginger	Native	Forest, Forest Slope	Low to Mid Elevation	Good	Moderate	Moderate

Scientific Name Of Stock	Common Name	Status	Grouping	Elevation	Availability Of Stock	Ease Of Establishment	Historic Presence
<i>Brodiaea hyacinthia</i>	Hyacinth Brodiaea	Native	Meadow, Forest Slope, Rocky	Low Elevation	Good	Good	Uncommon
<i>Camassia quamash</i>	Camas	Native	Wetland, Meadowland	Low to Mid Elevation	Good	Good	Uncommon
<i>Carex obnupta</i>	Slough Sedge	Native	Wetland, Riparian	Low Elevation	Good	Good	Common
<i>Carex pellita</i>	Woolly Sedge	Native	Wetland, Riparian, Meadow	Low to High Elevation	Review	Review	Review
<i>Carex</i> spp.	Sedges	Native	Wetland	Low to High Elevation	Good	Good	Common
<i>Carex vesicaria</i>	Inflated Sedge	Native	Wetland, Riparian	Low to Mid Elevation	Review	Review	Review
<i>Cicuta douglassii</i>	Douglas' Water-Hemlock	Native	Wetland, Riparian	Low to Mid Elevation	Review	Review	Review
<i>Claytonia perfoliata</i>	Miner's lettuce	Native	Riparian, Forest	Low to Mid Elevation	Review	Review	Moderate
<i>Clinopodium douglasii</i>	Yerba buena	Native	Riparian	Low to High Elevation	Review	Review	Review
<i>Cornus canadensis</i>	Bunchberry dogwood	Native	Riparian, Forest, Thickets, Meadows	Low to High Elevation	Good	Moderate	Moderate
<i>Cornus nuttallii</i>	Pacific Dogwood	Native	Riparian, Forest, Thickets, Forest Slope	Low Elevation	Good	Moderate	Moderate
<i>Cornus sericea</i> ssp. <i>Sericea</i>	Red Osier Dogwood	Native	Wetland, Riparian, Thicket	Low to Mid Elevation	Good	Good	Common
<i>Cornus stolonifera</i>	Red Osier Dogwood	Native	Wetland, Riparian, Thicket	Low to Mid Elevation	Good	Good	Common
<i>Corylus cornuta</i>	Beaked Hazelnut	Native	Forest, Forest Slope, Thicket	Low to Mid Elevation	Good	Good to moderate	Moderate
<i>Crataegus douglassii</i>	Black hawthorn	Native	Thickets, Grasslands	Low to Mid Elevation	Good	Good	Moderate
<i>Delphinium menziesii</i>	Menzies' Larkspur	Native	Grasslands, Meadows, Thickets	Low to Mid Elevation	Good	Good	Uncommon
<i>Delphinium</i> spp.	Larkspur	Native	Riparian, Forest, Thickets, Meadows	Low to High Elevation	Good	Good	Uncommon
<i>Eleocharis palustris</i>	Creeping Spike-Rush	Native	Wetland, Riparian	Low to Mid Elevation	Good	Moderate	Review
<i>Eleocharis</i> spp.	Spike Rush	Native	Emergent, Wetland, Riparian	Low to Mid Elevation	Good	Moderate	Review
<i>Epilobium angustifolium</i>	Fireweed	Native	Grasslands	Low to Mid Elevation	Good	Good	Common

Scientific Name Of Stock	Common Name	Status	Grouping	Elevation	Availability Of Stock	Ease Of Establishment	Historic Presence
Eriophyllum lanatum	Common Woolly Sunflower, Oregon Sunshine	Native	Rocky	Low to Mid Elevation	Good	Good	Uncommon
Fragaria vesca	Woodland Strawberry	Native	Riparian, Forest, Grassland	Low to High Elevation	Good	Good	Moderate
Fragaria virginiana	Wild Strawberry	Native	Riparian, Forest, Grassland	Low to High Elevation	Good	Good	Common
Fraxinus latifolia	Oregon Ash	Native	Riparian, Wetland, Thickets	Low to High Elevation	Good	Good	Common
Galium aparine	Cleavers	Native	Riparian, Forest, Thickets	Low to Mid Elevation	Review	Review	Review
Galium boreale	Small Bedstraw	Native	Riparian, Forest, Thickets, Rocky	Low to High Elevation	Good	Good	Moderate
Galium triflorum	Sweet Scented Bedstraw	Native	Wetland, Riparian	Low to Mid Elevation	Good	Good	Moderate
Gaultheria shallon	Salal	Native	Forest, Forest Slope, Rocky, Thickets	Low to Mid Elevation	Good	Good to moderate	Common
Goodyera oblongifolia	Rattlesnake Plantain	Native	Forest	Low to Mid Elevation	Good	Good	Uncommon
Heracleum lanatum	Cow parsnip	Native	Riparian, Forest	Low to High Elevation	Good	Good	Common
Holodiscus discolor	Oceanspray	Native	Forest, Forest Slope, Thicket	Low to Mid Elevation	Good	Good	Common
Howellia aquatilis	Water Howellia	Native	Aquatic, Wetland	Low to Mid Elevation	Poor	Unknown	Uncommon
Juncus effusus	Soft Rush	Native	Wetland, Riparian	Low to Mid Elevation	Good	Good	Common
Juncus spp.	Rushes	Native	Wetland, Riparian	Low to High Elevation	Good	Good	Common
Ledum glandulosum	Western Labrador tea	Native	Riparian, Thickets	Low to Mid Elevation	Good	Moderate, alkaline soils, bogs	Uncommon
Ledum groenlandicum	Bog Labrador tea	Native	Riparian, Thickets	Low to Mid Elevation	Good	Moderate, alkaline soils, bogs	Uncommon
Linnaea borealis	Twinflower	Native	Forest, Forest Slope	Low to High Elevation	Good	Low to moderate	Uncommon

Scientific Name Of Stock	Common Name	Status	Grouping	Elevation	Availability Of Stock	Ease Of Establishment	Historic Presence
Lomatium spp.	Lomatium	Native	Grassland, Rocky	Low to Mid Elevation	Good	Moderate	Uncommon
Lonicera ciliosa	Orange Honeysuckle	Native	Forest, Thicket	Low to High Elevation	Good	Moderate	Moderate
Lonicera involucrata	Black Twinberry	Native	Wetland, Riparian, Grassland	Low to High Elevation	Moderate	Good	Moderate
Lupinus spp.	Lupine	Native	Grassland	Low to High Elevation	Good	Good	Varies by
Lysichiton americana	Skunk cabbage	Native	Wetland, Riparian	Low to Mid Elevation	Good	Good	Uncommon
Mahonia (Berberis) aquifolium	Tall Oregon grape	Native	Forest, Forest Slope	Low to Mid Elevation	Good	Good	Moderate
Mahonia (Berberis) nervosa	Dull (Low) Oregon Grape	Native	Riparian, Forest	Low to High Elevation	Good	Moderate	Moderate
Malus fusca	Pacific Crabapple	Native	Forest, Riparian, Thickets	Low to Mid Elevation	Good	Good	Moderate
Mentha arvensis	Field Mint	Native	Wetlands, Riparian, Thickets	Low to Mid Elevation	Good	Good	Common
Mimulus guttatus	Sticky monkeyflower	Native	Riparian	Low to High Elevation	Good	Moderate	Moderate
Nuphar polysepalum	Yellow pond lily, wocas	Native	Wetland Submerged	Low to Mid Elevation	Good	Good	Moderate
Oemleria cerasiformis	Indian Plum, Osoberry	Native	Open Forest, Riparian	Low to Mid Elevation	Good	Good	Common
Osmorhiza occidentalis	Western sweet cicely	Native	Forest	Low to Mid Elevation	Review	Review	Review
Oxalis oregana	Wood Sorrel	Native	Forest, Open Forest, Riparian	Low to Mid Elevation	Good	Good	Common
Perideridia gairdneri	Gairdner's Yampah	Native	Thickets, Meadows	Low to Mid Elevation	Review	Review	Uncommon
Philadelphus lewisii	Mock Orange	Native	Forest, Forest Slope, Thicket	Low to Mid Elevation	Good	Good to moderate	Uncommon
Physocarpus malvaceus	Pacific Ninebark	Native	Riparian, Forest	Low to Mid Elevation	Good	Good	Common
Populus balsamifera	Black Cottonwood	Native	Wetland, Riparian	Low to Mid Elevation	Good	Good	Common
Potentilla anserina	Silverweed	Native	Riparian	Low to Mid Elevation	Good	Good	Moderate

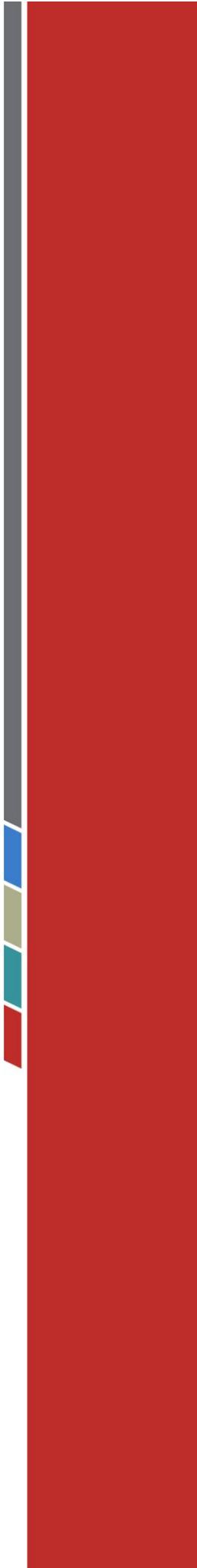
Scientific Name Of Stock	Common Name	Status	Grouping	Elevation	Availability Of Stock	Ease Of Establishment	Historic Presence
Potentilla spp.	Silverweed, Cinquefoil	Native	Riparian	Low to High Elevation	Good	Good	Uncommon
Prunus emarginata	Bitter Cherry	Native	Riparian, Forest, Forest Slopes, Thickets	Low to Mid Elevation	Good	Moderate	Uncommon
Prunus virginiana	Chokecherry	Native	Riparian, Forest, Thicket	Low to Mid Elevation	Good	Good	Uncommon
Pseudotsuga menziesii	Douglas-fir	Native	Forest, Forest Slope	Low to High Elevation	Good	Good	Common
Pteridium aquilinum	Bracken Fern	Native	Riparian, Forest, Forest Slopes, Meadow	Low to High Elevation	Review	Review	Review
Quercus garryana	Oregon White Oak	Native	Forest, Grassland	Low Elevation	Good	Good to moderate	Moderate
Rhamnus purshiana	Cascara	Native	Riparian, Forest, Forest Slope	Low to Mid Elevation	Good	Good	Common
Ribes spp.	Currants	Native	Riparian, Forest, Forest Slope, Thicket, Meadow	Low to High Elevation	Good	Good to moderate by species	Moderate
Rosa spp.	Wild rose	Native	Riparian, Forest, Forest Slope, Thickets	Low to Mid Elevation	Good	Good to moderate	Common
Rubus idaeus	Wild raspberry	Native	Thickets, Open Forest	Low to Mid Elevation	Good	Good	Uncommon
Rubus leucodermis	Black Raspberry, Blackcap	Native	Thickets, Open Forest	Low to Mid Elevation	Good	Good	Uncommon
Rubus parviflorus	Thimbleberry	Native	Riparian, Forest, Forest Slope	Low to High Elevation	Good	Good	Moderate
Rubus spectabilis	Salmonberry	Native	Riparian, Forest	Low to High Elevation	Good	Good to moderate	Moderate
Rubus ursinus	Trailing blackberry	Native	Thickets, Open Forest	Low to Mid Elevation	Good	Good	Common
Sagittaria latifolia	Wapato	Native	Wetland, Riparian; Submerged	Low Elevation	Good	Good	Uncommon
Salix spp.	Willow	Native	Wetland, Riparian, Forest	Low to High Elevation	Good	Good	Common
Sambucus spp.	Elderberry	Native	Riparian, Forest, Forest Slope, Thicket	Low to Mid Elevation	Good	Good to moderate	Moderate
Satureja douglasii	Yerba Buena	Native	Open Forest, Thickets, Rocky	Low to Mid Elevation	Good	Good	Uncommon

Scientific Name Of Stock	Common Name	Status	Grouping	Elevation	Availability Of Stock	Ease Of Establishment	Historic Presence
<i>Schoenoplectus acutus</i> , <i>Scirpus acutus</i>	Tule, Hard-stemmed bullrush	Native	Wetland, Riparian	Low to Mid Elevation	Good	Good	Common
<i>Sidalcea Nelsoniana</i>	Nelson's Checkermallow	Native	Wet meadow, Forest edge, Riparian	Low to Mid Elevation	Good	Good	Uncommon
<i>Sium suave</i>	Hemlock water parsnip	Native	Wetland, Riparian	Low to Mid Elevation	Review	Review	Review
<i>Smilacina racemosa</i>	False Solomon's seal, large	Native	Wetland, Forest, Forest Slope, Thicket	Low to High Elevation	Good	Moderate	Moderate
<i>Smilacina stellata</i>	False Solomon's seal, small	Native	Forest	Low to High Elevation	Good	Moderate	Moderate
<i>Solidago canadensis</i>	Canada Goldenrod	Native	Grasslands, Meadowland	Low to Mid Elevation	Good	Good	Moderate
<i>Spiraea douglasii</i>	Douglas Spirea	Native	Wetland, Riparian, Thicket	Low to Mid Elevation	Good	Good	Moderate
<i>Symphoricarpos albus</i>	Snowberry	Native	Forest, Forest Slope, Thicket	Low to Mid Elevation	Good	Good	Moderate
<i>Taxus brevifolia</i>	Western Yew, Pacific Yew	Native	Forest, Forest Slope	Low to Mid Elevation	Good	Good	Uncommon
<i>Thalictrum occidentale</i>	Western Meadow Rue	Native	Forest	Low to High Elevation	Good	Good	Review
<i>Thuja plicata</i>	Western Red Cedar	Native	Wetland, Riparian, Forest	Low to Mid Elevation	Good	Moderate	Moderate
<i>Tricholoma populinum</i>	Mushroom	Native	Forest, Forest Slope, Open Forest	Low to High Elevation	Review	Review	Varies by variety
<i>Tsuga heterophylla</i>	Western Hemlock	Native	Forest, Forest Slope, Riparian	Low to Mid Elevation	Good	Moderate	Moderate
<i>Urtica dioica</i>	Nettle	Native	Riparian, Thickets, Meadow, Open Forest	Low to High Elevation	Good	Good	Common
<i>Vaccinium spp.</i>	Huckleberry	Native	Forest, Forest Slope	Low to High Elevation	Good	Low to Moderate	Uncommon
<i>Veratrum viride</i>	Indian hellebore, False Hellebore	Native	Riparian, Thickets, Meadows, Open Forest	Low to High Elevation	Good	Good	Uncommon

Scientific Name Of Stock	Common Name	Status	Grouping	Elevation	Availability Of Stock	Ease Of Establishment	Historic Presence
<i>Veronica americana</i>	American Speedwell, Brooklime	Native	Wetland, Riparian	Low to Mid Elevation	Good	Good	Uncommon
<i>Veronica anagallis-aquatica</i>	Water Speedwell	Native	Wetland, Riparian	Low to High Elevation	Review	Review	Review
<i>Viola canadensis</i>	Canada Violet	Native	Riparian, Forest	Low to Mid Elevation	Review	Review	Review
<i>Xanthium strumarium</i>	Cocklebur	Native	Riparian, Thickets	Low to Mid Elevation	Review	Review	Review
<i>Zigadenus spp.</i>	Death camas	Native	Meadow, Grasslands	Low to Mid Elevation	Good	Good	Uncommon

Appendix E

Compliance with Other Authorities



COMPLIANCE WITH OTHER AUTHORITIES

This appendix presents a review of the potentially applicable laws and regulations that govern the Trustee Council restoration projects. Many federal, state, and local laws and regulations need to be considered during the development of this project as well as several regulatory requirements that are typically evaluated during the federal and state permitting process. A brief review of potentially applicable laws and regulations that may pertain to these projects is presented below. When implementing projects under this Restoration Plan, the project managers will ensure that there is coordination among these programs where possible and that project implementation and monitoring is in compliance with all applicable laws and regulations.

Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), 42 U.S.C §§ 9601 *et seq.*, and National Oil and Hazardous Substances Pollution Contingency Plan, 40 C.F.R § 300. CERCLA, also known as Superfund, provides the basic legal framework for cleanup and restoration of the nation's hazardous substances sites. CERCLA establishes a hazard ranking system for assessing the nation's contaminated sites with the most contaminated sites being placed on the National Priorities List. Natural resource trustees are responsible, under CERCLA, for restoring, rehabilitating, replacing or acquiring the equivalent of natural resources injured by hazardous substance releases and losses of services provided by those of natural resource. The federal, state, Indian tribal and foreign natural resource trustees determine resource injuries, assess natural resource injuries, present a claim, recover damages (including the reasonable costs of assessing damages) and develop and implement a plan for the restoration, rehabilitation, replacement, or acquisition of the equivalent of the natural resources under their trusteeship.

Oil Pollution Act of 1990 (OPA), 33 U.S.C §§ 2701 *et seq.* OPA provides for the prevention of, liability for, removal of, and compensation for the discharge, or the substantial threat of discharge, of oil into or upon the navigable waters of the United States, adjoining shorelines, or the Exclusive Economic Zone. Section 1006(e) requires the president, acting through the Under Secretary of Commerce for Oceans and Atmosphere, to develop regulations establishing procedures for natural resource trustees in the assessment of damages for injury to, destruction of, loss of, or loss of use of natural resources covered by OPA. Section 1006(b) provides for the designation of federal, state, Indian tribal and foreign natural resource trustees to determine resource injuries, assess natural resource injuries, present a claim, recover damages (including the reasonable costs of assessing damages) and develop and implement a plan for the restoration, rehabilitation, replacement, or acquisition of the equivalent of the natural resources under their trusteeship.

National Environmental Policy Act (NEPA), as amended, 42 U.S.C. §§ 4321 *et seq.*; 40 C.F.R §§ 1500-1508. NEPA was enacted in 1969 to establish a national policy for the protection of the environment. The Council on Environmental Quality was established to advise the president and to carry out certain other responsibilities relating to implementation of NEPA by federal agencies. Federal agencies are obligated to comply with the NEPA implementing regulations promulgated by the Council on Environmental Quality (40 C.F.R §§ 1500-1508). These regulations outline the responsibilities of federal agencies under NEPA and provide specific procedures for preparing environmental documentation to comply with NEPA. This Programmatic Environmental Impact Statement (PEIS) was prepared to analyze and disclose whether the proposed action (implementing restoration under the PEIS) will have a significant effect on the quality of the human environment. All comments received will be considered before the lead federal agency makes a final recommendation. Subsequent NEPA analysis will

be conducted for individual proposed Trustee-led projects. It is anticipated that environmental assessments tiered from this PEIS will typically be appropriate for these individual proposed projects; however, environmental impact statements may be prepared after the initiation of an environmental assessment if significant impacts are found. All comments received on project-based analyses will be considered before the lead federal agency makes a decision and begins project implementation. Please also see section 7.3.3 for a discussion of NEPA approaches for non-Trustee-led projects.

Clean Water Act (Federal Water Pollution Control Act), 33 U.S.C §§ 1251 *et seq.* The Clean Water Act is the principal law governing pollution control and water quality of the nation's waterways. It requires the establishment of guidelines and standards to control the direct or indirect discharge of pollutants to waters of the United States. Discharges of material into navigable waters are regulated under Sections 401 and 404 of the Clean Water Act. The USACE has the primary responsibility for administering the Section 404 permit program. Under Section 401, projects that involve discharge or fill to wetlands or navigable waters must obtain certification of compliance with state water quality standards.

Rivers and Harbors Act, 33 U.S.C §§ 401 *et seq.* This act regulates the development and use of the nation's navigable waterways. Section 10 of the act prohibits unauthorized obstruction or alteration of navigable waters and vests USACE with the authority to regulate discharges of fill and other materials into such waters. Actions that require Section 404 Clean Water Act permits are also likely to require permits under Section 10 of this act.

Endangered Species Act of 1973 (ESA), 16 U.S.C 1531 §§ *et seq.*, 50 C.F.R §§ 17, 222, 224. The ESA directs all federal agencies to conserve endangered and threatened species and their habitats and encourages such agencies to utilize their authorities to further these purposes. Under the Act, NMFS and USFWS publish lists of endangered and threatened species. Section 7 of the act requires that federal agencies consult with these agencies to ensure their actions are not likely to jeopardize listed species or result in destruction or adverse modification of designated critical habitat. ESA determinations of effect and consultations will be completed for future projects as appropriate. During the consultation and permitting phases of these future projects, any regulatory permits and consultation conditions for projects implemented under this plan will set forth a number of operating measures designed to prevent or mitigate any such disturbances to these species.

Magnuson-Stevens Act (MSA) (formerly Magnuson-Stevens Fishery Conservation and Management Act, MSFCMA), 16 U.S.C §§ 1801 *et seq.*, 50 C.F.R § 600. In 1996, the act was reauthorized and changed by amendments to require that fisheries be managed at maximum sustainable levels and that new approaches be taken in habitat conservation. Essential Fish Habitat is defined broadly to include "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity" (62 Fed. Reg. 66551, § 600.10 Definitions). The act requires consultation for all federal agency actions that may adversely affect Essential Fish Habitat. Under Section 305(b)(4) of the act, NMFS is required to provide advisory conservation and enhancement recommendations to federal and state agencies for actions that adversely affect Essential Fish Habitat. Where federal agency actions are subject to ESA Section 7 consultations, such consultations may be combined to accommodate the substantive requirements of both ESA and MSA. NMFS will be consulted on each future Trustee-proposed project regarding compliance with any MSA-designated EFH or managed species residing or migrating through the proposed project location.

Fish and Wildlife Coordination Act (FWCA), 16 U.S.C §§ 661 *et seq.*, and Migratory Bird Treaty Act of 1918, 16 U.S.C §§ 703 *et seq.* The FWCA requires that federal agencies consult

with the USFWS, NMFS, and state wildlife agencies for activities that affect, control, or modify waters of any stream or body of water, in order to minimize the adverse impacts of such actions on fish and wildlife resources and habitat. Similarly, the Migratory Bird Treaty Act protects migratory birds against actions that would directly harm migratory bird individuals, their nests, or nesting sites during nesting seasons. These consultations are generally incorporated into Section 404 of the Clean Water Act, NEPA, or other federal permit, license, or review requirements.

National Historic Preservation Act of 1966, 16 U.S.C §§ 470 et seq. The National Historic Preservation Act (NHPA) (Public Law 89-665; 54 U.S.C. 300101 et seq.) is legislation intended to preserve historical and archaeological sites in the United States of America. The Advisory Council on Historic Preservation's (ACHP's) Section 106 of the National Historic Preservation Act (NHPA) regulations (36 CFR 800) requires consideration of historic properties under National Environmental Policy Act (NEPA). Agencies should consider their Section 106 responsibilities as early as possible in the NEPA process. Agency Officials should ensure that preparation of an EIS and Record of Decision (ROD) includes appropriate scoping, identification of historic properties, assessment of effects upon them, and consultation leading to resolution of any adverse effects. (36 CFR 800.8(a)(3)).

Archaeological Resources Protection Act, 16 U.S.C §§ 469, et seq. The Archaeological Resources Protection Act (ARPA) strengthens the permitting procedures required for conducting archeological fieldwork on federal lands, originally mandated by the Antiquities Act. It governs the excavation of archaeological sites on federal and Indian lands in the United States, and the removal and disposition of archaeological collections from those sites.

ARPA forbids excavation or removal of archaeological resources from federal or Indian land without a permit from a land managing agency. ARPA also forbids sale, purchase, exchange, transport, or receipt of archaeological resources. An application for an ARPA permit must include authorization and a written agreement between the federal agency and an appropriate repository that will house and curate the collection recovered from the project. This permit process applies to all excavations on federal and Indian/tribal lands.

Executive Order 11514 (35 F.R. 4247; March 7, 1970): Protection and Enhancement of Environmental Quality, as amended. This executive order directs federal agencies to monitor, evaluate, and control their activities in order to protect and enhance the quality of the nation's environment, to inform and seek the views of the public about these activities, to share data gathered on existing or potential environmental problems or control methods, and cooperate with other governmental agencies. The release of this PEIS/RP, and the types of projects envisioned under the preferred alternative are consistent with the goals of this order. The proposed Restoration Plan is the product of intergovernmental cooperation and will protect and enhance the environment. The restoration planning process has and continues to provide the public with information about restoration efforts.

Executive Order 11988 (42 F.R. 26951; May 25, 1977): Floodplain Management. On May 24, 1977, President Carter issued Executive Order 11988, Floodplain Management. This executive order requires each federal agency to provide the opportunity for early public review of any plans or proposals for actions in floodplains, in accordance with Section 2(b) of Executive Order 11514, as amended, including the development of procedures to accomplish this objective.

Executive Order 11990 (42 F.R. 26959; May 25, 1977): Protection of Wetlands. On May 24, 1977, President Carter issued Executive Order 11990, Protection of Wetlands. This executive order requires each agency to provide the opportunity for early public review of any plans or proposals for new construction in wetlands, in accordance with Section 2(b) of Executive Order 11514, as amended, including the development of procedures to accomplish this objective.

Executive Order 12898 (59 F.R. 7629; February 16, 1994): Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, as amended. On February 11, 1994, President Clinton issued Executive Order 12898,. This executive order requires each federal agency to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations. EPA and the Council on Environmental Quality have emphasized the importance of incorporating environmental justice review in the analyses conducted by federal agencies under NEPA and of developing mitigation measures that avoid disproportionate environmental effects on minority and low-income populations.

Executive Order 12962 (60 F.R. 30769; June 9, 1995): Recreational Fisheries. This executive order directs federal agencies to, among other things, foster and promote restoration that benefits and supports viable, healthy, and sustainable recreational fisheries. The restoration projects that would be built under the preferred alternative would benefit recreational fish species and their prey.

Executive Order 13007 (61 F.R. 26771; May 29, 1996): Indian Sacred Sites and Executive Order 13175 65 F.R. 67249, November 9, 2000): Consultation and Coordination with Indian Tribal Governments. Executive Order 13007 describes federal policy for accommodating sacred Indian sites. This executive order requires federal agencies with statutory or administrative responsibility for managing federal lands to (1) accommodate access to and ceremonial use of Indian sacred sites by Indian religions practitioners, (2) avoid adversely affecting the physical integrity of such sacred sites where appropriate, and (3) maintain the confidentiality of these sacred sites.

Executive Order 13175 exists to (1) promote regular and meaningful consultation and collaboration with tribal officials in the development of federal policies that have tribal implications, (2) strengthen the United States government-to-government relationships with Indian tribes, and (3) reduce the imposition of unfounded mandates upon Indian tribes.

As part of the planning process for individual projects, appropriate coordination with federally recognized Indian tribes will be conducted.

Executive Order 13112 (64 F.R. 6183, February 8, 1999): Invasive Species. The purpose of Executive Order 13112 is to prevent the introduction of invasive species and provide for their control, and to minimize the economic, ecological, and human health impacts that invasive species cause.

No invasive species would be introduced by any projects under the preferred alternative, and any invasive species existing at the sites would be removed. Control of invasive species after restoration is implemented would also occur.

Information Quality Guidelines issued Pursuant to Public Law 106-554. Information disseminated by federal agencies to the public after October 1, 2002, is subject to information quality guidelines, developed by each agency pursuant to Section 515 of Public Law 106-554, that are intended to ensure and maximize the quality of such information (i.e., the objectivity,

utility, and integrity of such information). This PEIS/RP is an information product covered by the information quality guidelines established by NOAA and the Department of the Interior for this purpose. The information collected herein complies with applicable guidelines.

Americans with Disabilities Act (ADA) of 1990, as amended (42 U.S.C. § 126 and 47 U.S.C § 5). The ADA prohibits discrimination on the basis of disability in employment, State and local government, public accommodations, commercial facilities, transportation, and telecommunications. Restoration projects with new or improved public access would be required to comply with any applicable standards in this act.

Section 508 of the Rehabilitation Act, 29 U.S.C. 749D. Under Section 508 of the Rehabilitation Act, all federal agencies must take steps to afford persons with disabilities, including members of the public, access to information that is comparable to the access available to others. Section 508 was enacted in part to eliminate access barriers associated with information technology. For Web accessibility under Section 508, documents posted must make text equivalents available for any nontext elements (including images, navigation arrows, multimedia objects [with audio or video], logos, photographs, or artwork) to enable users with disabilities access to all important (as opposed to purely decorative) content. Compliance also extends to making accessible other multimedia and outreach materials and platforms, acquisition of equipment and other assistive technologies, and computer software compliance. To provide for access to this document by disabled persons who use special assistive technology type devices and services, an electronic version of this PEIS/RP, incorporating electronically readable text equivalents for all nontext elements has been created and is available at the following Web site:

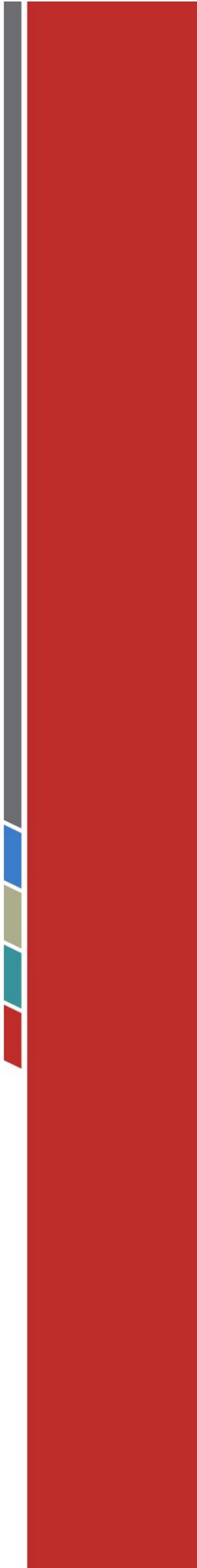
<http://www.fws.gov/oregonfwo/Contaminants/PortlandHarbor/default.asp>²⁵

²⁵ The Trustee Council is in the process of developing a new website. The future site address will be: www.portlandharborrestoration.org.

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Appendix F

Draft PEIS/RP Comment Responses



Response to Comments: Draft Portland Harbor Programmatic EIS and Restoration Plan

Prepared by

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Response to Comments: Draft Portland Harbor
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Portland, Oregon.

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Appendices

APPENDIX A: DELINEATED COMMENTS

ACRONYMS

AIM	American Indian Movement
BMPs	Best Management Practices
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of the Federal Register
CWA	Clean Water Act
DSAYs	Discounted Service Acre Years
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESEE	Economic, Social, Environmental and Energy
HEA	Habitat Equivalency Analysis
NEPA	National Environmental Policy Act
NAYA	Native American Youth and Family Center
NOAA	National Oceanic and Atmospheric Administration
NRDA	Natural Resource Damage Assessment
NRDC	Natural Resource Defense Council
OPA	Oil Pollution Act
PEIS/RP	Programmatic Environmental Impact Statement and Restoration Plan
PHCC	Portland Harbor Community Coalition
PRPs	Potentially Responsible Parties
SSA	Portland Harbor Superfund Study Area
SWMM	City of Portland Stormwater Management Manual
USC	United States Code

1. INTRODUCTION

The Draft Portland Harbor Programmatic EIS and Restoration Plan (Draft PEIS/RP) was released for public comment on July 9, 2012. The comment period ended October 8, 2012. A public Open House meeting was held on July 17, 2012.

Comments were received from 21 parties in the form of written letters, comment forms, and oral comments. The full comments are included as Appendix A. Each submission was carefully read and individual comments within the submissions were delineated, resulting in 193 individual comments. The individual comments were assigned a broad topic category to facilitate organization and responses to the comments.

Table 1 Comment Topic Categories

Topic Categories	Number of Comments
Alternatives	11
Climate Change	4
Cost-Benefit/Feasibility	6
Cumulative Effects	12
Damage Calculation	5
Economics	34
Environmental Justice	2
Fish	2
Geographic Scope	45
Individual Restoration Sites	24
Large Woody Debris	5
Monitoring and Stewardship	12
NRDA Process	5
Project Selection	4
Public Participation	9
Purpose and Need	1
Recreation	7
Short term impacts	1
Tiering	2
Wildlife	2
Total	193

Section 2 of this report contains the comment and response table where every delineated comment is listed, as excerpted from the original comment submission. Each comment's topic category, author and comment number is included. Each comment is also assigned a response type as described in Table 2. The response types are based on 40 C.F.R. §1503.4 Response to Comments.

Table 2 Response Types

Response Code in Comment Table	Description	Number of Comments
1 - Modify Alts.	Modify alternatives including the proposed action.	1
2 - New Alts	Develop and evaluate alternatives not previously given serious consideration by the agency.	0
3 - Augment Analysis	Supplement, improve, or modify its analyses.	42
4 - Factual Corrections	Make factual corrections.	12
5(a) - Explain why no response / change	Explain why the comments do not warrant further agency response, citing the sources, authorities, or reasons which support the agency's position and, if appropriate, indicate those circumstances which would trigger agency reappraisal or further response.	116
5(b) - Resp is in Report	Response is in Section 3 of this Response Report Document.	22

Many of the responses are also included in this table. However, some responses were too long to display in the table, and National Oceanic and Atmospheric Administration (NOAA) elected to aggregate some comments into groups and to provide one response to those grouped comments. These long or aggregated comment responses are found in Section 3.

2. Comment and Response Table

ID	Author	Affiliation	Category	Comment	Response Type	Response
001	Haury, David (Anchor QEA)	NW Natural	Geographic Scope	NW Natural believes there should be flexibility in the location of restoration projects and the percentage of an individual party's natural resource damage (NRD) liability that must be satisfied in the Superfund Study Area (SSA) rather than in any other geographic area. Lines 37 through 40 on pages 7 through 12 of the PEIS/RP, state that "The Trustee Council has determined that each settling PRP must provide at least one-half of its compensatory restoration inside of the SSA, and may provide no more than one-half of compensatory restoration within the broader focus area. Projects located outside either of these areas will not be considered." Rather than pre-determine the geographic breakdown of restoration projects and the minimum percentage of NRD liability that must be satisfied in the SSA, NW Natural encourages the Trustees to instead provide a more generalized but still prioritized list of locations. For example, priority could be given to projects in the following areas, to the extent possible: 1) within the SSA; 2) within the broader focus area (BFA); and 3) other locations on a case by case basis. Priority should also be given to projects that provide significant benefit without regard to whether they fall to one side or the other of a geographic line.	5(a) - Explain why no response / change	The Trustee Council believes that the geographic policy provides flexibility for where projects are located, while satisfying the requirement of a strong nexus between injury and compensation.
002	Haury, David (Anchor QEA)	NW Natural	Monitoring and Stewardship	NW Natural has a general concern that the monitoring activities related to the functional objectives (e.g., fish and wildlife monitoring) will be expensive and encourages the Trustees to provide the expected costs of this monitoring and discuss in the PEIS/RP how these types of broader scale monitoring activities will be cost-effective and how the information they generate will be used.	5(a) - Explain why no response / change	The general restoration project monitoring approach developed by the Trustee Council aims to answer basic questions about the effectiveness of each restoration project, and of the restoration projects cumulatively. The approach identifies basic questions and parameters that need to be addressed at each project site. Identification of the most cost-effective ways to answer these questions will be part of the development of each project's site-specific monitoring plan.
003	Sallinger, Bob	Audubon Society of Portland	Geographic Scope	The importance of urban areas urban rivers was recently highlighted in the Report: Urban and Rural-residential Land Uses: Their Role in Watershed Health and the Rehabilitation of Oregon's Wild Salmonids, which states, "Even though urban areas occupy a relatively small area of the landscape, their position can lead to disproportionately larger effects on salmonids or other fish assemblages. Compared to other land uses, urban areas occupy critical locations in Oregon's watersheds. Towns and cities are commonly located along streams and rivers at lower elevations and often at their confluences. As such they influence both local habitat in the lowlands and movement of fishes upstream and downstream. Migration barriers, alterations in physical habitat, and degradation of water quality at critical points along river networks have the potential to limit the abundance and distribution of salmonids throughout and entire watershed." [Independent Multidisciplinary Science Team (2010) Urban and Rural-residential Land Uses: Their Roles in Watershed Health and the Recovery of Oregon's Wild Salmonids. Technical Report 2010-1. Oregon Plan for Salmon and Watersheds, Oregon Watershed Enhancement Board. Salem, Oregon. (Page 36).]	4 - Factual Corrections	Thank you for this comment. Added information and reference at Section 1.8.1.
004	Sallinger, Bob	Audubon Society of Portland	Geographic Scope	We believe that the concept of "polluter pays" is critical to achieving health of the river and that industries that have long profited from development of the river should be held fully accountable and should mitigate for their impacts within the area that was impacted. To require any less would fail to meet legal requirements and leave our river degraded for wildlife and for future generations.	5(a) - Explain why no response / change	Agree; no action.
005	Sallinger, Bob	Audubon Society of Portland	Public Participation	Audubon urges the Trustees to ensure that the remainder of the NRDA process is as transparent and inclusive as possible: By necessity the process to date has occurred mostly behind closed doors with only the trustees and Potentially Responsible Parties ("PRPs") at the table. However as the NRDA process moves towards final resolution, it is critical to broadly engage the general public and public interest and community groups to the largest degree possible. It is important to recognize that the Lower Willamette River is adjacent to the most densely populated landscapes in Oregon including many underserved communities. Beyond its ecological importance, the Willamette River plays an important role in the health, recreation, and livability of these communities. While we recognize that settlement discussions may need to remain confidential, it is of fundamental importance that all relevant cost and habitat number as well as any points of debate or contention between the Trustees and PRPs be made available for public review so that the public will not be excluded until it is too late in the process to have an impact on final agreements.	5(a) - Explain why no response / change	In accordance with section 122 of CERCLA, 42 U.S.C. s. 9622 (i), at least thirty days before any NRD settlement is final, the Trustee Council will provide notice of the proposed settlement by publication of a notice in the Federal Register and the Trustee Council will observe a thirty-day comment period following the publication. During the comment period, non-parties to the proposed settlement will have an opportunity to provide the Trustee Council with written comments regarding the proposed settlement and the Trustee Council will consider those comments. In addition, see Narrative Response 3.1.2 for a description of other outreach activities.
006	Sallinger, Bob	Audubon Society of Portland	Geographic Scope	We believe that there are more than adequate restoration opportunities within the Portland Harbor Superfund Study Area to achieve NRDA objectives and that these should be the top priority for restoration activities occurring under NRDA. Portland Harbor is where the impacts took place and we can see no valid reason under CERCLA or NRDA to go beyond those boundaries.	5(a) - Explain why no response / change	Agree; no action. See Narrative Reponse 3.1.3 for a discussion of the Geographic Policy.

ID	Author	Affiliation	Category	Comment	Response Type	Response
007	Sallinger, Bob	Audubon Society of Portland	Economics	Trustees should reject industry arguments that conducting NRDA restoration within Portland Harbor would conflict with industrial land development requirements: Superfund PRPs repeatedly have argued that there is inadequate land supply within Portland Harbor to meet industrial land needs and therefore should occur outside Portland Harbor. In fact Statewide Land Use Planning Goal 9: Economic Development specifically recognizes the importance of protecting natural resources in economic development areas. <i>Goal 9, Section (A)(5) reads: Plans directed toward diversification and improvement of the economy of the planning area should consider as a major determinant, the carrying capacity of the air, land and water resources of the planning area. The land conservation and development actions provided for by such plans should not exceed the carrying capacity of such resources.</i> <i>Goal 9, Section (A)(2) reads: The economic development projections and the comprehensive plan which is drawn from the projections should take into account the availability of the necessary natural resources to support the expanded industrial development and associated populations. The plan should also take into account the social, environmental, energy, and economic impacts upon the resident population. Lack of industrial land supply should not be used as an excuse to divert or reduce legally required NRDA restoration activities.</i>	5(b) - Resp is in Report	Agree; Also see Narrative Response 3.2.1.
008	Sallinger, Bob	Audubon Society of Portland	Individual Restoration Sites	We urge the Trustees to ensure that NRDA related obligations are written in a manner the makes it explicitly clear that these activities are specifically mandated to mitigate for resources and resource services that have been harmed as a result of release of contaminants into the environment and not a surrogate for or in lieu of other natural resource programs, mandates and obligations.	5(a) - Explain why no response / change	Agree; no action.
009	Sallinger, Bob	Audubon Society of Portland	Individual Restoration Sites	It is important to develop a clear list of criteria that will be used to narrow the long list of sites contained in the Ecological Restoration Portfolio in order to help the public, agencies and PRPs focus resources on the most ecologically important sites: We would recommend consideration of the following criteria: a. Location: We would recommend focusing on sites within the Superfund Study Area exclusively, but to the degree that the Trustees go with the proposal to allow up to 50% of the restoration to occur in the broader focus area, we would encourage the trustees to weight sites inside the study area more heavily. b. Size of restoration sites: We would encourage the trustees to give priority to larger sites and contiguous sites that will achieve higher ecological function for more species. c. Distribution of restoration sites: Juvenile salmonids require shallow water habitat approximately every 0.25 miles in order to rest, forage and escape from predators. The Portland Harbor has extensive stretches in excess of 0.25 miles where no such habitat is available. We would encourage the Trustees to prioritize establishing restoration sites, including smaller sites, within these areas, so long as they meet functional objectives. d. Community Support: Consideration should be given to access to nature for the community so long that it does not conflict with restoration objectives.	5(a) - Explain why no response / change	Thank you for this comment. The Portfolio was intended to illustrate the types of projects that may meet Trustee objectives and connect PRPs with potentially viable projects. The suggestion of evaluation criteria as well as others are likely to be considered in project selection, however specific selection is outside the scope of this analysis. Additionally, refer to the response to Comment 001 regarding the Trustee Council's geographic location policy.
010	Sallinger, Bob	Audubon Society of Portland	Individual Restoration Sites	West Hayden Island: As per our comments in section 2 of this letter, we strongly encourage the Trustees to restrict NRDA restoration activities to the Superfund Study Area rather than the broader focus area. This approach would appropriately exclude West Hayden Island altogether from consideration as a potential restoration site. However should the Trustees move forward with allowing up to 50% of the restoration to occur in the broader study area that does include West Hayden Island, we would still urge you to exclude WHI from consideration unless the entire parcel is protected in perpetuity.	5(a) - Explain why no response / change	Thank you for this input, specific to a potential restoration project on West Hayden Island. West Hayden Island is considered to be within the BFA. Issues related to the project's footprint will be considered if and when interest is demonstrated in implementing restoration there.
011	Sallinger, Bob	Audubon Society of Portland	Damage Calculation	The NRDA process should consider potential negative impacts to native species caused by clean-up actions that rely heavily on capping rather than removal: PRPs have aggressively advocated for clean-up actions that rely primarily on natural recovery or capping rather than removal of contaminants. We urge the Trustees to take into account the fact that further hardening of the banks of Portland Harbor will make passage for a variety of native fish and wildlife species even more tenuous than it is today. At the same time the NRDA is accounting for past impacts to species, the clean-up action if it relies heavily on capping could further degrade the habitat quality of this section of the river and undermine the restoration efforts enabled by NRDA. In essence we could have a situation where NRDA gives back with one hand and Superfund Clean-up actions take back with the other. It is critical that NRDA and Superfund clean-up actions be carefully coordinated such that the overall health of the Portland Harbor is restored for native fish and wildlife to condition would mirror the state of the river had not the contamination occurred.	3 - Augment Analysis	See Narrative Response 3.1.1.
012	Ketts, Samantha (student)	None	Alternatives	This alternative is good for a particularly "injured" species, but the overall effects would be much less than the integrated habitat alternative. Also, the species-specific alternative could show problems such as who or what judges why a particular species gets to be restored and what about the habitat on which it relies. The species may be restored, but if its habitat is not as well the species will not be able to thrive.	5(a) - Explain why no response / change	Supports analysis; no action.

ID	Author	Affiliation	Category	Comment	Response Type	Response
013	Reichgott, Christine	Environmental Protection Agency	Alternatives	We are less supportive of the species-specific alternative, primarily because this alternative could employ artificial propagation. As noted on page 4-11 of the DEIS, artificial propagation is a controversial method of enhancing ESA-listed species. Concerns have been cited related to the genetic integrity, behavior and fitness of the progeny of artificially produced individuals, as well as their potential to interbreed with naturally produced individuals. Hatcheries also have potential implications for riverine habitat and water quality through their construction, operation, and waste water discharge. These factors, together with the fact that NOAA is at present reevaluating its hatchery strategy for the Columbia River through its Mitchell Act DEIS, lead us to conclude that the integrated habitat restoration approach is environmentally preferable.	5(a) - Explain why no response / change	Supports analysis; no action.
014	Kratz, Kim	Habitat Conservation Division, NOAA	Geographic Scope	While NMFS understands and supports the Trustees' policy to allow restoration credits outside of the SSA, we believe that greater benefits would occur if more restoration was implemented inside of the SSA. In fact, we believe that requiring 100% of the restoration in the SSA is certainly supported by scientific and feasibility considerations.	5(a) - Explain why no response / change	See response to comment 001.
015	Kratz, Kim	Habitat Conservation Division, NOAA	Geographic Scope	As noted by the Expert Panel, NMFS agrees that restoration in the SSA needs to occur on both sides of the Willamette River, and provide a logical sequence of connected projects to provide connected opportunities for salmon to rest, feed and avoid predators. Channel complexity, alcoves and floodplain areas historically provided important juvenile rearing habitat and their loss has diminished the success of specific juvenile life histories (Willamette Atlas).	5(a) - Explain why no response / change	Supports analysis; no action.
016	Kratz, Kim	Habitat Conservation Division, NOAA	Alternatives	NMFS supports the preferred alternative (Integrated Habitat Restoration) and agrees that ecosystem or habitat-based restoration in the lower Willamette River will promote recovery of listed salmon..... Furthermore, in-stream restoration projects that restore streamflow regimes by connecting historic channels and restore floodplain connectivity are more likely to increase habitat diversity and population resilience and ameliorate climate change effects (Beechie et al. 2012) and therefore should be considered high priority.	5(a) - Explain why no response / change	Supports analysis; no action.
017	Kratz, Kim	Habitat Conservation Division, NOAA	Alternatives	The species-specific restoration alternative (Alternative 3) will aid species recovery, although the ecological literature is more supportive of a habitat and ecosystem-based approach because a healthy ecosystem is more sustainable over time through increased resilience (see citations above). Further, the link between the injury incurred in the SSA and the species-specific approach is more tenuous in this alternative.	5(a) - Explain why no response / change	Supports analysis; no action.
018	Feldman, Laura	None	Public Participation	Well, part of what I notice immediately and throughout the night is one glaring omission, for me, from the Portland Harbor Draft Restoration Plan and EIS. And that is including people, restoring, um, restoring not only the ecosystem but people's relationship to the ecosystem and that happens with education.	5(a) - Explain why no response / change	The Trustee Council agrees that restoring people's relationship with the ecosystem is important, but restoring people's relationship with the environment is not part of the restoration plan. However, the Trustee Council encourages public engagement in this process through a public website, a quarterly newsletter, and public meetings. Additionally, see Narrative Response 3.1.2 for a description of outreach specifically to Native American populations.
019	Feldman, Laura	None	Public Participation	In the plan they talk about stewardship for ten years after project implementation, and I want to suggest that this guardianship can only happen if people have a relationship with the river, it's more likely to happen, and to continue to happen as this relationship is passed onto their children.	5(a) - Explain why no response / change	Agree. The ten year performance period following project construction refers to the active monitoring and management of the site, to ensure the successful establishment of restoration projects. The plan also includes protection and stewardship of restored lands in perpetuity.
020	Feldman, Laura	None	Public Participation	You need to involve these people, caretakers, you know, that's the way to ensure success. And I think engaging K through 12, high school students, as well as the University of Portland, which is right there next to the Willamette Cove, one of the most toxic sites, these people need to be at the table.	5(a) - Explain why no response / change	See response to comment 018.

ID	Author	Affiliation	Category	Comment	Response Type	Response
021	Harvey, David	Gunderson, LLC	Geographic Scope	It is clear that the Trustee council, including NOAA, made a policy decision to require at least 50% of restoration to occur within the working Harbor itself - or within the SSA as it is called in the PEIS. For all of the reasons discussed by the Commenters, this is a bad policy decision, and use of this 50/50 rule as a pre-ordained assumption in the PEIS inappropriately narrows the scope of alternative evaluated.	5(a) - Explain why no response / change	The Trustee Council considered an alternative (Open Geography) that does not limit restoration projects to a specified area. The Trustee Council dismissed this alternative because it does not ensure the requisite strong nexus between injury and restoration that is called for under CERCLA and OPA, and therefore does not meet the purpose and need of the Federal action.
022	Harvey, David	Gunderson, LLC	Geographic Scope	But, whatever the Trustee council ultimately decided is its policy with regard to the 50/50 rule, NOAA should delete all reference to the panel of experts as support for that policy. "Panel of experts" connotes a group of scientists approaching their work objectively without allegiance to organizations or ideology. The panel referred to in the PIES is, in contrast, a panel of two independent scientists, plus two policy advocates that strongly favor a policy of establishing juvenile Chinook resting and rearing habitat within the Portland Harbor.	3 - Augment Analysis	See Narrative Response 3.1.3
023	Jones, Edward	Linnton Neighborhood Association	Recreation	Every site needs to include public viewing and participation opportunities to ensure that the public stays involved in protecting the sites. Smith and Bybee lakes provide a useful example. The viewing areas bring the public in and create public support for the environmental goals of the area. Particularly along the rivers what is needed, long term, is everyday witnesses. We encourage the Trustee Council to build into the plan the mechanisms which will ensure there is public support now and far into the future for the habitat areas that the council creates.	5(a) - Explain why no response / change	We agree that public support and engagement are critical to the long-term viability of restoration actions. Although limited public access may be appropriate at some sites, it would be detrimental to restored habitats at other sites. In general, restored habitats will be managed for habitat values, and recreational restoration sites will be designed to divert recreational impacts from habitat restoration sites.
024	Lee, Rob	Linnton Neighborhood Association	Public Participation	I think the greatest gift the Native People's can give us honkies is the wisdom that the world is here for itself, not us. It's not about us. And so the harbor becomes a balanced place - industry and fine fish habitat exist side by side. So please restore as much as possible - the more sites the better - while at the same time investing in people the idea that taking care of the world is not different from taking care of ourselves. All one thing.	5(a) - Explain why no response / change	Thank you for this comment. No action or change for this PEIS/RP is necessary.
025	James-Neel, Amy	Oregon Tradeswomen, Inc.	Economics	Contractors looking for work on restoration implementation projects should be required to demonstrate a plan for including a significant percentage of women and minorities working on their crews, on the projects. Women and minorities deserve equal access to the skilled, high-wage jobs inherent in clean up and restoration.	5(a) - Explain why no response / change	To the extent that affected property owners include the City of Portland and other county, state or federal public entities, contractors conducting restoration work would presumably be required to follow hiring guidelines that include encouraging and requiring hires of women and minority workers.
026	McDonough, Sandra	Portland Business Alliance	Economics	The DEIS cites the Alliance report as justification for its conclusion, "given that any conversion of industrial land to restoration use would represent a very small percentage of available industrial land in Portland Harbor, and that the sites in the Portfolio do not meet the size criteria for the industrial land in highest demand, only minor or no impact is anticipated on the quantity of land available for industrial or water-dependent uses." This statement is completely contrary to the intent and conclusions of the Alliance report and is unsupported by any honest reading of its findings.	5(b) - Resp is in Report	See Narrative Response 3.2.2.
027	McDonough, Sandra	Portland Business Alliance	Economics	The report did not attempt to examine the issue of harbor access or marine industrial lands which are, by definition, much more limited than general industrial lands, which were the focus of the Land Availability study. Even a small reduction in harbor or marine industrial lands could have significant negative economic repercussions because there are no viable alternative sites.	5(b) - Resp is in Report	See Narrative Response 3.2.2.
028	McDonough, Sandra	Portland Business Alliance	Economics	The Land Availability report also did not examine the issue of demand for harbor or marine industrial lands. The city of Portland's recently adopted Economic Opportunity Analysis did and concluded that the city is already more than 600 acres deficient in harbor and marine industrial lands relative to expected demand.	5(b) - Resp is in Report	See Narrative Response 3.2.2.
029	McDonough, Sandra	Portland Business Alliance	Economics	Finally, the Land Availability report looked only at potential new industrial sites, not existing sites. Nothing in the Alliance report can be read to infer conclusions about potential impacts on existing industrial operations in the harbor. Even small reductions in the size of sites of existing firms in the harbor could have a significant impact.	5(b) - Resp is in Report	See Narrative Response 3.2.2.
030	McDonough, Sandra	Portland Business Alliance	Economics	The argument in the DEIS seems to be that there's very little developable land in the harbor so further reductions through conversions to restoration won't have much economic impact. In fact, because there are so few marine and harbor industrial lands, the report would lead to a conclusion in favor of less conversion not more. The Alliance believes the conclusions in the DEIS regarding the potential economic impact of conversion of industrial land to restoration are not supported by the Land Availability report nor by the city's Economic Opportunity Analysis, and we ask that they be removed from the document.	5(b) - Resp is in Report	See Narrative Response 3.2.2.

ID	Author	Affiliation	Category	Comment	Response Type	Response
031	Bacchieri, Jane	City of Portland	Damage Calculation	The Trustee Council has generally followed a habitat valuation methodology that includes a calculator known as the Habitat Equivalency Analysis or HEA. The City has commented on this methodology in the past and generally supports the HEA approach. We note, however, that details about the methodology are not included in the Draft PEIS or Restoration Plan. The City believes that the present HEA tool underlying the approach does not adequately value wildlife habitats. It is true that many of the ecological functions that support salmon also support regional wildlife; however, the overlap in habitat needs is far from complete. The HEA tool undervalues many critical wildlife habitat features and associated functions such as riparian and upland forests, snags, and very different landscape connectivity requirements to support salmon versus wildlife. In addition to HEA, the complete habitat valuation methodology includes many other elements that are not described or included in the Draft PEIS or Restoration Plan, such as wildlife determinations and analysis, differential weighting of key elements and cumulative benefits from projects that benefit both fish and wildlife. Without inclusion of the full habitat valuation methodology and the HEA calculator, the City cannot adequately comment on many of the conclusions presented in the Draft PEIS and Restoration Plan.	5(a) - Explain why no response / change	See Narrative Response 3.1.4.
032	Bacchieri, Jane	City of Portland	Wildlife	Regardless of the approach, it is important to explicitly value improvements that may greatly benefit wildlife but not be key habitat drivers for salmon. It is true that many good things done for salmon will benefit wildlife; however, salmon functions are necessary but not sufficient for supporting wildlife, and important features for wildlife will be missing in NRDA restoration projects if they are not explicitly valued.	5(a) - Explain why no response / change	Thank you, the Trustee Council agrees with this comment. The Trustee Council has developed a plan for Integrated Habitat Restoration; the objectives of this plan support the restoration of habitats for fish, birds, and terrestrial wildlife.
033	Bacchieri, Jane	City of Portland	Large Woody Debris	The City is similarly concerned about an apparent disconnect between the methodology and the Restoration Plan where the methodology may not value, or in some instances results in discounting, large wood structures. Many of the proposed restoration projects recommend the use of large wood. It appears that this approach can result in recommending a project design for which the methodology does not provide value or may even reduce the value of the project. The City believes that large wood should be included as a positive attribute in any calculator and should be recommended in project designs where appropriate.	5(b) - Resp is in Report	See Narrative Response 3.3.1.
034	Bacchieri, Jane	City of Portland	Large Woody Debris	The City includes large wood in its own scientific approach and would gladly share the scientific literature and rationale behind our habitat valuation methodology as a guide. The City is also currently evaluating the role of the historic floodplain in our own scientific approach and would be very interested in evaluating how this same process was addressed in the Trustee Council's evaluation and methodology.	5(a) - Explain why no response / change	See Narrative Response 3.3.1.
035	Bacchieri, Jane	City of Portland	Wildlife	The City would like more information regarding which species are used as the "representative" species for assessing the value of wildlife habitat. For instance, in section 7.2.1.2, river otter are listed as a surrogate species but left off of Table 7-2, where spotted sandpiper is inserted. Additionally, it is unclear whether salmonid and non-salmonid species are weighted differently in the creation and valuation of restoration sites.	5(a) - Explain why no response / change	The Trustee Council developed an Integrated Habitat Restoration Plan based on identification of the needs of multiple species. On a site-specific basis, the Trustee Council will work with project implementers to ensure that opportunities to restore habitats for salmon, lamprey, other fish, birds and terrestrial wildlife are maximized. The habitat requirements of juvenile Chinook salmon provide the basis of the model that the Trustee Council uses to calculate the "value" of a restoration project, but the project's potential to provide high-quality, sustainable habitat assemblages for multiple species is a threshold consideration. Also see Narrative Response 3.1.4.
036	Bacchieri, Jane	City of Portland	Damage Calculation	Restoration sites will evolve at different rates depending on the nature of the restoration project, the target species, and the proposed interaction between the integrated habitats. The "time to fully functioning" is listed in the Trustees' HEA Habitat Values Table, (PHNRTC, 2012); however, it is not clear how the time it takes to reach a fully functioning condition was determined. For example, the time it takes for mature riparian forest to "fully function" and provide value for Chinook will be different than the time it will take to fully function for osprey, both of which are species of concern. In addition, the timeline cited for "full function" (40 years) and 80% function (10 years) are substantial underestimates on both counts. After 10 years a planted tree is nowhere near 80% of its full size or associated functions, and 40 years is an inadequate timeline for key functions such as wood supply. Longer time frames - perhaps 80- 1 00 years - should be used to account for "full function."	5(a) - Explain why no response / change	Thank you for this comment. The level of detailed analysis regarding HEA methodology is beyond the scope of this PEIS/RP. However, more information about the use of the HEA model is provided in Narrative Response 3.1.4.
037	Bacchieri, Jane	City of Portland	Alternatives	The preferred alternative is titled "Integrated Habitat Restoration Planning Alternative." The City agrees with the selected alternative; however, we are unclear about how the selection was made. Because details of the HEA methodology are not included in this document, we are interested in knowing how it is proposed to work within the "Integrated Habitat Restoration" alternative with a limited focus on juvenile Chinook. Habitat preferences for juvenile Chinook may benefit all salmonids and other species of concern; however, this interaction does not receive full consideration and discussion in the Draft PEIS, and has not been articulated elsewhere. The City recommends including a more thorough discussion of the scientific rationale to protect and restore habitat for all injured species.	5(a) - Explain why no response / change	See Narrative Response 3.1.4.

ID	Author	Affiliation	Category	Comment	Response Type	Response
038	Bacchieri, Jane	City of Portland	Large Woody Debris	The Draft PEIS (p. B-15) cites a NMFS (2009) assertion that habitat has been particularly degraded in the lower reaches of tributaries to the Willamette River by the reduction of channel complexity associated with the removal of large wood for navigation. We would add that the removal of large wood from bridge footings and dock structures to protect infrastructure has contributed to the loss of habitat quality. Bank hardening throughout the Harbor prevents wood from snagging and residing along the river's shorelines and deflects wood downstream. These activities occur not only in the lower reaches of tributaries, but throughout tributary and the mainstem watersheds, resulting in the constant removal of a significant volume of wood from the system. Wood removal to protect infrastructure is one reason why relying solely on natural processes to provide wood will never fully function within an urban setting, and why more active management of wood supply and retention may be needed to reduce conflicts between habitat formation and maintenance and economic and societal activities along the river.	5(a) - Explain why no response / change	See Narrative Response 3.3.1.
039	Bacchieri, Jane	City of Portland	Large Woody Debris	We are also concerned that the Trustees' HEA model fails to incorporate the value of adding large wood to habitats in the Harbor Superfund Site and beyond. Considering the influence and improvement that large wood provides to riverine habitat-forming processes, as well as the fact that the Trustees recognize this asset and specifically call for the incorporation of it in more than 70% of their restoration portfolio projects as an element that improves juvenile salmon, lamprey, and sturgeon productivity, it is inappropriate that the HEA model does not incorporate credit for this process.	5(a) - Explain why no response / change	See Narrative Response 3.3.1.
040	Bacchieri, Jane	City of Portland	Large Woody Debris	The Trustees have not provide adequate site-specific scientific documentation to conclude that large wood structures are a detriment to salmon, steelhead and other native fish in the Willamette.	5(a) - Explain why no response / change	See Narrative Response 3.3.1.
041	Clader, Jackie	Portland Harbor Community Advisory Group	Geographic Scope	Noting that there are 21 in the Broader Focus Area, I feel that these fall in communities that have a wealthier income base and therefore have more wherewithal to handle costs of restoring and upgrading the streams in these watersheds. While I understand some of the restoration is directed toward improving quality of habitat for the lamprey and in response to tribal culture needs, not all of the restoration outside of the Superfund or Study Area. On behalf of the neighborhood communities near the Superfund Study area who general have a lower income and show a higher minority percentage, I would like to see restoration take place in these areas because it would mean serving traditionally underrepresented groups by improving their neighborhood and lives in terms of the environment. It would provide additional habitat and flora and fauna where the Superfund has removed those opportunities. Restoring natural habitat and creatures where possible for North Portland would mean the children in these areas would receive the natural benefits that the fish, birds, mink, river otter, and trees and shrubs offer. In comparison, Tryon Creek, Johnson Creek and Fanno Creek border many wealthy neighborhoods and reap their benefits. Therefore, we ask why only half of the restoration be directed to the SSA rather in those neighborhoods who bear the burden of the adjacency of the Superfund site?	5(a) - Explain why no response / change	See response to comment 001. The Trustee Council agrees that a significant percentage of the restoration for Portland Harbor should occur within the SSA.
042	Clader, Jackie	Portland Harbor Community Advisory Group	Individual Restoration Sites	While most of the proposed restoration design seems thorough and very well designed, we ask if the possibility of habitat for sturgeon that will be lost when the Confined Disposal Facility is built in Terminal 4, Slip 1 that it is replaced or a relocation effort be established for the sturgeon be considered.	5(a) - Explain why no response / change	Potential construction of a CDF in Terminal 4 is outside of the scope of this analysis.
043	Clader, Jackie	Portland Harbor Community Advisory Group	Individual Restoration Sites	Also, if possible, we would like to see if potentially a salmonid run or series of "safe harbors" could be created in the Superfund site to improve upon the gauntlet that salmonids face when they migrate toward the ocean. Perhaps establishing slightly offshore islands could be created that would be anchored so that they would not move but not interfere with navigational traffic.	5(a) - Explain why no response / change	Thank you for this comment. The Trustee Council agrees that the restoration of off-channel habitat for salmon throughout the most habitat-limited section of the lower Willamette is an important objective.
044	Clader, Jackie	Portland Harbor Community Advisory Group	Recreation	In that same vein, we would also like to see a locale of conducive habitat created to raise and nurture small-mouth bass, perch, carp, crappe in order to study and monitor their health during the decontamination process of the Portland Harbor clean up and afterwards. Unlike angling for salmon that requires a boat to achieve any productive catch, these fish are the ones available to those people who cannot afford a boat but instead fish from the shoreline for subsistence and recreational fishing.	5(a) - Explain why no response / change	The Trustee Council acknowledges that small-mouth bass and other non-anadromous species provide a fishing opportunity and food source for members of the community surrounding Portland Harbor. However, because of the predation impact of these species on ESA-listed juvenile Chinook salmon, these non-native, warm-water species are not the target for habitat restoration. The Restoration Plan's criteria for recreational restoration projects do include a focus on improving shore-based fishing opportunities.
045	Clader, Jackie	Portland Harbor Community Advisory Group	Individual Restoration Sites	ASH GROVE CEMENT This property appears to be a great candidate for restoration as it is vacant, zoned industrial but cleared and ready for the next activity. But there is another similar property with some of the same characteristics that should be included. After attending the NP Greenway Trail meeting with the City of Portland's Emily Roth, I learned that Ash Grove Cement is part of their plans of restoration in providing a bike and pedestrian trail. Perhaps, these could be coordinated in order to support the efforts of each other.	5(a) - Explain why no response / change	Thank you for this comment; the Trustee Council has evaluated the North Greenway trail plan and found that it's alignment does not pass through this site. No changes to the document have been made.

ID	Author	Affiliation	Category	Comment	Response Type	Response
046	Clader, Jackie	Portland Harbor Community Advisory Group	Individual Restoration Sites	Baltimore Woods is a similar area in that it does not have direct connectivity to the river but could be an excellent asset providing habitat for river creatures and be good filtering zone for water draining into the river. Baltimore Woods could serve as important hunting area for bald eagle, osprey, spotted sandpiper, mink and other species. It also carries historical significance as landing location for the Lewis & Clark Expedition.	5(a) - Explain why no response / change	Thank you for this comment. No action or change in the PEIS/RP is necessary.
047	Clader, Jackie	Portland Harbor Community Advisory Group	Individual Restoration Sites	Cathedral Park Again, coordinating with the City of Portland for the benefit of creature habitat but also would support the efforts with the NP Greenway Trail going through the park instead of on city streets. City streets are fine for the proposed bicycle path but not for those children and adults seeking the respite of a natural area like that suggested in the Programmatic Restoration Plan.	5(a) - Explain why no response / change	Thank you for this comment; if this site were to move forward for restoration consideration, the City of Portland would be responsible for coordination with trail planning. No changes to the document have been made.
048	Clader, Jackie	Portland Harbor Community Advisory Group	Individual Restoration Sites	Columbia River Slough Many locations suggested are now outside the connection to the Superfund site. Because of its need, the adjacency to lower income neighborhoods, this too could benefit from Programmatic Restoration Plan. Restoring this area could contribute to the effects that have impacted the Columbia River. It too has a fish advisory and has historical connection to tribes and Lewis & Clark.	5(a) - Explain why no response / change	Thank you for this comment; the Trustee Council chose to expand the area for restoration to include the broader focus area shown in Figure 1-1. This decision was based on knowledge of habitat needs for juvenile Chinook salmon and a consideration of a nexus with the damages within Portland Harbor. At this point no additional sites are being added to the Portfolio. The Portfolio is a list of potential sites and not a definitive, comprehensive or all-inclusive list for restoration under NRDA.
049	Clader, Jackie	Portland Harbor Community Advisory Group	Individual Restoration Sites	Doane Creek This area should be last on everybody's list, mainly because it is so polluted that it will take miracles to get its recovery past toxicity, yet alone all the major enhancements to bring it back to what might be even considered normal. Even matching 1980 standards, most creeks would be improved but because of its adjacency to the production of Agent Orange, Doane Creek would still be highly polluted. My fear is that to reverse its level of contamination would cost exorbitantly and then would not be anything but substandard remediation and to sacrifice funds that could be applied to more immediately promising areas seems futile.	5(a) - Explain why no response / change	Thank you for this comment; the Trustee Council has described the contamination concerns at Doane Creek, but the Portfolio does not provide a ranking of the potential restoration sites. No changes have been made to the document.
050	Robison, Jim	Portland Harbor Community Advisory Group	Individual Restoration Sites	Use the T-4 Slip 1 as an off-channel habitat restoration site.	5(a) - Explain why no response / change	Thank you for this comment; at this point no additional sites are being added to the Portfolio. The Portfolio is a list of potential sites and not a definitive, comprehensive or all-inclusive list for restoration under NRDA.
051	Robison, Jim	Portland Harbor Community Advisory Group	Geographic Scope	We see a need for more of the funds to be dedicated to projects within the Portland Harbor. We feel that all project work should be within either the Portland Harbor or watersheds that directly feed into the Portland Harbor.	5(a) - Explain why no response / change	See response to comment 001.
052	Robison, Jim	Portland Harbor Community Advisory Group	Economics	We see a need for environmental justice impacted communities to have improved access to the river for fishing, recreation, etc.	5(a) - Explain why no response / change	Agree; the Restoration Plan's criteria for recreational restoration projects include a focus on improving shore-based fishing opportunities.
053	Robison, Jim	Portland Harbor Community Advisory Group	Public Participation	We see a need to encourage environmental justice impacted communities to participate more actively in the NRDA process, to have input and engage in the decision making and to be able to benefit from jobs provided for restoration work.	5(a) - Explain why no response / change	The Trustee Council recognizes the importance of engaging low income and minority populations. This comment addresses engagement in the NRDA process, which is outside of the scope of this PEIS/RP, however a description of outreach activities is included in the Narrative Response 3.1.2.
054	Robison, Jim	Portland Harbor Community Advisory Group	Public Participation	City of Portland has the largest number of recognized tribes in the nation. What outreach has been done to all of the additional tribes represented in Portland beyond those on the Trustee Council?	3 - Augment Analysis	See Narrative Response 3.1.2. Also added information in the Final PEIS/RP in Section 1.9.2.
055	Robison, Jim	Portland Harbor Community Advisory Group	Project Selection	While we recognize the desirability of having project ready sites for selection, we don't want the decisions regarding restoration to be entirely driven by what is "ready" to go. We want restoration decisions to be based on what is best for restoring the native fish and wildlife habitat to a healthy state, which may mean adopting proposals for restoration at sites that are longer term, and may include sites that do not currently have a willing landowner.	5(a) - Explain why no response / change	Agree; see response to comment 009. Since the Trustee Council cannot compel any landowner to make their property available for restoration, landowner willingness is an important feasibility factor to consider. The Trustee Council acknowledges that some restoration sites will take several years to move through the feasibility and design phases.

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056	Robison, Jim	Portland Harbor Community Advisory Group	Project Selection	We strongly support creating distributed sites along the 11 mile Portland Harbor stretch (for example every 1 mile or so) to best meet the needs of migrating salmon.	5(a) - Explain why no response / change	Agree; see response to comment 043 and Narrative Response 3.3.3.
057	Robison, Jim	Portland Harbor Community Advisory Group	Project Selection	If a restoration plan that best meets the needs for habitat restoration determines that a particular site would be highly valuable for habitat creation, but that site does not currently have a willing landowner to restore the site, then we encourage the plan to allow for long term planning which may include a plan for restoring the site at a future date, giving the landowner necessary time to make changes that would be needed to meet their operational needs. For example, a current landowner could make plans to shift operations, or adjust their use of a site over time to allow for restoration in 20 years. If the site is highly valuable for restoration, this long term plan should be considered a viable option.	5(a) - Explain why no response / change	Agree; see responses to comments 009 and 055.
058	Robison, Jim	Portland Harbor Community Advisory Group	Fish	We see a significant need for additional attention to Sturgeon habitat in the restoration plan.	5(a) - Explain why no response / change	The habitat needs of sturgeon, along with those of salmon, lamprey, bald eagle, river otter and other species, were considered in the development of the Integrated Habitat Restoration Alternative. Specific screening criteria were developed (See Section 7.2.1.1 of the PEIS) to evaluate a project's potential benefit to sturgeon.
059	Dunn, Loren (Riddell Williams)	Portland General Electric (PGE)	Geographic Scope	The PEIS does not make as strong a case as it might for why restoration of off-channel and side-channel habitat in the Portland Harbor is of higher importance than other restoration activities within the larger Willamette River and lower Columbia River sub-basins. The PEIS would benefit from a section that clearly establishes why habitat restoration in the Portland Harbor is of higher priority than other potential restoration activities in a larger geographic area. In the white paper restoration in the Portland Harbor study area, provided by the Trustees in June, 2011, a number of studies are cited that document the need and priority for restoration and re-creation of off-channel and side-channel habitats in the Portland Harbor. The PEIS would benefit from inclusion of these arguments and citations.	3 - Augment Analysis	Thank you for this comment. Added reference to the literature review and one specific finding in Section 4.4 of the Final PEIS/RP.
060	Dunn, Loren (Riddell Williams)	Portland General Electric (PGE)	Geographic Scope	The PEIS does not thoroughly evaluate how the proposed Portland Harbor Restoration Plan aligns with species recovery plans already in existence. The PEIS would benefit from an analysis of how the proposed restoration plan aligns with the goals of established restoration and recovery plans. For example, the Northwest Power and Conservation Council's 2005 Draft Willamette River Subbasin Plan clearly addresses the priority and need for off-channel and side-channel habitat restoration in the Portland Harbor.	3 - Augment Analysis	The PEIS/RP describes other species recovery or restoration plans in Section 7.1 and this section has been updated in the Final PEIS/RP.
061	Dunn, Loren (Riddell Williams)	Portland General Electric (PGE)	Cumulative Effects	The PEIS' cumulative effects analysis does not evaluate the beneficial effects of the proposed restoration plan. Analysis of beneficial effects is now a standard requirement in NEPA analysis and would help further to explain and enumerate the merits of the proposed restoration program.	3 - Augment Analysis	Thank you for this comment. Beneficial cumulative effects of the preferred alternative (Integrated Habitat Restoration) were discussed in many places in Section 4.14 Cumulative Impacts. Specifically beneficial effects were identified in Sections 4.14.5 Geologic and Soil Resources, 4.14.6 Recreation, 4.14.9 Biological Resources and Federally Listed Species, 4.14.10.2 Climate, and 4.14.10.4 Floodplain and Flood Control. Some additional specific description of anticipated beneficial cumulative effects has been added in Section 4.14.
062	Dunn, Loren (Riddell Williams)	Portland General Electric (PGE)	Cumulative Effects	The PEIS' cumulative effects analysis does not evaluate the potential effects of climate change on the proposed restoration plan. Analysis of climate change is now a standard requirement in NEPA analysis and may further help to establish the value of restoration and re-creation of off-channel and side-channel habitats in the Portland Harbor.	3 - Augment Analysis	The potential effects of climate change on the proposed restoration plan were evaluated in Section 4.3.10.2. The Trustee Council has augmented its analysis with updated information about the likely impacts of climate change in the lower Willamette River, and how climate change has been considered in the development of the plan. Also see Narrative Response 3.1.10.
063	Dunn, Loren (Riddell Williams)	Portland General Electric (PGE)	Monitoring and Stewardship	The PEIS does not specifically evaluate the proposed lamprey monitoring component discussed in the Monitoring and Stewardship Plan. This raises concerns that the monitoring activities for lamprey may not be covered under the programmatic NEPA authorization and that future restoration activities designed to enhance or restore lamprey habitat will not be able to tier from the PEIS. To a lesser extent, the PEIS is vague on what monitoring and stewardship activities would be covered under the PEIS. Consequently, the PEIS would benefit from a clear description of the expected monitoring and stewardship activities that would be covered under this programmatic.	3 - Augment Analysis	The Trustee Council has augmented the Final PEIS/RP with a more robust description of the monitoring approach that will apply at all restoration sites (see Appendix D). The monitoring plan includes general ecological monitoring, as well as monitoring for presence of and utilization by wildlife species, and pre- and post-project implementation monitoring of presence of and utilization by lamprey.

ID	Author	Affiliation	Category	Comment	Response Type	Response
064	Weller, Darise (many affiliations)	None	Geographic Scope	I was very disappointed to see that the restoration area had been changed from 100% restoration in the damaged area to 50% . At Portland Harbor Community Advisory Group(PHCAG) meetings, at any meetings involving the public and the Trustees and NOAA, at Portland planning meetings, and at North West Toxic Communities Coalition(NWTCC) meetings with Region 10 EPA, I and others from the affected communities have stressed that we feel the restoration should take place exclusively in the areas that have been damaged.	5(a) - Explain why no response / change	See response to comment 001.
065	Weller, Darise (many affiliations)	None	Economics	Industry says restoration cannot happen in hard bank areas. That is not true. On the Cuyahoga River fish refuges were created in hard bank areas that did not affect commerce.	5(a) - Explain why no response / change	Thank you for this comment. The Trustee Council agrees that in some cases restoration of shoreline areas adjacent to industrial/commercial operations is possible and may provide benefit to injured resources.
066	Weller, Darise (many affiliations)	None	Geographic Scope	In the Community Perspectives on the Future of the Portland Harbor and the Willamette River done by Portland State issued May 2012, under Fish and Wildlife Habitat states: Many respondents viewed the Willamette River, first and foremost, as a habitat for fish and wildlife. These individuals felt that the river represents the value that this region places on the natural habitat. Half the river is not good enough. We need to restore and mitigate all that has been damaged and destroyed.	5(a) - Explain why no response / change	See response to comment 001.
067	Wenlund, Allison (student)	None	Short term impacts	The most significant impact in my opinion is the short-term impacts that construction within the project would cause on the ecosystem. Although the EIS stated that in order to mitigate this problem, only "best management practices" would be used, however, I feel that more specific guidelines should be available.	5(a) - Explain why no response / change	Because this is a Programmatic EIS evaluating the impacts of alternative approaches to restoration, providing specific best practices guidelines is outside of the scope. Please refer to Section 7.3.1 in the Final PEIS/RP and Appendix D Monitoring Framework for details about project selection, subsequent environmental review of restoration projects, and site monitoring practices.
068	Wenlund, Allison (student)	None	Cumulative Effects	Another concern I have, would be the timeline of the specific projects. I was surprised at the scale of this project when going through the list of sites, however, the large number of projects leads me to be concerned about the cumulative effects so many projects could have on the ecosystem. For example, even though the impact of one specific project may be considered mild to moderate, if several of the same type of project is under construction within a somewhat small area, the overall effects could be more damaging than originally expected. It is stated several times within the EIS that each specific project would undergo strict review to guarantee compliance with the components of the overall draft, but I think it is necessary to also coordinate between each project as well.	5(a) - Explain why no response / change	While some limited temporary adverse effects may occur from construction of restoration projects, the overall result will be a beneficial impact on the ecosystem. Further, the Trustee Council anticipates the restoration projects will not all occur simultaneously, but will be implemented over time.
069	Wenlund, Allison (student)	None	Alternatives	In regards to the Integrated Habitat Restoration alternative that was selected as the best option, I feel that possibly too much emphasis may be put on the rehabilitation of the Salmon species that is federally listed which seems to fall under the third alternative which is Species-Specific restoration planning. Although I agree that this species is vital to the health of the river, I would urge the committee to not overlook other important species that may not thrive as a result of the focus on the salmon.	5(a) - Explain why no response / change	See response to comment 035 and Narrative Response 3.1.4.
070	Williams, Travis	Willamette River Keeper	Economics	It is likely that the Lower Willamette will continue to be an important part of the regional economy for some time, yet as a result of the industrial use of the area, the river's ecological function has been severely compromised. WR believes that a major habitat restoration effort can be a vital part of a working harbor, and that the two are not in conflict. We can have much improved ecological function in this stretch of river, and also have workable options for those companies dependent on the river.	5(a) - Explain why no response / change	Agree; no action.
071	Williams, Travis	Willamette River Keeper	Economics	A recent study by the City of Portland indicates that for cleanup of Portland Harbor, each dollar invested will bring more than a dollar in return. There is a high likelihood that habitat restoration can bring the same benefits, with restoration taking place in the Harbor area.	3 - Augment Analysis	Thank you for this comment. The Trustee Council has provided additional information on the return on investment of watershed improvement projects in Section 4.3.2. Also see Narrative Response 3.2.3.
072	Williams, Travis	Willamette River Keeper	Geographic Scope	Restoration projects within Portland Harbor will benefit threatened species significantly. Numerous studies indicate this, and the benefits to native species are significant, even in a highly industrialized area. Every fish that makes its way to the Upper Willamette, and every juvenile fish that seeks to make its way to the Ocean, has to pass through this area. Improving the condition of this stretch of river is essential.	5(a) - Explain why no response / change	Agree; no action.

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073	Williams, Travis	Willamette River Keeper	Geographic Scope	It is known that native salmon and steelhead do not simply move through the Lower Willamette River as if it were a pipe to and from the ocean. Fish can be found in this area essentially year-round and are known to rear (put on weight and increase in size) while on their way to and from the ocean in the Lower Willamette. This is a key reason habitat must be improved from today's degraded condition.	5(a) - Explain why no response / change	Agree; no action.
074	Williams, Travis	Willamette River Keeper	Geographic Scope	There is clear evidence that Columbia and Snake River fish move into the Lower Willamette during their migrations—and may move preferentially around the southern tip of Sauvie Island. The presence of these fish adds to the importance of restoring the Portland Harbor stretch of the Willamette. Work in this stretch cannot be replaced by restoration elsewhere, no matter how beneficial it might be.	5(a) - Explain why no response / change	Agree; no action.
075	Williams, Travis	Willamette River Keeper	Project Selection	The Trustees have a very long list of potential projects that have been suggested for consideration. The Trustees should help the public better understand the list of likely projects by applying key criteria to shorten and focus the list on the best projects that yield the most ecologically. This will help the public and the liable parties focus on the most important restoration prospects. Potential criteria include: a) project size, b) number of habitat units that can be obtained by the project, c) connectivity of projects to one another, d) level of community support, e) potential for enhanced recreational benefits.	5(a) - Explain why no response / change	See response to comment 009. Thank you for this comment with suggested criteria for evaluating specific potential restoration sites. These and other considerations will factor into the selection of restoration sites by the Trustee Council, PRPs, and third party restoration developers.
076	Williams, Jeri	Portland Harbor Community Advisory Group	Public Participation	So we represent about 360 different tribes here in Portland, and many times when we're looking at dealing with things like the Willamette River or the Columbia River Crossing or anything like that, many times we default back to just working on who is federally mandated. Which means that the sovereignty of the federally recognized Tribes with the government working together, and so my suggestion is that we also look at those Tribal people who are here who are not represented by federally recognized tribes; because truly many of them are here because of previous government policy that either relocated them or terminated them and pushed them into this area in the first place. So I would like to see some recognition of those tribes and their culture with the water as well as the federally recognized Tribes. That's important to me.	3 - Augment Analysis	See Narrative Response 3.1.2.
077	Williams, Jeri	Portland Harbor Community Advisory Group	Damage Calculation	Another thing that's important is while I was the, is about the responsible parties and the potentially responsible parties, is that while I was the Executive Director of the Environmental Justice Action Group, we actually sued Oregon Steel Mills in 2001 for violation of the Clean Air Act, actually, like 82 violations of the Clean Air Act. And it was during that time that we had conversations with many of their workers who told us that while they were supposed to be putting their toxic waste into cars, train cars, that would go to Arlington, that actually many times they were instructed to just dump that, those toxics, into the river. And so our concern is that we understand some potential, potential polluters may have not as much responsibility to the clean up as others do. So as we are looking at allocations, possibly looking at their records and specifically their records with DEQ on their Air permitting, etc., to see is this a company that's had a history of violations in our community, I think would be very important as we're looking at who's paying what for the clean ups.	5(a) - Explain why no response / change	This comment is outside the scope of this analysis.
078	Williams, Jeri	Portland Harbor Community Advisory Group	Public Participation	I work at the City of Portland, currently, and run the diversity civic leadership projects which the Lower Willamette Group had spent a lot of money on creating a presentation and going out to communities of color to present it. I actually was invited to sit in one of those by the Latino network Verde who were concerned that maybe this was a type of green-washing effort. I did sit in the group and I did film, I did bring a film person with me to film the actual presentation. Beyond being culturally, not culturally sensitive, to the populations they were speaking to, I was generally concerned that the message they were sending was it doesn't matter whether we spend a million dollars or a billion dollars it's all going to be the same. And after checking with some of the communities about what they heard in their presentations, that is what they said was, that it doesn't matter how much we spend it's about going to be the same. So, if the money is going to come out of our pockets, which is what they were told, a large percentage is going to come from the taxpayers; then of course they wouldn't want to spend a lot of money. I personally felt that was incredibly misleading, and have voiced my concerns about that to several people. So those are my major concerns. Currently is that is the community being told the truth so that they can make a real informed choice about what the options are.	5(a) - Explain why no response / change	The outreach conducted by the LWG surrounding the draft Feasibility Study for cleanup of Portland Harbor is outside the scope of this analysis.
079	Williams, Jeri	Portland Harbor Community Advisory Group	Economics	Another suggestion I have is that if the Department of Defense, way back then, was one of the initial responsible parties due to all the ship building that happened in this community, that possibly we need to be looking at investing in green jobs to restore this. Putting both local people who are historically under employed to work as well as possibly looking at veterans who have recently come home to also look for jobs. So to create some sort of green jobs model that involves cleaning up, and replanting, and restoring, and doing all of these things to be a model of how we can do things differently and sustainably with the people we currently have, and address the disparities of our communities of color with the very high rates of unemployment they have.	5(a) - Explain why no response / change	Thank you for this comment. This kind of labor force change is outside of the scope of this NEPA analysis. However, the Trustee Council agrees that restoration related employment can make a significant contribution to the local economy. Please also see Narrative Response 3.2.3.

ID	Author	Affiliation	Category	Comment	Response Type	Response
080	Koehl, Krista	Port of Portland	Geographic Scope	The programmatic approach presented in the draft PEIS does not rely on any meaningful evaluation of restoration alternatives. The draft PEIS appears to rely on the opinions of an “expert panel on juvenile Chinook” to support placing a focus on the SSA and thereby justifying the 50/50 Policy. However, the expert panel did not develop restoration alternatives and did not utilize the required restoration planning criteria listed above in their evaluations.	5(a) - Explain why no response / change	These scientists knowledgeable about salmon were asked to provide information to the Trustee Council about the habitat requirements and limitations of juvenile Chinook salmon. The information they provided contributed to the Trustee Council's development of the geographic focus areas. The salmon habitat experts were not asked to develop restoration alternatives. Also see Narrative Response 3.1.3.
081	Koehl, Krista	Port of Portland	Alternatives	Through Phase II Natural Resource Damage Assessment efforts, the Trustees have identified a broad range of restoration projects both inside and outside of the SSA. Each of these projects should be evaluated relative to the above criteria, independent of the arbitrary 50/50 Policy. That information should be developed to provide the foundation for a revised PEIS/Restoration Plan.	5(a) - Explain why no response / change	See response to comment 009. The projects identified in the Restoration Portfolio are intended to provide examples of the types of restoration that would benefit potentially injured species under an Integrated Habitat Restoration alternative. The individual projects do not, per se, represent alternatives. Although feasibility criteria will be applied to potential projects as they are considered, more detailed evaluation of each of these example projects is outside the scope of this plan-level analysis.
082	Koehl, Krista	Port of Portland	Economics	First, the Trustees rely on the Regional Industrial Site Readiness study for the notion that any parcel smaller than 25 acres is not economically significant. However, the study does not support that conclusion.	5(b) - Resp is in Report	See Narrative Response 3.2.2.
083	Koehl, Krista	Port of Portland	Economics	Traded-sector firms sell goods to buyers outside of the Metro region, bringing in additional wealth and creating higher wage jobs for essential public services. Evaluating these larger sites was a way to focus the regional economic development strategy moving forward. This focus does not mean that industrial-zoned lots smaller than 25 acres are not important to sustaining and growing the regional economy.	5(b) - Resp is in Report	See Narrative Response 3.2.2.
084	Koehl, Krista	Port of Portland	Economics	The City has just adopted one of the foundation documents for the Comprehensive Plan update called the Economic Opportunities Analysis (EOA). ⁸ This document evaluates the 20-year supply and demand for employment and development land within the City of Portland. Oregon Administrative Rule 660-09-0015 requires the City to demonstrate that they have an adequate supply of industrial land to meet the 20-year forecasts. The EOA adopted by the Portland City Council in September 2012 concludes that there is a shortage of 629 acres of industrial land in the City to meet the 20-year forecasted demand. Specifically, the analysis determined that the City will need additional development capacity for industrial land “especially in the Columbia Harbor area,” also known as Portland Harbor. ⁹	5(b) - Resp is in Report	See Narrative Responses 3.2.1 and 3.2.2.
085	Koehl, Krista	Port of Portland	Economics	A key to Portland Harbor’s economic success is its centralized network of rail, roads, marine terminals, pipelines, warehousing, manufacturing and commercial activities that are interconnected and dependent on one another. For this reason, every acre of industrial land in Portland Harbor is important to retaining, supporting and attracting businesses to the harbor—businesses that provide both tax revenue and jobs to the community. Contrary to the Trustees’ conclusions, lots smaller than 25 acres can, in fact, be critical to retaining and growing these businesses. Smaller lots support transportation improvements. They provide space for important warehousing or other infrastructure in support of the traded-sector businesses. In addition, smaller lots that are adjacent to existing businesses may become a significant factor for a business considering an expansion at its Portland facility as opposed to expansion in another community that may have more land capacity.	5(b) - Resp is in Report	See Narrative Response 3.2.2.
086	Koehl, Krista	Port of Portland	Economics	Converting industrial land in Portland Harbor to other uses requires a more extensive analysis than what is provided in the Trustee Council’s PEIS. The Trustee Council’s PEIS should consider the City of Portland’s EOA and the economic significance of Portland Harbor as an integrated system.	5(b) - Resp is in Report	See Narrative Response 3.2.2.
087	Koehl, Krista	Port of Portland	Individual Restoration Sites	In addition, the Port recommends that the projects identified in the Appendix A, Ecological Restoration Portfolio, identify the current zoning, current land use, and anticipated land use of the potential restoration properties. The PEIS should calculate the number of acres that would be converted from industrial or commercial to non-industrial or non-commercial land so that the Trustees can evaluate the economic impacts of the Restoration Plan.	3 - Augment Analysis	Section 3.2 of the PEIS/RP describes existing land use including zoning and other regulatory controls. Information for each portfolio site has been added in this section. No calculation of acres to be converted has been performed because the potential projects included in the portfolio are illustrative and not all of the portfolio sites will be used for restoration.
088	Koehl, Krista	Port of Portland	Individual Restoration Sites	In addition to zoning information, the descriptions for each Restoration Site in the Portfolio should be more specific about land ownership and use, and this should be specifically identified on the figures. These two factors are important to assess the true feasibility of the projects identified. This information is also necessary so that potential funding parties and/or the Trustee Council are able to contact owners to determine interest in participating in a restoration project. The current presentation is potentially misleading when it lists all property owners generally, including those that own a very small portion that is not necessary to perform the project.	3 - Augment Analysis	See response to comment 087.

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089	Koehl, Krista	Port of Portland	Individual Restoration Sites	Albina Yard - The Port no longer owns any portion of the Albina Yard. The project outline for this site appears to be, at least in part, a portion of the old Albina Dock property that the Port held from 1971 until 2007. The Port sold this parcel to Union Pacific Railroad in 2007.	4 - Factual Corrections	Thank you for this comment; the Trustee Council has added this information to the inventory of site-specific feasibility information.
090	Koehl, Krista	Port of Portland	Individual Restoration Sites	Ash Grove Cement/Port of Portland - Tax Lot 2N1W26C-00700 is owned by Ash Grove (at the northern tip). Tax lots 2N1W26C-00600 and 00300 are owned by the Port and leased to Georgia-Pacific Corporation. A rail spur is located on the property. Transforming the Port's industrially zoned property to permanent restoration is not likely the best use of the land given its strategic location and existing surrounding infrastructure. The soil at the site is also not conducive to wetlands or other restoration.	4 - Factual Corrections	Thank you for this comment; the Trustee Council has added this information to the inventory of site-specific feasibility information.
091	Koehl, Krista	Port of Portland	Individual Restoration Sites	Balch Creek Cove - The boundaries of the restoration site may impact the Terminal 2 berthing area where Army Corps of Engineers dredges are currently stationed. Coordination with the Port would be required.	4 - Factual Corrections	Thank you for this comment; the Trustee Council has added this information to the inventory of site-specific feasibility information.
092	Koehl, Krista	Port of Portland	Individual Restoration Sites	Mar Com - This project site should be identified as the "Former Mar Com" site. Langley St. Johns owns the southern portion (about half), tax lot 1N1W12-00500. The Port owns the northern portion, tax lots 1N1W11-00400 and 00500. Oregon Department of State Land's (DSL) ownership extends riverward of the ordinary high water line. Since the ownership and the condition of the north and south portions of the site are very different, the description should use "north parcel" and "south parcel" throughout the summary.	4 - Factual Corrections	Thank you for this comment; the Trustee Council has added this information to the inventory of site-specific feasibility information.
093	Koehl, Krista	Port of Portland	Individual Restoration Sites	Mar Com - The statement that the "north end of the site has been paved" is inaccurate. The "north parcel" is mostly unpaved. The statement that "storm water runoff from upland areas" drains through an outfall is inaccurate. Rain on the "north parcel" infiltrates and is not collected and piped into the river. The outfall actually drains a substantial area of St. Johns, inland of the project site, and the effectiveness of a bio-swale project at the outfall is questionable. The statement that the site is not remediated is inaccurate. The "north parcel" is clean with no further remediation required. DEQ issued a certificate of cleanup completion for the "north parcel" in 2009. The map for this project site inappropriately depicts a floating dry dock off the site. The floating dry dock no longer exists and the map should be corrected with a more recent aerial that shows no such potential restriction to in-water restoration opportunities. There is a substantial amount of tires and other debris imbedded in the DSL owned riverbank at this project site. Removal of this debris for bank enhancement may compromise the bank stability. Finally, development is not "threat[ening]." Rather: "The Port's marine master plan contemplates the future development of the uplands as part of Terminal 4." Given the parcel's direct adjacency to Terminal 4 and its surrounding infrastructure, use of the upland portion of the north parcel for restoration would convert important industrial land to non-industrial uses and is not likely the best use of the property. Improvements to the bank in a way that is complimentary to the intended industrial use of the upland area may be possible after the in-water cleanup is implemented but would require more technical evaluation given the bank stability concerns.	4 - Factual Corrections	Thank you for this comment; the Trustee Council has added this information to the inventory of site-specific feasibility information.
094	Koehl, Krista	Port of Portland	Individual Restoration Sites	Southgate Rivergate Corridor - Bonneville Power Administration (BPA) also has overhead power lines and towers with either ownership or easement over a significant portion of the site. The site is bisected with several rail lines, a rail yard and a private road (Time Oil Road). The Port maintains a wetlands mitigation site on the parcel. Hydrology is complex due to the high-draining soil, and any bank layback work or further wetlands development would require extensive analysis to ensure that it would not impede the existing wetlands at the site or compromise the BPA and Portland General Electric (PGE) towers. Vegetation must also comply with tree height requirements of PGE and BPA. Finally, the statement that "Active dredging of the Willamette River causes a steep drop off from shore...." is not supported. There has not been any recent dredging off this project site. More likely the steep bank is due to the type of soil at the site and scouring from the river.	3 - Augment Analysis	Thank you for this comment; the Trustee Council has added this information to the inventory of site-specific feasibility information.
095	Koehl, Krista	Port of Portland	Individual Restoration Sites	Swan Island Beach North - Rip rap removal and re-grading of the shoreline at this project site is unlikely given the presence of McCarthy Park improvements and/or the occupied buildings immediately landward of the top of bank. Public use of McCarthy Park may constrain habitat value improvements for this site.	4 - Factual Corrections	Thank you for this comment; the Trustee Council has added this information to the inventory of site-specific feasibility information.
096	Koehl, Krista	Port of Portland	Individual Restoration Sites	Swan Island Beach South - The existing riverbank slopes at this project site are approximately 2.5 to 1. Actual slope should replace the statement "extremely steep." Bank layback is not feasible due to the location of an extensive grid of grounding wires related to the City of Portland Combined Sewer Overflow pump station back-up electrical generator. Feasibility of rip rap removal and shallow water habitat creation is uncertain without additional slope stability and scour analysis.	4 - Factual Corrections	Thank you for this comment; the Trustee Council has added this information to the inventory of site-specific feasibility information.
097	Koehl, Krista	Port of Portland	Individual Restoration Sites	Terminal 5 - The site description for this project site should be corrected to say "...the navigation channel and ship berth are periodically dredged to maintain passage." In addition, Department of Homeland Security requirements for marine terminals related to fencing should be noted as a potential limitation.	4 - Factual Corrections	Thank you for this comment; the Trustee Council has added this information to the inventory of site-specific feasibility information.

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098	Koehl, Krista	Port of Portland	Individual Restoration Sites	Willamette Cove - It should be noted that an additional constraint on development of this project site is the large amount of construction debris buried in the riverbank and near shore waters. A derelict barge is also submerged just off shore of the central parcel. Specific ownership information should be provided to note that Metro is the primary property owner that would need to be consulted.	4 - Factual Corrections	Thank you for this comment; the Trustee Council has added this information to the inventory of site-specific feasibility information.
099	Koehl, Krista	Port of Portland	Individual Restoration Sites	West Hayden Island - PGE owns approximately 6 acres of land for the power substation (TL 2N1E33B-00200). BPA owns approximately 15 acres of the power line corridor. Burlington Northern Santa Fe owns the rail bridge. Pacific Power & Light, PGE, BPA, and City of Portland have multiple easements over the property. The Port also refers the Trustee Council to its letter dated March 18, 2011, which provides the land use planning history for West Hayden Island. Metro's Urban Growth Boundary determination included a portion of West Hayden Island in its available land supply for industrial land. In addition, as noted above, the City of Portland has a shortage of industrially zoned land for the 20-year forecasted demand and annexation is one of the recommended strategies for addressing this shortage. West Hayden Island plays an important role in fulfilling the regional and City of Portland demands for development and employment lands. The Port requests that the Trustee Council's Restoration Plan recognize the planning history and the Port's plan for the property and limit the restoration projects to the 500-acres anticipated for open space zoning.	4 - Factual Corrections	Thank you for this comment; the Trustee Council has added the ownership information to the inventory of site-specific feasibility information. Also see response to comment 010.
100	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Alternatives	The PEIS/RP should explain how and why the Trustees selected the chosen alternatives.	3 - Augment Analysis	We have added a summary of NEPA scoping actions in Chapter 2 of the PEIS/RP. NOAA issued a Notice of Intent to publish an EIS in the Federal Register on February 1, 2010 (75 Federal Register 5039-40). Scoping included the scoping process included a public meeting, information posted on the case website and disseminated through email, and an opportunity to submit written comments through March 15, 2010.
101	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Alternatives	Neither Section 2, which describes the alternatives evaluated, nor Section 4, which compares the alternatives, makes clear that the Integrated Habitat Restoration Planning alternative has or should have any geographic limitation. The feature of this alternative that is most prominently discussed in Section 2.2 is that restoration projects under this alternative will be chosen that benefit a suite of different species, using juvenile Chinook salmon as a surrogate species for selection of the habitat improvements. Only in Section 5.3 does it become clear that the Integrated Habitat Restoration Planning alternative includes a geographic limitation to the 12-mile stretch of Portland Harbor described in the PEIS/RP as the "Superfund Study Area" or "SSA."	1 - Modify Alts.	Clarified descriptions of Alternatives in Chapter 2.
102	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Alternatives	<p>The PEIS/RP fails to adequately address the Open Geography Restoration Alternative and does not develop and assess any reasonable alternative between these two—including any that consider projects within a geographic area that benefit specific populations of species in that have been allegedly impacted by chemical releases from Portland Harbor and that match the functional ecological needs of those species, without regard to whether those projects are located with 12-mile stretch of Portland Harbor. As an example, the geographic scope could be described as that portion of the watershed ecologically important to the recovery of spring Chinook salmon, if that is properly established as the surrogate species. Or, even more specifically, it could be described as that portion of the watershed ecologically important to the feeding and rearing of juvenile spring Chinook salmon. Either of these would encompass a geographic area much larger than a narrow 12-mile corridor of Portland Harbor. For purposes of this discussion, this assumes that there would be at least one additional alternative identified as an "Integrated Habitat Approach Within Geography Supported by Ecological Function."</p> <p>As the alternatives are currently postulated, the PEIS/RP does not meet the NEPA requirement that it examine a reasonable range of alternatives, especially given the broad scope of the actions that will fall under the PEIS/RP. See 'Ilio'ulaokalani Coal. v. Rumsfeld, 464 F.3d 1083, 1098 (9th Cir. 2006) (quoting Natural Res. Def. Council v. Morton, 458 F.2d 827, 835 (D.C. Cir. 1972) ("When the proposed action is an integral part of a coordinated plan to deal with a broad problem, the range of alternatives that must be evaluated is broadened.").</p>	3 - Augment Analysis	See Narrative Response 3.1.5. Additionally, note that a new alternative, Study Area Restoration Planning (Section 2.4.2) has been added in the Final PEIS/RP, to reflect the decision making process. This alternative was dismissed from further consideration and in-depth analysis.

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103	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Alternatives	<p>(a)Second, the PEIS/RP is also deficient because it fails to provide a sufficiently detailed analysis of alternatives that satisfy its stated purpose and need. City of Carmel-by-the-Sea v. U.S. Dep’t of Transp., 123 F.3d 1142, 1155 (9th Cir. 1997). The PEIS/RP purpose and need statement compels a detailed analysis of alternatives for the selection of restoration projects that would “compensate the public for any natural resource injuries resulting from the release of hazardous substances and oil from the site” (purpose) and “facilitate effective restoration actions” (need). PEIS/RP, p. 1-2.</p> <p>(b&c) B. In Rejecting the "Open Geography" Alternative, and in Failing to Consider a Reasonable "Integrated Habitat Approach Within Geography Supported by Ecological Function" Alternative, the Trustees Have Failed to Take a Hard Look at a Reasonable Range of Alternatives.</p> <p>By rejecting the "Open Geography" alternative and particularly by failing to identify a reasonable alternative along the lines of that proposed above, an "Integrated Habitat Approach Within Geography Supported by Ecological Function" alternative, the Trustees failed to appropriately consider: (1) other federal and state legal authorities regarding the development and selection of habitat actions; and (2) peer-reviewed literature regarding the habitat needs and the design of successful projects to benefit the target potentially injured species population.</p>	5(a) - Explain why no response / change	See Narrative 3.1.8.
104	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	NRDA Process	<p>The PEIS/RP appears to reject the “Open Geography” alternative based on a misapplication of what it states in Section 2 to be “fundamental legal constraints.” The PEIS/RP states that there must be a “strong nexus” between the restoration actions and the injuries giving rise to the claim for natural resource damages. The Trustees take the position that these claims are for alleged injuries to species resulting from releases of hazardous substances in the Portland Harbor. However, in Section 2.4, the analysis jumps from a discussion of a nexus to “injury” to a species to a nexus to “habitat conditions” in the Portland Harbor. Contrary to what this implies, those habitat conditions that have affected species in the Harbor, including salmon, are not the result of the alleged releases of hazardous substances by PRPs, but, in fact, are conditions that have been created by many years of increasing physical development, including industrial, commercial and residential, in Portland Harbor. Those activities have greatly altered the riverine habitat but are not actionable under any NRD authorities. Instead of focusing on injury to habitat in Portland Harbor from other causes the Trustees should appropriately focus on restoration of whatever habitat could help compensate for any actionable injury to species that the Trustees allege has occurred. Because that injury is alleged to have occurred to the populations of species that use Portland Harbor (e.g., Section 2.4 discusses the alleged injury to the population of Chinook salmon), then restoration should occur at whatever geographic scale will be ecologically meaningful to the restoration of the population of those particular species. In fact, as discussed in more detail below, actions located outside the SSA could provide the same ecological benefits to allegedly injured species and, more importantly, may have a greater likelihood of success.</p>	5(a) - Explain why no response / change	The Trustee Council agrees that degraded habitat conditions in the Portland Harbor area are not wholly caused by releases of hazardous substances. Further, the Trustee Council believes that the preferred alternative and draft Restoration Plan do, in fact, focus on restoring the habitats that can most significantly compensate for injuries to resources. The Trustee Council disagrees with the assertion that restoration outside of the SSA and BFA "could provide the same ecological benefits to allegedly injured species"; in fact, restoration outside of the targeted areas may not benefit some injured species at all. For example, mink have a range of only 1-4 miles; therefore, injured populations of mink residing in the SSA would not receive any benefit from restoration of habitats up the Clackamas River, for example, or in the Lower Columbia area.
105	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	NRDA Process	<p>The PEIS/RP acknowledges that the Comprehensive Environmental Response, Compensation, and Liability Act (“CERCLA”), the Oil Pollution Act (“OPA”), the National Contingency Plan and the Clean Water Act (“CWA”) are applicable legal mandates and authorities but does not effectively incorporate these authorities into its evaluation of the alternatives. PEIS/RP, p. 1-4.</p>	5(a) - Explain why no response / change	This comment does not point out deficiencies with sufficient specificity to provide a response. Please see Section 1.4 through Section 1.8 and Appendix E for a description of how these authorities were incorporated.
106	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Geographic Scope	<p>These regulations require a mitigation project to be located within the same watershed as the impacted site and “where it is most likely to successfully replace lost functions and services,” considering watershed scale features such as aquatic habitat diversity, habitat connectivity, relationships to hydrologic sources, land use trends, ecological benefits and compatibility with adjacent uses. 40 C.F.R. § 230.93(b)(1). These regulations do not create an artificial geographic limitation on the location of otherwise beneficial projects, but rather they discourage mitigation projects in isolated areas that are not chosen based on a full functional ecology analysis relating to long-term aquatic resource needs. Based on this requirement, a restoration project that compensates for alleged injury to natural resources from Portland Harbor contamination should be at a location within the Lower Columbia and Willamette River watersheds, where it is most likely to be successful at restoring the injured salmonid resource. That geographic limitation restricts restoration to projects directed toward the populations injured by releases in Portland Harbor, and, therefore, such restoration would satisfy the “strong nexus” criterion discussed above.</p>	5(a) - Explain why no response / change	See response to comment 104.
107	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Geographic Scope	<p>This interpretation of a “strong nexus” in light of the CWA regulations supports the development of restoration actions based on their benefit to potentially injured populations of affected species rather than focus on the immediate site area. The Trustees should analyze these types of approaches, and in doing so consider whether they would integrate NRD-funded restoration with the larger geographic focus of the existing Lower Columbia and Upper Willamette Recovery Plans and thereby increase the positive cumulative impacts of the NRD-funded restoration projects.</p>	5(a) - Explain why no response / change	See response to comment 104.
108	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Geographic Scope	<p>The peer-reviewed literature does not support the Trustees’ assertion that the project area provides unique benefits to juvenile Chinook. is the Trustees have not established that an increase in shallow and off-channel habitats in the SSA would provide more significant benefits than similar improvements in shallow and off-channel habitat in any other areas of the watershed used by juvenile Chinook for rearing and feeding.</p>	5(a) - Explain why no response / change	See Narrative Response 3.1.9.

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109	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Tiering	The PEIS/RP does not adequately describe how assessments of future site-specific projects will be tiered to the PEIS/RP. Without a more detailed examination of the alternatives in the PEIS/RP, the Trustees cannot effectively tier individual assessments to the PEIS/RP. The PEIS/RP provides only a broad and non-committal explanation of how the Trustees expect to use it as a framework for the assessment of future site-specific actions	3 - Augment Analysis	Section 7.3.2 describes the project planning, design and implementation process, and addresses NEPA compliance in the "compliance and permitting" sub-section. This section has been augmented to include a more detailed description of potential NEPA compliance pathways, and a discussion of how environmental impacts analysis will be handled for non-Federal restoration projects (i.e., those developed prospectively for the restoration credit market by third-party developers).
110	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Tiering	The ability to efficiently tier individual restoration projects to this PEIS/RP will be critical to the timely implementation of those projects. Thus, the Trustees should develop the detail now in this PEIS/RP from which that tiering can follow, by identifying the elements that are considered likely to have been sufficiently evaluated by this PEIS/RP and those that, under circumstances enumerated with as much detail as is possible, are likely to require further environmental review.	3 - Augment Analysis	See response to comment 109.
111	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Cumulative Effects	The PEIS/RP should analyze the cumulative impacts on land use and shoreline use of siting restoration projects in an active industrial harbor. For example, the siting of a single restoration project in the Portland Harbor might not create significant adverse land use impacts, because the conversion of industrially zoned land to conservation land would be limited to that particular site. However, the PEIS/RP does not address the cumulative impacts of converting the industrially zoned land within the footprints of the projects the Trustees realistically expect to be constructed within the active industrial Harbor.	5(b) - Resp is in Report	See edits in Final PEIS/RP Cumulative Impacts section. Also see Narrative Response 3.2.2 with regard to economic impacts and Narrative Response 3.1.7 regarding the scope of the environmental analysis.
112	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Cumulative Effects	The PEIS/RP ignores these important, adverse cumulative impacts. Therefore, the discussion of mitigation measures in Section 4.15 of the PEIS/RP is necessarily incomplete. The decision makers and the public cannot evaluate how each alternative could be modified to reduce these adverse impacts. For example, the PEIS/RP does not consider whether restoration projects in the Harbor should be sited contiguously to reduce adverse impacts to commercial land and shoreline uses, while at the same time promoting important restoration objectives such as improving habitat connectivity. There is no way to analyze this potential mitigation measure, or even determine which measures might be appropriate, because of the complete lack of cumulative impacts analysis for land use and shoreline use.	3 - Augment Analysis	See edits in Final PEIS/RP Cumulative Impacts section. Although the Restoration Plan portion of the PEIS/RP discusses benefits of different types of restoration, evaluation of whether contiguous sites are preferred or not is impractical given the Trustee Council's established restoration study area and broader focus area, which are large and partially or highly developed. There are very limited opportunities for contiguous restoration sites available.
113	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Cumulative Effects	The PEIS/RP fails to integrate with the existing Lower Columbia and Upper Willamette Salmon Recovery Plans and, consequently, fails to consider the positive cumulative impacts of such integration.	3 - Augment Analysis	See response to comment 118.
114	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Cumulative Effects	Similarly, the proposed restoration projects are designed to improve habitat for listed species in the Harbor, but the PEIS/RP does not analyze the impacts, whether positive or negative, of attracting listed species to an active industrial harbor.	5(a) - Explain why no response / change	As stated in Section 3.10 of the PEIS/RP, ESA-listed salmon species are already present in the Harbor and actively using available habitats. The development of restoration projects will improve the condition of portions of existing habitats, and may increase the ability of the habitat to support larger numbers of ESA-listed individuals, both of which will provide beneficial effects to ESA-listed species that are using the Harbor at present.
115	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Cumulative Effects	Moreover, the PEIS/RP fails to consider the cumulative impacts, whether positive or negative, to listed species resulting from these restoration projects when placed in context among the myriad recovery and restoration efforts already underway or reasonably foreseeable in the future.	3 - Augment Analysis	Section 7.1 of the PEIS/RP describes the known ongoing, interrelated activities and programs relevant to the proposed action. The purpose of the Restoration Plan is to provide guidance for the development of compensatory restoration actions for Portland Harbor natural resource damages. As a general matter, the development of restoration actions in the Lower Willamette is anticipated to have an overall beneficial effect on listed species, both independently and in concert with other restoration and recovery efforts. At this conceptual planning stage, it is not possible to develop analysis at a finer scale.
116	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Cumulative Effects	The PEIS/RP indicates one of the primary reasons for implementing the restoration projects in the portfolio is to benefit allegedly injured species such as federally listed salmonids and concludes that there will be "major long-term beneficial impacts." PEIS/RP, pp. 1-4, 4-26. Consequently, there should be at least some discussion of these positive cumulative impacts associated with implementing the restoration alternatives; however, the PEIS/RP contains no such discussion.	3 - Augment Analysis	Please see response to comment 061.

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117	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Cumulative Effects	Although the introduction to Section 4.14 of the PEIS/RP lists seven of these other recovery and restoration efforts, including some but not all relevant recovery plans under the Endangered Species Act (“ESA”), Section 4.14.9 of the PEIS/RP—the section that specifically addresses impacts to listed species—does not even mention these other actions, except to note in passing that there are “other similar programs that improve similar resources throughout the project area.” PEIS/RP, p. 4-26. By failing to analyze the cumulative impacts with these other actions, the PEIS/RP fails to meet its obligations under NEPA to consider cumulative impacts to biological resources and listed species.	5(a) - Explain why no response / change	The overall objectives of the other programs can be evaluated in a cumulative context, but detailed analysis of physical impacts is beyond the scope of this programmatic EIS.
118	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Cumulative Effects	It would be a violation of the ESA for a federal agency to fail to evaluate the proposed restoration projects in the context of these plans to promote recovery and ultimate de-listing of these species. The PEIS/RP needs to fully perform an analysis of these cumulative impacts so that NOAA can better assess whether the active industrial Harbor and navigation channel is an appropriate location for restoration projects.	3 - Augment Analysis	The draft Restoration Plan has undergone consultation with National Marine Fisheries Service under Section 7 of the Endangered Species Act (30 January 2015). This Biological Opinion provides a detailed evaluation of the status of affected ESA-listed salmon populations, factors limiting their recovery, and priority areas and types of restoration as identified in the Recovery Plans listed by the commenter. The Harbor area is identified in the Biological Opinion as an area which, despite its degraded condition, has a high conservation value because it provides a critical migration corridor and important rearing habitat. Please also see response to comment 117.
119	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Geographic Scope	The 50/50 policy is unsupported and unwarranted, and the Trustees’ use of it as an assumed input into the PEIS/RP analysis renders the PEIS/RP insufficient.	5(a) - Explain why no response / change	See response to comment 001.
120	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Geographic Scope	Forcing projects into the SSA based solely upon a policy decision by the Trustees will produce fewer ecological benefits—while increasing cost—compared to allowing projects located outside the SSA, or even outside the broader focus area, to be analyzed as restoration options.	5(a) - Explain why no response / change	See response to comment 001. The assertion that “forcing” projects into the SSA will produce fewer ecological benefits at higher cost is not supported by this comment and is contrary to the initial findings by the Trustees. While costs (i.e., feasibility) should be and are considered in evaluating restoration projects, they are not the only factor. Further, the 50/50 approach adopted by the Trustee Council specifically allows for consideration of projects outside of the SSA.
121	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Geographic Scope	Forcing a significant number of restoration projects into the SSA will also reduce the amount of available industrial land within the Portland Harbor and may impair future industrial and navigational operations within the Harbor because of complaints about the effects of those operations on the restoration sites, including impacts from noise, lights, wake, prop-wash, dredging, and other navigational and industrial activities.	5(b) - Resp is in Report	The Final PEIS/RP includes new analysis explaining that even assuming that all of the sites listed in the Ecological Restoration Portfolio that have some industrial zoning were developed for restoration in both the Study Area and Broader Focus Area, less than 5% of industrial lands would be converted. This unlikely full build-out scenario is not anticipated to significantly affect industrial or navigational operations within the Harbor. Also see Narrative Response 3.2.2. and response to comment 169.
122	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	NRDA Process	CERCLA and its regulations contemplate and expressly allow for restoration through the replacement or acquisition of equivalent natural resources outside the injured area. The relevant provision of CERCLA imposes a duty “to restore, replace, or acquire the equivalent of such natural resources.” 42 U.S.C. § 9607(f)(1) (emphasis added); PEIS/RP, p. 5-3. The statute thus provides three options for redressing natural resource damages. Restoring suggests “fixing” the damaged resources directly. Replacing and acquiring, on the other hand, suggest substituting other resources for those that were damaged, which could include off-site mitigation.	5(a) - Explain why no response / change	The Trustee Council considered all available options under CERCLA in developing alternatives. Please see Sections 1.2 and 1.3 of the PEIS/RP for a discussion of how these were evaluated.
123	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Geographic Scope	Thus, as the Trustees well understand, the NRD assessment process is designed to be flexible to accommodate the unique circumstances in each case. See, e.g., NOAA, NOAA’s Approach to NRDA: What Do Trustees Want? at 8 (Oct. 4-5, 1999) (“Trustees have a great deal of flexibility in working within a cooperative assessment when these minimum conditions are met.”); NOAA et al., Introduction to Natural Resource Damage Assessment at 4 (May 10, 2010) (“Strategy must be encompassing and flexible”). However, on-site restoration is not required by statute or regulation.	5(a) - Explain why no response / change	Agreed. The Trustee Council considered a number of approaches and alternatives in developing the alternatives and draft Restoration Plan. Please see Chapter 2 for this discussion.
124	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Geographic Scope	In support of their argument that the 50/50 policy represents an appropriate exercise of discretion, the Trustees have offered three examples of other restoration plans where trustees “have exercised their discretion to limit the geographic extent of restoration actions and/or prioritize restoration actions.” However, the Trustees’ reference to these examples does not capture the full scope of the Trustees’ reasoning in those other plans, nor does it reveal just how generous those other geographic “restrictions” are in comparison to the Trustees’ overly restrictive policy for the Portland Harbor.	5(a) - Explain why no response / change	The comment refers to information not included in the Draft PEIS/RP. Further, the additional information referenced in the comment is beyond the scope of this analysis.

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125	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Geographic Scope	First, the Duwamish plan does not require any specific percentage of restoration to occur in the highest priority area; instead, the geographic preference is simply the highest ranked of several screening and valuation criteria for evaluating proposed restoration projects. Second, the Duwamish plan realistically acknowledges that, in spite of the geographic priority, restoration opportunities in the preferred area will be constrained because of the existing high level of alteration of the river and shoreline and the fact that there is likely to be little unused industrial land for the trustees to purchase in that area. The plan thus concludes that “no existing uses are anticipated to be eliminated.” See NOAA et al., Lower Duwamish River, WA, Supplement to Draft Programmatic Restoration Plan and Programmatic Environmental Impact Statement, pp. 21, 30-36, 41-46, 57-60, 87-88 (July 2012).	5(a) - Explain why no response / change	Thank you for this comment. The Trustee Council agrees that restoration inside the Portland Harbor area may be limited by availability of land for this purpose. Therefore, the geographic focus area was expanded to include the Broader Focus Area.
126	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Geographic Scope	The Trustees also refer to the Lavaca Bay, Texas, restoration plan. Although the Lavaca Bay plan does require all of the restoration projects to be sited within a particular geographic area, the area included is vast (at least 500 square miles) to address injuries from releases from a single aluminum smelting facility. This geographic policy is thus more generous than it is restrictive. See Texas General Land Office et al., Final Damage Assessment and Restoration Plan and Environmental Assessment for the Point Comfort/Lavaca Bay NPL Site, Ecological Injuries and Service Losses, pp. 9, 20-29, 33-36, 38 (June 2012).	5(a) - Explain why no response / change	The comment refers to information not included in the Draft PEIS/RP.
127	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Geographic Scope	Finally, the Trustees cite the Castro Cove plan, which addresses injuries caused by discharges from a petroleum refinery in northern California. The geographic “restriction” in this plan, too, is very broad. The release primarily damaged an area of about 200 acres within Castro Cove, which is a small cove that is part of the larger 90-square-mile San Pablo Bay, which in turn is part of the much larger San Francisco Bay. The plan allows restoration to occur in the “North Bay” sub-region of San Francisco Bay. The North Bay sub-region is larger than San Pablo Bay, and is therefore vastly larger than Castro Cove. The plan specifically notes that the trustees’ restoration strategy is to “identify and implement projects that improve the ecological function of habitats in San Pablo Bay...that at present are not fully functional and that are identical or similar to...habitat that was injured in Castro Cove.” NOAA et al., Castro Cove/Chevron Richmond Refinery Draft Damage Assessment and Restoration Plan/Environmental Assessment, p. iv (Nov. 2008) (emphasis added). Geographic proximity was obviously only a part of the decision-making process on restoration projects and was not a threshold criterion. One of the preferred projects discussed in the plan is 10 miles from Castro Cove, whereas one of the non-recommended projects is “adjacent” to the Cove. See id. at 3-5, 36, 41-44.	5(a) - Explain why no response / change	The comment refers to information not included in the Draft PEIS/RP.
128	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Cumulative Effects	These other restoration plans thus provide general support for the Trustees to include geography and location as elements of screening restoration projects. However, they do not provide any specific support for the restrictive 50/50 policy, regardless of other considerations, as a valid exercise of the Trustees’ discretion in this instance. These other plans differ in that critical respect from the Trustees’ proposal here: they targeted projects to the geographic areas—often very large areas—that were most likely to provide effective, long-term restoration, and then selected projects based upon an analysis of all of the selection criteria.	5(a) - Explain why no response / change	The comment refers to information not included in the Draft PEIS/RP.
129	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Geographic Scope	Incorrectly delineated a comment. Retained space/ID to avoid numbering errors.	5(a) - Explain why no response / change	N/A
130	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	NRDA Process	Throughout the rest of the PEIS/RP, the discussion of restoration to benefit juvenile Chinook focuses not on alleged injuries to the fish from release of toxic substances, but rather on loss of habitat in the Lower Willamette River due to its development as a working harbor.	5(a) - Explain why no response / change	See response to comment 104.
131	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Geographic Scope	The Trustees repeatedly point to the work of their expert panel as the claimed “scientific” justification for the 50/50 policy, but the expert panel’s work does not provide the missing link. The Trustees have presented no document containing the specific “charge” given to the expert panel by the Trustees, so we do not know exactly what questions the panel was asked to address. However, the few documents provided suggest that the panel was given a narrow charge with the geographic focus of the panel’s conclusion specified or perhaps limited by the Trustees’ direction to the panel.	3 - Augment Analysis	See Narrative Response 3.1.3.

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132	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Geographic Scope	The area referred to as the Initial Study Area in Tier 1 corresponds to the designated Portland Harbor Study Area. The panel was asked “whether factors exist that would make a project inside the study area more valuable to potentially injured juvenile Chinook than a similar project outside the study area,” and the discussion produced a list of 16 factors, only one of which—“toxic history”—relates directly to the focus of CERCLA. Id. at 7-18. Further discussion of the “tiering scenario” elicited a range of opinions from the experts—including (a) requiring 1/3 of the restoration to be within the Tier 1 area; (b) requiring 1/2 to be within Tier 1; and (c) requiring more than half to be in Tier 1, but with the possibility of expanding Tier 1 to the mouth of the Willamette. Id. at 20. Thus, in 2009, there was no consensus among expert panel reached no consensus as to the appropriate location mix for restoration projects.	3 - Augment Analysis	The panel, which is more accurately referred to as a group of scientists knowledgeable about juvenile Chinook, was not asked to reach consensus. The information they provided was considered by the Trustee Council, and helped inform the development of the geographic focus areas. See also response to comment 131.
133	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Geographic Scope	This background provides important context for the panel’s conclusions, contained in a January 2012 letter to the Trustee Council. In that letter, the expert panel stated that it “agrees with the initial focus on juvenile Chinook salmon,” but it did so without discussing how the salmon had specifically been damaged by the regulated release. Letter from Thomas A. Friesen, Stanley V. Gregory, Nancy Munn, and Chris Prescott to Erin Madden, p. 1 (Jan. 6, 2012) (“Expert Panel Letter”), included as Attachment C. As noted above, since the Trustees had directed the panel to focus on salmon from the beginning, this “agreement” does not constitute a scientific endorsement of the crucial link between the injuries caused by the release and the location of proposed restoration projects.	5(a) - Explain why no response / change	It is the responsibility of the Trustee Council to ensure a strong link between the injury and restoration. The group of scientists were asked to inform the Trustee Council about habitat limitation and opportunity for juvenile Chinook salmon, not to evaluate possible injury. See response to comment 131. Also see Narrative Response 3.1.4.
134	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Geographic Scope	The panel further said that it agreed with the 50/50 policy. Id. at 2. We cannot determine whether the panel itself reached consensus on this allocation sometime between the end of 2009 and the beginning of 2012, or if the Trustees simply “split the baby” and chose the 50/50 figure as the mid-point of the various panel members’ opinions, and then asked the panel for its response.	3 - Augment Analysis	See response to comment 132.
135	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Geographic Scope	The expert panel was chosen by the Trustees and convened to talk only about salmon habitat, not generally about the natural resources damaged by the releases. PEIS/RP, pp. 5-3–5-4. And yet, the entire “geographic priorities” discussion in the PEIS/RP—a document which purports to support an integrated, multi-species restoration plan—rests on this narrowly configured panel’s work related to juvenile Chinook. PEIS/RP, pp. 5-3–5-5.	5(a) - Explain why no response / change	See Narrative Response 3.1.3.
136	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Geographic Scope	Nowhere in the expert panel discussion or the PEIS/RP is there any scientifically-based explanation for the particular percentage formula chosen.	5(a) - Explain why no response / change	See response to comment 001.
137	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Geographic Scope	This PEIS/RP is too important to rely on unfounded and potentially biased input, particularly when it could rely instead on peer-reviewed scientific literature, thus making it less vulnerable to challenges. It should not rely on input from a City of Portland employee, regardless of scientific credentials, when determining whether the Trustees should require that habitat restoration projects be sited within the Portland Harbor and within the City of Portland. And, given the evidence discussed above indicating that the panel’s report was a compromise rather than a scientific conclusion, the PEIS/RP should not rely on a panel report potentially tainted by that input.	5(a) - Explain why no response / change	See response to comment 132 and Narrative Response 3.1.3.
138	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Geographic Scope	We do not argue with the Trustee Council’s point that juvenile salmon travel through Portland Harbor. We also agree that any resting habitat for these salmon as they pass through this stretch of the river was reduced long ago by human activity. However, that is a result of physical development of the riverbanks, not a result of releases of contaminants that are actionable under NRD authorities. Those who ultimately will pay for NRD restoration should not bear the added burden that would be imposed by the 50/50 policy of restoring salmon habitat lost from physical changes to the river basin caused by the construction and use of the Portland Harbor.	5(a) - Explain why no response / change	See response to comment 104.
139	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	NRDA Process	The NRD assessment process under CERCLA is not designed to address habitat loss and industrial impact in general, but only to the extent such losses arise from specific releases by individual parties of particular hazardous substances.	5(a) - Explain why no response / change	See response to comment 104.
140	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Geographic Scope	Combined delineated comment with ID 138. Retained space/ID to avoid numbering errors.	5(a) - Explain why no response / change	Combined with ID 138

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141	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Geographic Scope	First, because of the altered nature of the Harbor environment, restoring enough habitat to meet the 50/50 policy is likely to present technical challenges, particularly in terms of creating projects that will be successful over the long term. The expert panel emphasized the need to look at site-specific information in choosing restoration sites; the panel also noted the dearth of good information about how salmon currently behave within the Portland Harbor. Expert Panel Letter, p. 5-7 (describing the uncertainties and limitations of available studies and data). Thus, even within the Trustees' narrowly focused restoration strategy, feasible and successful restoration projects are not necessarily a given.	5(a) - Explain why no response / change	Potential feasibility issues was one of several reasons that the Trustee Council developed the geographic focus area, which provides flexibility by allowing for some of the restoration to be implemented outside the SSA. See response to comment 001.
142	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Geographic Scope	While it is possible that particular sites within the Harbor can be successfully restored to some degree, the constant shipping, docking, dredging, and other industrial activity that characterize this part of the river surely diminish the likelihood of long-term viability of restored habitat.	5(a) - Explain why no response / change	Potential impacts of ongoing industrial activity, and their potential to affect the long-term viability of restored habitat, will be important site-specific considerations in project selection.
143	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Geographic Scope	It is likely that restoration sites within the Harbor will require greater ongoing maintenance and additional restoration work in the future as compared to sites outside the Harbor.	5(a) - Explain why no response / change	The Trustee Council does not agree that a site's location inside the SSA necessarily requires more ongoing maintenance. All potential sites will be evaluated for their ability to ultimately be self-sustaining; similarly, all sites, regardless of their location, will likely require some initial maintenance in order to become self-sustaining.
144	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Recreation	Ironically, the Trustees seem to acknowledge greater threats to the feasibility and success of restoration projects from recreation than they do from current and future industrial activities in the Harbor.	5(a) - Explain why no response / change	The Trustee Council acknowledges potential threats to restored habitats (both inside the SSA and in the BFA) from recreation, industrial activity and numerous other causes.
145	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Recreation	The PEIS/RP also states that "implementation of a restoration project may permanently restrict access or restrict some recreation activities at a recreation area for the long-term protection of natural resources." PEIS/RP, p. 4-8 (and similar statement p. 4-19). But there is no parallel discussion of the very real likelihood that the Trustees or others might seek future restrictions on industrial operations to protect ecological restoration projects. In fact, at one point in the PEIS/RP, the Trustees make the rather surprising blanket assertion that "no adverse effect is anticipated on industrial and shipping activities from restoration under this plan[.]" PEIS/RP, p. 4-24. That statement is not based on a proper analysis of feasibility and likelihood of success.	5(a) - Explain why no response / change	The restrictions mentioned on p. 4-8 refer to where the public might currently be accessing a site, but if that site were to be used for restoration (with the approval of the property owners and acceptance of the Trustee Council that a site was appropriate), the public may lose some or all recreation use of the site. Because there is little, if any, restoration considered on active industrial sites where active use is occurring, the same analysis cannot apply. The Trustee Council does not anticipate any requirements for reductions on shipping activities for the purpose of protecting a restoration site, nor does the Trustee Council, or the owner of a restoration site, have the authority to impose such requirements.
146	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Economics	Projects within the highly modified and busy SSA are likely to be more expensive per unit of benefit than projects at other locations. Even if cost-effective projects can be designed within the SSA, if those projects require restrictions to adequately protect the newly-created habitats, such restrictions are certain to have an economic impact on the commerce that takes place in the SSA. Whether that is a direct or indirect cost of on-site restoration, it is a cost that must be included in the assessment. By stating the 50/50 policy as a non-negotiable preliminary requirement, the Trustees truncate an appropriate cost-benefit analysis.	5(a) - Explain why no response / change	This comment raises valid considerations that will be addressed as planning and evaluation of restoration projects proceeds. At this point in the planning and project development process it is premature to conclude which projects will be more or less cost-effective or to conclude that they "are certain to have an economic impact on commerce" as this comment claims. Restoration sites at any location, in or out of the SSA, could potentially affect the surrounding area; that is among the issues this EIS is evaluating (see Section 4.3.2 in the PEIS/RP).
147	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Cost-Benefit/Feasibility	First, this discussion does not actually compare the costs of projects inside and outside the SSA.	5(a) - Explain why no response / change	As noted in the paragraph quoted by this comment (Draft PEIS/RP, page 2-3), costs are one of several considerations. At this early level of planning costs are useful as one of many factors for comparisons and assessing general feasibility. Comparing the costs of projects in and out of the SSA is not needed to assess the effects of the restoration plan, as required by NEPA, or the ability of the alternatives to meet the project's purpose of restoring habitat.

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148	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Cost-Benefit/Feasibility	Furthermore, saying that the Trustees have done their cost-benefit analysis is not the same as demonstrating that the chosen restoration approach complies with this statutory requirement. The Trustees have not adequately explained what their feasibility investigations consisted of or how technical feasibility was demonstrated. Further, what the Trustees did appears to have been cursory.	5(a) - Explain why no response / change	The paragraph cited here (Draft PEIS/RP, page 2-3) is being mis-interpreted as stating a complete cost-benefit analysis has been prepared. The study and EIS are at a programmatic stage and projects are not defined to a level where a full cost-benefit comparison can be made. This approach and level of analysis presented is appropriate under CFR 40 CFR 1500.4(i) and NOAA Order 216-6 section 5.09a to assess the general environmental consequences of the plan and is not cursory but consistent with the level of information available. The evaluation completed is described in Section 7.2 as part of the draft restoration plan. Section 7.3 of the plan explains that the specific sites that will be developed are not yet known and lays out the implementation process that would be followed once the plan is established.
149	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Cost-Benefit/Feasibility	Finally, the cost at Portland Harbor as compared to other urbanized restoration sites is irrelevant.	5(a) - Explain why no response / change	Considering the costs of restoration projects within the SSA is vis a vis costs of other urban restorations is appropriate and relevant for a programmatic evaluation. This shows the Trustee Council appropriately considered whether the plan under consideration here is consistent with programs elsewhere across the country. This level of consideration is relevant at this early stage of planning.
150	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Cost-Benefit/Feasibility	In fact, the Trustees acknowledge that the cost analysis will not come until considerably later in project planning. Section 7.3.2 of the PEIS/RP says that cost estimates will initially be developed when a specific project is being planned. Permitting requirements (which will have a considerable impact on costs) will be identified when project design is about 30% complete. And refined cost estimates won't be developed until project design is about 60% complete. PEIS/RP, p. 7-14-7-15. The up-front 50/50 requirement puts the cart before the horse in terms of analyzing and comparing the cost effectiveness of restoration projects. Once the proper analysis has been done, it may turn out that the 50% in-Harbor requirement cannot be met.	5(a) - Explain why no response / change	Chapter 2 of the Draft PEIS/RP gives a brief but complete explanation of how the 50/50 policy was developed and the technical work involved, and there is further discussion in Part II. Accordingly, both alternatives being considered include the 50/50 policy as a means of accomplishing the purpose of restoring habitat. It is important to note this comment does not dispute the 50/50 policy itself but how it would be implemented. This evaluation is at a programmatic, or planning, level of analysis and the information on project costs (feasibility) is at a commensurately early level. As described in Section 7.3 of the plan, the Trustee Council will be working with the settling parties through project identification, design, implementation and monitoring. Expecting costs to be known at this stage contradicts what is accomplished by early review at a planning level.
151	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Cost-Benefit/Feasibility	Here, as noted below, requiring half of the restoration projects to be located within the busy Portland Harbor will result in a collateral economic injury to the Harbor's commerce. Off-site alternatives, on the other hand, could be implemented without attendant injury to the local and regional economy.	5(b) - Resp is in Report	See response to comment 121 and Narrative Response 3.2.2.
152	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Geographic Scope	As NOAA Guidance Documents tell us, there must be a basis for exercising an on-site preference in each case. See, e.g., NOAA Guidance Document at 5-4 (noting that an on-site restoration preference should be well founded when applied). Even if the Trustees can demonstrate ecological benefits to performing some in-Harbor restoration, that is only one piece of the puzzle, and does not justify a hard and fast 50/50 rule.	5(a) - Explain why no response / change	See response to comment 001.

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153	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Geographic Scope	Off-site restoration—even beyond the broader focus area—could achieve the same ecological benefits while more effectively meeting the other applicable restoration evaluation criteria and should be more thoroughly evaluated in the PEIS/RP. For example, it is possible that a significant restoration project could be located in the Johnson Creek drainage or even the Clackamas River (outside the broader focus area) that would provide more “bang for the buck” in terms of fish habitat and other natural resource values than any number of projects within the SSA itself. The 50/50 policy proposed by the Trustee Council not only lacks sufficient basis, it limits compliance with the required evaluation criteria and preemptively eliminates alternatives that would maximize the benefits provided under the evaluation criteria.	5(a) - Explain why no response / change	See response to comments 001 and 104.
154	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Economics	Locating restoration projects within the Portland Harbor will undermine the Harbor’s use for navigation and commerce. The Harbor is important to water-related manufacturing, water-based commerce, and other navigational activities. The Portland Harbor area is zoned for heavy industrial use and is within an “Industrial Sanctuary” designated by the Portland Comprehensive Plan, the purpose of which is to encourage industrial growth in the City. The sanctuary designation “is intended for areas where City policy is to reserve land for existing and future industrial development.... Nonindustrial uses are limited to prevent land use conflicts and to preserve land for industry.” Portland Comp. Plan Goal 10.4(21). Although parks and open space are also “allowed” uses in the heavy industrial zone, prioritizing such uses would be inconsistent with the purposes of the Industrial Sanctuary designation. Allowing open space within an industrial sanctuary is much different than actively requiring protected fisheries restoration sites that will likely create land use conflicts and take land out of industrial use. The City has clearly prioritized this particular area for navigation and commerce over non-industrial uses and has committed to preserving this land for industry, just as it has prioritized recreation and fisheries in other designated areas, such as Smith and Bybee Lakes nearby, which are zoned for open space and subject to a natural resources management plan.	5(b) - Resp is in Report	See Narrative Response 3.2.1.
155	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Climate Change	CEQ specifies further that a climate change analysis should consider effects on the environment and on vulnerable populations that are more likely to be adversely affected by climate change. Id. at 6. To comply with this guidance, the PEIS/RP should evaluate the relative expected impacts of climate change on each proposed and alternative action, including relative effects of climate change on the geographic locations of the actions.	3 - Augment Analysis	See Narrative Response 3.1.10.
156	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Climate Change	The PEIS/RP only briefly discusses climate change impacts relating to the integrated habitat and species-specific restoration planning alternatives and fails to consider the effects of climate change on the SSA relative to the effects of climate change in the broader focus area or other areas that serve the same allegedly injured populations of affected species. PEIS/RP, p. 4-27.	3 - Augment Analysis	See response to comment 155.
157	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Climate Change	This discussion of climate change fails to address the fact that the most likely, and most project-specific, impact of climate change is of temperature increases in the surface water. By failing to discuss the potential for surface water temperature increases to impact individual projects, the discussion of climate change in the PEIS/RP does not provide sufficient framework for evaluating future individual projects and fails to satisfy this aspect of the statement of purpose and need.	3 - Augment Analysis	See response to comment 155.
158	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Climate Change	Climate change, in the form of surface water temperature increases, will have the greatest impact in the SSA relative to the broader focus area and to other areas that serve the same allegedly injured populations of affected species. Surface water temperatures in the SSA are already warmer than in these other areas and are the most likely to be impacted by further temperature increases. Temperature is the leading source of water quality impairment in the Lower Willamette River, where 82% of the stream extent exceeded temperature standards in a 2009 study. DEQ, Willamette Basin Rivers and Streams Assessment, p. 50 (2009). Therefore, the success of an individual project in the SSA will depend in large part on whether the resulting habitat will continue to function at increased temperatures. This greatly diminishes the likelihood of success of actions in the SSA relative to areas that are less impacted by climate change. This is especially true for projects targeting juvenile Chinook, for which temperature is one of the most critical habitat components.	3 - Augment Analysis	See response to comment 155.
159	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Fish	The PEIS/RP should consider whether, rather than actions that encourage juvenile Chinook to spend more time in the warmer waters of the Lower Willamette River, actions that provide habitat in cooler waters.	5(a) - Explain why no response / change	The amount of time that juvenile Chinook spend resting and rearing in the Lower Willamette, including the Portland Harbor area, is critical to their growth and survival. Seeking to limit the amount of time that salmon spend in this area does not acknowledge this important phase of the salmon life cycle. Instead, the Trustee Council seeks to improve the availability and condition of this resting and rearing habitat, recognizing that this phase of the life cycle cannot be abbreviated.

ID	Author	Affiliation	Category	Comment	Response Type	Response
160	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Economics	The PEIS/RP further states that the Portland Harbor only contains three sites that meet the PBA report's criteria as regionally important. The PEIS/RP says that, since none of those sites are proposed for restoration projects, "it is unlikely that restoration implemented under this alternative would cause land use conversion that would have a moderate or major adverse effect on the industrial economy." PEIS/RP, p. 4-5. This so-called socioeconomic analysis is both shallow and wrong.	5(b) - Resp is in Report	See Narrative Response 3.2.2.
161	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Economics	The PBA study had a very particular purpose and a limited focus that had nothing to do with assessing general economic impacts from converting industrial land in the Portland Harbor to restoration projects. The study was narrowly designed to inventory large parcels (over 25 acres and over 50 acres, specifically) of development-ready land that could be used to recruit nationally and globally-scaled companies in the traded-sector economy. Nothing in the study suggests that other types and sizes of industrial parcels are not important, and there is absolutely no support in the PBA study for concluding that the Portland Harbor Restoration Plan will have only minor impact on the industrial economy. Id. at 2	5(b) - Resp is in Report	See Narrative Response 3.2.2.
162	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Economics	Furthermore, Mr. Clemons explicitly says it is "not a correct conclusion" to say that sites exceeding 25 acres in size are "the only sized sites that are 'substantially important' to the region's industrial land supply" and further notes that "[f]rom an economic development perspective, there is consensus that a community needs to have a variety of site sizes in their inventory in order to meet the needs of expanding and new companies." Id. at 3. In fact, demand appears to be considerable for smaller parcels of land.	5(b) - Resp is in Report	See Narrative Response 3.2.2.
163	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Economics	The PEIS/RP thus cannot legitimately conclude that there will be "only minor, if any, adverse economic impact through conversion of industrial land to restoration use" based on the PBA study. Indeed, Mr. Clemons concludes his letter by recommending that either the PEIS/RP be amended "to more accurately reflect the intent of the [PBA] Project, or to delete reference to it at all as a rationale for findings." Id. In addition, the Commenters understand that the PBA, itself, is submitting comments to the Trustees directly, stating that the PEIS/RP has completely missed the mark in terms of its interpretation of the scope and purpose of the Mackenzie study and as a result has also missed the mark in terms of trying to extrapolate its conclusions to fit with the Trustees' premise.	5(b) - Resp is in Report	See Narrative Response 3.2.2.
164	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Economics	The PEIS/RP contains another surprising statement about the impact of its restoration requirements on the working harbor. The PEIS/RP asserts that "[b]ased on preliminary estimates of the amount of restoration likely needed to compensate for any loss to potentially injured species, the Trustee Council is aware that access to sufficient land has already been secured that does not require conversion of land from an industrial use." PEIS/RP, p. 4-24. There is absolutely no explanation offered or basis provided to support this statement. Nor is there anything in the Trustees' restoration portfolio that supports the claim that sufficient land has been "secured" for restoration.	3 - Augment Analysis	See response to comment 121 and Narrative Response 3.2.2.
165	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Economics	Furthermore, nearly all of the harbor sites proposed for restoration projects are currently zoned for industrial use and are within an industrial sanctuary. In fact, the Trustees somewhat ironically note that the "threat of development" is a possible limitation on restoration for many of the parcels. It is not surprising that developable industrially-zoned land within the heart of Portland Harbor would be under threat of development. Thus, using these properties for restoration projects would inevitably result in an impact on industrial uses and land use conversion.	5(b) - Resp is in Report	See Narrative Response 3.2.2.
166	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Recreation	The PEIS/RP states that the Lower Willamette River generates \$34.7 million in local and travel expenditures annually in the Portland metropolitan area. PEIS/RP, p. 3-4. In fact, the report on which the PEIS/RP relies explains that those expenditures are for the entire Portland Metro/Columbia area, including the West Multnomah, Columbia, Washington and West Clackamas Counties, not just the Lower Willamette River. Dean Runyan Associates, Fishing, Hunting, Wildlife Viewing, and Shellfishing in Oregon: 2008 State and County Expenditure Estimates, pp. 11-13 (May 2009).	4 - Factual Corrections	Thank you for this comment. The Trustee Council has reviewed and made edits to the text in Section 3.3.
167	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Environmental Justice	Although the PEIS/RP does not have information to reach any conclusions about proportionate reliance on fishing as a source of food, the Commenters agree that serious attention should be paid to this risk pathway.	5(a) - Explain why no response / change	No response necessary.
168	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Environmental Justice	But it is also important to consider that these same environmental justice populations stand to be adversely impacted if the result of the development of restoration projects is that new businesses cannot be developed or that existing businesses cannot be expanded in the Harbor. For example, Attachment E provides the ethnic composition of the workforce of a water-dependent employer with approximately 1,000 employees in the Portland Harbor as compared to the U.S. Census of ethnic populations in Multnomah County. The comparison of that data demonstrates that this workforce is more diverse than the Multnomah County population. Thus, if restoration projects have a negative impact on jobs that attract the same workforce, then environmental justice populations will be disproportionately negatively impacted by those projects.	5(a) - Explain why no response / change	See Narrative Response 3.1.7.

ID	Author	Affiliation	Category	Comment	Response Type	Response
169	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Economics	<p>Section 4.3.2 of the PEIS/RP states: “Activities required to maintain industrial facilities and uses (such as dock maintenance, slip dredging, etc.) as well as dredging that is required to maintain the Willamette River’s navigational channel, are already regulated through the ESA and other laws. Since ESA-listed species are already present and utilizing habitats within the harbor, no additional regulation or restriction is anticipated to result from restoration of habitat in the area; therefore, no adverse effect is anticipated on industrial and shipping activities.” PEIS/RP, p. 4-6.</p> <p>This statement is deficient because there is no data analysis or evaluation of SSA restoration projects in relation to Harbor water-dependent activities to support it. Specifically, there is no analysis of impacts or potential restrictions on operational and maintenance activities. Analysis should be conducted on the impact to ongoing and future Harbor operations and activities from the siting, construction and maintenance of in-Harbor restoration projects through either potential restrictions or interference with development or maintenance of existing facilities and structures, ship traffic speeds, wakes, ship movements, maintenance dredging and other operational activities. It is difficult to understand how the PEIS/RP can conclude that no additional regulation or restriction will apply without a complete review of such existing operational or maintenance activities.</p>	5(a) - Explain why no response / change	The purpose of PEIS/RP is to describe the Trustee Council's proposed approach to developing and evaluating restoration activities to compensate for injury to natural resources in Portland Harbor. It is not possible at this stage to analyze the potential effects of potential future projects to all ongoing and possible future activities. Because of the fact that ESA-listed Chinook salmon are already present in the Harbor and activities with a Federal nexus are already subject to review and regulation under the ESA, the Trustee Council has concluded that no significant impact on activities listed by the commenter is reasonably foreseeable. Also responds to comment 171.
170	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Economics	For example, given that the Trustees have put together a portfolio of in-Harbor restorations projects, the PEIS/RP could conduct a NEPA analysis of a minimum of two of the proposed in-Harbor projects based on an inventory of the operational and maintenance activities that occur in proximity to those projects.	5(a) - Explain why no response / change	To include a detailed analysis of a minimum of two of the potential restoration sites in the portfolio is outside of the scope of this PEIS which aims to create a framework for restoration planning.
171	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Economics	Also, it is counterintuitive to conclude that the restoration projects would add “no additional regulation or restriction” given that any analysis required for a permit under Section 404 of the CWA for activities required to maintain the industrial facilities and uses would need to include impacts based on then-existing conditions, which would include the restoration project.	3 - Augment Analysis	See response to comment 169.
172	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Economics	Nor does the PEIS/RP show that the Trustees have gained approval and documentation from the other permitting agencies (ACOE, NOAA, USFWS, DEQ, ODSL, ODFW) that in-Harbor constructed restoration sites would result in no additional regulation or restriction.	5(a) - Explain why no response / change	The draft Restoration Plan has undergone consultation with National Marine Fisheries Service under Section 7 of the Endangered Species Act (30 January 2015). USFWS and ODFW are cooperators in development of the draft Restoration Plan. Although the Trustee Council is not required to seek "approval" from these other agencies at this conceptual plan level, NOAA, USFWS and the State of Oregon are Natural Resource Trustees and have participated in the development of the draft plan. As appropriate, specific restoration actions that move forward pursuant to this plan will need to seek authorization from the relevant permitting agencies.
173	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Economics	<p>The PEIS/RP also states: “A long-term major beneficial impact may result from restoration of these critically important habitats if it contributes to the recovery and ultimate de-listing of the species, as regulation of harbor activities under the ESA would be reduced or eliminated as a result of de-listing.” PEIS/RP, p. ES-5.</p> <p>A PEIS/RP cannot rely on speculative impacts. See <i>Robertson v. Methow Valley Citizens Council</i>, 490 U.S. 332, 356 (1989) (an EIS should focus on reasonably foreseeable impacts, not those that are highly speculative). In order to consider such a possible impact, the PEIS/RP would need to provide a strong basis for the expectation that ESA species will be de-listed as a result of the proposed restoration actions. It seems unlikely given that the listed salmonids that pass through the Portland Harbor are subject to many more stressors than the 12-mile stretch of the SSA. If it cannot be supported, the statement should be removed from the PEIS/RP.</p>	3 - Augment Analysis	We have removed the reference to de-listing and reduction of ESA regulation from the PEIS/RP.
174	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Cost-Benefit/Feasibility	Finally, the PEIS/RP also needs to analyze the probability of long-term success of the proposed restoration projects given the projected impact of both ongoing and future harbor operations and activities, through either recontamination or interference with the restoration project objectives (e.g., new ship traffic, increased erosion from waves).	5(a) - Explain why no response / change	The Trustee Council agrees that potential for recontamination of restored sites, as a result of ongoing or future harbor activity or Superfund cleanup activity, is an important consideration in site selection. Because specific restoration sites have not yet been selected, it is not possible to perform the analysis suggested by the commenter. Also see Narrative Response 3.1.6.

ID	Author	Affiliation	Category	Comment	Response Type	Response
175	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Geographic Scope	<p>The PEIS/RP is inadequate in its evaluation of potential impacts from recontamination, potential impacts from natural hydrodynamic forces (e.g., river flow, flooding, erosion), sedimentation (accretion in newly developed tributary openings), or hydrologic analyses from upland runoff and storm drains to the proposed restoration projects within the SSA project impacts. The PEIS/RP should, at a minimum, evaluate in general the potential impact of ongoing industrial and urban sources on restoration projects within the SSA, including runoff from roads, through storm and sanitary sewers into the river, and of municipalities for sewage operations and overflows into the river. The Trustees should consider in this regard the example of the Hylebos Waterway, where polychlorinated biphenyls have recontaminated that working waterway six years after the initial cleanup.</p> <p>To evaluate the potential for recontamination, the PEIS/RP should consider information provided in the Lower Willamette Group's draft feasibility study ("FS") and other documents regarding surface water transport of contaminants, sediment transport, stormwater inflows, upriver contributions, and upwelling from near shore contaminated sites. The PEIS/RP should also consider the impacts from recontamination associated with the range of dredging alternatives described in the draft FS.</p>	5(a) - Explain why no response / change	See Narrative Response 3.1.6.
176	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Monitoring and Stewardship	The PEIS/RP does not provide sufficient details on the scale and rationale for the monitoring and stewardship discussed, and in its current form denies the public and interested parties an adequate opportunity to provide scientific or technical comment. The absence of specific details on the proposed monitoring frequency, duration, scale and methods constrains the ability to tier or structure individual actions on the PEIS/RP.	3 - Augment Analysis	See response to comment 063.
177	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Monitoring and Stewardship	The monitoring framework for evaluating the potential benefits from restoration projects is vague on details with respect to goals and objectives, and the PEIS/RP is confusing by stating the need for a coordinated monitoring effort with varying sampling plans.	3 - Augment Analysis	See response to comment 063.
178	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Monitoring and Stewardship	The PEIS/RP also fails to develop goals and objectives for the restoration projects. By not clearly developing goals and objectives, it is not possible for the Trustees, or the reader, to conduct an adequate analysis under NEPA regarding short- and long-term impacts.	3 - Augment Analysis	See response to comment 063.
179	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Monitoring and Stewardship	Additionally, the PEIS should discuss how the monitoring framework meets, or is in compliance with, Statewide Planning Goal 5 or other State of Oregon statutory requirements.	3 - Augment Analysis	See response to comment 063.
180	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Monitoring and Stewardship	Also, as discussed in Part III.D.2, the PEIS/RP fails to consider the balance between a project's environmental costs and its anticipated benefits, here, with respect to the costs of project monitoring. Because there is no detail on how the projects will be monitored, it is not possible to evaluate project cost benefits against other projects.	3 - Augment Analysis	See response to comment 063.
181	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Monitoring and Stewardship	The Trustees should provide for public review a more detailed monitoring plan that clearly states the monitoring methods, procedures, duration, frequency and performance criteria for each type of project.	3 - Augment Analysis	See response to comment 063.
182	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Monitoring and Stewardship	Furthermore, the PEIS/RP indicates that the performance criteria will identify values that indicate the project is on a "positive trajectory" and will identify a timeframe in which the criteria should be met but fails to define what would constitute a positive trajectory. For example, there is no scientific basis provided for examining a positive trajectory. These performance criteria should already be identified and should be made available and clearly stated to the public.	3 - Augment Analysis	See response to comment 063.
183	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Monitoring and Stewardship	The performance criteria and monitoring efforts should also be appropriate for the biological endpoint. For example, there should be a correspondingly short monitoring period for organisms that are short-lived or that rapidly recruit juveniles into the population (e.g., benthic organisms).	3 - Augment Analysis	See response to comment 063.
184	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Monitoring and Stewardship	Further, the high level of Trustee involvement in direction, review, and approval of the proposed restoration projects must be reflected in the choice of monitoring parameters, performance standard endpoints, and overall monitoring effort. The Trustees are in effect co-designers of the restoration actions and will have dictated specific design criteria for the restoration projects, including possibly their geographic location. Therefore, the Trustees should not overly burden the restoration proponent with monitoring activities to guarantee ecological functions when many of the crucial design decisions will have been made by the Trustees themselves.	5(a) - Explain why no response / change	The Trustee Council has provided a Monitoring and Stewardship Plan framework that will guide the development of site-specific monitoring plans (see response to comment 063).
185	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Monitoring and Stewardship	Unfavorable results are most probably due to inappropriate projects or catastrophic events, neither of which should be the responsibility of those funding the restoration project.	5(a) - Explain why no response / change	No response necessary.

ID	Author	Affiliation	Category	Comment	Response Type	Response
186	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Recreation	The Commenters believe that the “recreational use” losses that the Trustees intend to address through potential restoration projects are likely to be quite small, if they exist at all, given that this is, and will remain, a working industrial harbor. Such limitations for recreation need to be considered in evaluating either potential losses or gains.	5(a) - Explain why no response / change	The comment refers to information not included in the Draft PEIS/RP. However, the Final Draft PEIS/RP will include summary information with regard to the NRDA process and HEA analysis.
187	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Recreation	In considering both potential recreation losses and potential restoration gains is it important to consider that there are ample “substitutes” for any recreational use of the Harbor. Given the quite small alleged loss, it is the Commenters’ belief that any potential recreational losses could be subsumed in habitat restoration projects. Such a strategy would enable recreational uses to be addressed in ways that lead to fewer potential conflicts with ecological service projects and more cost-effective restoration overall, an important criterion contained in the 43 C.F.R. Part 11 regulations.	5(a) - Explain why no response / change	The comment refers to information not included in the Draft PEIS/RP. However, recreation losses and restoration are briefly addressed in Section 5.2 Restoration Objectives and Process and Section 5.6 Recreational Resource Restoration Types.
188	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Damage Calculation	Footnote 1: The PEIS/RP should explain in further detail how juvenile Chinook serve as an adequate surrogate for other allegedly injured species in the Portland Harbor.	3 - Augment Analysis	See Narrative Response 3.1.4.
189	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Purpose and Need	Footnote 6: Note that agencies cannot define the purpose and need so narrowly as to unreasonably limit the alternatives that would meet these goals. Nat’l Parks & Conservation Ass’n v. Bureau of Land Mgmt., 606 F.3d 1058, 1070 (9th Cir. 2010). This precludes a purpose and need statement that would restrict the scope of the PEIS/RP to actions within the project area, excluding all other possible alternatives.	5(a) - Explain why no response / change	The purpose and need statement does not limit alternatives to within the project area. It does, however, incorporate the need for a strong nexus between injury and restoration. Alternatives that cannot provide that nexus would not meet the purpose and need for the action.
190	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Economics	Footnote 14: In discussing the “Relationship Between Short-Term Uses of the Human Environment and the Enhancement of Long-Term Productivity,” the document says that the chosen restoration planning alternative “would involve some short-term, localized effects to the environment, but these short-term effects would be offset considerably by improvements in long-term productivity of habitats and human uses such as recreation and aesthetic enjoyment. No adverse effects to long-term productivity are expected.” PEIS/RP, p. 4-18. This discussion is clearly limited to “environmental” factors, without considering the long-term productivity of the working harbor.	5(a) - Explain why no response / change	The requirement to review the “Relationship Between Short-Term Uses of the Human Environment and the Enhancement of Long-Term Productivity” is found at 42 USC 4332(2)(C). Reviewing this statute, it is plain that “long-term productivity” refers back to the phrase “man’s environment.” The comment asserts that we have not considered the long-term productivity of the working harbor, only “environmental factors.” The Trustee Council asserts that “environmental factors” are exactly what is necessary to consider under 42 USC 4332(2)(C) and not the economic issues associated with impacts on the “working harbor.”
191	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Economics	Footnote 15: As discussed below in Section IV.B.4, the Commenters are also concerned that restoration projects will impact navigation and commerce in the river. These concerns would be eliminated if the Trustees could say that they “will not” approve any restoration project that has an impact on navigation or commerce (e.g., that would require larger “no wake” zones, or that would cause there to be increased requirements in order to undertake maintenance dredging, or that would cause there to be increased requirements for a water discharge permit). However, the PEIS/RP does not say the Trustees “will not” approve any such restoration project, but rather that they do not “anticipate” such effects.	5(a) - Explain why no response / change	Thank you for your comment. At this programmatic level of analysis, it would be too difficult to foresee all possible permutations of restoration projects that may be proposed. Additionally, NOAA and the Trustee Council are not willing to set a rule in the PEIS/RP that they would reject a restoration project solely on the basis that it may have an adverse impact on navigation or commerce. While it is true NOAA does not anticipate the types of adverse impacts the commenter is concerned with, decisions about each project will be made on a site specific basis.
192	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Economics	Footnote 22: The Trustees should also consider Portland City Council’s recently adopted forecast for the City’s housing and employment supply, which found that the City will be short of land for industrial and manufacturing/production uses—particularly with respect to Portland Harbor industrial lands. City of Portland Bureau of Environmental Services, Media Release: Forecasts for Portland’s Population and Job Growth Adopted by City Council (Oct. 3, 2012).	5(b) - Resp is in Report	See Narrative Response 3.2.2.
193	Snyder, Joan (Stoel Rives)	16 Phase 2 Participating Parties	Economics	Footnote 23: Yet, at the same time, the PEIS/RP says that there will be moderate to major positive impacts on flood control. PEIS/RP, p. 4-20. It is difficult to imagine how there could be enough restoration within the Portland Harbor to create such significant benefits for flood control without having a corresponding negative impact on existing industrial uses.	3 - Augment Analysis	The Trustee Council agrees with this comment. In light of information now available about the amount of restoration that will likely occur as compensation for releases of hazardous substances in Portland Harbor (see cumulative effects section), the Trustee Council has revised the effects determination from "moderate to major positive impacts on flood control" to "minor positive impacts on flood control".

3. NARRATIVE RESPONSES

3.1 RESPONSES TOO LONG FOR INCLUSION IN THE RESPONSE TABLE

3.1.1 Comment 011

Response:

The Portland Harbor Natural Resource Trustee Council (Trustee Council) shares the commenter's concerns with respect to the potential negative impacts to native species that may occur as a result of clean-up actions. Because the Trustee Council conducted its initial settlement-oriented damage assessment well in advance of the selection of remedial actions by the Environmental Protection Agency (EPA), we used conservative assumptions about clean-up action scenarios as inputs to our injury model. "Conservative" in this context means we assumed a clean-up scenario that relies primarily on monitored natural recovery as opposed to, for example, sediment removal. The use of this assumption results in a calculation of injuries that is higher than would be the case for more aggressive clean-up scenarios. Thus, the amount of restoration required to compensate the public for lost ecological services is also higher.

As EPA gets closer to selecting actual clean-up actions, the Trustee Council will work closely with EPA to ensure our concerns with respect to impacts to natural resources resulting from such actions are heard and understood. In so doing, we hope to encourage the selection of remedial actions that provide a long term benefit to the ecological function of the system. In instances where remedial actions have the potential to result in substantial natural resource damages, the Trustee Council may, in fact, contemplate the development of claims for such damages.

3.1.2 Comments 018, 054 and 076

Response:

Under 40 C.F.R. § 1501.7 (a) (1), the lead federal agency is directed to invite affected American Indian Tribes to participate in the NEPA scoping process. When an action will have primarily local effects, public notices for NEPA-related hearings, public meetings, and the availability of public documents may include specific notice to an American Indian Tribe where the effects of the action may occur on the Tribe's reservation. 40 C.F.R. § 1506.6 (b) (3) (ii). Moreover, federal agencies are required to solicit comments on a draft environmental impact statement from an American Indian Tribe when the effects of the proposed alternative may occur on the Tribe's reservation. 40 C.F.R. § 1503 (a) (1) (ii).

Here, pursuant to 40 C.F.R. § 1501.7 (a) (1), NOAA coordinated with affected American Indian Tribes during the NEPA scoping process. The Trustee Council includes five Tribal sovereign nations. Each of the five Tribes participated in the development of the Draft and Final PEIS/RP as cooperating parties. Although not a member of the Trustee Council, the Confederated Bands and Tribes of the Yakama Nation is a trustee for natural resources in Portland Harbor and, as an affected American Indian Tribe, was provided with a copy of the Draft PEIS/RP. During the NEPA process, the Trustee Council did not identify any effects related to the preferred alternative that would result in effects on any American Indian Tribe's reservation and, therefore, the notice and comment solicitation provisions of 40 C.F.R. §§ 1503 (a) (1) (ii) and 1506.6 (b) (3) (ii) discussed above were not applicable.

Nonetheless, the Trustee Council conducted extensive public outreach in an effort to inform and obtain information from all interested members of the public, including those who identify as Native American. The following is a list of outreach and coordination with Native American Tribes.

- 5/19/2009 – Members from the Confederated Tribes of the Grand Ronde Community of Oregon and staff from NOAA’s Restoration Center and USFWS led a series of activities related to the Portland Harbor Superfund site for approximately 10 Salmon Club students from Native American Youth and (NAYA) Family Center. NAYA is an urban Indian agency that serves self-identified Native American youth and their families throughout the Portland, Oregon, metropolitan area.
- 8/6/2009 – Members from the Confederated Tribes of the Grand Ronde Community of Oregon, the Columbia Slough Watershed Council, and NOAA’s Restoration Center led educational activities to familiarize 25 students from NAYA Family Center’s Summer Camp Program with natural resources that will be restored through the Portland Harbor Natural Resource Damage Assessment (NRDA) case.
- 4/17/2012 – Representatives from the Nez Perce Tribe, Confederated Tribes of the Grand Ronde Community of Oregon, and NOAA Restoration Center met with staff from Groundwork Portland, NAYA, Latino Network, and other groups to discuss strategies for reaching more diverse communities with accurate information about the Portland Harbor Superfund site and raising awareness about the environmental justice issues at the site. This and subsequent meetings led to formation of the Portland Harbor Community Coalition (PHCC), a group of individual community members, community of color organizations, conservation organizations, environmental justice organizations, higher educational institutions, and Native organizations, all invested in the outcome of the Willamette River’s Superfund site cleanup. Core partners of PHCC include the American Indian Movement (AIM), Wiconi International, and Wisdom of the Elder. NAYA is a supporting partner of the Coalition.
- 3/11/2013 – Two members of the Trustee Council’s restoration committee led a presentation and discussion for Portland Harbor Community Coalition members about the natural resource damage assessment process and restoration planning at the Portland Harbor Superfund site.
- 5/6/2013 and 6/5/2013 – The Trustee Council’s outreach coordinator co-led Portland Harbor 101 workshops for members of the Portland Harbor Community Coalition. At the May 6th workshop there were about 20 attendees, most were tribal members from organizations such as NAYA, Wiconi International, Wisdom of the Elders, and the AIM. The June 5th workshop drew a crowd of about 25 individuals. Live Spanish language interpretation was provided for nearly half of the group, who was affiliated with the Latino Network.

In addition to the events above, ongoing outreach by the Trustee Council to the general public includes quarterly newsletters, maintenance of an email list that includes approximately 300 subscribers, hosting and attending public meetings, press releases, regular attendance and annual presentations at the Portland Harbor Community Advisory Group’s monthly meetings, occasional attendance at Portland Harbor Community Coalition meetings and events, tabling at various river-focused community events in Portland (such as SeaPort Celebration, Sundown at Ecotrust, RiverFest, and others) and maintaining a website for the public.

3.1.3 Comments 022 and 131

Response:

Within the framework of the Oil Pollution Act (OPA) and the Comprehensive Environmental Response, Compensation, and Liability Act, (CERCLA) trustees have discretion in the selection and siting of restoration projects that will address injuries to natural resources. The Trustee Council made a policy determination that restoration within the Portland Harbor Superfund Study Area (SSA) is the

highest priority for compensatory restoration because the Trustee Council prefers that habitat restoration occur in close proximity to the site of the injury - and the SSA is the location where injury to natural resources as a result of Portland Harbor hazardous substance releases is most proximate (see Section 4.4 of the Draft and Final PEIS/RP). Restoring habitat as close as possible to the location of resource injuries is the strategy most likely to produce ecological benefits for the species and species life stages most directly affected by the contamination. As a result, the Trustee Council originally envisioned *all* natural resource restoration occurring within the SSA.

It was only in response to concerns raised by some potentially responsible parties (PRPs) that the Trustee Council considered whether there was a technical basis to enlarge the geographic area where restoration could occur. In the fall of 2009, the Trustee Council asked four individuals knowledgeable about juvenile salmon and juvenile salmon habitat to provide the Trustee Council with their views on the following issues:

- ecological values that the Trustee Council had assigned to various habitat types related to juvenile Chinook salmon;
- other key ecological attributes for juvenile Chinook salmon habitat not addressed by the Trustee Council; and
- appropriate sites for compensatory restoration for juvenile Chinook salmon outside the SSA.

The Trustee Council, however, did not convene the group to independently delineate the geographic boundaries for restoration. Rather, the Trustee Council determined the geographic boundaries for restoration for the reasons cited. Based on the technical information received from those individuals, the Trustee Council decided to expand the area for compensatory restoration beyond the SSA. This change in restoration policy permits up to fifty percent of each potentially responsible party's restoration liability to be fulfilled in areas outside of the SSA.

One commenter questioned the participation of two of the individuals in the group queried by the Trustee Council alleging that they were policy advocates strongly in favor of establishing restoration projects within Portland Harbor. The fact that one or more of the individuals in the group may hold strong views is not a per se reason to exclude the input of that individual, particularly if that person has site-specific information. Furthermore, the technical information provided by the group and considered by the Trustee Council contributed to in a *decrease* in the amount of restoration required within the SSA.

3.1.4 Comment 031, 037, 069, and 188

Response Regarding HEA Methodology:

The Trustee Council is conducting a natural resource damage assessment of injuries associated with sediment contamination in the lower Willamette River in Portland, Oregon. To encourage cooperation with potentially responsible parties during the NRDA process, the Trustee Council is following an iterative, phased approach. Phase 1 focused on the development and completion of the Assessment Plan (and associated Work Plan). Phase 2 – the current phase – is focused on the cooperative implementation of the settlement-oriented Work Plan using existing data and injury quantification frameworks. Phase 3 will conclude the settlement-oriented NRDA. Finally, Phase 4 will focus on recovery of damages from non-settling potentially responsible parties.

The Trustee Council is engaged in efforts to restore resources that have been lost over time, with a particular emphasis on juvenile salmon, Pacific lamprey, mink, bald eagle and the habitats and food webs upon which these species rely. To assess ecological losses in Phase 2, the Trustee Council conducted a habitat equivalency analysis (HEA) using measured concentrations of contaminants in sediment as indicator of ecological injuries. This approach is specific to the Phase 2 process and will

not necessarily be used in any subsequent damage assessment phases. In this approach, rather than designing and implementing primary injury studies, which require time-consuming, extensive and costly scientific investigations, the Trustee Council opted to use existing sediment chemistry-based models developed for the Commencement Bay NRDA in Tacoma, Washington. These models rely primarily upon benthic invertebrate toxicity effects endpoints, but also include fish effects endpoints based, in part, on injury studies conducted by the Commencement Bay Trustees. Sediment chemistry-based HEAs are commonly used in settlement-oriented, cooperative NRDA.

As with any such HEA, Trustees must also contemplate the relative ecological value an area of habitat would provide in the absence of contamination. For the Portland Harbor NRDA, the Trustee Council used a layer of relative habitat values based on the forage and resting needs of out-migrating juvenile Chinook salmon, a threatened species under the Endangered Species Act (ESA). These relative habitat values are used to adjust the baseline level of services within the assessment area.

Using the inputs described above, the Trustee Council quantified a total amount of ecological service loss in units of discounted service acre years, or DSAYs. Natural resource damages associated with ecological service losses can thus be resolved via the development of habitat restoration projects that generate an equivalent number of DSAYs. While the Trustee Council is pursuing habitat restoration projects with functional elements that provide benefits to juvenile salmonids, we have also evaluated the extent to which such projects will provide benefits to other species (juvenile Pacific lamprey, bald eagle, mink). These other species were identified in the Ecological Risk Assessment and by the Trustee Council as those species most likely to be injured from contaminants released into the Harbor. Because two of the species (mink and eagle) are sensitive to bioaccumulative contaminants and are high trophic level feeders, their protection helps ensure that other species lower in the food chain will also be protected. For this reason, bald eagle and mink are considered indicator species for other birds and mammals in the Harbor. The Trustee Council determined critical habitat components for these species and then identified the habitat features that salmon, lamprey, mink, and bald eagles all require or derive benefits from when present within their territory. These evaluations indicate that salmonid-focused restoration projects will provide many direct benefits to other potentially injured species. In addition, the Trustee Council will incorporate, where feasible, design elements into restoration projects that may specifically benefit potentially injured, non-salmonid species, such as adding upland perch trees for birds and den sites for mammals.

Response Regarding Consideration of Habitat Interactions in Draft PEIS/RP:

The Draft PEIS/RP includes a substantial amount of information on habitat preferences for salmon (based on information from a group of scientists knowledgeable about juvenile Chinook), mink and eagle (from Wildlife Advisory Group), and for other species where (potential) injury is currently unquantified. The Draft PEIS/RP describes how the Trustee Council used a species guild approach to address species most likely to have been injured (using surrogate species and top predators) rather than study every potentially injured species. The Draft PEIS/RP identifies the specific types of habitats that benefit these species and indicates where restoration projects aimed at benefitting these species could be located. Thus, the Trustee Council asserts that the scientific rationale regarding how specific habitat characteristics overlap and will benefit many species (including potentially injured species) has already been well articulated in the Draft PEIS/RP. Following are relevant excerpts from the Draft PEIS/RP:

- Criteria used to identify the ecological benefit of a potential restoration action were developed separately for fish and wildlife species and overlap where appropriate. The Trustee Council identified salmon, steelhead, lamprey, and sturgeon as the target fish species, and bald eagle, osprey, spotted sandpiper, and mink, as the target wildlife species. These species were selected because they represent species guilds common in Pacific Northwest river systems that share similar types of habitats, and/or because

these species may have been injured by releases of hazardous substances or oil in Portland Harbor. [p 7-6 lines 38-42 and 7-7 lines 1-2]

- Restoring habitat attributes for these representative species would also benefit other aquatic-dependent wildlife groups, including amphibians and other waterbirds, because many habitat characteristics along the river are shared by these species. It should be noted that selecting these representative species for identifying initial restoration attributes does not mean that injury will be quantified for all species during the assessment. [p 7-10, lines 10-15]
- A recurring theme identified for all four representative species was lack of shallow water and wetland habitat that provides foraging opportunities for these species; shallow water and wetland habitat were also previously identified as highly beneficial to salmonids. [p 5-6, lines 37-39; p 7-10, lines 27-30]
- Preferred riparian width identified for bald eagles...supplies suitable perch habitat for foraging and territory defense, as well as providing buffers from human disturbance. [p 5-7, lines 21-24] This [riparian] habitat provides perching and nesting sites for birds such as bald eagle and osprey, and also provides habitat for mammals that also use riparian areas for feeding, such as mink and river otter. [p 5-7, lines 28-31]
- Following the identification of initial criteria and restoration attributes for wildlife, the Trustee Council convened a Wildlife Advisory Group in 2010 to conduct a site visit to ground-truth and refine these attributes and to identify limiting habitat for some of the representative wildlife species. [p 7-10, lines 16-19]
- This information helped confirm that an integrated habitat restoration approach focusing on restoring limiting habitat features and services could be highly beneficial to any potentially-injured trust resources. [p 7-10, lines 30-32]
- The sites included in the portfolio have been screened against the criteria developed by the Trustee Council and have been found to provide some potential benefit to key species including other potentially injured species such as mink and bald eagle. [p 7-1, lines 21-23]

3.1.5 Comment 102

Response:

This comment appears to be based on a misunderstanding of the Trustee Council's preferred alternative. The preferred Integrated Habitat Restoration Planning Alternative does not limit restoration projects to the 12-mile stretch of Portland Harbor as suggested by the commenter. Rather, the preferred alternative would specifically allow restoration projects to occur within a much broader geographic area that encompasses 26 miles of the lower Willamette River, as well as Multnomah Channel and portions of the Columbia River (See Figure 1-1). The Trustee Council determined that restoration within this geographic focus area supports ecological function and provides a strong nexus to the site of the injury and the resources, including specific species and life stages, potentially injured by contaminant releases within the Portland Harbor assessment area. In addition to NOAA's preference for restoration that is proximate to the injury, one of the potentially injured populations of species (Chinook salmon) is listed under the ESA, and critical habitat has been designated for this species within the Portland Harbor area. The critical habitat located within the Portland Harbor area is used by juvenile Chinook salmon to rest and rear in preparation for entry into the lower Columbia River estuary. Thus, this critical habitat provides unique functions and features for a particular life stage of an ESA-listed species and cannot be replaced by habitats that support other life stages. In 2009, the Trustee Council convened a group of scientists knowledgeable about juvenile Chinook that

considered the relative importance of habitats within Portland Harbor to ESA-listed juvenile Chinook. These experts helped the Trustee Council identify the areas outside of the SSA that would provide the most benefit to the potentially injured species and life stage; these identified areas make up the Broader Focus Area.

The commenter suggests that the Trustee Council consider an alternative that would benefit specific populations of injured species and match the ecological needs of these species. The Trustee Council believes that the preferred alternative accomplishes what the commenter is requesting with the “Integrated Habitat Approach Within Geography Supported by Ecological Function” alternative (See the Final PEIS/RP, Section 2.2).

Additionally, the cases cited by the commenter for the proposition that the Trustee Council must consider additional alternatives “given the broad scope of the actions that will fall under the PEIS/RP” are entirely distinguishable from the present action under consideration. For example, in *‘Ilo’ulaokalani Coal. v. Rumsfeld*, 464 F.3d 1083 (9th Cir. 2006), the “broad problem” for which an EIS was developed was the transformation of the 2nd Brigade in Hawaii into a Stryker Brigade Combat Team as part of a “major re-working of the United States Army.” 464 F.3d at 1087. The Ninth Circuit held that the government’s failure to consider alternatives that would allow such transformation outside Hawaii rendered its range of alternatives too narrow in violation of the National Environmental Policy Act (NEPA). The court noted that the range of alternatives is informed by the stated purpose and need for the project, and that the Army failed to explain why additional alternatives could not meet the broad purpose and need articulated by the Army in this case, namely to “transform” the Army in a way that enabled it to “achieve force characteristics articulated in the [programmatic transformation plan] in the most timely and efficient manner possible without compromising readiness and responsiveness... to address the changing circumstances of the 21st Century.” *Id.* at 1097-98. The Ninth Circuit concluded that because the Army’s broad purpose and need was not tied to the narrow geographic area considered in the EIS (i.e. the island of Oahu), the Army failed to consider reasonable alternatives outside Hawaii that could accomplish its goals. *Id.*

Similarly in *Natural Res. Def. Council v. Morton*, 458 F.2d 827 (D.C. Cir. 1972) (NRDC), the proposed action was developed to address the nation’s “energy demands” during the energy crisis of the 1970s. 458 F.2d at 831. The D.C. Circuit held that the government’s failure to consider alternatives other than the lease sale of 80 tracts of land under the Outer Continental Shelf Lands Act violated NEPA because there were other reasonable alternatives that could solve the “broad problem” under consideration.

Here, in contrast, the purpose and need articulated in the Draft PEIS/RP is necessarily narrower than that considered in *Rumsfeld* or *NRDC* and tied to a specific geographic location. As the Draft PEIS/RP states, the purpose of the Restoration Plan is to “provide guidance to the Trustee Council in its decision-making regarding the selection and implementation of restoration activities intended to compensate the public for any natural resource injuries resulting from the release of hazardous substances and oil from the [Portland Harbor] site.” Draft PEIS/RP at 1-2. The restoration of natural resources injured by contamination within a discrete area is entirely distinguishable from the “broad problem” of transformation of the U.S. Army under consideration in *Rumsfeld* or the response to U.S. energy demands in *NRDC*. Thus, the alternatives considered in the Draft and Final PEIS/RP represent a reasonable range of alternatives under NEPA.

The commenter fails to articulate how the Open Geography alternative considered but eliminated from further detailed analysis, or any other alternative that considers restoration within an area beyond the geographic focus area articulated in the preferred alternative would meet the stated purpose of this proposed project to address natural resource injuries due to the “release of hazardous substances from the [Portland Harbor] site.”

However, the Trustee Council determined it should indeed have described one additional alternative considered, but eliminated that alternative from further detailed analysis. The Final PEIS/RP has been amended to include the Study Area Planning Restoration Alternative which would allow for restoration to occur only within the SSA.

3.1.6 Comment 174 and 175

The Trustee Council acknowledges that the Portland Harbor Superfund area is highly urbanized, and is under ongoing threat of contamination from urban and industrial sources. However, the Council's Restoration Plan recognizes the Lower Willamette River as key mainstem migration habitat for ESA-listed species that have been potentially injured by contamination from Portland Harbor; as such, this area provides services that cannot be replaced by improving habitats elsewhere (also see 3.1.9). Despite some potential for ongoing contamination and/or recontamination resulting from cleanup actions, the Trustee Council has assumed that the implementation of EPA's cleanup plan will result in an overall lower level of contamination in the Lower Willamette than currently exists. The Trustee Council has also assumed that existing regulation of urban and industrial sources of contamination will persist into the future.

The modeling the commenter suggests would likely provide a poor representation of the potential for recontamination at individual restoration sites if done at the programmatic level of this evaluation. Given the priorities for restoration discussed in the Restoration Plan, most restoration would occur off-channel where it would be unlikely to receive much resettling of contaminated fines (in terms of relative mass), compared to the mass of fines flowing past the restoration areas or resettling in the mainstem deposition areas. Additionally, the degree of resuspension during dredging is typically small (the vast majority of resuspended sediments would settle close to the dredge area) but varies widely depending on the contaminant concentrations in sediment and method of dredging (see review by Palermo et al. 2008). Modeling potential dredging events that may occur in the future in the entire lower Willamette River would likely be unreliable, as it is unknown what method of dredging would be used or what the degree of contamination would be at a particular site to be dredged. Further, dredging in medium or high contaminated areas typically involve best management practices (BMPs) such as use of environmental clamshell buckets or silt curtains to minimize dispersal of resuspended sediments, and use of these BMPs would have to be accounted for in the model. Resettling of contaminated fines in off-channel habitats would likely be de minimus and potentially unmeasurable, with study results showing huge variability in predictions. This type of analysis is not appropriate at the scale of this programmatic evaluation; however, information provided in the Draft Feasibility Study regarding sediment transport, surface water transport, stormwater inflows and other potential sources of contamination may be considered, as appropriate, in evaluating and designing restoration actions on a site-specific basis.

Reference: Palermo, M.R., P.R. Schroeder, T.J. Estes, and N.R. Francingues. 2008. Technical guidelines for environmental dredging of contaminated sediments. U.S. Army Corps of Engineers, Engineer Research and Development Center, Environmental Laboratory, Vicksburg, Mississippi. 288 pp.

3.1.7 Comment 168

Response:

The impact identified in this comment is highly speculative and, as such, further analysis in the Final PEIS/RP is not appropriate. Pursuant to § 102 (C) of NEPA, 42 U.S.C. § 4332 (C), for any federal action that will significantly affect the quality of the human environment, federal agencies must evaluate the environmental impacts and environmental effects of the proposed action. In *Metropolitan Edison Co. v. People Against Nuclear Energy*, the United States Supreme Court stated that the key adjective in § 102 (c) of NEPA is "environmental." 460 U.S. 766, 772 (1983). "NEPA

does not require the agency to address every impact or the effect of its proposed action, but only the impact or effect on the environment.” *Id.* Similar to tort law, § 102 of NEPA requires “a reasonably close causal relationship between a change in the physical environment and the effect at issue.” *Id.* at 774. Thus, an EIS is required to “focus on reasonably foreseeable impacts” to ensure that the NEPA process provides “information and discussion on those consequences of greatest concern to the public and of greatest relevance to the agency’s decision, rather than distorting the decisionmaking [sic] process by overemphasizing highly speculative harms.” *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 356 (1989) (internal quotes omitted).

In the instant case, the impact raised by the commenter is not a reasonably foreseeable impact of restoration in Portland Harbor and, under *Robertson* and *Metro. Edison Co.*, further NEPA analysis is not warranted. The commenter asserts that restoration in Portland Harbor will foreclose the expansion of industry in Portland Harbor and, in turn, lead to job losses and decreased employment opportunities that will disproportionately affect minority populations. The commenter provides information regarding the ethnic composition of one Portland Harbor employer’s workforce and contends that this singular employer’s workforce is representative of the ethnic make-up of all employees working for businesses operating in Portland Harbor. The commenter provides no additional support for this broad assumption.

Moreover, the requisite close causal relationship between the proposed federal action and the impact of that action articulated by the Court in *Metro. Edison Co.* is not present. The alleged impact raised by the commenter, disparate negative economic effects on minority populations, is not closely related to the proposed action, habitat restoration in Portland Harbor. There is an intervening, equally speculative, impact in the chain of causation. For habitat restoration in Portland Harbor to disparately affect minority populations, as alleged by the commenter, the restoration must first foreclose opportunities for industrial expansion in Portland Harbor, which is also a highly speculative impact. The relationship between the changes in the physical environment in Portland Harbor resulting from the preferred alternative selected in the PEIS/RP and the negative impacts on the economic well-being of minority populations alleged by the commenter is too attenuated for analysis (See Section 3.2.2 of this report for a discussion of economic impacts).

3.1.8 Comment 103

Response:

The range of alternatives evaluated in the Draft PEIS/RP satisfy the stated purpose and need, and NOAA properly eliminated the Open Geography Restoration Planning Alternative from further detailed consideration because it was inconsistent with the nature and scope of the proposed action. NOAA is not adding the requested alternative titled “Integrated Habitat Approach within Geography Supported by Ecological Function”. NEPA requires an agency to specify the purpose and need for an action and to develop a reasonable range of alternatives based on that purpose and need. In doing so, an agency need not consider all proffered alternatives, but rather only reasonable or feasible ones. 40 C.F.R. § 1502.14(a).

The project alternatives analyzed in the Draft PEIS/RP are sufficient because the alternatives properly reflect the purpose and need as well as the NRDA authorities under which NOAA prepared the Draft PEIS/RP. The purpose and needs of a project dictate the range of reasonable alternatives to be considered by an agency pursuant to the NEPA process. *Westlands Water Dist. v. U.S. Dept. of the Interior*, 376 F.3d 853, 865 (9th Cir. 2004); *City of Carmel-by-the-Sea v. U.S. Dept. of Transp.*, 123 F.3d 1142, 1155 (9th Cir. 1995). Moreover, “where an action is taken pursuant to a specific statute, the statutory objectives of the project serve as a guide by which to determine the reasonableness of objectives outlined in an EIS, so too do the statutory objectives underlying the agency’s action work significantly to define its analytic obligations.” *Oregon Natural Desert Ass’n v. Bureau of Land Mgmt.*, 531 F.3d 1114, 1130 (9th Cir. 2008) (quoting *Westlands Water Dist.*, 376 F.3d at 866)

(internal citations and punctuation omitted). Those considerations that are relevant under the statutory authority requiring and guiding the action that is the subject of the NEPA analysis must be addressed in the NEPA analysis. *Id.* The purpose and needs set forth in the Draft PEIS/RP reflect the statutory goals of NRDA statutory authorities and, per *Oregon Natural Desert Ass'n*, NOAA properly relied on the statutory objectives to guide its analysis of project alternatives.

Because project alternatives derive from an EIS's purpose and need, NOAA first defined the project's purpose and need, which is to:

[D]evelop a Restoration Plan that will provide guidance to the Trustee Council in its decision-making regarding the selection and implementation of restoration activities intended to compensate the public for any natural resource injuries resulting from the release of hazardous substances and oil from the site by numerous potentially responsible parties (PRPs) who have owned, operated, or are operating, facilities in and along the waterway.

Draft PEIS/RP at 1-2.

In the Draft PEIS/RP, NOAA identified a number of NRDA statutory authorities, including, but not limited to, CERCLA, 42 U.S.C. §§ 9601, *et seq.*; OPA, 33 U.S.C. §§ 2701, *et seq.*; and CWA, 33 U.S.C. §§ 1251, *et seq.*, which require the preparation of a restoration plan to guide natural resource trustees as they implement restoration and provide an opportunity for public notice and participation in the implementation of that restoration. Draft PEIS/RP at 1-4. Under these NRDA statutory authorities, the natural resource trustees' mandate is to act on behalf of the public to recover damages for injuries to natural resources and any recovered damages must be used "only to restore, replace, or acquire the equivalent" of injured natural resources. CERCLA, 42 U.S.C. § 9607(f) (1); see CWA, 33 U.S.C. § 1321(f) (5); see also OPA, 33 U.S.C. § 2706.

Here, NOAA considered a range of project alternatives in the Draft PEIS/RP that were reasonable and feasible based on the Draft PEIS/RP purpose and need and underlying NRDA statutory authority and goals. Each alternative was considered in light of the Trustee Council's objective under CERCLA, OPA, the CWA and other relevant authorities: whether or not the alternative would restore, replace, or acquire the equivalent of those natural resources that were injured as a result of the release of hazardous substances in Portland Harbor. As discussed in Chapter 2, NOAA considered four alternatives: 1) a No-Action Alternative; 2) an Integrated Habitat Restoration Planning Alternative; 3) a Species-Specific Restoration Planning Alternative; 4) and an Open Geography Restoration Planning Alternative that was eliminated from further detailed analysis because it was inconsistent with the scope of the project. See *Native Ecosystems Council v. U.S. Forest Serv.*, 428 F.3d 1233, 1247 (9th Cir. 2005) (proposed alternatives "that do not advance the purpose of [a project] will not be considered reasonable or appropriate"); see also *Nw. Env'tl. Def. Ctr. v. Bonneville Power Admin.*, 117 F.3d 1520, 1538 (9th Cir. 1997) (stating that the range of reasonable alternatives is "dictated by the nature and scope of the proposed action"). The alternatives included in the Draft PEIS/RP are reasonable because the included alternatives reflect the Trustee Council's determination that the SSA is the highest priority for compensatory restoration under the NRDA process and the location where at least fifty percent of compensatory restoration must occur. In reaching its determination, the Trustee Council relied on several factors informed by information about the injured natural resources that it seeks to restore. The SSA is the area in which the injury to natural resources is most proximate, and the Trustee Council desires that habitat restoration occur in close proximity to the site of the injury. In addition, Chinook salmon, an important potentially injured species that is listed under the ESA, has critical habitat designated within the Portland Harbor area. This critical habitat provides unique functions and features for the Chinook salmon juvenile life stage that are not fungible with functions and features provided by habitat located outside of the SSA and broader focus area.

NOAA recognized the reasonable geographic restraint for alternatives given the Trustee Council's determination that the project area consists of both the SSA and the broader focus area for restoration depicted in Draft PEIS/RP Figure 1-1 and discussed in Section 3.1 because restoration actions in these geographic areas meet both the purpose and needs stated in the Draft PEIS/RP and the NRDA statutory objectives. Determining the geographic area within which a project's potential environmental impacts are assessed "is a task assigned to the special competency of the appropriate agencies." *Kleppe v. Sierra Club*, 427 U.S. 390, 414 (1976). As the Ninth Circuit explained in *Selkirk Conservation Alliance v. Forsgren*, 336 F.3d 944, 958 (9th Cir. 2003), the "task of selecting the geographic boundaries of an EIS requires . . . analysis of several factors, such as the scope of the project considered . . . and the types of species in the area." As discussed above, the Trustee Council analyzed a number of factors, including the presence of injured species in Portland Harbor, which ultimately supported its policy to require at least fifty percent of restoration actions to be implemented in the SSA. Thus, NOAA properly eliminated the Open Geography Restoration Planning Alternative because it was contrary to the Trustee Council's informed and reasoned determination that the SSA is the highest priority for compensatory restoration under the NRDA process and the location where at least fifty percent of compensatory restoration must occur.

3.1.9 Comment 108

Response:

The Endangered Species Act Section 7(a)(2) Biological and Conference Opinion, and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Draft Natural Resource Restoration Plan for the Portland Harbor Superfund Site (NMFS, January 30, 2015), supports the Trustee Council's conclusion that restoration of habitat in the SSA would provide more significant benefits than similar improvements elsewhere. The Biological Opinion states:

The value of critical habitat for these species in the Lower Willamette and Columbia Rivers is limited by poor water quality, altered hydrology, lack of floodplain connectivity and shallow-water habitat, and lack of complex habitat to provide food and cover. The action area is in an urban area where the habitat has been degraded due to past land use practices including stormwater runoff and industrial and urban development. Despite this, the critical habitat in the action area has a high conservation value for the ESA-listed species covered in this opinion, except for green sturgeon whose critical habitat does not extend into the action area, due to its critical role as a migration corridor. The services provided to ESA-listed species by this mainstem migration corridor habitat cannot be replaced by improving tributary spawning habitats.

In addition, please see the response to comment 104, which discusses the need for a nexus between injury and restoration for potentially injured species other than salmon.

3.1.10 Comments 155, 156, 157, and 158

Response:

Likely effects of climate change are discussed in Section 4.3.10.2 and 4.14.10.2 and the Trustee Council agrees with the commenter that elevated water temperatures are a potential impact of climate change. The comments suggest that by restoring habitat outside of the SSA, the Trustee Council could "encourage" juvenile salmon to spend more time outside of the SSA and less time inside the SSA. In fact, Chinook salmon have to pass through the SSA twice during their life cycle; there is no alternative route. In addition, the NorWeST climate change data projects that surface temperatures in both the SSA and broader study area will be impacted by climate change to a similar degree (between 1.64 and 1.66 degrees Celsius by 2040 for the SSA and broader focus area) – we do not see evidence that the temperature in the SSA will increase more than the broader focus area

(<http://www.fs.fed.us/rm/boise/AWAE/projects/NorWeST.html>). Further, the NOAA Fisheries Climate Science Strategy Western Regional Action Plan (WRAP) Draft version 20, March, 2016 recommends the NorWeST datasets for examining climate-driven future scenarios for West Coast hydrology and stream temperatures.¹The Integrated Habitat approach discussed in the Draft RP/PEIS takes a holistic view of the salmon life cycle, recognizing that salmon require viable habitat in all phases of the life cycle in order to persist, and acknowledging the importance of juvenile rearing capacity and floodplain connectivity. In their paper "Projected Impacts of Climate Change on Salmon Habitat Restoration (2007), Battin et al state:

Although direct mitigation of the hydrologic impacts of climate change may not be possible, habitat restoration, particularly the restoration of juvenile rearing capacity, may benefit salmon populations threatened by climate change. Such benefits would likely accrue by boosting lower-elevation sub-populations to compensate for declines at higher elevations. Allowing streams and side channels to flow across a greater proportion of their historical floodplain and reconnect with freshwater and estuarine wetland habitats can improve low flows and lessen the negative impacts of peak flows.

Further, the actions proposed in the Restoration Plan, such as floodplain reconnection, are considered to be effective actions to ameliorate changes to peak flows and temperature due to climate change. In the paper, "Restoring Salmon Habitat for Climate Change," Beechie et. al. (2012) describe floodplain reconnection as a way to create diverse fish habitat and restore access to floodplains for fish.² In addition, the authors describe these as effective actions for ameliorating changes to peak flows and temperatures caused by climate change. The authors state:

These actions, which typically include reconnection or creation of side channels and sloughs, removal or set back of levees and dikes, and re-meandering of dredged or straightened channels, can ameliorate peak flow increases by storing flood water and reducing flood peaks... or by increasing the availability of velocity and thermal refugia... Similarly, removing levees or re-meandering channels can ameliorate temperature increases by increasing length of hyporheic flow paths beneath the floodplain, which can cool water during the summer.... [And these improvements] generally allows for increased life history diversity within a population... which has been linked to increased population resilience.

3.2 SOCIOECONOMICS RELATED COMMENTS

3.2.1 Comments 007, 084, and 154 reference a number of land use regulations and guidelines that affect the City of Portland's actions in the Portland Harbor. These regulations and guidelines have multiple goals that include economic development and habitat protection.

Response:

¹ NOAA Fisheries, 2016. Climate Science Strategy Western Regional Action Plan (WRAP) Draft, Version 20. March 2016. Available online: https://swfsc.noaa.gov/uploadedFiles/Home/WRAP_WesternRegionalActionPlan_FinalDraft_for_PublicComment_22Mar2016.pdf

² NOAA's Climate Science Strategy Western Regional Action Plan cites the Beechie et. al. paper (amongst others) as an examples of studies, "identifying restoration activities that are most robust and effective under a changing climate... This kind of work has underlain the recent policy guidance for incorporating climate change in Endangered Species Act (ESA)."

The City's goals for the Portland Harbor encourage multiple land uses including industrial and employment lands, and lands dedicated to open space and functioning habitats. To help implement these goals, the City employs a number of policies and guidelines that promote both industrial development and natural resource protection or restoration in the harbor area. While the emphasis in certain parts of the harbor is on industrial and water-dependent development, the policies and guidelines that regulate land use call for the protection of natural resources in these areas.

Statewide Planning Goals 9 and 15 are such guidelines. Goal 9 includes the following statements:

Goal 9, Section (A)(2): The economic development projections and the comprehensive plan which is drawn from the projections should take into account the availability of the necessary natural resources to support the expanded industrial development and associated populations. (page 1)

Goal 9, Section (A)(5): Plans directed toward diversification and improvement of the economy of the planning area should consider as a major determinant, the carrying capacity of the air, land and water resources of the planning area. The land conservation and development actions provided for by such plans should not exceed the carrying capacity of such resources. (page 2)

Additionally, according to the City of Portland's *Willamette River Greenway Inventory, Proposed Draft*, May 2014 (*Greenway Inventory*),

Oregon State Land Use Planning Goal 15 is intended to protect, conserve, enhance and maintain the natural, scenic, historical, agricultural, economic and recreational qualities of lands along the Willamette River. (page 3)

This Goal 15 inventory, along with other information, will be used to inform updates of City's plans for the land along the Willamette River. (page 3)

A related guideline is the Statewide Planning Goal 5 Economic, Social, Environmental and Energy (ESEE) analyses conducted by the City of Portland and Metro, as noted in the Draft PEIS/RP.³ These reports evaluate where and how to protect fish and wildlife habitat and consider the tradeoffs between various levels of protection and other uses of the land. Local zoning code restrictions use the ESEE reports as one source of information when designating environmental protections.

Thus, while maintaining the importance and priority for industrial development in Portland Harbor lands, the City does not and cannot ignore goals and policies for complimentary protection of natural resources.

The City of Portland's 2014 Stormwater Management Manual (SWMM), which applies city-wide, is another source of environmental protections and describes the following approach to stormwater management:

The City of Portland's approach to stormwater management emphasizes the use of vegetated surface facilities to treat and infiltrate stormwater on the property where the stormwater runoff is created. Infiltrating stormwater onsite with vegetated surface facilities is a multi-objective strategy that provides a number of benefits, including but not limited to pollution reduction, volume and peak flow reduction, and groundwater recharge. These benefits play a critical role in protecting stormwater infrastructure and improving watershed health.⁴

³ Draft PEIS/RP, page 4-5.

⁴ City of Portland. 2014. *2014 Stormwater Management Manual*, January, page Intro-1. <http://www.portlandoregon.gov/bes/64040>.

The requirements in the manual apply to all development, redevelopment, and improvement projects within the City of Portland on private and public property and in the public right-of-way.⁵

The City's regulations on stormwater management are another example of encouraging actions that benefit habitat on all land uses. The City's stormwater regulations emphasize a green infrastructure⁶ approach to stormwater management on all lands within the City, including industrial lands in the harbor. One of the goals of this approach is "improving watershed health."

These regulations are another example of the City's multiple land-use goals that include economic development and habitat protection and restoration. Additionally, the Portland Zoning Code,⁷ Title 33, Planning and Zoning, Chapter 33.140 Employment and Industrial Zones, states under Use Regulations, Table 140-1 Employment and Industrial Zone Primary Uses, that Parks and Open Areas are one of a few lands uses allowed on employment or industrial zoned land.

3.2.2 Comments 026, 027, 028, 029, 030, 082, 083, 084, 085, 086, 121, 151, 154, 160, 161, 162, 163, 165, 192 raise the following points:

- Authors of the Draft PEIS/RP incorrectly interpreted the results of the Portland Business Alliance 2012 report, *Land Availability Limited Options* and failed to appreciate the limited nature of viable industrial lands in the harbor.
- Parcels of industrial land less than twenty-five acres are important to the growth of the regional economy.
- The Economic Opportunities Analysis concluded that there is a shortage of 629 acres of industrial land in Portland needed to meet the 20-year forecasted demand.
- Authors of the Draft PEIS/RP have underestimated the impact of restoration within the Portland harbor on industrial land uses and associated economic activities.

Response:

As outlined above, we received several comments that question the impact of restoration on industrial land in Portland Harbor. An underlying tenet of our response is that the purpose of a programmatic EIS is to describe likely outcomes of proposed actions generally, or on a broad scale.

Programmatic NEPA ... can reduce or eliminate redundant and duplicative analyses and effectively address cumulative effects. Federal agencies have used programmatic analyses for broad categories of activities ranging from facilities and land use planning to sequencing multistage actions....

... Some agencies use programmatic analyses to evaluate cumulative effects effectively and to formulate mitigation efforts comprehensively, ... Still other agencies use programmatic analyses to address mitigation parameters at the broad

⁵ <http://www.portlandoregon.gov/bes/64040>.

⁶ According to the US EPA, "Green infrastructure uses vegetation, soils, and natural processes to manage water and create healthier urban environments."
http://water.epa.gov/infrastructure/greeninfrastructure/gi_what.cfm.

⁷ City of Portland, *Portland Zoning Code*, Planning and Sustainability,
<https://www.portlandoregon.gov/bps/31612>.

landscape, ecosystem or regional level, thereby reducing the need to re-address these measures at the site-specific level.⁸

The Draft PEIS/RP conclusion that restoration activities in the Portland Harbor would cause minor or no impact on the quantity of land available for industrial or water-dependent development is a general or broad conclusion, based on the fact that restoration could affect a small percentage of the available industrial land in Portland Harbor, and based, in part, on the fact that restoration would not affect any of the large parcels identified in the Portland Business Alliance 2012 report, *Land Availability, Limited Options: An analysis of industrial land ready for future employers* (Land Availability report).

Such a conclusion in the Draft PEIS/RP does not preclude findings of impacts on specific properties once restoration alternatives have been defined. The Draft PEIS/RP describes this possibility,

Future analysis of individual restoration projects will consider economic impacts and will evaluate the significance of any conversion of land from commercial or industrial to restoration use that might occur.⁹

Current owners of industrial lands may decline including their properties on the list of potential restoration sites. The Portland Harbor Natural Resource Restoration Portfolio (April 2012) (Portfolio), which identifies potential restoration sites within and outside Portland Harbor, notes that owners of properties identified as potential restoration sites have no obligation to allow restoration on their properties,

... there is no obligation on the part of landowners to allow restoration work to take place at any particular site.¹⁰

Reference to the *Land Availability* report was meant to show that restoration would not affect lands that the report authors considered *most* important to development in the Portland Harbor—large-lot industrial lands. The Draft PEIS/RP reached this conclusion, in part, because the Ecological Restoration Portfolio does not include any of these sites.¹¹ Such a reference, however, does not mean that restoration actions would have no effect on smaller lots—lots less than twenty-five acres. Accounting for the possibility of such impacts is part of the determination of minor impacts on industrial lands in the Portland Harbor at the Programmatic level.

Other factors related to the finding of minor impacts at the Programmatic level include:

- Restoration actions could occur on publically owned lands in Portland Harbor that are not available for industrial development
- Industrial development is not permitted on some lands in Portland Harbor
- Restoration will only occur on sites with willing landowners
- Nearby industrial lands in the Port of Vancouver and Clark County are available to meet regional demands for industrial and water-dependent lands

⁸ The NEPA Task Force. 2003. *Modernizing NEPA Implementation*. Report to the Council On Environmental Quality. September, page 35.

⁹ Draft PEIS/RP, pages 4-5, 4-6.

¹⁰ Portland Harbor Natural Resource Trustee Council. 2012. *Ecological Restoration Portfolio*. April, page 2.

¹¹ Draft PEIS/RP, page 4-5.

The concern over industrial land in the harbor should further consider the characteristics of the twenty-seven potential restoration sites in Portland Harbor listed in the *Portfolio*. A number of these sites, including Cathedral Park (page 13), Centennial Mills (page 15), Swan Island Beach South (page 43), and Willamette Cove (page 49), are owned by public entities and the uses of these parcels are restricted to exclude industrial uses. Should restoration happen on these parcels it will have no impact on available industrial lands in Portland Harbor. In addition, Table 7: Top 10 Public Property Owners By Reach, on page 7 of the *Greenway Inventory* report, lists 802 acres of publicly owned land in the North Reach, the boundary of which overlaps with the Portland Harbor area.¹² Public property owners include the City of Portland, the federal government, Metro, and the State of Oregon. Should restoration happen on these lands, it will have no impact on available industrial lands in Portland Harbor.

Table 2, Acres per Zone by Willamette River Reach, on page 4 of the *Greenway Inventory* report, lists 170 acres of land in the North Reach currently zoned as open space.¹³ The Portland Zoning Code,¹⁴ Title 33, Planning and Zoning, Chapter 33.100 Open Space Zone, notes under Use Regulations, Table 100-1 Open Space Zone Primary Uses, that industrial land uses are prohibited on lands zoned for open space. Should restoration happen on these acres it will have no impact on the supply of industrial lands.

According to the *Portfolio*, a number of owners of potential restoration sites in Portland Harbor stated no objection to restoration on their properties. These sites include the Joslin Property (page 19) and the Owens-Corning Floodplain site (page 27). The Final PEIS/RP explains that even assuming that all of the sites listed in the Ecological Restoration Portfolio that have some industrial zoning were developed for restoration in both the Study Area and Broader Focus Area, less than 5% of industrial lands would be converted.

Regarding the supply of industrial and water-dependent lands for development, the regional supply of such lands includes lands available at the Port of Vancouver and in Clark County. According to the Port of Vancouver's *Strategic Plan 2014-23*,

The Port of Vancouver USA is one of the major ports on the Pacific Coast. Its competitive strengths include *available land*, versatile cargo handling capabilities, vast transportation networks, a skilled labor force and an exceptional level of service to its customers and community. [*emphasis added*] (page 1)

The Port of Vancouver's *Strategic Plan 2014-23* also states, "Fifty acres of shovel ready and over 150 acres of undeveloped industrially zoned land is in port ownership." (page 6)

Under the heading of industrial lands, the Port of Vancouver's website includes the following information:

Acres of Opportunity

¹² The boundary of which closely matches the boundary of the Portland Harbor. City of Portland, River Plan/North Reach, <https://www.portlandoregon.gov/bps/article/233951>; EPA, Portland Harbor Superfund Site, <http://yosemite.epa.gov/R10/CLEANUP.NSF/ph/Portland+Harbor+Superfund+Site>.

¹³ The *Greenway Inventory* report cites as its source for zoning data the Bureau of Planning and Sustainability's GIS zoning data (March 2014), (*Greenway Inventory*, page 4).

¹⁴ City of Portland, Portland Zoning Code, Planning and Sustainability, <https://www.portlandoregon.gov/bps/31612>.

... The port currently occupies a total of 2,127 acres. In addition to more than 800 acres of developed, currently operating industrial and marine facilities, we have 600+ acres available for future development.¹⁵

Centennial Industrial Park includes more than 100 acres of light industrial property ... While many ports are constrained by a lack of available land in highly urbanized areas, the port has abundant property ready for development.¹⁶

The Trustee Council does not consider restoration on the Washington side of the Columbia River is not considered to have the required nexus to resources injured by the release of hazardous substances in Portland Harbor and, therefore, do not consider restoration on the Washington side of the Columbia River to be appropriate. Additionally, acres of industrial land in Clark County cannot be included in the accounting of acres needed to fulfill future supply specific to land use guidelines for the Portland area, e.g., urban growth boundary requirements, because of the constraints of political boundaries and separate statewide planning requirements between Oregon and Washington. However, these acres are available to help meet the regional demand for industrial lands generated by market forces, and should not be dismissed such that industrial land pressure in Portland Harbor is artificially over-reported.

3.2.3 Comments 071 and 079. In addition to receiving comments about the negative economic impacts of habitat restoration we received comments about positive economic impacts of habitat restoration. This response focuses on further describing positive benefits and is referenced as part of the response to the negative impact comments.

Response:

These comments are addressed, in part, on page 4-7 of the Final PEIS/RP, “Watershed Restoration and Business Impacts.” Additional resources describing beneficial impacts of restoration are described below.

A 2010 report by Ecotrust titled, Oregon’s Restoration Economy, describes a range of economic benefits of restoration projects.¹⁷ These benefits include:

- In Oregon, restoration projects have created jobs in construction, in technical fields such as engineering and wildlife biology, and in supporting businesses such as plant nurseries, heavy equipment companies, rock and gravel quarries, and other local businesses.¹⁸
- Between 2001 and 2010, over \$411 million was invested in restoration projects in Oregon.
- These restoration projects supported 4,600 to 6,500 jobs.
- This spending generated \$750 million to \$978 million in economic output.

¹⁵ Port of Vancouver USA, Industrial, <http://www.portvanusa.com/industrial/cip/>.

¹⁶ Port of Vancouver USA, Industrial, <http://www.portvanusa.com/industrial/cip/>.

¹⁷ Ecotrust. 2010. *Oregon’s Restoration Economy*. <http://www.ecotrust.org/media/WWRI-Restoration-Economy-Brochure.pdf>.

¹⁸ Ecotrust, 2010, page 2.

- An average of \$0.80 of every \$1.00 spent on restoration projects in Oregon stays in the county where the project happens, and \$0.90 stays in Oregon.

The Federal Caucus of ten federal agencies working on salmon and steelhead recovery in the Columbia Basin report that habitat restoration projects conducted by the Caucus partners created 1,751 jobs and \$154 million in economic output in 2010.¹⁹

The University of Oregon’s Ecosystem Workforce Program conducts studies of the economic benefits of habitat restoration, including forest and watershed restoration projects in Oregon. They calculate the number of jobs created and the economic output per \$1 million spent by type of restoration project. Table 1 lists this information.

Table 1: Employment and Economic Output Effects per \$1 Million in Forest and Watershed Projects, by Project Type

Project Type	Jobs	Economic Output
In-Stream	14.7	\$2,203,851
Riparian	23.1	\$2,310,128
Wetland	17.6	\$2,259,422
Fish Passage	15.2	\$2,240,281
Upland	15.0	\$2,476,290
Other	14.7	\$2,270,862
Aggregate (all)	16.3	\$2,311,468

Source: Nielsen-Pincus, M. and C. Moseley. 2010. *The Employment and Economic Impacts of Forest and Watershed Restoration in Oregon*. University of Oregon. Ecosystem Workforce Program. Briefing Paper Number 23. Spring.

The employment impacts for the types of riparian or in-water restoration projects that could happen on lands within the harbor area range from 14.7 jobs per \$1 million spent for in-stream projects, to 23.1 jobs per \$1 million spent on riparian projects.

In 2016, the U.S. Department of the Interior and the U.S. Geological Survey released a study evaluating calculation methods of the economic impacts of restoration projects and describing the impacts of several individual case studies specific to NRDA restoration. Overall, the study indicated that for every \$1 million invested in NRDA ecosystem restoration projects between 13 and 32 job-years²⁰ were created and between \$2.2 and \$3.4 million total economic output²¹ was created (Thomas, et. al 2016).

3.3 BIOLOGY RELATED COMMENTS

3.3.1 Comments 033, 034, 038, 039, 040 all consider Large Woody Debris and can be summarized as follows. The City of Portland expressed concerns

¹⁹ Columbia Basin Fish Recovery. 2011. *Habitat Restoration Means Business*. November, salmonrecovery.gov.

²⁰ Job-years measure the total number of annualized full and part-time jobs accumulated over the duration of a restoration project (Thomas, et. al 2016).

²¹ Economic output measures the total value of the production of goods and services supported by project expenditures and is equal to the sum of all business to business sales and sales to consumers (Thomas, et. al 2016).

regarding valuation of large wood for restoration projects. The City believed that large wood was undervalued, or in some cases was negatively valued during Habitat Equivalency Analysis and restoration site evaluations.

Response:

The Trustee Council agrees that large wood may be an appropriate restoration component for some sites; along with other design considerations, the appropriateness of large wood will be discussed during each project's design phase. Large wood – both standing and downed – may be a component of a successful restoration site. Wood and woody structures are elements of a connected floodplain and are part of the geomorphic/hydrologic features performance standard. Several elements must be in place for a successful project. Other elements of this performance standard include clean sediment, other structure, riparian vegetation, etc.

Each project will be tailored to its unique site, and each will be valued separately by the Trustee Council's Restoration Committee. For example, sites where large wood would require anchoring, would likely not be ranked highly for this element. Preferred sites for large wood would likely include those where natural accumulation is more likely. As projects are designed, implemented, and monitored, the criteria for a suitable project and its monitoring will also change as part of an adaptive management plan.

3.3.2 Comments 032 and 035 consider wildlife issues. The City of Portland expressed concern that a focus on salmon habitat might under-represent the needs of wildlife in the study area. The City also requested clarification on which wildlife species would be considered representative, and if different species would be valued differently.

Response:

Salmon are a proxy at this time. Restoration activities are anticipated to provide benefit to all aquatic organisms, which in turn can become prey for wildlife species. Whereas, valuing features for both fish and wildlife might seem appropriate, it might actually confound the data and rankings by "diluting" the values for each. As the commenter notes, different valuation of each species could occur, but if more than a few species are chosen, their values would tend to offset each other and all site values would tend to regress to the mean, i.e., the more differing and potentially offsetting features are valued, the more likely it is all sites become closer in absolute values. Although relative values might still provide usable rankings, the features presented for the focus species would still drive the rankings overall, even if non-focus species are included. Therefore, it is valid to use the rankings for one focus species group (e.g., salmon) that is a legitimate proxy for almost all other injured resources.

The wildlife focus will be on bald eagle, osprey, spotted sandpiper, and mink. The inclusion of river otter in Section 7.2.1.2 of the Draft PEIS/RP was incorrect.

3.3.3 Comments 056 and 159 consider restoration project selection and fish issues. Joan Snyder commented that the Trustee Council should consider providing habitat in cooler waters rather than in those of the warmer lower Willamette River. Jim Robison commented that restoration sites should be distributed along the 11-mile Portland Harbor stretch to best meet the needs of migrating salmon.

Response:

The lower Willamette River is the only corridor for upriver-origin fish transiting the Portland area. While habitat elsewhere, including locations with cooler water, might increase overall populations, it is necessary for upriver populations to use this reach. Restoration in this reach would provide benefits because anadromous adults and juveniles cannot routinely transit this stretch over short periods. Often these fish can take days to move through the Portland Harbor. In addition, benefits to resident aquatic organisms, including invertebrates and fish, would also occur, thus providing potential prey for local wildlife.

Appendix A

Delineated Comments



Comment Form

Portland Harbor Natural Resource Damage Assessment (NRDA) Draft Programmatic EIS / Restoration Plan (PEIS/RP)

Thank you for taking the time to comment on the Draft Portland Harbor NRDA PEIS/RP. The comments that you make, in their entirety, including the personal information you provide, will become part of the public administrative record for this project. The Trustee Council will not consider anonymous comments, so you must provide a name and address. Responses to your comments will be provided in the Final PEIS/RP.

First Name: Jane	Last Name: Bacchieri
Street Address: 1120 SW Fourth Ave., 10 th Floor	City, State, Zip: Portland, OR 97210
Email: jane.bacchieri@portlandoregon.gov <input type="checkbox"/> Check here to sign up for project email updates	Organization (if any): City of Portland

Please write your comments below, and attach additional pages if you need more space. You can download this form and email your comments online at <http://www.fws.gov/oregonfwo/Contaminants/PortlandHarbor/default.asp>. Comments must be received by October 8, 2012.

Comments:

Portland Harbor Natural Resource Trustee Council:

The City of Portland (City) supports the Draft Portland Harbor Programmatic Environmental Impact Statement and Restoration Plan (Draft PEIS). The City recognizes and appreciates the significant effort and leadership that the Trustees have provided in restoration efforts in the Portland Harbor through their presentation of a comprehensive and integrated science-based approach to protect and restore historically impacted natural resources in the Harbor.

The City has multiple policies, regulations and projects affecting Portland Harbor, all of which also are based on a comprehensive and integrated scientific approach. For example, in recent years the City has worked to integrate a large capital infrastructure project – the Combined Sewer Overflow Abatement (“Big Pipe”) Project – that combines green infrastructure and stormwater management approaches, the Framework for Watershed Health, the Portland Watershed Management Plan, and regulation through environmental zoning. The City’s and the Trustees’ approaches both focus on integrated, sustainable restoration projects that enhance natural ecosystem processes. Both approaches conclude that the restoration of ecological processes is possible and necessary in Portland Harbor.

We strongly support the Trustees’ statement on pg 5-2 of the Draft PEIS that the NRD process should be used to leverage restoration projects with other efforts. As you know, the City has been implementing natural resource restoration projects in the Willamette River and its watersheds and tributaries for decades. The City has a comprehensive planning process to evaluate watershed needs, as is demonstrated in the City Council’s adoption of the Portland Watershed Management Plan. The Plan outlines a number of multi-scale restoration projects that have been evaluated and proposed for implementation to improve watershed health. Implementing these projects is dependent on City resources and competing public priorities. The City hopes to coordinate watershed planning efforts with the Trustee Council to implement restoration projects that address both the Trustees’ and the City’s Portland Harbor restoration goals.

The Trustee Council’s approach to the integration of recreation at restoration sites is also consistent with the City’s goal to connect people to the river. To strengthen the Restoration Plan and the Draft PEIS, we offer the following general observations and more specific attached comments. The main comments focus on four key issues: 1) the primary



analytical tool on which the approach is based is not included as part of this review, 2) the need for more transparent wildlife valuation of riverine restoration, 3) the lack of valuation for wood, 4) more documentation and perhaps revision of time to full function used in the HEA tool. These issues are briefly discussed below and scientific findings relevant to these points are provided in Attachment A.

The Trustee Council has generally followed a habitat valuation methodology that includes a calculator known as the Habitat Equivalency Analysis or HEA. The City has commented on this methodology in the past and generally supports the HEA approach. We note, however, that details about the methodology are not included in the Draft PEIS or Restoration Plan. The City believes that the present HEA tool underlying the approach does not adequately value wildlife habitats. It is true that many of the ecological functions that support salmon also support regional wildlife; however, the overlap in habitat needs is far from complete. The HEA tool undervalues many critical wildlife habitat features and associated functions such as riparian and upland forests, snags, and very different landscape connectivity requirements to support salmon versus wildlife. In addition to HEA, the complete habitat valuation methodology includes many other elements that are not described or included in the Draft PEIS or Restoration Plan, such as wildlife determinations and analysis, differential weighting of key elements and cumulative benefits from projects that benefit both fish and wildlife. Without inclusion of the full habitat valuation methodology and the HEA calculator, the City cannot adequately comment on many of the conclusions presented in the Draft PEIS and Restoration Plan. For example, is it not clear how the timeframe is determined for a fully functioning and therefore fully credited condition. The City has a Terrestrial Site Assessment Form we use on all restoration projects to evaluate and improve wildlife conditions. We would gladly share the form and rationale with the Trustees so that all conditions are evaluated; however, we cannot compare how useful it will be to evaluating wildlife benefits on NRD restoration projects because the full habitat valuation methodology is not apparent. Regardless of the approach, it is important to explicitly value improvements that may greatly benefit wildlife but not be key habitat drivers for salmon. It is true that many good things done for salmon will benefit wildlife; however, salmon functions are necessary but not sufficient for supporting wildlife, and important features for wildlife will be missing in NRDA restoration projects if they are not explicitly valued.

The City is similarly concerned about an apparent disconnect between the methodology and the Restoration Plan where the methodology may not value, or in some instances results in discounting, large wood structures. Many of the proposed restoration projects recommend the use of large wood. It appears that this approach can result in recommending a project design for which the methodology does not provide value or may even reduce the value of the project. The City believes that large wood should be included as a positive attribute in any calculator and should be recommended in project designs where appropriate. While re-creating river conditions that accumulate wood is a necessary component of restoring wood functions, it is not sufficient by itself. The process of restoring wood supply will be a process many decades in the making across a very broad landscape. Threatened and endangered salmon do not have the luxury of waiting on such a timeline. Adding wood is a critical component of addressing a major limiting factor in the short term to stave off extinction until the long-term processes of forest regeneration and senescence develop. In addition, protecting critical harbor infrastructure requires management of wood. Even in the distant future when wood supplies are closer to sufficient, the process of wood transport and deposition is never likely to be a maintenance-free process in a highly developed harbor. The City includes large wood in its own scientific approach and would gladly share the scientific literature and rationale behind our habitat valuation methodology as a guide. The City is also currently evaluating the role of the historic floodplain in our own scientific approach and would be very interested in evaluating how this same process was addressed in the Trustee Council's evaluation and methodology.

The City supports the Draft Programmatic Environmental Impact Statement and Restoration Plan and believes both could be strengthened by the inclusion of a more transparent and rigorous discussion of the scientific underpinnings of the analysis and conclusions reached in both documents.



Thank you for the opportunity to comment on the Draft PEIS. We look forward to continuing our dialog with the Trustee Council on these issues and to working with the Council on future restoration projects.



Concerns Regarding Overall Approach

Under “Part I – The National Environmental Policy Act,” the Trustees indicate a clear desire for the final PEIS to serve as a “comprehensive planning and organizational tool for . . . evaluating the impacts of specific restoration activities.” (Emphasis added). Currently the Draft Portland Harbor Programmatic Environmental Impact Statement and Restoration Plan (Draft PEIS) assesses potential restoration sites in general terms, then evaluates environmental impacts of the restoration planning alternatives. The Draft PEIS does not include a comprehensive methodology on how the specific restoration activities will be evaluated. The City requests including an explanation of the Habitat Equivalency Analysis (HEA) proposed for use and referenced in Section 1.8.2. Significant effort has been put forth over the last several years to develop this method of quantifying the benefits of restoration projects, and the City would like to see this information fully included and evaluated in the Draft PEIS. The Natural Resources Damage Assessment Restoration Plan represents an excellent effort toward site selection for inclusion in the Restoration Portfolio. To support the transparency of the science behind the restoration sites, please provide additional information on other factors detailed below in order to allow for a robust review of the benefits and impacts to the species at issue as required by NEPA. We request inclusion of the HEA analysis and any other scientific approach to evaluating and developing the Restoration Plan.

Injured Species of Concern

While the Restoration Plan states that the Integrated Habitat Approach will compensate for injuries to all species, we are concerned about the assessment of species named as surrogates for injured fish, mammal and bird species.

Osprey, bald eagle, mink and river otter feed on both salmon and their predators. These and other terrestrial species elevate the value of riparian and wetland habitat according to the Trustees’ Wildlife Advisory Group, and yet wetlands are not listed in the Trustees’ list of “key habitat types.” It remains unclear how injuries to all natural resources will be compensated through the Integrated Habitat Approach. Currently, the City of Portland uses a Terrestrial Site Assessment Form to evaluate all restoration projects and identify opportunities for improvement for wildlife species. The Draft PEIS does not provide adequate information for us to evaluate the usefulness of this approach on NRD qualifying restoration sites. The City has also developed guidelines for avoiding impacts to nesting birds during construction. It is unclear how some of the practices and approaches in these guidelines would be evaluated in the wildlife analysis.

L-035

The City would like more information regarding which species are used as the “representative” species for assessing the value of wildlife habitat. For instance, in section 7.2.1.2, river otter are listed as a surrogate species but left off of Table 7-2, where spotted sandpiper is inserted. Additionally, it is unclear whether salmonid and non-salmonid species are weighted differently in the creation and valuation of restoration sites.

L-036

Restoration sites will evolve at different rates depending on the nature of the restoration project, the target specie, and the proposed interaction between the integrated habitats. The “time to fully functioning” is listed in the Trustees’ HEA Habitat Values Table, (PHNRTC, 2012); however, it is not clear how the time it takes to reach a fully functioning condition was determined. For example, the time it takes for mature riparian forest to “fully function” and provide value for Chinook will be different than the time it will take to fully function for osprey, both of which are

species of concern. In addition, the timeline cited for “full function” (40 years) and 80% function (10 years) are substantial underestimates on both counts. After 10 years a planted tree is nowhere near 80% of its full size or associated functions, and 40 years is an inadequate timeline for key functions such as wood supply. Longer time frames – perhaps 80-100 years – should be used to account for “full function.”

Concerns about adequacy of HEA

The preferred alternative is titled “Integrated Habitat Restoration Planning Alternative.” The City agrees with the selected alternative; however, we are unclear about how the selection was made. Because details of the HEA methodology are not included in this document, we are interested in knowing how it is proposed to work within the “Integrated Habitat Restoration” alternative with a limited focus on juvenile Chinook. Habitat preferences for juvenile Chinook may benefit all salmonids and other species of concern; however, this interaction does not receive full consideration and discussion in the Draft PEIS, and has not been articulated elsewhere. The City recommends including a more thorough discussion of the scientific rationale to protect and restore habitat for all injured species.

Concerns about Habitat Values used as input for HEA

One overarching element of degraded habitat in the Portland Harbor, described throughout the Trustees’ Draft PEIS, is the absence of complex habitat that is established in the presence of large wood. The role that large wood plays in creating and maintaining high-functioning fish and wildlife habitat on the river is critically important for many reasons. Primarily, it increases channel complexity -- pools, split channels, scour protection, bank stability, protective interstitial spaces for predator avoidance and high flow refuge, sediment/nutrient sorting and distribution, and flood attenuation; secondarily, it produces invertebrate prey, the principal food source for juvenile salmon and trout.

The Draft PEIS (p. B-15) cites a NMFS (2009) assertion that habitat has been particularly degraded in the lower reaches of tributaries to the Willamette River by the reduction of channel complexity associated with the removal of large wood for navigation. We would add that the removal of large wood from bridge footings and dock structures to protect infrastructure has contributed to the loss of habitat quality. Bank hardening throughout the Harbor prevents wood from snagging and residing along the river’s shorelines and deflects wood downstream. These activities occur not only in the lower reaches of tributaries, but throughout tributary and the mainstem watersheds, resulting in the constant removal of a significant volume of wood from the system. Wood removal to protect infrastructure is one reason why relying solely on natural processes to provide wood will never fully function within an urban setting, and why more active management of wood supply and retention may be needed to reduce conflicts between habitat formation and maintenance and economic and societal activities along the river.

It is unmistakable that channel complexity is a primary limiting factor to improving habitat function and salmon and trout production in the Willamette River, and the Trustees’ Draft PEIS affirms this throughout. However, the HEA model does not incorporate credit for the presence of large wood in project areas even though the Draft PEIS states the following at least four times: “The most limited or scarce habitat types within the Harbor area include refuge from mainstem flows, shallow water and beach habitat with or without large wood assemblages, and undulating shorelines.” Floodplain connection, logjams and channel meanders would address and correct all of these problems. Additional references in the Draft PEIS to the importance of large wood in river function and restoration are found throughout the document:

P. 3-19 Prior to large dam operation, the frequent flooding of the river in the project area contributed to habitat diversity via flow to side channels and deposition of woody debris (Bottom et al. 2005).

P. 5-7 Beach habitat tends to accumulate large woody debris from upstream sources; large woody debris tends to develop microhabitats that can provide refuge and feeding areas for juvenile salmonids.

P. 5-7 Vegetated riparian habitat...maintains habitat for fish and other aquatic organisms...and it acquires woody debris for the active channel margin by snagging (migratory debris) floating by.

P. 7-8 Relevant indicators for functioning fish habitat in the lower Willamette River include complex in-stream structure.

P. 7-11 Relevant indicators for functioning wildlife habitat in the lower Willamette River and its riparian area include complex in-stream structure.

P. 7-15 The lower Willamette River is highly altered with ecosystem processes that no longer function to support healthy habitats. Riparian and marsh habitats have ... reduced inputs of detritus and wood.

P. D1-2 Habitat attributes that improve the quality of fish and wildlife habitat and increase the ecological function of a site include terrestrial and aquatic large wood ... these features should be monitored for stability or artificially placed elements and recruitment of new elements.

P. D-5 Table D-1 lists components of Portland Harbor restoration projects that will require effectiveness monitoring. The first goal listed is: Create complex habitat for potentially injured species, and the first habitat element within this goal is Large Wood. Additionally, large wood is the only attribute in the entire table that is targeted for monitoring in all seven habitat types listed (tributary, off-channel, active channel margin, shallow water, beach, riparian, and upland). No other habitat component provides important restoration processes across all harbor habitats.

Ecological Restoration Portfolio

Appendix A of the Trustees' Draft PEIS compiles and details a list of potential habitat restoration sites within the Portland Harbor NRDA study area, as well as outside of the study area (those sites outside of the study area are referred to as in the "broader focus area"). The compilation is presented as the Trustees' Ecological Restoration Portfolio, which maps and describes each site with conceptual restoration treatments and their anticipated benefits.

Considering the importance of large wood in properly functioning river habitat (Opperman et al. 2006, Bisson et al. 2003, Bolton and Berman 2003, Fox et al. 2003) -- NMFS (1996) describes a minimum of 80 key pieces (24" dbh by 50' length minimum) per mile to qualify Westside river habitat as properly functioning because:

"Available data indicate that salmon production increases as Large Woody Debris (LWD) increases. Additionally, every large wood target for western Washington and Oregon rivers (including the lower Columbia and Willamette Rivers describes an increase in habitat function/condition as large wood volume is increased. LWD provides cover, velocity refuge, and plays a vital role in pool formation and the maintenance of channel complexity required by salmon in their freshwater habitat. LWD also aids in reducing channel erosion and buffering sediment inputs by providing sediment storage in headwater streams." *Making ESA Determinations of Effect for Individual or Grouped Actions at the Watershed Scale*, National Marine Fisheries Service, 1996, Portland, Oregon, USA.

In their (2012) draft ESA Recovery Plan for lower Columbia and Willamette River salmon and steelhead, NMFS recommends addressing the limiting factors of impaired instream complexity, bed form and channel

form that affect local salmon and steelhead production by streamlining delivery of large wood to restoration sites and restoring riparian areas to provide long term supplies of large wood to streams. Many restoration projects in the Trustees' Portfolio detail the addition of large wood to the site. Restoration of riparian habitat for future (50+ years) large wood recruitment to the river is also highly recommended for uplift at many sites in the Portfolio. The recommendation for the addition or incorporation of large wood structures and debris to restoration sites in the Portland Harbor NRDA Project Site, detailed in Appendix A of the Draft PEIS, is detailed in Table 1:

Table 1. Trustee Restoration Portfolio sites that include large wood in proposed restoration treatments.

Page	Site – Project Name	Proposed Restoration Treatments	Treatment Benefits
P. 5	Albina Yard	Increasing the amount of large wood along the river bank and in the floodplain	The accumulation of more wood would add further complexity and sediment retention ability to the system. Juvenile salmon, lamprey, and sturgeon prefer complex habitats that provide cover and feeding stations.
P. 9	Ash Grove	Adding large wood and snags to restore native habitat and structure to the site.	Restore habitat structure and complexity to benefit juvenile salmonids
P. 11	Balch Creek Confluence	Add complexity to shallow water habitat by adding large wood	Adding large wood would create more complex habitat. Off-channel, shallow, slow moving waters... gather wood and provide refuge and productive foraging areas for lamprey and juvenile salmon.
P. 12	Balch Creek Confluence	Map calls out adding large wood and native trees and shrubs to the bank at the Balch Creek project site.	Restore habitat structure and complexity to benefit juvenile salmonids
P. 13	Cathedral Park	Increase vegetation and wood to restore riparian areas and creating off-channel wetlands at the mouth of the swale	Adding large wood and other features would create more complex habitat, which is preferred by juvenile salmon, lamprey and sturgeon because it provides cover and feeding stations.
P. 14	Cathedral Park	Map calls out placing and retaining wood on the bank.	Restore habitat structure and complexity to benefit juvenile salmonids
P. 19	Joslin Property	Add large wood to the shoreline to supply more habitat structure	Adding large wood along the banks will improve habitat complexity, increase sediment retention, and provide an invertebrate food source for fish and some wildlife.
P. 21	Linnton Neighborhood	Add wood to increase the quantity and quality of shallow water habitat	Vegetation and wood provide cover and feeding stations for various species while contributing to improved water quality.
P. 21	Linnton Neighborhood	Add wood to increase the quantity and quality of shallow water habitat	Vegetation and wood provide cover and feeding stations for various species while contributing to improved water quality.

Page	Site – Project Name	Proposed Restoration Treatments	Treatment Benefits
P. 23	MarCom	Restoring the site before it is developed and loses all of its current habitat function because the beach there already has significant wood accumulation and can function at a high rate if off-channel wetland habitat is created, a bioswale is →	→ constructed, and the site is revegetated with native species- no increase in LWD volume is proposed here.
P. 25	Miller Creek Confluence	Add large wood along Miller Creek	Adding large wood will improve habitat connectivity and quality, enhancing habitat for salmon, lamprey, and sturgeon.
P. 27	Owens-Corning	Remove riprap and regrade the shoreline and floodplain	Replacing the riprap with a sloped shoreline will allow for the accumulation of wood, trapping sediment and adding further complexity to the system. Juvenile salmon, lamprey, and sturgeon prefer complex habitats that provide cover and feeding stations. Low gradient tributaries also provide suitable spawning and rearing habitat for salmon.
P. 28	Owens-Corning	Map calls out adding large wood to the bank.	Restore habitat structure and complexity to benefit juvenile salmonids
P. 31	Powerline Corridor	Adding large wood to the stream and beach	Large wood habitat complexity for juvenile salmon, lamprey, and sturgeon that use them for cover and feeding stations.
P. 32	Powerline Corridor	Map calls out adding large wood to the shoreline.	Restore habitat structure and complexity to benefit juvenile salmonids
P. 35	Saltzman Creek	Adding large wood to the shoreline and river banks	Habitat structure created by wood provides cover and feeding opportunities for a variety of species, while contributing to improved sediment retention and water quality.
P. 36	Saltzman Creek	Map calls out adding large wood to the shore and river bank.	Restore habitat structure and complexity to benefit juvenile salmonids
P. 39	Steel Hammer	Install snags and large wood to provide structure that enhances the value of native habitat	Enhancing bank and shoreline habitats and increase floodplain connectivity.
P. 40	Steel Hammer	Map calls out installing large wood on the riverbank and shoreline habitats.	Restore habitat structure and complexity to benefit juvenile salmonids
P. 41	Swan Island Beach North	Remove riprap and replace with a sloped shoreline	Replacing the rip rap with a sloped shoreline will allow for the additional accumulation of wood, adding further complexity to the system. Juvenile salmon, lamprey, and sturgeon prefer complex habitats that provide cover and feeding stations.
P. 43	Swan Island Beach South	Remove riprap and replace with a sloped shoreline	Replacing the rip rap with a sloped shoreline will allow for the additional accumulation of wood, adding further

Page	Site – Project Name	Proposed Restoration Treatments	Treatment Benefits
			complexity to the system. Juvenile salmon, lamprey, and sturgeon prefer complex habitats that provide cover and feeding stations.
P. 46	Swan Island Lagoon	Map calls out placing large wood on the bank.	Restore habitat structure and complexity to benefit juvenile salmonids
P. 47	Terminal 5	Add large wood to the site.	Juvenile salmon, lamprey, and sturgeon prefer complex habitats that provide cover and feeding stations. Native vegetation and wood provide cover and feeding stations while contributing to improved water quality.
P. 49	Willamette Cove	Remove riprap, pull back the bank, create off-channel habitat, and expand shallow water habitat.	Off-channel, shallow waters gather wood and provide refuge and productive foraging areas for lamprey and juvenile salmon.
P. 56	Cottonwood Bay Shoreline	Large wood placement along the shore and in shallow water	Increase complexity and help create resting areas for juvenile salmon.
P. 57	Cottonwood Bay Shoreline	Map calls out increasing volumes of large wood.	Restore habitat structure and complexity to benefit juvenile salmonids
P. 58	Elk Rock Island	Placement of large wood on the banks and shallow water areas.	Increase habitat structure on the beach and in shallow water areas.
P. 60	Elk Rock Island	Map calls out enhancing habitat by adding large wood.	Restore habitat structure and complexity to benefit juvenile salmonids
P. 61	Holgate Slough	Large wood placement along the floodplain and riparian areas	Add in-stream habitat complexity, stabilize river banks, capture sediment in stormwater runoff, support natural hydrologic flow processes and nutrient cycling, and provide a source of woody materials to the river.
P. 62	Holgate Slough	Map calls out increasing the amount of large wood to protect banks from wave erosion.	Stabilize banks and restore juvenile salmon habitat structure in their migratory corridors.
P. 65	Kellogg Dam Removal	Placement of large woody debris structures	Restore tributary, wetland and riparian habitat.
P. 68	Mary S. Young State Park	Improve riparian areas	Stabilize banks, capture and reduce sediment flows, nutrient cycling, and provide large wood to the river.
P. 71	McCarthy Creek	Add large wood structures	Restore habitat structure and complexity to benefit juvenile salmonids
P. 74	Oaks Amusement Park	Increase amount of wood on river bank and shallow water areas.	Improve rearing and refuge habitat for fish: Restore habitat structure and complexity to benefit juvenile salmonids

Page	Site – Project Name	Proposed Restoration Treatments	Treatment Benefits
P. 75	Oaks Amusement Park	Map calls out increasing amount of large wood along the river bank.	Restore habitat structure and complexity to benefit juvenile salmonids
P. 76	Oaks Bottom Refuge	Revegetate riparian areas, add large woody debris in off-channel areas	Native riparian vegetation will provide a large wood source to the river, LWD in the off-channel area will provide significant amounts of instream habitat structure for salmonids and lamprey.
P. 78	Oregon Yacht Club	Improve riparian areas; increase downed large wood along the river bank and throughout the floodplain	Increases quality of wildlife food and cover, stabilize streambanks, capture sediment in stormwater runoff, support natural hydrologic processes and nutrient cycling, and provide a source of wood to the river, floodplain, and riparian habitats.
P. 79	Oregon Yacht Club	Map calls out increasing snag and large wood elements along river bank and throughout floodplain.	Enhance shallow water habitat and improve rearing and refuge habitat for salmonids and other native fish.
P. 80	Port of St. Helens	Install large wood in emergent and scrub-shrub wetlands	Restore emergent wetland habitat for lamprey and juvenile salmon refuge and forage.
P. 82	Powers Marine Park	Establishing wood jams and other habitat structures	Enhance shallow water habitat and improve rearing and refuge habitat for salmonids and other native fish.
P. 84	Rinearson Creek	Add large woody debris to a restored channel	Improve off-channel habitat for rearing, resting, and foraging juvenile salmon and lamprey.
P. 86	Rinearson Creek	Map calls out adding habitat structure to the stream.	Improve rearing and refuge habitat for salmonids.
P. 89	South Waterfront	Increase amount of wood on the shoreline and in shallow water areas.	Improve rearing and refuge habitat for salmonids.
P. 90	South Waterfront	Map calls out adding large wood to the river banks.	Restore habitat structure and complexity to benefit juvenile salmonids
P. 93	Wapato Access	Add large wood structures	Restore habitat structure and complexity to benefit juvenile salmonids
P. 99	Willamette Park	Increase amount of large wood; improve riparian vegetation	Improve rearing and refuge habitat for salmonids; provide a source of woody material to the river.
P. 100	Willamette Park	Map calls out increasing large wood along the riverbank.	Restore habitat structure and complexity to benefit juvenile salmonids

The Trustees' HEA calculation of credits ultimately depends directly on what restoration elements are incorporated into specific projects. The project applicant may select, with guidance from the Trustees' portfolio descriptions, which elements to invest in at each site.

L-039

We are also concerned that the Trustees' HEA model fails to incorporate the value of adding large wood to habitats in the Harbor Superfund Site and beyond. Considering the influence and improvement that large wood provides to riverine habitat-forming processes, as well as the fact that the Trustees recognize this asset and specifically call for the incorporation of it in more than 70% of their restoration portfolio projects as an element that improves juvenile salmon, lamprey, and sturgeon productivity, it is inappropriate that the HEA model does not incorporate credit for this process.

We recognize that in order for large wood to create and maintain habitat in perpetuity, the processes by which the watershed grows and supplies wood must be restored. This is accomplished by restoring riparian and upland forests throughout the entire watershed, and altering the practice of wood-removal from river and tributary channels. However, the time-scale for the recruitment of large wood from restored riparian areas is longer than the time-scale to reverse wild salmon declines. The interim solution for salmon habitat restoration, until the river's riparian resources can sustainably supply large wood on their own, is to install large wood wherever feasible. Placing "softly" engineered large wood in shallow water and active channel margins jump starts the recovery process (Bisson et al. 2003) by allowing immediate complexity for cover as resting refuge year-round, but particularly during high stress periods of flood flow and low flow/high temperature. Thirty-one (31) out of a total of 44 restoration portfolio projects recommend adding large wood, primarily for the improvement of fish and wildlife habitat function.

We recognize that juvenile salmon predation by non-native fish species may occur in the Harbor, which could potentially impact production. The extent to which this impact affects salmon productivity in the Harbor is unknown; however, Friesen et al. (2007) cites several authors, particularly Zimmerman (1999) that describe predation on juvenile salmonids by resident fish in the lower Willamette River to be minimal. The National Marine Fisheries Service's Lower Columbia River Recovery Plan (Draft 2012) describes predation by pikeminnow as a credible threat to juvenile salmon in mainstem habitats, but it is not listed as a primary or secondary factor believed to limit salmon and trout production. The plan describes the most threatening factor that limits salmon recovery as degraded channel habitat complexity. Degraded habitat is a primary limiting factor for every listed ESA population that uses the lower river and its tributaries, including the Willamette River.

Friesen et al. (2007) suggests, based on observations from their study (significant growth of juvenile salmonids, their presence in the harbor throughout much of the year, extensive feeding, and low predation rates and predator densities), that the lower Willamette River has value as rearing habitat for juvenile Chinook salmon, and that their predation rates are low. The assertion that large wood structure and complexity would promote salmon predation on juvenile salmon is unfounded.

The Trustees' statement that twice the species diversity and five times the abundance of fish are found in large wood accumulations is consistent with published literature. It is true that warm water temperatures (15°C +) induce stress on salmonids and favor warm water fish species; however, water quality conditions such as this are observed less than 25% of the year in the harbor, and when conditions reach stressful limits, juvenile fish require more abundant and frequent resting opportunities along their migration up and down the shoreline. The Trustees have not provide adequate site-specific scientific documentation to conclude that large wood structures are a detriment to salmon, steelhead and other native fish in the Willamette.

L-040

Large wood in the channel aids salmon and trout migrating along the shoreline by providing swimming respite between natural wood complexes or other types of shelter (resources that are extremely limited in the

lower Willamette River), especially during warm summer months, when they are most susceptible to disease, predation due to disorientation, or exhaustion. For the remainder of the year, when temperatures usually fall within Chinook salmon productivity requirements of 10 - 20°C (McCullough 1999, Bjornn and Reiser 1991, Bell 1986), large wood accumulations provide high flow refugia and food resources to salmon during critical life stages. Large wood in the river and nearshore areas serves rearing and migrating salmon and trout year-round because it provides predator refuge via interstitial spaces within rootwads and between branches and slash that can exclude larger-sized fish. Reingold (1968) regularly observed adult steelhead overwintering in large rivers because survival is higher there and the slightly higher temperatures in large mainstem channels enabled timely maturation. Disruptions in adult migration are certainly relevant during late summer and fall periods of low precipitation. Without ample velocities and turbid camouflage that come with rainfall, most salmon and trout pause and hold where they can find adequate cover to rest and avoid predators before moving up into their spawning grounds. This demonstrates another reason the lack of cover resources in the lower Willamette and Columbia Rivers limits production and needs to be addressed.

In order to be consistent with the current state of science, large wood structures should be incorporated into restoration project sites in the harbor to support the recovery of ESA-listed fish. Inclusion of wood in project designs should generate credit parties implementing restoration projects. Bringing adequate sizes and volumes of large wood to project sites and installing it using techniques that ensure high function can be expensive. If the Trustees are recommending this habitat forming process (in over 70% of their portfolio projects), then they should guarantee that the restoration designs that add large wood to the river generate credit for the projects.

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Comment Form

***Portland Harbor Natural Resource Damage Assessment (NRDA)
Draft Programmatic EIS / Restoration Plan (PEIS/RP)***

Thank you for taking the time to comment on the Draft Portland Harbor NRDA PEIS/RP. The comments that you make, in their entirety, including the personal information you provide, will become part of the public administrative record for this project. The Trustee Council will not consider anonymous comments, so you must provide a name and address. Responses to your comments will be provided in the Final PEIS/RP.

First Name: Jackie	Last Name: Calder
Street Address: 6825 N McKenna Ave	City, State, Zip: Portland Or 97203
Email: cleanriveroregon4@yahoo.com	Organization (if any): Portland Harbor Community Advisory Group
<input type="checkbox"/> Check here to sign up for project email updates	

Please write your comments below, and attach additional pages if you need more space. You can download this form and email your comments online at <http://www.fws.gov/oregonfwo/Contaminants/PortlandHarbor/default.asp>. Comments must be received by October 8, 2012.

Comments:

Comment on the Draft Portland Harbor Programmatic EIS and Restoration Plan by the Jackie Calder

C-041

Noting that there are 21 in the Broader Focus Area, I feel that these fall in communities that have a wealthier income base and therefore have more wherewithal to handle costs of restoring and upgrading the streams in these watersheds. While I understand some of the restoration is directed toward improving quality of habitat for the lamprey and in response to tribal culture needs, not all of the restoration outside of the Superfund or Study Area. On behalf of the neighborhood communities near the Superfund Study area who general have a lower income and show a higher minority percentage, I would like to see restoration take place in these areas because it would mean serving traditionally underrepresented groups by improving their neighborhood and lives in terms of the environment. It would provide additional habitat and flora and fauna where the Superfund has removed those opportunities. Restoring natural habitat and creatures where possible for North Portland would mean the children in these areas would receive the natural benefits that the fish, birds, mink, river otter, and trees and shrubs offer.

In comparison, Tryon Creek, Johnson Creek and Fanno Creek border many wealthy neighborhoods and reap their benefits.

Therefore, we ask why only half of the restoration be directed to the SSA rather in those neighborhoods who bear the burden of the adjacency of the Superfund site?

Perhaps the Trustees were unaware but Portland holds a tradition of ignoring environmental justice issues when it comes to North and Northeast Portland such as building freeways and hospitals. The proposed restoration, if not re-oriented will result in the same type of situation. It will continue the pattern of disenfranchising neighbors to the North and caters to those who live in economically and politically more resilient.

There is no doubt that the SSA was selected because of its injury. To not respond to those damages as much as possible by rectifying with restoration seems counterproductive.

C-042

While most of the proposed restoration design seems thorough and very well designed, we ask if the possibility of habitat for sturgeon that will be lost when the Confined Disposal Facility is built in Terminal 4, Slip 1 that it is replaced or a relocation effort be established for the sturgeon be considered. While we understand the difficulty in characterizing and studying the sturgeon on the whole due to the lack of available research, in turn, we request that the effort be made perhaps in collaboration with the Port of Portland or the Lower Willamette Group who have proposed the Confined Disposal Facility and is responsible to the Department of State Lands as those waters where the sturgeon and



other species reside are part of the "Public Trust" which is held in tact by the Department of State Lands.

C-043 Also, if possible, we would like to see if potentially a salmonid run or series of "safe harbors" could be created in the Superfund site to improve upon the gauntlet that salmonids face when they migrate toward the Columbia. Perhaps establishing slightly offshore islands could be created that would be anchored so that they would not move but not interfere with navigational traffic. At one time, Oregon and Portland had an amazing salmon habitat and fish industry so large they were whole state departments devoted to its protection and perpetuation. Only a vestige of that habitat and industry remains. Perhaps a secondary benefit of enhancing salmon habitat is that a truly sustainable, nonpolluting industry could be revitalized.

C-044 In that same vein, we would also like to see a locale of conducive habitat created to raise and nurture small-mouth bass, perch, carp, crappe in order to study and monitor their health during the decontamination process of the Portland Harbor clean up and afterwards. Unlike angling for salmon that requires a boat to achieve any productive catch, these fish are the ones available to those people who cannot afford a boat but instead fish from the shoreline for subsistence and recreational fishing.

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Comment on Specific Locations -

C-045 ASH GROVE CEMENT

This property appears to be a great candidate for restoration as it is vacant, zoned industrial but cleared and ready for the next activity. But there is another similar property with some of the same characteristics that should be included. After attending the NP Greenway Trail meeting with the City of Portland's Emily Roth, I learned that Ash Grove Cement is part of their plans of restoration in providing a bike and pedestrian trail. Perhaps, these could be coordinated in order to support the efforts of each other.

Baltimore Woods is a similar area in that it does not have direct connectivity to the river but could be an excellent asset providing habitat for river creatures and be good filtering zone for water draining into the river. Baltimore Woods could serve as important hunting area for bald eagle, osprey, spotted sandpiper, mink and other species. It also carries historical significance as landing location for the Lewis & Clark Expedition.

Cathedral Park **C-046**

Again, coordinating with the City of Portland for the benefit of creature habitat but also would support the efforts with the NP Greenway Trail going through the park instead of on city streets. City streets are fine for the proposed bicycle path but not for those children and adults seeking the respite of a natural area like that suggested in the Programmatic Restoration Plan.

C-047 →

C-048

Columbia River Slough

Many locations suggested are now outside the connection to the Superfund site. Because of its need, the adjacency to lower income neighborhoods, this too could benefit from Programmatic Restoration Plan. Restoring this area could contribute to the effects that have impacted the Columbia River. It too has a fish advisory and has historical connection to tribes and Lewis & Clark.

C-049

Doane Creek

This area should be last on everybody's list, mainly because it is so polluted that it will take miracles to get its recovery past toxicity, yet alone all the major enhancements to bring it back to what might be even considered normal. Even matching 1980 standards, most creeks would be improved but because of its adjacency to the production of Agent Orange, Doane Creek would still be highly polluted. My fear is that to reverse its level of contamination would cost exorbitantly and then would not be anything but substandard remediation and to sacrifice funds that could be applied to more immediately promising areas seems futile.



Comments Continued:

Please email comment form to: portlandharbor.restoration@noaa.gov

Or mail comments to: Megan Callahan Grant
NOAA Restoration Center
1201 NE Lloyd Blvd., Suite 1100 -

Portland, OR 97232 -

PORTLAND HARBOR
Natural Resource Trustee Council





PORTLAND BUSINESS ALLIANCE

Leading the way

October 9, 2012

Megan Callahan Grant
NOAA Restoration Center
1201 NE Lloyd Blvd., Suite 1100
Portland, OR 97232

Dear Ms. Grant,

The Portland Business Alliance represents more than 1,300 small, medium and large employers in the greater Portland Metropolitan area. The Alliance would like to take this opportunity to comment on the Draft Portland Harbor Programmatic EIS and Restoration Plan (July 9, 2012) and specifically statements made in Section 4.3.2 Socioeconomics that reference a 2012 document by the Portland Business Alliance, titled *Land Availability, Limited Options: An analysis of industrial land ready for future employers*.

The DEIS cites the Alliance report as justification for its conclusion, "given that any conversion of industrial land to restoration use would represent a very small percentage of available industrial land in Portland Harbor, and that the sites in the Portfolio do not meet the size criteria for the industrial land in highest demand, only minor or no impact is anticipated on the quantity of land available for industrial or water-dependent uses." This statement is completely contrary to the intent and conclusions of the Alliance report and is unsupported by any honest reading of its findings.

PR-026

The report analyzed a specific land type, potential industrial sites of 25 acres or larger, because previous analysis by Metro identified a potential shortfall in sites of this kind. Large sites are indeed important to the state and regional economic development strategy and the *Land Availability* report acknowledged this fact. But that does not mean that small sites are unimportant. The report does not state or even imply that industrial sites of less than 25 acres are unimportant.

PR-027 The report did not attempt to examine the issue of harbor access or marine industrial lands which are, by definition, much more limited than general industrial lands, which were the focus of the *Land Availability* study. Even a small reduction in harbor or marine industrial lands could have significant negative economic repercussions because there are no viable alternative sites.

PR-028 The *Land Availability* report also did not examine the issue of demand for harbor or marine industrial lands. The city of Portland's recently adopted Economic Opportunity Analysis did and concluded that the city is already more than 600 acres deficient in harbor and marine industrial lands relative to expected demand.

PR-029 Finally, the *Land Availability* report looked only at potential new industrial sites, not existing sites. Nothing in the Alliance report can be read to infer conclusions about potential impacts on existing industrial operations in the harbor. Even small reductions in the size of sites of existing firms in the harbor could have a significant impact.

PR-030 The argument in the DEIS seems to be that there's very little developable land in the harbor so further reductions through conversions to restoration won't have much economic impact. In fact, because there are so few marine and harbor industrial lands, the report would lead to a conclusion in favor of less conversion not more.

The Alliance believes the conclusions in the DEIS regarding the potential economic impact of conversion of industrial land to restoration are not supported by the *Land Availability* report nor by the city's Economic Opportunity Analysis, and we ask that they be removed from the document.

Thank you for considering our comments on this important issue.

Sincerely,



Sandra McDonough
President & CEO
Portland Business Alliance



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October 8, 2012

Via Email and U.S. Mail

Ms. Megan Callahan Grant
NOAA Restoration Center
1201 NE Lloyd Blvd., Suite 1100
Portland, OR 97232

Re: Comments on Draft Portland Harbor Programmatic EIS

Dear Megan:

These comments are offered on behalf of Portland General Electric with respect to the Trustees draft Programmatic Environmental Impact Statement for habitat restoration projects with respect to the Portland Harbor Superfund Site. They are intended to offer constructive suggestions about how the Trustees might improve the EIS. Please let us know if you have any questions about the comments.

P-059 **Importance of Off-Channel Habitat.** The PEIS does not make as strong a case as it might for why restoration of off-channel and side-channel habitat in the Portland Harbor is of higher importance than other restoration activities within the larger Willamette River and lower Columbia River sub-basins. The PEIS would benefit from a section that clearly establishes why habitat restoration in the Portland Harbor is of higher priority than other potential restoration activities in a larger geographic area. In the white paper *An annotated bibliography of studies pertinent to the issue of whether to target restoration in the Portland Harbor study area*, provided by the Trustees in June, 2011, a number of studies are cited that document the need and priority for restoration and re-creation of off-channel and side-channel habitats in the Portland Harbor. The PEIS would benefit from inclusion of these arguments and citations.

P-060 **Existing Recovery Plans.** The PEIS does not thoroughly evaluate how the proposed Portland Harbor Restoration Plan aligns with species recovery plans already in existence. The PEIS would benefit from an analysis of how the proposed restoration plan aligns with the goals of established restoration and recovery plans. For example, the Northwest Power and Conservation Council's 2005 *Draft Willamette River Subbasin*

P-060 **Plan** clearly addresses the priority and need for off-channel and side-channel habitat restoration in the Portland Harbor.

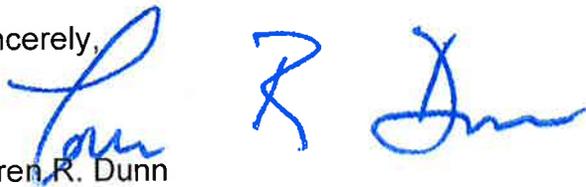
P-061 **Analysis of Cumulative Beneficial Effects.** The PEIS' cumulative effects analysis does not evaluate the beneficial effects of the proposed restoration plan. Analysis of beneficial effects is now a standard requirement in NEPA analysis and would help further to explain and enumerate the merits of the proposed restoration program.

P-062 **Climate Change.** The PEIS' cumulative effects analysis does not evaluate the potential effects of climate change on the proposed restoration plan. Analysis of climate change is now a standard requirement in NEPA analysis and may further help to establish the value of restoration and re-creation of off-channel and side-channel habitats in the Portland Harbor.

P-063 **Monitoring Component.** The PEIS does not specifically evaluate the proposed lamprey monitoring component discussed in the Monitoring and Stewardship Plan. This raises concerns that the monitoring activities for lamprey may not be covered under the programmatic NEPA authorization and that future restoration activities designed to enhance or restore lamprey habitat will not be able to tier from the PEIS. To a lesser extent, the PEIS is vague on what monitoring and stewardship activities would be covered under the PEIS. Consequently, the PEIS would benefit from a clear description of the expected monitoring and stewardship activities that would be covered under this programmatic.

PGE appreciates the opportunity to comment. Please let us know if you need a clarification or any further information.

Sincerely,



Loren R. Dunn
of

RIDDELL WILLIAMS P.S.

LRD/lal
Counsel for Portland General Electric

Cc: Richard George
Jayne Allen
Arya Behbehani
Brad Rawls
David Weatherby

Laura Feldman, 6920 N Charlestown at St. Johns.

Comment recorded 8/2/2012

I just live a block or two from the river, and I am very interested the current cleanup of the river and so that's why I'm here tonight learning about the restoration plan.

Well, part of what I notice immediately and throughout the night is one glaring omission, for me, from the Portland Harbor Draft Restoration Plan and EIS. And that is including people, restoring, um, restoring not only the ecosystem but people's relationship to the ecosystem and that happens with education. So, I think place-based education is really crucial. So we need to, we as residents, need to learn about the river, what is imperiling the river. We need to connect with the river again, we need to learn to love the river again basically; not just recreate on it or use it as a commercial resource, but relate to it again, become part of it. I know that it probably sounds a little bit woo woo but I can't help it. I think it's, I think it's key. In the plan they talk about stewardship for ten years after project implementation, and I want to suggest that this guardianship can only happen if people have a relationship with the river, it's more likely to happen, and to continue to happen as this relationship is passed onto their children. So, I guess that's mostly what I wanted to say tonight is that that relationship, that education about the river, the watershed needs to happen. And there are different ways of doing this. There's a lot of different community-based models that one can look at to see what could work. But I think definitely youth and the people who live around this part of the river, the Lower Willamette, that is so polluted, that is going to be cleaned up supposedly. You need to involve these people, caretakers, you know, that's the way to ensure success. And I think engaging K through 12, high school students, as well as the University of Portland, which is right there next to the Willamette Cove, one of the most toxic sites, these people need to be at the table. There's a wonderful slogan from South Africa that says "anything without us, anything for us without us..." No..."anything about us without us is not for us". And I think that's just what it's all about. I appreciate these efforts but you know it's the human and the non-human environment together we need to learn how to live with this river in harmony and all of that wildlife that surrounds it.

N/A-018

N/A-019

N/A-020

October 8, 2012

VIA E-MAIL

Ms. Megan Callahan Grant
NOAA Restoration Center
1201 NE Lloyd Blvd, Suite 1100
Portland, Oregon 97232

Re: Gunderson Supplemental Comments on Draft Portland Harbor
Programmatic EIS and Restoration Plan

Dear Ms. Callahan Grant:

Gunderson participated in the comments on the Draft Portland Harbor Programmatic EIS and Restoration Plan (PEIS) submitted by Joan Snyder of Stoel Rives LLP on behalf of several funders of the Portland Harbor Trustees' Natural Resource Damage Assessment (the Commenters). Pages 11-24 of those comments discuss the Trustees so-called 50/50 rule, which artificially restricts the geographic scope of restoration alternatives considered under the PEIS. These comments supplement a portion of that discussion. Specifically, all references to the recommendations or conclusions of the so-called "panel of experts" should be deleted from the PEIS. This panel is discussed primarily in sections 2.4 and 5.3 of the PEIS.

It is clear that the Trustee council, including NOAA, made a policy decision to require at least 50% of restoration to occur within the working Harbor itself—or within the SSA as it is called in the PEIS. For all of the reasons discussed by the Commenters, this is a bad policy decision, and use of this 50/50 rule as a pre-ordained assumption in the PEIS inappropriately narrows the scope of alternatives evaluated. But, whatever the Trustee council ultimately decides is its policy with regard to the 50/50 rule, NOAA should delete all reference to the panel of experts as support for that policy. "Panel of experts" connotes a group of scientists approaching their work objectively without allegiance to organizations or ideology. The panel referred to in the PEIS is, in contrast, a panel of two independent scientists, plus two policy advocates that strongly favor a policy of establishing juvenile Chinook resting and rearing habitat within the Portland Harbor.

P-021

P-022

As stated by the Commenters:

"In addition to the fact that the expert panel's charge and report provides inadequate scientific support for the 50/50 rule, the panel's conclusions must be disregarded because of the obvious undue bias of at least one of the four panel members – Chris Prescott of the City of Portland – presumably the one that was the strongest advocate for requiring restoration projects within the study area. The City of Portland has been actively engaged for years in pursuing a policy of encouraging restoration projects within Portland Harbor. This policy was perhaps best manifested by the City's attempted implementation of the River Plan/North

Reach which was subsequently overturned by the Oregon Land Use Board of Appeals and the Oregon Court of Appeals because the City of Portland failed to adequately weigh impacts on business, industrial lands, and economic interests. *Gunderson v. City of Portland*, 259 P.3d 1007 (2011).

This PEIS/RP is too important to rely on potentially biased input, particularly when it could rely instead on peer-reviewed scientific literature, thus making it less vulnerable to challenges. Thus, it should not rely on input from a City of Portland employee, regardless of scientific credentials, as to whether the Trustees should require that habitat restoration projects be sited within the Portland Harbor and within the City of Portland. And, given the evidence discussed above that the report of the panel was a compromise rather than a scientific conclusion, it should not rely on a panel report potentially tainted by that input."

In addition to the problem with the city employee on the panel, Nancy Munn of NOAA/NMFS was also a panelist, and also likely a strong advocate on the panel for requiring restorative projects within the SSA. Since the beginning of the development of the discredited North Reach plan, Ms. Munn has been a vocal policy advocate for siting juvenile Chinook resting and rearing habitat within Portland Harbor and specifically within the heart of the working harbor. For example, beginning in the spring of 2007 she participated as a member of a Portland Harbor Mitigation/Conservation Bank Task Group where she was identified as an employee of NMFS and "a working member of the trustee council." See <http://www.portlandoregon.gov/bps/44236>. Obviously, as a working member of the trustee council, she helped to develop the very policy that she was later called upon, as part of the "panel of experts" to endorse. Ms. Munn's policy advocacy on these issues began well before 2007 and extended well beyond. NOAA has an Administrative Order, 202-735D, that speaks specifically to "Scientific Integrity." Section 6 of that Administrative Order requires all NOAA employees and contractors to:

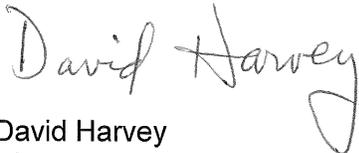
- "• Clearly differentiate between facts, personal opinions, assumptions, hypotheses, and professional judgment in reporting the results of scientific activities and characterizing associated uncertainties in using those results for decision-making, and in representing those results to other scientists, decision-makers, and the public.
* * *
- Approach all scientific activities objectively and completely, and accurately report results in a timely manner without allegiance to individuals, organizations, or ideology.
* * *
- Objectively consider conflicting data and/or studies."

One of the goals of the Administrative Order is to promote transparency. There is nothing transparent about the reported findings of the "panel of experts," including any indication of the roles played by the individual panel members, or the points at which members were expressing personal opinions that extend beyond the scientific findings. There was also no apparent consideration by the policy advocates on the panel of an extensive body of conflicting science.

Megan Callahan Grant
October 8, 2012
Page 3 of 3

There is nothing inherently wrong with being a policy advocate, but an advocate is not an independent expert. NOAA and the Trustee Council should not be promoting four people as an independent panel of experts when two of them have an obvious policy bias by virtue of their employment, or their prior policy advocacy, or both. The conclusions of this so-called panel of experts should not be referenced as providing scientific validity for the 50/50 policy, because of an overt policy bias, and for all the reasons set forth by the Commenters.

Sincerely,

A handwritten signature in cursive script that reads "David Harvey". The signature is written in dark ink and is positioned above the typed name and title.

David Harvey
Director of Environmental Health & Safety

MM/jmf/kw

002402/00214/3988211v1

Enclosure

Copy: Max M. Miller, Jr., via e-mail only



6 Penns Trail, Suite 201
Newtown, Pennsylvania 18940
Phone 267.753.6301
Fax 267.753.6306

October 8, 2012

Ms. Megan Callahan Grant
NOAA Restoration Center
1201 Northeast Lloyd Boulevard, Suite 1100
Portland, Oregon 97232

Re: Comments on the Draft Portland Harbor Programmatic Environmental Impact Statement and Restoration Plan

Dear Ms. Callahan Grant:

This letter provides comments on the *Draft Portland Harbor Programmatic Environmental Impact Statement and Restoration Plan* (Draft PEIS/RP) on behalf of NW Natural. The Portland Harbor Trustee Council (Trustees) provided notice that the Draft PEIS/RP was being released for public comment in the Federal Register (Vol. 77, No. 129, 39686) on July 5, 2012. NW Natural appreciates the time and effort the Trustees have put into developing the Draft PEIS/RP and the opportunity to comment on the document. NW Natural provides the following comments with the intent of continuing to work cooperatively with the Trustees to reach settlement for alleged injury related to releases of hazardous materials at the Portland Harbor site:

- NW Natural believes there should be flexibility in the location of restoration projects and the percentage of an individual party's natural resource damage (NRD) liability that must be satisfied in the Superfund Study Area (SSA) rather than in any other geographic area. Lines 37 through 40 on pages 7 through 12 of the PEIS/RP, state that "*The Trustee Council has determined that each settling PRP must provide at least one-half of its compensatory restoration inside of the SSA, and may provide no more than one-half of compensatory restoration within the broader focus area. Projects located outside either of these areas will not be considered.*" Rather than pre-determine the geographic breakdown of restoration projects and the minimum percentage of NRD liability that must be satisfied in the SSA, NW Natural encourages the Trustees to instead provide a more generalized but still prioritized list of locations. For example, priority could be given to projects in the following areas, to the extent possible: 1) within the SSA; 2) within the broader focus

P-001

P-001

area (BFA); and 3) other locations on a case by case basis. Priority should also be given to projects that provide significant benefit without regard to whether they fall to one side or the other of a geographic line.

Not pre-determining the geographic and percentage breakdown of restoration locations is important to consider because a more generalized approach provides more incentive for implementing early restoration projects and still results in substantial benefits to the target species. For example, restoration within the SSA must consider issues related to the future remediation work, such as the potential for recontamination during remediation or delays due to the need to remediate a site prior to restoration.

NW Natural believes that it is important to recognize that a ratio of 50:50 split between the SSA and BFA for restoration is not necessary because the same species are present in both areas (and areas outside of the BFA), including juvenile Chinook salmon. Furthermore, the same limiting factors are present within both areas, including lack of connectivity to the floodplain, lack of active channel margin (ACM) and shallow water habitat, and lack of off-channel habitat. Therefore, implementing restoration in the BFA or other areas would provide as valuable habitat benefits to species of interest as restoration occurring within the SSA. In fact, some restoration opportunities in the BFA may provide better overall habitat function and scale than those available within the SSA.

This approach would allow flexibility in settlement discussions with individual parties or groups of parties and is consistent with the approach taken at other Superfund sites in the region (e.g., Lower Duwamish Waterway).

- NW Natural generally agrees with the flexibility built into the monitoring and stewardship framework that allows for developing a site-specific monitoring and stewardship plan on a case by case basis depending on specific restoration goals and objectives. NW Natural has a general concern that the monitoring activities related to the functional objectives (e.g., fish and wildlife monitoring) will be expensive and encourages the Trustees to provide the expected costs of this monitoring and discuss in the PEIS/RP how these types of broader scale monitoring activities will be cost-effective and how the information they generate will be used.

P-002

Again, thank you for the opportunity to provide comments on this document and please do not hesitate to contact us directly if you have any questions related to these comments.

Sincerely,

A handwritten signature in black ink, appearing to read "D. Haury". The signature is written in a cursive style with a large initial "D" and a stylized "H".

David Haury
Anchor QEA, LLC

cc: Bob Wyatt, NW Natural
Patt Dost, Pearl Legal Group

DH:rrw



Comment Form

Portland Harbor Natural Resource Damage Assessment (NRDA) Draft Programmatic EIS / Restoration Plan (PEIS/RP)

Thank you for taking the time to comment on the Draft Portland Harbor NRDA PEIS/RP. The comments that you make, in their entirety, including the personal information you provide, will become part of the public administrative record for this project. The Trustee Council will not consider anonymous comments, so you must provide a name and address. Responses to your comments will be provided in the Final PEIS/RP.

First Name: Amy	Last Name: James-Neel
Street Address: 3934 NE MLK	City, State, Zip: Portland OR 97212
Email: amy@tradeswomen.net <input checked="" type="checkbox"/> Check here to sign up for project email updates	Organization (if any): Oregon Tradeswomen, Inc.

Please write your comments below, and attach additional pages if you need more space. You can download this form and email your comments online at <http://www.fws.gov/oregonfwo/Contaminants/PortlandHarbor/default.asp>. Comments must be received by October 8, 2012.

Comments:

PR-025

Contractors looking for work on restoration implementation projects should be required to demonstrate a plan for including a significant percentage of women & minorities working on their crews, on the projects. Women & minorities deserve equal access to the ~~the~~ skilled, high-wage jobs inherent in clean up & restoration.

Comment Form

***Portland Harbor Natural Resource Damage Assessment (NRDA)
Draft Programmatic EIS / Restoration Plan (PEIS/RP)***

Thank you for taking the time to comment on the Draft Portland Harbor NRDA PEIS/RP. The comments that you make, in their entirety, including the personal information you provide, will become part of the public administrative record for this project. The Trustee Council will not consider anonymous comments, so you must provide a name and address. Responses to your comments will be provided in the Final PEIS/RP.

First Name: edward	Last Name: jones
Street Address: 10250 NW 110 th Ave	City, State, Zip: portland, OR 97231
Email: linntonlanduse@gmail.com	Organization (if any): Linnton Neighborhood Association
<input checked="" type="checkbox"/> Check here to sign up for project email updates	

Please write your comments below, and attach additional pages if you need more space. You can download this form and email your comments online at <http://www.fws.gov/oregonfwo/Contaminants/PortlandHarbor/default.asp>. Comments must be received by October 8, 2012.

Comments:

My coments are directed to the community participation aspect of the plan.

C-023

In the context of preserving habitat the long view is needed. Laws, much less policies or office holders, won't last as long as protections will be needed. To ensure that the protections survive there must be a mechanism for long term public support of the actions taken. Hidden habitat will not gain the public attention and protection it needs. Every site needs to include public viewing and participation opportunities to ensure that the public stays involved in protecting the sites. Smith and Bybee lakes provide a useful example. The viewing areas bring the public in and create public support for the environmental goals of the area. Particularly along the rivers what is needed, long term, is everyday witnesses.

We encourage the Trustee Council to build into the plan the mechanisms which will ensure there is public support now and far into the future for the habitat areas that the council creates.



Comments Continued:

Please email comment form to: portlandharbor.restoration@noaa.gov

Or mail comments to: - Megan Callahan Grant -
NOAA Restoration Center -
1201 NE Lloyd Blvd., Suite 1100 -
Portland, OR 97232 -

September 30, 2012
Comments Due: October 7, 2012

Attn: Megan Callahan Grant, NOAA
NOAA Restoration Center
1201 NE Lloyd Blvd. #1100
Portland, OR 97232
Email: portlandharbor.restoration@noaa.gov

RE: Portland Harbor Programmatic EIS and Restoration Plan

Dear Megan Callahan Grant,

I am writing to you as an undergraduate student at the University of Colorado in regards to the proposed restoration plan of Portland Harbor. There are many sections I find beneficial for this restoration project. Thank you for taking the time to consider public comments for this restoration plan.

The restoration goals and objectives would improve the quality of the Portland Harbor immensely. Clean up the chemicals that are currently in the harbor will improve the quality of life for the species, people and natural resources that reside there. Also by providing a sustainable habitat for fish and wildlife the overall ecosystem will recover in a more natural way. Overall, the plan has good intent and could increase the quality of life for many.

The Integrated Habitat Restoration Planning Alternative would be the alternative that I approve of the most. As it is the preferred plan, I understand that it is also the alternative the NOAA Restoration Center agrees with as well. The Species – Specific Restoration Planning Alternative is also good but I do have concerns. **This alternative is good for a particularly “injured” species, but the overall effects would be much less than the integrated habitat alternative. Also, the species-specific alternative could show problems such as who or what judges why a particular species gets to be restored and what about the habitat on which it relies. The species may be restored, but if its habitat is not as well the species will not be able to thrive.** The No-Action alternative I see as problematic because this area needs the restoration.

N/A - 012

I believe that the draft EIS was thorough and included both consequences and what would be done about them. There is nothing I have questions on as they were all answered.

Thank You,

Samantha Ketts
2915 Baseline Rd #231
Boulder, CO 80303

Samantha.ketts@colorado.edu

THE LOCAL AND REGIONAL ECONOMIC IMPACTS OF PORTLAND WORKING HARBOR, 2011

Prepared for:



JULY 16, 2012

Martin Associates

941 Wheatland Ave., Suite 203

Lancaster, PA 17603

www.martinassoc.net

Economic Impacts of Portland Working Harbor

Portland's Working Harbor (referred to as Portland Harbor) is the deep water shipping channel and surrounding marine, commercial, industrial and transportation infrastructure from about the Broadway Bridge on the Willamette River (RM 11.65) to Terminal 6 on the Columbia River. (Refer to Figure 1). Portland Harbor includes public and private marine terminals, industrial parks, and other commercial and warehousing businesses. Martin Associates was retained by the Port of Portland to prepare a study that presents the economic impacts of the terminals and firms located within Portland Harbor.

As background, Martin Associates recently completed two related studies for the Port of Portland that were reported in The Local and Regional Economic Impacts of the Port of Portland, 2011 (the "Port of Portland Economic Impact Study"):¹

- (1) The Economic Impacts of the Portland Harbor. This study provided the economic impacts created by marine cargo and vessel activity handled at and related to marine terminals located in the Portland Harbor, but did not include economic impacts of other businesses located within Portland Harbor. The study focused on the public marine terminals owned by the Port of Portland and private marine terminals located within the Harbor boundaries as defined by the U.S. Army Corps of Engineers. The Port of Portland's public marine terminals include Terminal 6, which is the primary ocean container terminal on the Columbia River; Terminal 2, which handles breakbulk cargoes and steel; Terminal 4, which handles bulk products, as well as breakbulk cargoes and automobiles; and Terminal 5, which handles grain and mineral bulks. Automobiles and breakbulk are also handled at Terminal 6. Private marine terminals within the Portland Harbor handle grain, petroleum products and dry bulk cargoes such as cement, alumina, sand and gravel and limestone. In calendar year 2011, these public and private marine terminals in the Portland Harbor handled nearly 24 million tons of cargo for exporters and importers located within the metropolitan region, the State of Oregon, as well as throughout the Pacific Northwest and the United States.

- (2) The Economic Impact of the Port of Portland's Industrial Parks. This study included the economic impacts of the tenants located in the industrial parks developed by the

¹ The Local and Regional Economic Impacts of the Port of Portland, 2011, prepared for the Port of Portland, March, 2012, by Martin Associates. This report summarizes three separate studies: The Economic Impacts of the Portland Harbor; The Economic Impacts of the Real Estate Tenants of the Port's Business and Industrial Parks; Economic Impacts of PDX and General Aviation Airports

Port of Portland² at Swan Island, Rivergate, Troutdale Industrial Park and Portland International Center. The study excluded marine terminals, airport properties and other Port-owned properties not contained in these parks. Two of these industrial parks—Swan Island and Rivergate—are located within Portland Harbor.

Martin Associates was retained to expand the Port of Portland Economic Impact Study to identify the total economic impacts of the companies located within Portland Harbor, regardless of whether the uses were water dependent or whether the firms are located within the Port's Rivergate and Swan Island industrial and business parks.

The 2011 Economic Impact of the Portland Harbor only included the economic impacts of the service providers and marine terminals and tenants that were dependent on the use of the marine terminals to ship and receive cargo. For those tenants and service providers that were only partially dependent upon the use of the marine terminals, employment was adjusted down to only reflect the portion that is dependent on the use of the terminals. Employment with the firms that were not directly dependent on shipping and receiving cargo via the terminals was not included in the economic impact analysis.

Similarly, the economic impacts measured for the Port of Portland developed industrial parks only include the impacts of the tenants of these parks, particularly the Rivergate and Swan Island industrial parks, and not the economic impacts of firms located within the harbor as a whole. Therefore, the marine cargo and real estate tenant economic impacts measured in the Port of Portland Economic Impact Study are a subset of the total economic impacts of the Portland Harbor.³

To measure the total impacts of the Portland Harbor, Martin Associates was provided access to the Oregon Employment Department (OED) data base by Port of Portland. This confidential data base was used to identify those firms not included in the Portland Harbor Economic Impact Study, as well as the employment of the firms that were only partially included in the impact analysis based on the degree of dependency on shipping and receiving cargo via the public and private marine terminals. Similarly, those non-maritime dependent firms located within the geographical boundaries of the Portland Harbor, but not tenants of the Port of Portland's Rivergate and Swan Island industrial and business parks were identified from the OED data base. The OED data base includes employment and average salary for each firm. The data in the OED data base was used to match the employment data measured for each firm included in the Port of Portland Economic Impact Study with that firm data in the OED data

² Also included were the economic impacts generated by the Port of Portland International Airports and general aviation activity at the Port operated airports of Hillsboro and Troutdale.

³ The impacts of PDX and the general aviation airports and the tenants of the Portland International Center and the Troutdale Industrial park are not included in the Portland Working Harbor.

base, so as to identify employment that was not dependent upon the cargo activity at the private and public marine terminals.⁴ In addition, the OED data base was used to identify non-maritime cargo related firms that were not tenants of the Rivergate and Swan Island industrial and business parks.

The firms from the OED data base were categorized by NAICS code, and then the additional employment not included in the Port of Portland Economic Impact Study was identified by NAICS code. The real estate models developed by Martin Associates as part of the Port of Portland Real Estate Economic Impact Study were then used to estimate the economic impacts of the additional employment not included in the Port of Portland Economic Impact Study. These models are NAICS code specific and developed from the actual data provided to Martin Associates as part of the Port of Portland Economic Impact Study. The Martin Associates' Marine Seaport Impact Model was used to estimate the economic impacts of firms whose employment was only partially counted in the Port of Portland Harbor Economic Impact Study.

The results of the analysis of the additional economic impacts were then combined with the previously estimated economic impacts measured for the marine cargo activity at the Portland Harbor and the economic impacts of the tenants of the Swan Island and Rivergate Industrial Parks.

The economic impacts measured are:

- Employment impact;
- Personal earnings impact;
- Business revenue impact; and
- Tax impact.

Direct jobs are those jobs held by employees of a particular firm, and are measured in terms of full-time equivalent workers. The employment is based on a survey of more than 800 firms conducted by Martin Associates as part of the Port of Portland Economic Impact Study, and combined with the firm-specific employment data provided from the OED data base.

Those directly employed by firms in a given industry receive wages and salaries. A portion of the wages and salaries is saved; another portion is used to pay personal taxes, while a final portion is used to purchase goods and services. A percentage of these purchases are made

⁴ The employment data used in the Port of Portland Economic Impact analysis of the Portland Harbor is based on detailed survey data collected by Martin Associates, and the jobs are expressed in terms of full-time employees. The OED data is number of jobs. However, budget limitations did not permit a detailed survey of all firms located in the Portland Working Harbor.

in the Portland metropolitan area, while some consumption purchases are made outside the area. These consumption purchases, in turn, generate additional jobs in those firms supplying the goods and services. The *induced jobs* measured in this study are only those generated in the Portland metropolitan area.

Jobs, which are created due to the purchases by firms, not individuals, are classified as *indirect jobs*. These jobs are estimated based on the local purchases made by the firms located within the Portland Working Harbor.

The *income impact* consists of the level of wage and salary earnings associated with the jobs created by the maritime, aviation and real estate tenants, and is adjusted to reflect re-spending throughout the economy. The personal income impact is, for the most part, based on salary and annual earnings data provided from the survey conducted by Martin Associates. As described above, individuals directly employed by a firm use a portion of their income to purchase goods and services. A portion of these purchases is made from firms located in the Portland area, while another portion is used for out-of-region purchases. Re-spending of income within a geographical region is measured by an income multiplier. The size of the multiplier varies by region depending on the proportion of in-region goods and services purchased by individuals. The higher this percentage, the lower the income leakage out-of-region.⁵

The *revenue impact* is the measure of direct business revenue received by firms located in the Portland Working Harbor.

The *state, county and local tax revenues* are generated by economic maritime activity at the marine terminals and by the activity of the real estate tenants of the Port of Portland Business and Industrial Parks and other firms located within the Portland Working Harbor.

⁵ It is to be noted that different income multipliers are used to estimate the induced job impacts and the re-spending and consumption impacts for seaport activity and real estate activity. The income multipliers, as estimated for Martin Associates by the U.S. Bureau of Economic Analysis for the Portland regional economy, reflect the level of salary associated with each industry group, as well as the leakages of income from the Portland economy for the specific industry sector. Because of the higher direct wages and salaries associated with seaport activity, the direct income multiplier used to measure the impacts of the seaport activity is higher than the direct income multiplier associated with the real estate tenants.

The combined economic impacts of the Portland Working Harbor are presented in Exhibit I.

Exhibit I
Economic Impact of the Portland Harbor

TOTAL HARBOR WIDE	
Jobs	
Direct	23,646
Induced	14,739
Indirect	14,399
Total	52,784
Personal Income	
Direct	\$1,182,639,000
Re-Spending/Local Consumption	\$1,720,553,000
Indirect	\$714,306,000
Total	\$3,617,498,000
Business Revenue	\$7,607,030,000
Local Purchases	\$1,288,362,000
State/Local Taxes	\$350,723,000

In summary, 52,784 direct, induced and indirect jobs are supported by the Portland Harbor:

- 23,646 jobs are directly created by the firms located within the Portland Harbor.
- As the result of local purchases by the 23,646 directly employed workers, an additional 14,739 induced jobs are supported in the local economy to provide goods and services to those directly employed.
- 14,399 indirect jobs are also supported in the local economy as the result of the local purchases of goods and services by the firms located within the Portland Harbor.

Businesses located within the Portland Harbor received \$7.6 billion of direct business revenue. The \$7.6 billion of revenue received by the businesses providing the services in the Portland Harbor does not include the value of the cargo moving over the marine terminals, since the value of the cargo is determined by the demand for the cargo, not the use of the marine terminals.

The business activity located within the Portland Harbor also created \$3.6 billion of direct, induced and indirect personal wage and salary income and local consumption expenditures for Portland metropolitan residents. The consumption expenditures are a part of the direct multiplier effect, and measure the local consumption expenditures by those directly employed. The consumption expenditures support the induced jobs. The 23,646 direct job holders received \$1.2 billion of direct wage and salary income, for an average salary of \$50,000.⁶

A total of \$350.7 million of state and local tax revenue was generated by activity in the Portland Harbor in calendar year 2011.

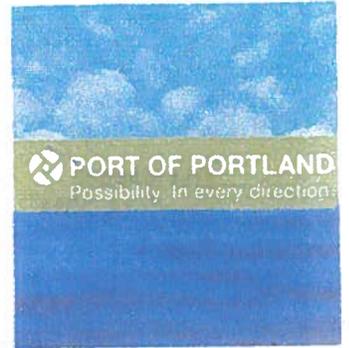
⁶ The re-spending and local consumption impact cannot be divided by induced jobs to estimate average induced salary, since local consumption expenditures are counted in the re-spending effect. This would overstate the average induced wage and salary per induced job.

FIG 1. PORTLAND HARBOR STUDY AREA



COPY

Mission: To enhance the region's economy and quality of life by providing efficient cargo and air passenger access to national and global markets.



March 18, 2011

Ms. Erin Madden, Chair
Portland Harbor Natural Resource Trustee Council
Cascadia Law PC
2716 SE 23rd Avenue
Portland, Oregon 97202

Dear Erin:

Thank you for your February 14 letter regarding West Hayden Island as a potential restoration opportunity site in the Portland Harbor Natural Resources Damage Assessment process. As mentioned in our discussions during the November tour of West Hayden Island, the Port is supportive of restoration-based NRD settlements and we believe a portion of West Hayden Island could play a significant role in that process. This letter provides comments on the assumptions and project description to ensure the Trustee Council's information regarding West Hayden Island will support development of restoration concepts that are truly feasible and implementable.

While some of the property may be available for NRD projects, the fact sheet draws an inaccurate picture of the resources available on this property by assuming all 800 acres are available for NRD restoration projects. That assumption disregards the following:

- Existing uses on the site (including municipal and industrial easements and a large, active, dredge material management facility) limit the options available for natural resources activity.
- The property has long been viewed by local and regional government as having high value for industrial development.
- Consistent with this history, the Port is pursuing an annexation proposal with the City of Portland, and has received guidance to evaluate marine terminal concepts and zoning for 300 acres.

We request that you modify your description to reflect these restrictions. The Trustee Council's restoration work would not be well served by concepts that disregard current and future restrictions on site availability.

Existing Uses

The map provided does not reflect any of the existing uses currently established on West Hayden Island. The existing uses include three power line rights-of-way (PGE, PPL and BPA), City of Portland Bureau of Environmental Services sewer line and dechlorination plant and outfall structure, rail right of way for BNSF mainline, and a 104-acre dredge material placement site with associated access and discharge facilities. Each of these uses is a critical part of regional infrastructure with a long and well-documented history.

Erin Madden
March 18, 2011
Page 2

For example, one specific restoration concept mentioned in the fact sheet assumes removal of the dredge material placement site facilities.¹ West Hayden Island has been used continuously for over 80 years for dredge material management, supporting the Army Corps of Engineers and Port of Portland maintenance of the Columbia and Willamette Rivers for navigation uses. Given that there are hundreds of acres elsewhere on West Hayden Island, NRD restoration concepts would be better served by working around this and other existing site uses.

Existing Land Use Policies

The assumption that the entire site is available for NRD restoration purposes is also inconsistent with the land use policy foundation that applies to West Hayden Island. The land use laws in the state of Oregon give special status to property uses within a defined urban area known as the urban growth boundary. Land on the urban margin is brought into the urban growth boundary for the specific purpose of being made available for urban development. In 1983, Metro brought the West Hayden Island property into the urban growth boundary with the specific intention of addressing a marine terminal need. The Port purchased the property in 1994 with the long term plan of realizing the expectation of marine terminal development.

Metro's policy guidance over the last 28 years has consistently reaffirmed the intent of that initial decision—that a portion of the property should be made available for marine industrial development such as deep draft marine terminals. The following chronology briefly describes the regional government's policy intent for this property. More detailed information is included in the attached Memoranda from Ball Janik and City of Portland Attorney.

- o 1995—Metro's 2040 Growth Concept Map identifies the north portion of WHI as an Industrial design type (marine terminal use) and the south portion as open space.
- o 2004—Metro designated all of West Hayden Island as Regionally Significant Industrial Area (RSIA) through Title 4 update; Ordinance 04-1040B.
- o 2005—Metro's designation of the majority of WHI as moderate habitat conservation area (HCA) reflected both high habitat value and high development potential under Title 13. Metro also directed the City of Portland and the Port of Portland to develop a plan district for West Hayden Island that accommodates both a marine terminal use and habitat.
- o 2009—Metro counts 422 acres on West Hayden Island as buildable for industrial purposes in the Urban Growth Capacity Report, which serves as the basis for Metro's urban growth boundary expansion decision in December 2011.

Use of the entire 800 acres of West Hayden Island for restoration would be inconsistent with the long standing regional land use determinations, and would have significant implications for Metro's urban growth boundary and City of Portland's inventory of buildable lands.

¹ The fact sheets states: "Potential actions could include excavating a portion of the current dredge spoil site to create an off-channel aquatic habitat and a series of grass and shrub habitat areas."

Erin Madden
March 18, 2011
Page 3

Current Planning Process

Consistent with the overarching land use policy direction established by the regional government, the City of Portland has engaged with the Port to consider annexation of West Hayden Island into the City. In July, the City Council directed City staff to bring forward an annexation, zoning and comprehensive plan amendment concept that includes 300 acres for deep draft terminals and 500 acres for open space (City Council Resolution #36805). Although the City has not yet made a decision as to whether it will annex West Hayden Island, the long-standing land use policy decisions made with respect to West Hayden Island and the Port's public mission to support maritime commerce for the economic benefit of our region and State, make it highly unlikely that the acreage slated for marine terminal use will be available for NRD restoration purposes.

Conclusion

We request that you correct the map and description of this property to reflect the government's policy direction, existing uses, and Port's development intent. These corrections will facilitate more productive NRD restoration discussions going forward. We believe the open-space acreage on West Hayden Island presents a unique opportunity for ecosystem restoration, and the Trustee Council's process is better served by focusing on what has real potential. Our understanding is that the area which will be left as open space will be the largest contiguous parcel in the Trustee's NRD restoration planning process. We look forward to working with you on potential NRD restoration projects on the potentially available lands on West Hayden Island.

Sincerely,



Krista Koehl
General Manager, Harbor Environmental

Attachment

CC: Sam Ruda, Port of Portland
Susie Lahsene, Port of Portland



CITY OF
PORTLAND, OREGON
OFFICE OF CITY ATTORNEY

Linda Meng, City Attorney
1221 S.W. 4th Avenue, Suite 430
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April 9, 2009

INTEROFFICE MEMORANDUM

TO: Alice Ann Wetzel
Bureau of Planning

FROM: Kathryn Beaumont *KSB*
Senior Deputy City Attorney

SUBJECT: West Hayden Island

I have reviewed the March 30, 2009 memorandum from Ball Jamik LLP entitled "Zoning and Planning Framework for West Hayden Island Annexation." In my opinion, the memorandum presents an accurate summary of the zoning history and land use regulatory framework applicable to West Hayden Island.

Please call me if you have any questions.

KB:KSB



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MEMORANDUM

TO: Susie Lahsene
FROM: Steve Janik and Dana Krawczuk
DATE: March 30, 2009
CLIENT: Port of Portland
RE: Zoning and Planning Framework for West Hayden Island Annexation

The Port of Portland (Port) and the City of Portland (City) have initiated a process to evaluate annexation, zoning, and development of a District Plan for West Hayden Island (WHI). As part of this evaluation, the City has chartered the Community Working Group (CWG) to advise City Council on how marine industrial, habitat, and recreational uses might be reconciled on West Hayden Island; and, if the CWG determines that a mix of uses is possible on WHI, to recommend a preferred concept plan.

WHI has a long regional and local planning history. You asked us to provide a summary of this planning history and the legal framework that flows from that history as background information to assist Port staff, City staff, and the CWG as you work through the evaluation process.

Summary

WHI was brought into the Metro Urban Growth Boundary (UGB) in 1983 for the purpose of satisfying a regional need for marine terminal facilities. Metro Ordinance No. 83-151, Exhibit B at 1. Multnomah County agreed to delay planning and zoning for WHI until a site specific study was completed to evaluate environmental impacts and minimization of those impacts. *Id.* at 5-6. In 2004, Metro designated WHI as a "Regionally Significant Industrial Area" under Title 4 of Metro's Urban Growth Management Functional Plan (UGMFP). Metro Ordinance 04-104B. Finally, Metro adopted its Nature in Neighborhoods program as a regional approach to Goal 5 for fish and wildlife habitat in 2005. Metro Code (MC) 3.07.1320. Nature in Neighborhoods requires the City of Portland and the Port of Portland to create a "District Plan" for WHI. MC 3.07.1330.B.4.b.

Metro's previous planning decisions demonstrate an intent to accommodate both industrial development (in the form of a marine terminal) and natural resource protection measures on WHI. Both the Statewide Planning Goals and Metro's Urban Growth Management Functional Plan (UGMFP) provide the framework for how the City of Portland must implement Metro's prior planning decisions. Under the Goals and the UGMFP, the City's task in the annexation and rezoning process is to harmonize Metro's two objectives such that neither is accommodated to the exclusion of the other. This regulatory framework is important because it provides a reference point as planning decisions are made in the planning process.

Planning History

WHI is located in Multnomah County, and since 1977 it has been zoned Multiple Use Forest 19 (MUF19) with a Significant Environmental Concern (SEC) overlay. Multnomah County Ordinance No. 333. In the early 1980s, Metro and Multnomah County took steps toward urbanizing WHI. Multnomah County amended its comprehensive plan in 1982 to support the eventual development of a marine shipping terminal on WHI. Multnomah County Ordinance Nos. 333-335. These amendments included an "Urban" designation, a Marine Transportation System policy, and additional Growth Management Policies. In 1983, Metro included WHI in the UGB to "satisfy a long term regional need for water-dependent, marine terminal and industrial facilities." Metro Ordinance No. 83-151, Exhibit B at 1. In recognition of the unique importance of WHI for this purpose, the Metro Council found that "alternative sites for deep draft marine industrial facilities" did not exist anywhere else in the region. *Id.* at 6.

Both Metro and Multnomah County also considered the environmental impacts of marine industrial development on WHI. In the UGB decision, Metro determined that the marine industrial development value of WHI outweighed its natural resource protection value, but that both could be accommodated:

There is no question that any large scale urban development of West Hayden Island would impair wildlife habitat. However, the habitat on West Hayden Island is not, in a planning sense, "unique" or "significant," and applicants and the county have established a process for minimizing adverse environmental impacts. Given the great importance of marine industrial facilities to the social and economic growth and vitality of the region, and that there are no alternative sites for deep draft marine industrial facilities, the positive social and economic consequences of an urban designation clearly outweigh the environmental consequences. Metro Ordinance No. 83-151, Exhibit B at 6.

It was determined that the environmental impacts would be addressed by Multnomah County through the requirements of the County's Significant Environmental Concern overlay designation. Specifically, Multnomah County agreed to defer rezoning WHI to a future planning process that would include a study of how to minimize these impacts. *Id.* at 5-6. Neither the study nor the rezoning has yet to occur.

Another component of the 1983 UGB decision was that Multnomah County sought assurances in the form of conditions that both marine industrial and environmental objectives would be accommodated on WHI if the City of Portland assumed the responsibility for urbanizing WHI. *Id.* at 8-9. Metro found that those objectives went to the "fundamentals" of the applications and the commitments made by the applicants. *Id.* at 9-10. If the City failed to carry out those commitments, Metro would provide a forum for the County or other interested parties to object. *Id.* at 10.

The planning and zoning status of WHI remained largely unchanged for over 20 years following the 1983 UGB decision. Over the last five years, Metro has adopted two new policies for WHI that reaffirm the objectives of the 1983 UGB decision and continue to recognize the importance of WHI for both marine industrial development and habitat protection.

First, as part of its 2004 Title 4 update, which refines the 2040 Growth Concept Map, Metro identified WHI as a "Regionally Significant Industrial Area" (RSIA). Metro Ordinance 04-104B. RSIA's are defined as "industrial areas with site characteristics that are relatively rare in the region that render them especially suitable for industrial use." Metro Code (MC) 3.07.130. As such, the Metro Code gives RSIA's the highest level of protection against conflicting non-industrial uses. MC 3.07.420. Metro's designation of WHI as a RSIA reflects its intent to preserve WHI for industrial uses. Metro's 2040 Growth Concept Map also depicts a marine terminal on WHI, consistent with Metro's 1983 UGB decision.

Second, Metro adopted the "Nature in Neighborhoods" program in 2005 as a regional approach to Goal 5 for fish and wildlife habitat. OAR 660-023-0080; MC 3.07.1320. As part of this program, Metro developed maps identifying Habitat Conservation Areas (HCAs) that are subject to variable levels of conservation or protection based on Metro's balance of the habitat value of a site against its development value in MC Table 3.07-13a. Metro identified WHI as a moderate HCA because it contained both high development value and high riparian habitat values (Class I Riparian Habitat). Consistent with Metro's assessment of the industrial and natural resource value of WHI in its UGB decision, Nature in Neighborhoods requires that the City develop a WHI "District Plan" in cooperation with the Port to address the moderate HCA designation. MC 3.07.1330.B.4.b. A District Plan is a means to implement site specific habitat conservation measures that protect natural resources and mitigate the environmental impacts of industrial development.

The City of Portland must undertake the next steps in the planning process for WHI. As noted above, these steps include annexation, rezoning, and the formation of a "District Plan." Ultimately, these steps will establish the permissible range of uses and the appropriate level of natural resource protection for WHI.

Legal Framework

The District Plan and associated annexation, zoning and comprehensive plan designations are carried out by the City through the application of the following state land use planning laws and Metro regulations.

1. Goal 14

Goal 14 and its implementing rules govern the establishment and expansion of UGBs. In order to expand its UGB, a jurisdiction must demonstrate a need for that category of land based on a long range population forecast. Both the version of Goal 14 in effect when WHI was included in the Metro UGB and the current version of Goal 14 require that WHI be zoned consistent with Metro's UGB decision.

WHI was included in Metro's UGB under a previous version of Goal 14, which did not have any specific implementing rules. Under this previous version, LUBA has held that where a decision to expand a UGB is based on need for a specific use, the local government must ensure that planning and zoning designations applied to the expansion area will accommodate that use. 1000 Friends of Oregon v. City of North Plains, 27 Or LUBA 372, 383-84, aff'd 130 Or App 406 (1994). Local governments cannot circumvent Goal 14 by justifying a UGB expansion with a need for a particular category of land and then planning and zoning that land for a different category of use.

The current version of Goal 14 was adopted by LCDC in 2006 and includes specific implementing rules at OAR 660 Division 24. The new rules provide that when land is added to the UGB, the planning jurisdiction must adopt comprehensive plan and zoning designations that are consistent with the need determination, or maintain the land as urbanizable land by applying interim zoning that retains the land's potential for urban development until the land is rezoned for planned urban uses. OAR 660-024-0050(5). This is consistent with LUBA's interpretation of the prior version of Goal 14 and ensures that the premise underlying a UGB decision is carried out during later stages in the planning process.

Metro approved the 1983 UGB amendment based on the commitments made by Multnomah County and the applicants to develop a marine industrial terminal on WHI and to adopt environmental protection measures to minimize the impact of that terminal. The decision makes it clear that if the City of Portland ultimately assumed the role of urbanizing WHI, it would be required to "promote the interests that the commitments are designed to protect." Metro Ordinance No. 83-151, Exhibit B at 1. Adopting planning and zoning designations that ensure that both a marine industrial terminal and natural resource protection measures can be accommodated on WHI would be consistent with either version of Goal 14.

2. Urban Growth Management Functional Plan

Metro's UGMFP requires cities and counties to adopt changes to their comprehensive plans and zoning ordinances to implement regional goals and objectives adopted by the Metro Council. Title 11 (*Planning for New Urban Areas*), Title 4 (*Industrial and Other Employment Areas*), and Title 13 (*Nature in Neighborhoods*) of the UGMFP contain important planning and zoning requirements for WHI.

First, Title 11 provides general planning guidance for areas brought into the UGB. Under Title 11, local governments must adopt planning and zoning designations for lands added

to the UGB in accordance with Metro's designated 2040 Growth Concept design type. MC 3.07.1120. The 2040 Growth Concept design type for WHI is identified as RSIA.¹

Second, Title 4 contains Metro's goals and policies for protecting industrial and employment lands. Similar to Title 11, Title 4 requires local governments to adopt planning and zoning designations for RSIA's consistent with Metro's maps. MC 3.07.420.A. RSIA's receive the highest level of protection from non-industrial uses under Title 4, including specific limitations on employment and retail uses. Title 4 also requires local governments to meet specific criteria in order to amend the designation of RSIA land to allow uses not allowed by Title 4. MC 3.07.450. Thus, the elements of Metro's planning framework established by Title 11 and Title 4 require the City to adopt industrial plan and zoning designations for WHI.

Third, the City must also implement Nature in Neighborhoods on WHI pursuant to Metro Title 13. As noted above, WHI is designated as a moderate HCA because it contains both high riparian habitat values and high development values. Ordinarily, local governments can choose among four methods to implement Title 13. MC 3.07.1330.B. However, Title 13 specifically requires the City of Portland to develop a "District Plan" for WHI in cooperation with the Port of Portland. MC 3.07.1330.B.4.b. A District Plan is a special planning process that allows local governments to develop alternative approaches to habitat protection that incorporate site specific measures, rather than the region-wide approach created by Nature in Neighborhoods model ordinance. MC 3.07.1330.B.4.a. The City must demonstrate that the District Plan achieves "substantially comparable" habitat protection to Nature in Neighborhoods model ordinance. *Id.*; MC 3.07.1330.B.3. Substantial compliance may be demonstrated by the City through implementation of comprehensive plan and ordinances and "use of incentive based, voluntary, education, acquisition and restoration programs." MC 3.07.1330.B.3.b. The District Plan process is consistent with Metro's, Multnomah County's, and the applicant's original commitment to minimize the impact of industrial development on WHI's natural resources.

To effectively meet *both* Metro Title 4 and Title 13, the City must try to accommodate both a marine industrial terminal and natural resource protection on WHI. As long as these two objectives are satisfied, the City will have significant discretion in developing planning and zoning designations for WHI.

Conclusion

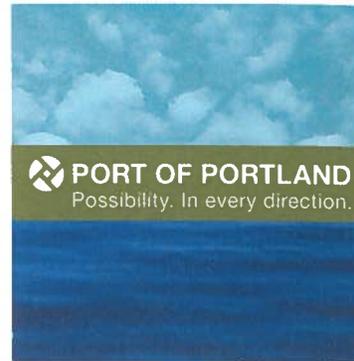
Metro's previous planning decisions and the Statewide Planning Goals create an important regulatory framework for the City of Portland to annex and rezone WHI. In essence, this framework directs the City to do two things:

1. To adopt planning and zoning designations on WHI for a functional marine industrial terminal. This was the justification for the inclusion of WHI into the Metro UGB. Both the Statewide Planning Goals and Title 4 and 11 of the UGMFP require that the marine industrial development commitments made in the 1983 UGB decision are carried out

¹ The most recent version of the 2040 Growth Concept Map was updated on November 4, 2008.
http://www.oregonmetro.gov/files/planning/2040_growth_concept.pdf

2. **To develop a "District Plan" for WHI to implement Metro's Nature in Neighborhoods program under Title 13 of the UGMFP. The District Plan must achieve "substantially comparable" habitat protection to Nature in Neighborhoods model ordinance. The District Plan process should also carry out the natural resource protection commitments made in the 1983 UGB decision.**

To carry out these requirements in the annexation and rezoning process, the City's task should be to try to achieve Metro's two objectives such that neither is accommodated to the exclusion of the other.



Via Email and U.S. Mail

October 8, 2012

Ms. Megan Callahan Grant
NOAA Restoration Center
1201 NE Lloyd Blvd., Suite 1100
Portland, Oregon 97232

Re: Comments on the Draft Portland Harbor Programmatic EIS and Restoration Plan

Dear Ms. Callahan Grant:

Thank you for the opportunity to comment on the Draft Portland Harbor Programmatic Environmental Impact Statement (PEIS) and Restoration Plan for the Portland Harbor Superfund Site Natural Resource Damage Assessment. This letter provides comments on the Trustee Council's approach to restoration as it relates to the applicable regulations and guidance, as well as the economic information contained in the PEIS. This letter also provides comments on the restoration site descriptions associated with Port-owned properties presented in Appendix A, Ecological Restoration Portfolio.

I. The Trustee Council should conduct the required analyses to support the PEIS/Restoration Plan.

The programmatic approach presented in the draft PEIS relies on a policy that at least 50 percent of the restoration projects must be located within the Portland Harbor Superfund Study Area (SSA), and 50 percent may be located within the broader focus area. This is called the "50/50 Policy." In establishing this policy, the Trustee Council does not rely on any meaningful evaluation of restoration alternatives and fails to apply the restoration criteria established by law.

Trustee development of a Restoration Plan is controlled by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)¹ and the Oil Pollution Act (OPA).²

¹ 42 U.S.C. §§ 9601, *et seq.*

² 33 U.S.C. §§ 2701, *et seq.*

Much like the Comparative Analysis of a Feasibility Study, the CERCLA and OPA regulations list required criteria for developing and evaluating the relative effectiveness of alternative restoration actions. Under the CERCLA regulations, the Trustees must evaluate alternatives and make their selection based on the following criteria:

- 1) Technical feasibility;
- 2) Relationship of the expected costs of the proposed actions to the expected benefits from the restoration, rehabilitation, replacement, and/or acquisition of the equivalent resources;
- 3) Cost effectiveness;
- 4) Results of any actual or planned response actions;
- 5) Potential for additional injury resulting from the proposed actions, including long-term and indirect impacts, to the injured resources or other resources;
- 6) Natural recovery period determined in [43 C.F.R. §] 11.73(a)(1);
- 7) Ability of the resources to recover with or without alternative actions;
- 8) Potential effects of the action on human health and safety;
- 9) Consistency with relevant Federal, State, and tribal policies; and
- 10) Compliance with applicable Federal, State, and tribal laws.³

The OPA regulations require Trustees to consider a reasonable range of restoration alternatives. An alternative must be technically feasible and “in accordance with applicable laws, regulations, or permits.”⁴ If an alternative has satisfied those two factors, the Trustees then evaluate the alternative using, at a minimum, the following criteria:

- 1) Cost to carry out the alternative;
- 2) Extent to which each alternative is expected to meet the trustees’ goals and objectives in returning the injured natural resources and services to baseline and/or compensating for interim losses;
- 3) Likelihood of success of each alternative;

³ 43 C.F.R. § 11.82(d).

⁴ 15 C.F.R. § 990.53(a)(2).

- 4) Extent to which each alternative will prevent future injury as a result of the incident, and avoid collateral injury as a result of implementing the alternative;
- 5) Extent to which each alternative benefits more than one natural resource and/or service; and
- 6) Effect of each alternative on public health and safety.⁵

If Trustees determine that two or more restoration alternatives are equally preferable, they must select the most cost effective alternative.⁶

P-080 The programmatic approach presented in the draft PEIS does not rely on any meaningful evaluation of restoration alternatives. The draft PEIS appears to rely on the opinions of an “expert panel on juvenile Chinook” to support placing a focus on the SSA and thereby justifying the 50/50 Policy. However, the expert panel did not develop restoration alternatives and did not utilize the required restoration planning criteria listed above in their evaluations.

P-081 Through Phase II Natural Resource Damage Assessment efforts, the Trustees have identified a broad range of restoration projects both inside and outside of the SSA. Each of these projects should be evaluated relative to the above criteria, independent of the arbitrary 50/50 Policy. That information should be developed to provide the foundation for a revised PEIS/Restoration Plan.

II. The PEIS does not adequately consider the social and economic impacts of conversion of industrial land.

In evaluating the Trustees’ preferred alternative, the Trustees dismiss the socioeconomic impacts of the 50/50 Policy based on a 2012 Regional Industrial Site Readiness study conducted by Group Mackenzie that evaluated the availability of large sites (25 acres or greater) for industrial development. The Trustees concluded:

“Given that any conversion of industrial land to restoration use would represent a very small percentage of available industrial land in Portland Harbor, and that the sites in the Portfolio do not meet the size criteria for industrial land in highest demand, only minor or no impact is anticipated on the quantity of land available for industrial or water-dependent uses.”⁷

This conclusion is flawed for several reasons.

⁵ 15 C.F.R. § 990.54(a).

⁶ *Id.* at § 990.54(b).

⁷ Draft PEIS/Restoration Plan, p. 4-5.

- P-082 First, the Trustees rely on the Regional Industrial Site Readiness study for the notion that any parcel smaller than 25 acres is not economically significant. However, the study does not support that conclusion. The study was commissioned by Portland Business Alliance, the Port of Portland, Metro, Business Oregon, and NAIOP in response to Metro's 2009 Urban Growth Boundary (UGB) Report which identified a shortage of large-lot industrial sites in the region. The study's purpose was to take the raw land supply considered in Metro's 2009 UGB Report to the next step by evaluating the development-readiness of these employment lands. The study evaluated lots 25-acres and larger because establishing a development-ready supply of large industrial sites is a critical part of our region's strategy to attract and retain traded-sector industrial uses. Traded-sector firms sell goods to buyers outside of the Metro region, bringing in additional wealth and creating higher wage jobs for essential public services. Evaluating these larger sites was a way to focus the regional economic development strategy moving forward. This focus does not mean that industrial-zoned lots smaller than 25 acres are not important to sustaining and growing the regional economy.
- P-083

- In fact, the importance of each acre of industrial land in Portland Harbor is highlighted by recent planning efforts by the City of Portland. The City of Portland is performing a periodic review and updating its Comprehensive Plan as required by the State of Oregon to comply with the State's land use requirements and planning goals. The City has just adopted one of the foundation documents for the Comprehensive Plan update called the Economic Opportunities Analysis (EOA).⁸ This document evaluates the 20-year supply and demand for employment and development land within the City of Portland. Oregon Administrative Rule 660-09-0015 requires the City to demonstrate that they have an adequate supply of industrial land to meet the 20-year forecasts. The EOA adopted by the Portland City Council in September 2012 concludes that there is a shortage of 629 acres of industrial land in the City to meet the 20-year forecasted demand. Specifically, the analysis determined that the City will need additional development capacity for industrial land "especially in the Columbia Harbor area," also known as Portland Harbor.⁹
- P-084

The City's policy recommendation in Chapter 4 of the EOA identifies the following as a way to address the identified shortfall in the Columbia Harbor and Other Industrial Areas:

- "Annex and rezone West Hayden Island for industrial use to meet the demand for marine terminals.
- Identify other opportunities to create additional industrial capacity including:

⁸ *Economic Opportunity Analysis*. (n.d.). Retrieved from <http://www.portlandoregon.gov/bps/59297>

⁹ E. D. Hovee & Company, LLC, *Economic Opportunities Analysis – Sections 2/3 Supply & Demand* (September 2012). Retrieved from <https://www.portlandonline.com/portlandplan/?a=392785&>

- Supporting remediation and reuse of brownfields,
 - Making progress on the Portland Harbor Superfund cleanup program,
 - Maintaining industrial sanctuary designations, and
 - Giving priority to investments that yield greater utilization of existing industrial properties.
- Invest in Columbia Harbor as Oregon's Trade and Freight Hub."¹⁰

Portland Harbor's importance to the City's and region's industrial land supply is understandable given its economic contribution. The Portland Harbor businesses, which include water-dependent and upland activities, support the following for our community:¹¹

- 23,646 direct jobs with an average annual salary of \$50,000 per person;
- 52,784 total jobs (direct, induced and indirect jobs) generating \$3.6 billion of personal wage and salary income and consumption impacts annually for the region; and
- \$350.7 million of local and state tax revenue in calendar year 2011.

P-085 A key to Portland Harbor's economic success is its centralized network of rail, roads, marine terminals, pipelines, warehousing, manufacturing and commercial activities that are interconnected and dependent on one another. For this reason, every acre of industrial land in Portland Harbor is important to retaining, supporting and attracting businesses to the harbor—businesses that provide both tax revenue and jobs to the community. Contrary to the Trustees' conclusions, lots smaller than 25 acres can, in fact, be critical to retaining and growing these businesses. Smaller lots support transportation improvements. They provide space for important warehousing or other infrastructure in support of the traded-sector businesses. In addition, smaller lots that are adjacent to existing businesses may become a significant factor for a business considering an expansion at its Portland facility as opposed to expansion in another community that may have more land capacity.

Portland Harbor was strategically developed as a dense, centralized industrial sanctuary by local and state government over the past 150 years and it will continue to play a significant economic role for the community in the future.

P-086 Converting industrial land in Portland Harbor to other uses requires a more extensive analysis than what is provided in the Trustee Council's PEIS. The

¹⁰ E. D. Hovee & Company, LLC, *Economic Opportunities Analysis – Section 4 Alternative Choices* (September 2012). Retrieved from <http://www.portlandonline.com/portlandplan/?a=392786&>

¹¹ Martin & Associates, *The Local and Regional Impacts of Portland Working Harbor, 2011* (July 16, 2012). Please note that the PEIS refers to outdated economic statistics that relate only to water-dependent activities in the harbor. The PEIS should be updated with the most recent and more complete information contained in the July 2012 Martin study.

P-086 Trustee Council's PEIS should consider the City of Portland's EOA and the economic
P-087 significance of Portland Harbor as an integrated system. In addition, the Port recommends that the projects identified in the *Appendix A, Ecological Restoration Portfolio*, identify the current zoning, current land use, and anticipated land use of the potential restoration properties. The PEIS should calculate the number of acres that would be converted from industrial or commercial to non-industrial or non-commercial land so that the Trustees can evaluate the economic impacts of the Restoration Plan. Certain properties identified in the SSA would not have an impact, while others may. A thorough analysis is necessary in light of the significant impact Portland Harbor has within the City of Portland, regionally and statewide from a social and economic perspective.

III. The Ecological Restoration Portfolio Should Be Revised to Provide More Complete and Accurate Information.

P-088 In addition to zoning information, the descriptions for each Restoration Site in the Portfolio should be more specific about land ownership and use, and this should be specifically identified on the figures. These two factors are important to assess the true feasibility of the projects identified. This information is also necessary so that potential funding parties and/or the Trustee Council are able to contact owners to determine interest in participating in a restoration project. The current presentation is potentially misleading when it lists all property owners generally, including those that own a very small portion that is not necessary to perform the project.

The following comments relate to the specific restoration site descriptions associated with Port-identified properties, presented in the Appendix A, Ecological Restoration Portfolio.

P-089 **Albina Yard**
The Port no longer owns any portion of the Albina Yard. The project outline for this site appears to be, at least in part, a portion of the old Albina Dock property that the Port held from 1971 until 2007. The Port sold this parcel to Union Pacific Railroad in 2007.

P-090 **Ash Grove Cement/Port of Portland**
Tax Lot 2N1W26C-00700 is owned by Ash Grove (at the northern tip). Tax lots 2N1W26C-00600 and 00300 are owned by the Port and leased to Georgia-Pacific Corporation. A rail spur is located on the property. Transforming the Port's industrially zoned property to permanent restoration is not likely the best use of the land given its strategic location and existing surrounding infrastructure. The soil at the site is also not conducive to wetlands or other restoration.

P-091 Balch Creek Cove

The boundaries of the restoration site may impact the Terminal 2 berthing area where Army Corps of Engineers dredges are currently stationed. Coordination with the Port would be required.

P-092 Mar Com

This project site should be identified as the “Former Mar Com” site. Langley St. Johns owns the southern portion (about half), tax lot 1N1W12-00500. The Port owns the northern portion, tax lots 1N1W11-00400 and 00500. Oregon Department of State Land’s (DSL) ownership extends riverward of the ordinary high water line. Since the ownership and the condition of the north and south portions of the site are very different, the description should use “north parcel” and “south parcel” throughout the summary.

P-093 The statement that the “north end of the site has been paved” is inaccurate. The “north parcel” is mostly unpaved. The statement that “storm water runoff from upland areas” drains through an outfall is inaccurate. Rain on the “north parcel” infiltrates and is not collected and piped into the river. The outfall actually drains a substantial area of St. Johns, inland of the project site, and the effectiveness of a bio-swale project at the outfall is questionable. The statement that the site is not remediated is inaccurate. The “north parcel” is clean with no further remediation required. DEQ issued a certificate of cleanup completion for the “north parcel” in 2009. The map for this project site inappropriately depicts a floating dry dock off the site. The floating dry dock no longer exists and the map should be corrected with a more recent aerial that shows no such potential restriction to in-water restoration opportunities. There is a substantial amount of tires and other debris imbedded in the DSL owned riverbank at this project site. Removal of this debris for bank enhancement may compromise the bank stability. Finally, development is not “threat[ening].” Rather: “The Port’s marine master plan contemplates the future development of the uplands as part of Terminal 4.” Given the parcel’s direct adjacency to Terminal 4 and its surrounding infrastructure, use of the upland portion of the north parcel for restoration would convert important industrial land to non-industrial uses and is not likely the best use of the property. Improvements to the bank in a way that is complimentary to the intended industrial use of the upland area may be possible after the in-water cleanup is implemented but would require more technical evaluation given the bank stability concerns.

P-094 South Rivergate Corridor

Bonneville Power Administration (BPA) also has overhead power lines and towers with either ownership or easement over a significant portion of the site. The site is bisected with several rail lines, a rail yard and a private road (Time Oil Road). The Port maintains a wetlands mitigation site on the parcel. Hydrology is complex due to the high-draining soil, and any bank layback

P-094 work or further wetlands development would require extensive analysis to ensure that it would not impede the existing wetlands at the site or compromise the BPA and Portland General Electric (PGE) towers. Vegetation must also comply with tree height requirements of PGE and BPA. Finally, the statement that “Active dredging of the Willamette River causes a steep drop off from shore...” is not supported. There has not been any recent dredging off this project site. More likely the steep bank is due to the type of soil at the site and scouring from the river.

P-095 **Swan Island Beach North**
Rip rap removal and re-grading of the shoreline at this project site is unlikely given the presence of McCarthy Park improvements and/or the occupied buildings immediately landward of the top of bank. Public use of McCarthy Park may constrain habitat value improvements for this site.

P-096 **Swan Island Beach South**
The existing riverbank slopes at this project site are approximately 2.5 to 1. Actual slope should replace the statement “extremely steep.” Bank layback is not feasible due to the location of an extensive grid of grounding wires related to the City of Portland Combined Sewer Overflow pump station back-up electrical generator. Feasibility of rip rap removal and shallow water habitat creation is uncertain without additional slope stability and scour analysis.

P-097 **Terminal 5**
The site description for this project site should be corrected to say “...the navigation channel and ship berth are periodically dredged to maintain passage.” In addition, Department of Homeland Security requirements for marine terminals related to fencing should be noted as a potential limitation.

P-098 **Willamette Cove**
It should be noted that an additional constraint on development of this project site is the large amount of construction debris buried in the riverbank and near shore waters. A derelict barge is also submerged just off shore of the central parcel. Specific ownership information should be provided to note that Metro is the primary property owner that would need to be consulted.

P-099 **West Hayden Island**
PGE owns approximately 6 acres of land for the power substation (TL 2N1E33B-00200). BPA owns approximately 15 acres of the power line corridor. Burlington Northern Santa Fe owns the rail bridge. Pacific Power & Light, PGE, BPA, and City of Portland have multiple easements over the property. The Port also refers the Trustee Council to its letter dated March 18, 2011, which provides the land use planning history for West Hayden Island. Metro’s Urban Growth Boundary determination included a portion of West Hayden Island in its available land supply

P-009

for industrial land. In addition, as noted above, the City of Portland has a shortage of industrially zoned land for the 20-year forecasted demand and annexation is one of the recommended strategies for addressing this shortage. West Hayden Island plays an important role in fulfilling the regional and City of Portland demands for development and employment lands. The Port requests that the Trustee Council's Restoration Plan recognize the planning history and the Port's plans for the property and limit the restoration projects to the 500-acres anticipated for open space zoning.

IV. Conclusion

The Port appreciates the significant work completed to date by the Trustee Council on restoration planning. The Port's comments should not be taken as a lack of support for restoration in Portland Harbor. The Port believes that restoration in certain locations within Portland Harbor may in fact be feasible, cost-effective and can be done in a way that limits the impact to the industrial land inventory issues within the City of Portland and region. The Port requests a more thorough analysis to take these factors into account and appropriately prioritize and select restoration projects within and outside of Portland Harbor in accordance with the CERCLA and OPA regulations and regional land use implications. We look forward to working with the Trustee Council on potential NRD restoration projects identified in this plan.

Sincerely,



Krista Koehl
General Manger, Harbor Environmental

Enclosures: Letter to Erin Madden, Portland Harbor Natural Resource Trustee Council (March 18, 2011).

The Local and Regional Impacts of Portland Working Harbor by Martin & Associates (July 16, 2012).

c: Sam Ruda, Port of Portland
Susie Lahsene, Port of Portland
Tom Imeson, Port of Portland



Comment Form

Portland Harbor Natural Resource Damage Assessment (NRDA) Draft Programmatic EIS / Restoration Plan (PEIS/RP)

Thank you for taking the time to comment on the Draft Portland Harbor NRDA PEIS/RP. The comments that you make, in their entirety, including the personal information you provide, will become part of the public administrative record for this project. The Trustee Council will not consider anonymous comments, so you must provide a name and address. Responses to your comments will be provided in the Final PEIS/RP.

First Name: <u>Rob</u>	Last Name: <u>Lee</u>
Street Address: <u>12327 NW Harborbn</u>	City, State, Zip: <u>Portland, 97231</u>
Email: <u>roblee43@gmail.com</u> <input checked="" type="checkbox"/> Check here to sign up for project email updates	Organization (if any): <u>Lincoln Neighborhood Assoc.</u>

Please write your comments below, and attach additional pages if you need more space. You can download this form and email your comments online at <http://www.fws.gov/oregonfwo/Contaminants/PortlandHarbor/default.asp>. Comments must be received by October 8, 2012.

Comments:

C-024

Thank you for your work.

I think the greatest gift the Native Peoples can give us honties is the wisdom that the world is here for itself, not us. It's not about us. And so the harbor becomes a balanced place - industry and fine fish co-exist side by side.

So please restore as much as possible - the more sites the better - while at the same time investing ⁱⁿ people with the idea that taking care of the world is not different from taking care of ourselves. All one thing.

Thank you again.



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
1201 NE Lloyd Boulevard, Suite 1100
PORTLAND, OREGON 97232-1274

October 4, 2012

Erin Madden
Chair, Portland Harbor Trustee Council
Cascadia Law P.C.
917 SW Oak, Suite 300
Portland Oregon 97205

Re: Comments on the DRAFT Portland Harbor Programmatic EIS and Restoration Plan

Dear Ms. Madden:

Thank you for this opportunity to provide comments on the DRAFT Portland Harbor Programmatic EIS and Restoration Plan (Plan); the Plan outlines the Portland Harbor Trustee Council's approach to compensating the public for injuries to natural resources that have incurred over years of industrial activity in the Portland Harbor reach of the lower Willamette River. The National Marine Fisheries Service (NMFS) recognizes the many years of effort by the Trustees to develop this Plan, and supports your vision of ecosystem-based restoration for fish and wildlife in a reach of the river that has been highly degraded over the past 150 years. In our comments below, we provide information on the fish species that use the lower Willamette River, the importance of this reach to those species, how habitat restoration can contribute to the recovery of those species, and lastly, we provide specific comments on the draft Restoration Plan and draft Programmatic EIS. The link between species recovery and the Trustees' Plan is important; it supports a paradigm that highly urbanized areas can contribute to species recovery by improving species spatial and genetic diversity, and habitat connectivity. Please consider this information as you finalize the Plan.

Salmon and Steelhead Species in the Lower Willamette River

The National Marine Fisheries Service (NMFS) has listed five species of salmon and steelhead under the Endangered Species Act (ESA) that migrate through, rear, or spawn within the Superfund Study Area (SSA) to complete their life cycle: Upper Willamette (UWR) Chinook salmon, UWR steelhead, Lower Columbia River (LCR) coho salmon, LCR Chinook salmon and LCR steelhead¹. There are an additional 11 ESA-listed species within NMFS' jurisdiction that may migrate and rear within the Portland Harbor broader focus area (including the Columbia River), and many of them have critical habitat in the SSA (Table 1).

¹ In addition, threatened Columbia River chum (Clackamas population) have not been found in the lower Willamette River in recent years, but is targeted for recovery in the Lower Columbia Recovery Plan.



Historically, the Willamette River in the Portland area was an extensive and interconnected system of active channels, open slack waters, emergent wetlands, riparian forest, and adjacent upland forests on hill slopes and Missoula Flood terraces (WRI 2004). Significant dredging, diking, and channeling of the mainstem Willamette have altered many of these historical conditions. The mainstem has been narrowed and deepened and off-channel habitat has been virtually eliminated. The river's banks have been hardened precluding important naturally caused channel changes and minimizing the interaction between the river and riparian and floodplain vegetation. Habitat has been simplified and large tracts of riparian vegetation have been cleared. As a result of these actions, significant amounts of shallow water, floodplain and off-channel habitats have been lost in the SSA.

The lower Willamette River is a crucial part of the life history for the five salmonid species that migrate, rear or spawn within the SSA. Floodplain areas in the lower Willamette River are used by juvenile Chinook salmon from the upper Willamette River, lower Columbia River, and upper Columbia River summer-fall ESUs (Teel *et al.* 2009). The Willamette River mainstem supports both winter steelhead and spring Chinook salmon at various life stages throughout every month of the year. These fish rely on habitat in the SAA to complete their life cycle. Coho salmon are spawning in Miller Creek, a tributary within the SSA, after a project by the Oregon Department of Transportation to repair fish passage. Additionally, Friesen and his colleagues at the Oregon Department of Fish and Wildlife (ODFW)(2005 and 2007) showed that yearling and subyearling Chinook salmon are feeding and growing while migrating through the lower Willamette River, and that smaller juvenile fish often rear within the reach for weeks during the winter months. The ODFW's results have been supported by recent work by Dr. Dan Bottom, NOAA's Northwest Fishery Science Center, and his colleagues in the Columbia River near the mouth of the Willamette River where they have demonstrated the importance of shallow habitats in providing a refuge for juvenile salmon. Their research has shown that juvenile fish actively and repeatedly move into shallow, off-channel habitats with tidal cycles and flow changes (Roegner *et al.* 2012, Bottom 2012, pers.comm.). This recent research demonstrates the important role habitat in the SAA plays in the life history of listed salmonids.

Salmon and Steelhead Recovery

Even though salmon and steelhead use the lower Willamette River to migrate, rear, grow and even spawn, the lack of adequate freshwater habitat likely hinders attainment of healthy populations. The relationship between habitat loss and fragmentation and species persistence has been well studied (*e.g.*, Harrison and Bruna 1999).

When listing the five species of salmon and steelhead as threatened, NMFS identified lack of adequate freshwater rearing habitat as a limiting factor. The ESA requires that NMFS develop and implement recovery plan for listed species. NMFS released a proposed Lower Columbia River Recovery Plan on May 16, 2012, and adopted the Final Upper Willamette River Recovery Plan on August 22, 2011. Both Plans discuss the need for actions that improve the availability and quality of freshwater rearing habitat. While specific actions are not identified in the plans, NMFS describes an approach to recovery using ecosystem-based management of habitat, and the establishment and attainment of specific viability criteria for each population within an ESA-listed species. NMFS defines a viable salmonid population as an independent population of any Pacific salmonid that has a negligible risk of extinction due to threats from demographic

variation, local environmental variation, and genetic diversity changes over a 100-year time frame (McElhany *et al.* 2000). Four parameters form the key to evaluating population viability status: abundance, population growth rate, population spatial structure, and diversity. Therefore, viability criteria for each population within a species are defined in terms of abundance, productivity, spatial structure and diversity. This understanding is important when considering habitat in the lower Willamette River because of the relevance of past habitat degradations (including water and sediment contamination) to the viability status of listed salmonid species using this reach.

Inadequate rearing habitat in this reach can affect all four viability criteria. For example, accelerated growth can foster increased survival for juvenile coho salmon growth and survival are reduced when fish migrate through poor quality habitat. Enhanced growth of juvenile fish that are able to use higher quality habitats leads to improved survival as larger physical size and condition size may confer an advantage for surviving disturbances such as flooding (Pearsons *et al.* 1992; Fausch and White 1986; Bell *et al.* 2001) and for competing for limited resources such as food or refuge space (Allee 1981; Hughes 1998).

The lower Willamette River provides an important connection between the upper Willamette River and the Columbia River, its estuary and the ocean. Furthermore, the lower Willamette River connects to high quality tributary streams such as those in Forest Park. Connectivity between high quality habitats, and connectivity between a diversity of habitat types are key factors in improving the spatial structure component of species viability criteria. In addition to improved spatial structure, connectivity supports improved ecosystem resilience (Nuñez *et al.* In Press), and promotes juvenile growth, abundance, and survival (Ebersole *et al.* 2006), keys to both abundance and productivity (McElhany *et al.* 2003). The amount and quality of different types of habitat are thought to be reasonable predictors of juvenile salmonid abundance and production (Roni *et al.* 2010). We request the Trustees carefully consider the roles habitat connectivity will play in salmon recovery as you finalize your Restoration Plan.

The dramatic loss of shallow rearing habitats have negatively affected the genetic diversity of salmon populations that exhibit stream type life histories with extended juvenile rearing in freshwater. Strengthening salmon resilience will require expanding habitat opportunities for salmon populations to express their maximum life-history variation (Bottom *et al.* 2011) and increase genetic variation. We encourage the Trustees to take advantage of opportunities to restore shallow-water habitat whenever possible.

Restoration of habitat in the SSA is feasible as evidenced by the recent restoration of Miller and Crabapple creeks which restored passage for coho salmon and steelhead. Coho salmon are now spawning in Miller Creek. Creation and enhancement of limiting habitats like off-channel shallow areas conserve and restore key biological, ecological, and landscape processes and therefore improve the viability of the species and recovery (NMFS and ODFW 2011). If thoughtfully developed, such restoration opportunities present themselves at multiple spatial scales and are not restricted to actions which incorporate significant acreage. We hope you will consider this information and design future restoration projects to address species limiting factors and provide the greatest possible benefit to viability.

Specific Comments on the Draft Portland Harbor Restoration Plan

In the Plan, the Trustees present their policy decision to accept no more than 50% of the restoration credits in the broader focus area, and to require at least 50% of the restoration credits in the SSA. **While NMFS understands and supports the Trustees' policy to allow restoration credits outside of the SSA, we believe that greater benefits would occur if more restoration was implemented inside of the SSA. In fact, we believe that requiring 100% of the restoration in the SSA is certainly supported by scientific and feasibility considerations. The link to the injury is greatest within the SSA, and habitat is severely degraded in this reach. This reach has had no true restoration projects since the development of the recovery plans, and all five listed salmon and steelhead species must use this reach to complete their life cycles. Further, ecosystem resilience and species viability (abundance, growth, spatial structure and genetic diversity) will be enhanced through restoration in the SSA.**

F-014

As noted by the Expert Panel, NMFS agrees that restoration in the SSA needs to occur on both sides of the Willamette River, and provide a logical sequence of connected projects to provide connected opportunities for salmon to rest, feed and avoid predators. Channel complexity, alcoves and floodplain areas historically provided important juvenile rearing habitat and their loss has diminished the success of specific juvenile life histories (Willamette Atlas).

F-015

Specific Comments on the Portland Harbor Draft EIS

F-016

NMFS supports the preferred alternative (Integrated Habitat Restoration) and agrees that ecosystem or habitat-based restoration in the lower Willamette River will promote recovery of listed salmon. This alternative will support improved viability criteria (abundance, productivity, spatial structure and genetic diversity) by creating and improving lost shallow-water and off-channel habitat for juvenile salmonids. In addition to Chinook salmon, this strategy will benefit coho salmon and steelhead by increasing opportunities for spawning and rearing in the SSA. Projects that are ecologically sustainable and provide flow and thermal refugia for juvenile salmon and steelhead will provide the greatest benefit to salmon recovery.

Furthermore, in-stream restoration projects that restore streamflow regimes by connecting historic channels and restore floodplain connectivity are more likely to increase habitat diversity and population resilience and ameliorate climate change effects (Beechie *et al.* 2012) and therefore should be considered high priority.

F-017

The species-specific restoration alternative (Alternative 3) will aid species recovery, although the ecological literature is more supportive of a habitat and ecosystem-based approach because a healthy ecosystem is more sustainable over time through increased resilience (see citations above). Further, the link between the injury incurred in the SSA and the species-specific approach is more tenuous in this alternative.

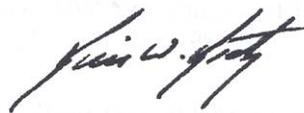
NMFS agrees with the Trustees that Alternative 4, Open Geography Restoration Planning Alternative, does not meet the purpose and need of the action because not all restoration projects would have a strong nexus to the injury that has occurred. We support the ecological and policy arguments, as outlined in the Draft Programmatic EIS, for the need to link restoration actions with the injury caused by the hazardous substance or oil releases. Restoration projects are

technically and economically feasible in the study area and would be most beneficial for juvenile salmon migrating and rearing in this reach.

The programmatic EIS also discusses the need for restoration of lost recreation services. NMFS supports restoration of recreation services; however, we agree with the Plan that it must not occur in a location or manner that degrades ecological value. We are available to work with NOAA and the Trustees on this issue as specific recreation projects are identified.

We appreciate the efforts of NOAA and the Trustees in developing this Plan, and reiterate our desire to continue to work with you in implementing your vision of restoration in the lower Willamette River. If you have questions about this letter, please call Christy Fellas, fisheries biologist in the Willamette Basin/Lower Columbia Branch of the Oregon State Habitat Office, at 503.231.2307.

Sincerely,

A handwritten signature in black ink, appearing to read "Kim W. Kratz".

Kim W. Kratz, Ph.D
Director, Oregon State Habitat Office
Habitat Conservation Division

cc: Megan Callahan Grant, NOAA Restoration Center

Table 1. ESA-Listed Species and Designated Critical Habitat in the Broader Focus Area (Willamette River from fall to mouth, Sauvie and Hayden Islands and Multnomah Channel to Scappoose Bay) and the study area (Willamette RM 0.8 to 12.3). Steller sea lions are protected under the Marine Mammal Protection Act.

Species	Present in study area	Present in broader focus area	Critical Habitat in study area	Critical Habitat in broader focus area
CHINOOK SALMON (<i>Oncorhynchus tshawytscha</i>)				
Lower Columbia River	Yes	Yes	Yes	Yes
Upper Willamette River spring-run	Yes	Yes	Yes	Yes
Snake River spring/summer-run	No	Yes	No	Yes
Upper Columbia River spring-run	No	Yes	No	Yes
Snake River fall-run	No	Yes	No	Yes
CHUM SALMON (<i>O. keta</i>)				
Columbia River	No	Yes	No	Yes
COHO SALMON (<i>O. kisutch</i>)				
Lower Columbia River	Yes	Yes	*	*
SOCKEYE SALMON (<i>O. nerka</i>)				
Snake River	No	Yes	No	Yes
STEELHEAD (<i>O. mykiss</i>)				
Lower Columbia River	Yes	Yes	Yes	Yes
Upper Willamette River	Yes	Yes	Yes	Yes
Snake River Basin	No	Yes	No	Yes
Middle Columbia River	No	Yes	No	Yes
Upper Columbia River	No	Yes	No	Yes
GREEN STURGEON (<i>Acipenser medirostris</i>)				
Southern DPS	No	Yes	No	Yes
EULACHON (<i>Thaleichthys pacificus</i>)				
Southern DPS	No	Yes	No	Yes
STELLER SEA LIONS (<i>Eumetopias jubatus</i>)				
Eastern DPS	No	Yes	No	Yes

* Critical habitat for LCR coho has not yet been designated.

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Comment Form

***Portland Harbor Natural Resource Damage Assessment (NRDA)
Draft Programmatic EIS / Restoration Plan (PEIS/RP)***

Thank you for taking the time to comment on the Draft Portland Harbor NRDA PEIS/RP. The comments that you make, in their entirety, including the personal information you provide, will become part of the public administrative record for this project. The Trustee Council will not consider anonymous comments, so you must provide a name and address. Responses to your comments will be provided in the Final PEIS/RP.

First Name: Dennis

Last Name: O'Connor

Street Address: 15211 NW Decatur Way

City, State, Zip: Portland, Oregon 97229

Email: habitatconcepts@gmail.com

Organization (if any): Habitat Concepts

Check here to sign up for project email updates

Please write your comments below, and attach additional pages if you need more space. You can download this form and email your comments online at <http://www.fws.gov/oregonfwo/Contaminants/PortlandHarbor/default.asp>. Comments must be received by October 8, 2012.

Comments:

Will any tributaries be considered for restoration and culvert removal? -



Comments Continued:

Please email comment form to: portlandharbor.restoration@noaa.gov

Or mail comments to: - Megan Callahan Grant -
NOAA Restoration Center -
1201 NE Lloyd Blvd., Suite 1100 -
Portland, OR 97232 -



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10

1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140

OFFICE OF
ECOSYSTEMS, TRIBAL AND
PUBLIC AFFAIRS

October 3, 2012

Megan Callahan Grant
NOAA Restoration Center
1201 NE Lloyd Blvd. #1100
Portland, Oregon 97232

Re: U.S. Environmental Protection Agency (EPA) comments on the Draft Portland Harbor Natural Resources Damage Assessment (NRDA) Programmatic Environmental Impact Statement (PEIS) and Restoration Plan (EPA Project Number: 10-007-NOA).

Dear Ms. Grant:

This review was conducted in accordance with our responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act. Under our policies and procedures, we evaluate the environmental impact of the proposed action and the adequacy of the impact statement.

The PEIS evaluates the potential environmental impacts of two restoration planning alternatives and a no action alternative. The first action alternative proposes an integrated habitat restoration approach. The second action alternative is a species-specific restoration approach. The PEIS selects the integrated habitat restoration approach as the preferred alternative. The document also presents the Draft Portland Harbor NRDA Restoration Plan, which describes the integrated habitat approach and discusses restoration priorities, project selection, planning, implementation, and stewardship.

The EPA supports the identification of the integrated habitat restoration approach as the preferred alternative. We agree that this approach is likely to result in improvements to habitat, including water and sediment quality, over the long term. We are less supportive of the species-specific alternative, primarily because this alternative could employ artificial propagation. As noted on page 4-11 of the DEIS, artificial propagation is a controversial method for enhancing ESA-listed species. Concerns have been cited related to the genetic integrity, behavior and fitness of the progeny of artificially produced individuals, as well as their potential to interbreed with naturally produced individuals. Hatcheries also have potential implications for riverine habitat and water quality through their construction, operation, and waste water discharge. These factors, together with the fact that NOAA is at present reevaluating its hatchery strategy for the Columbia River through its Mitchell Act DEIS¹, lead us to conclude that the integrated habitat restoration approach is environmentally preferable.

F-013

The EPA also agrees with the project selection criteria established in the Restoration Plan, as well as the types of desired restoration projects identified. We support and encourage close collaboration with the Trustee Council and the potentially responsible parties to incorporate beneficial habitat restoration into

¹ <http://www.nwr.noaa.gov/Salmon-Harvest-Hatcheries/Hatcheries/MA-EIS.cfm>

remedial project designs. We also support integrating restoration planning into the remedial process. By collaborating closely throughout this process we hope to ensure that projects within the study area effectively meet both remediation and restoration goals. We also hope to achieve cost savings and more expeditious completion of restoration.

Based on our review, we have assigned the PEIS a rating of LO (Lack of Objections). A copy of the EPA rating system is also enclosed. We appreciate this opportunity to comment at this stage of the analysis process. If you have any questions or concerns please contact me at (206) 553-1601 or by electronic mail at reichgott.christine@epa.gov, or you may contact Teresa Kubo of my staff at (503) 326-2859 or by electronic mail at kubo.teresa@epa.gov.

Sincerely,



Christine B. Reichgott, Manager
Environmental Review and Sediment Management Unit

Enclosures:

EPA Rating System for Draft Environmental Impact Statements



Comment Form

Portland Harbor Natural Resource Damage Assessment (NRDA) Draft Programmatic EIS / Restoration Plan (PEIS/RP)

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First Name: Jim	Last Name: Robison
Street Address: 6615 N Princeton St	City, State, Zip: Portland, OR 97203
Email: jim@jimrobison.org <input type="checkbox"/> Check here to sign up for project email updates	Organization (if any): Portland Harbor CAG

Please write your comments below, and attach additional pages if you need more space. You can download this form and email your comments online at <http://www.fws.gov/oregonfwo/Contaminants/PortlandHarbor/default.asp>. Comments must be received by October 8, 2012.

Comments:

Comment on the Draft Portland Harbor Programmatic EIS and Restoration Plan by the Portland Harbor Community Advisory Group

- **C-051** We see a need for more of the funds to be dedicated to projects within the Portland Harbor. We feel that all project work should be within either the Portland Harbor or watersheds that directly feed into the Portland Harbor.
- **C-052** We see a need for environmental justice impacted communities to have improved access to the river for fishing, recreation, etc.
- **C-053** We see a need to encourage environmental justice impacted communities to participate more actively in the NRDA process, to have input and engage in the decision making and to be able to benefit from jobs provided for restoration work.
- **C-054** City of Portland has the largest number of recognized tribes in the nation. What outreach has been done to all of the additional tribes represented in Portland beyond those on the Trustee Council?
- **C-055** While we recognize the desirability of having project ready sites for selection, we don't want the decisions regarding restoration to be entirely driven by what is "ready" to go. We want restoration decisions to be based on what is best for restoring the native fish and wildlife habitat to a healthy state, which may mean adopting proposals for restoration at sites that are longer term, and may include sites that do not currently have a willing landowner.
- **C-056** We strongly support creating distributed sites along the 11 mile Portland Harbor stretch (for example every 1 mile or so) to best meet the needs of migrating salmon.
- **C-057** If a restoration plan that best meets the needs for habitat restoration determines that a particular site would be highly valuable for habitat creation, but that site does not currently have a willing landowner to restore the site, then we encourage the plan to allow for long term planning which may include a plan for restoring the site at a future date, giving the landowner necessary time to make changes that would be needed to meet their operational needs. For example, a current landowner could make plans to shift operations, or adjust their use of a site over time to allow for restoration in 20 years. If the site is highly valuable for restoration, this long term plan should be considered a viable option.



Comments Continued:

- We see a high value to day-lighting of streams that feed into the Portland Harbor.
- **C-058** We see a significant need for additional attention to Sturgeon habitat in the restoration plan.

Please email comment form to: portlandharbor.restoration@noaa.gov

Or mail comments to: - Megan Callahan Grant
NOAA Restoration Center
1201 NE Lloyd Blvd., Suite 1100
Portland, OR 97232



Comment Form

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First Name: <u>Jim Robison</u>	Last Name: <u>Robison</u>
Street Address: <u>6615 N Princeton St</u>	City, State, Zip: <u>Portland, OR 97203</u>
Email: <input type="checkbox"/> Check here to sign up for project email updates	Organization (if any): <u>Portland Harbor CAG</u>

Please write your comments below, and attach additional pages if you need more space. You can download this form and email your comments online at <http://www.fws.gov/oregonfwo/Contaminants/PortlandHarbor/default.asp>. Comments must be received by October 8, 2012.

Comments:

C-050

Use T-4 Slip 1 as an off-channel habitat restoration site.



Date: October 8, 2012

Re: Audubon Society of Portland Comments on Portland Harbor NRDA Draft EIS

From: Bob Sallinger, Audubon Society of Portland

To: Megan Callahan Grant

NOAA Restoration Center

1201 NE Lloyd Blvd., Suite 1100

Portland, OR 97232

Sent By email: portlandharbor.restoration@noaa.gov

Dear Ms. Callahan Grant,

I am writing on behalf of the Audubon Society of Portland and our 13,000 members in the Portland Metropolitan Region to provide comments on the Draft Portland Harbor Programmatic EIS and Restoration Plan and associated Ecological Restoration Portfolio. Audubon Society of Portland has been actively engaged in protection and restoration of the Lower Willamette River for decades and the health of the river as it passes through Portland is of great interest to our members. We view Superfund and the Natural Resource Damage Assessment (NRDA) as unique and unprecedented opportunities to redress past, current and future impacts to the river and its associated wildlife populations due to release of contaminants into the environment and to set the river on a path towards ecological health. Failure to take advantage of this opportunity will set the river back in ways that may never be recoverable.

Historically, the Lower Willamette River was a braided, complex reach that provided important habitat for a huge array of native fish and wildlife species. This included shallow water habitat essential for juvenile salmonids during their migration to the ocean. The Lower Willamette also provided spawning and migratory habitat for adult salmonids. In addition the Lower Willamette is also provides a migratory corridor and nesting habitat for native birds, over 200 species of which can be found in the Portland Metropolitan Region and the vast majority of which use riparian habitats for some portion of their lifecycle. According to the Metro Goal 5 Analysis, there are 294 known native vertebrate species found in the metro region of which 94% use riparian areas for some portion of their lifecycle and 455 of which are dependant on these areas for some portion of their lifecycle

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Over the course of the past 150 years, the Lower Willamette has become tremendously degraded. It has been deepened, narrowed and simplified. The banks of the Lower Willamette have been hardened, steepened and lined. Floodplain and off-channel habitats have been filled and destroyed. The Lower Willamette is extensively contaminated with large portions of the North Reach designated as a Superfund site under CERCLA. The combination of habitat loss and contamination in the lower Willamette has contributed to native wildlife populations in the Pacific Northwest. Its continued degraded state undermines restoration work that is being done throughout the Willamette River System, an area that drains more than 11,500 square miles.

The importance of urban areas urban rivers was recently highlighted in the Report: *Urban and Rural-residential Land Uses: Their Role in Watershed Health and the Rehabilitation of Oregon's Wild Salmonids*, which states,

*Even though urban areas occupy a relatively small area of the landscape, their position can lead to disproportionately larger effects on salmonids or other fish assemblages. Compared to other land uses, urban areas occupy critical locations in Oregon's watersheds. Towns and cities are commonly located along streams and rivers at lower elevations and often at their confluences. As such they influence both local habitat in the lowlands and movement of fishes upstream and downstream. Migration barriers, alterations in physical habitat, and degradation of water quality at critical points along river networks have the potential to limit the abundance and distribution of salmonids throughout and entire watershed.*¹

PR-003

Audubon supports Alternative 2: Integrated Restoration Planning Alternative (preferred). We congratulate the Trustees for an overall outstanding job in terms of the work done to date and specifically on the DEIS. We believe that the options presented in the DEIS are laid out clearly and that the methodology underpinning this work is sound. We concur with the Trustees that Alternative 2 is best suited to "fulfill the goals of NRDA to restore injured natural resources and services" by improving habitats "that function in support of multiple fish and wildlife species, as well as serve as food base for these species." We particularly support Alternative 2's focus on delivering "broad ecosystem benefits concentrated within and around the area where the injuries to natural resources and natural resource services have taken place."²

We believe that the concept of "polluter pays" is critical to achieving health of the river and that industries that have long profited from development of the river should be held fully accountable and should mitigate for their impacts within the area that was

PR-004

¹ Independent Multidisciplinary Science Team (2010) *Urban and Rural-residential Land Uses: Their Roles in Watershed Health and the Recovery of Oregon's Wild Salmonids*. Technical Report 2010-1. Oregon Plan for Salmon and Watersheds, Oregon Watershed Enhancement Board. Salem, Oregon. (Page 36).

² Draft Portland Harbor Programmatic Environmental Impact Statement @ ES 4.

impacted. To require any less would fail to meet legal requirements and leave our river degraded for wildlife and for future generations.

We would make the following specific comments regarding the Draft EIS:

1. **Audubon urges the Trustees to ensure that the remainder of the NRDA process is as transparent and inclusive as possible:** By necessity the process to date has occurred mostly behind closed doors with only the trustees and Potentially Responsible Parties ("PRPs") at the table. However as the NRDA process moves towards final resolution, it is critical to broadly engage the general public and public interest and community groups to the largest degree possible. It is important to recognize that the Lower Willamette River is adjacent to the most densely populated landscapes in Oregon including many underserved communities. Beyond its ecological importance, the Willamette River plays an important role in the health, recreation, and livability of these communities. While we recognize that settlement discussions may need to remain confidential, it is of fundamental importance that all relevant cost and habitat number as well as any points of debate or contention between the Trustees and PRPs be made available for public review so that the public will not be excluded until it is too late in the process to have an impact on final agreements.

PR-005

2. **Audubon urges the Trustees to require that 100% of the restoration required under NRDA occur within the boundaries of the Superfund Study Area (from river mile 0.8 to river mile 12.3):** Audubon does not support the decision to allow up to 50% of the restoration to occur outside the boundaries of the Superfund area in a geography that extends from Willamette Falls to the south to the edge of West Hayden Island to the east and portions of Scappoose Bay to the west. We believe that there are more than adequate restoration opportunities within the Portland Harbor Superfund Study Area to achieve NRDA objectives and that these should be the top priority for restoration activities occurring under NRDA. Portland Harbor is where the impacts took place and we can see no valid reason under CERCLA or NRDA to go beyond those boundaries.

PR-006

Portland Harbor is the most degraded reach of the entire Willamette River System and its continued state of degradation severely undermines restoration efforts throughout the rest of the system. Every migratory fish using the 11,500 square mile Willamette River system must at some point during its lifecycle pass through Portland Harbor. In addition, Portland Harbor has repeatedly proven to be one of the most politically difficult landscapes on which to accomplish restoration activities--failure to take full advantage of this opportunity to achieve legally mandated restoration objectives could potentially relegate Portland Harbor to a state of perpetual degradation, whereas restoration in the larger NRDA focus area outside of Portland Harbor, while certainly challenging, is likely to be relatively more feasible and fundable in the coming decades.

We strongly encourage the Trustees to reconsider allowing up to 50% of the NRDA restoration to occur outside the Portland Harbor Superfund Study Area.

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PR-007

3. **Trustees should reject industry arguments that conducting NRDA restoration within Portland Harbor would conflict with industrial land development requirements:** Superfund PRPs repeatedly have argued that there is inadequate land supply within Portland Harbor to meet industrial land needs and therefore should occur outside Portland Harbor. In fact Statewide Land Use Planning Goal 9: Economic Development specifically recognizes the importance of protecting natural resources in economic development areas.³ Goal 9, Section (A)(5) reads:

Plans directed toward diversification and improvement of the economy of the planning area should consider as a major determinant, the carrying capacity of the air, land and water resources of the planning area. The land conservation and development actions provided for by such plans should not exceed the carrying capacity of such resources.

Goal 9, Section (A)(2) reads:

The economic development projections and the comprehensive plan which is drawn from the projections should take into account the availability of the necessary natural resources to support the expanded industrial development and associated populations. The plan should also take into account the social, environmental, energy, and economic impacts upon the resident population.

Lack of industrial land supply should not be used as an excuse to divert or reduce legally required NRDA restoration activities.

PR-008

4. **We urge the Trustees to ensure that NRDA related obligations are written in a manner the makes it explicitly clear that these activities are specifically mandated to mitigate for resources and resource services that have been harmed as a result of release of contaminants into the environment and not a surrogate for or in lieu of other natural resource programs, mandates and obligations:** There has been a pattern in recent years of Superfund PRP's pointing to NRDA as an alternative to local natural resource protection programs mandated under Statewide Land Use Planning Goals and other local and state regulations. Most notably a number of Superfund PRPs argued during the recent North Reach River Plan adoption process that new requirements for protection and restoration in the North Reach were superfluous and duplicative because of the NRDA process. As a result of this lobbying, many provisions of the North Reach River Plan were either weakened or removed altogether. While River Plan and NRDA are complimentary, they address completely different impacts. NRDA looks at past, present and future injury to natural resources and resource functions due to release of contaminants into the environment while River Plan was prospective, establishing a program to avoid, minimize and mitigate for habitat loss and fragmentation due to future development in Portland

³ <http://www.oregon.gov/LCD/docs/goals/goal9.pdf>

Harbor. Both programs are necessary to set the Lower Willamette on a path toward ecological health. Notably, the River Plan is currently under appeal by industrial interests and its fate remains uncertain. More recently the Port of Portland and other industrial interests have repeatedly intertwined NRDA with local habitat mitigation requirements that may be required as a condition of developing 300 acres of wildlife habitat on West Hayden Island. As recently as September 28, 2012, the Port suggested in a West Hayden Island workshop that it be allowed to "double dip" and count any WHI related development mitigation toward its NRDA liability. Given recent history, it is critical that the Superfund Trustees neither rely upon other environmental programs to restore Portland Harbor nor allow Superfund PRPs to use NRDA as a way to avoid other environmental obligations and liabilities.

5. **It is important to develop a clear list of criteria that will be used to narrow the long list of sites contained in the Ecological Restoration Portfolio in order to help the public, agencies and PRPs focus resources on the most ecologically important sites:** We would recommend consideration of the following criteria:
- a. **Location:** We would recommend focusing on sites within the Superfund Study Area exclusively, but to the degree that the Trustees go with the proposal to allow up to 50% of the restoration to occur in the broader focus area, we would encourage the trustees to weight sites inside the study area more heavily.
 - b. **Size of restoration sites:** We would encourage the trustees to give priority to larger sites and contiguous sites that will achieve higher ecological function for more species.
 - c. **Distribution of restoration sites:** Juvenile salmonids require shallow water habitat approximately every 0.25 miles in order to rest, forage and escape from predators. The Portland Harbor has extensive stretches in excess of 0.25 miles where no such habitat is available. We would encourage the Trustees to prioritize establishing restoration sites, including smaller sites, within these areas, so long as they meet functional objectives.
 - d. **Community Support:** Consideration should be given to access to nature for the community so long that it does not conflict with restoration objectives.

PR-009

6. **West Hayden Island:** As per our comments in section 2 of this letter, we strongly encourage the Trustees to restrict NRDA restoration activities to the Superfund Study Area rather than the broader focus area. This approach would appropriately exclude West Hayden Island altogether from consideration as a potential restoration site. However should the Trustees move forward with allowing up to 50% of the restoration to occur in the broader study area that does include West Hayden Island, we would still urge you to exclude WHI from consideration unless the entire parcel is protected in perpetuity.

PR-010

West Hayden Island is an 800+ acre parcel that includes bottomland hardwood forests, grasslands, wetlands, and shallow water habitats. The parcel is almost entirely within the floodplain. At the Port of Portland's behest, the parcel is currently being

considered for annexation and zoning by the City of Portland to allow for 300 acres of marine industrial development within the habitat area (decision expected by the end of 2012 calendar year.) Controversy surrounding this decision has delayed annexation and rezoning since the late 1990s. Under the Port's proposal it would be allowed to develop 300 acres and use the remain 500 acres, a significant portion of which is currently owned by the Department of State Lands for NRDA mitigation. Audubon believes that any industrial development on West Hayden Island should exclude the entire parcel from consideration for NRDA credits regardless of the geographic extent of the focus area. Our reasons are as follows:

- a) The Port of Portland represents the sole threat to this parcel. The Port took WHI from PGE in 1993 under threat of using its powers of condemnation. It has consistently rejected opportunities to protect the parcel including inclusion of the parcel as a potential target area in the 1996 Metro Greenspace Bond Measure and efforts by the conservation community to initiate discussion about purchase of the parcel for conservation purposes in 1995. The Port should not be allowed convert a significant portion of this parcel for industrial use and then use the NRDA process as a positive public relation aspect of their proposal.
- b) The Port has repeatedly asserted over the past two years that it is unwilling to consider the remaining 500 acres of habitat on WHI for meeting local mitigation requirements for developing the 300 acres because it is reserving those 500 acres for Superfund/ NRDA restoration requirements. Instead the Port argues that it should be allowed to both severely reduce WHI development related mitigation and also conduct whatever mitigation is required off of West Hayden Island. The absurd result of the Port's proposal is that it would meet NRDA restoration obligations outside of Portland Harbor on WHI and it would meet WHI development mitigation opportunities off of West Hayden Island and outside the broader NRDA Focus Area. In essence the Port is proposing to use a geographic sleight of hand to shift it NRDA mitigation obligation outside even the broader focus area by bumping other mitigation requirements further afield. There is no legitimate reason to not require mitigation required as a result of development on West Hayden Island to occur on-site and in-kind and the Port's efforts to move its mitigation around amount to nothing more than a regulatory shell game.
- c) Development on West Hayden Island would have very significant direct and indirect impacts on the remaining habitat: In addition to the loss of 300 acres of habitat, the remaining 500 acres would be subjected to significantly increased fragmentation and edge to interior ratios. It would also be subject to increased noise, light, vibration, and pollution from the development. Finally the remaining 500 acres is already impacted by utility rights of way, would be further impacted by increased recreational use, and potentially could be further fragmented and disturbed by future development of roads, bridges, parking lots, and recreational facilities to support district plan that is being

developed. The degree of impact is such that even without NRDA mitigation, the remaining habitat restoration opportunities on West Hayden Island after development are not sufficient to fully mitigate for the impacts of development. The City of Portland's Mitigation Memo (9-18-12) (attached) recognizes that mitigating for development impacts alone would require a combination of both on-island and off-island actions.

- d) WHI development currently is in the concept phase and the Port has not actually said what it will build, conducted an alternatives analysis, EIS, addressed floodplain impacts with FEMA, or gone through federal permitting. In fact the City's consultants, ECONorthwest have indicated that development is not likely to occur until 2023 at the earliest.⁴ Under these circumstances it would be inappropriate to allow for NRDA credit on a parcel whose ultimate disposition is far from certain or clearly understood.
- e) The Port has persistently intertwined NRDA and local mitigation obligations over the past year in a manner that is confusing to stakeholders, agencies and the general public. Discussions about local mitigation requirements have been repeatedly infused with extraneous discussions of NRDA. In September 28, 2012 Port officials at a public WHI workshop suggested that mitigation conducted as part of local regulatory requirements could also be counted toward NRDA. NRDA should not be allowed to be used to confuse or complicate local annexation, zoning and environmental decision-making that are completely separate from NRDA process.

For all of the above listed reasons, we believe that it would be entirely inappropriate to consider West Hayden Island as a NRDA restoration receiving site.

7. The NRDA process should consider potential negative impacts to native species caused by clean-up actions that rely heavily on capping rather than removal: PRPs have aggressively advocated for clean-up actions that rely primarily on natural recovery or capping rather than removal of contaminants. We urge the Trustees to take into account the fact that further hardening of the banks of Portland Harbor will make passage for a variety of native fish and wildlife species even more tenuous than it is today. At the same time the NRDA is accounting for past impacts to species, the clean-up action if it relies heavily on capping could further degrade the habitat quality of this section of the river and undermine the restoration efforts enabled by NRDA. In essence we could have a situation where NRDA gives back with one hand and Superfund Clean-up actions take back with the other. It is critical that NRDA and Superfund clean-up actions be carefully coordinated such that the overall health of the Portland Harbor is restored for native fish and wildlife to condition would mirror the state of the river had not the contamination occurred.

PR-011

⁴ ECONorthwest West Hayden Island Cost/ Benefit Analysis @ 1-1
<http://www.portlandoregon.gov/bps/article/389017>

Thank your for your consideration of these comments.

A handwritten signature in black ink that reads "Bob Sallinger". The signature is written in a cursive, slightly slanted style.

Bob Sallinger
Conservation Director
Audubon Society of Portland

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Comment Form

**Portland Harbor Natural Resource Damage Assessment (NRDA)
Draft Programmatic EIS / Restoration Plan (PEIS/RP)**

Thank you for taking the time to comment on the Draft Portland Harbor NRDA PEIS/RP. The comments that you make, in their entirety, including the personal information you provide, will become part of the public administrative record for this project. The Trustee Council will not consider anonymous comments, so you must provide a name and address. Responses to your comments will be provided in the Final PEIS/RP.

First Name: Joan	Last Name: Snyder
Street Address: 900 SW 5th Ave, Suite 2600	City, State, Zip: Portland, OR 97204
Email: jpsnyder@stoel.com <input checked="" type="checkbox"/> Check here to sign up for project email updates	Organization (if any): On behalf of entities listed in Attachment A

Please write your comments below, and attach additional pages if you need more space. You can download this form and email your comments online at <http://www.fws.gov/oregonfwo/Contaminants/PortlandHarbor/default.asp>. Comments must be received by October 8, 2012.

Comments:

Please see attached letter and its attachments.



Comments Continued:

Please email comment form to: portlandharbor.restoration@noaa.gov

Or mail comments to: Megan Callahan Grant
NOAA Restoration Center
1201 NE Lloyd Blvd., Suite 1100
Portland, OR 97232

October 8, 2012

Megan Callahan Grant
NOAA Restoration Center
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Portland, OR 97232

RE: Comments on Draft Portland Harbor Programmatic EIS and Restoration Plan

Dear Ms. Callahan Grant:

This letter provides comments on the Draft Portland Harbor Programmatic EIS and Restoration Plan (together, the “PEIS/RP”) on behalf of those entities listed in Attachment A (collectively, the “Commenters”). The Commenters consist of parties from the Phase 2 funding group, which has provided in excess of \$5 million to fund the Portland Harbor Trustees’ Natural Resource Damage (“NRD”) assessment.

The Commenters recognize the significance of the restoration planning that is the subject of the draft programmatic EIS. Through the Portland Harbor NRD process, the Portland Harbor NRD Trustees will be making decisions for restoration projects that have the potential to make changes in the ecological system at a scope and scale that could have significant positive impact on the long-term health and viability of species that use the Portland Harbor.

The Commenters also join the Trustees in their desire to make certain this Restoration Plan is carefully considered and is built upon a state-of-the-art understanding of the science of restoration planning. This comment process is an important part of restoration planning. It is in this spirit that the Commenters offer the following comments on the PEIS/RP.

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I. The PEIS/RP Should Be Significantly Revised to Incorporate Greater Detail and Scientific Rigor and Analysis; as Written, It Has Neither Developed a Reasonable Range of Alternatives nor Properly Considered Those It Developed.

The Commenters encourage the Trustees to provide more robust analysis and to significantly revise the document to address the following deficiencies.

A. The PEIS/RP Fails to Take a Hard Look at a Reasonable Range of Alternatives That Meet the Stated Purpose and Need.

The PEIS/RP fails to properly consider a reasonable range of alternatives. 40 C.F.R. § 1502.14(a); *Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin.*, 538 F.3d 1172, 1217 (9th Cir. 2008) (citing *Native Ecosystems Council v. U.S. Forest Serv.*, 428 F.3d 1233, 1245 (9th Cir. 2005)). The PEIS/RP only evaluates three alternatives in any level of detail—(1) no action, (2) integrated habitat restoration planning and (3) species-specific restoration planning—and summarily rejects a fourth alternative, open geography restoration planning.

This analysis is deficient in two ways. First, the narrow range of alternatives examined fails to include a reasonable alternative between the “Integrated Habitat Restoration Planning” alternative and the “Open Geography Restoration Planning” alternative. Specifically, the PEIS/RP fails to include an integrated habitat restoration alternative that relies on juvenile Chinook salmon as a surrogate species for selection of habitat improvement projects but that does not limit the projects to the 12-mile stretch of urbanized, industrialized Portland Harbor.

P-100 The PEIS/RP should explain how and why the Trustees selected the chosen alternatives. Neither

P-101 Section 2, which describes the alternatives evaluated, nor Section 4, which compares the alternatives, makes clear that the Integrated Habitat Restoration Planning alternative has or should have any geographic limitation. The feature of this alternative that is most prominently discussed in Section 2.2 is that restoration projects under this alternative will be chosen that benefit a suite of different species, using juvenile Chinook salmon as a surrogate species for selection of the habitat improvements.¹ Only in Section 5.3 does it become clear that the Integrated Habitat Restoration Planning alternative includes a geographic limitation to the 12-mile stretch of Portland Harbor described in the PEIS/RP as the “Superfund Study Area” or “SSA.”

The only other alternative evaluated in the PEIS/RP that uses an integrated habitat approach is the alternative that is raised and then summarily rejected in Section 2.4, the “Open Geography Restoration Planning” alternative. As defined in the PEIS/RP, this alternative would similarly choose restoration projects that benefit a suite of different species but, rather than limiting its geographic scope to the 12 miles of Portland Harbor, it would allow for the selection of

¹ The PEIS/RP should explain in further detail how juvenile Chinook serve as an adequate surrogate for other allegedly injured species in the Portland Harbor.

appropriate restoration projects that “could occur anywhere” with no geographic limit whatsoever. PEIS/RP, p. 2-2.

P-102

The PEIS/RP fails to adequately address the Open Geography Restoration Alternative and does not develop and assess any reasonable alternative between these two—including any that consider projects within a geographic area that benefit specific populations of species in that have been allegedly impacted by chemical releases from Portland Harbor and that match the functional ecological needs of those species, without regard to whether those projects are located with 12-mile stretch of Portland Harbor. As an example, the geographic scope could be described as that portion of the watershed ecologically important to the recovery of spring Chinook salmon, if that is properly established as the surrogate species.² Or, even more specifically, it could be described as that portion of the watershed ecologically important to the feeding and rearing of juvenile spring Chinook salmon.³ Either of these would encompass a geographic area much larger than a narrow 12-mile corridor of Portland Harbor. For purposes of this discussion, this assumes that there would be at least one additional alternative identified as an “Integrated Habitat Approach Within Geography Supported by Ecological Function.”

As the alternatives are currently postulated, the PEIS/RP does not meet the NEPA requirement that it examine a reasonable range of alternatives, especially given the broad scope of the actions that will fall under the PEIS/RP. *See Ilio‘ulaokalani Coal. v. Rumsfeld*, 464 F.3d 1083, 1098 (9th Cir. 2006) (*quoting Natural Res. Def. Council v. Morton*, 458 F.2d 827, 835 (D.C. Cir. 1972) (“When the proposed action is an integral part of a coordinated plan to deal with a broad problem, the range of alternatives that must be evaluated is broadened.”)).

P-103(a)

Second, the PEIS/RP is also deficient because it fails to provide a sufficiently detailed analysis of alternatives that satisfy its stated purpose and need. *City of Carmel-by-the-Sea v. U.S. Dep’t of Transp.*, 123 F.3d 1142, 1155 (9th Cir. 1997). The PEIS/RP purpose and need statement compels a detailed analysis of alternatives for the selection of restoration projects that would “compensate the public for any natural resource injuries resulting from the release of hazardous substances and oil from the site” (purpose) and “facilitate effective restoration actions” (need). PEIS/RP, p. 1-2.

² The compensatory mitigation rule guidance issued under the Clean Water Act, which is referenced in the PEIS/RP as an authority, notes that restoration should focus on a “watershed approach” and “[e]mphasizes that the process of selecting a location for compensation sites should be driven by assessments of watershed needs.” U.S. Army Corps of Engineers/EPA, *Compensatory Mitigation Rule: Improving, Restoring, and Protecting the Nation’s Wetlands and Streams Questions and Answers*, p. 5.

³ The Federal Register identifies critical habitat for listed salmonid and steelhead species. 70 Fed. Reg. 52630, 52673 Table 12 (Sept. 2, 2005). Table 12 shows over 1,400 miles of streams, lakes, and marine critical habitat for Upper Willamette River Chinook Salmon and 1,300 for Lower Columbia River Chinook Salmon.

P-104

The PEIS/RP appears to reject the “Open Geography” alternative based on a misapplication of what it states in Section 2 to be “fundamental legal constraints.” The PEIS/RP states that there must be a “strong nexus” between the restoration actions and the injuries giving rise to the claim for natural resource damages.⁴ The Trustees take the position that these claims are for alleged injuries to species resulting from releases of hazardous substances in the Portland Harbor.⁵ However, in Section 2.4, the analysis jumps from a discussion of a nexus to “injury” to a species to a nexus to “habitat conditions” in the Portland Harbor. Contrary to what this implies, those habitat conditions that have affected species in the Harbor, including salmon, are not the result of the alleged releases of hazardous substances by PRPs, but, in fact, are conditions that have been created by many years of increasing physical development, including industrial, commercial and residential, in Portland Harbor. Those activities have greatly altered the riverine habitat but are not actionable under any NRD authorities. Instead of focusing on injury to *habitat in Portland Harbor from other causes* the Trustees should appropriately focus on restoration of *whatever habitat could help compensate for any actionable injury to species that the Trustees allege has occurred*. Because that injury is alleged to have occurred to the populations of species that use Portland Harbor (e.g., Section 2.4 discusses the alleged injury to the population of Chinook salmon), then restoration should occur at whatever geographic scale will be ecologically meaningful to the restoration of the population of those particular species.⁶ In fact, as discussed in more detail below, actions located outside the SSA could provide the same ecological benefits to allegedly injured species and, more importantly, may have a greater likelihood of success.

P-103(b)

B. In Rejecting the “Open Geography” Alternative, and in Failing to Consider a Reasonable “Integrated Habitat Approach Within Geography Supported by Ecological Function” Alternative, the Trustees Have Failed to Take a Hard Look at a Reasonable Range of Alternatives.

By rejecting the “Open Geography” alternative and particularly by failing to identify a reasonable alternative along the lines of that proposed above, an “Integrated Habitat Approach Within Geography Supported by Ecological Function” alternative, the Trustees failed to

⁴ The PEIS/RP rejects the open geography alternative because, although it is technically feasible and cost-effective as required by the Trustees’ own threshold criteria for projects (PEIS/RP, p. 2-1), it “would not necessarily improve” habitat conditions in the Portland Harbor for potentially injured species and “does not provide a strong nexus to the site of injury or potentially injured natural resources.” *Id.* at 2-3.

⁵ The Baseline Ecological Risk Assessment (“BERA”) does not identify contaminants resulting from chemical releases in the Portland Harbor as posing potentially unacceptable risk to juvenile Chinook salmon. Draft Final BERA, Table 7-7 (July 1, 2011).

⁶ Note that agencies cannot define the purpose and need so narrowly as to unreasonably limit the alternatives that would meet these goals. *Nat’l Parks & Conservation Ass’n v. Bureau of Land Mgmt.*, 606 F.3d 1058, 1070 (9th Cir. 2010). This precludes a purpose and need statement that would restrict the scope of the PEIS/RP to actions within the project area, excluding all other possible alternatives.

P-189

P-103(c)

appropriately consider: (1) other federal and state legal authorities regarding the development and selection of habitat actions; and (2) peer-reviewed literature regarding the habitat needs and the design of successful projects to benefit the target potentially injured species population.

1. The Trustees Failed to Consult Guidance from Other Federal and State Authorities on the Development and Selection of Habitat Actions.

The Trustees failed to consider regulations issued by other federal and state authorities regarding the development and selection of habitat actions to compensate for the alleged loss of aquatic resources. When evaluating actions to meet similar goals, federal agencies should consider the regulations and guidance of other federal and state agencies that have already been developed and vetted through a public comment process.

P-105

The PEIS/RP acknowledges that the Comprehensive Environmental Response, Compensation, and Liability Act (“CERCLA”), the Oil Pollution Act (“OPA”), the National Contingency Plan and the Clean Water Act (“CWA”) are applicable legal mandates and authorities but does not effectively incorporate these authorities into its evaluation of the alternatives. PEIS/RP, p. 1-4.

For example, in addition to the regulations under CERCLA and OPA governing NRD assessments, regulations promulgated under the CWA establish standards and criteria for compensatory mitigation for losses of aquatic resources. *See* 40 C.F.R. Part 230. These

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regulations require a mitigation project to be located within the same watershed as the impacted site and “where it is most likely to successfully replace lost functions and services,” considering watershed scale features such as aquatic habitat diversity, habitat connectivity, relationships to hydrologic sources, land use trends, ecological benefits and compatibility with adjacent uses. 40 C.F.R. § 230.93(b)(1). These regulations do not create an artificial geographic limitation on the location of otherwise beneficial projects, but rather they discourage mitigation projects in isolated areas that are not chosen based on a full functional ecology analysis relating to long-term aquatic resource needs. Based on this requirement, a restoration project that compensates for alleged injury to natural resources from Portland Harbor contamination should be at a location within the Lower Columbia and Willamette River watersheds, where it is most likely to be successful at restoring the injured salmonid resource. That geographic limitation restricts restoration to projects directed toward the populations injured by releases in Portland Harbor, and, therefore, such restoration would satisfy the “strong nexus” criterion discussed above.

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This interpretation of a “strong nexus” in light of the CWA regulations supports the development of restoration actions based on their benefit to potentially injured populations of affected species rather than focus on the immediate site area. The Trustees should analyze these types of approaches, and in doing so consider whether they would integrate NRD-funded restoration with the larger geographic focus of the existing Lower Columbia and Upper Willamette Recovery Plans and thereby increase the positive cumulative impacts of the NRD-funded restoration projects.

2. The Trustees Failed to Rely on the Weight of Peer-Reviewed Literature Regarding the Habitat Needs of Juvenile Chinook.

The development of successful habitat restoration projects is highly dependent on valid scientific assumptions and experiences relating to the targeted species. Therefore, to determine the locations and types of projects that would most benefit a species, it is appropriate to consult peer-reviewed literature relating to their habitat needs and the qualities of restoration projects that have successfully benefitted the species.

The Trustees failed to take into account the weight of peer-reviewed literature in deciding to restrict restoration actions to the SSA. Focusing on juvenile Chinook as an ESA-listed species, the Trustees state that restoration projects should be located in the SSA because that portion of the Lower Willamette River is uniquely situated to benefit juveniles:

“The project area was identified as the most habitat-limited portion of the lower Willamette River for ESA-listed juvenile Chinook salmon by a panel of experts convened by the Trustee Council.⁷ Chinook salmon critical habitat located within the Portland Harbor area is used by juvenile Chinook salmon to rest and rear in preparation for entry into the lower Columbia River estuary. Thus, this critical habitat provides unique functions and features for a particular life stage of an ESA-listed species and cannot be replaced by habitats that support other life stages. In addition to identifying the project area as a highly important rearing and feeding location, the panel found that it is also the most altered section of the river. The most limited or scarce habitat types within this area include refuge from mainstem Willamette River flows, shallow water and beach habitats with or without large wood assemblages, and undulating natural shorelines. Given these conditions, implementing integrated habitat restoration projects within this area is likely to provide long-term benefits to federally listed salmon.” PEIS/RP, p. ES-6.

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The peer-reviewed literature does not support the Trustees’ assertion that the project area provides unique benefits to juvenile Chinook. is the Trustees have not established that an increase in shallow and off-channel habitats in the SSA would provide more significant benefits than similar improvements in shallow and off-channel habitat in any other areas of the watershed used by juvenile Chinook for rearing and feeding. The peer-reviewed literature is summarized in Attachment B, *An Annotated Bibliography of Studies Pertinent to the Issue of Whether to Target Restoration in the Portland Harbor Study Area* (June 2011). That annotation concludes as follows:

⁷ For a discussion of the inappropriateness of relying on this Trustee-convened “expert panel” rather than on a broader assessment of the weight of peer-reviewed scientific literature, see further comments in Section III.C below.

“Based on this review, there is no *a priori* evidence to suggest that the UWR [Upper Willamette River] Chinook ESU [evolutionary significant unit] would be better served by conducting restoration activities within the Portland Harbor Study Area versus the Broader Focus Area or other areas upstream and downstream of those areas. Moreover, there is no evidence to suggest that there is any scientific basis for an *a priori* allotment of a percentage of restoration to occur with the Study Area. Restoration actions within this area do not provide unique opportunities to improve VSP [viable salmonid population] parameters for the UWR Chinook ESU. ... Indeed, for a variety of reasons *the Portland Harbor Study Area is less suitable than other areas as a focus area for furthering the recovery of the UWR Chinook ESU.*” *Id.* at 15-16 (emphasis added).

C. The PEIS/RP Does Not Contain Sufficient Detail to Allow Analysis of, and Comment on, Alternatives or to Allow Tiering of Specific Restoration Projects.

The stated purpose of the PEIS/RP is “to develop a restoration plan that will provide a framework for future site-specific restoration actions to be tiered from this analysis and implemented in accordance with NEPA and other statutes.” PEIS/RP, p. ES-2. To provide this framework, the PEIS/RP must (1) analyze an adequate range of alternatives to justify narrowing future actions to those within the proposed approach and (2) describe how the site-specific assessments will tier from the PEIS/RP. As drafted, the PEIS/RP does not satisfy its stated purpose of providing a framework for the assessment of future site-specific restoration actions.

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The PEIS/RP does not adequately describe how assessments of future site-specific projects will be tiered to the PEIS/RP. Without a more detailed examination of the alternatives in the PEIS/RP, the Trustees cannot effectively tier individual assessments to the PEIS/RP. The PEIS/RP provides only a broad and non-committal explanation of how the Trustees expect to use it as a framework for the assessment of future site-specific actions:

“The Draft PEIS/RP is intended to expedite and provide a point of departure for future site-specific projects and facilitate the preparation of subsequent project-specific environmental documents. Project-specific NEPA environmental evaluation documents, probably in the form of environmental assessments, will be prepared for future restoration projects and will be referenced back to, or tiered from, the PEIS/RP. Should conditions warrant, NOAA, through the Trustee Council, could apply any of the environmental evaluation documents developed through the NEPA process, such as an environmental impact statement (EIS), supplemental EIS, categorical exclusion or other documentation supported by each federal trustees’ NEPA procedures. Selection of the appropriate process under NEPA for future proposed federal actions will be decided by the appropriate federal agency and that decision will be made available for public review and comment.” PEIS/RP, p. 1-5.

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The ability to efficiently tier individual restoration projects to this PEIS/RP will be critical to the timely implementation of those projects. Thus, the Trustees should develop the detail now in this PEIS/RP from which that tiering can follow, by identifying the elements that are considered likely to have been sufficiently evaluated by this PEIS/RP and those that, under circumstances enumerated with as much detail as is possible, are likely to require further environmental review.

II. The PEIS/RP Fails to Adequately Address All Potential Cumulative Impacts.

The PEIS/RP fails to consider certain significant cumulative impacts. In particular, the PEIS/RP fails to adequately examine adverse impacts on land use and shoreline use. The PEIS/RP also fails to consider the potentially positive cumulative impacts of integrating the NRD restoration program with other recovery and restoration efforts affecting the Portland Harbor.

A. The PEIS/RP Fails to Adequately Address the Cumulative Impacts of Projects on Land Use and Shoreline Use.

Although Section 4.14.1 of the PEIS/RP is titled “Land Use, Shoreline Use and Aesthetics,” the one-paragraph discussion of these important issues addresses only aesthetic impacts. This is incomplete because many significant cumulative impacts to land use and shoreline use are likely. Moreover, this section of the PEIS/RP focuses almost exclusively on short-term impacts. Long-term impacts are addressed in a single, conclusory sentence regarding the long-term aesthetic cumulative impacts to the Lower Willamette River in general resulting from implementation of restoration projects.

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The PEIS/RP should analyze the cumulative impacts on land use and shoreline use of siting restoration projects in an active industrial harbor. For example, the siting of a single restoration project in the Portland Harbor might not create significant adverse land use impacts, because the conversion of industrially zoned land to conservation land would be limited to that particular site. However, the PEIS/RP does not address the cumulative impacts of converting the industrially zoned land within the footprints of the projects the Trustees realistically expect to be constructed within the active industrial Harbor.

In addition, the restoration projects not only would convert industrial land to restoration land but would also limit shoreline uses for commercial purposes. This would magnify these adverse impacts, because, as discussed in Part IV.B.1 below, there is a very limited supply of shoreline land in the Harbor where new, water-dependent businesses could locate and existing water-dependent businesses could expand their operations.

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The PEIS/RP ignores these important, adverse cumulative impacts. Therefore, the discussion of mitigation measures in Section 4.15 of the PEIS/RP is necessarily incomplete. The decision makers and the public cannot evaluate how each alternative could be modified to reduce these adverse impacts. For example, the PEIS/RP does not consider whether restoration projects in the Harbor should be sited contiguously to reduce adverse impacts to commercial land and shoreline

P-112 uses, while at the same time promoting important restoration objectives such as improving habitat connectivity. There is no way to analyze this potential mitigation measure, or even determine which measures might be appropriate, because of the complete lack of cumulative impacts analysis for land use and shoreline use.

B. The PEIS/RP Fails to Consider the Positive Cumulative Impacts Associated with Other Recovery and Restoration Efforts in the Portland Harbor.

P-113 The PEIS/RP fails to integrate with the existing Lower Columbia and Upper Willamette Salmon Recovery Plans and, consequently, fails to consider the positive cumulative impacts of such integration. Federal agencies at times have assumed that positive impacts do not need to be fully analyzed under NEPA, but NEPA requires the analysis of both positive and negative effects. See 40 C.F.R. § 1508.8 (“Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial.”). Federal courts have agreed that NEPA requires analysis of all impacts, whether beneficial or detrimental to the human and natural environments. *Envtl. Def. Fund v. Marsh*, 651 F.2d 983, 993 (5th Cir. 1981) (“[A] beneficial impact must...be discussed in an EIS, so long as it is significant.”).⁸

For example, in *Natural Resources Defense Council, Inc. v. Department of Energy*, No. C-04-04448, 2007 WL 1302498, at *17 (N.D. Cal. May 2, 2007), amended on other grounds by 2007 WL 2349288 (N.D. Cal. Aug. 15, 2007), the court chastised the Department of Energy’s failure to analyze under NEPA the impacts resulting from a site remediation expected to “improve the quality of the site’s natural environment,” because “the remediation also has the potential to induce people to move to and reside in the site, which would elevate the risk of people’s exposure to such contamination.” Had the agency evaluated this impact, it could have analyzed potential mitigation options, such as institutional land use controls, thereby meeting NEPA’s dual goals of promoting informed decision making and fully informing the public regarding the environmental consequences of federal agency decisions.

P-114 Similarly, the proposed restoration projects are designed to improve habitat for listed species in the Harbor, but the PEIS/RP does not analyze the impacts, whether positive or negative, of attracting listed species to an active industrial harbor. Moreover, the PEIS/RP fails to consider

P-115 the cumulative impacts, whether positive or negative, to listed species resulting from these restoration projects when placed in context among the myriad recovery and restoration efforts

P-116 already underway or reasonably foreseeable in the future. The PEIS/RP indicates one of the

⁸ The Ninth Circuit has reserved ruling on the question of whether NEPA requires an analysis of beneficial impacts when the proposed agency action is expected to generate no significant adverse impact on the environment. *Humane Soc’y of U.S. v. Locke*, 626 F.3d 1040, 1056 (9th Cir. 2010). However, that is not the case with this DPEIS, as NOAA admits in the first paragraph of Section 4.14.9 that adverse short-term impacts to the listed species are expected.

P-116 primary reasons for implementing the restoration projects in the portfolio is to benefit allegedly injured species such as federally listed salmonids and concludes that there will be “major long-term beneficial impacts.” PEIS/RP, pp. 1-4, 4-26. Consequently, there should be at least some discussion of these positive cumulative impacts associated with implementing the restoration alternatives; however, the PEIS/RP contains no such discussion.

P-117 Although the introduction to Section 4.14 of the PEIS/RP lists seven of these other recovery and restoration efforts, including some but not all relevant recovery plans under the Endangered Species Act (“ESA”), Section 4.14.9 of the PEIS/RP—the section that specifically addresses impacts to listed species—does not even mention these other actions, except to note in passing that there are “other similar programs that improve similar resources throughout the project area.” PEIS/RP, p. 4-26. By failing to analyze the cumulative impacts with these other actions, the PEIS/RP fails to meet its obligations under NEPA to consider cumulative impacts to biological resources and listed species.

This failure to consider these potentially positive cumulative impacts undermines the goals of not only NEPA, but also the ESA. Federal agency obligations under the ESA have resulted in the painstaking development of comprehensive recovery plans and critical habitat designations by professionals with substantial expertise on the allegedly injured listed species and their recovery needs.

P-118 It would be a violation of the ESA for a federal agency to fail to evaluate the proposed restoration projects in the context of these plans to promote recovery and ultimate de-listing of these species.

The PEIS/RP needs to fully perform an analysis of these cumulative impacts so that NOAA can better assess whether the active industrial Harbor and navigation channel is an appropriate location for restoration projects.

III. The Trustees’ “50/50 Policy” on Restoration is Not Supported by an Adequate Scientific Basis for Making Such an Important Species-Determinative Decision.

The PEIS/RP proposes a “50/50” restoration policy to compensate for natural resource damages in the Portland Harbor.⁹ The “policy” requires that a minimum of 50 percent of the restoration (measured in units of DSAYs) be located within the SSA with the remainder located within a somewhat broader, but still arbitrarily defined, focus area.¹⁰ PEIS/RP, p. 7-12.

⁹ The 50/50 policy is discussed in the PEIS/RP in Section 5.3 (Geographic Priorities), Section 7.2.1 (Project Screening Criteria), and Section 7.2.3 (Geographic Screening Criteria).

¹⁰ The SSA extends northward from the Broadway Bridge to just past the southern end of Sauvie Island, a distance of approximately 11.5 river miles. The broader focus area (“BFA”) extends south of the SSA to Willamette Falls, north of the SSA along all sides of Sauvie Island to the mouth of the Multnomah Channel, and southeast into the Columbia from the mouth of the Willamette to the eastern end of Hayden Island. PEIS/RP, p. 3-1, 3-3.

P-119 The 50/50 policy is unsupported and unwarranted, and the Trustees' use of it as an assumed input into the PEIS/RP analysis renders the PEIS/RP insufficient. Forcing projects into the SSA

P-120 based solely upon a policy decision by the Trustees will produce fewer ecological benefits—while increasing cost—compared to allowing projects located outside the SSA, or even outside the broader focus area, to be analyzed as restoration options. Forcing a significant number of

P-121 restoration projects into the SSA will also reduce the amount of available industrial land within the Portland Harbor and may impair future industrial and navigational operations within the Harbor because of complaints about the effects of those operations on the restoration sites, including impacts from noise, lights, wake, prop-wash, dredging, and other navigational and industrial activities. Specifically, the 50/50 restoration policy suffers from five critical flaws. First, the policy is by no means mandated by applicable law and regulations. Second, the policy does not reflect an appropriate exercise of the Trustees' discretion. Third, the policy lacks the necessary scientific linkage to restoration of natural resources alleged to have been damaged by release of contaminants and is therefore contrary to the preferred restoration alternative proposed in the PEIS/RP. Fourth, the policy limits the ability to adhere to the project evaluation criteria prescribed by statutes, regulations, and agency policy. Fifth, the policy detracts from the overall goal of making the public whole for the alleged losses.

A. On-Site Restoration is Not Required by Statute or Regulation.

The starting point for determining an appropriate approach to restoration of natural resources allegedly damaged by a release of hazardous substances is the relevant language of CERCLA, OPA and the implementing regulations for both statutes. CERCLA and its regulations

P-122 contemplate and expressly allow for restoration through the replacement or acquisition of equivalent natural resources outside the injured area. The relevant provision of CERCLA imposes a duty “to restore, replace, *or* acquire the equivalent of such natural resources.” 42 U.S.C. § 9607(f)(1) (emphasis added); PEIS/RP, p. 5-3. The statute thus provides three options for redressing natural resource damages. *Restoring* suggests “fixing” the damaged resources directly. *Replacing* and *acquiring*, on the other hand, suggest substituting other resources for those that were damaged, which could include off-site mitigation. Similarly, the regulations of NOAA under the OPA provide the same option of “acquisition of equivalent natural resources.” 40 C.F.R. § 300.615(c)(1)(iv); 43 C.F.R. § 11.81(a)(1). And both NOAA and the U.S. Fish and Wildlife Service (“USFWS”) have employed this option in drafting NRD assessments, sometimes calling exclusively for off-site natural resource acquisition. *See, e.g., NOAA et al., Final Restoration Plan and Environmental Assessment, Applied Environmental Services (Shore Realty) Superfund Site* at 5, 10 (Sept. 2002) (opting solely to acquire equivalent natural resources off-site because the injured site did “not provide optimum conditions for the long-term survival of [the restoration project]”).

P-123 Thus, as the Trustees well understand, the NRD assessment process is designed to be flexible to accommodate the unique circumstances in each case. *See, e.g., NOAA, NOAA's Approach to*

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NRDA: What Do Trustees Want? at 8 (Oct. 4-5, 1999) (“Trustees have a great deal of flexibility in working within a cooperative assessment when these minimum conditions are met.”); NOAA et al., *Introduction to Natural Resource Damage Assessment* at 4 (May 10, 2010) (“Strategy must be encompassing and flexible”). However, on-site restoration is not required by statute or regulation.

B. The Trustees Overstate Their Discretion to Adopt the 50/50 Policy.

The Trustees do not claim that the 50/50 policy is mandated by the statute. Instead, they argue that the formula represents a policy preference that is within their discretion and that is consistent with NOAA’s and DOI’s long-standing policies. However, the Trustees overstate both the degree of their discretion and the extent to which their policy addresses allegedly injured resources.

The Trustees claim that they have discretion to select, site, constrain, condition, or prioritize restoration projects as a matter of policy. PEIS/RP, p. 5-3 (“Within this statutory guidance, the Trustees have considerable discretion to choose among alternative restoration projects. Trustees may exercise that discretion by ruling out certain types of restoration projects, prioritizing types of projects or approaches, or requiring consideration of additional factors or criteria.”). However, the Trustees’ discretion is not open-ended. The restoration decisions cannot be arbitrary; they must be grounded in the specific injuries caused by the release and bounded by and supported according to the factors listed in the statutes and regulations.

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In support of their argument that the 50/50 policy represents an appropriate exercise of discretion, the Trustees have offered three examples of other restoration plans where trustees “have exercised their discretion to limit the geographic extent of restoration actions and/or prioritize restoration actions.” However, the Trustees’ reference to these examples does not capture the full scope of the Trustees’ reasoning in those other plans, nor does it reveal just how generous those other geographic “restrictions” are in comparison to the Trustees’ overly restrictive policy for the Portland Harbor.

For example, although the Lower Duwamish River plan does prioritize a certain geographic area for restoration projects, the Duwamish policy is distinguishable from the Portland Harbor 50/50 policy in two important ways.

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First, the Duwamish plan *does not require any specific percentage of restoration to occur in the highest priority area*; instead, the geographic preference is simply the highest ranked of several screening and valuation criteria for evaluating proposed restoration projects. Second, the Duwamish plan realistically acknowledges that, in spite of the geographic priority, restoration opportunities in the preferred area will be constrained because of the existing high level of alteration of the river and shoreline and the fact that there is likely to be little unused industrial land for the trustees to purchase in that area. The plan thus concludes that “no existing uses are anticipated to be eliminated.” See NOAA et al., *Lower Duwamish River*,

P-125 *WA, Supplement to Draft Programmatic Restoration Plan and Programmatic Environmental Impact Statement*, pp. 21, 30-36, 41-46, 57-60, 87-88 (July 2012).

P-126 The Trustees also refer to the Lavaca Bay, Texas, restoration plan. Although the Lavaca Bay plan does require all of the restoration projects to be sited within a particular geographic area, the area included is vast (at least 500 square miles) to address injuries from releases from a single aluminum smelting facility. This geographic policy is thus more generous than it is restrictive. *See Texas General Land Office et al., Final Damage Assessment and Restoration Plan and Environmental Assessment for the Point Comfort/Lavaca Bay NPL Site, Ecological Injuries and Service Losses*, pp. 9, 20-29, 33-36, 38 (June 2012).

P-127 Finally, the Trustees cite the Castro Cove plan, which addresses injuries caused by discharges from a petroleum refinery in northern California. The geographic “restriction” in this plan, too, is very broad. The release primarily damaged an area of about 200 acres within Castro Cove, which is a small cove that is part of the larger 90-square-mile San Pablo Bay, which in turn is part of the much larger San Francisco Bay. The plan allows restoration to occur in the “North Bay” sub-region of San Francisco Bay. The North Bay sub-region is larger than San Pablo Bay, and is therefore vastly larger than Castro Cove. The plan specifically notes that the trustees’ restoration strategy is to “identify and implement projects that improve the ecological function of habitats in San Pablo Bay...that at present are not fully functional and *that are identical or similar to...habitat that was injured in Castro Cove.*” NOAA et al., *Castro Cove/Chevron Richmond Refinery Draft Damage Assessment and Restoration Plan/Environmental Assessment*, p. iv (Nov. 2008) (emphasis added). Geographic proximity was obviously only a part of the decision-making process on restoration projects and was not a threshold criterion. One of the preferred projects discussed in the plan is 10 miles from Castro Cove, whereas one of the non-recommended projects is “adjacent” to the Cove. *See id.* at 3-5, 36, 41-44.

In other situations, trustee councils have also exercised their discretion to support “off-site” restoration when that provides the best chance of creating a viable, long-term restoration project. The Shore Realty Superfund site in New York State, cited earlier, is one such example. In that case, although the trustees originally sought restoration in the immediate vicinity of the releases from a petrochemical company site, they eventually decided that because of the altered conditions in that vicinity, off-site restoration would be more effective over the long term. *See NOAA et al., Final Restoration Plan and Environmental Assessment, Applied Environmental Services (Shore Realty) Superfund Site*, pp. 7-10 (Sept. 2002). Similarly, in the Bayou Verdine plan in Louisiana, the trustees recognized that their geographic focus for restoration projects should properly be on the larger ecosystem surrounding the release site rather than only on the immediate release location of the petroleum refinery operation. *See NOAA et al., Draft Damage Assessment and Restoration Plan and Environmental Assessment for Bayou Verdine, Calcasieu Parish, Louisiana*, pp. 3-1, 5-1–5-8 (Mar. 2009). And yet another example of using off-site restoration is the Commencement Bay restoration plan in Washington. There, the primary focus area included river miles *upstream* from the contamination, and smaller habitat focus areas were

created in order to “break up a large, complex, industrial, urban embayment into smaller geographic and functional units to more easily visualize restoration potentials.” CB/NRDA Restoration Panel, *Commencement Bay Natural Resource Restoration Plan*, pp. 2-6–2-7 (June 1997); see NOAA et al., *Preassessment Screen of Natural Resources Damages in the Commencement Bay Environment*, p. 1-3 (Oct. 29, 1991). The trustees specifically acknowledged “the limitations of placing restoration in areas that are adjacent to major commercial or industrial developments” and specifically stated in their site selection criteria that if a site “is near disturbing human activities, it should be rated as disadvantaged.” *Restoration Plan* at 2-6, 3-4.

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These other restoration plans thus provide general support for the Trustees to include geography and location *as elements* of screening restoration projects. However, they do not provide any specific support for the restrictive 50/50 policy, regardless of other considerations, as a valid exercise of the Trustees’ discretion in this instance. These other plans differ in that critical respect from the Trustees’ proposal here: they targeted projects to the geographic areas—often very large areas—that were most likely to provide effective, long-term restoration, and then selected projects based upon an analysis of *all* of the selection criteria.

C. The PEIS/RP Fails to Demonstrate the Necessary Link Between the Hazardous Substances Release and the 50/50 Policy.

The governing statute makes clear that the parties are liable only for restoration of resources that were lost as a direct result of the release.¹¹ CERCLA states that trustees shall recover sums “for use *only* to restore, replace, or acquire the equivalent of such natural resources.” 42 U.S.C. § 9607(f)(1) (emphasis added). The natural resources to which this provision refers are those injured, destroyed, or lost “*resulting* from such a release.” *Id.* § 9607(a)(C) (emphasis added) (referring to a release of hazardous substances regulated by CERCLA).

The PEIS/RP recognizes the need for a nexus between the alleged injuries and the proposed restoration in its explanation of the screening criteria for a restoration project. See, e.g., PEIS/RP, p. 5-3 (“[T]he Trustee Council must establish a linkage between the proposed restoration actions and the injuries giving rise to the recovered damages.”). The PEIS/RP explains that “ecological benefit” criteria were developed by selecting several fish and wildlife guilds that “may have been injured by releases of hazardous substances or oil in Portland Harbor” and choosing target species to represent each guild. PEIS/RP, pp. 7-6–7-7. For each target species, the PEIS/RP lists “relevant indicators” to screen proposed projects. PEIS/RP, Tables 7-1, 7-2.

¹¹ See also USFWS, *The Restoration Program*, available at <http://www.fws.gov/contaminants/Issues/Restoration.cfm> (“[T]he natural resource trustees conduct a damage assessment to determine the extent of injury to natural resources *caused by the hazardous substance release*. This information is used to determine the amount of restoration that is needed.” (Emphasis added)).

P-129 However, the PEIS/RP fails to connect this discussion of ecological benefit screening criteria to the 50/50 policy. The discussion of the “geographic screening criteria” occupies only one paragraph in the PEIS/RP:

“The Trustee Council has a strong *preference* for restoration within the Portland Harbor SSA. This preference stems from the fact that natural resource injuries have been caused by hazardous substance and oil releases in the harbor area. In addition, all Willamette River populations of salmon and some Columbia River populations of salmon, as well as other fish, must pass through the SSA, spending various amounts of time there, while moving to other habitats upstream or downstream. As described above, the expert panel supported the prioritization of restoration inside the SSA, but also identified areas outside the SSA where restoration could provide significant benefits to juvenile Chinook salmon. The areas identified by the expert panel make up the broader focus area as described in Section 3.1. ...*The Trustee Council has determined that each settling PRP must provide at least one-half of its compensatory restoration inside the SSA, and may provide no more than one-half of compensatory restoration with the broader focus area. Projects located outside either of these areas will not be considered.*” PEIS/RP, p. 7-12 (emphases added).

With this short discussion, the PEIS/RP moves from a justifiable “preference” for restoration projects that directly address contamination-caused injuries to multiple species and a variety of habitats to a rigid and arbitrary 50/50 geographic requirement grounded in restoring habitat primarily for one species of fish at one part of one life cycle stage.

P-130 Throughout the rest of the PEIS/RP, the discussion of restoration to benefit juvenile Chinook focuses not on alleged injuries to the fish from release of toxic substances, but rather on loss of habitat in the Lower Willamette River due to its development as a working harbor.

P-131 The Trustees repeatedly point to the work of their expert panel as the claimed “scientific” justification for the 50/50 policy, but the expert panel’s work does not provide the missing link. The Trustees have presented no document containing the specific “charge” given to the expert panel by the Trustees, so we do not know exactly what questions the panel was asked to address. However, the few documents provided suggest that the panel was given a narrow charge with the geographic focus of the panel’s conclusion specified or perhaps limited by the Trustees’ direction to the panel. A 2009 document referred to the geographic tiers *that the Trustee Council has developed*:

- 1) Mainstem Willamette ISA [Initial Study Area] (RM 1.0 to RM 11.0);
- 2) W. Hayden Island, Columbia Slough, Multnomah Channel, Sauvie Island areas not in Tier 1;
- 3) Confluence areas of Tryon, Kellogg, Clackamas and Johnson creeks, as well as Ross Island; and

- 4) Mainstem Columbia downstream and upstream of Willamette confluence. Expert Panel Discussions on Valuing Restoration Sites and Habitat Types in the Willamette River System with Special Emphasis on Portions of the Lower Willamette River, Nov. 30 – Dec. 1, 2009, Portland, Oregon (hereinafter “Expert Panel Discussions”), p. 11.

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The area referred to as the Initial Study Area in Tier 1 corresponds to the designated Portland Harbor Study Area. The panel was asked “whether factors exist that would make a project inside the study area more valuable to potentially injured juvenile Chinook than a similar project outside the study area,” and the discussion produced a list of 16 factors, only one of which—“toxic history”—relates directly to the focus of CERCLA. *Id.* at 7-18. Further discussion of the “tiering scenario” elicited a range of opinions from the experts—including (a) requiring 1/3 of the restoration to be within the Tier 1 area; (b) requiring 1/2 to be within Tier 1; and (c) requiring more than half to be in Tier 1, but with the possibility of expanding Tier 1 to the mouth of the Willamette. *Id.* at 20. Thus, in 2009, there was no consensus among expert panel reached no consensus as to the appropriate location mix for restoration projects.

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This background provides important context for the panel’s conclusions, contained in a January 2012 letter to the Trustee Council. In that letter, the expert panel stated that it “agrees with the initial focus on juvenile Chinook salmon,” but it did so without discussing how the salmon had specifically been damaged by the regulated release. Letter from Thomas A. Friesen, Stanley V. Gregory, Nancy Munn, and Chris Prescott to Erin Madden, p. 1 (Jan. 6, 2012) (“Expert Panel Letter”), included as Attachment C. As noted above, since the Trustees had directed the panel to focus on salmon from the beginning, this “agreement” does not constitute a scientific endorsement of the crucial link between the injuries caused by the release and the location of proposed restoration projects.

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The panel further said that it agreed with the 50/50 *policy*. *Id.* at 2. We cannot determine whether the panel itself reached consensus on this allocation sometime between the end of 2009 and the beginning of 2012, or if the Trustees simply “split the baby” and chose the 50/50 figure as the mid-point of the various panel members’ opinions, and then asked the panel for its response. In any event, in 2012, the panel said it agreed with the policy because “it is critical to apply restoration resources to the locations that have experienced the most significant habitat loss and industrial impacts, and virtually all Willamette basin salmon—juvenile or adult—must pass through this area [the Portland Harbor].” *Id.* Notably, however, up until this time, the expert panel’s discussions focused primarily on the Lower Willamette River generally, not on Portland Harbor specifically.

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The expert panel was chosen by the Trustees and convened to talk *only* about salmon habitat, not generally about the natural resources damaged by the releases. PEIS/RP, pp. 5-3–5-4. And yet, the entire “geographic priorities” discussion in the PEIS/RP—a document which purports to

P-135 support an integrated, multi-species restoration plan—rests on this narrowly configured panel’s work related to juvenile Chinook. PEIS/RP, pp. 5-3–5-5. The panel’s “endorsement” of the 50 percent requirement in the Harbor appears to be nothing more than a compromise among the members of the panel who argued for all restoration to be limited to the Harbor and those who felt that effective restoration projects could be sited elsewhere. Nowhere in the expert panel discussion or the PEIS/RP is there any scientifically-based explanation for the particular percentage formula chosen.

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In addition to the fact that the expert panel’s charge and report provides no scientific support for the 50/50 rule, it is also cause for concern that a representative of the City of Portland was one of the four individuals chosen by the Trustees to with on the panel and the panel’s conclusions appear to reflect the City of Portland’s position on restoration projects in the Portland Harbor. The City has been actively engaged for years in pursuing a policy of encouraging restoration projects within Portland Harbor. This policy was perhaps best manifested by the City’s attempted implementation of the River Plan/North Reach, which was subsequently overturned by the Oregon Land Use Board of Appeals and the Oregon Court of Appeals because the City of Portland failed to adequately weigh impacts on business, industrial lands, and economic interests. *Gunderson v. City of Portland*, 259 P.3d 1007 (Or. Ct. App. 2011).

P-137 This PEIS/RP is too important to rely on unfounded and potentially biased input, particularly when it could rely instead on peer-reviewed scientific literature, thus making it less vulnerable to challenges. It should not rely on input from a City of Portland employee, regardless of scientific credentials, when determining whether the Trustees should require that habitat restoration projects be sited within the Portland Harbor and within the City of Portland. And, given the evidence discussed above indicating that the panel’s report was a compromise rather than a scientific conclusion, the PEIS/RP should not rely on a panel report potentially tainted by that input.

P-138 We do not argue with the Trustee Council’s point that juvenile salmon travel through Portland Harbor. We also agree that any resting habitat for these salmon as they pass through this stretch of the river was reduced long ago by human activity. However, that is a result of physical development of the riverbanks, not a result of releases of contaminants that are actionable under NRD authorities. After stressing the lack of habitat, the Trustees note, almost off-handedly, that “[o]ther important *potential* limiting factors include temperature and *toxics*...” (Emphases added.) This lack of attention to toxics—which are *the* central focus of CERCLA and OPA—demonstrates the problem with the Trustees’ 50/50 policy for location of restoration projects.

P-139 The NRD assessment process under CERCLA is not designed to address habitat loss and industrial impact in general, but only to the extent such losses arise from specific releases by individual parties of particular hazardous substances. CERCLA states that trustees shall recover sums “for use *only* to restore, replace, or acquire the equivalent of such natural resources.” 42 U.S.C. § 9607(f)(1) (emphasis added). The natural resources to which this provision refers are

those injured, destroyed, or lost “*resulting* from such a release.” 40 U.S.C. § 9607(a)(C) (emphasis added). The statute makes clear that NRD restoration is meant to compensate for the injury to resources that were lost as a direct result of the toxic release.¹² Those who ultimately will pay for NRD restoration should not bear the added burden that would be imposed by the 50/50 policy of restoring salmon habitat lost from physical changes to the river basin caused by the construction and use of the Portland Harbor.¹³

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The Assessment Plan prepared for the Trustees clearly acknowledges the limitations of CERCLA’s natural resources damage assessment process:

“Because NRDA claims are limited to losses associated with releases of hazardous substances, the Trustee Council must consider other factors that may degrade natural resources. In highly modified urban waterways such as Portland Harbor, navigational dredging, filling, shoreline hardening, over-water structure placement, and other activities have reduced and degraded habitat over a period of decades. These degradations stress organisms and populations and may cause adverse effects for which the Trustee Council has no NRDA claims.” Portland Harbor Natural Resource Trustee Council, *Portland Harbor Superfund Site Natural Resources Damage Assessment*, p. B-6 (June 1, 2010).

D. The 50/50 Policy Precludes Other Viable Projects.

As noted above, the Trustees argue that the 50/50 policy is a proper exercise of their discretion “*within the broad guidance of OPA and CERCLA.*” However, the statutes provide much more than “broad guidance.” Several of the statutory requirements and factors are in fact quite specific. By strictly adhering to a 50/50 policy, the Trustee Council is precluding restoration project alternatives that are not only viable but likely preferable according to the applicable evaluation criteria. Both the Department of Interior and NOAA regulations lay out criteria for evaluating possible restoration projects, including technical feasibility and likelihood of success, cost/benefit analysis, and the avoidance of collateral injury resulting from implementation. *See*

¹² *See* USFWS, *The Restoration Program*, available at <http://www.fws.gov/contaminants/Issues/Restoration.cfm> (“[T]he natural resource trustees conduct a damage assessment to determine the extent of the injury to natural resources *caused by the hazardous substance release.* This information is used to determine the amount of restoration that is needed.” (Emphasis added)).

¹³ *See* United States Department of the Interior Bureau of Land Management, *BLM Natural Resource Damage Assessment and Restoration Handbook*, p. 2 (May 27, 2008) (“The trustees can use NRDAR to address only injuries and service losses caused by releases of hazardous substances or discharges of oil. *Trustees cannot use NRDAR to address harm caused by physical damage, unless the physical damage is incurred during the response to a discharge or release[.]*” (Emphasis added)).

43 C.F.R. § 11.82(d); 15 C.F.R. § 990.53-990.54; NOAA, *Primary Restoration, Guidance Document for Natural Resource Damage Assessment Under the Oil Pollution Act of 1990*, p. 5-1 (Aug. 1996) (hereinafter “NOAA Guidance Document”). As the Trustee Council is well aware, the Portland Harbor is a busy channel of commerce, filled with heavy vessel traffic and docking on a daily basis. This fact has a substantial impact on applying the project evaluation criteria to on-site restoration.

1. The 50/50 Policy Limits Technical Feasibility and Decreases the Likelihood of Success for Restoration Projects.

P-141 First, because of the altered nature of the Harbor environment, restoring enough habitat to meet the 50/50 policy is likely to present technical challenges, particularly in terms of creating projects that will be successful over the long term. The expert panel emphasized the need to look at site-specific information in choosing restoration sites; the panel also noted the dearth of good information about how salmon currently behave within the Portland Harbor. Expert Panel Letter, p. 5-7 (describing the uncertainties and limitations of available studies and data). Thus, even within the Trustees’ narrowly focused restoration strategy, feasible and successful restoration projects are not necessarily a given. While it is possible that particular sites within the

P-142 Harbor can be successfully restored to some degree, the constant shipping, docking, dredging, and other industrial activity that characterize this part of the river surely diminish the likelihood of long-term viability of restored habitat. It is likely that restoration sites within the Harbor will

P-143 require greater ongoing maintenance and additional restoration work in the future as compared to sites outside the Harbor.

P-144 Ironically, the Trustees seem to acknowledge greater threats to the feasibility and success of restoration projects from recreation than they do from current and future industrial activities in the Harbor. For instance, the PEIS/RP notes that restoration projects incorporating recreational elements would need to be designed to limit human access to sensitive ecological restoration areas. PEIS/RP, p. 5-9. In particular, the Trustees declare their intent to avoid recreational structures such as docks because of their detrimental effects on habitat. *Id.* The PEIS/RP also

P-145 states that “implementation of a restoration project may permanently restrict access or restrict some recreation activities at a recreation area for the long-term protection of natural resources.” PEIS/RP, p. 4-8 (and similar statement p. 4-19).¹⁴ But there is no parallel discussion of the very real likelihood that the Trustees or others might seek future restrictions on industrial operations

¹⁴ In discussing the “Relationship Between Short-Term Uses of the Human Environment and the Enhancement of Long-Term Productivity,” the document says that the chosen restoration planning alternative “would involve some short-term, localized effects to the environment, but these short-term effects would be offset considerably by improvements in long-term productivity of habitats and human uses such as recreation and aesthetic enjoyment. No adverse effects to long-term productivity are expected.” PEIS/RP, p. 4-18. This discussion is clearly limited to “environmental” factors, without considering the long-term productivity of the working harbor.

P-145 to protect ecological restoration projects. In fact, at one point in the PEIS/RP, the Trustees make the rather surprising blanket assertion that “no adverse effect is anticipated on industrial and shipping activities from restoration under this plan[.]” PEIS/RP, p. 4-24.¹⁵ That statement is not based on a proper analysis of feasibility and likelihood of success.

2. The 50/50 Policy Fails to Address Cost-Benefit Analysis or Cost Effectiveness.

The regulations and policies also require an analysis of the costs and benefits of possible projects, including a look at direct and indirect costs, and mandate that the most cost-effective alternative be selected among equally desirable alternatives. *E.g.*, 15 C.F.R. § 990.54(b) (“If the trustees conclude that two or more alternatives are equally preferable based on [the other evaluation criteria], the trustees *must* select the most cost-effective alternative.” (Emphasis added)).

P-146 Projects within the highly modified and busy SSA are likely to be more expensive per unit of benefit than projects at other locations. Even if cost-effective projects can be designed within the SSA, if those projects require restrictions to adequately protect the newly-created habitats, such restrictions are certain to have an economic impact on the commerce that takes place in the SSA. Whether that is a direct or indirect cost of on-site restoration, it is a cost that must be included in the assessment. By stating the 50/50 policy as a non-negotiable preliminary requirement, the Trustees truncate an appropriate cost-benefit analysis.¹⁶

The PEIS/RP says that in establishing the 50/50 policy:

“[T]he Trustee Council considered whether costs and technical feasibility of restoration within the prioritized area may override the benefits to the public of this geographically limited restoration planning approach. As described in Section 1.7, the Trustee Council has undertaken a rigorous effort to identify and evaluate potential restoration opportunities within the SSA and broader focus area. This effort has included review of proposed project designs, investigation of feasibility issues (including costs), and comparison of this information to restoration opportunities associated with other NRDA cases within and outside of

¹⁵ As discussed below in Section IV.B.4, the Commenters are also concerned that restoration projects will impact navigation and commerce in the river. These concerns would be eliminated if the Trustees could say that they “will not” approve any restoration project that has an impact on navigation or commerce (e.g., that would require larger “no wake” zones, or that would cause there to be increased requirements in order to undertake maintenance dredging, or that would cause there to be increased requirements for a water discharge permit). However, the PEIS/RP does not say the Trustees “will not” approve any such restoration project, but rather that they do not “anticipate” such effects.

¹⁶ In addition, this requirement short-circuits the application of the Trustees’ own ecological screening criteria and an appropriate alternatives analysis, as discussed elsewhere in these comments. P-191

the Pacific Northwest. These investigations have demonstrated that (1) a significant number of restoration opportunities exist within the SSA and broader focus area that meet the Trustee Council’s restoration objectives; (2) a significant portion of these opportunities appear to be technically feasible, despite the challenges of implementing restoration within a highly urbanized area; and (3) the estimated costs of implementing potential restoration projects within the SSA are relatively comparable to costs of restoration associated with other urbanized NRDA sites, particularly when the lower costs of restoration within the broader focus area are considered.” PEIS/RP, p. 2-3.

P-147 Several things are important about this paragraph. First, this discussion does not actually compare the costs of projects inside and outside the SSA. Furthermore, saying that the Trustees have done their cost-benefit analysis is not the same as demonstrating that the chosen restoration approach complies with this statutory requirement. The Trustees have not adequately explained what their feasibility investigations consisted of or how technical feasibility was demonstrated. Further, what the Trustees did appears to have been cursory. Finally, the cost at Portland Harbor as compared to other urbanized restoration sites is irrelevant. Instead, the Trustees need to analyze the cost of Portland-specific restoration projects as compared to the benefits expected from such projects. Adopting the 50/50 policy truncates this analysis. In fact, the Trustees acknowledge that the cost analysis will not come until considerably later in project planning. Section 7.3.2 of the PEIS/RP says that cost estimates will initially be developed when a specific project is being planned. Permitting requirements (which will have a considerable impact on costs) will be identified when project design is about 30% complete. And refined cost estimates won’t be developed until project design is about 60% complete. PEIS/RP, p. 7-14–7-15. The up-front 50/50 requirement puts the cart before the horse in terms of analyzing and comparing the cost effectiveness of restoration projects. Once the proper analysis has been done, it may turn out that the 50% in-Harbor requirement cannot be met.

3. The 50/50 Policy Fails to Consider Potential Collateral Injury.

Finally, the potential additional injuries—the collateral injuries—resulting from the proposed restoration projects must be assessed, including an analysis of the injury to economic activity. See 43 C.F.R. § 11.82(d)(5) (“Potential for additional injury resulting from the proposed actions, including long-term and indirect impacts, to the injured resources *or other resources*.” (Emphasis added)); see, e.g., NOAA et al., *Final Damage Assessment and Restoration Plan/Environmental Assessment, North Pass Mississippi River Delta* at 33 (May 2005) (“The selected restoration project will have no adverse social or economic impacts on neighborhoods or communities. General land use patterns will not be affected by the selected alternative[.]”). Here, as noted below, requiring half of the restoration projects to be located within the busy Portland Harbor

P-151 will result in a collateral economic injury to the Harbor's commerce.¹⁷ Off-site alternatives, on the other hand, could be implemented without attendant injury to the local and regional economy.

P-152 As NOAA Guidance Documents tell us, there must be a basis for exercising an on-site preference in each case. *See, e.g.*, NOAA Guidance Document at 5-4 (noting that an on-site restoration preference should be well founded when applied). Even if the Trustees can demonstrate ecological benefits to performing some in-Harbor restoration, that is only one piece of the puzzle, and does not justify a hard and fast 50/50 rule. Off-site restoration—even beyond

P-153 the broader focus area—could achieve the same ecological benefits while more effectively meeting the other applicable restoration evaluation criteria and should be more thoroughly evaluated in the PEIS/RP. For example, it is possible that a significant restoration project could be located in the Johnson Creek drainage or even the Clackamas River (outside the broader focus area) that would provide more “bang for the buck” in terms of fish habitat and other natural resource values than any number of projects within the SSA itself. The 50/50 policy proposed by the Trustee Council not only lacks sufficient basis, it limits compliance with the required evaluation criteria and preemptively eliminates alternatives that would maximize the benefits provided under the evaluation criteria. The impacts to economic activity are not only part of the Trustees' required analysis under the CERCLA and OPA statute and regulations; the analysis of socioeconomic impacts is also required as part of NEPA. As discussed in Part IV.B below, the discussion in the PEIS/RP of these impacts is inadequate.

E. Requiring 50 Percent of Restoration to Occur On-Site Detracts from the Goal of Making the Public Whole.

A goal of CERCLA and the NRD assessment process is to restore natural resources, but this goal does not preclude the consideration of costs in selecting how to achieve restoration. The North Pass Superfund Restoration Plan is a concrete example of how this goal was implemented without a negative impact to the social and economic environment where restoration occurred: NOAA, USFWS, and the state agencies developed a plan that did not result in adverse social or economic impacts or affect the general land use patterns. The chosen restoration alternative did not injure economic use of the natural resources. *Final Damage Assessment and Restoration Plan/Environmental Assessment, North Pass Mississippi River Delta*, p. 33. With a 50/50 policy, however, the Trustee Council is committing to a set amount of restoration within the Portland Harbor, a set amount that is likely to have an adverse impact on both the economy and the general land use patterns of the area.

¹⁷ Indeed, the requirement may even go above 50%, since the PEIS/RP says that ongoing analyses of damages to Tribal resources and recreational resources may add additional restoration projects. *See, e.g.*, PEIS/RP, pp. 5-7, 8-9.

Locating restoration projects within the Portland Harbor will undermine the Harbor's use for navigation and commerce. The Harbor is important to water-related manufacturing, water-based commerce, and other navigational activities. The Portland Harbor area is zoned for heavy industrial use and is within an "Industrial Sanctuary" designated by the Portland Comprehensive Plan, the purpose of which is to encourage industrial growth in the City.¹⁸ The sanctuary designation "is intended for areas where City policy is to reserve land for existing and future industrial development.... Nonindustrial uses are limited to prevent land use conflicts and to preserve land for industry." Portland Comp. Plan Goal 10.4(21). Although parks and open space are also "allowed" uses in the heavy industrial zone, prioritizing such uses would be inconsistent with the purposes of the Industrial Sanctuary designation. *Allowing* open space within an industrial sanctuary is much different than *actively requiring* protected fisheries restoration sites that will likely create land use conflicts and take land out of industrial use. The City has clearly prioritized this particular area for navigation and commerce over non-industrial uses and has committed to preserving this land for industry, just as it has prioritized recreation and fisheries in other designated areas, such as Smith and Bybee Lakes nearby, which are zoned for open space and subject to a natural resources management plan.

A decision on restoration planning should not undermine navigation or river-dependent commerce without careful weighing of the alternatives, particularly when the Harbor is designated as industrial.

IV. Other Aspects of the PEIS/RP Fail to Take a Hard Look at the Impacts of the Proposed "Geographic Priority" for Restoration Projects in Portland Harbor.

Apart from the validity of the 50/50 geographic policy itself, other aspects of the PEIS/RP fail to appropriately account for the impacts of choosing restoration projects based on that policy.

A. The Evaluation of Effects of Climate Change Does Not Consider the Disproportionate Impact of Temperature on the Very Geographic Area Proposed for Restoration Efforts.

The discussion of climate change in the PEIS/RP does not adequately address the potential effects of climate change on the proposed action and the alternative actions. NEPA, as recently interpreted by the Ninth Circuit, requires an EIS to consider climate change. *Ctr. for Biological Diversity*, 538 F.3d at 1216 (finding a NEPA document insufficient for failing to discuss the effect of carbon dioxide emissions on climate change). The Council on Environmental Quality ("CEQ") has also advised federal agencies to consider climate change in an EIS relating to both (1) how an action may affect greenhouse gas emissions and (2) how current or projected impacts of climate change may affect an action. CEQ, *Memo for Heads of Federal Department and*

City of Portland Bureau of Planning, *River Industrial Zoning Background and Issues Report*, p. 7 (June 19, 2007).

Agencies re Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions (Feb. 18, 2010). To determine the extent to which an EIS should address the latter, CEQ advises that “[c]limate change effects should be considered in the analysis of projects that are designed for long-term utility and located in areas that are considered vulnerable to specific effects of climate change (such as increasing sea level or ecological change) within the project’s timeframe.” *Id.* at 7.

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CEQ specifies further that a climate change analysis should consider effects on the environment and on vulnerable populations that are more likely to be adversely affected by climate change. *Id.* at 6. To comply with this guidance, the PEIS/RP should evaluate the relative expected impacts of climate change on each proposed and alternative action, including relative effects of climate change on the geographic locations of the actions.

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The PEIS/RP only briefly discusses climate change impacts relating to the integrated habitat and species-specific restoration planning alternatives and fails to consider the effects of climate change on the SSA relative to the effects of climate change in the broader focus area or other areas that serve the same allegedly injured populations of affected species. PEIS/RP, p. 4-27.

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This discussion of climate change fails to address the fact that the most likely, and most project-specific, impact of climate change is of temperature increases in the surface water. By failing to discuss the potential for surface water temperature increases to impact individual projects, the discussion of climate change in the PEIS/RP does not provide sufficient framework for evaluating future individual projects and fails to satisfy this aspect of the statement of purpose and need.¹⁹

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Climate change, in the form of surface water temperature increases, will have the greatest impact in the SSA relative to the broader focus area and to other areas that serve the same allegedly injured populations of affected species. Surface water temperatures in the SSA are already warmer than in these other areas and are the most likely to be impacted by further temperature increases. Temperature is the leading source of water quality impairment in the Lower Willamette River, where 82% of the stream extent exceeded temperature standards in a 2009 study. DEQ, *Willamette Basin Rivers and Streams Assessment*, p. 50 (2009). Therefore, the success of an individual project in the SSA will depend in large part on whether the resulting habitat will continue to function at increased temperatures. This greatly diminishes the likelihood of success of actions in the SSA relative to areas that are less impacted by climate change.

¹⁹ The purpose of the PEIS/RP is “to develop a restoration plan that will provide a framework for future site-specific restoration actions to be tiered from this analysis and implemented in accordance with NEPA and other statutes.” PEIS/RP, p. ES-2.

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This is especially true for projects targeting juvenile Chinook, for which temperature is one of the most critical habitat components.²⁰ For example, creating juvenile Chinook habitat in surface water that is less susceptible to temperature increases encourages juvenile Chinook to spend more time in areas that can provide both preferable physical habitat and more beneficial water temperatures, creating better conditions to support development of the species population. Temperature data compiled by DEQ shows that average maximum temperatures in the Lower Willamette River are higher than in the Upper Willamette River and in Multnomah Channel.²¹

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The PEIS/RP should consider whether, rather than actions that encourage juvenile Chinook to spend more time in the warmer waters of the Lower Willamette River, actions that provide habitat in cooler waters.

B. The Evaluation of Socioeconomic Impacts Does Not Consider the Disproportionate Negative Impacts if Projects Are Required To Be Sited in the SSA.

The discussion of socioeconomic impacts in the PEIS/RP is fundamentally inadequate. The PEIS/RP appropriately opens the socioeconomic discussion by recognizing the significant economic importance of the Portland Harbor, but then it fails to adequately assess this important factor. Section 3.3 notes that the Portland Harbor is the nation’s largest wheat export hub and the third largest auto import gateway in the country. PEIS/RP, p. 3-4. Furthermore, the PEIS/RP states that activity in the Portland Harbor supports approximately 20,000 jobs in the region and created \$1.4 billion in personal wage and salary income and local expenditures in 2007. Projections in 2008 predicted further growth, with an additional 5,800 jobs and 800 acres of development or redevelopment by 2015. Between 2004 and 2008, “industries had invested about \$440 million on 36 harbor area sites.” *Id.*

²⁰ The Oregon Department of Environmental Quality noted in its Willamette Basin assessment that temperature is especially important for the survival of cold-water adapted species like salmon. DEQ, *Willamette Basin Rivers and Streams Assessment*, p. 25 (2009).

²¹ DEQ’s 2010 Integrated Report Database shows that temperatures in the Lower Willamette River (RM 38.3) were at a seven-day-average maximum of 20°C while temperatures in the Upper Willamette River (RMs 96.6, 113.5, 141.3, 146.8, 151.1 and 184.7) and in the Multnomah Channel (RM 11.5) were at a seven-day-average maximum of 18°C from summer 2001 to fall 2002. DEQ, *Water Quality: Water Quality Assessment—Oregon’s 2010 Integrated Report Database and 303(d) List*, at <http://www.deq.state.or.us/wq/assessment/rpt2010/search.asp> (last visited Oct. 4, 2012). Data in the September 2006 Willamette River Total Maximum Daily Load (“TMDL”) also demonstrate that temperature averages in the Lower Willamette River have been lower than those in the Middle and Upper Willamette River. DEQ Willamette Basin TMDL, at <http://www.deq.state.or.us/wq/tmdls/willamette.htm> (last visited Oct. 5, 2012).

1. The PEIS/RP Does Not Adequately Consider the Impacts of Conversion of Industrial Land.

In spite of this recognition of the Portland Harbor’s economic importance, the PEIS/RP surprisingly concludes that “implementation of a suite of restoration actions sufficient to compensate for the injury will result in only minor, if any, adverse economic impact through conversion of industrial land to restoration use” and that “any conversion of industrial land to restoration use would represent a very small percentage of available industrial land in Portland Harbor[.]” PEIS/RP, p. 4-5. The PEIS/RP reaches these conclusions in spite of the fact that the 50/50 policy would require at least half of all the restoration projects—measured in DSAYs—to be sited in the heart of this nationally significant working harbor. The reasoning offered for this conclusion about minimal-to-no impact is fatally flawed. In fact, the PEIS/RP notes that there is a shortage of industrial land available for development in the Portland Metropolitan region,²² but then suggests that only large sites (25 acres or more) with certain characteristics really “count” for purposes of determining socioeconomic impacts, citing a Portland Business Alliance (“PBA”) report for this statement, 2012 Land Availability: Limited Options included as

P-160 Attachment D. The PEIS/RP further states that the Portland Harbor only contains three sites that meet the PBA report’s criteria as regionally important. The PEIS/RP says that, since none of those sites are proposed for restoration projects, “it is unlikely that restoration implemented under this alternative would cause land use conversion that would have a moderate or major adverse effect on the industrial economy.”²³ PEIS/RP, p. 4-5. This so-called socioeconomic analysis is both shallow and wrong.

The PEIS/RP completely misuses the PBA study in support of its conclusion of minimal economic impacts. Indeed, the main author of this study “dispute[s] the conclusions drawn in the Draft EIS” from the study. Letter from Mark Clemons, Director of Project Development, Group Mackenzie, Inc., to David Harvey, Gunderson Marine Inc. (Sept. 26, 2012), included as Attachment D. The PBA study was not an open-ended study of industrial properties in the Portland area. Attachment D, p. 3 (“The Project did not address market demand[.]”). P-161 The PBA study had a very particular purpose and a limited focus that had nothing to do with assessing general economic impacts from converting industrial land in the Portland Harbor to restoration

²² The Trustees should also consider Portland City Council’s recently adopted forecast for the City’s housing and employment supply, which found that the City will be short of land for industrial and manufacturing/production uses—particularly with respect to Portland Harbor industrial lands. City of Portland Bureau of Environmental Services, *Media Release: Forecasts for Portland’s Population and Job Growth Adopted by City Council* (Oct. 3, 2012). P-192

²³ Yet, at the same time, the PEIS/RP says that there will be moderate to major positive impacts on flood control. PEIS/RP, p. 4-20. It is difficult to imagine how there could be enough restoration within the Portland Harbor to create such significant benefits for flood control without having a corresponding negative impact on existing industrial uses. P-193

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projects. The study was narrowly designed to inventory large parcels (over 25 acres and over 50 acres, specifically) of development-ready land that could be used to recruit nationally and globally-scaled companies in the traded-sector economy. Nothing in the study suggests that other types and sizes of industrial parcels are not important, and there is absolutely no support in the PBA study for concluding that the Portland Harbor Restoration Plan will have only minor impact on the industrial economy. *Id.* at 2 (“There was identification of the importance of larger acre parcels to meet the region’s economic development needs, but there was no statement concerning the lack of value of sites smaller than 25 acres.”).

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Furthermore, Mr. Clemons explicitly says it is “not a correct conclusion” to say that sites exceeding 25 acres in size are “the only sized sites that are ‘substantially important’ to the region’s industrial land supply” and further notes that “[f]rom an economic development perspective, there is consensus that a community needs to have a variety of site sizes in their inventory in order to meet the needs of expanding and new companies.” *Id.* at 3. In fact, demand appears to be considerable for smaller parcels of land. The Clemons letter provides the following statistics:

“[O]nly 7% of commercial and industrial land sales over the last 10 years were sites that are over 25-acres. The majority of sales, 56%, were sites that were less than 5-acres. 37% of transactions were sites between 6- and 25-acres. ...[F]rom a 10 year historical perspective, the region averaged 30 sales of land parcels less than 25-acres per year. The average size parcel was 5.4-acres. ...[A]s of September 2011 there were 142 parcels under 25-acres for sale in greater Portland area (Oregon only). A reasonable assumption from this is that the region has less than a five year supply of smaller industrial parcels.” *Id.* at 4.

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The PEIS/RP thus cannot legitimately conclude that there will be “only minor, if any, adverse economic impact through conversion of industrial land to restoration use” based on the PBA study. Indeed, Mr. Clemons concludes his letter by recommending that either the PEIS/RP be amended “to more accurately reflect the intent of the [PBA] Project, or to delete reference to it at all as a rationale for findings.” *Id.* In addition, the Commenters understand that the PBA, itself, is submitting comments to the Trustees directly, stating that the PEIS/RP has completely missed the mark in terms of its interpretation of the scope and purpose of the Mackenzie study and as a result has also missed the mark in terms of trying to extrapolate its conclusions to fit with the Trustees’ premise.

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The PEIS/RP contains another surprising statement about the impact of its restoration requirements on the working harbor. The PEIS/RP asserts that “[b]ased on preliminary estimates of the amount of restoration likely needed to compensate for any loss to potentially injured species, the Trustee Council is aware that access to sufficient land has already been secured that does not require conversion of land from an industrial use.” PEIS/RP, p. 4-24. There is absolutely no explanation offered or basis provided to support this statement. Nor is there

P-164 anything in the Trustees' restoration portfolio that supports the claim that sufficient land has been "secured" for restoration. Of the 23 summaries of possible projects within the Harbor contained in Appendix A to the PEIS/RP, only five say that the landowner is or may be willing to allow the site (or part of it) to be used for restoration; a sixth site is described as currently on the market.

P-165 Furthermore, nearly all of the harbor sites proposed for restoration projects are currently zoned for industrial use and are within an industrial sanctuary. In fact, the Trustees somewhat ironically note that the "threat of development" is a possible limitation on restoration for many of the parcels. It is not surprising that developable industrially-zoned land within the heart of Portland Harbor would be under threat of development. Thus, using these properties for restoration projects would inevitably result in an impact on industrial uses and land use conversion.

This appears to be the sum total of the socio-economic analysis of projected impacts on land development in a PEIS/RP that directs conserving or developing scarce industrial land into a use that is both non-industrial and potentially threatening to existing industrial and navigational activity in the Portland Harbor. For the same reasons articulated by LUBA and the Oregon Court of Appeals in *Gunderson v. City of Portland*, the short shrift given in the PEIS/RP to these impacts does not withstand scrutiny.

2. The PEIS/RP Does Not Accurately Represent the Economic Impact of Watershed Recreation in the Portland Harbor.

P-166 In addition to its brief assessment of the economics of commercial and industrial development in the Harbor, the PEIS/RP provides information in Section 3.3 related to the sport fishing economy. The PEIS/RP states that the Lower Willamette River generates \$34.7 million in local and travel expenditures annually in the Portland metropolitan area. PEIS/RP, p. 3-4. In fact, the report on which the PEIS/RP relies explains that those expenditures are for the entire Portland Metro/Columbia area, including the West Multnomah, Columbia, Washington and West Clackamas Counties, not just the Lower Willamette River. Dean Runyan Associates, *Fishing, Hunting, Wildlife Viewing, and Shellfishing in Oregon: 2008 State and County Expenditure Estimates*, pp. 11-13 (May 2009).

3. The PEIS/RP Does Not Consider the Impact of Potential Job Loss on Environmental Justice Populations.

With respect to fish consumption, the PEIS/RP states that some populations from ethnic minority groups and Native Americans rely on fishing to supplement food sources proportionately more than the larger population and that these populations should be considered "environmental justice populations." Although the PEIS/RP does not have information to reach any conclusions about proportionate reliance on fishing as a source of food, the Commenters agree that serious attention should be paid to this risk pathway. That is an issue integral to the decisions EPA will be

making with respect to the cleanup of the Portland Harbor Superfund Site, totally apart from any NRD restoration actions.

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But it is also important to consider that these same environmental justice populations stand to be adversely impacted if the result of the development of restoration projects is that new businesses cannot be developed or that existing businesses cannot be expanded in the Harbor. For example, Attachment E provides the ethnic composition of the workforce of a water-dependent employer with approximately 1,000 employees in the Portland Harbor as compared to the U.S. Census of ethnic populations in Multnomah County.²⁴ The comparison of that data demonstrates that this workforce is more diverse than the Multnomah County population. Thus, if restoration projects have a negative impact on jobs that attract the same workforce, then environmental justice populations will be disproportionately negatively impacted by those projects.

4. The PEIS/RP Does Not Adequately Evaluate Potential Impacts to Harbor Water-Dependent Activities.

The PEIS/RP is also inadequate in its evaluation of potential impacts to ongoing and future waterborne commerce activities caused by carrying out proposed restoration projects within the SSA. The Portland Harbor is the major shipping, industrial/commercial, and transportation (rail and truck) corridor within the City of Portland. The Port of Portland and the other commercial and industrial business are an important component of Oregon and SW Washington's economic viability. Waterfront-dependent businesses are increasing in intensity, as evidenced by the Port of Portland marine operations producing its third-best tonnage year in the Port's history in 2010-2011 (Port of Portland FY 2010-2011). As such, impacts to water-dependent operations and the maintenance and redevelopment of water side structures (piers, docks, moorages) and navigation channels and further restrictions on discharges near restoration sites must be fully evaluated to assess whether they will be impeded by restoration sites within the SSA. The PEIS/RP fails to fully evaluate, even at a programmatic level, expected impacts to water-dependent operations from proposed restoration sites with the SSA.²⁵

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Section 4.3.2 of the PEIS/RP states:

“Activities required to maintain industrial facilities and uses (such as dock maintenance, slip dredging, etc.) as well as dredging that is required to maintain the Willamette River's navigational channel, are already regulated through the ESA and other laws. Since ESA-listed species are already present and utilizing habitats within the harbor, no additional regulation or restriction is anticipated to

²⁴ See <http://quickfacts.census.gov/qfd/states/41000.html>.

²⁵ As noted in Section III.D.2 above, these analyses would not be necessary if the Trustees were to qualify their restoration plans to make clear that they will not approve any particular restoration project that has a negative impact on navigation or commerce.

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result from restoration of habitat in the area; therefore, no adverse effect is anticipated on industrial and shipping activities.” PEIS/RP, p. 4-6.

This statement is deficient because there is no data analysis or evaluation of SSA restoration projects in relation to Harbor water-dependent activities to support it. Specifically, there is no analysis of impacts or potential restrictions on operational and maintenance activities. Analysis should be conducted on the impact to ongoing and future Harbor operations and activities from the siting, construction and maintenance of in-Harbor restoration projects through either potential restrictions or interference with development or maintenance of existing facilities and structures, ship traffic speeds, wakes, ship movements, maintenance dredging and other operational activities. It is difficult to understand how the PEIS/RP can conclude that no additional regulation or restriction will apply without a complete review of such existing operational or maintenance activities. For example, given that the Trustees have put together a portfolio of in-

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Harbor restorations projects, the PEIS/RP could conduct a NEPA analysis of a minimum of two of the proposed in-Harbor projects based on an inventory of the operational and maintenance activities that occur in proximity to those projects.

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Also, it is counterintuitive to conclude that the restoration projects would add “no additional regulation or restriction” given that any analysis required for a permit under Section 404 of the CWA for activities required to maintain the industrial facilities and uses would need to include impacts based on then-existing conditions, which would include the restoration project. As currently written, the PEIS/RP does not contain enough information for (i) the public to be fully informed and (ii) decision makers (regulators from multiple agencies) to have all the necessary information to make informed decisions. Nor does the PEIS/RP show that the Trustees have

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gained approval and documentation from the other permitting agencies (ACOE, NOAA, USFWS, DEQ, ODSL, ODFW) that in-Harbor constructed restoration sites would result in no additional regulation or restriction.

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The PEIS/RP also states:

“A long-term major beneficial impact may result from restoration of these critically important habitats if it contributes to the recovery and ultimate de-listing of the species, as regulation of harbor activities under the ESA would be reduced or eliminated as a result of de-listing.” PEIS/RP, p. ES-5.

A PEIS/RP cannot rely on speculative impacts. *See Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 356 (1989) (an EIS should focus on reasonably foreseeable impacts, not those that are highly speculative). In order to consider such a possible impact, the PEIS/RP would need to provide a strong basis for the expectation that ESA species will be de-listed as a result of the proposed restoration actions. It seems unlikely given that the listed salmonids that pass through the Portland Harbor are subject to many more stressors than the 12-mile stretch of the SSA. If it cannot be supported, the statement should be removed from the PEIS/RP.

Moreover, even if the species were delisted, regulatory authorities under Section 404 of the CWA would remain, so it is difficult to see that any significant level of regulation would be removed.

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Finally, the PEIS/RP also needs to analyze the probability of long-term success of the proposed restoration projects given the projected impact of both ongoing *and future* harbor operations and activities, through either recontamination or interference with the restoration project objectives (e.g., new ship traffic, increased erosion from waves).

C. The PEIS/RP Fails to Consider the Risk to Project Success Caused by the Recontamination Potential Present Within the Chosen Geography.

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The PEIS/RP is inadequate in its evaluation of potential impacts from recontamination, potential impacts from natural hydrodynamic forces (e.g., river flow, flooding, erosion), sedimentation (accretion in newly developed tributary openings), or hydrologic analyses from upland runoff and storm drains to the proposed restoration projects within the SSA project impacts. The PEIS/RP should, at a minimum, evaluate in general the potential impact of ongoing industrial and urban sources on restoration projects within the SSA, including runoff from roads, through storm and sanitary sewers into the river, and of municipalities for sewage operations and overflows into the river. The Trustees should consider in this regard the example of the Hylebos Waterway, where polychlorinated biphenyls have recontaminated that working waterway six years after the initial cleanup.²⁶

To evaluate the potential for recontamination, the PEIS/RP should consider information provided in the Lower Willamette Group's draft feasibility study ("FS") and other documents regarding surface water transport of contaminants, sediment transport, stormwater inflows, upriver contributions, and upwelling from near shore contaminated sites. The PEIS/RP should also consider the impacts from recontamination associated with the range of dredging alternatives described in the draft FS.

V. The Draft EIS and Restoration Plan Does Not Provide Sufficient Detail on the Monitoring and Stewardship Requirements to Provide an Adequate Opportunity for Comment.

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The PEIS/RP does not provide sufficient details on the scale and rationale for the monitoring and stewardship discussed, and in its current form denies the public and interested parties an adequate opportunity to provide scientific or technical comment. The absence of specific details on the proposed monitoring frequency, duration, scale and methods constrains the ability to tier or structure individual actions on the PEIS/RP. The PEIS/RP is also inconsistent in this area, stating first, "In order to be able to measure the response from the fish population it will be

²⁶ See <http://www.thenewstribune.com/2012/09/13/2295371/pricey-to-remove-pollutant-in.html>.

important to have a coordinated monitoring effort throughout the harbor.” PEIS/RP, p. D-2. The PEIS/RP later states, “The sampling plan will vary for each restoration project.” PEIS/RP, p. D-

P-177 3. The monitoring framework for evaluating the potential benefits from restoration projects is vague on details with respect to goals and objectives, and the PEIS/RP is confusing by stating the need for a coordinated monitoring effort with varying sampling plans.

P-178 The PEIS/RP also fails to develop goals and objectives for the restoration projects. By not clearly developing goals and objectives, it is not possible for the Trustees, or the reader, to conduct an adequate analysis under NEPA regarding short- and long-term impacts. Additionally,

P-179 the PEIS should discuss how the monitoring framework meets, or is in compliance with, Statewide Planning Goal 5 or other State of Oregon statutory requirements.

P-180 Also, as discussed in Part III.D.2, the PEIS/RP fails to consider the balance between a project’s environmental costs and its anticipated benefits, here, with respect to the costs of project monitoring. Because there is no detail on how the projects will be monitored, it is not possible to evaluate project cost benefits against other projects.

P-181 The Trustees should provide for public review a more detailed monitoring plan that clearly states the monitoring methods, procedures, duration, frequency and performance criteria for each type of project. The PEIS/RP indicates that performance criteria will be established for key monitoring attributes in the site-specific monitoring plan but fails to identify these performance criteria. PEIS/RP, pp. 7-16–7-17. Furthermore, the PEIS/RP indicates that the performance

P-182 criteria will identify values that indicate the project is on a “positive trajectory” and will identify a timeframe in which the criteria should be met but fails to define what would constitute a positive trajectory. For example, there is no scientific basis provided for examining a positive trajectory. These performance criteria should already be identified and should be made available and clearly stated to the public.

P-183 The performance criteria and monitoring efforts should also be appropriate for the biological endpoint. For example, there should be a correspondingly short monitoring period for organisms that are short-lived or that rapidly recruit juveniles into the population (e.g., benthic organisms). Moreover, professional biologists assisting the Trustees should be able to anticipate the likely success of their chosen projects and the recovery and recruitment time of various species and habitats. Further, the high level of Trustee involvement in direction, review, and approval of the

P-184 proposed restoration projects must be reflected in the choice of monitoring parameters, performance standard endpoints, and overall monitoring effort. The Trustees are in effect co-designers of the restoration actions and will have dictated specific design criteria for the restoration projects, including possibly their geographic location. Therefore, the Trustees should not overly burden the restoration proponent with monitoring activities to guarantee ecological functions when many of the crucial design decisions will have been made by the Trustees themselves. Unfavorable results are most probably due to inappropriate projects or catastrophic

P-185 events, neither of which should be the responsibility of those funding the restoration project.

VI. The PEIS/RP Fails to Consider Limitations on Recreational Restoration in a Working Harbor.

The PEIS/RP assumes in Section 5.6 that the release of contaminants into the Portland Harbor has affected recreational use levels of the Harbor. The Commenters believe that the

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“recreational use” losses that the Trustees intend to address through potential restoration projects are likely to be quite small, if they exist at all, given that this is, and will remain, a working industrial harbor. Such limitations for recreation need to be considered in evaluating either potential losses or gains. Additionally, there is little factual support for a contamination-related loss to the major fish species such as salmon or to other potential recreational activities. In

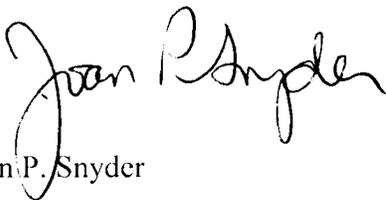
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considering both potential recreation losses and potential restoration gains is it important to consider that there are ample “substitutes” for any recreational use of the Harbor. Given the quite small alleged loss, it is the Commenters’ belief that any potential recreational losses could be subsumed in habitat restoration projects. Such a strategy would enable recreational uses to be addressed in ways that lead to fewer potential conflicts with ecological service projects and more cost-effective restoration overall, an important criterion contained in the 43 C.F.R. Part 11 regulations.

VII. Conclusion

With utmost respect for the efforts of the Trustees to date, the Commenters strongly urge the Trustees to revise the PEIS/RP to provide a higher level of scientific assessment and specifically to address the issues raised in the comments above.

Very truly yours,



Joan P. Snyder

Attachments

- A. List of Commenters
- B. *An Annotated Bibliography of Studies Pertinent to the Issue of Whether to Target Restoration in the Portland Harbor Study Area* (June 2011)
- C. Letter from Thomas A. Friesen, Stanley V. Gregory, Nancy Munn, and Chris Prescott to Erin Madden (Jan. 6, 2012)
- D. Letter from Mark Clemons, Director of Project Development, Group Mackenzie, Inc., to David Harvey, Gunderson Marine Inc. (Sept. 26, 2012)
- E. Gunderson Workforce Diversity

ATTACHMENT A

Signatories

Air Liquide Americas Specialty Gases LLC

Ashland, Inc. and its wholly owned subsidiary Hercules Incorporated

BAE Systems San Diego Ship Repair, Inc.

Marine Group LLC

BNSF

Calbag Metals

Chevron U.S.A. Inc.

Evraz Inc NA

FMC Corporation

Gould Electronics, Inc.

Gunderson LLC

Legacy Site Services LLC, agent for Arkema Inc.

Phillips 66 Co.

Portland Terminal Railroad Company

Siltronic Corporation

Union Pacific Railroad Company

AN ANNOTATED BIBLIOGRAPHY OF STUDIES PERTINENT TO THE ISSUE OF WHETHER TO TARGET RESTORATION IN THE PORTLAND HARBOR STUDY AREA

June 2011

1 INTRODUCTION

The Portland Harbor Natural Resource Trustees have stated a policy for restoration actions to offset Natural Resource Damage (NRD) liabilities that would limit restoration actions to the Portland Harbor Study Area (approximately Portland Harbor RM 2 to RM 11.6) and a Broader Focus Area that encompasses the Willamette River downstream of Willamette Falls, Multnomah Channel, portions of West Hayden Island, and a limited area of the southern shoreline of the Columbia River. Further, the policy states that 50 percent of the restoration must occur in the Study Area. The policy was adopted by the Trustees based on a conclusion in the summary of an expert panel report prepared for the Trustees that stated: “The panel suggested that Potentially Responsible Parties should be required to direct a minimum of one-third to one-half of their total liability to restoration projects inside the study area.”¹ Although there is some discussion of focusing restoration on these areas in the expert panel summary, no clear technical justification is provided in that document for such a policy.

The focus of the Trustees for the Portland Harbor NRD restoration efforts is the Upper Willamette River (UWR) Chinook salmon Evolutionarily Significant Unit (ESU) (hereafter “UWR Chinook ESU”),² which is listed as threatened under the Endangered Species Act (ESA). Given this focus, it is important to make certain that any restoration projects in the Willamette are constructed in areas most likely to positively impact recovery of the UWR Chinook ESU and that they contain the habitat components most necessary to that recovery. The Trustees have recently asked a team led by Dr. Stan Gregory to provide more specific input on the question of the “relative importance of the lower Willamette River for management and recovery of spring Chinook salmon.” That will be important input. In the context of providing input with respect to the Lower Willamette, it will be extremely helpful for Dr. Gregory’s team to provide guidance specifically on the importance of building those restoration projects within the 10-mile

¹ Portland Harbor Natural Resource Trustee Council “Expert Panel” Discussion of Habitat Restoration for Chinook Salmon – Executive Summary, http://www.fws.gov/filedownloads/ftp_OFWO/PortlandHarborNRDAWebSupport/Documents/ExpPanelSum021210.pdf.

² The ESU includes all naturally spawned populations of spring-run Chinook salmon in the Clackamas River and in the Willamette River, and its tributaries, above Willamette Falls, Oregon, as well as seven artificial propagation programs: the McKenzie River Hatchery (Oregon Department of Fish and Wildlife (ODFW) stock #24), Marion Forks/North Fork Santiam River (ODFW stock #21), South Santiam Hatchery (ODFW stock #23) in the South Fork Santiam River, South Santiam Hatchery in the Calapooia River, South Santiam Hatchery in the Molalla River, Willamette Hatchery (ODFW stock #22), and Clackamas hatchery (ODFW stock #19) spring-run Chinook hatchery programs.

stretch of the Portland Harbor Study Area, as compared to other stretches of the LWR, because that area is specifically called out for 50 percent of the restoration projects under the Trustees' currently stated policy.

The purpose of this paper is to provide input on a number of the elements outlined in the Scope of Work for the literature review that is being conducted by Dr. Stan Gregory particularly as they relate to the Portland Harbor Study Area. Specifically, this paper presents information on Chinook salmon pertinent to the following elements of Dr. Gregory's Scope of Work:

- Habitat use by juveniles
- Food webs and food resources
- Predation
- Movement and timing of movement
- Relative importance of the lower Willamette River for management and recovery of spring Chinook salmon

The paper has two parts:

1. An annotated bibliography of technical information pertinent to the question of recovery of the UWR Chinook ESU (section 6 below).
2. A summary of the information contained in the annotated bibliography pertinent to the elements of the Trustees' Scope of Work for the literature review and an analysis of the information in the context of the "viable salmonid population" (VSP) concept (McElhany et al. 2000, 2003, 2006) for the UWR Chinook ESU (sections 3 through 5). In addition, brief summary information on the populations that comprise the ESU is provided as background (section 2).

2 BACKGROUND ON POPULATION STRUCTURE OF THE ESU

2.1 UPPER WILLAMETTE RIVER ESU: TAXONOMIC AND POPULATION STATUS

For the purposes of this document, fish that are the product of river spawning are referred to as "natural" fish. These are also known as "unclipped" fish because their adipose fin has not been clipped as part of a hatchery marking system. The term "wild" is used herein to refer to fish that have no historic genetic hatchery influence. Hence, "wild" fish refers to fish that were produced by natural spawning and have had little genetic influence from hatchery practices. Fish produced in hatcheries are referred to as "hatchery" fish. These typically have had their adipose fin clipped and are also known as "clipped" fish. Not all of the sources cited in this document use these terms consistently. Within this document, the sources' original terms are kept and their meaning is interpreted using the definitions mentioned above.

The UWR Chinook ESU contains seven populations, five of which are made up almost entirely of hatchery fish. Chinook from seven hatchery programs are included in the ESU. The overall natural spawning population (i.e., not including marked hatchery fish) of the ESU is in the range of 4,000 to 5,000 adults (Schroeder et al. 2007). The Clackamas River and the McKenzie River populations are the only populations with significant natural reproduction.

A native-origin spring Chinook run historically existed in the Clackamas River basin. Oregon Department of Fish and Wildlife (ODFW) suggests that Upper Willamette River spring Chinook have historically strayed into the Clackamas River (which joins the Willamette River at Willamette RM 24.8) naturally, when river conditions prevented passage at Willamette Falls (located at Willamette RM 26.6) (ODFW 1998 *in* Myers et al. 2006). This, in addition to hatchery transfers within the basin, likely explains why Clackamas River spring Chinook are more genetically similar to Upper Willamette River spring Chinook than to Lower Columbia River Chinook. Adult Chinook passing the North Fork Dam have exceeded 1,000 in most years since 1987, and have shown considerable increases since 1990. ODFW estimated the 2004 adult abundance for the Clackamas population at 3,730, with a 25-year average of 2,128 (ODFW 2005). Schroeder et al. (2007) estimated 1,178 wild and 477 hatchery adults, resulting in approximately 71% of spawning fish being of “wild” origin (used by Schroeder et al. to describe all naturally-produced fish) (Schroeder et al. 2007). Insufficient data exists to estimate productivity in the Clackamas population (i.e., the ratio of the total number of adults returning to the total number of adults that produced that run) (ODFW 2005).

The McKenzie River is home to a native spring Chinook run. Adult passage at Leaburg Dam in 2001 was estimated at approximately 4,500, with approximately 3,300 (73%) natural-origin spawners (NMFS 2005). Schroeder et al. (2007) estimate 2,735 “wild” (used by author to describe all naturally-produced fish) spring Chinook and 532 hatchery Chinook in the McKenzie River in 2007, indicating that 84% of spawners were of natural origin (Schroeder et al. 2007). The most recent productivity estimate was in 1998 and indicated the ratio of the total number of adults returning to the total number of adults that produced that run was 3.3. (ODFW 2005).

The remaining populations are the Molalla, North Santiam, South Santiam, Calapooia, and Middle Fork Willamette Rivers. Wild spring run Chinook are believed to be extirpated, or nearly so, from the Calapooia, Middle Fork Willamette, and Molalla Rivers. Additionally, the North and South Santiam rivers contain primarily hatchery fish (McElhany 2005; Myers et al. 2006). None of these populations are considered self-sustaining (ODFW 2005). Productivity rates can only be determined from existing information on the North Santiam, which had a productivity of 0.1 as of 2003 (ODFW 2005).

3 THE USE OF PORTLAND HARBOR BY MIGRATORY CHINOOK

Based on a review of the pertinent articles and papers, which are described in more detail in the annotated bibliography, presented below is a summary of the findings of those articles and an assessment of their relevance to restoration of the UWR Chinook ESU.

3.1 CHARACTERISTICS OF SHORELINE HABITAT

Shoreline habitat within Portland Harbor has been greatly altered over the last century and a half through waterfront development, including bank stabilization, seawalls, wharves, pile-supported and floating structures, and dredge/fill. Shallow water areas have been reduced in abundance, while deep water area has increased. Several large off-channel lakes have been filled and/or separated from the river and thus lost as salmon habitat.

The existing shoreline consists of steep banks often with a narrow band of shallow water at the base that varies in substrate and characteristics. The shoreline types identified by Vile and Friesen (2004) are beach, rock outcrop, rock, seawall, vegetated riprap, unvegetated riprap, bio-engineered and unclassified fill. Shoreline characteristics identified include pilings and floating structures, both shaded and un-shaded. Beach habitat is the most common habitat type in Portland Harbor (29%), followed by vegetated riprap (24%) and unclassified fill (20%). Unvegetated riprap constitutes 8%. (Vile and Friesen 2004). Vile and Friesen (2004) categorized habitats and structures constructed by humans as “artificial” or “altered” (e.g., riprap, seawall, piling, fill), and habitats present without human intervention as “natural” or “unaltered” (e.g., beach, rock, rock outcrop). Natural shoreline constitutes approximately 59% of the shoreline area from RM 0 to RM 26, but approximately 33% of shoreline habitat from RM 0 to RM 13 (Vile and Friesen 2004).

3.2 AQUATIC INVERTEBRATES

Aquatic invertebrate surveys indicate juvenile salmonid prey, such as *Daphnia* and copepods, are abundant in Portland Harbor (Friesen et al. 2005).³ These and other juvenile Chinook prey items are found along a variety of habitat types (Friesen et al. 2005). According to Friesen et al. (2005), sampling adjacent to the two most common shoreline habitat types (beach and riprap or a mix of these two (Vile and Friesen 2004)) identified the highest abundance and diversity of aquatic invertebrates of the habitats studied (Friesen et al. 2005). Important juvenile salmonid prey items such as cladocerans (*Daphnia* and *Bosminidae*), chironomids, and copepods were abundant with cladocerans being the most commonly captured aquatic invertebrate at beach, riprap, and mixed habitat (Friesen et al. 2005). Floating structures (e.g., docks) also supported a high abundance of invertebrates that are prey for juvenile Chinook (Friesen et al. 2005). Seawall habitat had the lowest invertebrate abundances although no statistical testing was

³ Friesen et al. (2005) only sampled in May and June, 2003, and thus provide limited seasonality information on aquatic invertebrates. However, Vile et al. (2005) sampled juvenile Chinook stomachs over a one-year period and found *Daphnia* to be a dominant dietary component of juvenile Chinook throughout the year.

conducted (Friesen et al. 2005). Previous studies of aquatic macroinvertebrates in the Lower Willamette River sampled benthic organisms rather than zooplankton. Numerous benthic invertebrates that are eaten by Chinook (e.g., *Chironomids*, amphipods, and oligochaetes) were routinely encountered in those studies (Ward et al. 1988; Windward Environmental 2004; McCabe et al. 1997). In summary, based on Friesen et al. (2005), prey for juvenile Chinook are abundant at both altered and natural shoreline habitat in Portland Harbor.

3.3 RESIDENT PREDATORY FISH/PREDATION WITHIN PORTLAND HARBOR/LOWER WILLAMETTE AREA

Predation on juvenile salmonids by resident predatory fish species in the Lower Willamette River has been found by multiple studies to be insignificant due both to low numbers of predatory fish and low rates of predation by those predatory fish on juvenile salmonids (Ward et al. 1989, 1990, 1991; North et al. 2002; Friesen et al. 2003; Pribyl et al. 2005). Friesen et al. (2003) noted that predatory fish were so scarce in the Lower Willamette River that they encountered difficulty in assessing differences in use of aquatic habitats by these species. Pribyl et al. (2004) concluded that “[c]urrently, densities of all large predator fishes are low, and effects on juvenile salmonids are likely negligible” (p. 177).

Pribyl et al. (2004) studied resident predatory fish species presence and habits in the Lower Willamette River. Their study focused on species known to prey on juvenile salmonids, such as northern pikeminnow (*Ptychocheilus oregonensis*), walleye (*Sander vitreus*), smallmouth bass (*Micropterus dolomieu*), and largemouth bass (*Micropterus salmoides*). Pribyl et al. (2004) describe resident predatory fish abundance in Portland Harbor as relatively low throughout the year. One possible explanation offered by the authors for their relative scarcity is angling pressure, as the Lower Willamette River hosts a popular bass fishery. Little evidence exists of disproportionate habitat use or avoidance of altered habitats by predatory fish; they generally use all types of habitats—both altered and natural—in proportion to habitat availability (Friesen et al. 2003; North et al. 2002; Pribyl et al. 2005). For example, almost 30% of shoreline habitat in the Lower Willamette River is beach, and approximately 30% of radio-tagged smallmouth and largemouth bass were recovered at beach habitat (Pribyl et al. 2005).

North et al. (2002) detected no significant difference between habitat use by predatory fish of beach/rock, rock outcrop, and riprap habitat, but did detect significantly lower use of vertical wall habitat by predators. Other sampling methods detected no significant difference between any of the habitats (North et al. 2002). Friesen et al. (2003) reported higher catch per unit of effort (CPUE) of predatory fish at natural shoreline sites than at altered sites (e.g., riprap, docks, pilings). However, differences between catch per unit of effort at specific habitat types were not statistically significant. Pribyl et al. (2005) recorded resident piscivorous fish (e.g., smallmouth bass, largemouth bass, and walleye) at disproportionately higher occurrence rates at sites with pilings. They also found some species using riprap disproportionately more frequently in summer/autumn but disproportionately less often in winter/spring. (Predatory fish species (e.g., smallmouth

bass and northern pikeminnow) in these areas had crayfish in their stomachs and not juvenile salmonids (Pribyl et al. 2005).) Ward et al. (1989, 1990, 1991) found native northern pikeminnow showed no preference for altered habitat over natural habitat.

Studies investigating the diets of piscivorous fish in Portland Harbor (Ward et al. 1989; 1990; 1991; North et al. 2002; Friesen et al. 2003; Pribyl et al. 2005) indicate that these species (northern pikeminnow, smallmouth bass, largemouth bass, walleye) prey on juvenile salmonids at very low levels. Ward et al. (1989, 1990, 1991, 1994) found juvenile salmonids in the stomachs of between 8% and 13% of the northern pikeminnow they examined. No significant difference in predation rates on juvenile salmonids was observed between sites with or without overwater structures (Ward et al. 1989, 1990, 1991). Pribyl et al. (2005) found no fish in the stomachs of northern pikeminnow, and could only identify one salmonid in all the stomach contents sampled, found in a smallmouth bass. Further, many studies found that predation on juvenile salmonids by predatory fish was not statistically different between altered (overwater structures, riprap, etc.) and natural (beach, rock outcrop, etc.) sites (Ward et al. 1989, 1990, 1991; Ward et al. 1994).

Thus, based on the studies above, predatory fish are present in Portland Harbor at low densities, generally utilize habitat in proportion to its availability, do not extensively feed on juvenile salmonids in general, and do not consume higher percentages of juvenile salmonids at altered sites as opposed to natural sites. For the reasons outlined above and as concluded by Ward et al. (1989, 1990, 1991, 1994) and Pribyl et al. (2005), the weight of evidence suggests that predation by piscivorous fish on juvenile salmonids in the Lower Willamette River, including Portland Harbor, is not significant and thus not likely a limiting factor for juvenile salmonids in the river. Furthermore, there is no evidence to conclude that predation would be further reduced if there were more “natural” habitat in this portion of the river.

3.4 JUVENILE CHINOOK HABITAT USE IN PORTLAND HARBOR

3.4.1 SIZE

Juvenile Chinook, both yearling and sub-yearling, generally use Portland Harbor as a migratory channel. Juvenile chinook presence in Portland Harbor peaks from approximately January through June. (Friesen et al. 2003, 2004, 2007; North et al. 2002.) There is little evidence to suggest year-round rearing in Portland Harbor by individual fish, although juvenile Chinook may be found in Portland Harbor in very small numbers outside of the peak migration period. Friesen et al. (2004) found juvenile Chinook in Portland Harbor representing a broad range of sizes. Naturally produced (unmarked) Chinook found in Portland Harbor represent a wide size range, from fork lengths of approximately 30 mm to over 200 mm. This indicates that the naturally-produced run consists of outmigrants ranging from small sub-yearling (30 mm) through larger yearling (200 mm). Hatchery fish display a more narrow size range—between 100 and 200 mm, presumably due to hatchery release policies.

Unmarked juvenile Chinook sampled in beach seines displayed a bimodal fork length distribution with peaks at 45 mm and 75 mm (Friesen et al. 2004). Since fall Chinook are scarce in the Willamette River, this bimodal distribution implies that sub-yearling from different spring-run subpopulations were present in Portland Harbor at the same time (Friesen et al. 2004). Unmarked juvenile Chinook sampled by electrofishing, at habitats that could not be beach seined, had a mean fork length of 115 mm but ranged from 30 to over 200 mm (Friesen et al. 2004). Friesen et al. (2004) caught more small unmarked fish in beach seines than they did large unmarked fish through electrofishing. However, the overall relative abundance of small unmarked fish versus larger unmarked fish using the Willamette River cannot be determined from these data due to differences in sampling methods and the fact that there was only partial sampling of those habitats occupied by larger unmarked Chinook. Specifically, while fish greater than 100 mm have typically been found throughout the width of the river (Ward et al. 1989, 1990, 1991, 1994; North et al. 2002; Friesen et al. 2003), Friesen et al. (2004) sampled only a portion of this area. Therefore, results with higher catches in the beach seine rather than by electrofishing, Friesen et al. (2004), do not provide useful information about the overall relative abundance of small, and possibly more shoreline dependent Chinook, versus larger less shoreline dependent Chinook.

Myers et al. (2006) note that the majority of adults returning to the Upper Willamette River entered the ocean as yearling fish. The authors note that this is likely due to the influence of hatchery production, as hatchery juveniles are released in their first autumn or second spring. Myers et al. (2006) cite several references to observations (e.g., Craig and Townsend 1946, Mattson 1962, Howell et al. 1988 *in* Myers et al. 2006) of fry and fingerling Chinook migrating downriver from the Willamette River and its tributaries. Overall, Chinook that migrate as yearlings (either naturally-produced or hatchery-produced) form the bulk of the returning adults. Since the majority of returning adults are the result of juveniles that enter the ocean as yearlings, it must be concluded that many of the sub-yearling fish that emigrate from the Willamette River either rear in the Lower Columbia River for extended periods to enter the ocean at one year of age or do not survive to enter the ocean as sub-yearlings (Myers et al. 2006).

In summary, juvenile Chinook presence in Portland Harbor is greatest in January through June and includes unmarked fish ranging from small sub-yearling (30 mm) to large yearling (200 mm) fish. Based on the high proportion of spawning adults being the product of fish that enter saltwater as yearling fish, many small sub-yearling fish that are returning as adults must rear downstream of Portland Harbor.

3.4.2 CHINOOK MIGRATION RATE/REARING

Both yearling and larger sub-yearling Chinook migrate relatively rapidly through Portland Harbor. Friesen et al. (2007) observed juvenile Chinook (>100 mm fork length) migrating approximately 7 miles/day. Friesen et al. (2004) found juvenile Chinook (>100 mm fork length) migrated at a rate of 5.2 to 7.7 miles/day. North et al. (2002) tagged yearling and sub-yearling Chinook (>107 mm fork length) to track migration rate through Portland Harbor. Large sub-yearling Chinook (>107 mm fork length) exhibited a

migration rate of approximately 4.4 miles/day, and yearling Chinook migrated at approximately 6.8 miles/day (North et al. 2002). Ward et al. (1989, 1990, 1991, 1994) found that yearling Chinook (>175 mm fork length) migrated the lower 19 miles of the Willamette River in as little as 2-3 days, but as long as 8 days, with mean migration rates between approximately 4 and 5 miles/day. These migration rates are similar to those for yearlings in the Columbia River (Raymond 1968; cited by Healy 1991) and large sub-yearlings in the Rogue River (Cramer and Lichatowich 1978; cited by Healy 1991). Several studies indicated that juvenile Chinook, both yearling and larger sub-yearling, migrate through the entire width of the river rather than migrating primarily through the nearshore area (Friesen et al. 2003, 2004, 2007; North et al. 2002; Ward et al. 1989, 1990, 1991, 1994). Therefore, the reduction in shallow water and off-channel habitats would not be a limiting factor for migration of yearling and larger sub-yearling Chinook.

Due to the limitations of radio telemetry tags, smaller sub-yearlings (e.g., <100 mm fork length) have not been tagged and tracked, and thus their migration rate and use of habitats are not nearly as well known as for yearling and larger sub-yearling Chinook. Friesen et al. (2003, 2004) concluded that extended rearing may occur in Portland Harbor's active channel margin and small alcove habitats. The numbers of fish in these habitats peak in patterns similar to those of the larger sub-yearling and yearling Chinook in the river, with peaks in February and April/May. Small individual Chinook may spend longer periods in Portland Harbor than larger fish, but this has not been demonstrated conclusively through tagging or other sampling. The very low numbers of Chinook that are present in the summer suggest no year round rearing by individual fish is occurring in this reach, and their presence in summer-fall is more likely representative of transient use by fish that spent the earlier portion of the year upstream rather than year-round rearing within Portland Harbor.

Teel et al. (2009) found small Chinook from the UWR Chinook ESU and other ESUs using seasonal floodplain wetlands along the Lower Willamette River, Multnomah Channel, and Columbia Slough in the winter and spring. Simenstad et al. (2010) presented findings of sub-yearling Chinook in the Lower Columbia River in the early spring. These studies indicate that sub-yearling Chinook can and do migrate through the Lower Willamette River as small fish to rearing habitat well downstream of Portland Harbor very early after emergence from the spawning gravel.

In summary, yearling and sub-yearling Chinook generally use Portland Harbor as a migration corridor, passing through in 2-4 days. Some studies indicate that sub-yearling Chinook may be rearing for longer periods, but there is insufficient data to determine the length of residence by individual fish. Sub-yearling Chinook can and do migrate through Portland Harbor in the later winter and early spring soon after emergence from the spawning gravel to rear in downstream habitats.

3.4.3 HABITAT USE BY CHINOOK SALMON

Juvenile Chinook habitat use in Portland Harbor has been studied extensively (Friesen et al. 2003, 2004; North et al. 2002; Ward et al. 1989, 1990, 1991, 1994). However,

relatively few of those studies have focused on small sub-yearling Chinook (e.g., <100 mm fork length), and thus very little is known about their use of Portland Harbor. Due to the different levels of available information for the two groups, each is addressed separately below.

Yearling and Large (>100 mm Fork Length) Sub-Yearling Chinook

Ward et al. (1989, 1990, 1991, 1994) found that yearling juvenile Chinook migration was not adversely affected by shoreline development, nor was predation increased.

Studies have found no obvious shoreline habitat preferences for yearling Chinook generally. Ward et al. (1989, 1990, 1991) studied juvenile Chinook migration and habitat use in Portland Harbor and found no significant difference between the proportion of radio-tagged yearling Chinook at nearshore locations and the proportion of nearshore river surface area in Portland Harbor, whether offshore or nearshore sites. Thus, they were distributed in proportion to available habitat and were not concentrated at particular habitat types.

Both North et al. (2002) and Friesen et al. (2003) found radio-tagged yearling juvenile Chinook relocated to rock outcrop sites at a higher rate than other habitat and relocated to all other habitat types approximately proportionately to the habitat's availability. However, this preference for rock outcrop was not detected during electrofishing sampling (North et al. 2002; Friesen et al. 2003), nor was it noted in Friesen et al. 2005.

Friesen et al. (2003), when combining electrofishing results with North et al. (2001) results, found significantly higher ($P < 0.01$) use of natural versus artificial (e.g., seawall, riprap, pilings—referred to as “altered” in this document). Friesen et al. (2003) indicate that low catch per unit of effort at seawall sites may be influenced by sampling methods, as electrofishing samples only in the upper 10 ft of the water column, while seawall sites are typically much deeper (30-60 ft). Sampling of individual bank habitat type (e.g., presence/absence of riprap, structure, alcove, and seawall) or bank treatment type (e.g., beach, riprap, mixed, rock outcrop, seawall, and alcove) revealed less clarity on habitat preference. For example, among bank habitat types, alcove habitat was used most of all, but use of alcove habitat was not significantly higher than that of no riprap/structure, riprap/no structure, or riprap/structure habitat. Seawall habitat was used least of all but was not used significantly less than no riprap/structure or riprap/structure sites (Friesen et al. 2003). Among bank treatment types, though alcove bank treatment was used most of all, no significant difference in habitat use was detected among beach, riprap, mixed, rock outcrop, and alcove bank treatments. Seawall bank treatment sites were used least of all, but their use was not significantly different than use of mixed or rock outcrop habitat. North et al. (2002) also found high relocation of radio-tagged yearling Chinook to rock outcrop sites but did not observe this, or any other significant difference in habitat use, during electrofishing. North et al. (2002) also found no significant difference in juvenile Chinook use of lighted versus light-limited sites.

Friesen et al. (2004) found no statistically significant differences between juvenile Chinook use of shoreline habitat (with the possible exception of low use of seawall sites that the authors indicate may have been an artifact of sampling methods), including altered and natural types. High levels of relocation of radio-tagged yearling Chinook to rock outcrop sites observed in North et al. (2002) and Friesen et al. (2003) were not observed in Friesen et al. (2004).

Based on these studies, yearling Chinook do not demonstrate meaningful preference for any particular habitat type.

Smaller Sub-yearling Chinook (<100 mm FL)

Due to the difficulty of radio-tagging and the reduced effectiveness of electrofishing for smaller sub-yearling Chinook, little is known about their use of Portland Harbor. Both North et al. (2002) and Friesen et al. (2003) found small sub-yearling Chinook during beach seining and electrofishing. Electrofishing efforts generally captured larger fish than did beach seining, though some small sub-yearlings were captured during electrofishing. Additionally, beach seining was only conducted at beaches. These reports include no separate analysis or conclusion of habitat use by smaller sub-yearling fish.

Friesen et al. (2004) captured a large number of sub-yearling Chinook, particularly during beach seining. However, electrofishing was of limited effectiveness for capturing small sub-yearling fish, as the authors “did not often capture these fish [small sub-yearlings] with electrofishing gear” (p. 116). For these reasons, the authors conclude that they could not effectively analyze sub-yearling Chinook habitat preference, though they did infer an importance of beach habitat for sub-yearlings based on the high numbers found during beach seining, and citing a number of studies indicate the importance of beach habitat to small sub-yearling Chinook in other systems (Friesen et al. 2004). In many river systems, small Chinook that have recently emerged from the spawning gravel are oriented along shorelines in shallow low-velocity water with increasing use of deeper area occurring as fish size increases (Healy 1991).

Teel et al. (2009) found small sub-yearling Chinook in seasonal floodplain wetlands within the Lower Willamette River in both winter and spring. However, the study was limited in scope, and tells little about sub-yearling Chinook habitat use in the Lower Willamette beyond their presence at floodplain wetlands in winter and spring.

Overall, much less is known about smaller sub-yearling Chinook use of Portland Harbor than larger sub-yearling or yearling Chinook due to the limited effectiveness and capabilities of sampling methods for such small fish. It is known that they use beach habitats, but it is not known if and to what degree they also use other habitats, or what habitat parameters (e.g., substrate, depth, other) drive habitat use. Friesen et al. (2004) sums up the state of knowledge of sub-yearling Chinook in Portland Harbor: “...we believe the effects of development are incompletely explored, especially with respect to subyearling fish” (p. 117).

3.4.4 JUVENILE CHINOOK FEEDING HABITS

While in Portland Harbor, juvenile salmonids feed primarily on *Daphnia*. Vile et al. (2005) examined the stomach contents of 346 yearling juvenile Chinook over a one-year period and found *Daphnia* to be the most abundant species in the stomach contents by both abundance and wet weight throughout most of the year. In February and November *Corophium* were increasingly found in stomach samples, and were more abundant in stomach samples than *Daphnia* in November by wet-weight (but not by abundance). According to Friesen et al. (2005), *Daphnia* is abundant in the Lower Willamette River but was not the most abundant aquatic invertebrate in the sampled habitats; *Bosminidae*, which is of the same taxonomic sub-order as *Daphnia*, is more abundant than *Daphnia* (Friesen et al. 2005). However, selection indices indicate that juvenile Chinook avoid *Bosminidae* but preferentially select *Daphnia* (Vile et al. 2005). As mentioned earlier, Portland Harbor sampling by Friesen et al. (2005) indicated that riprap and beach habitat—the two most abundant habitat types in Portland Harbor—are the most productive habitat types for juvenile Chinook prey items, particularly *Daphnia*.

Based on the results of Vile et al. (2005), little diet overlap has been found between juvenile Chinook and non-native resident species. This observation suggests that juvenile Chinook may not be competing for food with the non-native fish that reside in the lower Willamette River.

Thus, juvenile Chinook have abundant food resources in Portland Harbor. Further, as discussed above, *Daphnia* is produced abundantly at all habitat types (Friesen et al. 2005), but in particular abundance at beach and riprap habitat, the two most common habitat types in Portland Harbor.

3.5 SUMMARY OF JUVENILE CHINOOK HABITAT USE

- Naturally produced yearling and larger sub-yearling Chinook use a wide range of both natural and altered habitats in Portland Harbor, without a clear preference for one over another.
- Friesen et al. (2004, p. 117) “found little evidence to suggest that nearshore habitat as it currently exists is a critical factor affecting yearling salmonids. However...the effects of development are incompletely explored, especially with respect to sub-yearling fish.”
- Smaller sub-yearling Chinook were often captured by beach seining. Sampling of other habitat types has not been effective enough to draw conclusions regarding the range of habitats that may be used by smaller sub-yearling Chinook.
- Small UWR sub-yearling Chinook are found in the Lower Columbia River all the way to the estuary very early in the spring.
- Individual larger yearling and sub-yearlings (>100 mm) typically spend 2-4 days rearing/migrating through the Portland Harbor area.

- No tagging data are available to verify length of residence for individual smaller sub-yearlings (<100 mm) in the Portland Harbor area.
- There is no evidence of food stress for juvenile Chinook and indeed food is abundant.
- Food is present in all habitat types at Portland Harbor.
- Predatory fish are not abundant in Portland Harbor and are not having a significant effect upon juvenile Chinook.
- Predatory fish in Portland Harbor primarily prey on crayfish and non-salmonid fishes.

4 VIABLE SALMONID POPULATIONS (VSP)

NOAA Technical Memorandum NMFS-NWFSC-42, McElhany et al. 2000, and revisions in McElhany et al. 2003 and 2006 introduce the VSP concept. Its purpose is to propose criteria for determining the conservation status of Pacific salmon populations and ESUs, as well as for establishing Endangered Species Act (ESA) delisting goals. The VSP concept provides biologically defined parameters that are helpful for describing the performance and resilience of a population. The VSP criteria or parameters (McElhany et al. 2006) are: abundance/population productivity; population spatial structure; and diversity. Each of the parameters is discussed below, followed by a discussion of how knowledge of juvenile Chinook use of Portland Harbor can inform conclusions about the relative importance of this area for recovery of the upper Willamette Spring Chinook ESU.

4.1 ABUNDANCE/PRODUCTIVITY

Abundance is the number of adult fish within a population. For the purposes of ESA-listed salmonids, the focus of the abundance criterion is natural (i.e., progeny of naturally spawning parents) populations of adult fish in their native ecosystem, rather than hatchery-produced fish. Hatchery-produced fish in the wild can contribute to spawners but cannot be counted as recruits (McElhany et al. 2006). A viable population must be large enough to weather environmental disasters and maintain genetic stability over the long term (McElhany et al. 2000). All other factors being equal (e.g., habitat quality, spawning success, vulnerability to disaster), a larger population has a lower risk of extinction than a smaller population (McElhany et al. 2006).

Productivity, in a VSP sense, is a measure of the population growth rate, or how well a population is “performing,” throughout the whole of its life cycle. The productivity parameter describes whether a population is replacing itself. This is typically determined by the rate at which naturally-spawning adults are replaced by naturally-spawning adults in the next generation, i.e., the recruitment rate into the breeding population. A viable (self-sustaining) population should yield more than one adult spawner (male or female) for every spawner (male or female) that produced that run (productivity >1). If each spawning adult produces less than one spawner (productivity <1), the population is not replacing itself and its long-term viability is threatened, even if abundance is high.

The distinctions within the abundance/productivity parameter provide a context for analyzing and prioritizing habitat restoration. Actions that increase survival or conversely limit mortality will increase productivity and yield higher abundance. If the selected restoration actions yield an increase in habitat acreage but do not increase survival, then neither productivity nor abundance will typically increase. Further, restoration actions that provide habitat but increase mortality (e.g., by increasing predation or stranding fish when water levels change) will lower survival. This reduces productivity and abundance. The target for restoration must be to increase survival to improve the abundance/productivity parameter for the populations of the ESU.

4.2 SPATIAL STRUCTURE

Spatial structure is a measure of the habitat quality, spatial configuration, dynamics, and dispersal characteristics of a population. Populations with broader spatial distribution are considered to be more viable, as they are less exposed to threats at any one location. McElhany et al. (2000) focus primarily on spawning group distribution and connectivity for their analysis of spatial structure. Additionally, natural straying rates (i.e., individuals breeding in a geographic area different from where they were produced) should be maintained and not substantially increased or decreased by human activities. Further, source populations (which are typically higher abundance populations with productivities >1) are important to help sustain populations with low abundance and low productivities (<1).

4.3 DIVERSITY

Diversity measures the breadth of variation of a population's traits, including anadromy, morphology, fecundity, run-timing, spawn timing, juvenile life history, age at smolting, age at maturity, egg size, developmental rate, ocean distribution patterns, spawning behavior, physiology, and molecular genetic characteristics. Diversity allows a population to use a wide variety of environments, to withstand short-term temporal and spatial changes in its environment, and to have the raw (i.e., genetic) material to survive long-term environmental change (McElhany et al. 2000).

4.4 HOW DO HABITAT CONDITIONS IN PORTLAND HARBOR AFFECT THE UWR CHINOOK ESU VSP PARAMETERS?

The following section discusses the relationship between the habitat conditions within Portland Harbor and parameters associated with a Viable Salmon Population (VSP). In addition, it examines whether Portland Harbor provides any unique opportunities for affecting the VSP parameters for the UWR Chinook ESU compared to alternative restoration areas.

4.4.1 ABUNDANCE/PRODUCTIVITY

Although specific population or ESU abundance is an important goal, the critical component of this dual abundance/productivity VSP parameter is productivity. If a population has a long-term productivity <1 the population will go extinct. If a population has a long-term productivity >1 , the population will grow and some level of abundance

will be achieved. Achieving productivity greater than 1 sets a population on a path to recovery even if abundance builds at a slow pace.

The assessment of the relevant studies conducted in Portland Harbor indicates that there is no basis to conclude that the habitat conditions in the Study Area cause mortality that reduces the productivity of the UWR Chinook ESU (or its component populations). The scientific literature suggests that food is abundant and predation is limited within Portland Harbor. There is no mechanistic (e.g., lack of food, predation) basis for concluding that the current habitat conditions in the Study Area cause mortality for any size of juvenile Chinook that passes through this area.

Moreover, there is no evidence that space is limited for juvenile Chinook when the continuum of habitats in the Lower Willamette River and to the mouth of the Columbia River is considered. Indeed, space is abundant in the Study Area for yearling and larger sub-yearling Chinook that pass through the habitat in a rearing/migration mode because they use the entire width of the river and have not been affected by the historical shift from a dominance of shallow water habitat to a dominance of deep water habitat in the Study Area (Friesen et al. 2003, 2004, 2007; North et al. 2002; Ward et al. 1989, 1990, 1991, 1994).

The question of whether there is enough shallow water margin habitat or off-channel habitat in the Study Area to support the numbers of small sub-yearling Chinook (30-75 mm) produced by the ESU is more difficult to assess. Data is lacking on the residence time of small sub-yearling Chinook as is data on the overall abundance of this group of fish. The pertinent questions related to rearing space for smaller sub-yearling Chinook (30-75 mm) are whether the absence of specific habitat types in the Study Area would: 1) preclude these fish from growing adequately so that they can survive when they enter the ocean; or 2) preclude them from surviving during higher flow events in the winter and early spring.

It is generally accepted that juvenile Chinook that reach the ocean at larger size survive at higher rates than smaller fish (Healey 1991). Therefore, if small sub-yearling Chinook miss the opportunity to grow prior to reaching the ocean due to lack of habitat, their survival could be reduced, decreasing the overall productivity of the population. In contrast to yearling and larger sub-yearling Chinook, there is inconclusive evidence about the extent of habitat that small Chinook use in the Study Area. Further, there is no reliable information on whether the current numbers of these small Chinook exceed the capacity of the current shallow water habitats in the Study Area. Given the greatly reduced population in the UWR Chinook ESU in general, it cannot be automatically concluded that insufficient habitat is available in the Study Area. Second, if we assume their numbers do exceed the capacity of the habitat, then the question becomes whether those additional rearing opportunities can be provided downstream. Teel et al. (2009) found small Chinook from the UWR Chinook ESU and other ESUs using seasonal floodplain wetlands along the Lower Willamette River, Multnomah Channel, and Columbia Slough in the winter and spring. Simenstad et al. (2010) reported captures of small sub-yearling from the UWR Chinook ESU at the upper end of the Columbia River Estuary as early as late winter (January–March). These studies demonstrate that sub-

yearling Chinook can and do migrate through the Study Area to downstream rearing habitats while very small. It is reasonable to conclude that small sub-yearlings will feed, grow and experience low predation rates while migrating through the Study Area to these and other alternative habitats downstream, just as the larger fish do. There is no mechanistic reason or data to conclude otherwise.

It is possible that small sub-yearlings would use restored habitat located in the Study Area. However, there is no evidence to suggest that these habitats would provide any unique opportunity to increase the productivity or abundance of the ESU that could not be provided in the Broader Focus Area or even farther upstream or downstream. The Lower Willamette River and the Columbia River provide a continuum of habitats that serve very similar functions for small sub-yearling Chinook all the way to the estuary. The consideration for increasing the productivity of this ESU should be to ensure that there is abundant shallow water and off-channel habitat somewhere in the 100+ miles of the Lower Willamette and Columbia River habitat where growth can occur prior to entry into the ocean.

4.4.2 SPATIAL STRUCTURE

A primary focus of the spatial structure VSP parameter is ESU spawning distribution. Constraining the restoration actions to the Study Area and Broader Focus Area dramatically reduces the potential for improving this VSP parameter because no Chinook spawning habitat occurs in the Study Area or Broader Focus Area.

From the perspective of ESU recovery, improving spawning habitat could increase productivity/abundance, spatial structure, and diversity of the ESU. Five of the seven populations in the ESU have very low numbers of fish and several have compromised spawning distributions compared to historic conditions. Consideration of a broad range of spawning habitat improvements could support recovery of the ESU. The selection amongst these options could be based on the potential for benefits from a focus on spawning improvement for healthy subpopulations (i.e., Clackamas, McKenzie) or for weak subpopulations (i.e., Molalla, North Santiam, South Santiam, Calapooia, and Middle Fork Willamette Rivers).

4.4.3 DIVERSITY

Diversity of the UWR Chinook ESU would be increased if more sub-yearlings contributed to the adult recruitment than are currently being observed. Creating additional shallow water and off channel habitat within the entire range of the ESU upstream and downstream of Portland Harbor could provide a great increase in habitats important for increased diversity.

5 CONCLUSIONS

Based on this review, there is no *a priori* evidence to suggest that the UWR Chinook ESU would be better served by conducting restoration activities within the Portland Harbor Study Area versus the Broader Focus Area or other areas upstream and downstream of those areas. Moreover, there is no evidence to suggest that there is any

scientific basis for an *a priori* allotment of a percentage of restoration to occur with the Study Area. Restoration actions within this area do not provide unique opportunities to improve VSP parameters for the UWR Chinook ESU. The same conclusion would apply to the Broader Focus Area because alternative habitat actions located upstream or downstream of the Broader Focus Area could provide for recovery of the ESU.

Indeed, for a variety of reasons the Portland Harbor Study Area is less suitable than other areas as a focus area for furthering the recovery of the UWR Chinook ESU. For example, elevated water temperatures have been commonly cited as a concern in that portion of the Lower Willamette River which encompasses the Study Area (WRI. 2004). The Study Area essentially has the highest water temperature of any habitat reach of the entire freshwater habitat continuum traversed by individuals of this ESU. This stressor is not expected to be corrected by any of the restoration actions (although some small cool water habitats may be provided) and will persist in the future. Assuming climate change projections are correct, water temperatures may even increase over time in this reach. The overall effect would be to further reduce the time in the late spring and early summer when the Study Area has suitable temperatures for juvenile Chinook. In addition, changes in temperature may change the ecological interactions (predation, competition) with the numerous introduced warm water fish species in the Lower Willamette River. Given this stressor alone, aggregation of substantial restoration activities in the Study Area and even portions of the Broader Focus Area entail substantial risk that high water temperatures would limit future benefits for Chinook from any restoration project.

As a second example, constraining actions to the Portland Harbor Study Area and the Broader Focus Area severely restricts the actions that can address delisting goals for the ESU as defined by the VSP parameters, and the populations that can be targeted. For example, a more direct focus on spawning or rearing habitat in the Clackamas River may provide a more direct means of increasing productivity for that population than actions in the Study Area. In a similar fashion, habitat actions focused on the McKenzie River population may increase the productivity and abundance of this population so that it can serve as a “source” population contributing natural spawners to the other upstream populations of the ESU that are currently dominated by hatchery fish. Such actions help address all of the VSP parameters and support delisting decisions.

Overall, the Trustees’ currently stated policy of crediting habitat restoration only within the Study Area and the Broader Focus Area and the greater restriction of requiring 50 percent of the DSAYs from restoration projects within the Study Area will greatly limit the potential for NRD restoration to meaningfully support recovery of the UWR Chinook ESU.

6 ANNOTATED BIBLIOGRAPHY

Friesen, T. A., H. K. Takata, J. S. Vile, J. C. Graham, R. A. Farr, M. J. Reesman, & B. S. Cunningham. 2003. Relationships between bank treatment / nearshore development and anadromous / resident fish in the Lower Willamette River. Prepared for City of Portland Bureau of Environmental Services. February 2003.

This is the second year of the study initiated below in North et al. (2002). This study, conducted from mid-2001 through mid-2002, identified and quantified nearshore habitat within the Lower Willamette River (up to RM 26). The study also included radio tagging/tracking study of 51 salmonids, including 14 yearling Chinook (20-77g; 116-186 mm fork length) and six sub-yearling Chinook (≥ 15 g; ~ 113 mm fork length). Shoreline sampling, including beach seining and electrofishing, was conducted to examine habitat use. Beach seine sampling occurred at six shoreline sites using a 2.4 m x 45.7 m beach seine. Each site was sampled approximately three times per month. Limited electrofishing was used for juvenile salmonids but was used more extensively for resident fish. Electrofishing targeted areas of 1-3 m water depth. Gillnetting was also used to sample resident fish, using a 2.4 m x 45.7 m net with a target effort of 40 minutes. Stomach samples of 71 resident predatory fish (> 250 mm fork length) were sampled.

Sub-yearling Chinook (≥ 15 g; ~ 113 mm fork length) had the fastest migration rate of the fish tracked with radio tags. Radio-tagged juvenile Chinook of all sizes/age classes were relatively evenly distributed throughout the width of the river. Beach seining captured yearling and sub-yearling salmonids in the Lower Willamette River in every month of the year, though pronounced peaks of abundance of both age classes were observed from February through June. Very low numbers of both were recorded from July through December. Catch per unit of effort was highest during late winter through spring. Unmarked juvenile salmonids were generally much smaller (68 mm mean fork length in April-June) than hatchery salmonids (151 mm mean fork length in April-June).

Friesen et al. present results combined with the study's previous year's results (North et al. 2002). Radio-tagged Chinook relocated to rock outcrop sites at a higher rate than its availability. However, higher use of rock outcrop sites was observed during electrofishing sampling. Significantly higher ($P < 0.01$) use of "natural" versus "artificial" (e.g., seawall, riprap, pilings) was observed. However, among bank habitat types, alcove sites were used most of all, but use was not significantly higher than that of no riprap/structure, riprap/no structure, or riprap/structure habitat. Seawall habitat was used least of all but was not used significantly less than "no riprap/structure" or "riprap/structure" sites (Friesen et al. 2003). Among bank treatment types, though alcove bank treatment was used most of all, no significant difference in habitat use was detected among beach, riprap, mixed, rock outcrop, and alcove bank treatments. Seawall bank treatment sites were used least of all, but their use was not significantly different than use of mixed or rock outcrop habitat. The authors note that low catch per unit of effort at seawall sites may be influenced by sampling methods, as electrofishing samples only the upper 10 ft of the water column, while seawall sites are typically much deeper (30-60 ft).

In general, resident piscivorous fish were found at natural shoreline habitat (e.g., beach, rock outcrop) and habitat without structure (e.g., no docks) at higher rates than at artificial habitat (e.g., riprap, seawall) or at habitat with structure (e.g., docks). Predation of fish by resident piscivorous fish was relatively low. Sixty-nine percent (49 of 71) of the predatory fish sampled had empty stomachs. Of the 22 that had food in their stomachs, 10 (45%) had fish remains. The only identifiable fish remains were those of sculpin.

Friesen, T. A., J. S. Vile, & A. L. Pribyl. 2004. Migratory behavior, timing, rearing, and habitat use of juvenile salmonids in the Lower Willamette River. Oregon Department of Fish and Wildlife. November 2004.

Juvenile Chinook salmon presence, habitat use, and migratory timing in the Lower Willamette River were sampled by radio telemetry, beach seining, and electrofishing at various representative sites along the Lower Willamette River. Salmonid presence peaks in late spring/early summer, but small numbers were found year round. Due to limitations of electrofishing gear and beach seine nets, electrofishing generally occurred in deeper water than beach seining. Electrofishing detected larger fish (155 mm mean fork length hatchery fish, 115 mm fork length unmarked fish) than beach seining (147 mm mean fork length hatchery fish, 63 mm mean fork length unmarked fish), and detected more hatchery fish than unmarked fish (2,078 vs. 488) as compared to beach seining (77 vs. 1,315).

Several shoreline habitat types (beach, riprap, rock outcrop, seawall, and mixed) were examined for juvenile salmonid (>100 mm fork length) use. No significant habitat preference was detected (low catch per unit of effort was reported at seawall sites, but it was noted that this may have been related to gear effectiveness rather than actual presence/absence). Sub-yearling Chinook were not captured in enough quantity or in enough different habitat types to characterize habitat preferences due to limitations of the electrofishing and beach seining gear.

Friesen, T. A., J. S. Vile, & M. J. Reesman. 2005. A brief survey of aquatic invertebrates in the Lower Willamette River. Oregon Department of Fish and Wildlife. January 2005.

Several habitat types (beach, riprap, rock outcrop, seawall, and mixed) were sampled in May-June for aquatic invertebrates using multiple plate sample, drift net, and ponar dredge. Cladocerans (Bosminidae and Daphnia), copepods, and aquatic insects constitute 90% of the organisms found within the Lower Willamette River. Of the habitat types studied, riprap produced the highest abundance and diversity of aquatic invertebrates, particularly Daphnia. Beach habitat generally contained the second-highest abundance and diversity totals.

Friesen, T. A., J. S. Vile, & A. L. Pribyl. 2007. Outmigration of Juvenile Chinook Salmon in the Lower Willamette River, Oregon. *NW Science*, 81(3): 173-190. May 2007.

This paper is a journal publication summary report of Friesen et al. 2004.

Good, T.P., R.S. Waples, and P. Adams (editors). 2005. Updated status of federally listed ESUs of West Coast salmon and steelhead. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-66, 598 p.

This status update of Upper Willamette River Chinook concludes that, of the seven populations that make up the ESU (Clackamas, North Santiam, South Santiam, Molalla, Calapooia, McKenzie, and Middle Fork Willamette), “most natural-origin spring-run Chinook populations are likely extirpated, or nearly so. The only population considered potentially self-sustaining is the McKenzie River population. However, its abundance has been relatively low (low thousands), with a substantial number of these fish being of hatchery origin.” Recent increases in abundance of the McKenzie River population were attributed to high ocean survival.

Hulse, D., S. Gregory, & J. Baker, eds. 2002. Willamette River Basin Planning Atlas. Trajectories of environmental and ecological change. Oregon State University Press. 2002.

This resource provides abundant information on historic and current conditions within the Willamette River Basin.

McElhany, P., M.H. Ruckelshaus, M.J. Ford, T.C. Wainwright, & E.P. Bjorkstedt. 2000. Viable salmonid populations and the recovery of evolutionarily significant units. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-42,156 p.

This is a NOAA Technical Memorandum that sets forth criteria by which viability of salmonid populations can be determined and delisting goals for ESA-listed salmonids can be established. The four criteria are abundance (number of spawning adults, particularly naturally-spawning of natural origin), productivity (replacement rate of a population), spatial structure (physical characteristics and availability of habitat), and diversity (genetic, habitat, life history, etc.). A population in which these characteristics meet certain guidelines (outlined therein) is considered viable.

McElhany, P., T. Backman, C. Busack, S. Heppell, S. Kolmes, A. Maule, J. Myers, D. Rawding, D. Shively, A. Steel, C. Steward, & T. Whitesel. 2003. Interim report on viability criteria for Willamette and Lower Columbia Basin Pacific salmonids. Willamette/Lower Columbia Technical Recovery Team. March 31, 2003.

This document discusses and makes revised recommendations regarding interim viability criteria for Willamette and Lower Columbia River salmon and steelhead that were presented in McElhany et al. (2000). The four viability criteria presented in McElhany et al. (2000) are revised to combine abundance and productivity and add juvenile outmigrant productivity and habitat as criteria.

McElhany, P., C. Busack, M. Chilcote, S. Kolmes, B. McIntosh, J. Myers, D. Rawding, A. Steel, C. Steward, D. Ward, T. Whitesel, & C. Willis. 2006. Revised Viability Criteria for Salmon and Steelhead in the Willamette and Lower Columbia Basins Review Draft. Willamette/Lower Columbia Technical Recovery Team and Oregon Department of Fish and Wildlife. April 1, 2006.

This document revises and builds on McElhany et al. 2000 and 2003 regarding viability criteria for Willamette and Lower Columbia River salmonid populations, as well as assessing extinction risks for Lower Columbia River coho populations. The viability criteria are once again revised, with this document combining and re-organizing the five criteria from McElhany et al. (2003) into three: abundance/productivity, spatial structure, and diversity.

Mobrand Biometrics, Inc. 2004. Appendix P: EDT Assessment of Aquatic Habitat in the Clackamas Subbasin. Appendix to Draft Willamette Subbasin Plan. May 28, 2004. URL: http://www.nwcouncil.org/fw/subbasinplanning/willamette/plan/App%20P_EDT%20Assessment%20Clack.pdf.

This document presents an Ecosystem Diagnosis and Treatment (EDT) assessment of aquatic habitat within the Clackamas River basin as an appendix to the Northwest Power and Conservation Council's Willamette Subbasin Management Plan. The EDT assessment characterizes existing conditions, "restored reference conditions" (the river system unencumbered by anthropogenic modifications), and "properly functioning conditions" (conditions likely to result in a robust salmon population) of the river in question. These characterizations are used to estimate the river's habitat potential for the focal species, prioritize areas for restoration, and identify specific factors constraining current performance. The lower Clackamas River, followed by the lower Willamette River, is recommended as having the greatest restoration potential for Clackamas spring Chinook. The document concludes that the lower Willamette River is used by salmonids almost entirely as a migratory corridor, and lists the following as limiting habitat factors within this area: chemical pollutants, loss of habitat diversity, pathogens, predation, and loss of key habitat. The report hypothesizes, among other things, that increasing shallow water habitats in the lower Willamette River will improve the survival and increase capacity of Clackamas River juvenile spring Chinook. The report justified this hypothesis based on dramatic reductions in shallow water habitat that have occurred in the lower Willamette River. The report recommends identifying, designating, and implementing certain shallow water and off-channel restoration opportunities as a means to improve survival.

This EDT Assessment relies on existing data and expert opinions of existing conditions, as determined by a technical team. The EDT appears to make certain assumptions regarding juvenile Chinook survival in the Clackamas River and lower Willamette River, including that juvenile Chinook rearing conditions are poor due to low levels of prey resources and poor shoreline and off-channel habitat, that predation on juvenile Chinook is high, and that this leads to low survival in the lower Willamette River. Though these conditions have been shown to adversely affect survival of juvenile Chinook in certain

contexts, the conclusions presented in this document are not justified based on results of the studies listed in this bibliography particular to the lower Willamette River. As discussed in this bibliography, there is no current information that indicates that survival of juvenile salmonids in the lower Willamette River is reduced, and particularly that any reduced survival is a direct result of the loss of shallow water habitat in this zone or elevated levels of predation. The document appears to assume this based on the reduction in shallow water habitat that has occurred in this area rather than on data particular to the lower Willamette River. On the contrary, juvenile Chinook feed in the lower Willamette River on ample prey resources and utilize a wide variety of shoreline aquatic habitat, including altered habitat (Vile et al. 2004; Friesen et al. 2004, 2005). Additionally, the document also assumes that predation is a limiting factor in the lower Willamette River based on the presence of numerous non-native fish species in the lower Willamette River. However, as indicated by several sources discussed in this bibliography, predation is not a limiting factor on juvenile salmonids in the lower Willamette River. Piscivorous fish are relatively scarce in the lower Willamette River (Pribyl et al. 2005), and juvenile salmonids have not been shown to be a major prey item of the piscivorous fish species sampled (Pribyl et al. 2005; Friesen et al. 2003; North et al. 2002; Ward et al. 1989, 1990, 1991).

Myers, J., C. Busack, D. Rawding, A. Marshall, D. Teel, D.M. Van Doornik, and M.T. Maher. 2006. Historical population structure of Pacific salmonids in the Willamette River and lower Columbia River basins. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-73, 311 p.

This document discusses the historic population structure of Willamette River and Lower Columbia River Pacific salmonids. All of the populations within the UWR Chinook ESU are discussed, with data on historical abundance, and actions within the watersheds that have affected those populations.

North, J. A., L. C. Burner, B. S. Cunningham, R. A. Farr, T. A. Friesen, J. C. Harrington, H. K. Takata, & D. L. Ward. 2002. Relationships between bank treatment / nearshore development and anadromous / resident fish in the Lower Willamette River. Prepared for City of Portland Bureau of Environmental Services. February 2002.

This study reports the findings of the first year of a multi-year study funded by the City of Portland to determine salmonid use of the Lower Willamette River (Friesen et al. 2003 is year two). This study included characterizing all shoreline habitat between RM 0 and RM 26.6 of both banks of the Willamette River. Twenty-two study sites of varying shoreline bank habitat (referred to as “treatments”) were selected in this area, plus six off-channel habitat sites, from which to sample habitat use by salmonids and resident fish. A total of 66 fish were tagged and released, including 32 yearling and sub-yearling Chinook, 18 coho, and 16 steelhead, in six different events for a radio telemetry study. Due to radio tag limitations, only the largest sub-yearling fish (>13g; ~107 fork length) could be used. Resident piscivorous fish were also sampled for habitat use using radio telemetry (30

northern pikeminnow, 11 smallmouth bass, and 4 walleye), beach seining, and electrofishing.

Peak catch of juvenile salmonids occurred November-January and April-May. Of the beach seine catch, unmarked, sub-yearling Chinook (mean fork length 64 mm) and unidentified Chinook (mean fork length 71 mm) were the most frequently caught salmonid cohort. Both were assumed to be naturally-produced due to the apparent difference between mean fork length of these two groups and mean fork length (127 mm) of known hatchery Chinook. These sub-yearling Chinook were caught in beach seines in the highest densities from February through June, but were present in low numbers year round.

Radio-tagged sub-yearling Chinook (~107 mm fork length) relocated to shoreline habitat in approximate proportion to habitat availability, with the exception of rock outcrop habitat, which was chosen with higher frequency. However, this apparent preference for rock outcrop habitat was not observed during electrofishing sampling. Catch per unit of effort of juvenile Chinook at the various habitat types was not significantly different from each other. When combining all altered habitat and all natural habitat, catch per unit of effort was higher (though statistically insignificant) at natural shoreline habitat than altered habitat. However, this was affected by two sites in which catch was much higher than the other sites: one site was beach habitat, and the other was bio-engineered rock revetment/beach. Juvenile salmonids were fairly evenly distributed across the river width.

Resident fish generally avoided the mid-channel portion of the river. Electrofishing and gillnetting catch per unit of effort of predatory fish was not significantly different among different habitat types and beach treatments, though resident fish tended to marginally prefer rock outcrop and avoid seawall sites.

Oregon Department of Fish and Wildlife (ODFW). 2005. 2005 Oregon native fish status report. Volume II: Species Management Unit summaries. Willamette Spring Chinook SMU. Online document. URL: <http://www.dfw.state.or.us/fish/ONFSR/docs/final/03-spring-Chinook/sc-summary-willamette.pdf>.

This report summarizes the status of Oregon Department of Fish and Wildlife (ODFW) species management units (SMUs), including the Willamette Spring Chinook SMU and the Lower Columbia Spring Chinook SMU. ODFW considers the Upper Willamette to include the Molalla, North Santiam, South Santiam, Calapooia, McKenzie, and Upper Willamette populations. The Clackamas population, considered by NMFS within the UWR Chinook ESU, is considered part of the Lower Columbia SMU by ODFW.

Of the six populations in the Upper Willamette Spring Chinook SMU, the status of four of the populations is considered uncertain but likely depressed. Only the McKenzie River population met the productivity criteria (1.2 naturally produced recruits per spawner) and the abundance criteria (naturally produced fish at least 25% average levels). Three of the six (McKenzie, Calapooia, Molalla) pass the distribution criteria (naturally

produced fish occupy >50% pre-development habitat). None of the populations met the independence criteria (hatchery spawners make up less than 10% of the spawning adults). The Clackamas population is described as having been “substantially influenced by hatchery fish.” This population passed the distribution criteria, as 100% of its historic habitat is accessible. It failed the reproductive independence criteria and insufficient information was available to determine productivity.

Pribyl, A. L., T. A. Friesen, & J. S. Vile. 2005. Population structure, movement, habitat use, and diet of resident piscivorous fishes in the Lower Willamette River. Oregon Department of Fish and Wildlife. January 2005.

This study was conducted between 2000 and 2003 and included capture of resident piscivorous fish by beach seining, electrofishing, and gillnetting. Seventy-three predatory fish were tagged with a radio transponder and released to track movement and habitat use. Several habitat types were studied, including beach, rock outcrop, rock, riprap, fill, floating structures and seawall. The stomach contents of 121 predatory fish were examined to determine diet preferences.

The study concluded that predator-sized northern pikeminnow, smallmouth bass, largemouth bass, and walleye are relatively rare in the Lower Willamette River. Radio-tagged predatory fish relocated at disproportionately high levels to piling sites and to a lesser extent riprap sites, but were relatively evenly distributed between remaining habitat types. Northern pikeminnow and smallmouth bass used riprap at disproportionately high rates in summer/autumn only, and at disproportionately low rates in winter/spring (when juvenile salmonids are most abundant). Largemouth bass used rock sites at disproportionately high rates during winter/spring only, piling sites in all seasons, and did not use riprap sites at all.

At all sites including piling sites, crayfish are the primary prey item of the predatory fish sampled. Fish were a very rare prey item, and of the predatory fish found with fish in their stomach contents, only one (smallmouth bass) was found with a juvenile salmonid. None of the northern pikeminnow, which the authors cite as a major predator on outmigrating juvenile salmonids on the Lower Columbia River, were found with fish in their stomachs. Walleye consumed relatively the highest proportion of fish prey, though no salmonids were identified in their stomach contents. The authors conclude that predatory fish are probably too rare in the Lower Willamette River to have an effect on salmonid survival. Smallmouth bass diet was dominated by fish and included the only identifiable juvenile salmonid. The authors surmise that smallmouth bass could have negative impacts on juvenile salmonids if predatory fish densities were higher. However, since densities of all predatory fish in the Lower Willamette River are low, the authors conclude that effects on juvenile salmonids are likely negligible. Riprap and alcove sites had the highest numbers of fish whose stomachs contained food. Predator fish stomach samples contained food most frequently in the autumn and least frequently in the winter.

The study concludes by recommending that structures with pilings be minimized as well as considering alternatives to riprap when possible. However, the study contained no

evidence that predation was higher at piling sites. Further, the recommendation regarding riprap were explained as “supported in part by study findings” (slightly higher densities of predatory fish and highest occurrence frequencies of fish and crayfish in predatory fish stomach samples at riprap sites) and in part by “general ecological principles and ecosystem functions.” However, the study also found that disproportionately high use of riprap only occurred in summer/fall when juvenile salmonids are least frequent, and that piscivory in general was low and was very low on salmonids. Finally, the paper’s conclusion was that predation on juvenile salmonids is likely negligible. This is also consistent with the conclusions of Ward et al. (1989, 1990, 1991) and Friesen et al. (2003).

Schroeder, R. K., K. R. Kenaston, L. K. McLaughlin. 2007. Spring Chinook salmon in the Willamette and Sandy Rivers. Annual progress report. Fish Research Project, Oregon. Fish Division. ODFW.

This document is ODFW’s 2006-2007 report on populations within the Willamette and Sandy River basins.

Simenstad, C. A., J. Burke, M. Ramirez, A. Whiting, P. Trask, D. Heatwole, S. Coveny, H. Dillon, & L. Johnson. Strategic restoration / preservation planning of juvenile salmon habitat based on the Columbia River estuary ecosystem classification. PowerPoint Presentation to the 2010 Columbia River Estuary Conference. URL: http://cerc.labworks.org/2010/presentations/session2/crec_simenstadetal.pdf.

This presentation lists restoration strategies in the Lower Columbia River estuary. The presentation also includes sampling data showing small numbers of juvenile Chinook between approximately 50 and 130 mm fork length in the Lower Columbia River as early as January. These results suggest that even very small sub-yearling Chinook can emigrate from the Willamette and Clackamas rivers early and rear in downstream locations in the Columbia River.

SWCA Environmental Consultants. 2009. Benthic macroinvertebrate survey for downtown Portland sediment characterization. Prepared for GSI Water Solutions, Inc. January 6, 2009.

A benthic macroinvertebrate survey of Willamette River RM 12-16 was conducted. The survey included 76 sediment samples obtained using a Van Veen grab sampler. The most common benthic organisms were oligochaete worms, midge larva, Corophium, polychaete worms, and Asian clam.

Teel, D. J., C. Baker, D. R. Kuligowski, T. A. Friesen, & B. Shields. 2009. Genetic stock composition of sub-yearling Chinook salmon in seasonal floodplain wetlands of the Lower Willamette River, Oregon. Trans. Amer. Fish. Soc., 138:211-217. February 5, 2009. DOI: 10.1577/T08-084.1

This paper discusses sampling conducted in seasonal floodplain wetlands on the Lower Willamette River to determine which stocks utilize this portion of the river. Specifically, floodplain wetland and mainstem habitats were sampled in winter and spring, including two wetland sites along Multnomah Channel, two sites within a wetland restoration site in the Columbia Slough, and four sites along the mainstem Willamette River up to RM 26.9. Genetic identification was performed on 280 non-finclipped sub-yearling (35 to 108 mm fork length) Chinook. Proportions vary with time of year, but Willamette River spring Chinook were generally the most abundant. Other common Chinook by origin include Spring Creek tule fall Chinook, West Cascade tributary fall Chinook, and even Upper Columbia River summer-fall Chinook.

Vile, J. S. & T. A. Friesen. 2004. Description and categorization of nearshore habitat in the Lower Willamette River. Oregon Department of Fish and Wildlife. April 2004.

All shoreline habitat of the Willamette River between the mouth and Willamette Falls at RM 26.5 was categorized based on shoreline characterization. Several habitat types were identified; however, since many groups were small, the groups were combined into six larger categories to increase sample size: alcove, beach, riprap, rock outcrop, seawall, and mixed habitat. Fifty-nine percent (59%) of the available habitat was identified as "undeveloped." Beach habitat was the most common habitat type at 34.4%, followed by riprap at 21.5% (17.7% vegetated riprap, 3.8% unvegetated riprap), rock outcrop at 14.4%, unclassified fill at 12.1%, and natural, rounded river rock at 10.4%.

Vile, J. S., T. A. Friesen, & M. J. Reesman. 2004. Diets of juvenile salmonids and introduced fishes of the Lower Willamette River. Oregon Department of Fish and Wildlife. August 2004.

For a one-year period between 2002 and 2003, the stomach contents of 670 fish, including 346 salmonids, were examined. Juvenile Chinook salmon (larger than 99 mm fork length) consume primarily Daphnia spp., followed by Corophium spp. Daphnia was the dominant prey item for most of the year, though decreasing slightly in February/March and more strongly in November, as Corophium became more abundant and were increasingly consumed by juvenile Chinook. In November, Corophium were more abundant by wet weight (but not by abundance) than Daphnia in juvenile Chinook stomach samples. There is no significant dietary overlap between salmonids and non-native fish. The authors rejected their null hypothesis that "diet composition of juvenile salmonids does not differ from the composition of food items available." In other words, juvenile salmonids positively selected for Daphnia, which was relatively less abundant in the environment than it was found in juvenile salmonid stomach contents. Juvenile Chinook and coho (>99 mm fork length) do not necessarily simply exploit the most abundant food source, as Daphnia presence in juvenile Chinook and coho stomach contents was disproportionately high compared with its presence in the environment. Of the five shoreline habitat types sampled, little difference was detected in stomach fullness between juvenile Chinook found at the sites. The study concluded that it is unlikely that

resident fish feeding adversely affects juvenile salmonid survival due to the abundance of prey items.

Ward, D. L. P. J. Connolly, R. A. Farr, and A. A. Nigro. 1988. Feasibility of evaluating the impacts of waterway development on anadromous and resident fish in Portland Harbor. Feasibility study. Oregon Department of Fish and Wildlife.

The feasibility of conducting a multi-year study on the effects of waterway development on anadromous and resident fish in Portland harbor was investigated. It was determined that this study was generally feasible. The study was conducted and is reported in Ward et al. 1989, 1990, and 1991.

Ward, D. L. & R. A. Farr. 1989. Effects of waterway development on anadromous and resident fish in Portland Harbor. Annual progress report. Fish research project Oregon. Oregon Department of Fish and Wildlife.

Sampling occurred during May and June of 1988, and included tracking of 19 radio-tagged yearling Chinook (>175 mm fork length), sampling at several collection sites, a mark-recapture study with approximately 85,000 yearling Chinook, and radio-telemetry study with resident piscivorous fish. Recapture methods were also used to sample predatory fish for habitat use and predation of juvenile Chinook. Predation of juvenile Chinook by northern pikeminnow did not differ between altered and natural sites; northern pikeminnow were more abundant at natural sites than at altered sites.

Ward, D. L. & R. A. Farr. 1990. Effects of waterway development on anadromous and resident fish in Portland Harbor. Annual progress report. Fish research project Oregon. Oregon Department of Fish and Wildlife.

This is the second of a three-year study, including Ward et al. 1989 and Ward et al. 1991. Similar methods and findings resulted from this study as from Ward et al. 1989.

Ward, D. L. & R. A. Farr. 1991. Effects of waterway development on anadromous and resident fish in Portland Harbor. Annual progress report. Fish research project Oregon. Oregon Department of Fish and Wildlife.

This is the third of a three-year study, including Ward et al. 1989 and Ward et al. 1990. Similar methods and findings resulted from this study as from Ward et al. 1989, 1990.

Ward, D. L., A. A. Nigro, R. A. Farr, & C. J. Knutsen. 1994. Influence of waterway development on migrational characteristics of juvenile salmonids in the Lower Willamette River, Oregon. *N. Amer. J. of Fish. Mgmt*, 14, 362-371. 1994.

This paper is a summary of the findings of Ward et al. 1988-1991 for submission to a journal. This study was conducted from 1987 to 1990 to investigate the effects of shoreline development on migrating juvenile salmonids, including habitat use and predation. Migration rates of 1-2 days for steelhead and 2-3 days for Chinook were

observed. Both groups were found distributed across the entire river while migrating and were not strictly nearshore-dependent. During each year of the study, mean catch per unit of effort of juvenile salmonid predators was higher at natural sites than altered sites. No difference was observed in predation at altered versus natural areas. The study concluded that waterway development does not affect juvenile salmonid migration and does not increase predation.

Willamette Restoration Initiative (WRI). 2004. Draft Willamette Subbasin Plan. Prepared for the Northwest Power and Conservation Council. May 28, 2004. URL: <http://www.nwcouncil.org/fw/subbasinplanning/willamette/plan/>.

This document is the Northwest Power and Conservation Council's management plan for the Willamette River Subbasin. The plan includes several appendices, including Ecosystem Diagnosis and Treatment (EDT) assessments of several subbasins.

Willamette Restoration Initiative (WRI). 2004. Draft Willamette Subbasin Plan. Appendix J: Draft EDT Assessment of Aquatic Habitat in the Lower Willamette River Mainstem. Prepared for the Northwest Power and Conservation Council. May 28, 2004. URL: http://www.nwcouncil.org/fw/subbasinplanning/willamette/plan/App%20J-K_EDTAssessment.pdf.

This document presents an Ecosystem Diagnosis and Treatment (EDT) assessment of aquatic habitat within the lower Willamette River mainstem as an appendix to the Northwest Power and Conservation Council's Willamette Subbasin Management Plan. The EDT assessment characterizes existing conditions, "restored reference conditions" (the river system unencumbered by anthropogenic modifications), and "properly functioning conditions" (conditions likely to result in a robust salmon population) of the river in question. These characterizations are used to estimate the river's habitat potential for the focal species, prioritize areas for restoration, and identify specific factors constraining current performance. The plan cites the loss of off-channel lakes (e.g., Guilds, Kittredge, Doanes, and Ramsey lakes), the deepening and narrowing of the river channel, and the steepening of the banks as primary habitat losses. The report hypothesizes, among other things, that improving shallow water and floodplain habitats and increasing large wood will improve survival of juvenile salmonids during rearing and migration in the lower Willamette River. The report justifies this hypothesis based on the fact that these habitat types have been lost in the lower Willamette River and juvenile salmonids are generally known to use these habitat types. The report recommends identifying opportunities to create/restore habitat, removing anthropogenic structures, softening shoreline banks, and installing and protecting large wood as a means to increase survival of juvenile Chinook.

This EDT assessment relies on existing data and expert opinions of existing conditions, as determined by a technical team. The EDT appears to make certain assumptions regarding juvenile Chinook survival in the lower Willamette River, including that juvenile Chinook rearing conditions are poor due to low levels of prey resources and poor shoreline and off-channel habitat, and that predation on juvenile Chinook is high, and that these lead to low survival in the lower Willamette River. Though these

conditions have been shown to adversely affect survival of juvenile Chinook in certain contexts, the conclusions presented in this document are not justified based on the results of the studies listed in this bibliography particular to the lower Willamette River. As discussed in this bibliography, there is no current information that indicates that survival of juvenile salmonids in the lower Willamette River is reduced, and particularly that any reduced survival is a direct result of the loss of shallow water habitat in this zone. The document appears to assume this based on the reduction in shallow water habitat that has occurred in this area rather than on data demonstrating an effect of this loss to juveniles in the lower Willamette River. On the contrary, juvenile Chinook feed in the lower Willamette River on ample prey resources and utilize a wide variety of shoreline aquatic habitat, including altered habitat (Vile et al. 2004; Friesen et al. 2004, 2005).

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January 6, 2012

Ms. Madden:

We appreciate the invitation from the Portland Harbor Natural Resource Trustee Council (Trustees) to participate in the development of a scientific foundation for the restoration planning being conducted under the Natural Resource Damage and Assessment Program for the Portland Harbor Superfund site. The "Expert Panel" (Panel) has been meeting since late 2009, with the goal of identifying a scientific framework and priorities to guide the development of a restoration plan.

In the course of this work, we completed a literature review (attached) of the habitat relationships and ecology of juvenile spring Chinook salmon in the lower Willamette River (LWR) to ensure our recommendations are based on the best available science. The Panel suggests that this review could become a living document that incorporates new information as it emerges, or past literature as it is deemed relevant. The literature review and the Panel recommendations could be posted online and would be available for all parties and the public, potentially assisting similar efforts in other locations.

In this letter, we summarize some key points from the literature review, discuss our primary recommendations, and identify areas of emerging knowledge. The views expressed here do not necessarily constitute the policies or positions of our respective agencies and institutions.

Recommendations:

The Panel agrees with the initial focus on juvenile Chinook salmon; they comprise two evolutionarily significant units (ESUs) listed as threatened under the federal Endangered Species Act (ESA), are numerically dominant among salmonids in the LWR, and represent the species with the greatest socioeconomic impact to the region. Improvements to habitat will likely benefit multiple species, directly or indirectly. However, we encourage all parties to recognize the presence and importance of other species, whether ESA-listed (winter steelhead and coho salmon, multiple ESUs) or sensitive (white sturgeon, Pacific lamprey) and to consider their different habitat requirements when planning and implementing projects.

Geography/Focus Areas

We refer here to two geographic areas considered for habitat restoration efforts: the Portland Harbor area proper (approximately river kilometer 5.6 to 15.3), and the “broader focus area,” including those locations downstream that may be affected by activities in the Portland Harbor.

In our review of the scientific literature (and best professional judgment), it is clearly evident that this area is important in many ways to juvenile Chinook salmon, perhaps best evidenced by their nearly constant presence (34 of 35 months in one study) and diverse life-history. Researchers also documented genetic diversity among fish utilizing off-channel habitat, extensive feeding, growth, and utilization of most available habitat types. As determined from radio telemetry work conducted, larger juvenile (yearling) fish do not appear to reside for long in the LWR (days to weeks), but this is likely a critical time as they prepare to transition to the Columbia River estuary and ocean. The residence time of subyearling juveniles is largely unknown but likely to be longer because migration rate is positively related to fish size (length).

We generally agree with the Trustees’ approach to expend no less than 50% of the available resources for habitat restoration in the Portland Harbor area, though some Panel members recommended that more than 50% of the restoration should occur here. It is critical to apply restoration resources to the locations that have experienced the most significant habitat loss and industrial impacts, and virtually all Willamette basin salmon – juvenile or adult – must pass through this area. We recommend that the allocation of restoration efforts should be based on both minimum proportional distribution and also minimum linear distribution for connectivity. Connectivity is a critical ecological requirement for migrating fish, therefore the distribution of restoration efforts must also provide an effective linear sequence of restored habitats of “stepping stones” that provide habitat for resting feeding and predator avoidance along their migratory route. If restoration projects are limited to a small number of different areas, we recommend locating at least three projects within the Portland Harbor area with restored areas on both sides of the river. This minimum distribution would insure that fish could find several sites with suitable habitat within the lower Willamette River and subyearling fish could find habitat on either bank. The criterion for connectivity should be met before distributing restoration efforts outside the Portland harbor area to the broader focus area. We note that significant efforts are underway through the 2008 Willamette Project Biological Opinion to improve habitat, fish passage, water quality, and survival in the basin above Willamette Falls and other restoration projects are being implemented along the lower Columbia River by other agency and

conservation groups. Benefits realized from those efforts will undoubtedly be enhanced by restoration actions in the lower Willamette River.

In the broader focus area, we recommend any proposed restoration efforts focus on the area between the upstream end of Hayden Island and the downstream end of Sauvie Island. Previous recommendations suggested including the Columbia River to the mouth of the Sandy River. Although genetic “signatures” for Willamette spring Chinook salmon have been documented near the Sandy River, it is likely that these are a reflection of past hatchery practices that incorporated Willamette fish into the Sandy broodstock. Current work indicates Willamette-origin fish are present around Hayden and Sauvie islands, and on both sides of the Columbia River (see our discussion under *Uncertainties and emerging information*)

We include the Multnomah Channel in this recommendation, as juvenile Chinook salmon are routinely collected there during research efforts, and one study estimated 71% of radio-tagged Chinook salmon released near Willamette Falls used that route (or at least entered the channel). Returning adult fish also use this route, as evidenced by the popular and productive sport fishery that occurs there.

The Columbia Slough has significant water quality issues and an abundance of introduced fish species; we do not recommend this area be included in the broader focus area for restoration unless those issues are addressed. The eventual reconnection of the slough to the mainstem Columbia River would likely be very beneficial, and would change our position on the priority of restoration actions here.

The literature review and our discussions support a strong focus on restoring active channel margin (ACM), off-channel, and tributary habitats. The scientific evidence is very strong in demonstrating the importance of nearshore habitats to juvenile Chinook salmon, especially subyearlings. It is important to note that the small (fry or subyearling) fish we refer to are virtually all naturally produced (hatcheries release much larger fish), so their role in the ultimate regional goal of recovering “wild” populations is critical. We highly recommend the preservation of existing shallow water beaches and forested riparian habitat, and suggest that such preservation be credited as restoration when it is part of a larger project footprint that includes active restoration.

While small tributaries may not contribute substantially to broad-scale population recovery, they may serve as important habitats (e.g., thermal refuges) to outmigrating salmonids. We recommend focusing on tributary confluences within the LWR and relying on site-specific information about historic and potential use to determine the

project footprint at these sites. The availability of cool, clean water can help identify important historic tributaries.

Habitat Value

The Panel discussed a suite of issues related to the proposed habitat values (HEAs):

We determined that ACMs with invasive vegetation are less valuable than unvegetated ACM because (1) invasive vegetation prevents recolonization of native vegetation, and (2) invasive vegetation provides a seed source that will contribute to the spread of invasive plants. We therefore recommend revising the HEA value for ACM slope <5:1 from 0.9 to 0.75.

Undulating shorelines may or may not be more valuable than linear shorelines. Many high catch areas for subyearling Chinook salmon in the LWR (based on the literature review) were straight, homogenous beaches. Further, the river will tend to reshape whatever shoreline type is designed. The most important factor to consider in designs is that they are geomorphologically sustainable and hydrologically appropriate. All proposed projects should allow habitat-forming processes to shape a natural shoreline, and we recommend against any artificial constraints to these processes, including placement of engineered log jams in the LWR. The value of projects incorporating such constraints should be reduced relative to the value of ideal (unconstrained) habitats.

The Panel has some concerns with the placement of large wood along the mainstem shoreline. In a large river, wood behaves like sediment, moving with flow and tidal fluctuations; in the lower Willamette, large pieces tend to move during floods and settle above ordinary high water. Instead of manually placing large wood accumulations (jams), we recommend creating conditions that allow large wood to accumulate naturally. Conserving (or restoring) forested riparian and upland areas will be essential to the natural recruitment of large wood. The effect of predation on juvenile salmonids by northern pikeminnow, bass, walleye, and other predators has not been sufficiently studied in the Willamette basin, but is a well-known limiting factor in the Columbia and other rivers. As shoreline large wood is known to attract predators (logs and artificial jams are often used to enhance warmwater fisheries in lakes), care should be taken to avoid wood placement where salmonid and predator habitats overlap. We recognize the intrinsic value of large wood as a contributor to primary production and potential cover for salmonids; concerns about attracting predators may even be outweighed by these benefits. However, much of the high-value habitat identified through the literature review (i.e. beaches) did not have significant accumulations of large wood.

We do not recommend considering deep water within the navigation channel as having a different habitat value relative to other deep water. Biologically we conclude there is very little difference, as the evidence suggests small fish are found primarily near shore, and larger fish (e.g., smolts in the radio tag studies) were distributed evenly across the river channel. One special case might be when the ACM is in very deep water, i.e. near sheetpile walls (seawalls) in the Portland Harbor area. Among the many fish-habitat analyses conducted by the Oregon Department of Fish and Wildlife (ODFW) in the LWR, only one relationship was consistent – juvenile salmonid density was significantly lower at seawall sites, suggesting they have little value as fish habitat.

Overwater structures: We propose a zero habitat value for floating structures (log rafts, barges, etc.) when anchored over shallow water habitat or ACMs. In addition to increasing the potential for attracting predators, these structures may physically alter or make otherwise good habitat inaccessible (for example, during low tide or low flows). Recent work has demonstrated these structures can affect primary and epibenthic productivity by limiting light and restricting the growth of vegetation. Floating structures may affect the ability of juvenile salmonids to forage, avoid predators and navigate. An eight-year study in Lake Washington conducted by the U.S. Fish and Wildlife Service showed that juvenile Chinook salmon avoided areas directly beneath overwater structures regardless of life history stage, especially at night.

Monitoring

We strongly recommend the implementation of monitoring at restoration project sites. Monitoring should be of sufficient rigor to detect changes in physical characteristics and biota of restored sites over time, and should use standardized, broadly applicable, and widely accepted methods so that monitoring is repeatable and scientifically defensible. We suggest this can best be accomplished through a third party (or parties), which could be funded by PRP contributions to a monitoring “bank.” This approach would allow key parameters to be monitored and compared across all restoration projects.

Uncertainties and emerging information:

While we believe our review of the existing scientific literature was thorough and sufficient to use as a basis for informed restoration decisions, it is important to recognize that there are many uncertainties and emerging issues pertaining to our knowledge of salmon biology and their interactions with the environment. We list a few examples here:

- 1) Much remains unknown about the life-history diversity of Willamette spring Chinook salmon. Historically, juvenile spring Chinook were categorized only as “stream type,” living in fresh water for a year or more before migrating to the ocean. Biologists now recognize at least four major life-history patterns (fry migrants, spring subyearling migrants, fall subyearling migrants, and yearling migrants), and research in progress has identified up to 14 potential life-history pathways (our review of published literature did not include abstracts from professional meetings, but this research by ODFW was presented at the 2011 national meeting of the American Fisheries Society and published as a professional abstract).

The best available data suggest that yearling juveniles generally contribute most to returns of adult Chinook salmon in the Willamette River (the reason hatchery fish are released as smolts), but significant contributions to adult recruitment by subyearlings has been demonstrated, and this life-history type may have historically been the primary contributor to adult returns. In studies of the interior Columbia basin and British Columbia streams, this life history has been shown to be viable. Good freshwater conditions (allowing fish to avoid predators, dams, pollution, high temperatures, and sub-optimal habitats) can lead to improved survival to the ocean and increased contributions to adult returns. Most importantly, this diversity of life-history types provides resilience to the population - a “bet-hedging” strategy.

We have described a few of the more obvious behavioral differences among juvenile Chinook life-history stages in this letter, and strongly recommend considering all life-history types when developing a comprehensive restoration strategy.

- 2) While prevalent in the LWR, small juvenile Chinook salmon are difficult to study because of their fragility and the lack of adequate means to mark or tag them without causing injury or death (also potentially biasing studies). Similarly, the ODFW LWR study captured small fish primarily with beach seines in shallow water, where other gear types were ineffective, so comparisons among habitat types were not possible. Because migration rate has been shown to increase with fish length for Chinook salmon, we hypothesize that small (fry or subyearling) fish spend more time in the LWR than larger juveniles. We expect advances in tagging technology and research being conducted in support of the 2008 Willamette Project Biological Opinion will improve our understanding of the behavior and habitat use of small juvenile Chinook salmon in the near future.

- 3) The effects of predation on juvenile salmonids by native and exotic fish species in the Willamette Basin are incompletely explored. Only one peer-reviewed study was entirely devoted to this topic – 31 years ago. The recent expansion of predators such as smallmouth bass in the lower Willamette River and the extensive documentation of predation on salmonids in the Columbia and Yakima rivers suggest this is an important potential limiting factor, and should be considered in the context of habitat restoration.
- 4) Use of the Oregon and Washington sides of the Columbia River by Willamette juvenile spring Chinook salmon is an emerging topic. Researchers are currently conducting sampling for juvenile Chinook salmon on a monthly basis in the lower Columbia River, including locations near the Sandy River delta, Hayden Island, and Sauvie Island. The fish are genetically sampled to determine their stock of origin. Willamette-origin fish have been documented in these locations on both sides of the river, but it is too early to make conclusions about relative habitat use. We hypothesize that subyearling fish, being shoreline oriented, likely enter the Columbia River from the Willamette and remain on the Oregon side for some time. The larger, more mobile smolts (or yearlings) are more likely to traverse the river channel and use habitat on the Washington side to some extent (based on published radio telemetry studies in the mainstem Willamette River).
- 5) As discussed above, the biological costs and benefits of using large wood as a restoration tool in the mainstem Willamette River remain uncertain.

Thank you for the opportunity to participate in this important work. We are hopeful our collaborative efforts will lead to greater protections for threatened spring Chinook salmon and improvements to the lower Willamette River ecosystem.

Sincerely,



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Oregon Department of Fish and Wildlife
Corvallis, Oregon



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 The logo for Group Mackenzie features the word "GROUP" in blue, uppercase letters above the word "MACKENZIE" in black, uppercase letters. A horizontal line is positioned between the two words, and a vertical line is positioned to the right of "MACKENZIE".

September 26, 2012

Gunderson Marine Inc.
 Attention: David Harvey
 4350 NW Front Avenue
 Portland, OR 97210

Re: **Gunderson Harbor EIS Assistance**
 Project Number 2120436.00

Dear David:

This provides a technical review of the Draft Portland Harbor Programmatic EIS and Restoration Plan (July 9, 2012) and specifically statements made in Section 4.3.2 Socioeconomics. That section cites a 2012 document by the Portland Business Alliance (PBA), *Land Availability, Limited Options: An analysis of industrial land ready for future employers*.¹

As the main author of the fi Attachment B om which the PBA document was drawn, I would like to respond to these statements in the Draft EIS and provide more detail as to the purpose of the report and dispute the conclusions drawn in the Draft EIS.

For background, Group Mackenzie was contracted by the Portland Business Alliance, METRO, the Port of Portland, the Oregon Business Development Department (Business Oregon), and NAIOP Commercial Real Estate Development Association, Oregon Chapter to document the regional inventory of large industrial sites and provide detail about their constraints and the potential economic benefits of development. The report that was produced is titled *Regional Industrial Site Readiness Project, August 2012* (the Project)². The document referred to in the Draft EIS was prepared by the PBA to summarize the findings of the first phase of the Project.

The Draft EIS states that the PBA document “indicates that the Portland Harbor area has only a few large sites (25-acres or greater) that meet the criteria to be attractive for industrial development” (Page 4-5). The Draft EIS goes on to say that “the study focused on larger sites because its authors determined that development-ready large industrial land is a key ingredient for regional economic health, especially sites attractive to the ‘traded-sector’...”

¹ Attached to the letter

² The Project’s Executive Summary is attached to this letter

The Draft EIS identifies that “of the 65 sites³ that met the study’s first level of screening criteria, only 3 are located within in the SSA for HRDA restoration”. The Draft EIS then states that “the majority of the sites in the Portfolio are **smaller than 25 acres and thus do not meet Portland Business Alliance study’s criteria as substantially important in the regional industrial land availability studies**” (emphasis added). The Draft EIS then draws the conclusion that “given that any conversion of industrial land to restoration use would represent a very small percentage of available industrial land in Portland Harbor, **and that the sites in the Portfolio do not meet the size criteria for the industrial land in highest demand**, only minor or no impact is anticipated on the quantity of land available for industrial or water-dependent uses” (emphasis added).

The Draft EIS report draws erroneous conclusions from the PBA document. First the Draft EIS states that sites smaller than 25 acres “do not meet the criteria as substantially important in the regional industrial land availability studies” and refers to the PBA document and METRO’s 2009 study. In the Reference Section of the Draft EIS, the PBA document is cited, but there is no reference to a 2009 METRO study, rather there is a reference to METRO 2010 Appendix 4 to the Urban Growth Report (UGR). Assuming the METRO reference is to the 2009 UGR, neither the PBA or METRO documents state or infer that sites smaller than 25-acres are not “substantially important” to the regions industrial land inventory.

METRO’s 2009 UGR defines large lot industrial as parcels 25-acres and greater. The UGR identified a shortage of 50-acres and greater sites in the Portland metropolitan area for new traded sector investment. There was identification of the importance of larger acre parcels to meet the region’s economic development needs, but there was no statement concerning the lack of value of sites smaller than 25-acres.

The Draft EIS draws the conclusion that because METRO identified a shortage of 50-acre sites in the regional inventory and the Regional Industrial Site Readiness Project only looked at sites greater than 25-acres and that these sized sites are therefore the only sized sites that are “substantially important” to the region’s industrial land supply. This is not a correct conclusion. For the Regional Industrial Site Readiness Project, it was a qualitative and methodological decision to focus on sites greater than 25-acres and for METRO it was a finding of their inventory that a shortage of a specific sized site (greater than 50-acres) existed.

³ This statement is incorrect, in fact there are 56 sites in the Phase 1 inventory

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The decision by the Project Management Team for the Regional Industrial Site Readiness Project to focus on 25-acres and greater was both qualitative and quantitative. To quote from PBA's summary document "while this analysis could have looked at a variety of employment land types, it focuses specifically on large industrial sites. Metro has identified a shortage of these sites in the regional industrial land's inventory. Many of the region's largest and often highest-paying industrial firms are located on parcels 25-acres or more in size."⁴ From a quantitative and methodological standpoint, the Project's scope and budget constrained the analysis to sites greater than 25-acres and did not look at the inventory or market readiness of sites less than 25-acres. The study did not make the statement nor was it the intent to say that sites less than 25-acres were not an important part of the regional inventory of industrial land.

The second statement in the Draft EIS that is erroneous is "that the sites in the Portfolio do not meet the size criteria for the industrial land in highest demand" (Page 4-5). This statement is not credited to any source, so the inference is that the language quoted previously in this letter, and preceding in the Draft EIS document, is the rationale for the statement.

Neither The Regional Industrial Site Readiness Project nor the PBA summary document quoted in the Draft EIS draws any conclusions about industrial demand. The Project did not address market demand with any quantitative analysis. In fact, the Project recommendations call for further analysis, again with a focus on large sites, to "analyze the absorption/demand/missed opportunities for large lot industrial sites ..."⁵

Further research and analysis is required to substantiate the conclusions drawn in the Draft EIS regarding the appropriate size required for successful economic development and to determine size of industrial land that is in the highest demand. From an economic development perspective, there is consensus that a community needs to have a variety of site sizes in their inventory in order to meet the needs of expanding and new companies.

Regarding demand, a couple of pieces of information reveal market activity in the region. According to the Portland office of Colliers International only 7% of commercial and industrial land sales over the last 10 years were sites that are over 25- acres. The majority of sales, 56%, were sites that were less than 5-acres. 37% of transactions were sites between 6- and 25-acres. Another brokerage firm, CBRE's

⁴ Portland Business Alliance Document *Land Availability, Limited Options: An analysis of industrial land ready for future employers* (Page 1) attached

⁵ *Regional Industrial Site Readiness Project, August 2012* (Page 6) attached

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Portland office, completed an analysis in September 2010 that found that from a 10 year historical perspective, the region averaged 30 sales of land parcels less than 25-acres per year. The average size parcel was 5.4-acres. They found that as of September 2011 there were 142 parcels under 25-acres for sale in greater Portland area (Oregon only). A reasonable assumption from this is that the region has less than a five year supply of smaller industrial parcels.

In conclusion, the statements in the Draft EIS regarding the findings of the *Regional Industrial Site Readiness Project, August 2012* and the summary report *Land Availability, Limited Options: An analysis of industrial land ready for future employers* are incorrect. These misrepresent the intent of the Project, as well as conclusions regarding the demand for industrial land. The recommendation is to amend the Draft EIS to more accurately reflect the intent of the Project, or to delete reference to it at all as a rationale for findings. Additionally, it is recommended that a more thorough analysis is required in order to determine the region wide demand for industrial sites, and more specifically the demand for sites adjacent to the Portland Harbor.

Sincerely,



Mark Clemons
Director of Project Development

Enclosures: Portland Business Alliance *Land Availability, Limited Options: An analysis of industrial land ready for future employer*
Regional Industrial Site Readiness Project, August 2012 Executive Summary



2012

LAND AVAILABILITY | LIMITED OPTIONS

An analysis of industrial land ready for future employers

About this report

This report examines the current and near-term supply of large industrial sites available to accommodate the expansion of existing employers and recruitment of potential new employers to the Portland-metro region.¹ The project was conceived partly in response to Metro's 2009 Urban Growth Report analysis that identified a shortage of large-lot industrial sites in the region and in recognition of the need for a mechanism to replenish large-lot industrial sites as they are developed.

The report was produced by Group Mackenzie in partnership with the Portland Business Alliance, Port of Portland, Business Oregon (an Oregon state agency), NAIOP Oregon Chapter (a commercial real estate development association) and Metro.

1 The Regional Industrial Lands Inventory examined vacant, industrially-zoned or planned lands within the Metro urban growth boundary and selected urban reserves that are suitable for large lot industrial development by new firms moving to the region or to accommodate the growth of existing firms that do not hold land for future expansion. The study identified and documented user-owned sites held for future use but excluded these from the detailed analysis.

Why land availability matters

The Value of Jobs Coalition believes that quality of life begins with a good job and that a thriving economy creates the foundation for quality schools, healthy parks and happy families. According to a study sponsored by the coalition, in the late 1990s, the Portland-metro region's wages and incomes fell below the national average and have stayed there. Other peer regions have passed us by in terms of income level and employment. The coalition is sponsoring a series of studies to take a closer look at our economy to see what our region's economic needs and issues are.

There are a number of factors that help a metro region's economy thrive – an educated workforce, sound infrastructure, a coordinated transportation system and available land to grow and attract employers, to name a few. This analysis examines one ingredient of regional economic health: the readiness of large-lot industrial lands.

A consistent inventory of sites is a key requirement for meeting market demand, either by expanding local employers or attracting new employers to our region. This analysis shows, however, that

we have a supply of industrial land that is not readily available to attract and cultivate the types of catalytic employers that will help our region's ability to grow and thrive.

Our region has a land use history to be proud of, and we take a measured approach to development. Most of the large-lot sites that will become available for industrial development within the foreseeable future are inside the existing Metro urban growth boundary (UGB) or urban reserves. Advancing the readiness of those sites improves our economic competitiveness, maximizes the efficient use of existing infrastructure and reduces outward pressure on the UGB.

We hope the information in this report will start a conversation among public- and private-sector leaders to help move public policy in a direction that enhances our quality of life by creating well paying jobs and laying the foundation for innovative tools that grow employers in, and attract employers to, our region.

A focus on industrial lands

While this analysis could have looked at a variety of employment land types, it focuses specifically on large industrial sites. Metro has identified a shortage of these sites in the regional industrial lands inventory. Many of the region's largest and often highest-paying industrial firms are located on parcels 25 acres or more in size.

Such firms include high-tech manufacturing (Intel Corporation and Genentech), heavy manufacturing (Vigor Industrial, Gunderson, Freightliner), research and development labs (Oregon Health & Sciences University) and firms that support other business such as warehouses and shipping terminals. These employers create products or services that are sold outside of Portland-metro and bring new dollars into the region. These businesses are commonly referred to as “traded-sector” employers. With these employers come good, family-wage jobs and tax revenues that support critical public services such as schools, health care and law enforcement.

The state of Oregon, the Portland-Vancouver region, the city of Portland and most of the region's counties and cities all identify a similar universe of traded-sector business as the centerpiece of their economic development strategies.² A successful strategy includes retention and growth of existing businesses as

² See for example: *Business Oregon's Strategic Plan May 2009*; *Comprehensive Economic Development Strategy for the Portland-Vancouver Metropolitan Region 2010-2011 Update*; *City of Portland Economic Development Strategy, A Five Year Plan for Promoting Job Creation and Economic Growth, 2009*.

“We're competing globally to retain, expand and recruit traded-sector companies and the quality jobs and wages they bring. The window of opportunity to win major investment is often short and very competitive. Building an inventory of shovel-ready sites is a key ingredient to positioning the Greater Portland region for long-term job creation.”

Sean Robbins, Chief Executive Officer,
Greater Portland Inc.

well as the recruitment of new traded-sector businesses. Although not all traded-sector firms require large parcels, nationally or globally scaled firms that can have a significant impact on regional economic growth – such as Intel, Genentech and Freightliner – do require large parcels.

The experience of state and regional economic development experts indicates that accomplishing our region's industrial retention, expansion and recruitment strategy depends on the immediate availability of an adequate supply of well-located, market-priced and readily developable large-lot industrial lands.

BY THE NUMBERS:

5.

Number of broadly attractive 25-acre or larger sites available for industrial development within 180 days.

1.

Number of 50-acre or larger sites available for immediate development within 180 days.

1.

Number of 100-acre sites available for immediate development within 180 days.

0.

Number of 100-acre sites available for development between seven and 30 months.

35%.

Percentage of the region's total payroll that came from the traded sector in 2007.

\$14,600.

Average additional wage earned by workers in traded-sector jobs vs. non-traded-sector jobs.

65,500.

Number of jobs at firms located on parcels of 25-acres or more.

50%.

Percentage of all industrial land development in the past 20 years that took place during two, three-year peaks of development (1996-1998) and (2006-2008).

Why the focus on traded-sector clusters?

Traded-sector employers export goods and services from the region and import revenue into the region. In the Portland region, many of these traded-sector firms are manufacturers. Economic development strategies focus on these traded-sector employers because they pay higher wages and can increase the wealth of the community.

A 2010 analysis by ECONorthwest for the Value of Jobs Coalition, *2010 Check-Up on the Portland-Region's Economic Health*, found that the average Portland-metro traded-sector wage was \$53,000 in 2007, \$14,600 greater than the average non-traded-sector wages. The analysis also found that traded-sector jobs accounted for 28 percent of the region's total jobs and 35 percent of total payroll. According to a Business Oregon analysis in 2008, the average wage for the High Technology cluster was \$82,000.³

The wealth generated by these traded-sector jobs circulates in the community, ultimately supporting supplier or service companies and neighborhood businesses. Larger traded-sector firms also seed entrepreneurs who spin out to create start-up firms that grow into larger firms. This process is what produces the economic clusters that are vital to the economic success of the region. Traded-sector firms also support public services directly and indirectly with higher wage jobs and taxable incomes, resulting in funding for schools, social services, parks and other critical public services.

³ www.oregon4biz.com/dev/www/BOR/The-Oregon-Advantage/Industry/

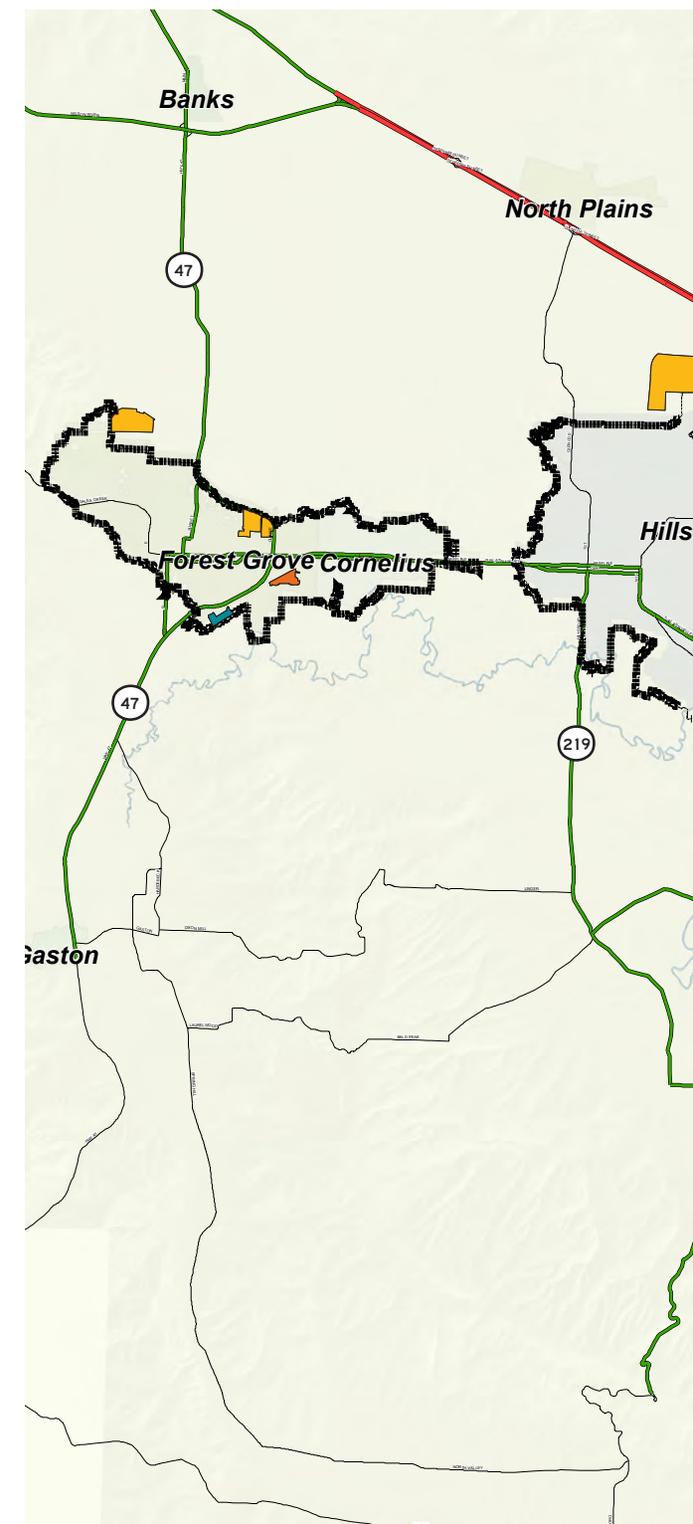
This land inventory analysis provides a snapshot of the industrial land supply inside the Metro UGB and selected urban reserves established in mid-2011. The inventory can be used as a reference for monitoring and tracking changes and absorption of industrial land in the region and can also be used by Portland-metro municipalities as the basis for making informed land use and investment decisions around the supply, regulation and market readiness of industrial lands.

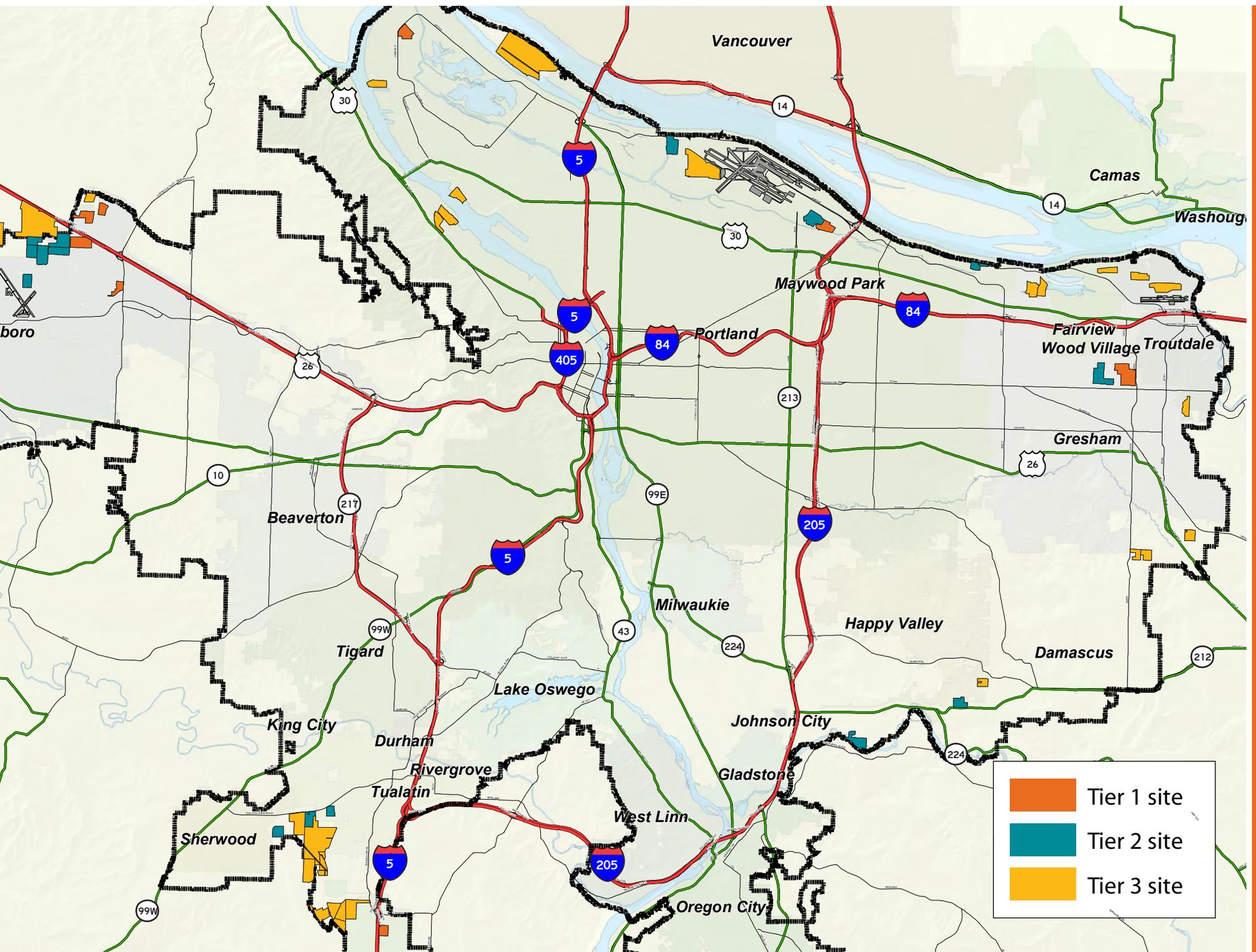
The market-based approach

This analysis started with a simple question: **What is the inventory of market ready sites this region needs to be competitive in a global marketplace and successful in attracting large traded-sector firms to locate or expand here?**

Business Oregon has extensive experience recruiting national and international traded-sector businesses into the state and the Portland-metro region. Their experience is that the majority of employers considering whether to locate in the region require sites where they can break ground within 180 days of site selection.

It is also important for the region to offer a number of potential sites for employers to choose from in order to receive serious consideration by site selectors. The fewer the number of sites available for immediate development, the lower the odds are that the region will be able to meet the new employer's requirements.





What about Clark County?

Could the Portland-metro industrial land readiness issue be addressed by looking north to Clark County? Not according to a report recently issued by the Columbia River Economic Development Council, which found only 13 sites are available and it would take up to 12 to 18 months to get permits in place for construction. The report noted that the shortage of readily available land has already led some businesses to look elsewhere to grow, and could hamper the community's economic recovery, according to local leaders.⁴

What do large-lot industrial developments add to the regional economy?

A 2010 Metro report found that 60 employers located on parcels of 25 acres or more accounted for more than 8 percent of the region's total employment in 2006 or 65,500 jobs.⁵ A Business Oregon analysis of recent recruiting efforts found the economic impact per acre of large-lot developments varies depending on the type of company and ranges from \$200,000 per acre for warehouse and distribution centers to \$1.4 million per acre for clean tech manufacturing.

⁴ "Few places to build jobs," *The Columbian*, Tuesday, January 10, 2012.

⁵ *Metro 2009-2030 Urban Growth Report, Appendix 4*, January 14, 2010

Based on experience, Business Oregon has identified the characteristic minimum parcel size and other site requirements for most cluster recruitment targets. Most of these cluster industry recruitments require net developable sites of at least 25 acres with a number of clusters, such as globally scaled high tech, requiring much larger sites.

This analysis focuses on the net developable acreage, as some sites have a high number of gross acreage but limited area that would be suitable for an employer to build a facility.

To identify the inventory of market ready sites in the region the project applied a series of filters from the perspective of potential employers. Starting with Metro's 2009 Buildable Lands Inventory, supplemented with information from local jurisdictions throughout the region, the analysis identified parcels with the following characteristics:

- ▶ Inside the UGB or in selected urban reserves
- ▶ Zoned, planned, or, in the case of urban reserves, suitable for industrial uses
- ▶ Containing at least 25 net buildable, vacant acres after accounting for constraints such as wetlands, flood plains and slope
- ▶ Not set aside by existing firms for future expansion opportunities

Using Business Oregon and industry expertise, the parcels identified through this initial process were further analyzed as to their market readiness using sufficiency of infrastructure and transportation facilities, brownfield or environmental issues, need for land assembly, need for annexation and availability for lease or sale.

This more refined analysis resulted in an inventory of existing or potential industrial sites that were assigned a tier based on market readiness or estimated length of time before they can be developed. Tire 1 sites could be shovel ready within 180 days (six months). With sufficient resources and expeditious jurisdiction approvals, Tier 2 sites could be development ready in seven to 30 months. Sites that will require more than 30 months to be ready for development were designated Tier 3.⁶

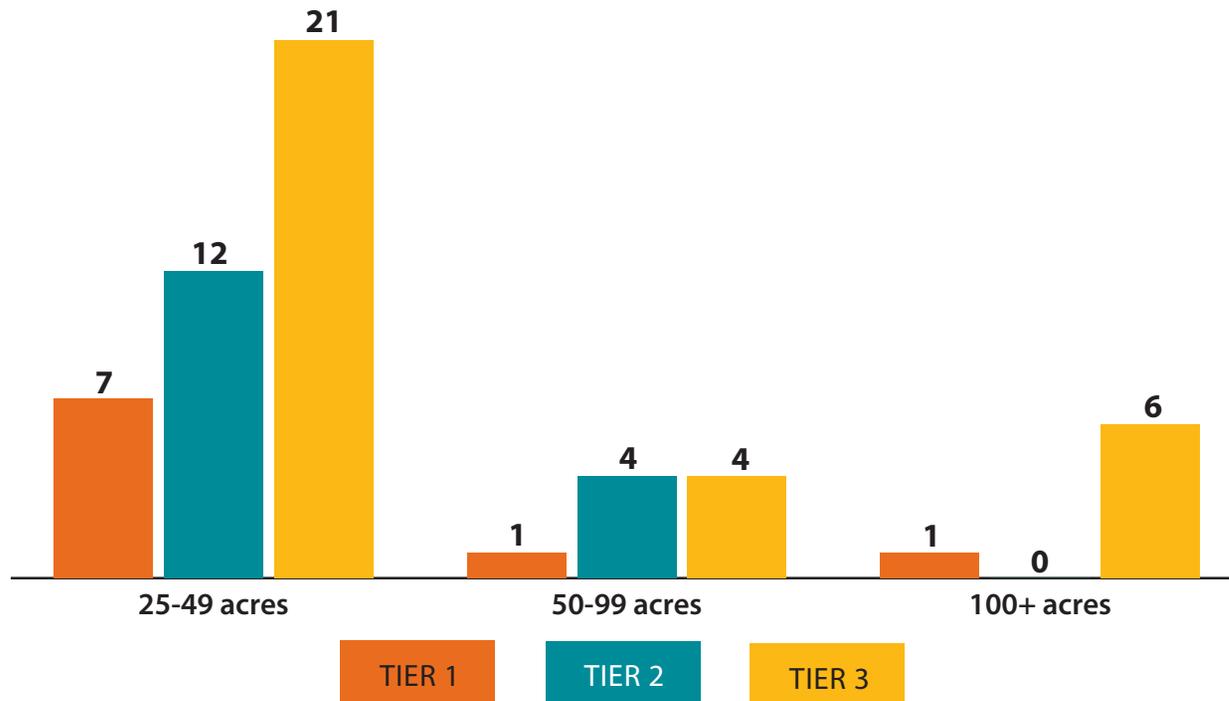
⁶ *The Value of Jobs Coalition is working with the Regional Industrial Lands Study partners on a second phase of this analysis that will examine the costs and benefits of moving Tier 2 and Tier 3 sites into the Tier 1 level of readiness.*

What the numbers show

Tier 1 Sites

The analysis found that there are only nine sites in the UGB that are both 25 net acres or larger and can be developed within 180 days. Washington County has five of these sites, followed by three in Multnomah County and one in Clackamas County.⁷ The number of very large sites is even more limited. There is only one 50-acre and one 100-acre site in Tier 1.

Figure 1: Distribution of sites by acreage



Beyond shovel-ready availability, there are a handful of economic factors that drive the suitability of industrial sites for immediate development. A closer look at the nine Tier 1 sites reveals that the number of sites attractive to a broad range of potential traded-sector cluster companies is even smaller. Of the nine sites, two are for lease only, which is typically less desirable to potential users who, anticipating significant capital investments, want to own rather than lease.

It is also more difficult to secure financing for a land lease versus a fee-simple ownership project.

Another Tier 1 site is of an irregular shape and would require an unusual development footprint, possibly increasing costs and precluding market-accepted building design.

One last factor is, of course, price. One site is currently for sale at a price that is much higher than industrial development could support and it is unclear when, if ever, the current owner will align the asking price with current industrial market pricing.

The net result is only five Tier 1 sites that can meet the business retention, expansion or recruitment criteria for a broad range of potential users.

Figure 2: Tier 1 sites that meet development criteria

TIER 1 SITES	9
Lease only	-2
Irregular shape	-1
Above market price	-1
TOTAL SITES	5

⁷ This analysis only included the area within the Metro UGB, or adjacent urban reserves. It did not examine industrial sites outside the Metro boundary.

It is important to recognize that, for site selectors, these requirements are the absolute minimum requirements for a location to even be considered. Meeting these requirements is like reaching first base in a baseball game: all significant, potential employers require much more than simply meeting the minimum threshold. To make it all the way home, many factors must fit for the transaction ultimately to work and result in hiring.

The smaller the inventory of sites that meet even the minimum requirements, the less the region's odds are of successfully making it to first base, let alone hitting a home run and successfully recruiting the employer. Given the region's lagging wages and incomes, it should be our goal to increase our opportunities for success by ensuring that we have a variety of development ready sites.

“No one wants to go to their company president with only one possible site.”

Peter Bragdon, senior vice president of legal and corporate affairs for Columbia Sportswear, in reference to his experience with site selection.

Tier 2 and 3 sites

The analysis found 16 Tier 2 sites (seven to 30 months from shovel ready) and 31 potential Tier 3 sites (more than 30 months to shovel ready) within the UGB and selected urban reserves. The bulk of these sites are in either Washington or Multnomah counties. Here again, the number of larger sites is very constrained. Tier 2 has no 100-plus acre sites, and only four 50-plus acre sites. Tier 3 has only four potential 50-plus acre and six potential 100-plus acre sites.

The few large sites in Tier 2 and 3 face significant challenges to becoming ready, including the need to complete brownfield clean up, build infrastructure such as roads and sewers, remediate wetlands and assemble parcels currently under multiple separate ownerships.

Ten of the potential Tier 3 sites would require aggregation of parcels in separate ownership, and ownership ranges from two owners up to 17 owners, depending on the site. The more owners involved, the more complex and lengthy the development process would be. Twenty of the sites in Tiers 2 and 3 will require some kind of state, regional or local action such as concept planning, annexation or UGB expansion to become development ready.

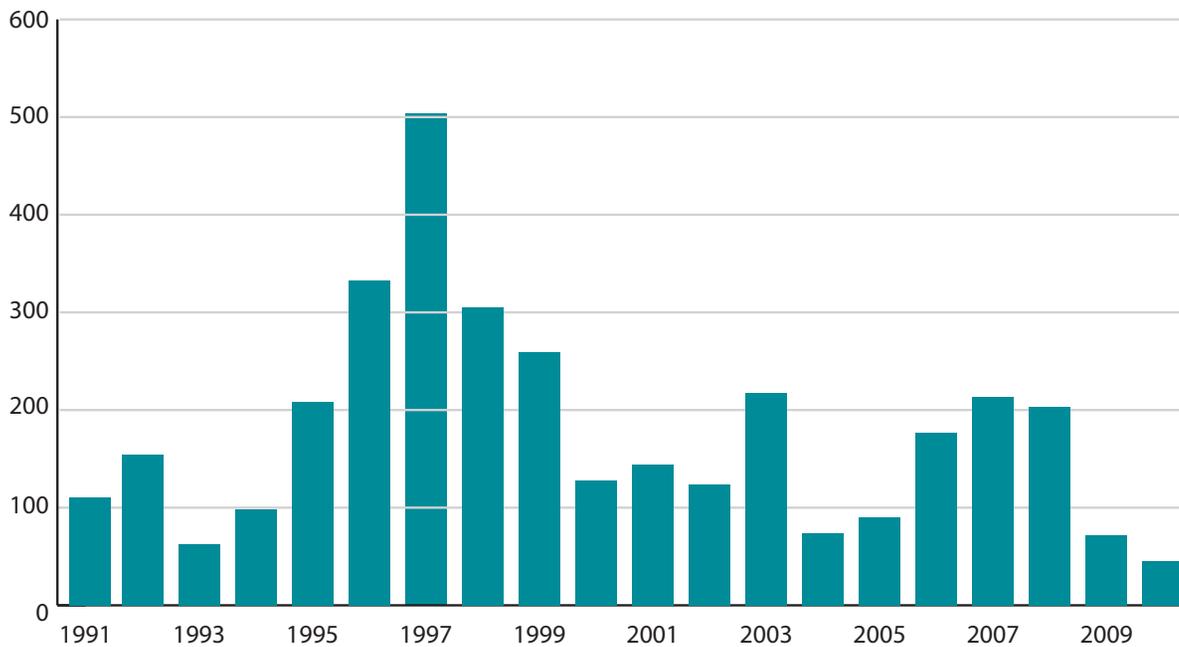
All of these steps can be challenged through the land-use process. Thirty-one of the Tier 2 and 3 sites face multiple challenges. The table to the right shows the variety of challenges faced by sites in the pipeline.

Figure 3: Tier 2 and 3 potential development constraints

	TOTAL
Legislative Actions	20
Infrastructure	19
Transportation	18
Not willing to transact	18
Land Assembly	14
National Resources	13
Brownfield/Cleanup	8

The largest sites face tremendous challenges and limitations. One is West Hayden Island, which has extensive environmental limitations associated with future marine terminal development and will require annexation into the city of Portland. Three sites are outside the current urban growth boundary and one is limited to aviation-oriented, lease-only development. In sum, there are very few of the largest sites currently available and the supply of future large sites is equally or even more constrained.

Figure 5: Estimated industrial land consumption in acres, 1991-2010



Demand for land

Being market ready is critical as industrial land development is very cyclical. According to an analysis by Business Oregon and NAIOP, the majority of the demand for industrial lands comes in short bursts. Fifty percent of all industrial land acres developed in the study area over the past 20 years came during two three-year peak periods of development (1996-1998) and (2006-2008).⁸ If the region does not have developable sites ready to go when the

growth cycle hits, it will miss the opportunity for significant job and income expansion for a decade or more. How our region grows jobs and improves wages and incomes depends on getting these sites ready for employers. The goal of this inventory study is to move conversations forward so our region can better coordinate, recruit and grow the number of traded-sector employers and grow jobs.

⁸ 2011 Industrial Lands Policy Paper: Large Lot Supply & Demand, Business Oregon (Source: Costar, NAIOP). Analysis of industrial construction square footage reported in Costar for all parcel sizes converted to acreage assuming an average 30 percent coverage ratio.

Land-banked parcels

The analysis excluded land-banked parcels (owned and held for future expansion by existing firms) and sites with structures comprising more than 25 percent of the land area for redevelopment. While land-banked parcels may become available for recruitment in the future, there is currently no way to judge if or when this might occur. Redevelopment of occupied parcels may be possible but is generally not broadly attractive to targeted cluster industry companies due to uncertain timing and costs that can greatly exceed market rates for industrial land in other parts of the country or world. Additional analysis of redevelopment costs and opportunities was outside the scope of this analysis.

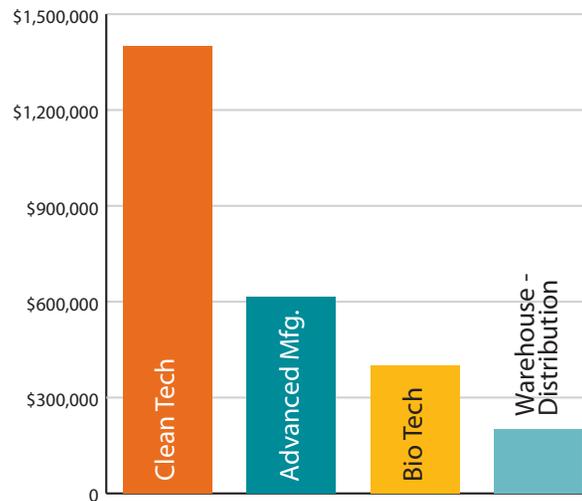
Conclusions

The industrial land inventory analysis confirms that Portland-metro's market-ready supply of large-lot industrial lands for targeted traded-sector employer expansion and recruitment is limited, particularly for potential developments that require 50 acres or more.

The sites that are available are concentrated in the Columbia Corridor of Multnomah County and around Hillsboro in Washington County, limiting the potential to more broadly distribute job opportunities within the Portland-metro area.

While this analysis has identified the available sites and, at a high level, outlined the challenges that exist to bringing Tier 2 or 3 sites to shovel-ready status, the timeframes in the analysis assume that the jurisdictions, property owners, land-use regulatory bodies and potential interveners are all working in support of the potential employer and the site's development.

Figure 4: Economic impact per acre



Source: 2011 Industrial Lands Policy Paper: Large Lot Supply & Demand, Business Oregon

The tier designations assume the “best case” and do not reflect issues that could significantly delay development such as unidentified wetlands or brownfields, opposition from interest groups, or requests from local jurisdictions for additional planning or design reviews. Any one of these factors could dramatically extend the timeframe for these sites to become market ready.

“Our dwindling inventory of available industrial lands is making it difficult to respond to companies interested in expanding their operations into Oregon. We need to find strategies to make potential sites shovel ready so we can compete, not just for recruitment, but for expansion and retention of the great companies we already have.”

Tim McCabe, Director, Business Oregon

Future analysis, known as Phase 2 of this study, will look at the costs and benefits of getting these sites ready and what the potential impact of successful recruitments or expansions could be in terms of jobs, incomes and taxes generated and improving the Portland-metro region's quality of life.

Partners



About the Value of Jobs Coalition

The Value of Jobs Coalition is based on the premise that in order to have a prosperous, healthy Portland region with a good quality of life, we need more private-sector jobs. The coalition began with an economic study in the fall of 2010, which uncovered troubling economic data about the Portland-metro region. A number of other studies have followed that highlight the region's economic opportunities and challenges. Find out more at:

www.valueofjobs.com.



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PORTLAND BUSINESS
ALLIANCE

PORTLAND BUSINESS ALLIANCE

200 SW Market Street, Suite 150
Portland, OR 97201
www.valueofjobs.com

Project Executive Summary



Project Sponsors

Business Oregon — Metro — NAIOP Oregon Chapter
Port of Portland — Portland Business Alliance

Project Management Team and Sponsors:

Business Oregon - Mike Williams
Metro - John Williams and Ted Reid
NAIOP Oregon Chapter - Kirk Olsen and Mike Wells
Port of Portland - Keith Leavitt, Lise Glancy, and Susie Lahsene
Portland Business Alliance - Bernie Bottomly



Consultant Team:

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Ash Creek Associates, Inc. – Chris Breemer
Johnson Reid – Chris Blakney



Agency Review:

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Oregon Department of State Lands – Kirk Jarvie
Oregon Department of Transportation – Kelly Scannell Brooks

Project Funders:

Commercial Real Estate Economic Coalition (CREEC)
Clackamas County
City of Gresham
City of Hillsboro
City of Portland
City of Sherwood
City of Wilsonville
Howard S. Wright
National Electrical Contractors Association – Oregon-Columbia Chapter
Oregon State Building & Construction Trades Council
Portland General Electric
Plumbing & Mechanical Contractors Association
Sheet Metal & Air Conditioning Contractors National Association
Three Oaks Development Company
Westside Economic Alliance

The Project is being funded in part through funds provided by the State of Oregon, acting by and through the Business Oregon (an Oregon state agency).

The site information contained in this report is based on publicly available data sources and is not intended to replace independent due diligence for transaction purposes. Prospective purchasers, tenants, and others shall perform and rely solely upon, their own independent due diligence with respect to the Property.

PROJECT EXECUTIVE SUMMARY

A. PROJECT PURPOSE

Traded-sector companies sell goods to buyers outside of the Metro region, bringing in additional wealth. Attracting and retaining traded-sector industrial companies is important for the Portland region's long-term economic prosperity. Establishing a supply of development-ready large industrial sites is a critical part of a strategy to attract and retain traded-sector jobs. Because the Portland region must compete with other metropolitan areas for these traded-sector jobs, it must be able to provide a reasonable inventory of available sites.

This report examines the current and near-term supply of large (25+ acres) industrial sites available to accommodate the expansion of existing employers and recruitment of potential new employers to the Portland metro region¹. For purposes of this study, only vacant, industrially zoned, or planned lands within the Portland metropolitan Urban Growth Boundary (UGB) and selected Urban Reserves were analyzed.

The project was conceived partly in response to Metro's 2009 Urban Growth Report, which identified a shortage of large-lot industrial sites in the region and in recognition of the need to replenish large-lot industrial sites as they are developed. This project report was produced by Group Mackenzie in partnership with Business Oregon, Metro, NAIOP - Commercial Real Estate Development Association Oregon Chapter, Port of Portland and Portland Business Alliance, whose representatives served as the Project Management Team (PMT).

The project is divided into two parts. Phase 1 documented the regional inventory of large industrial sites and categorized them into three tiers based on their development readiness. Phase 2 analyzed 12 representative Phase 1 sites to provide more detail about their constraints and the potential economic benefits of development. The purpose of the project is to:

- Quantify the supply and readiness of large industrial sites in the Portland metro area.
- Determine the costs and benefits of developing a representative subset of these sites.
- Inform discussion on future tools and policies to maintain a market-ready inventory of industrial sites.

¹ The Regional Industrial Site Readiness Project examined vacant, industrially-zoned, or planned lands within the Portland metropolitan area's UGB and selected urban reserves that are suitable for large-lot industrial development by new firms moving to the region or the growth of existing firms that do not hold land for future expansion. Rural areas of Clackamas and Washington counties outside the UGB were not included in this analysis. The study identified and documented user-owned sites held for future use but excluded these from the detailed analysis because these sites were not available to the marketplace.

B. FINDINGS

1. Development Readiness

The analysis in this study shows that the region lacks a supply of industrial land that is readily available to attract and grow the types of catalytic employers that will help the region's ability to prosper. This is particularly an issue for sites of 50 acres or more.

Figure 1 represents the findings of the regional inventory as of October 2011. The study found:

9 Tier 1 sites

Available for facility construction within 180 days

There are few Tier 1 "market ready" sites available for traded-sector opportunities in the near term. Further, only five of these nine sites meet broad marketability requirements.

16 Tier 2 sites

Available for facility construction between seven and 30 months

There is a modest supply of mid-term sites requiring investment and policy actions to bring these sites to market. Four of these sites require assembly of smaller lots.

31 potential Tier 3 sites

Available for facility construction beyond 30 months

There are multiple challenges and significant investment and time required to bring these pipeline sites to market. Ten of these sites require lot assembly.

There is a limited supply of 50-plus and 100-plus acre sites in the Portland region. The study found:

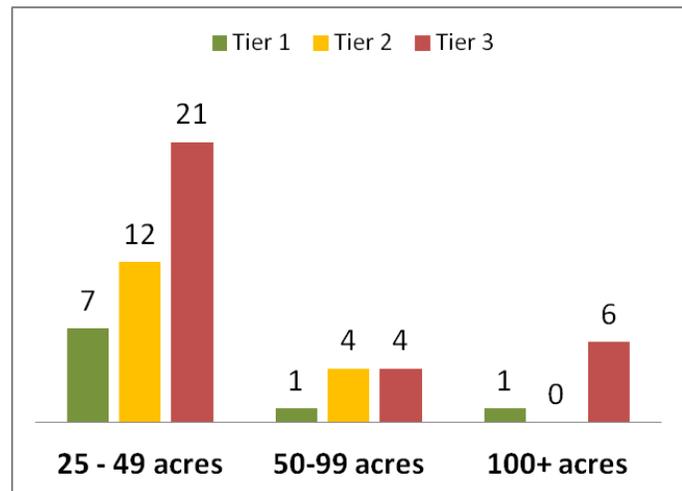
Tier 1 sites: One 100-plus acre site

Tier 2 sites: No 100-plus acre sites

Tier 3 sites: Six potential 100-plus acre sites; three require lot assembly

Industrial sites in the region are in varying states of readiness, requiring regulatory approvals (permitting, mitigation), state/local actions (concept planning, annexation, rezoning), infrastructure (sewer, water, transportation), assembly of sites, and brownfield cleanup. This report provides a clearer understanding of the actions and investments required to make more of these sites development ready to ensure the region's competitiveness.

Figure 1: Regional Site Distribution based on Tiers



Source: Group Mackenzie

2. Development Costs

Evaluation of the 12 Phase 2 case study sites shows most sites have at least one major constraint which is significant enough to preclude market activity. A lack of off-site public utilities such as water, sanitary sewer, storm water, and transportation, are the most common, and in many of the case studies, the most severe constraint. Across all 12 Phase 2 sites, off-site costs comprise roughly 44 percent of all development costs. Transportation constraints are the largest contributing factor. The median cost for off-site infrastructure ranges between \$0.16 per square foot to \$0.85 per square foot. Transportation is the highest at \$0.85 per square foot. Beyond dollars, the time to establish infrastructure approaches 24 to 30 months.

Direct public investment to address off-site issues can have a significant positive impact. For example, the East Evergreen site in Hillsboro has a market viability gap of \$13.3 million, the most significant element of which is transportation infrastructure. An investment in this infrastructure would alleviate 78 percent of the market gap for this site.

The sites with critical infrastructure deficiencies are not likely to attract large firms if investment is left solely to the private market or delayed until a business willing to commit to a site is found.

On-site constraints, such as floodplain, slope, wetlands, and brownfields are not as broadly common, but where they do exist, are often costly and cause delays.

Eight of the Phase 2 sites have a wetland bank in their watershed, which is the preferred mitigation method and reduces time to development. The other three sites that have wetland issues either would necessitate on-site mitigation, reducing net developable acreage, or as in the case of the Troutdale Reynolds Industrial Park (TRIP), require the purchase of additional land for off-site mitigation. Currently, wetland permitting and mitigation cannot occur without a specific user and site plan in hand.

When combined with the long lag times for permitting and mitigation, wetland mitigation is a key "opportunity constraint." Investment in resources, such as creation of wetland banks or a streamlined process, could move these sites further toward marketability at a relatively low cost.

Eight of the 12 sites in this study are agricultural greenfields that have had no previous industrial use. Because of this, brownfield remediation is the smallest dollar cost constraint across all Phase 2 sites. However, even where costs are quite small, environmental remediation is typically the first activity which must occur in the development process. The median brownfield remediation time for all sites (except TRIP) is six months. If the time required for brownfield remediation were eliminated for these sites it would mean a savings of \$2,800 per acre in time costs could be achieved through early environmental remediation.

Brownfield remediation for previously used industrial sites can, on the other hand, be significant. On the TRIP site in Troutdale, environmental cleanup totals \$3.6 million, excluding the costs already incurred by the previous owner on this Superfund site. This is \$1.28 per square foot and exceeds 7.5 percent of total site readiness costs.

Simplifying and expediting permitting and other pre-development processes can have a significant financial impact on project feasibility. There is a time cost associated to the capital required to ameliorate on and off-site constraints². The Phase 2 analysis found that nearly a quarter of all site development costs are related to time and risk. Activities that reduce uncertainty and delay will implicitly reduce time and risk costs and make a site more financially feasible.

Table1: Tier 2 and Tier 3 Development Constraints

CONSTRAINT*	NUMBER OF SITES
Brownfield/Cleanup	8
Natural Resources	13
Infrastructure	19
Transportation	18
Land Assembly	14
State/Local Actions	20
Not Willing to Transact	18

*Sites may have multiple constraints
Source: Group Mackenzie

² This study calculated a 7 percent annualized rate from the period dollars are spent in the development schedule to site development readiness.

Front end due diligence to identify issues and early investments in preparing sites for market readiness can have a significant impact on their viability by reducing time and risk to the developer or user. Due diligence that identifies a site’s constraints and the time to address them, will highlight those that have low costs but long timeframes. These types of constraints provide a good place to focus initial efforts.

One of the most significant project findings is that lot aggregation is a major hurdle to site readiness. Six of the 12 Phase 2 sites require parcel aggregation as the sites are made up of multiple parcels and multiple owners. In one case, there are eight separate owners to aggregate, and in another, 17 owners. While it was not possible to estimate how long the aggregation process may take, it is important to understand that sites that have multiple ownerships have an additional constraint that adds risk and needs to be addressed.

Constraints need to be understood from the perspective of cost, time, and risk. For sites that are close to economic viability, tools that reduce risks and time to market are likely to be most efficient. Sites with more severe constraints will require more comprehensive strategies that include financial tools to bring them to the market.

3. Economic Benefits

Significant economic and fiscal benefits can be created through investments in market ready sites (Table 2). Providing a sense of scale, the 12 sites analyzed in Phase 2 have the capacity to create an estimated 12,500 direct jobs on-site with average annual wages of \$97,000. When off-site impacts are considered, associated regional job growth could create \$3.7 billion in annual payroll at just over \$58,000 per job at full build-out of the twelve sites.

As a result of direct job creation, the 12 Phase 2 sites have the capacity to generate \$764 million in payroll tax revenue over the first 20 years of site development, construction, and operation. When all impacts are considered, the state of Oregon could potentially gain roughly \$2.3 billion in payroll tax revenue over the first 20 years if all 12 sites were developed.

Phase 2 sites have the combined potential to generate a cumulative \$217 million in local property tax revenues over the first 20 years and \$25 million annually thereafter.

Table 2: All 12 Case Study Sites Potential Economic Benefit

	TOTAL
Total Direct Jobs	12,500
Average Annual Wage Level	\$97,000
Total Property Tax over 20 Years	\$217 Million
Total State Payroll Tax over 20 Years (Direct Jobs Only)	\$764 Million
Total State Payroll Tax over 20 Years (Direct and Indirect)	\$2.3 Billion

Source: Johnson Reid

Based on the conceptual uses assumed for the Phase 2 sites, the fiscal benefits to state and local jurisdictions are quite large. These benefits, if realized, in most cases exceed what it would cost an entity to finance infrastructure improvements necessary to make sites development ready. To sum up, from the perspective of the public, infrastructure investment can have a significant positive return.

C. CONCLUSIONS

The analysis reached the following conclusions:

- A small inventory of large industrial sites available in Tier 1 and 2 could potentially result in lost expansion and recruitment opportunities.
- Market choice is more limited for larger 50-plus and 100-plus acre sites. Parcel aggregation is a key issue to supplying larger sites.
- Tier 2 and 3 sites will require new investment, policy actions, and time to become development ready.
- Funding for infrastructure of all kinds is a critical limiting factor to site readiness.
- The cost of off-site infrastructure is the primary challenge to site readiness, comprising nearly 40 percent of total development costs. Transportation costs are the largest contributor to off-site infrastructure costs.
- Direct public investment to address off-site infrastructure needs and costs can have a significant impact.
- On-site issues vary by site. For some sites addressing on-site issues, such as brownfield remediation, has a high cost or long timeframe. An understanding of each site's constraints and the time to address them, will define those that have low costs but long timeframes. These types of constraints provide a good place to focus initial efforts.
- Nearly a quarter of total development costs are related to time and risk. The longer it takes a developer or user to address constraints and the greater the uncertainty about permitting processes, the higher the project cost and the further away from financial feasibility the project is. Front-end work on investigating and preparing sites for market readiness can have a significant impact on their viability.
- Not all sites have owners who are motivated to sell at industrial land prices (or any price). Some owners anticipate a better price with changes in circumstances or zoning that may or may not be realistic. A willing property owner and motivated jurisdiction are critical to moving sites to market.
- Significant economic benefits (jobs, payroll, and property taxes) would result from traded sector investment in these industrial sites.
- The state's general fund is potentially a big winner from associated job and associated payroll tax revenue growth.

D. RECOMMENDATIONS

Site selection decision timelines are getting shorter in order to meet companies' needs to bring goods and services quickly to market. At the same time, there are limited financial tools available to address barriers to development of industrial sites with higher degrees of complexity. The private credit market is extremely tight and private developers generally are unable to finance projects with significant upfront capital investment, longer term paybacks, and regulatory uncertainty. Public sector resources and financing tools that could play a role in infrastructure and site development are also limited.

While discussion and evaluation of potential options for addressing market readiness of industrial sites needs to take place at the regional and state level, the Project Management Team has identified recommendations for further analysis:

- Establish a mechanism for regional leaders to identify potential industrial sites of regional significance and focus resources on bringing these sites to market readiness.
- Maintain and expand existing state infrastructure funding and technical assistance programs and explore opportunities to improve and target state support.
- Investigate the creation of new funding partnerships between state and local entities to support site readiness of large lot sites for traded sector development.
- Explore opportunities to streamline or make more predictable state and local regulatory and permitting requirements and timelines to reduce permitting risk and increase private sector investment.
- Explore regulatory and policy tools in the arena of wetlands mitigation and brownfields remediation to assist in moving sites to market readiness at the local, state, and regional level.
- Explore opportunities for regional and state funding for patient developer entities, either public or private, that can invest in due diligence and site preparation without requiring a market-driven return on investment.
- Analyze the investments needed to move the remaining 36 Tier 2 and Tier 3 sites to market-readiness to assist with regional economic and infrastructure development plans.
- Perform an annual inventory update of large lot industrial sites and encourage other regions around the state to adopt the inventory methodology.
- Analyze the absorption/demand/missed opportunities for large lot industrial sites and the economics of redevelopment for industrial purposes and traded-sector competitiveness.

The recommendations listed here are meant to be the beginning of a dialogue on creating effective tools and policies for ensuring the region and state has a competitive supply of market-ready industrial sites.

In the summer of 2012, the Project Management Team plans on meeting with key regional, state, public and private leaders, culminating in fall 2012 with a meeting of an Oregon Business Plan subcommittee. The work will then be integrated into the Oregon Business Plan. Parallel efforts will be ongoing with legislators and other regional partners to facilitate action and bring about results.

E. PROJECT REPORTS

The Regional Industrial Site Readiness Project includes three volumes, in addition to the Executive Summary. Volume 1 is the complete Project analysis and findings. Volume 2 presents the site specific details and results of the Project. Volume 3 includes all of the technical appendices.



Workforce Diversity

Gunderson	Ethnicity
4%	African American
17%	Asian
58%	Caucasian
10%	Caucasian-Russian/Slavic
9%	Hispanic
2%	Native American
0	Other/Not stated

- Approximately 40% of the workforce speaks English as a second language (ESL).
- Upwards of 18 languages are the primary languages of workers at Gunderson, and we regularly translate training materials into Vietnamese, Russian, and Spanish.
- We offer continuing education on ESL to employees.
- We train many of our employees from scratch to perform skilled labor because a qualified workforce is not readily available; for example, we train welders onsite.



portlandharbor restoration <portlandharbor.restoration@noaa.gov>

Comment form

1 message

Darise Weller <dweller972@comcast.net>
To: portlandharbor.restoration@noaa.gov

Mon, Oct 8, 2012 at 9:15 PM

It's still Oct. the 8th and I didn't see a time for a deadline so I will still attempt to send it. Had intended to sent it from my new computer as I have been out of town the last 6 days, but it has some sort of glitch a et me on the Internet, and now upon my return home late this afternoon I have been trying to fix the problem for hours turns out I will have to do a full recovery. I really hate computers sometimes.

I'm using my antiquated computer which will not open macro enabled documents. So I hope I have included the necessary information.

Darise Weller

9259 NW Germantown Rd. Portland OR. 97231

dweller972@comcast.net

I speak for myself on this issue but I am a:

Member of the Portland Harbor Community Advisory Group

Board member of North West Toxics Community Coalition
for EPA Region 10

Environmental representative for Linnton Neighborhood Association.

Neighborhood communities representative for DSL's RRAC committee

N/A - 064

I was very disappointed to see that the restoration area had been changed from 100% restoration in the damaged area to 50% .

At Portland Harbor Community Advisory Group(PHCAG) meetings, at any meetings involving the public and the Trustees and NOAA, at Portland planning meetings, and at North West Toxic Communities Coalition(NWTCC) meetings with Region 10 EPA, I and others from the affected communities have stressed that we feel the restoration should take place exclusively in the areas that have been damaged.

N/A - 065

Industry says restoration cannot happen in hard bank areas. That is not true. On the Cuyahoga River fish refuges were created in hard bank areas that did not affect commerce.

N/A - 066

In the Community Perspectives on the Future of the Portland Harbor and the Willamette River done by Portland State issued May 2012, under Fish and Wildlife Habitat states: Many respondents viewed the Willamette River, first and foremost, as a habitat for fish and wildlife. These

N/A - 066

individuals felt that the river represents the value that this region places on the natural habitat.

Half the river is not good enough. We need to restore and mitigate all that has been damaged and destroyed.

Thank you for your time and consideration on this matter.

Darise Weller

Comment Form

***Portland Harbor Natural Resource Damage Assessment (NRDA)
Draft Programmatic EIS / Restoration Plan (PEIS/RP)***

Thank you for taking the time to comment on the Draft Portland Harbor NRDA PEIS/RP. The comments that you make, in their entirety, including the personal information you provide, will become part of the public administrative record for this project. The Trustee Council will not consider anonymous comments, so you must provide a name and address. Responses to your comments will be provided in the Final PEIS/RP.

First Name: Allison	Last Name: Wenlund
Street Address: 1811 22 nd Street Apt. 5	City, State, Zip: Boulder, CO 80302
Email: allison.wenlund@colorado.edu <input type="checkbox"/> Check here to sign up for project email updates	Organization (if any): Student

Please write your comments below, and attach additional pages if you need more space. You can download this form and email your comments online at <http://www.fws.gov/oregonfwo/Contaminants/PortlandHarbor/default.asp>. Comments must be received by October 8, 2012.

Comments:

Please see attached Pages



Comments Continued:

Please email comment form to: portlandharbor.restoration@noaa.gov

Or mail comments to: Megan Callahan Grant
NOAA Restoration Center
1201 NE Lloyd Blvd., Suite 1100
Portland, OR 97232

October 1, 2012

NOAA Restoration Center
1201 NE Lloyd Blvd., Suite 1100
Portland, OR 97232

Public Comment Due October 8, 2012

RE: Portland Harbor, Natural Resource Damage Assessment

Attn: Members of the Portland Harbor Natural Resource Trustee Council

To whom it may concern:

As a student attending the University of Colorado at Boulder in the program of Environmental Design, I am writing in support of the restoration plan proposed for the Willamette Floodplain, including the Portland Harbor. After review of the DRAFT Portland Harbor Programmatic EIS and Restoration Plan prepared by the National Oceanic and Atmospheric Administration, I submit the following comments:

Overall, I find the scope and purpose outlined in the EIS draft to be accurate and beneficial to the goal of rehabilitating the watershed of the Willamette River. As can be seen in many rivers and riparian zones throughout the U.S., industrial development has caused significant changes and in many cases damages to these delicate ecosystems. Of the three alternatives provided within the EIS draft, I agree that the Integrated Habitat Restoration Planning is the best strategy in improving the quality of these waters.

I do not feel that any of the impacts listed as moderate to major within the categories of socioeconomics, biological resources, or floodplain/flood control are severe enough to require mitigation or compensation, however there are a few small concerns that I feel should be considered.

N/A - 067 The most significant impact in my opinion is the short-term impacts that construction within the project would cause on the ecosystem. Although the EIS stated that in order to mitigate this problem, only “best management practices” would be used, however, I feel that more specific guidelines should be

N/A - 067 available. Another concern I have, would be the timeline of the specific projects. I was surprised at the

N/A - 068 scale of this project when going through the list of sites, however, the large number of projects leads me to be concerned about the cumulative effects so many projects could have on the ecosystem. For example, even though the impact of one specific project may be considered mild to moderate, if several of the same type of project is under construction within a somewhat small area, the overall effects could be more damaging than originally expected. It is stated several times within the EIS that each specific project would undergo strict review to guarantee compliance with the components of the overall draft, but I think it is necessary to also coordinate between each project as well.

N/A - 069 In regards to the Integrated Habitat Restoration alternative that was selected as the best option, I feel that possibly too much emphasis may be put on the rehabilitation of the Salmon species that is federally listed which seems to fall under the third alternative which is Species-Specific restoration planning. Although I agree that this species is vital to the health of the river, I would urge the committee to not overlook other important species that may not thrive as a result of the focus on the salmon.

The recurring theme within the draft of minimizing conflict between ecological restoration and human use I find to be extremely important and I would like to thank this organization for your efforts. I feel the health and vibrancy of our waterways is of the utmost importance and am glad to see so much progress being made in that part of our environment.

Sincerely,

Allison Wenlund

1811 22nd Street Apt. 5

Boulder, CO 80302

Allison.wenlund@colorado.edu

Sources

<http://www.fws.gov/oregonfwo/Contaminants/PortlandHarbor/>

[http://www.fws.gov/filedownloads/ftp_OFWO/PortlandHarborNRDAWebSupport/Documents/20120627 PEIS DraftforRelease.pdf](http://www.fws.gov/filedownloads/ftp_OFWO/PortlandHarborNRDAWebSupport/Documents/20120627_PEIS_DraftforRelease.pdf)

Addendum: Portland Harbor Restoration Plan

This case is currently in the draft EIS stage and is accepting public comments. The purpose of the project is to mitigate damage caused to the Willamette River, specifically the lower floodplain and Portland Harbor caused by historical pollution from industry and the resulting injury to the resources caused by the release of hazardous substances into the water. This draft EIS is acting as a guideline for multiple individual projects along the river. All future project will also be subjected to the EIS process however this being the main EIS. This project has been underway for many years, however the main push occurring after the area was designated by the EPA as a “National Priority” in 2000. The agencies involved include the Department of the Interior Fish and Wildlife Service as well as State and Tribal members of the Portland Harbor Natural Resource Trustee Council. There are three alternatives given: 1) No Action, 2) Integrated Habitat Restoration Planning, and 3) Species Specific Restoration Planning. The major impacts were found to be confined to three categories including socioeconomics, biological resources and floodplain/flood control. The overall goal of the project is to minimize conflict between ecological restoration and human use.

Jeri Williams Recorded Comment

7/17/2012

My name is Jeri Williams. I live at 587 N Rosa Parks Way, Apartment 3, Portland, Oregon 97213. And, I am a member of the Portland Harbor Community Advisory Group. And, while I work for the city I am with the Portland Harbor group as a private citizen and had helped form the Portland Harbor superfund group back 12 years ago when I was the Executive Director of the Environmental Justice Action Group.

I am also a member of the Klamath Tribe, and I have been working on environmental issues, specifically environmental justice issues, here in the City of Portland for the last 20 years. And, one of my, what I've learned, is on how policy affects people differently. Because I come from a terminated tribe I understand a lot of Indian law and how devastating progress in some peoples' words have been to native people, including the Willamette River progress. And so some of the concern comes from maintaining cultural values, and one of the things that folks don't talk about a lot is the fact that we have around 360 Tribes represented in the City of Portland which is the ninth largest city as far as having Tribal folks in their city.

N/A-076 So we represent about 360 different tribes here in Portland, and many times when we're looking at dealing with things like the Willamette River or the Columbia River Crossing or anything like that, many times we default back to just working on who is federally mandated. Which means that the sovereignty of the federally recognized Tribes with the government working together, and so my suggestion is that we also look at those Tribal people who are here who are not represented by federally recognized tribes; because truly many of them are here because of previous government policy that either relocated them or terminated them and pushed them into this area in the first place. So I would like to see some recognition of those tribes and their culture with the water as well as the federally recognized Tribes. That's important to me.

N/A-077 Another thing that's important is while I was the, is about the responsible parties and the potentially responsible parties, is that while I was the Executive Director of the Environmental Justice Action Group, we actually sued Oregon Steel Mills in 2001 for violation of the Clean Air Act, actually, like 82 violations of the Clean Air Act. And it was during that time that we had conversations with many of their workers who told us that while they were supposed to be putting their toxic waste into cars, train cars, that would go to Arlington, that actually many times they were instructed to just dump that, those toxics, into the river.

And so our concern is that we understand some potential, potential polluters may have not as much responsibility to the clean up as others do. So as we are looking at allocations, possibly looking at their records and specifically their records with DEQ on their Air permitting, etc., to see is this a company that's had a history of violations in our community, I think would be very important as we're looking at who's paying what for the clean ups.

N/A-078 I work at the City of Portland, currently, and run the diversity civic leadership projects which the Lower Willamette Group had spent a lot of money on creating a presentation and going out to communities of

N/A-078 color to present it. I actually was invited to sit in one of those by the Latino network Verde who were concerned that maybe this was a type of green-washing effort. I did sit in the group and I did film, I did bring a film person with me to film the actual presentation. Beyond being culturally, not culturally sensitive, to the populations they were speaking to, I was generally concerned that the message they were sending was it doesn't matter whether we spend a million dollars or a billion dollars it's all going to be the same. And after checking with some of the communities about what they heard in their presentations, that is what they said was, that it doesn't matter how much we spend it's about going to be the same. So, if the money is going to come out of our pockets, which is what they were told, a large percentage is going to come from the taxpayers; then of course they wouldn't want to spend a lot of money. I personally felt that was incredibly misleading, and have voiced my concerns about that to several people.

N/A-079 So those are my major concerns. Currently is that is the community being told the truth so that they can make a real informed choice about what the options are. Another suggestion I have is that if the Department of Defense, way back then, was one of the initial responsible parties due to all the ship building that happened in this community, that possibly we need to be looking at investing in green jobs to restore this. Putting both local people who are historically under employed to work as well as possibly looking at veterans who have recently come home to also look for jobs. So to create some sort of green jobs model that involves cleaning up, and replanting, and restoring, and doing all of these things to be a model of how we can do things differently and sustainably with the people we currently have, and address the disparities of our communities of color with the very high rates of unemployment they have.

So those are my major concerns and thank you for recording them.

Willamette RIVERKEEPER®

October 4, 2012

Megan Callahan Grant
NOAA Restoration Center
1201 NE Lloyd Blvd., Suite 1100
Portland, OR 97232

Re: Comments on Draft Programmatic EIS and Restoration Plan for Portland Harbor.

Dear Ms. Callahan Grant:

On behalf of Willamette Riverkeeper (WR) please accept our comments on the Draft Programmatic EIS and Restoration Plan for Portland Harbor. As you may know, this site is of intense interest to WR and our members throughout Portland and the Willamette Valley.

We believe that a vigorous and timely cleanup of the Portland Harbor stretch of the Willamette River is essential for the overall health of the river. As part of this, conducting intensive habitat restoration in Portland Harbor is essential under NRDA. Given the very degraded conditions now found in this part of the Willamette River, we believe that a significant level of restoration must occur in this stretch of the river to ensure the health and recovery of native species that use the entire river.

With the significant restoration investment occurring far upstream, along with modifications to the flood control dams operated by the US Army Corps of engineers, there is a need to greatly improve habitat for fish and wildlife in Portland Harbor. If we do not improve habitat, there is a risk that we will further degrade native species, and waste the other restoration investments upstream.

We have several specific points to convey regarding the Draft EIS, but first off I would like to thank the Trustees for the detailed, extensive work on this EIS to date. The technical basis for your effort seems very sound, and reflects a great deal of experience and understanding of the Willamette and other rivers. This is a very important project, and your level of expertise and professionalism will serve the Willamette's long-term recovery and health well. If the actions found within the Restoration Plan do not take place, the restoration of the Willamette will be set back many decades.

There are many entities who have profited greatly from the degradation of the Willamette for many years, and we feel that they have a community responsibility to give back to the river, rather than to continuously take from it. The level of restoration investment included by NOAA and the other Trustees in the Restoration Plan is more than realistic and attainable for the river. The site has been properly characterized, and the general merits of habitat restoration at various sites has been well described.

We have several additional points.

1. WR supports the Preferred Alternative - Integrated Habitat Restoration Planning.

P - 070 2. It is likely that the Lower Willamette will continue to be an important part of the regional economy for some time, yet as a result of the industrial use of the area, the river's ecological function has been severely compromised. WR believes that a major habitat restoration effort can be a vital part of a working harbor, and that the two are not in conflict. We can have much improved ecological function in this stretch of river, and also have workable options for those companies dependent on the river.

P - 071 3. A recent study by the City of Portland indicates that for cleanup of Portland Harbor, each dollar invested will bring more than a dollar in return. There is a high likelihood that habitat restoration can bring the same benefits, with restoration taking place in the Harbor area.

4. We believe that the level of restoration sought in this Plan is suitable for the Willamette, and should not be diminished further in scale and scope. The restoration opportunities in Portland Harbor will be a benefit to threatened species, and successful implementation is needed.

5. We believe that at least 50% of the restoration work should occur within the Portland Harbor Superfund site. It is likely that more than 50% is justified, but the baseline should be at least 50%. The injury from contamination and habitat degradation occurred in Portland Harbor, and this is one strong reason that the restoration should occur in the same place. There are many solid restoration opportunities in that area that make tremendous sense to complete from an ecological perspective. There are other funds that could pay for projects outside of the Superfund boundary. There is both a strong ecological and ethical case for keeping the restoration sites within the Superfund boundary.

P - 072 6. Restoration projects within Portland Harbor will benefit threatened species significantly. Numerous studies indicate this, and the benefits to native species are significant, even in a highly industrialized area. Every fish that makes its way to the Upper Willamette, and every juvenile fish that seeks to make its way to the Ocean, has to pass through this area. Improving the condition of this stretch of river is essential.

P - 073 7. It is known that native salmon and steelhead do not simply move through the Lower Willamette River as if it were a pipe to and from the ocean. Fish can be found in this area essentially year-round and are known to rear (put on weight and increase in size) while on their way to and from the ocean in the Lower Willamette. This is a key reason habitat must be improved from today's degraded condition.

- P - 074 8. There is clear evidence that Columbia and Snake River fish move into the Lower Willamette during their migrations—and may move preferentially around the southern tip of Sauvie Island. The presence of these fish adds to the importance of restoring the Portland Harbor stretch of the Willamette. Work in this stretch cannot be replaced by restoration elsewhere, no matter how beneficial it might be.
- P - 075 9. The Trustees have a very long list of potential projects that have been suggested for consideration. The Trustees should help the public better understand the list of likely projects by applying key criteria to shorten and focus the list on the best projects that yield the most ecologically. This will help the public and the liable parties focus on the most important restoration prospects. Potential criteria include: a) project size, b) number of habitat units that can be obtained by the project, c) connectivity of projects to one another, d) level of community support, e) potential for enhanced recreational benefits.

We assume that some in the business community in the Harbor area will seek to diminish the benefits of restoration in Portland Harbor, and will seek to discount the historic value and abundance of habitat in this area. In our view the Trustees have done exemplary work identifying what has been lost in Portland Harbor, just in the past few decades.

Having examined this stretch of river many times in the past 12 years, we can easily see its degraded condition, and how the banks and riverside lands have been essentially destroyed. The condition of riparian zones and nearshore areas is typically greatly altered from what existed previously. In many areas, the river has been so greatly denuded it seems a surprise today that any river species exist there at all. What is most important though, is that in those small nodes of natural habitat, and some of the more recent restoration projects that have been completed, native species do return.

The simple truth in this situation is that if we can direct habitat restoration to Portland Harbor, a range of native species that were once found here in abundance can benefit, and Portland Harbor will not be a detriment to the overall health of the Willamette River system. The entities responsible for the condition of the river in this area have a moral obligation to give back to the river, rather than to continuously take from it. Federal Law, on which this plan and EIS is based, also require action by these entities that have liability under NRDA.

We appreciate your consideration of these comments.

Sincerely,



