

## Portland Harbor Natural Resource Trustees

### Potential Restoration Projects

The following list of potential restoration opportunities within the Portland Harbor Study Area (SA) has been developed by the Trustees in partnership with the City of Portland’s Bureau of Environmental Services. These restoration opportunities have been screened against the fish and wildlife criteria prepared by the Trustees (October 2008). Using these criteria, the Trustees compared existing condition at each site to potential restored condition, with the overall goal of evaluating each site’s “value” in terms of benefits to potentially injured species. Information regarding the sites was compiled from the City of Portland’s River Plan (2008), the City of Portland’s draft Ecosystem Restoration General Investigation Study (2005), and institutional knowledge of the Trustees and their technical staff. 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. Attachments to this list include: an overview map showing the location of each site on the river; a brief description of each site, conceptual restoration treatments and their anticipated benefits; and a figure for each site.

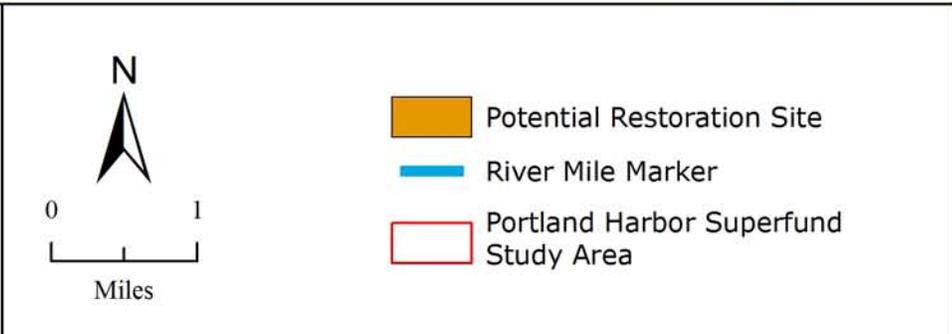
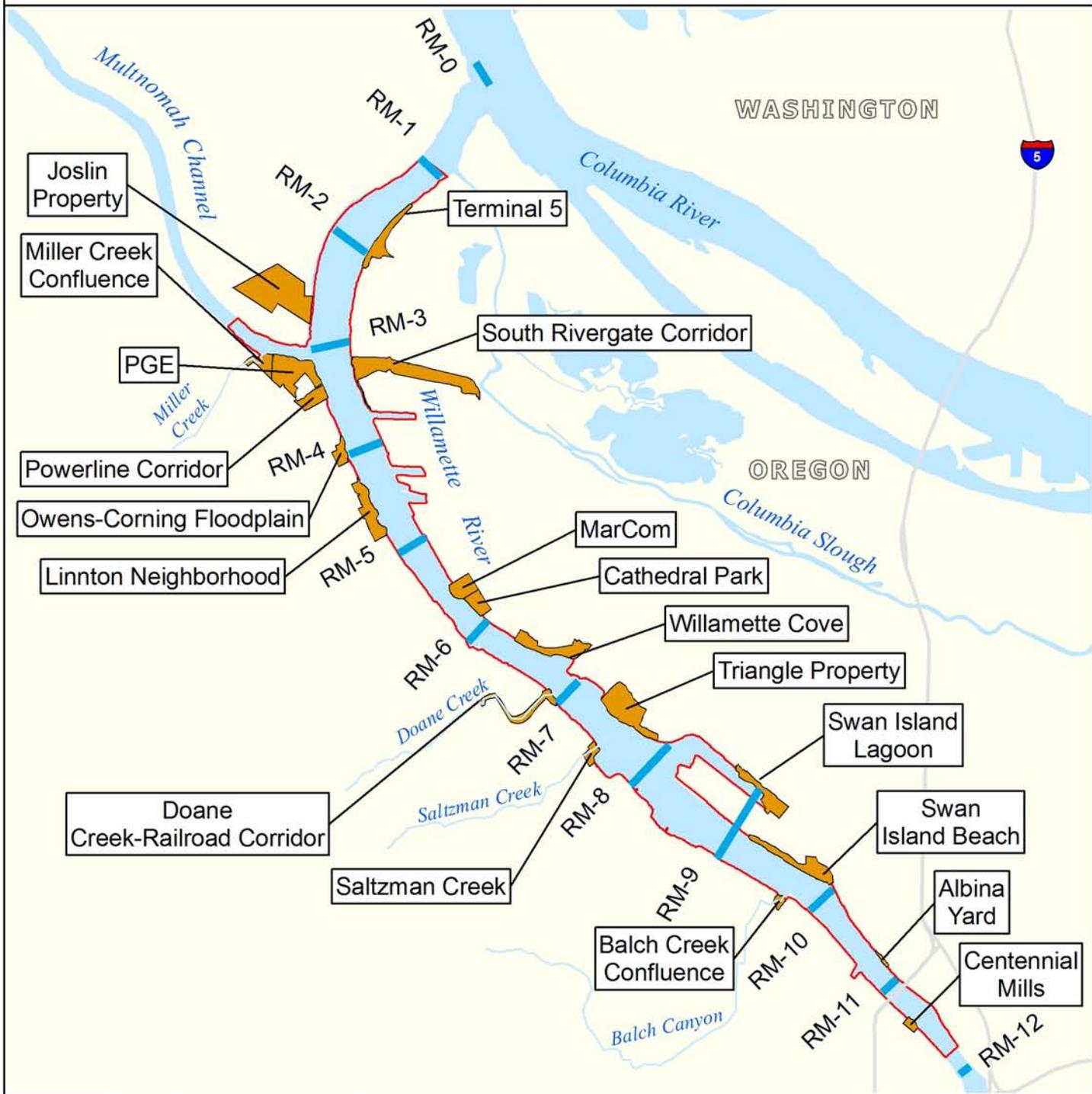
Site No.	Project Name	River Mile
1	Albina Yard	10.75
2	Ash Grove Cement/Port of Portland*	3.25
3	Balch Creek Confluence	9.75
4	Cathedral Park	5.75
5	Centennial Mills	11.4
6	Doane Creek/Railroad Corridor	7
7	Joslin Property	~2.5
8	Linnton Neighborhood	4.6
9	MarCom	5.5
10	Miller Creek Confluence	3.2
11	Owens-Corning Floodplain	4
12	PGE	3.2
13	Powerline Corridor	3.4
14	Powerline Corridor Crossing*	3.4
15	Saltzman Creek	7.5
16	South Rivergate Corridor	~3.3
17	Steel Hammer*	~6
18	Swan Island Beach North	9.5
19	Swan Island Beach South	9.75
20	Swan Island Lagoon	9

Site No.	Project Name	River Mile
21	Terminal 5	2 - 3
22	Time Oil-Schnitzer*	3.5
23	Triangle Property	7.5
24	Willamette Cove	6 - 6.5

\* These sites are not yet shown on the overview map.

# Potential Restoration Site Map

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.

## Albina Yard

**Landowner:** Union Pacific Railroad, Port of Portland

**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.

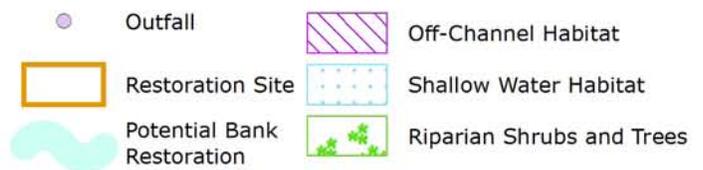
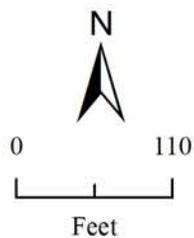
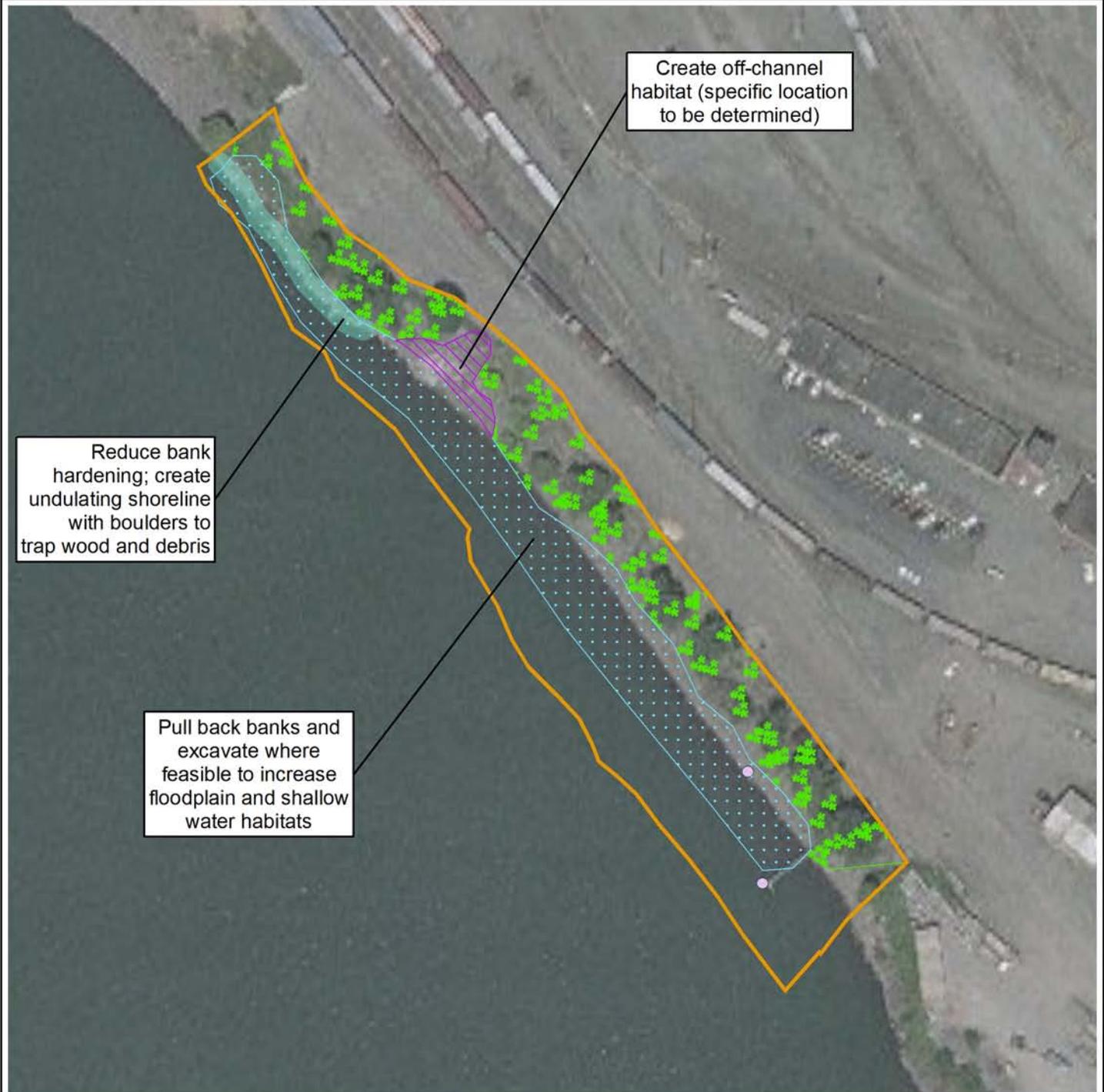
**Benefits:** Replacing the hardened banks with a more gently sloped and vegetated shoreline would allow for the accumulation of more wood, adding further complexity and sediment retention ability to the system. Juvenile salmon, lamprey, and sturgeon prefer complex habitats that provide cover and feeding 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.

## **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.

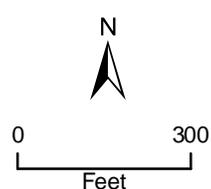
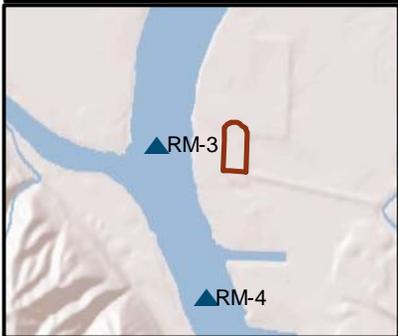
**Benefits:** The site could be turned from a vacant area with virtually no native vegetation and little wildlife habitat value to a patch that could expand on a larger habitat area to the south (i.e., the Rivergate Corridor), which also serves as a wildlife corridor to other important habitats. Larger, 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.

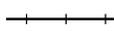
**Feasibility:** The land is zoned for industrial use, although it has been vacant of structures for many years. There are no known contaminant concerns at the site. There are no known permitting issues. Once constructed, the project would be largely self sustaining.

**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

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. (2/10/10)

## Balch Creek Confluence

**Landowner:** Port of Portland, Sause Brothers, Portland Fire Bureau, 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.

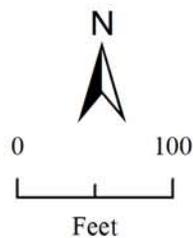
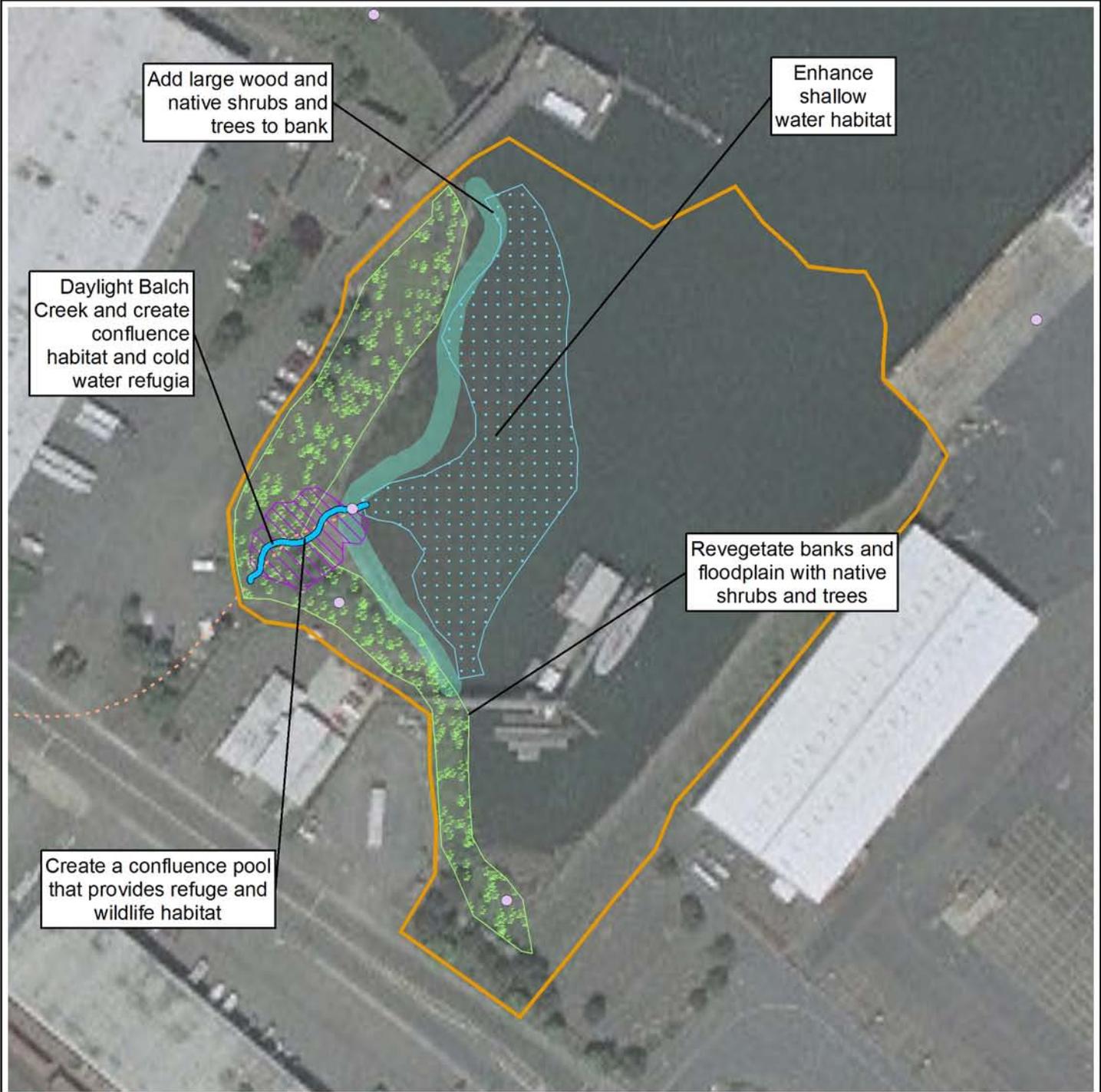
**Benefits:** Naturally sloped, vegetated stream banks increase floodplain connectivity and habitat diversity. Adding large wood and other habitat features would create more complex habitat, which is preferred by juvenile salmon, lamprey, and sturgeon because it provides cover and feeding stations. Off-channel, 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                    |  | Potential Channel Restoration |
|  | Piped Stream Segment       |  | Off-Channel Habitat           |
|  | Restoration Site           |  | Shallow Water Habitat         |
|  | Potential Bank Restoration |  | 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. This map was prepared using a geospatial database provided by the City of Portland's Bureau of Environmental Services.

## **Cathedral Park**

**Landowner:** City of Portland, Parks and Recreation

**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.

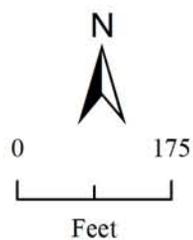
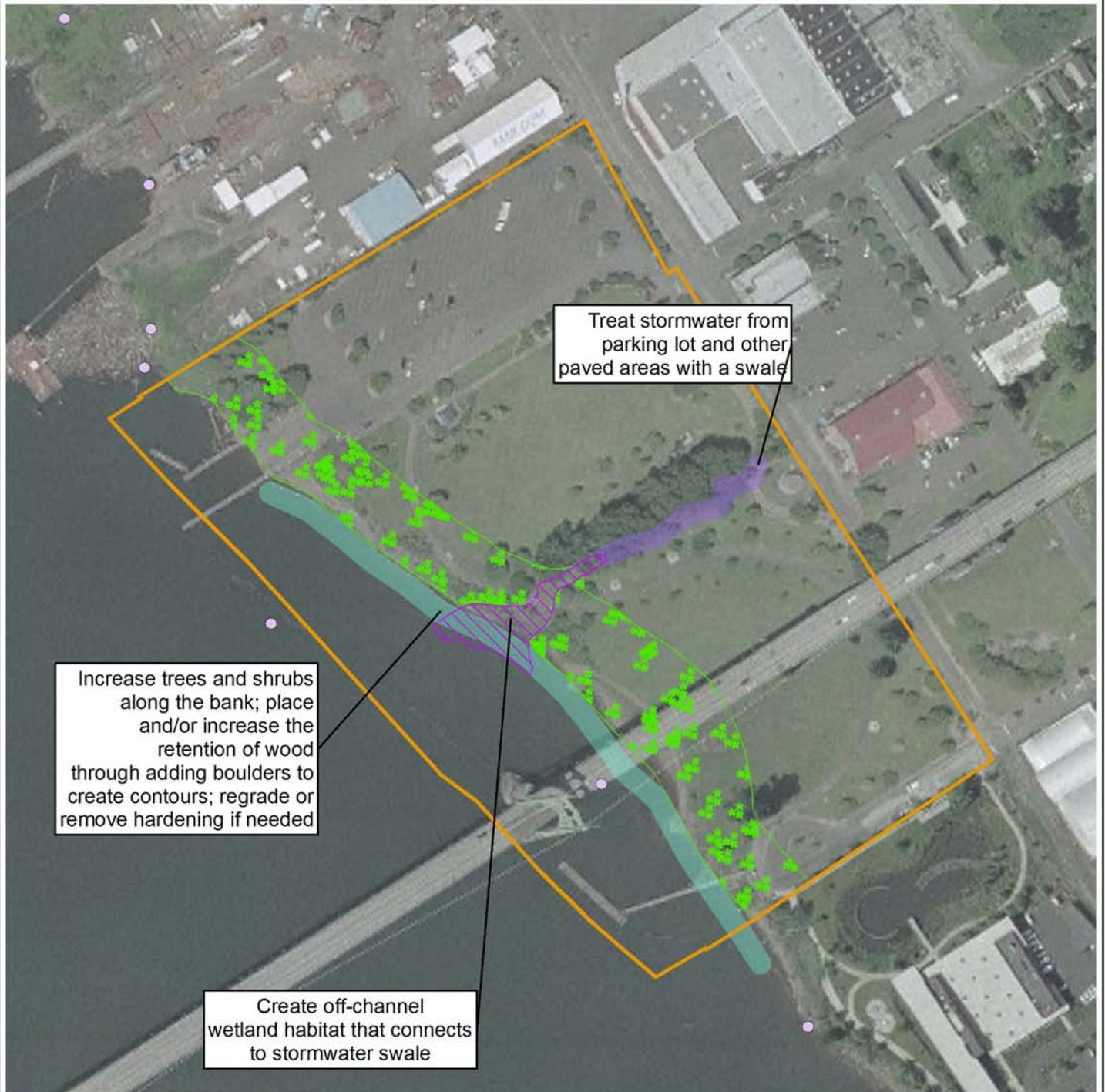
**Benefits:** Beach habitats sustain rich invertebrate populations; consequently they are important foraging areas for spotted sandpiper, mink, and a variety of other organisms. Naturally sloped, vegetated stream banks increase floodplain connectivity and habitat diversity. Adding large wood and other 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

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.

## Centennial Mills

**Landowner:** City of Portland, Portland Development Commission

**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.

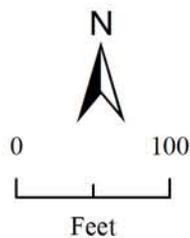
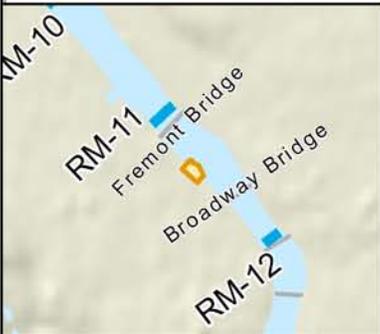
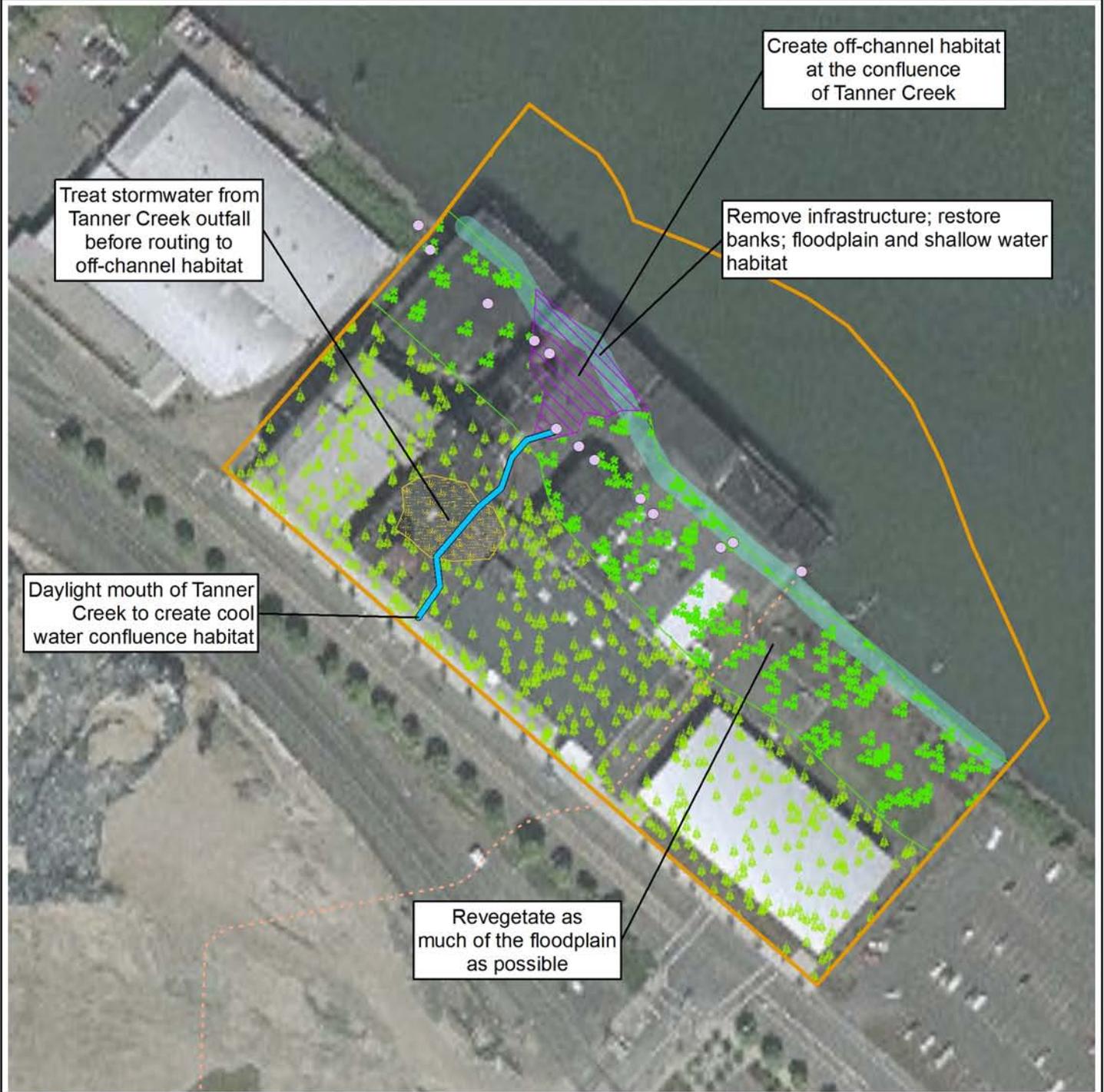
**Benefits:** Rerouting and “daylighting” the creek will improve habitat complexity, enhancing the habitat for salmon, lamprey, sturgeon, and terrestrial species. Creating additional tributary and wetland habitat will increase off-channel areas used by lamprey and juvenile salmon. Shallow areas can also 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 |  |                           |

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.

## Doane Creek / Railroad Corridor

**Landowner:** Siltronics, Burlington Northern Santa Fe Railway, Atofina Chemicals Inc.

**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.

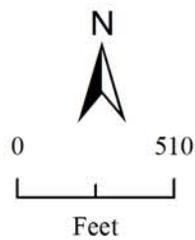
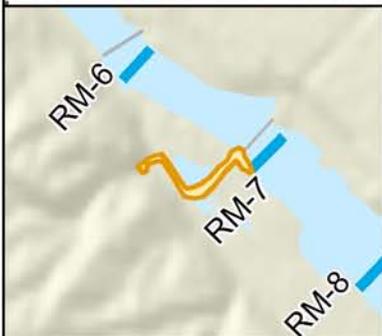
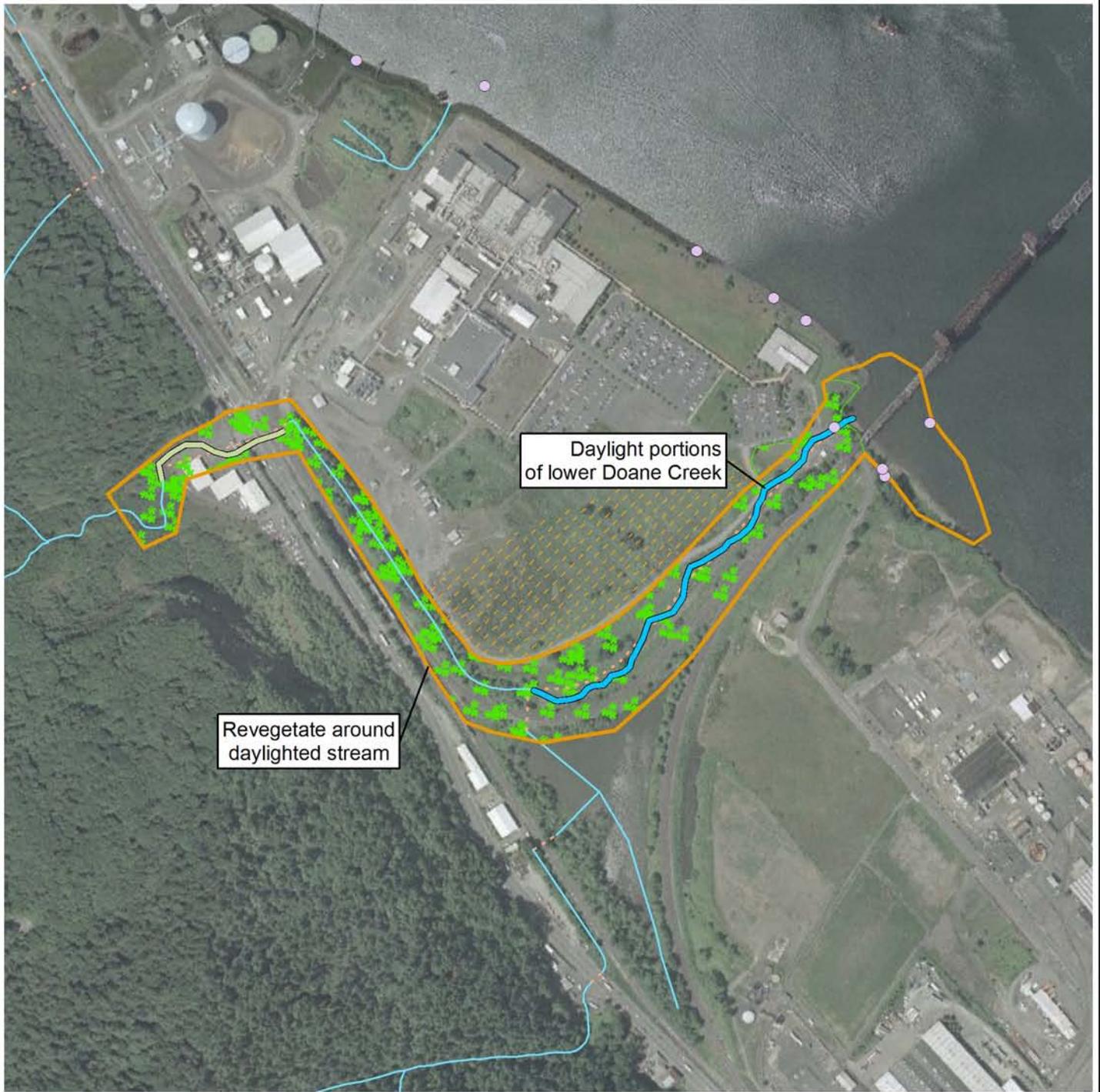
**Benefits:** Realigning and “daylighting” the creek and addressing fish passage barriers will improve habitat complexity and connectivity, enhancing the habitat for salmon, lamprey, sturgeon, and terrestrial species. Creating additional tributary and wetland habitat will increase off-channel areas for 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

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.

## Joslin Property

**Landowner:** Private - Jeff Joslin

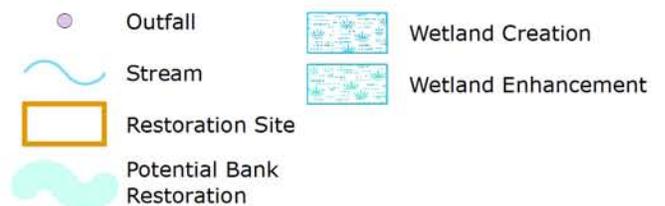
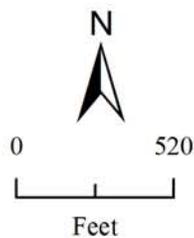
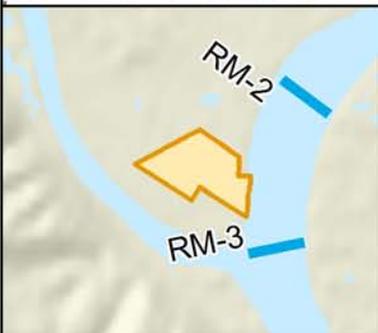
**Site description:** The Joslin property is located at river mile 2.5 near the confluence of the Willamette River with the Multnomah Channel. The property is 118 acres. Some shallow in-water habitat is present at the site adjacent to the leveed river bank. Some large wood has accumulated along the beach.

**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.



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.

## Linnton Neighborhood

**Landowner:** Linnton Plywood Association, Babcock Land Co LLC, RK Storage & Warehouse Inc.

**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.

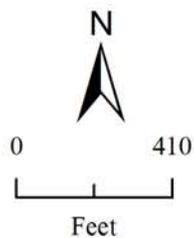
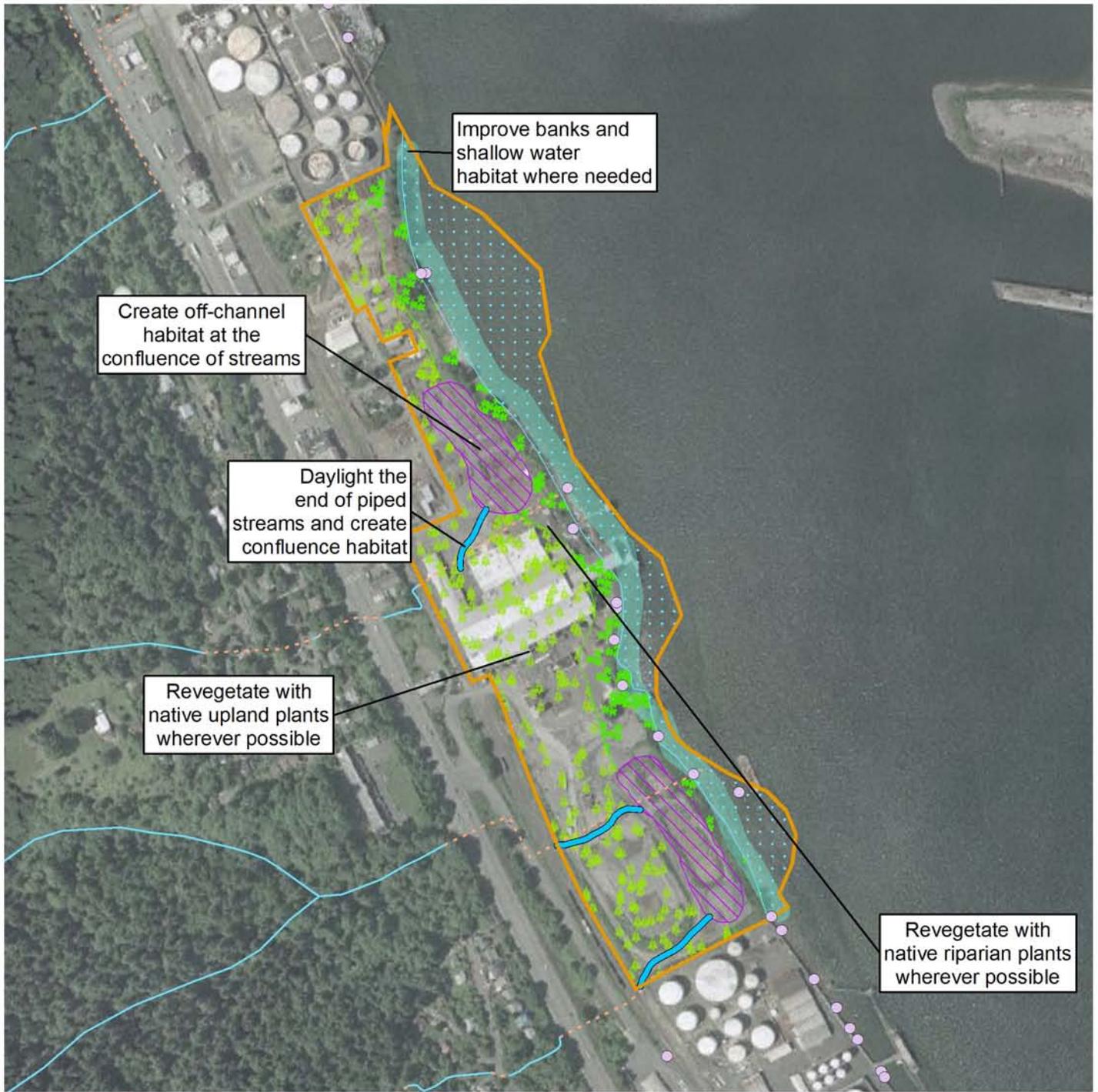
**Benefits:** “Daylighting” the piped streams on this site and restoring passage will provide fish and wildlife access to shallow, complex habitat, and return floodplain function to this mostly impervious site. Increased floodplain connectivity also enhances habitat complexity and encourages the use 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             |

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.

## MarCom

**Landowner:** Langley St Johns LLC, Port of Portland

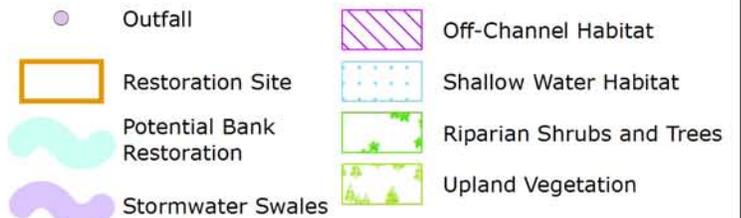
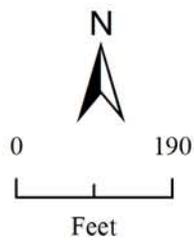
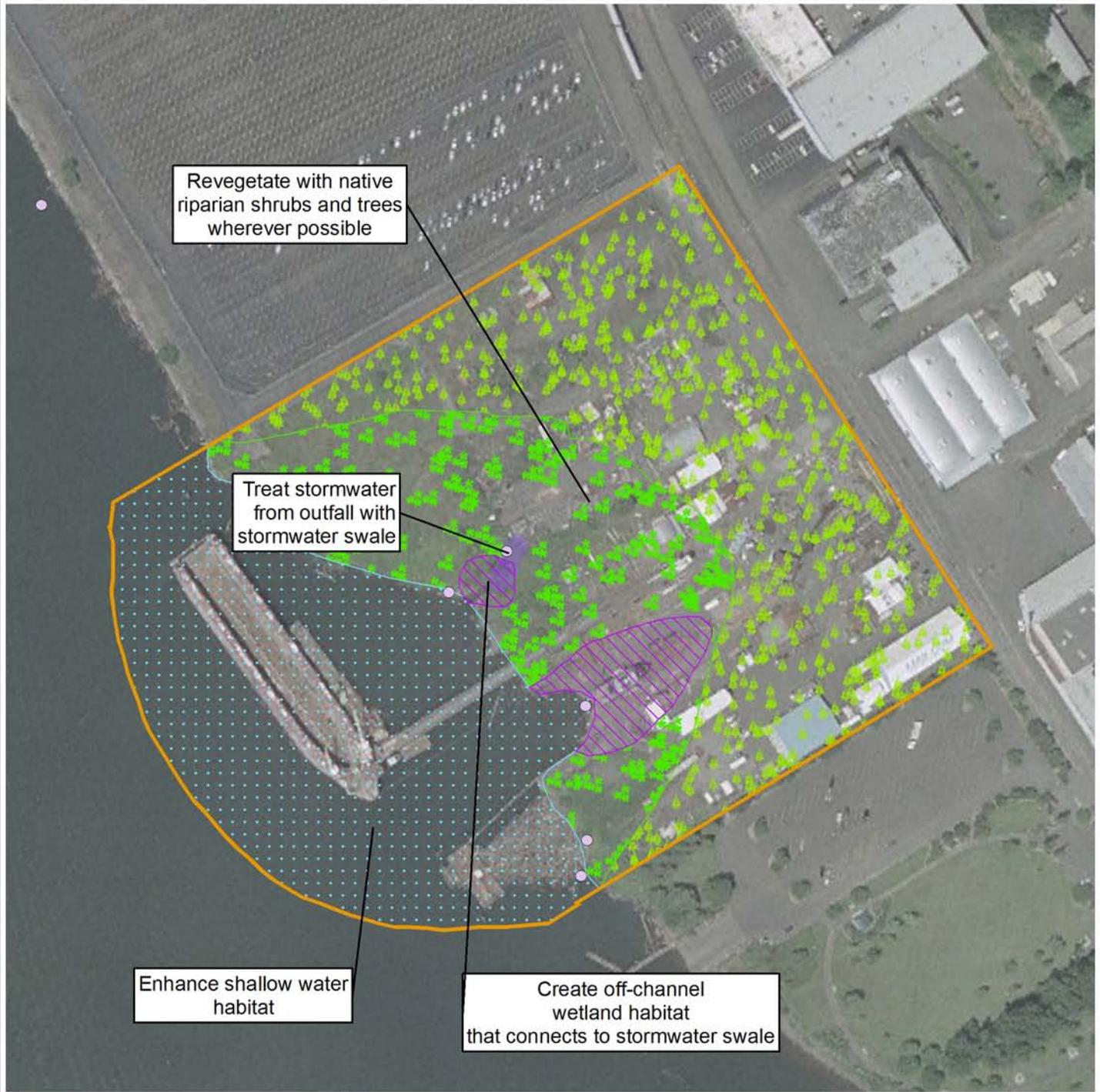
**Site description:** The MarCom site is located at river mile 5.5 on the east bank of the Willamette River. The riverbank is classified as beach and accumulates large wood. The north end of the site has been paved. There is currently good quality beach habitat present at the site. There is limited shallow 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.



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.

## Miller Creek Confluence

**Landowner:** Frevach Land Co., Lucky Landing LLC, 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.

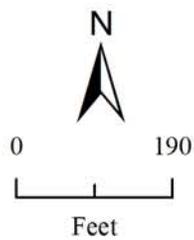
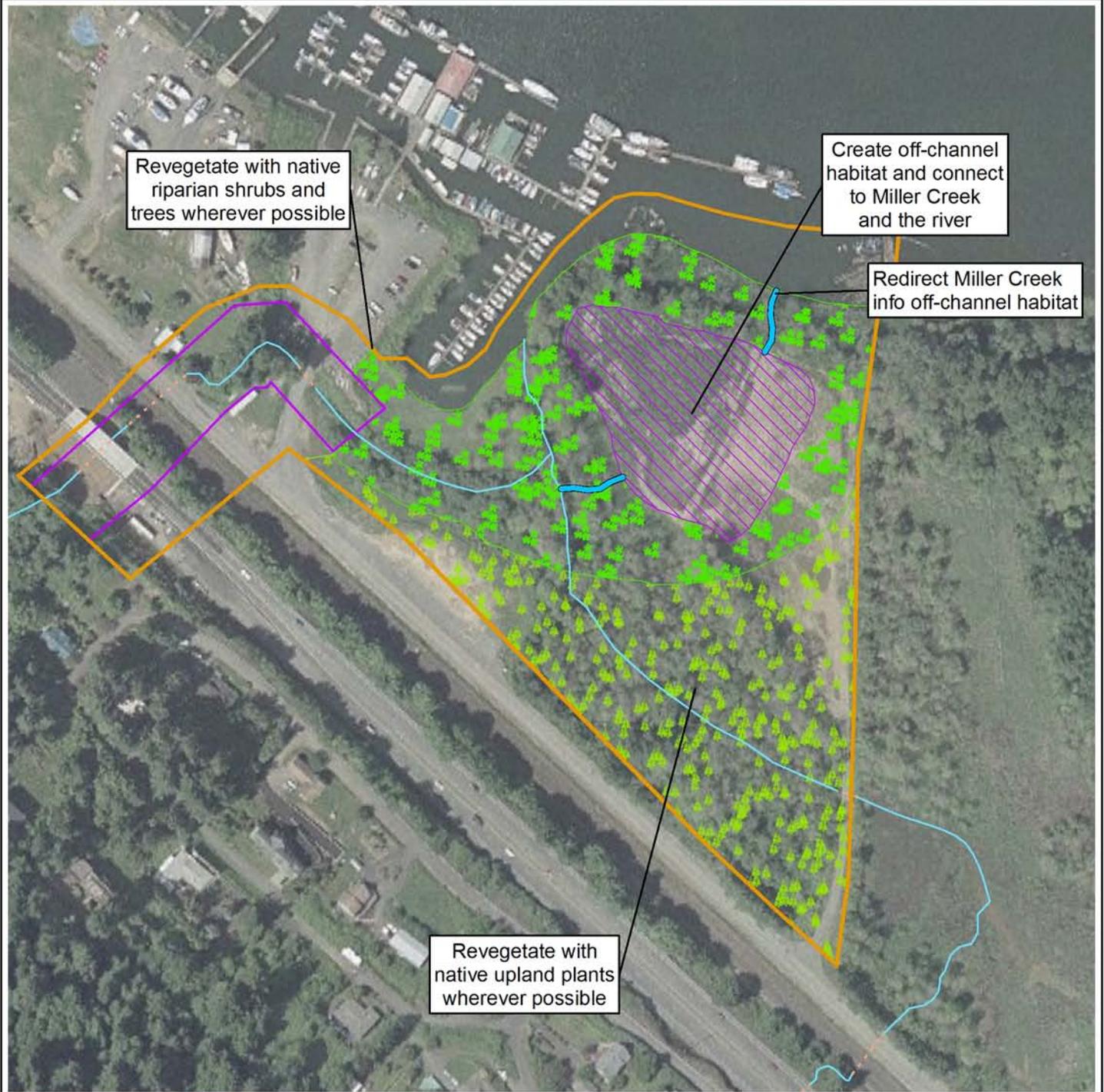
**Benefits:** Realigning the creek, improving passage, and adding native vegetation and large wood will improve habitat connectivity and quality, enhancing the habitat for salmon, lamprey, sturgeon, and terrestrial species. Forested areas would provide large trees for perching and nesting opportunities 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 |  |   |

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.

## Owens-Corning Floodplain

**Landowner:** Owens-Corning, GATX Storage Terminals

**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.

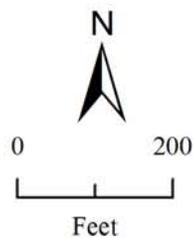
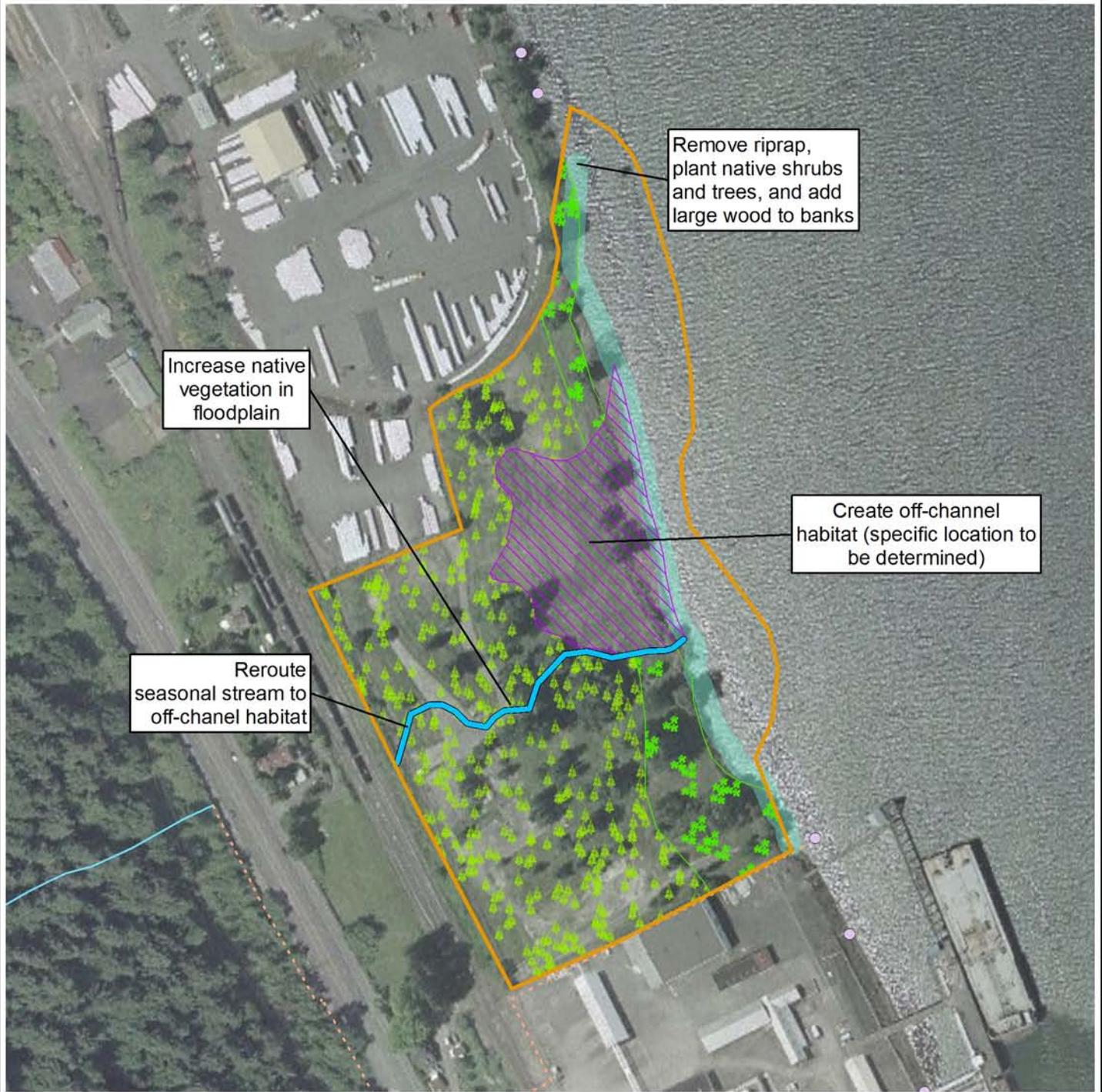
**Benefits:** Naturally sloped, vegetated stream banks increase floodplain connectivity and habitat diversity. Replacing the rip rap with a sloped shoreline will allow for the accumulation of wood, trapping sediment and adding further complexity to the system. Juvenile salmon, lamprey, and sturgeon prefer 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 |  |                               |

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.

## PGE

**Landowner:** Portland General Electric

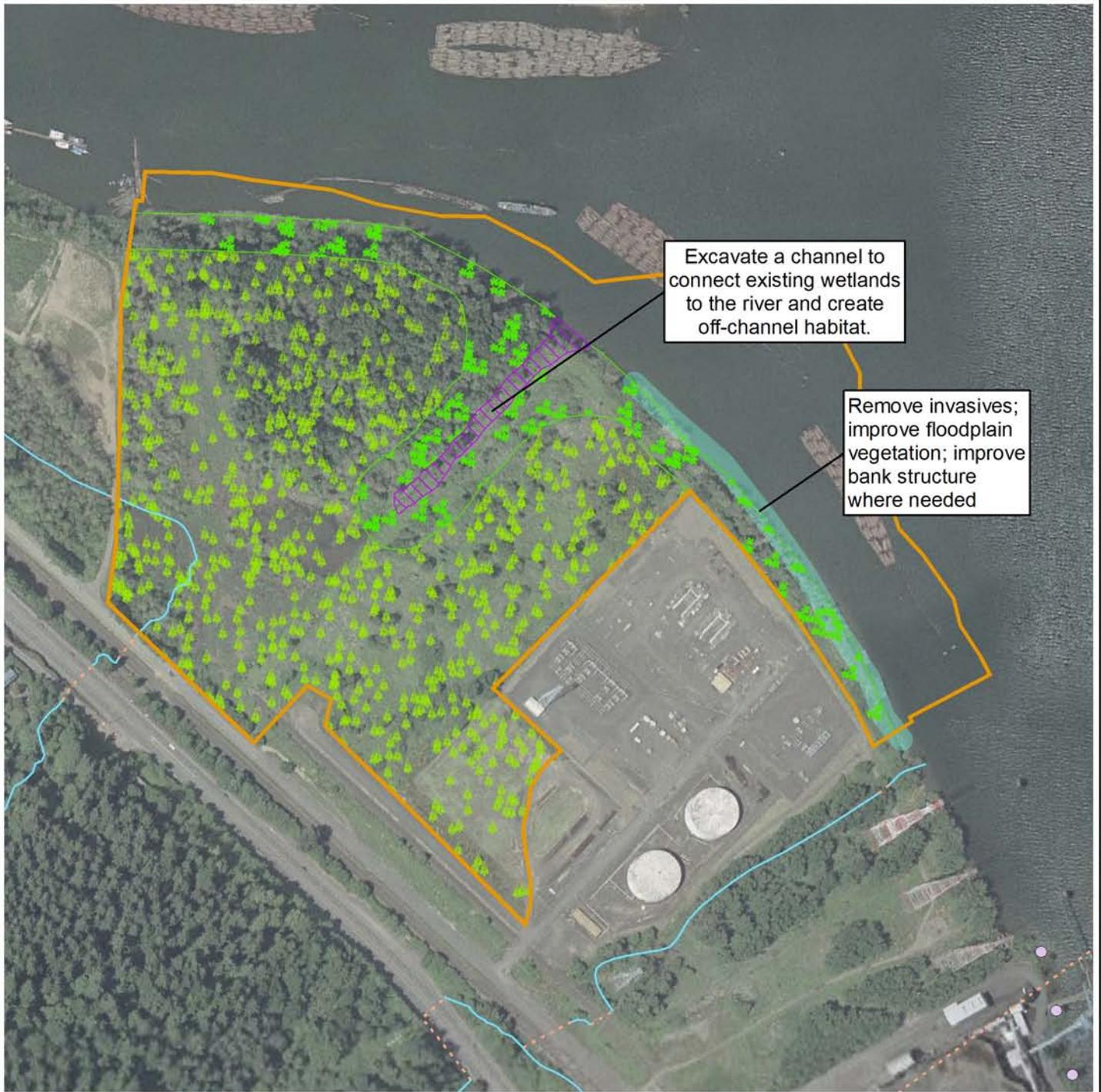
**Site description:** The PGE site is located at river mile 3.2, at the confluence of the Willamette River and Multnomah Channel. The site contains the Harborton Wetlands, a remnant black cottonwood and ash floodplain forest wetland area that provides good quality off-channel habitat, floodplain function, 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.

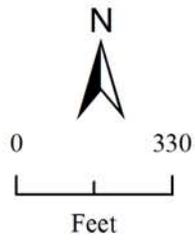
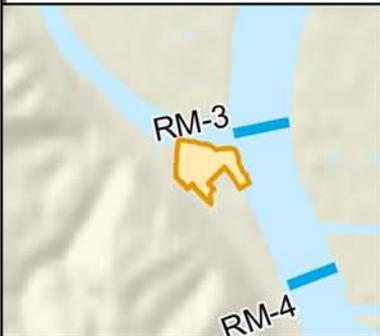
**Feasibility:** The land is privately owned and it is anticipated that the owner may be willing to allow restoration on the property. There are no known permitting issues. The plantings and wetlands would require minor ongoing maintenance.

**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

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.

## Powerline Corridor

**Landowner:** Portland General Electric, US Government powerline easement.

**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.

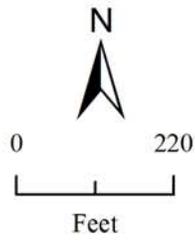
**Benefits:** Off-channel and tributary waters are some of the most productive rearing sites for salmon. Shallow areas can also serve as important hunting areas for bald eagles, osprey, spotted sandpiper, mink and other species. Natural beaches and shallow wetlands also serve as foraging areas for mink 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



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.

## **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.

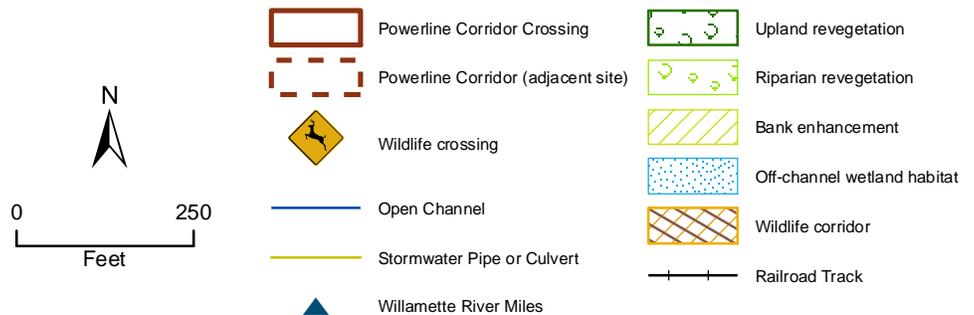
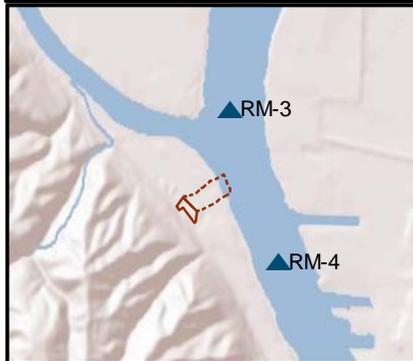
**Benefits:** The site may offer a rare opportunity to facilitate wildlife movement between Forest Park and the Willamette River in an area where the distance between the two is relatively short. Small mammals such as mink may be able to use the corridor to locate resources such as food, cover and den 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



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. (3/18/10)

## Saltzman Creek

**Landowner:** Genstar Roofing, Kinder-Morgan, GATX Terminals, Atofina Chemicals

**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.

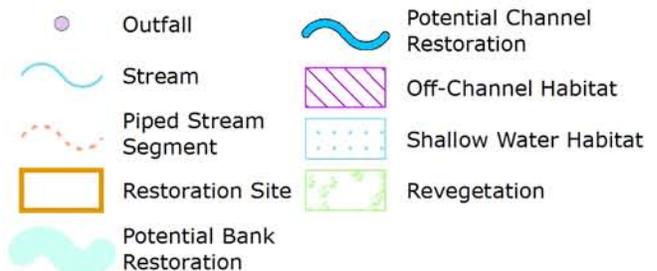
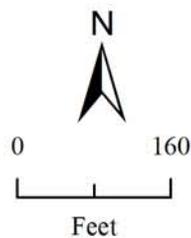
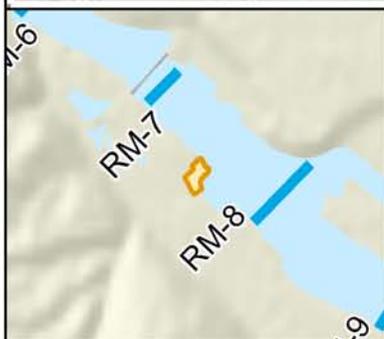
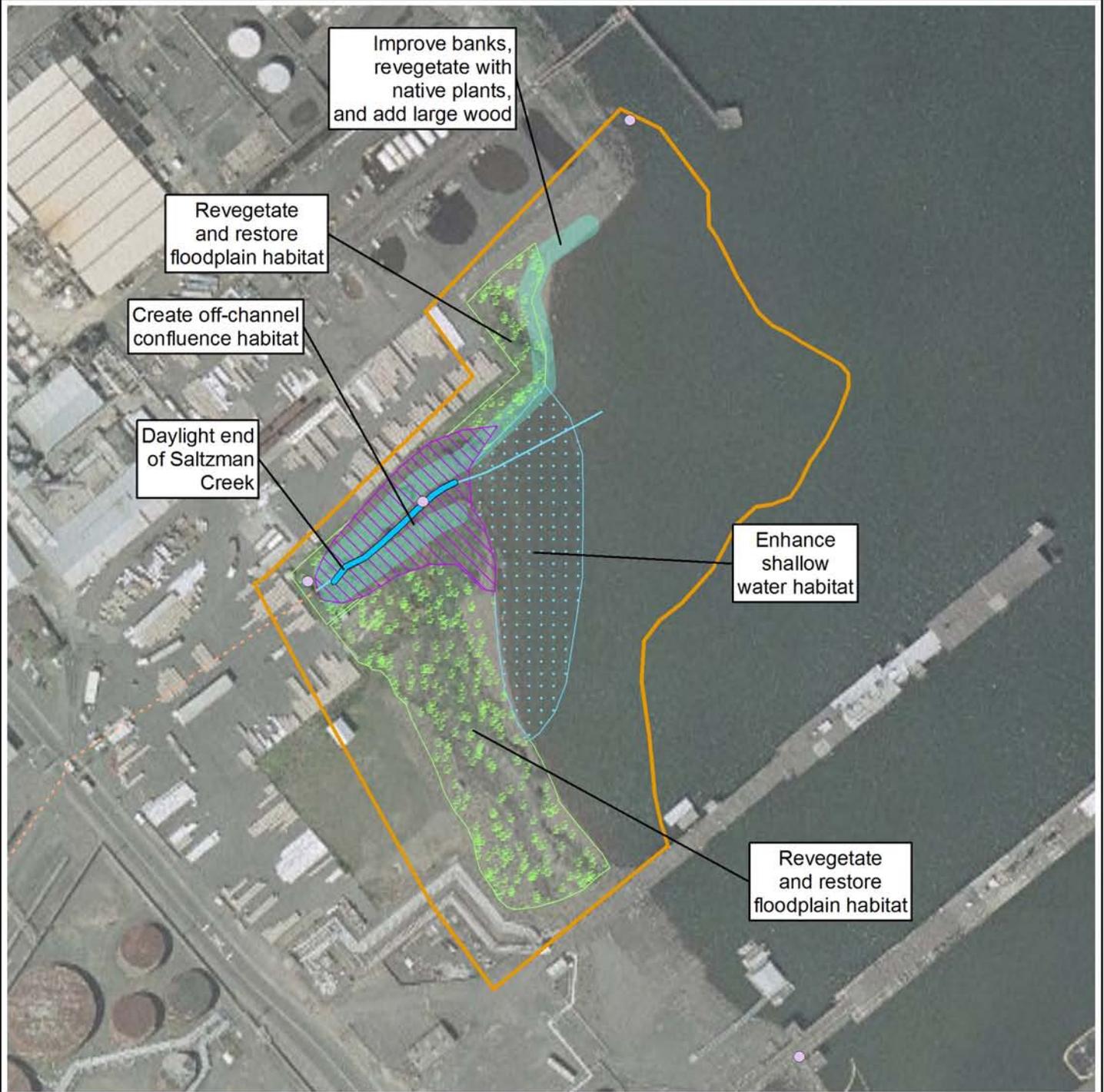
**Benefits:** Shallow, low velocity, complex shoreline habitat is crucial for salmon rearing. Shallow areas can also serve as important hunting areas for bald eagles, osprey, spotted sandpiper, mink and other species. The habitat structures created by vegetation and wood provide cover and feeding stations 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



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.

## South Rivergate Corridor

**Landowner:** Oregon-Washington Railroad, Port of Portland, City of Portland, Portland General Electric, Time Oil Co

**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.

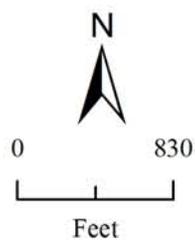
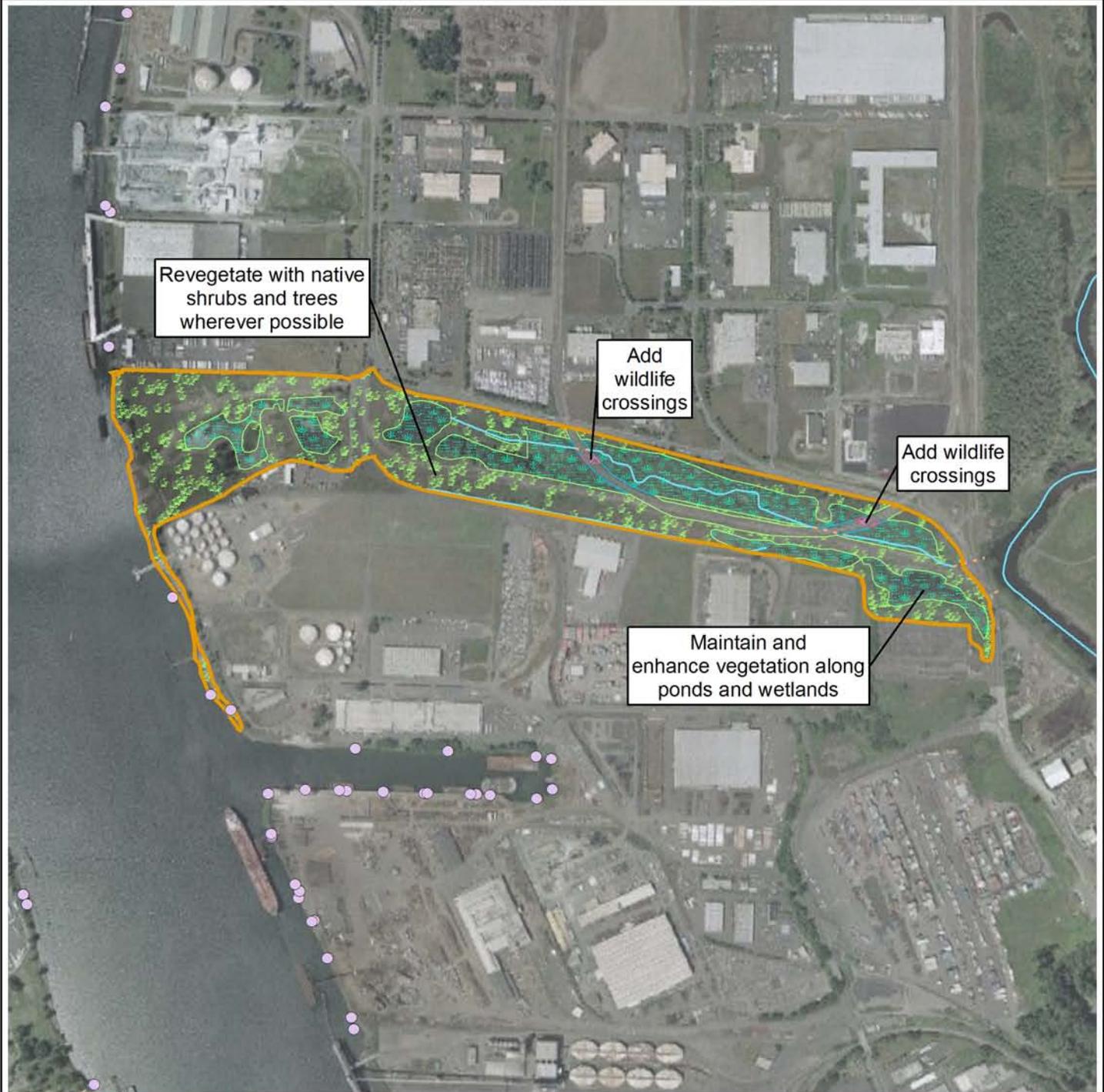
**Benefits:** Revegetation of the corridor would provide a wildlife movement corridor to the Rivergate wetlands. Enhancement of wetlands will provide foraging habitat for spotted sandpiper, mink and other wildlife species.

**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



- |   |                            |   |                               |
|---|----------------------------|---|-------------------------------|
|  | Outfall                    |  | Potential Channel Restoration |
|  | Stream                     |  | Revegetation                  |
|  | Piped Stream Segment       |  | Wetland Enhancement           |
|  | Restoration Site           |  | Wildlife Corridor             |
|  | Potential Bank Restoration |   |                               |

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.

## Steel Hammer

**Landowner:** Steel Hammer Properties, LLC (*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.

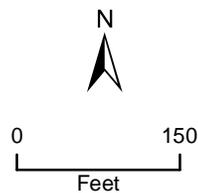
# Steel Hammer

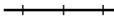
Map prepared for Portland Harbor  
Natural Resource Trustees



Remove pavement, improve soils and restore native vegetation

Enhance riverbank and shoreline habitats and increase floodplain connectivity through measures such as removing bank armoring, regrading or benching banks, revegetating and installing large wood



- |   |                        |   |                       |
|---|------------------------|---|-----------------------|
|  | 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

**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.

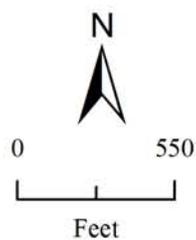
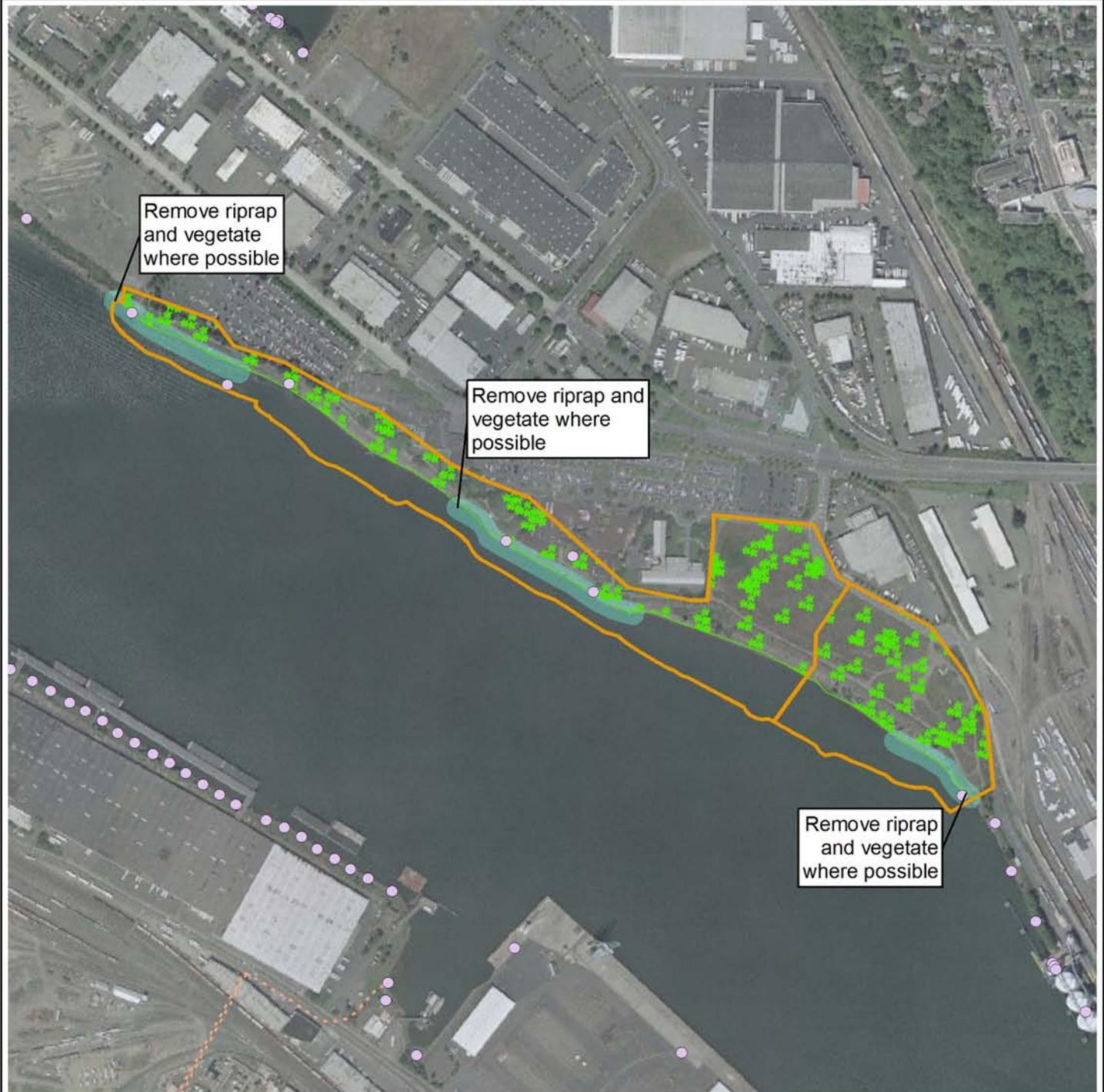
**Benefits:** Beach habitats sustain rich invertebrate populations; consequently they are important foraging areas for spotted sandpiper, mink, and a variety of other organisms. Naturally sloped, vegetated stream banks increase floodplain connectivity and habitat diversity. Replacing the rip rap with 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

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.

## Swan Island Beach South

**Landowner:** City of Portland

**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.

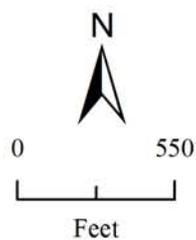
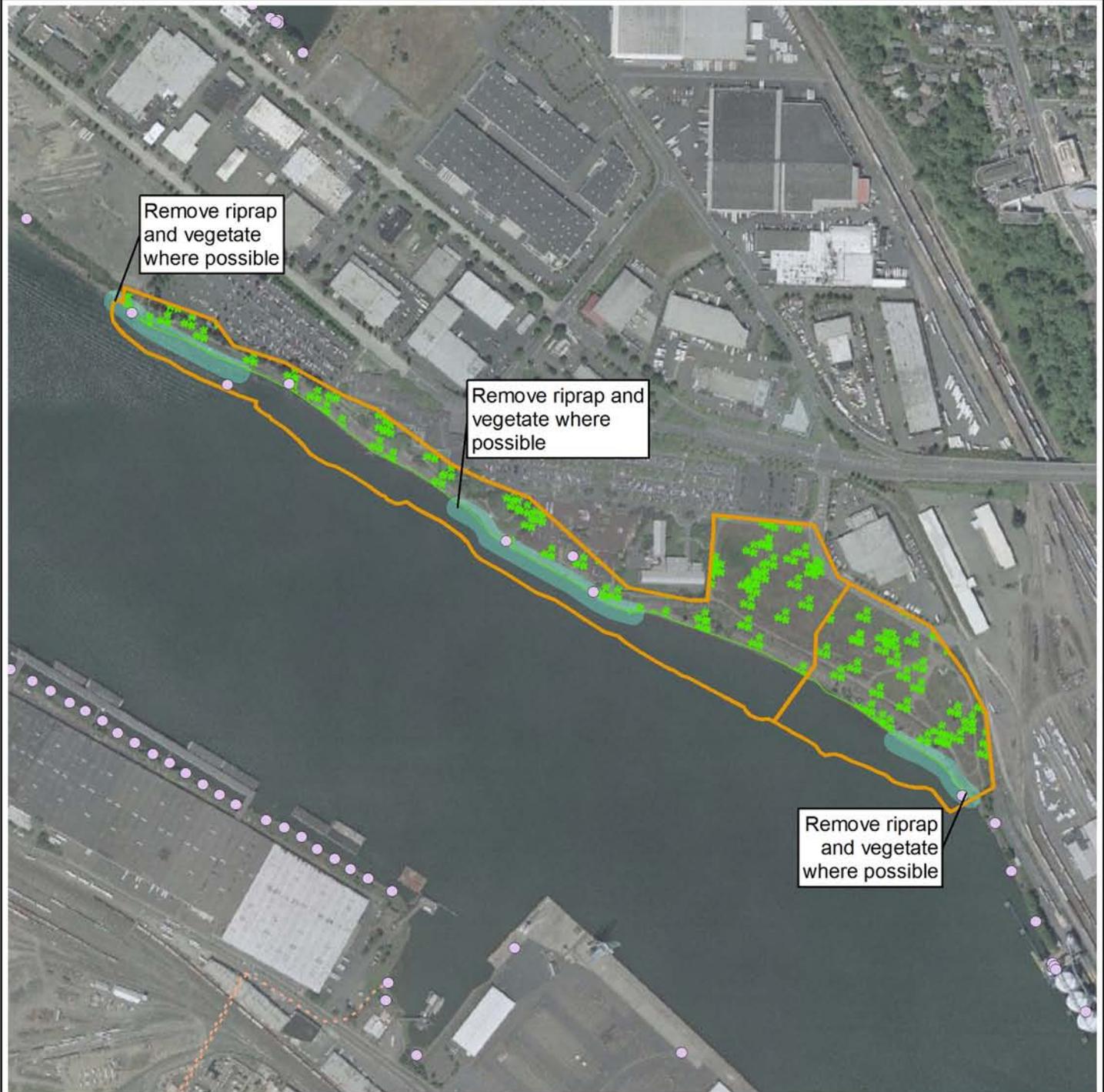
**Benefits:** Beach habitats sustain rich invertebrate populations; consequently they are important foraging areas for spotted sandpiper, mink, and a variety of other organisms. Naturally sloped, vegetated stream banks increase floodplain connectivity and habitat diversity. Replacing the rip rap with 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

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.

## Swan Island Lagoon

**Landowner:** City of Portland, Port of Portland, Anchor Park LLC, ATC Leasing Co., Becker Land LLC, North Basin Watumull LLC

**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.

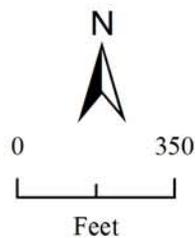
**Benefits:** Beach habitats sustain rich invertebrate populations; consequently they are important foraging areas for spotted sandpiper, mink, and a variety of other organisms. Naturally sloped, vegetated stream banks increase floodplain connectivity and habitat diversity. Juvenile salmon, lamprey, 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 clean up 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



- Outfall
- Restoration Site
- Potential Bank Restoration
- ▨ Impervious Surface Attenuation
- ▨ 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. This map was prepared using a geospatial database provided by the City of Portland's Bureau of Environmental Services.

## Terminal 5

**Landowner:** Port of Portland, Oregon Steel Mills Inc.

**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.

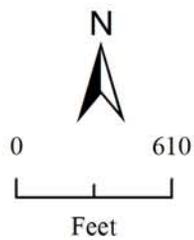
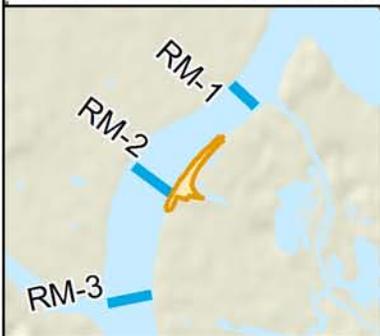
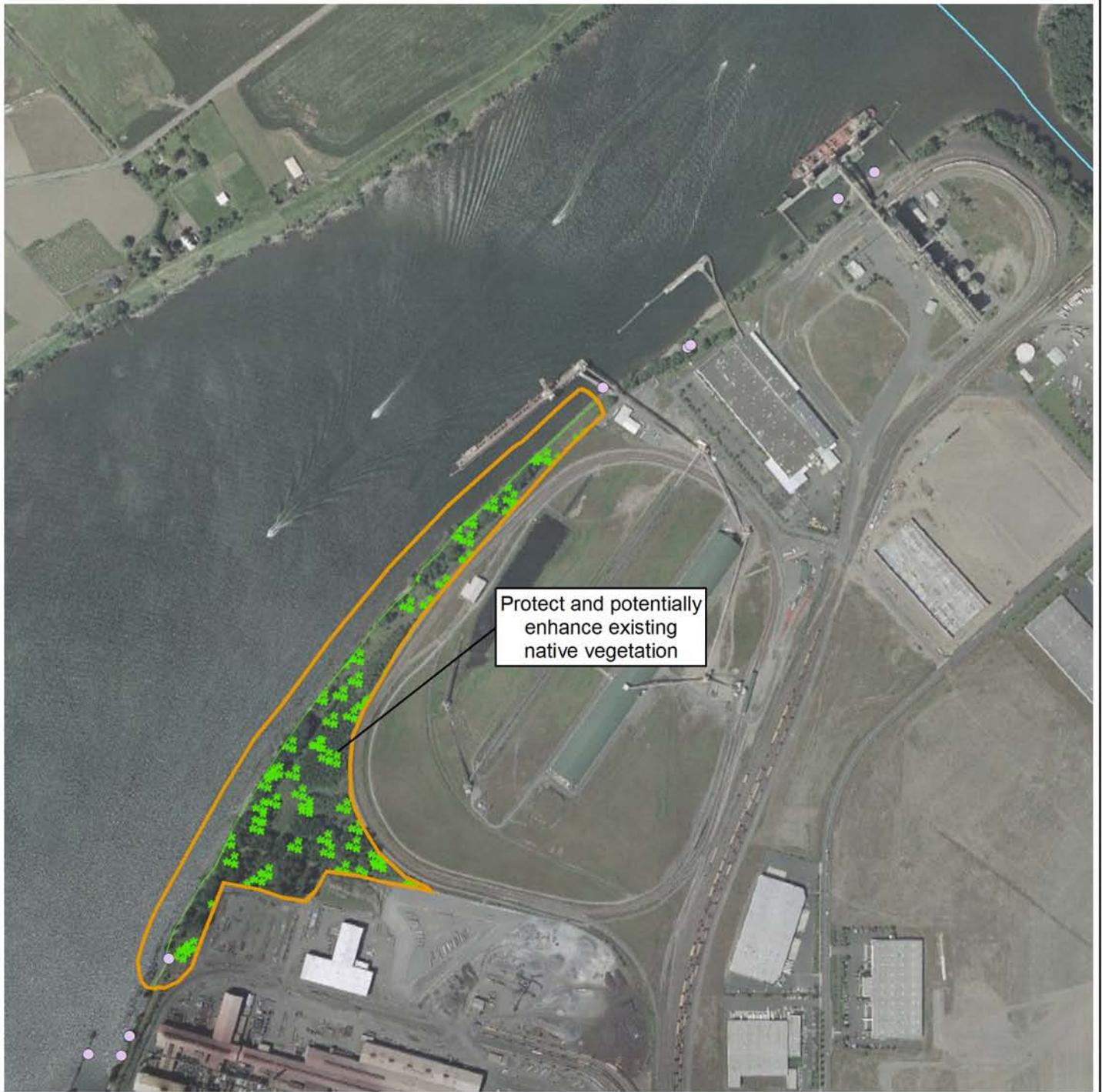
**Benefits:** Naturally sloped, vegetated stream banks increase floodplain connectivity and habitat diversity. Juvenile salmon, lamprey, and sturgeon prefer complex habitats that provide cover and feeding stations. Emergent and shrub wetlands provide shelter and a prey source for lamprey and salmon, 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

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.

## **Time Oil-Schnitzer**

**Landowner:** Time Oil Co. and Schnitzer Investment Corp.

**Site description:** The potential project area includes about 50 acres of vacant land near river mile 3.5 on the east bank of the Willamette River. Relatively natural beach occurs along the shoreline, although some armoring and sloping occurred to limit erosion and prepare the site for industrial uses which began in the 1940s. Dredged fill occurs on portions of the area.

**Proposed restoration:** Upland, riparian and potentially wetland and shallow-water riverine habitats could be restored at this site. The site could also be used to improve connectivity between the Willamette River and natural areas to the north and east. Restoration activities could involve removing fill, pavement, remnant building structures and invasive species and restoring soils and native vegetation to the shoreline, riparian areas and uplands. Fences could be removed or opened in various locations to allow for wildlife movement across the site and to nearby habitats. Installing signage to facilitate safe wildlife crossings across Time Oil Road could reduce risks associated with vehicular traffic. Opportunities to restore or create wetlands could be evaluated. River banks appear to be somewhat natural from aerial photos, but they have been hardened and steepened and could likely be restored to a more natural condition. Opportunities to add a fish component to the project could be evaluated.

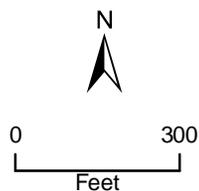
**Benefits:** This is a relatively large site within a highly developed industrial area, offering a unique opportunity to turn vacant lands that provide very little habitat value into a mosaic of significant habitats. It could also help reconnect the Willamette River with Smith and Bybee Lakes and the Columbia Slough by expanding on and linking to the South Rivergate Corridor.

**Feasibility:** Contaminants occur on the site. Portions of the properties are high and medium Oregon Department of Environmental Quality (DEQ) priorities for source control; the eastern portion of the Time Oil property has reached a “No Further Action” designation. Over thirty tanks were removed in 2009. Source control and clean-up efforts are occurring to address remaining contaminant concerns for future industrial use. Contaminant levels will need to be further evaluated for ecological risks in order to develop an appropriate habitat restoration plan, since fish and wildlife habitat has not been considered as a future use on these properties. While the types and locations of suitable restoration activities may be limited and needs further exploration, the site holds potential to make significant habitat improvements.

**Other constraints/considerations:** City of Portland “Greenway” zoning occurs along the river. The site has not been identified by the City of Portland for its restoration potential in the City’s draft River Plan (as of 11/09) or related efforts. Existing wharfs offer river-dependent industrial uses on these properties.

# Time Oil - Schnitzer

Map prepared for Portland Harbor Natural Resource Trustees



- |  |                                 |  |                        |
|--|---------------------------------|--|------------------------|
|  | Upland revegetation             |  | Restoration site       |
|  | Riparian revegetation           |  | Wildlife crossing      |
|  | Wetland restoration or creation |  | Railroad Track         |
|  | wildlife corridor               |  | Willamette River Miles |

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. (2/10/10)

## Triangle Property

**Landowner:** University of Portland

**Site description:** The Triangle Property site is located at river mile 7.5 on the northeast side of the Willamette River. The shoreline is classified as fill and rock bank and has a steep slope. There is very little shallow in-water habitat at the site, except in the slip area. There is a strip of trees and shrubs lining the shore throughout the site. The adjacent McCormick and Baxter property was formerly a highly contaminated creosote plant and is currently being remediated.

**Proposed restoration:** Restoration at the site could involve several components: regrading the banks and shoreline to reduce slopes and create shallow in-water habitat; excavating upland areas to increase inundation frequency and create shallow, off-channel habitat during high flows; replanting river bank and uplands with native vegetation; enhancing and expanding shallow water habitat; and adding large wood and boulders along the river bank.

**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:** Remediation of sediments at the site must occur before restoration begins. There are no known permitting issues. Some minor ongoing maintenance would be required to assure maintenance of plantings and hydrology.

**Other constraints/considerations:** The opportunity for creating habitat connectivity is limited because the industrialized Swan Island is just upstream and the contaminated McCormick and Baxter site is just downstream of the property. The City is planning for a Greenway trail to run along the shoreline and through a portion of this site.

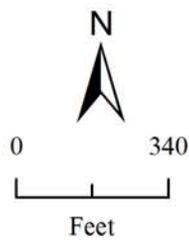
# Triangle Property

Map prepared for Portland Harbor  
Natural Resource Trustees



Expand and enhance shallow water habitat

Restore floodplain and revegetate the river bank and excavate upland areas to increase inundation frequency



- Outfall
- ▭ Restoration Site
- ☞ Potential Bank Restoration
- ▨ Floodplain Restoration
- ▤ Shallow Water Habitat
- ★ Riparian Shrubs and Trees
- ★ Upland Vegetation

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.

## Willamette Cove

**Landowner:** Metro, City of Portland

**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.

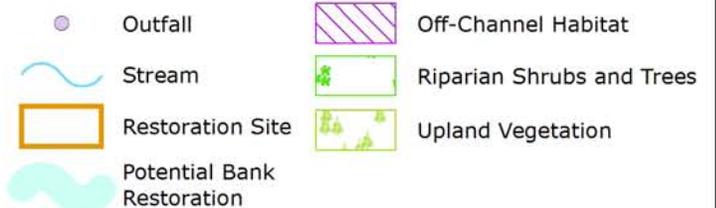
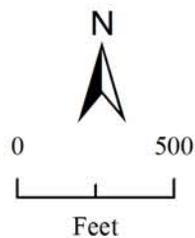
**Benefits:** Naturally sloped, vegetated stream banks increase floodplain connectivity and habitat diversity. Juvenile salmon, lamprey, and sturgeon prefer complex habitats that provide cover and feeding stations. Off-channel, shallow, slow moving waters gather wood and provide refuge and productive 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



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.