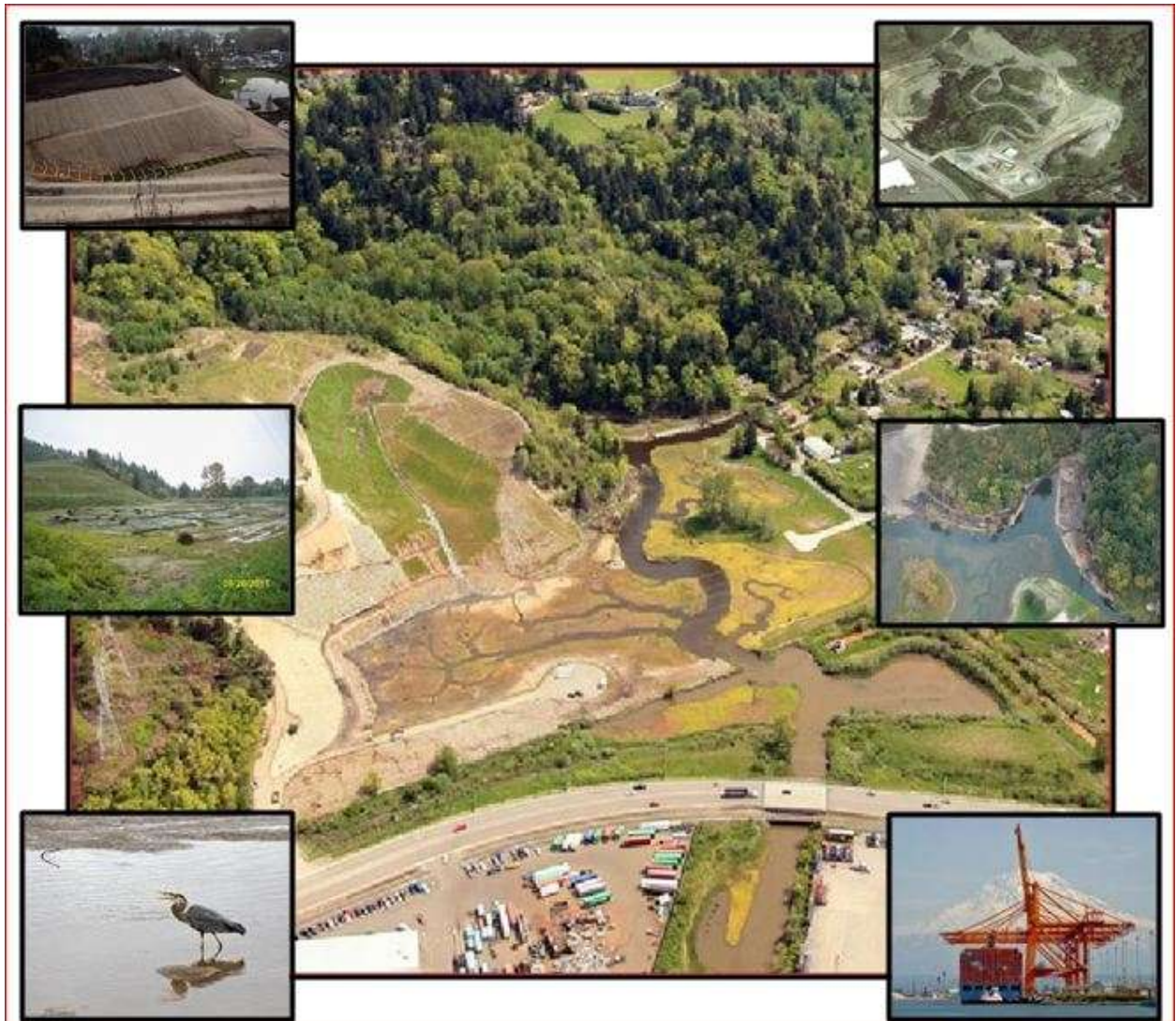


Place of Circling Waters-Site Restoration and Habitat Creation

Port of Tacoma



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INTRODUCTION

The Port of Tacoma (Port) created its first mitigation site in the mid-1980s. Since then, the Port has completed more than 19 mitigation and habitat sites. To date, the Port has cleaned up approximately 420 acres of formerly contaminated property for return to productive use, restored more than 100 acres of habitat for fish and other wildlife, and preserved about 70 acres of open space to serve as a natural buffer between industrial activities and residential areas.

The mitigation requirements associated with port development have increased, sustainability objectives of the port industry have grown, and appropriate mitigation sites have become scarcer, making mitigation sites increasingly more expensive and complex to build. The Port's most recent site, Place of Circling Waters, is a model for the port industry on how to select locations with the most ecological benefit and to create mitigation sites that can meet multiple habitat needs.

The Place of Circling Waters is an approximately 30-acre consolidated habitat area located along the edge of one of North America's busiest ports. This site provides freshwater and intertidal marsh, forested wetlands and riparian habitat along salmon-bearing Hylebos Creek. This site provided an opportunity to combine a contaminated site cleanup with a large-scale habitat restoration and creation. The project site, a former gravel mine and inert waste disposal site, presented many unforeseen challenges and required trade-offs between cleanup and mitigation obligations while managing conflicting environmental, engineering, and regulatory requirements.

The Place of Circling Waters project team overcame a complex series of technical and regulatory challenges to successfully develop a pristine habitat site from a former industrial area. When completed, the site restoration and habitat creation project removed and recycled 7,800 tons of concrete, replaced invasive species with nearly 35,000 native plants, removed 255,000 tons of contaminated soils, restored a ravine ravaged by 50 years of mining, and created extensive new intertidal and freshwater habitat.

Goals and Objectives

Environmental stewardship and sustainability have become an increasing focus of the Port of Tacoma over the last decade. The driving vision of the Port is to be the most efficient global gateway in North American, a catalyst for community vitality, a steward of our environment and a source of regional pride. To this end, the five publicly elected commissioners passed a resolution in 2008 that outlined the Port's commitment to protecting land and water, restoring habitat, reducing diesel emissions, improving stormwater quality, partnering with the community, and going beyond compliance.

The Port of Tacoma's primary objectives for the Place of Circling Waters site restoration and habitat creation were to:

1. Develop a large-scale, highly ecologically functioning habitat and mitigation site at the most beneficial location.
2. Build a cost effective, sustainable and expandable habitat site that meets five separate regulatory obligations while providing essential salmon and wildlife habitat.

3. Develop sound mitigation techniques based on ecological processes and habitat stewardship goals that can be used as a template to locate and create future Port habitat sites with the highest potential for long term success.

Discussion

Background

The Place of Circling Waters is a 30-acre consolidated habitat area constructed on reclaimed industrial land that was operated for more than 50 years as a gravel quarry and inert waste landfill. The comprehensive goal of the habitat site was to construct five individual mitigation components in one location in order to provide a continuous complex of aquatic, riparian and upland habitat. The five separate habitat restoration and mitigation requirements were:

1. moving a Natural Resource Damage Assessment (NRDA) restoration project planned at inappropriate site;
2. mitigating for a previous property owner's City of Tacoma critical areas ordinances violations;
3. mitigating for impacts to a jurisdictional ditch that were caused by a stimulus package transportation project;
4. constructing approximately 2.7 acres of advance mitigation for future needs; and
5. completing mine reclamation as required by the Washington State Department of Natural Resources (DNR).



2010



2011

The restoration work involved the removal of abandoned buildings, debris from a former structural fire, a derelict bridge, and approximately 255,000 tons of fill (soils, slag, wood waste, asphalt and concrete) from the former pits of the 50-year-old gravel mining operation. The fill was generally 20-30 feet deep and contained both contaminated and inert materials. Recyclable materials were removed to another Port property for processing and storage and contaminated soils and other debris was hauled to an approved disposal location. When the excavation was complete, two dendritic channels were cut into the native soils to create new tidally influenced habitat. Large woody material was placed in and adjacent to the channels to provide refuge for juvenile salmon. The surrounding area was planted with approximately 35,000 native trees and shrubs, including willow, maple, hemlock, Nootka rose, elderberry, Indian plum and oceanspray.

The Port's restoration and mitigation actions at the Place of Circling Waters included creating tidal channels, freshwater marsh, open water habitat, forested wetlands and uplands, restoring shrub/forested habitat and riparian buffers, preserving

open water habitat and removing derelict structures and contaminated soils. The site was further enhanced by including off street public-access and a viewing platform that overlooks restored inter-tidal and upland areas.

Objectives and Methodology

The Place of Circling Waters project allowed the Port to develop a high quality habitat and mitigation site located near a working waterfront that optimized ecological benefit while meeting multiple regulatory obligations. To complete the Project, the Port used existing technologies and innovative solutions to solve a complex range of challenges.

To meet the broad objectives of this project, regulatory, environmental, sustainability and community goals were set. To meet regulatory obligations for all the mitigation actions, the property was divided into five separate areas. This allowed the Port to satisfy regulatory agency needs while providing greater ecological value and reduced overall costs with a strategically located combined site.

To meet the Port-wide commitment to be a leader in conducting business in a way that protects environmental quality, the Port set numerous stewardship and sustainability goals for the project. The stewardship goals were to remediate existing contamination in order to protect public health and the environment, and to create high-value, sustainable habitat for fish and wildlife. Sustainability goals included recycling and reusing materials, removing invasive species, and using Low Impact Design (LID).

The Port of Tacoma realizes that the environment includes the people, businesses, culture and history of our community. For this reason, the Port reaches out

to partner with the community to build a better Tacoma. By transforming a contaminated industrial site into visually appealing habitat area, the Port has met its environmental goals while providing public access and an opportunity to learn about the local ecosystem.

How The Place of Circling Waters Fulfills The Six Award Criteria

1. The level and nature of benefits to environmental quality, beautification or community involvement;

The restoration and habitat creation at the Place of Circling Waters ultimately far exceeded the Port's mitigation requirements in both acreage and value of habitat. Environmental quality is enhanced not only for the local area, but extending further into the Hylebos Creek watershed and outward into Commencement Bay. By removing approximately 255,000 cubic yards of contaminated soil and debris, a derelict overwater structure, acres of invasive species and by creation of extensive new stream channels and planting of native vegetation, hundreds of species of insects, fish, birds and mammals have gained valuable habitat. This isle of lush vegetation, seen from as far away as Vashon Island and Downtown Tacoma, provides the added beautification benefit of decreasing road and industrial noise to bordering residential area and controlling stormwater.

Community involvement occurred at all stages of the project. Multiple stakeholders were engaged before, during, and following the completion of the project. This process lead to successfully meeting the goals and obligations presented by Natural Resource Damage Assessment (NRDA) Trustees, regulatory agency requirements, tribal

concerns, archeological finds, and utility needs. In addition to creating a wildlife oasis on the edge of a highly industrialized area, the project also added public access to the habitat site. An off-street parking area, viewing overlook area, and interpretive signs allow the public to view the habitat area while learning the importance of the restoration site.

The Puyallup Tribe of Indians, an important community partner and co-resource manager, was involved in many stages of this project. The Port of Tacoma worked with the Tribe to name the site. Officials with the Puyallup Tribe of Indians selected the site's Twulshootseed name that means "Place of Circling Waters." During construction of the site, a Native American artifact was uncovered. Port staff worked with Tribe cultural resource experts to make sure it was handled in a sensitive manner, and the artifact was presented later to Tribe officials at the dedication ceremony.

2. The level of independent involvement and effort by the port;

The Port of Tacoma funded and led all aspects of the design, creation, and maintenance of the Place of Circling Waters habitat area. Project objectives and goals were met by engaging many team members from the Port's Planning, Environmental, and Engineering Departments. The Port Project Managers led the design and construction of the project including the management of consultants and contractors.

3. The creativity of the solution or program;

The underlying goal of this mixed habitat mitigation site was to meet five disparate regulatory habitat mitigation obligations. The Port was able to exceed its obligations by designing a single project to meet all five obligations, through a judicious choice of

location, and by integrating a significant contamination cleanup. All of this was accomplished within economic, schedule, and administrative constraints. The Port creatively blended innovative and existing technology to successfully develop the habitat site and overcome unforeseen obstacles.

Past Port habitat sites focused on mitigating for single habitat types or single project impacts. The Place of Circling Waters mitigates for multiple project impacts and creates, restores, or preserves eight types of habitat. Creative and innovative techniques included recycling 7,800 tons of concrete debris, reusing 70,000 cubic yards of clean on-site soils to fill gravel pit/ravine, reusing old growth stumps encountered onsite for large woody material in tidal channels, and using a Low Impact Design (LID) stormwater facility to treat runoff from the public parking lot. Other techniques included the use of a recycling wheel-wash system and Ultra Low Sulfur Diesel (ULSD) fuel and vegetable oil hydraulic oils in construction equipment.

4. Whether the project or program results are apparent (the project must be complete through some beneficial increment);

The benefits of the Place of Circling Waters are quite apparent. Shortly after the completion of the habitat site numerous insects, fish, birds, and mammals began to utilize the restored area. Visually, the area has been transformed from an abandoned industrial eyesore to a beautiful natural site. A walk through the habitat site shows signs of sand bees in the hillside and insects utilizing both preserved and newly planted vegetation. Fish now have access to complex, highly valuable intertidal habitat. The created tidal channels provide foraging and refuge for salmon and other fish. Terrestrial

and aquatic birds are often seen resting or feeding onsite. These feathered visitors are attracting humans eager to see their favor bird this season or cross off a species from their “life list”. Mammals like coyotes, beavers, and raccoons, are often seen utilizing upland and aquatic habitats.

5. The cost effectiveness of the activity or program; and

Developing a large-scale, highly ecologically functional habitat and mitigation site involves numerous, often conflicting economic and regulatory requirements. A balance between project cleanup requirements, mitigation obligations, and economic and social responsibilities must be found.

The initial cost estimation for Place of Circling Waters was approximately \$8.3 million. Because of prior industrial land use on the property, substantially larger amounts of contaminated soils were discovered than initially estimated. These findings lead to the decision to increase the volume of soil excavation in order to prevent recontamination of the habitat site. The time to excavate the additional soil and debris extended the construction into the rainy (and then snowy) season, adding significant water management costs and reducing excavation efficiencies. These and other unforeseen factors ultimately increased the project costs to approximately \$13.7 million. In order to offset the increased project costs, the Port applied for and received a \$3 million Washington State Department of Ecology grant.

The Port also leveraged the cleanup to reduce future costs and risks. Originally slated to remain undeveloped until future mitigation needs were identified, the completed advanced mitigation area provided three long-term cost saving measures.

Removing the contaminated soil from this area in conjunction with the contaminated soil in the rest of the habitat site saved future expenses related to recontracting and remobilizing in a potentially more competitive economic environment and duplicative permitting and design. It also reduced the risk of costly additional remedial actions had the remaining contamination have impacted the new habitat site. In addition, as the advanced mitigation area matures, those more fully functioning mitigation acres, adjacent to other high quality habitat, can be used to offset future Port project impacts at a lower mitigation ratio than concurrent mitigation. Because of these innovative cost effectiveness measures, the true project costs are estimated to be only slightly above the initial project budget, on par with the purchase price of similar mitigated acreage, and the Port has an additional 2.7 acres of high function habitat for future use.

6. The transferability of the technology or idea to the port industry.

Nationwide, roughly 50 percent of mitigation sites fail because of improper site selection, poor design, and lack of stewardship. The Port of Tacoma has recognized the need to change how sites are selected, restored and created. The technologies and ideas used in the creation of the Place of Circling Waters are readily transferable to other Port of Tacoma mitigation needs, port industry needs, and mitigation creation projects in general. In order to create mitigation sites that are sustainable and have the highest potential for long term success, project proponents should determine if onsite or offsite location offer the greatest ecological function and benefit, design complex multiple habitat type mitigation areas, and establishing environmental stewardship and sustainability programs.

Conclusion

Restoring this former industrial site was much more complex than most previous habitat creation and mitigation projects. Large quantities of previously unknown contaminated soils, large amounts of inert waste materials and trying to accommodate unusually large numbers of regulatory obligation and site constraints added to the normal challenges associated with the creation of habitat and mitigation sites. The Port creatively applied both innovative and existing technologies, community participation and environmental stewardship practices to create, enhance, and protect nearly 30 acres of mixed intertidal, freshwater, and wetland habitat.

The Place of Circling Waters mitigation and habitat site met or exceeded both the project objectives and the Port's sustainability goals by:

- ***protecting land and water*** by removing 255,000 tons of contaminated soils and 7,800 tons of concrete debris and planting 35,000 native plants,
- ***restoring habitat*** to create approximately 30 acres of intertidal, wetland, and upland habitat for salmon and wildlife,
- ***reducing diesel emissions*** by reusing 70,000 cubic yards of onsite soil and large woody material, thus reducing the number of truck trips needed during construction. Furthermore, completing the advanced mitigation area not only eliminated temporal habitat loss, but removes the need to mobilize equipment in the future,
- ***improving stormwater*** quality through a Low Impact Design (LID) stormwater facility and encouraging natural infiltration of water,

- ***partnering with community*** and other stakeholders to design, plan and develop the habitat area. The Place of Circling Waters is designed to complement other habitat and restoration sites in the area, while being expandable in the future. The mitigation site includes a public access area with signs and a scenic overlook to provide the community with outdoor and educational experiences,
- ***and going beyond compliance*** by removing 255,000 tons of contaminated soil and debris, nearly doubling the area of high value intertidal habitat, and creating 40 percent more habitat area than the original conceptual plan.